

Fujitsu Storage
ETERNUS AF S3 series All-Flash Arrays,
ETERNUS DX S5 series, ETERNUS DX8100 S4/DX8900 S4
Hybrid Storage Systems

ETERNUS Web GUI User's Guide



Settings/operations/maintenance via Web GUI

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Preface

This manual provides operational information on how to set up, operate, and manage the Fujitsu Storage ETERNUS AF S3 series All-Flash Arrays, ETERNUS DX S5 series, and ETERNUS DX8100 S4/DX8900 S4 Hybrid Storage Systems via Web GUI (hereinafter referred to as "ETERNUS Web GUI").

This manual is written for controller firmware versions V11L60 and later. (V11L61 and later in a Unified Storage environment.)

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Acknowledgments

Third-party trademark information related to this product is available at:

<https://www.fujitsu.com/global/products/computing/storage/eternus/trademarks.html>

About This Manual

Intended Audience

This manual is intended for system administrators who configure and perform operation management of the ETERNUS AF/DX, or field engineers who maintain the ETERNUS AF/DX. Refer to this manual as required.

Knowledge of UNIX or Windows® system management is required.

Target Models

Product name	Model name
All-Flash Arrays	ETERNUS AF150 S3/AF250 S3/AF650 S3
Hybrid Storage Systems	ETERNUS DX60 S5/DX100 S5/DX200 S5
	ETERNUS DX500 S5/DX600 S5/DX900 S5
	ETERNUS DX8100 S4/DX8900 S4

Related Information and Documents

The latest information for your model is available at:

<https://www.fujitsu.com/global/support/products/computing/storage/manuals-list.html>

Refer to the following manuals of your model as necessary:

- Design Guide
- Configuration Guide (Basic)
- Configuration Guide -Server Connection-
- Configuration/Operation Guide (NAS)
- Configuration Guide (Web GUI)
- ETERNUS Web GUI User's Guide (Easy Administration View)
- ETERNUS CLI User's Guide

The Structures and Contents of ETERNUS Web GUI Manuals

The ETERNUS Web GUI manual is composed of the following three manuals.

- Configuration Guide (Web GUI)
- ETERNUS Web GUI User's Guide (this manual)
- ETERNUS Web GUI User's Guide (Easy Administration View)

The following table describes the contents of each manual.

Manual name	Contents
Configuration Guide (Web GUI)	This manual describes the installation and the environmental settings for the storage systems.
ETERNUS Web GUI User's Guide	This manual describes the procedures, setup parameters, input conditions, and the default values for ETERNUS Web GUI that are not described in "Configuration Guide (Web GUI)". In addition, this manual describes how to check the states during operation and how to check the parameters during the configuration of the storage system.
ETERNUS Web GUI User's Guide (Easy Administration View)	This manual describes how to use ETERNUS Web GUI (Easy Administration View), its operating procedures, and the items that are displayed on the screen.

Document Conventions

■ Third-Party Product Names

- Oracle Solaris may be referred to as "Solaris", "Solaris Operating System", or "Solaris OS".
- Microsoft® Windows Server® may be referred to as "Windows Server".
- Trademark symbols such as ™ and ® are omitted in this manual.

■ Notice Symbols

The following notice symbols are used in this manual:

Caution

Indicates information that you need to observe when using the storage system. Make sure to read the information.

Note

Indicates information and suggestions that supplement the descriptions included in this manual.

■ Abbreviations Used in This Manual

ETERNUS AF All-Flash Arrays and ETERNUS DX Hybrid Storage Systems are hereinafter referred to as "storage system" or "ETERNUS AF/DX (storage systems)". For other models, refer to the following table.

Target models	Naming conventions
ETERNUS AF150 S3/AF250 S3/AF650 S3, ETERNUS AF250 S2/AF650 S2, ETERNUS AF250/AF650 All-Flash Arrays	ETERNUS AF ETERNUS AF series
ETERNUS AF150 S3/AF250 S3/AF650 S3 All-Flash Arrays	ETERNUS AF S3 ETERNUS AF S3 series
ETERNUS AF250 S2/AF650 S2 All-Flash Arrays	ETERNUS AF S2 ETERNUS AF S2 series
ETERNUS DX60 S5/DX100 S5/DX200 S5, ETERNUS DX500 S5/DX600 S5/DX900 S5, ETERNUS DX60 S4/DX100 S4/DX200 S4, ETERNUS DX500 S4/DX600 S4, ETERNUS DX8100 S4/DX8900 S4, ETERNUS DX60 S3/DX100 S3/DX200 S3, ETERNUS DX500 S3/DX600 S3, ETERNUS DX8100 S3/DX8700 S3/DX8900 S3 Hybrid Storage Systems	ETERNUS DX
ETERNUS DX60 S5/DX100 S5/DX200 S5, ETERNUS DX500 S5/DX600 S5/DX900 S5, ETERNUS DX60 S4/DX100 S4/DX200 S4, ETERNUS DX500 S4/DX600 S4, ETERNUS DX8100 S4/DX8900 S4, ETERNUS DX60 S3/DX100 S3/DX200 S3, ETERNUS DX500 S3/DX600 S3, ETERNUS DX8100 S3/DX8700 S3/DX8900 S3 Hybrid Storage Systems	ETERNUS DX S5/S4/S3 series
ETERNUS DX60 S5/DX100 S5/DX200 S5, ETERNUS DX500 S5/DX600 S5/DX900 S5 Hybrid Storage Systems	ETERNUS DX S5 series
ETERNUS DX60 S4/DX100 S4/DX200 S4, ETERNUS DX500 S4/DX600 S4, ETERNUS DX8100 S4/DX8900 S4 Hybrid Storage Systems	ETERNUS DX S4 series
ETERNUS DX8100 S4/DX8900 S4 Hybrid Storage Systems	ETERNUS DX8000 S4 series
ETERNUS DX60 S3/DX100 S3/DX200 S3, ETERNUS DX500 S3/DX600 S3, ETERNUS DX8100 S3/DX8700 S3/DX8900 S3 Hybrid Storage Systems	ETERNUS DX S3 series
ETERNUS AF150 S3/AF250 S3/AF650 S3, ETERNUS AF250 S2/AF650 S2, ETERNUS AF250/AF650, ETERNUS DX60 S5/DX100 S5/DX200 S5, ETERNUS DX500 S5/DX600 S5/DX900 S5, ETERNUS DX60 S4/DX100 S4/DX200 S4, ETERNUS DX500 S4/DX600 S4, ETERNUS DX8100 S4/DX8900 S4, ETERNUS DX60 S3/DX100 S3/DX200 S3, ETERNUS DX500 S3/DX600 S3, ETERNUS DX8100 S3/DX8700 S3/DX8900 S3, ETERNUS DX200F, ETERNUS DX90 S2, ETERNUS DX410 S2/DX440 S2, ETERNUS DX8100 S2/DX8700 S2, ETERNUS DX90, ETERNUS DX410/DX440, ETERNUS DX8100/DX8400/DX8700, ETERNUS4000/ETERNUS8000, ETERNUS6000	ETERNUS storage system

■ Units in This Manual

Except as otherwise noted, the following units are used in this manual:

- Drive capacity assumes that 1 KB = 1000 bytes, 1 MB = 1000 KB, 1 GB = 1000 MB, and 1 TB = 1000 GB (example: "600 GB drive").
- Other capacities (such as for RAID Groups and volumes) assume that 1 KB = 1024 bytes, 1 MB = 1024 KB, 1 GB = 1024 MB, and 1 TB = 1024 GB.

Note that the screen shots in this manual were captured during development of the software and the actual screens may be different.

Microsoft product screen shot(s) reprinted with permission from Microsoft Corporation.

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1. Web GUI Overview

■ What is Web GUI?

Web GUI is a Web application which supports the setting modifications and the maintenance operations of the ETERNUS DX S5 series, the ETERNUS DX8000 S4 series, and the ETERNUS AF S3 series.

■ Display Mode (View)

Web GUI has two display modes (views). "Easy Administration View" mode was added to controller firmware version V11L60 and later.

Refer to "ETERNUS Web GUI User's Guide (Easy Administration View)" for details about Easy Administration View.

In this manual, "Normal View" or "Web GUI (Normal View)" refers to Web GUI that has been supported from V11L50 and earlier.

■ Acknowledgments

- Microsoft, Windows, and Windows Server are either registered trademarks or trademarks of Microsoft Corporation in the United States and other countries.
- Other company names, product names, and service names are registered trademarks or trademarks of their respective owners.
- The latest trademark information related to this product is available at:
<https://www.fujitsu.com/global/products/computing/storage/eternus/trademarks.html>

■ Caution

- "ETERNUS Web GUI" is referred to as "Web GUI", "ETERNUS CLI" is referred to as "CLI", and "ETERNUS RESTful API" is referred to as "RESTful API" in this manual.
- The content of this manual is subject to change without notice.
- This manual was prepared with the utmost attention to detail.
However, Fujitsu shall assume no responsibility for any operational problems as the result of errors, omissions, or the use of information in this manual.
- Fujitsu assumes no liability for damages to third party copyrights or other rights arising from the use of any information in this manual.
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Notes for Web GUI

■ Notes for Using Web GUI

Note the following points when using Web GUI:

- If the PC and the storage system belong to different networks and the transfer rate setting for each network does not match, the retransmission of packets occur more frequently and the operation screen for Web GUI may take more time to be displayed.

By setting the same transfer rate for each network, the time to display the operation screen can be reduced.

Note the following points when setting the transfer rate.

- Set the same transfer rate for each network (or adjust to the lowest of the transfer rates)
- When the transfer rate for the storage system is not "Auto-negotiation", the same transfer rate must also be set for the network switches

- Do not use the standard buttons of each browser (for example, the [Back] button, the [Forward] button, and the [Refresh] button), the screen reload key (for example, the [F5] key), or the [Back Space] (back) key.
- If any of the following messages is displayed after the operation is started, operations cannot be continued. The messages and how to deal with them are as follows.
 - If the message "Lock was relinquished to another user or expired by timeout." appears
The Web GUI operation is suspended due to an update by another user or a timeout. Click the [OK] button to return to the previous screen and then restart the function.
 - If the error message "The configuration was updated. The process was aborted." appears
The data update in Web GUI failed due to an operation by another user. Click the [OK] button to return to the previous screen. Check whether the operation target data was updated and re-start the related function as required.
 - If the confirmation message "Do you wish to forcibly acquire the lock?" appears
Another user is updating data. If the [OK] button is clicked, the data update of the other user may fail. Click the [Cancel] button to return to the previous screen. Any newly added or changed information is discarded. Restart the related function.
 - If the warning message "The login authority was lost." appears
The login state of Web GUI for the current user is lost. Click the [OK] button to return to the login screen. Log in again to continue using Web GUI.

■ Operating Environment

Web Browsers

The web browsers supported by Web GUI are as follows:

- Google Chrome 128
- Microsoft® Edge 128

Caution

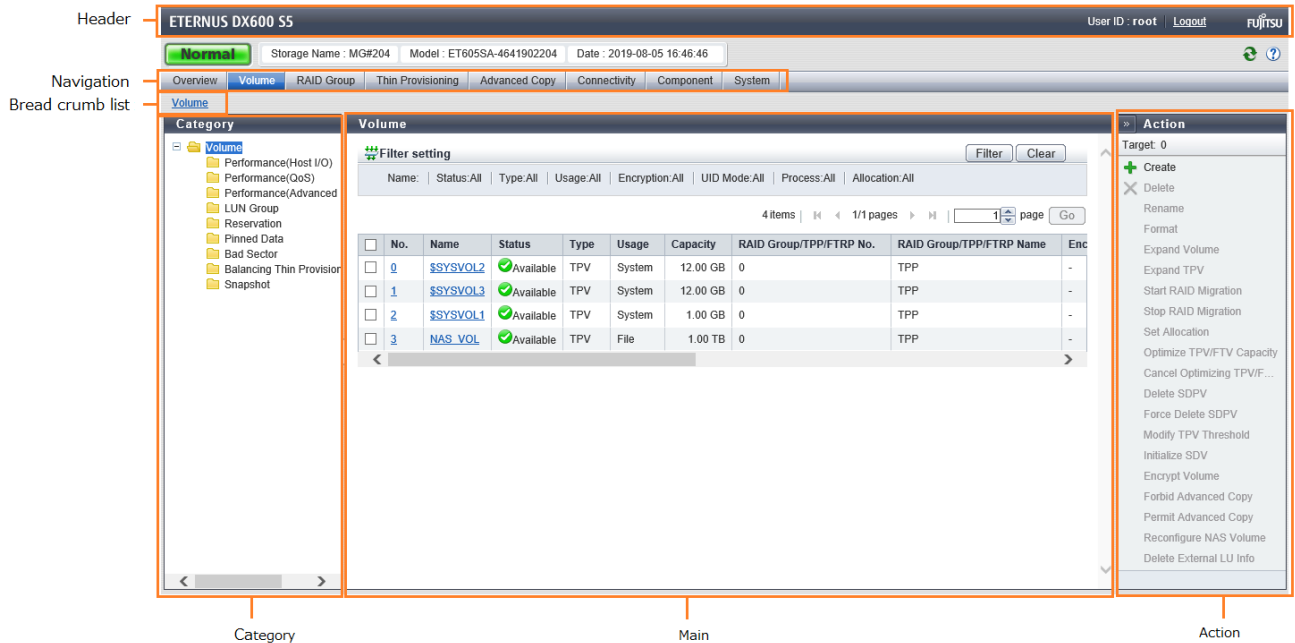
- Note the following points:
 - Set the display magnification of the web browser to 100%.
 - Set "Do not use proxy server" as the proxy setting.
 - Configure the temporary file (cache) setting of pages so that the pages are updated every time the browser is started.
 - Enable the JavaScript setting.
 - When Auto Reading of pages is available, enable the setting.
- To use Microsoft Edge, perform the following operation.
 - Disable Microsoft Defender SmartScreen.
- When using SSL (https), note the following points:
 - On the Internet Options-Advanced tab, scroll to Security, and select [Use TLSx] (x: version number).
The SSL version for HTTPS (GUI/REST) that is used for communication between the storage system and the setting PC can be specified. Refer to the [Setup SSL Version] function for details.
 - On the Internet Options-Advanced tab, scroll to Security, and clear the "Do not save encrypted pages to disk" checkbox.
- To use an IPv6 device address, click the [LAN Settings] button under the Internet Options-Connections tab and disable [Use automatic configuration script].

Screen Resolution

1024x768 pixels or more is recommended.

Screen Structures

■ Screen Examples



Header

User ID, [Logout] link, general status, storage system name, model name, date, [🔄] icon (Refresh), and [?] icon (Help) are displayed in the header. Only when maintenance is being performed for the storage system, "Maintenance Mode" is displayed.

The header is always displayed.

- General status of the storage system
Status of each component in the storage system is monitored periodically, and the result is displayed as a general status icon with character strings. Refer to ""Storage System General Status" (page 1603)" for details.

Navigation

Overview, Volume, RAID Group, Thin Provisioning, Advanced Copy, Connectivity, Component, and System tabs are displayed.

Click the tab for the function that is to be used to display a list screen for that function.

The navigation is always displayed.

Bread Crumb List

Bread crumb indicates the location of the current screen on Web GUI.

Click the link to display the list screen of the target item.

Category

The subordinate items are displayed for an item that is clicked in the navigation. The category directory is used for switching the contents that are displayed in the Main screen. Click the item for the function that is to be used. The horizontal width of the category area can be changed.

Main

A list of items is displayed for an item that is clicked on the navigation or in the category. The filter setting area may also be displayed for some lists.

- Filter setting
Filter setting is a function used to display a list of only the items meeting all the specified conditions. The conditions that are available depend on the function. No filtering is set by default.
- Displaying multiple items
When there are two display targets, the items are separated with a "," (comma) and displayed. When there are three or more display targets, the first two items and a [more...] link are separated with a "," (comma) and displayed. Click the [more...] link to display all of the items. The [less...] link is also displayed. Clicking the [less...] link returns to the original screen (the first two items and a [more...] link).

Action

Only the available functions for the selected items from the navigation or in the category are displayed. Click the function that is to be used to display the wizard screen.

Click the [>>] button to switch the display of the action area.

The number of operation targets that is selected in the Main area is displayed in the "Target:" field. When no selections are made, "0" is displayed.

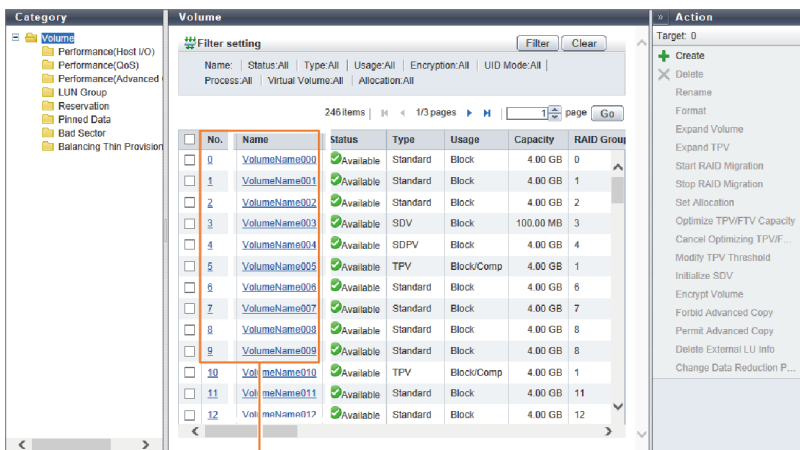
List Screen/Detailed Screen

There are two types of main screens; a list screen and a detailed screen.

The header, bread crumb list, and navigation areas are not included in the screen shots in this section.

List Screen

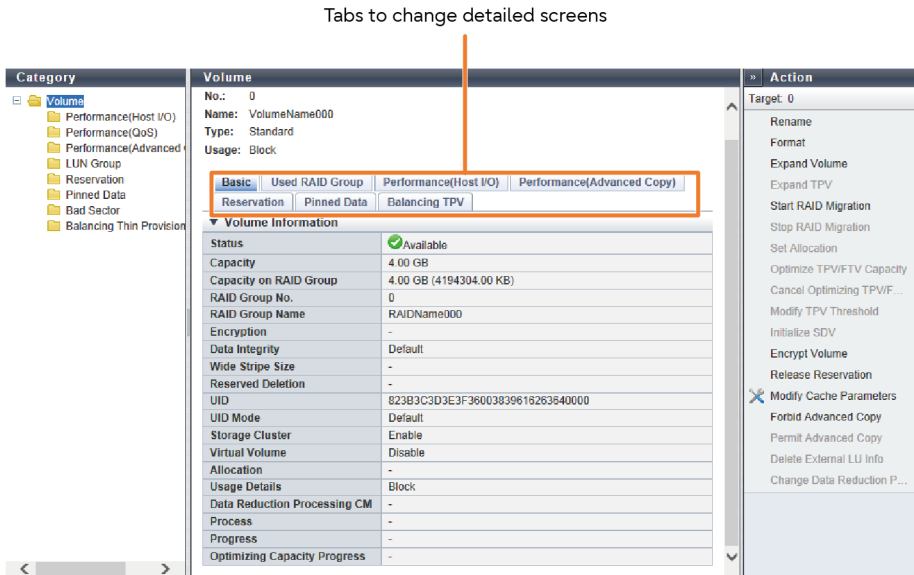
A list of the items that were clicked on the navigation or in the category is displayed. For items with detailed information, links to the detailed screens are displayed.



Links to detailed screen

Detailed Screen

Click the link for each item in the list screen to display a detailed screen. Click the tabs that are displayed to switch the display.

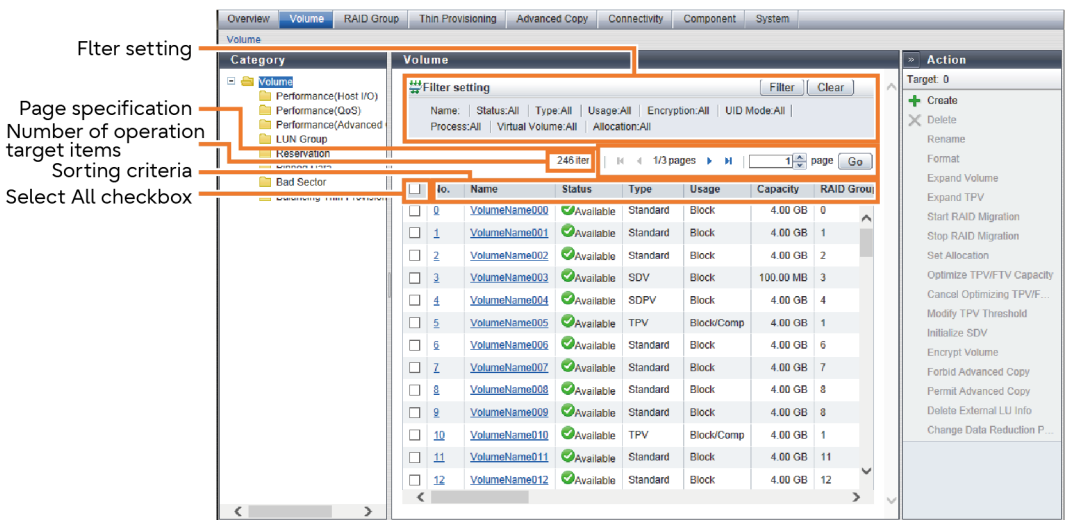


Note

- For some items, the same information may be displayed for the list screen and the detailed screen. From "8. System" (page 1142) onward, only the information for items in the detailed screen that is different from the list screen is described.

Basic Operation

Select the desired item and execute the selected operation.



■ Selecting an Operation

When an item in the navigation or category is clicked, a list items for the selected item is displayed. Select the checkbox or checkboxes of the listed items for the desired operation. Note that some operations, such as creating new volumes, do not require the item to be selected.

The following operations are available in the list screen:

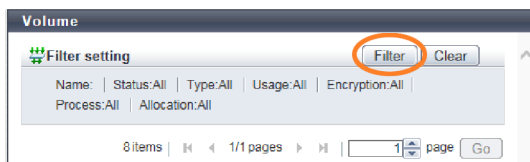
- Filter setting

Filter setting is a function used to display a list of only the items meeting all the specified conditions. The settings that can be specified vary depending on the function that is selected. No filtering is set by default. For "Name", "WWN" (World Wide Name) and "iSCSI Name", items matching or partially matching the input characters or numbers are displayed.

The procedure to filter the displayed items is as follows:

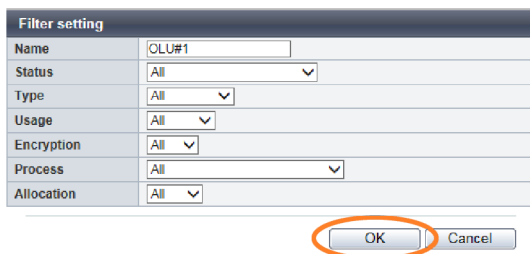
Procedure ▶▶▶

- 1 The current filter setting is displayed in the "Filter setting" field. Click the [Filter] button to set a filter condition.



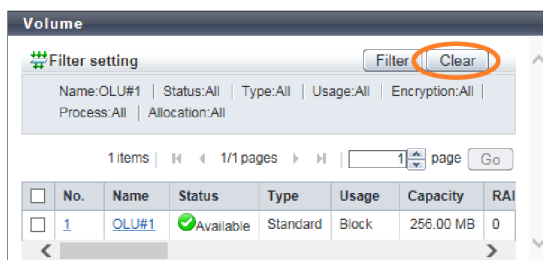
→ The [Filter setting] screen appears.

- 2 Specify a filter condition and click the [OK] button. For multiple filters, AND is used as the condition.



→ The filtered list screen is displayed.

- 3 Click the [Clear] button.



→ The list screen is displayed after the filter setting is cleared.



- Number of operation target items



Number of operation target items

The number of operation target items that are registered in the storage system is displayed.

- Page specification



Page specification

Page specification is a function used to display the specified page. This setting is available when lists are displayed on multiple pages. The total number of pages and the current page number is displayed.

- Click the [<<] button to display the first page.
- Click the [<] button to display the previous page.
- Click the [>] button to display the next page.
- Click the [>>] button to display the last page.

When specifying the page that is to be displayed, input the numeric character in the page specification spin box and click the [Go] button. A list for the specified page is displayed.

- Sort

Sorting is a function that rearranges the order of the display items in ascending order (A - Z or 0 - 9), in descending order (Z - A or 9 - 0), or in a specific order. Click the sorting criteria to change the order.

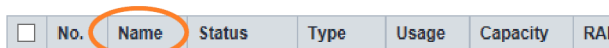
The item that is furthest to the left is displayed in ascending order by default.

Note that the order of some display items that have specific meanings (such as the concatenation order of volumes) cannot be sorted.

The example procedure to sort the volume list by "Name" is as follows.

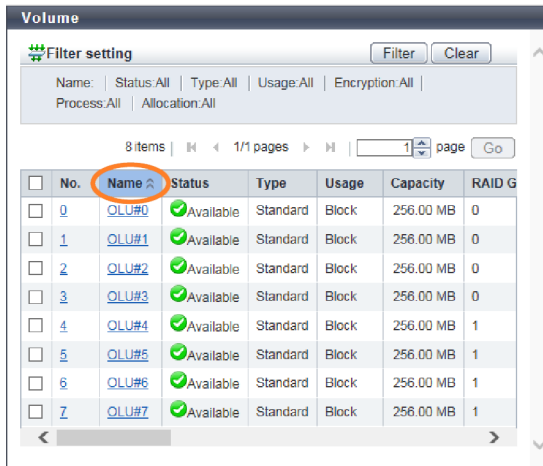
Procedure ▶▶▶

- 1 Click "Name".



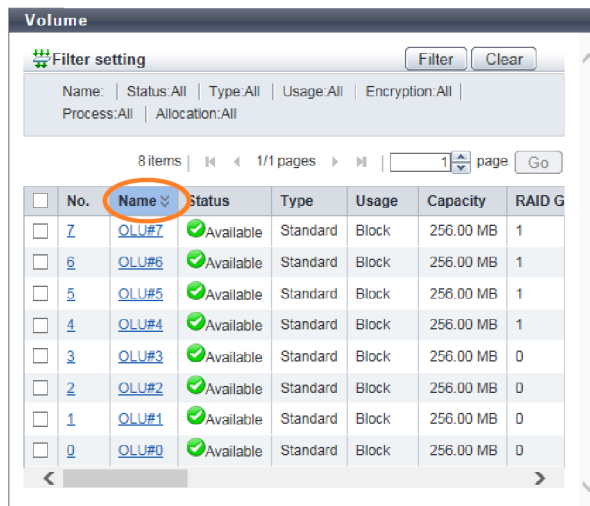
→ The "Name" cell turns light blue and the ascending order mark is displayed.

2 Click "Name".



→ The name list is sorted in descending order.

3 Click "Name".



→ The name list is returned to ascending order.



• Select All checkbox

The "Select All" checkbox is the first item in the left of the item field. Click this checkbox to select all of the checkboxes that are listed. This checkbox is left clear by default. The example procedure to select all items in the volume list is as follows.

Procedure ▶▶▶

1 Select the checkbox to the left of the item field of the volume list.

<input type="checkbox"/>	No.	Name	Status	Type	Usage	Capacity	RAI
<input type="checkbox"/>	0	OLU#0	Available	Standard	Block	256.00 MB	0
<input type="checkbox"/>	1	OLU#1	Available	Standard	Block	256.00 MB	0
<input type="checkbox"/>	2	OLU#2	Available	Standard	Block	256.00 MB	0
<input type="checkbox"/>	3	OLU#3	Available	Standard	Block	256.00 MB	0
<input type="checkbox"/>	4	OLU#4	Available	Standard	Block	256.00 MB	1
<input type="checkbox"/>	5	OLU#5	Available	Standard	Block	256.00 MB	1
<input type="checkbox"/>	6	OLU#6	Available	Standard	Block	256.00 MB	1
<input type="checkbox"/>	7	OLU#7	Available	Standard	Block	256.00 MB	1

The checkboxes for all the volumes in the list are selected.

<input checked="" type="checkbox"/>	No.	Name	Status	Type	Usage	Capacity	RAI
<input checked="" type="checkbox"/>	0	OLU#0	Available	Standard	Block	256.00 MB	0
<input checked="" type="checkbox"/>	1	OLU#1	Available	Standard	Block	256.00 MB	0
<input checked="" type="checkbox"/>	2	OLU#2	Available	Standard	Block	256.00 MB	0
<input checked="" type="checkbox"/>	3	OLU#3	Available	Standard	Block	256.00 MB	0
<input checked="" type="checkbox"/>	4	OLU#4	Available	Standard	Block	256.00 MB	1
<input checked="" type="checkbox"/>	5	OLU#5	Available	Standard	Block	256.00 MB	1
<input checked="" type="checkbox"/>	6	OLU#6	Available	Standard	Block	256.00 MB	1
<input checked="" type="checkbox"/>	7	OLU#7	Available	Standard	Block	256.00 MB	1

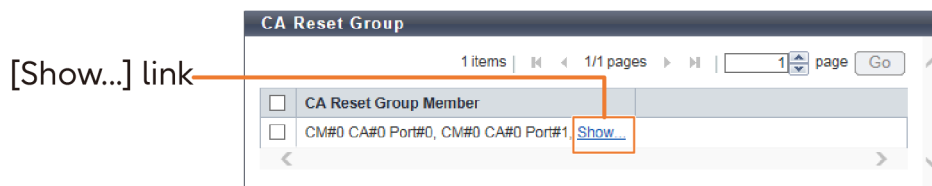


■ **Displaying Multiple Items**

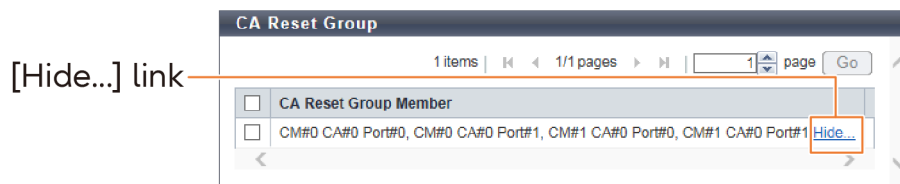
When there are multiple display targets, a display target and a [Show...] link are displayed. Click the [Show...] link to display all of the items and a [Hide...] link. Click the [Hide...] link to return to the default display.

The following are examples of when multiple CA reset group members are displayed.

- When the [Show...] link is displayed



- When the [Hide...] link is displayed



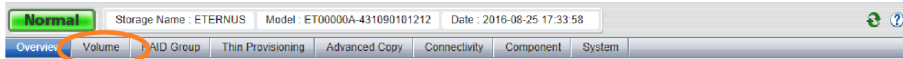
■ **Executing an Operation**

Select the desired operation item from the navigation or category, and then select the function that is to be executed in the Action field.

Some functions in the Action field require one target item from the list to be selected, some functions require multiple target items to be selected, and other functions can be performed without selecting any items. Only the available functions can be clicked.
The example procedure to select [Rename] in [Action] from the volume list screen is as follows.

Procedure ▶▶▶

- 1 Click the [Volume] navigation tab.



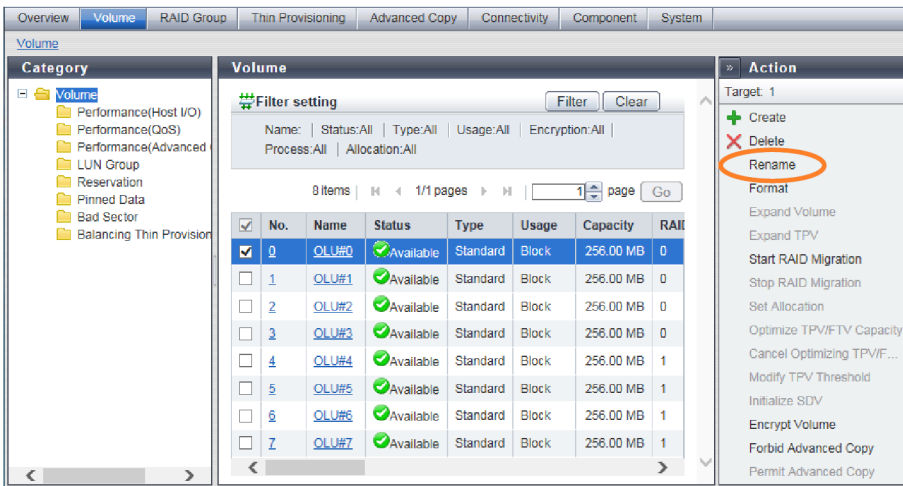
→ The [Volume] screen is displayed.

- 2 Select the operation target volume.



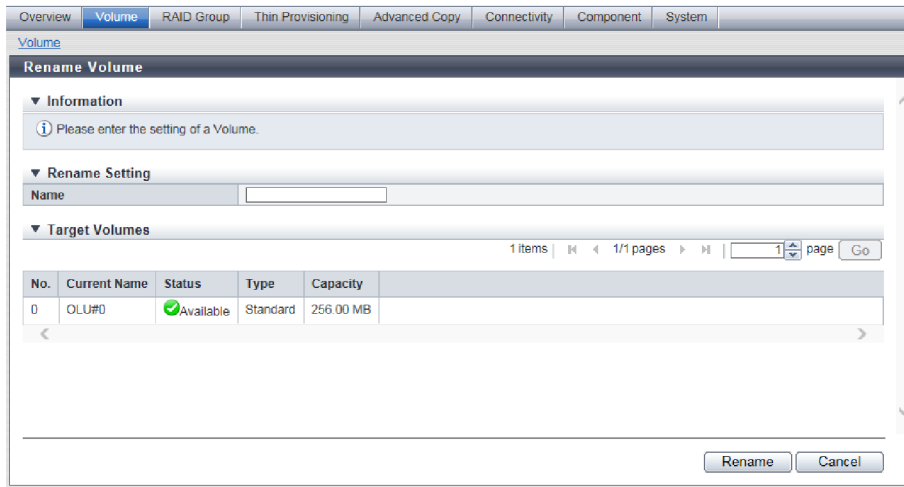
→ The background of the selected volume information turns light blue.

- 3 Click [Rename] in [Action].



→ The [Rename Volume] screen is displayed.

4 Rename the volume.



- [Cancel] button



Deletes the newly added or changed information, and then returns to the previous screen. Or cancels the current operation, and then returns to the previous screen.

■ Confirming the Operation



To continue the operation, click the [OK] button. Clicking this button starts the process.
To cancel the operation, click the [Cancel] button. Clicking this button discards any newly added or changed information and returns to the start screen, or cancels the current process and returns to the start screen.

■ Updating the Screen Display



When the [Refresh] icon in the global header is clicked or a category, a navigation, or an action is selected, the most recently updated screen is obtained. If a tab is clicked, the screen is not updated. Note that only the [Overview] screen automatically updates periodically according to the specified update interval.

Note

- The header, bread crumb list, and navigation areas are not included in the screen shots in the following chapters and sections.

Login

- "■ Overview" (page 28)
- "■ User Privileges" (page 29)
- "■ Settings" (page 29)
- "■ Operating Procedures" (page 30)

■ Overview

Log in to Web GUI to start the operation. The Web GUI operation screen appears. The menu that is displayed depends on the role that is applied for the current user account.

Caution

- If a login is attempted while 16 users are already logged in to Web GUI, an error screen appears. When this occurs, note the error message and try logging in again after completing the required operation.
- "Software" is the role that is used for external software. A user account with the "Software" role cannot log in to Web GUI.
- Also note that when another user is already logged in and performing one of the following operations, a warning message appears and some functions cannot be used. Confirm the current Web GUI usage state and start the login operation.
 - When applying controller firmware
 - When applying disk firmware
 - During the RAID group diagnosis
 - During the disk diagnosis
- If a user account with the "Password Policy" setting enabled is used to log in and the "Maximum Password Age" of the relevant user account has expired, the [Change Password] screen appears. Users cannot log in until the password is changed.
- If a user account with the "Lockout Policy" setting enabled is used to log in and the number of failed authentications exceeds the "Lockout Threshold", the relevant user account is locked out. The lockout is not released until the specified "Lockout Duration" passes.
- A user assigned with a tenant cannot log in to Web GUI (Normal View). Use Easy Administration View.
- Perform the following procedure to log in to Easy Administration View.
 - Connect using HTTPS.
 - Connect to the Master CM.
- Logging in to Easy Administration View is not available under the following conditions:
 - When the RESTful API function is disabled
 - When the storage system is in the "Not Ready" state

Note

- Specifying a user policy (Password Policy and Lockout Policy) can improve the security level of the password. Refer to the [Modify User Policy] function for details.
- One user policy can be specified in the storage system. Select whether to enable or disable the user policy for each user account when creating new user accounts or when editing existing user accounts. A user policy can also be set for the default user IDs ("root" and "f.ce"). Refer to the [Setup User Account] function for details.

■ **User Privileges**

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	✓
Admin	✓
StorageAdmin	✓
AccountAdmin	✓
SecurityAdmin	✓
Maintainer	✓

Refer to "[A. User Roles and Policies](#)" (page 1580)" for details on the policies and roles.

■ **Settings**

[Login] Screen

Item	Description	Setting values
User ID	Input a user ID. Entered letters are case-sensitive. The initial user accounts are registered in the storage system. Refer to " Initial User Account " (page 30)" for details.	Up to 32 alphanumeric characters and symbols (!, '-', '_', '!')
Password	Input a password. Entered letters are case-sensitive.	4 - 64 alphanumeric characters and symbols (!, "", #, \$, %, &, ", (,), *, +, ,, -, ., /, '@', [, \,], ^, _ , {, , }, ~, ~, ~, <, =, >, '?')
Login to Web GUI with Easy Administration View	Select the GUI display mode (view) to be used. Clear the checkbox to log in to GUI with the Normal View mode. Select the checkbox to log in to GUI with the Easy Administration View mode.	Checkbox Selected Cleared

[Change Password] Screen

Item	Description	Setting values
Old Password	Input the current password.	4 - 64 alphanumeric characters and symbols (!, "", #, \$, %, &, ", (,), *, +, ,, -, ., /, '@', [, \,], ^, _ , {, , }, ~, ~, ~, <, =, >, '?')

Item	Description	Setting values
New Password	<p>Input a new password. Entered letters are case-sensitive.</p> <p>Caution</p> <ul style="list-style-type: none"> An error screen appears if the password does not satisfy the input conditions for changing passwords. Refer to the [Modify User Policy] function for details. The following shows procedures corresponding to each error. <ul style="list-style-type: none"> If "Minimum Password Length" is not satisfied The entered password is less than the required number of characters. Check the minimum length ("x") displayed in the "x - 64" format to the right of the password input field. If "Password Complexity" is not satisfied The required character types have not been used in the entered password. At least three of the following character types must be used; "uppercase letters", "lowercase letters", "numeric characters", and "symbols". If "Password History" is not satisfied The entered password does not meet the reuse condition. The same password that was previously set (between the latest and the specified number of generations) cannot be used. Set a different password. 	<p>For user accounts in which "Password Policy" is disabled with the [Setup User Account] function</p> <ul style="list-style-type: none"> Number of characters 4 - 64 Type of characters Alphanumeric characters and symbols (!, "", #, \$, %, &, ", (,), *, +, ,, -, ., /, '@', '[, \,], ^, _ , ` , {, , }, ~, ;, <, =, >, ?) <p>For user accounts in which "Password Policy" is enabled with the [Setup User Account] function</p> <ul style="list-style-type: none"> If "Password Complexity" is enabled <ul style="list-style-type: none"> Number of characters "Minimum password length" to 64 (minimum password length: 4 - 64) Type of characters At least three of the following character types must be used. <ul style="list-style-type: none"> Uppercase letters (A - Z) Lowercase letters (a - z) Numeric characters (0 - 9) Symbols (!, "", #, \$, %, &, ", (,), *, +, ,, -, ., /, '@', '[, \,], ^, _ , ` , {, , }, ~, ;, <, =, >, ?) If "Password Complexity" is disabled <ul style="list-style-type: none"> Number of characters "Minimum password length" to 64 (minimum password length: 4 - 64) Type of characters Alphanumeric characters and symbols (!, "", #, \$, %, &, ", (,), *, +, ,, -, ., /, '@', '[, \,], ^, _ , ` , {, , }, ~, ;, <, =, >, ?)
Confirm New Password	Input the same character string as the value entered in the "New Password" field for confirmation.	Same character string as the "New Password" field

Initial User Account

User ID	Default password	Default role	Available functions
root	root	Admin	The system administrator account. Configuration functions related to, for example, status display and configuration management can be used.
f.ce	Check code + Serial number	Maintainer	The maintenance engineer account. Configuration functions related to, for example, status display, configuration management, and maintenance can be used.

■ Operating Procedures

Procedure ▶▶▶

- 1 Click the [Option] button in the login screen, and select the language (English or Japanese).

- 2** Enter the User ID and Password.
The User ID and the Password vary depending on which account is being used to log in.
- 3** Select the Web GUI display mode (view) to be used.
To log in to Easy Administration View, select the "Login to Web GUI with Easy Administration View" checkbox.
To log in to the existing Web GUI (Normal View), clear the checkbox.
- 4** Click the [Login] button.
→ The operation screen appears.

Caution

- If an input error occurs, enter the User ID and Password again to log in to the storage system.
- If "Maximum Password Age" for the user account has expired, the "[Change Password] Screen" (page 29) appears. Change passwords by entering the "Old Password", "New Password", and "Confirm New Password".
- If the number of failed logins exceeds the specified "Lockout Threshold", the relevant user will not be able to log in. Wait until the lockout state is automatically released or ask the administrator who manages the user account to disable the "Lockout Policy" for the locked out user account. Refer to the [Setup User Account] function for details.



Logout

- "[■ Overview](#)" (page 31)
- "[■ User Privileges](#)" (page 31)
- "[■ Operating Procedures](#)" (page 32)

■ Overview

Log out from Web GUI to finish the operation.

Caution

- A logout is performed automatically under the following conditions:
 - When a different user executes a forced login (*1)
 - When the storage system is turned off
 - When a session timeout occurs after logging in (*2)

*1 : When the user name is the same as a user who is already logged in, the user who was previously logged in is forcibly logged out.

*2 : No operation is performed so the user is automatically logged out. A session timeout limit can be specified by the user. Refer to the [Setup Subsystem Parameters] function for details. The default value is 60 minutes.

■ User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	✓

Default role	Availability of executions
Admin	✓
StorageAdmin	✓
AccountAdmin	✓
SecurityAdmin	✓
Maintainer	✓

Refer to "[A. User Roles and Policies](#)" (page 1580) for details on the policies and roles.

■ Operating Procedures

Procedure ▶▶▶

- 1 Click the [Logout] link on the top right of the screen.
→ A confirmation screen appears.
- 2 Click the [OK] button.
→ This completes the logging out process.
The login screen appears.



Overview

- "[■ Overview](#)" (page 32)
- "[■ User Privileges](#)" (page 33)
- "[■ Settings](#)" (page 34)
- "[■ Display Contents \(Overview\)](#)" (page 34)
- "[■ Display Contents \(Export Event Log\)](#)" (page 39)
- "[■ Operating Procedures \(Export Event Log\)](#)" (page 39)

■ Overview

This function can be used to check the general status of the storage system (storage system status as well as the usage of the RAID groups, the [Thin Provisioning Pools](#), and the [Snap Data Pools](#)) on the screen.

In addition, "Error" level event logs and "Warning" level event logs can be obtained on this screen.

Caution

- The [Initial Setup] screen is displayed for the first login after installation of the storage system is complete.
- If the system message "Currently Network Configuration is set to factory default." is displayed, the network environment settings for the MNT port must be performed. Use the [Setup Network Environment] function in the [Network] screen under the [System] navigation. Some functions are not available if the network environment settings are incomplete.
- If one of the following system messages is displayed, the password must be changed. If the password expires, it cannot be used to log in.
 - "Your password will expire in x days." (x: 1 - 14)
 - "Your password will expire in 24 hours."
 - "Your password has expired and must be changed."
- If the message "Configuration was applied to storage system." is displayed in the system message field, the storage system must be rebooted. Any setting processes cannot be performed until the applied configuration information is enabled by rebooting the storage system.
- When the application schedule for controller firmware is being reserved, a message to that effect as well as "Firmware Version", "Application Start Date", and "Apply Mode" are displayed. When the application mode is "Update & Reboot", the storage system is automatically rebooted after the controller firmware is applied.
- If the message which indicates that the controller firmware application has been reserved disappears before the reserved application date, the reservation may be canceled automatically. In this case, reserve the application schedule for the controller firmware again. Refer to the [Apply Controller Firmware] function for details.

Note

- If the system message "Unified storage license has been registered." is displayed, the unified upgrade must be performed. Use the [Apply Controller Firmware] function in the [Firmware Maintenance] screen under the [System] navigation and reboot the storage system. After changing the firmware for the active controller to the unified firmware (*1), apply the same unified firmware to the inactive controller. Refer to the [Apply Controller Firmware] function for details.

*1: A controller firmware with built-in Unified Storage functions.
- Use the "Password Policy" setting to specify the expiration date for the password. Refer to the [Modify User Policy] function for details. The password expiration date is monitored if the "Password Policy" setting is enabled for the user account with the [Setup User Account] function. To change the password, use the [Change User Password] function.
- **TPP** usage is displayed only when "Enable" is selected for the Thin Provisioning function.
- **SDP** usage is displayed when one of the following conditions applies:
 - Advanced Copy function license has been registered
 - "Enable" is displayed for the "Unified Storage" field

■ User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	✓

1. Web GUI Overview Overview



Default role	Availability of executions
Admin	✓
StorageAdmin	✓
AccountAdmin	✓
SecurityAdmin	✓
Maintainer	✓

Refer to "'A. User Roles and Policies" (page 1580)" for details on the policies and roles.

■ Settings

Auto Refresh

The [Overview] screen is refreshed at the specified update interval.

Item	Description	Setting values
Auto Refresh	<p>Select the update interval to refresh the [Overview] screen.</p> <p>The monitoring time is reset to "0" when the update interval is changed or the  icon is clicked. If the specified interval is a value other than "OFF", the new update interval is applied after the monitoring time is reset.</p> <p>The update interval works while the user is logged in to Web GUI even when other functions are started from the [Overview] screen. The update interval returns to the default value (OFF) when the Master CM is switched or when the user logs out of Web GUI.</p> <div style="background-color: #fff9c4; padding: 10px; margin-top: 10px;"> <p>Caution</p> <ul style="list-style-type: none"> Auto refresh is available only for the [Overview] screen. Screens other than [Overview] are refreshed when the  icon is clicked or a screen is redisplayed. </div>	OFF (Default) 60 sec. 120 sec. 180 sec.




■ Display Contents (Overview)

The screenshot displays the ETERNUS Web GUI Overview page. At the top, the status is 'Normal'. The page is divided into several sections:

- Hardware Components:** A table showing 22 Modules and 24 Drives.
- System Information:** Details for Storage System Name (ETERNUS), Model Name (ET00000A), Serial Number (453054), and Status (Normal).
- RAID Group:** A pie chart showing RAID Group Count (2) and Volume Count (8). Capacity statistics: Total Used Capacity (2.00 GB), Total Free Capacity (64.50 GB), Total Capacity (66.50 GB).
- Thin Provisioning Pool:** A pie chart showing Thin Provisioning Pool Count (0) and Volume Count (0). Capacity statistics: Total Used Physical Capacity (0.00 MB), Total Free Physical Capacity (0.00 MB), Total Physical Capacity (0.00 MB), Maximum Pool Capacity (256.00 TB).
- Snap Data Pool:** A pie chart showing Snap Data Pool Count (0). Capacity statistics: Total Used Capacity (0.00 MB), Total Free Capacity (0.00 MB), Total Capacity (0.00 MB).

System Messages

A system message is displayed.














Item	Description
 Message	When any information from the storage system exists, an information message is displayed.
 Message	When an event causes a warning state, a warning message is displayed. A warning level LCD message is displayed. If an Advanced Copy path in the warning state exists, a message is displayed.
 Message	When an event causes the error state, an error message is displayed. An error level LCD message is displayed. If an Advanced Copy path in the error state exists, a message is displayed.

Note

- An "LCD message" is a message to notify if a failure or warning status occurs. It is displayed when the Master CM is used to operate the storage system (or when a user logs in to the ETERNUS DX900 S5 or the ETERNUS DX8900 S4 by specifying the Master IP address via a web browser).

Hardware Components

The number of components for each status is displayed.

Item	Description	
 Normal	Modules	The number of components (*1) in the normal state ("  " or "  ") is displayed.
	Drives	The number of drives in the normal state ("  " or "  ") is displayed.
 Warning	Modules	The number of components (*1) in the warning state ("  " or "  ") is displayed.
	Drives	The number of drives in the warning state ("  " or "  ") is displayed.
 Error	Modules	The number of components (*1) in the error state ("  Error") is displayed.
	Drives	The number of drives in the error state ("  Error") is displayed.

*1: The number of components that can be maintained. The number of components does not include the number of drives.

System Information

The information of the storage system is displayed.

Item	Description
Storage System Name	The name of the storage system is displayed. When logged in with a user account that can display detailed component information (*1), a link is displayed on the storage system name. Click this link to display the [Storage] screen in the [Component] navigation. *1: A user account with the "Status Display" policy or the "Maintenance Operation" policy can display detailed component information. When a user account that has a "Monitor", "Admin", "StorageAdmin", "SecurityAdmin", or "Maintainer" default role was used to log in, a link is displayed on the storage system name.
Model Name	The model name of the storage system is displayed.
Serial Number	The serial number of the storage system is displayed.

1. Web GUI Overview Overview

Item	Description
Firmware Version	The current controller firmware version is displayed. VxxLyy-zzzz Vxx: Version Lyy: Level zzzz: Release number
Status	The general status (detail) is displayed. When the general status is normal, "✔Normal" is displayed. Refer to ""Storage System General Status (Detail)" (page 1603)" for details.
Operation Mode	The operation mode is displayed. <ul style="list-style-type: none"> • Normal The storage system is in operation. • Maintenance Mode The storage system is under maintenance.
System Memory Capacity	The system memory capacity of each CE that can be used in the storage system is displayed.
Cache Mode	The current status and the factor of the cache are displayed. The normal status is "Write Back Mode". For the ETERNUS DX900 S5 or the ETERNUS DX8900 S4, click this item to display the [Controller Enclosure] screen. Refer to the [Controller Enclosure] function for details. <ul style="list-style-type: none"> • Write Back Mode When a Write request is issued from the host, "Write Complete" is displayed after writing to the cache area is complete. • Write Through Mode When a Write request is issued from the host, "Write Complete" is displayed after writing to the cache area and the drives is complete. In the Write Through Mode, "Write Through (factors)" is displayed. When there are multiple factors, all the factors are separated with a "/" (slash) and displayed. Factors of the Write Through Mode are displayed in the following formats. <ul style="list-style-type: none"> - Write Through (Pinned Data) A large amount of pinned data occurred in the storage system. - Write Through (Battery) The battery charge level is low. - Write Through (Maintenance) One of the following functions is currently being used: <ul style="list-style-type: none"> • Upgrading the controller firmware in hot mode • Changing the Controlling CM of the RAID group • Adding the Controller Module (*1) • Setting the Deduplication/Compression mode (when enabling) • Setting the exclusive read cache size - Write Through (1CM) The storage system is operated with 1CM. (*2) <p>*1 : When reassigning the Controlling CM for the RAID group using all normal CMs including the added CM, the cache mode is temporarily changed to "Write Through Mode" during a configuration.</p> <p>*2 : This mode is displayed when "1CM Write Through" is enabled by using the [Setup Subsystem Parameters] function and the storage system is operated with 1CM (only 1CM can be used due to an error such as a CM failure). The "1CM Write Through" setting for the [Setup Subsystem Parameters] function is displayed and can be changed when logged in using a user account with the "Maintenance Operation" policy. The default value is "Disable".</p>

Item	Description
Connecting Module	<p>The CM that is connected to Web GUI is displayed.</p> <p>For the ETERNUS DX900 S5 or the ETERNUS DX8900 S4 CE#x CM#y</p> <p>For the other models CM#y</p> <p>x: CE number y: CM number</p>
Remote Support	<p>The remote support status (REMCS or AIS Connect) is displayed.</p> <ul style="list-style-type: none"> • Operating The remote support is operating. • Maintenance in Progress The storage system is under maintenance and the remote support is temporarily stopped. After the maintenance is complete, remote support is automatically resumed. • Stopped The remote support is stopped. • "-" (hyphen) The remote support is not configured.

RAID Group

The usage of RAID groups is displayed.

Item	Description
Pie chart	<p>The pie chart indicates the total used capacity and the total free capacity in the RAID groups.</p> <p>Blue: Total used capacity Gray: Total free capacity</p>
RAID Group Count	<p>The number of RAID groups registered in the storage system is displayed.</p> <p>The "RAID Group Count" includes the number of RAID groups that configure TPPs, the number of RAID groups that configure FTRPs, the number of RAID groups that are registered as REC Disk Buffers, and the number of RAID groups that are registered as Extreme Cache Pools.</p>
Volume Count	<p>The number of volumes registered in the storage system is displayed.</p> <p>The "Volume Count" displays the number of "Standard" type volumes and "Wide Striping Volumes (WSV)".</p>
Total Used Capacity	<p>The total used capacity of the RAID groups is displayed. The "Total Used Capacity" is the total capacity of all of the RAID groups that are used.</p> <p>The "Total Used Capacity" includes the capacity of the RAID groups that configure TPPs, the capacity of the RAID groups that configure FTRPs, the capacity of the RAID groups that are registered as REC Disk Buffers, and the capacity of the RAID groups that are registered as Extreme Cache Pools.</p>
Total Free Capacity	<p>The total free capacity of the RAID groups is displayed. The "Total Free Capacity" is a total of unused capacities in the RAID groups.</p> <p>The "Total Free Capacity" includes the capacity of the RAID groups that configure TPPs, the capacity of the RAID groups that configure FTRPs, the capacity of the RAID groups that are registered as REC Disk Buffers, and the capacity of the RAID groups that are registered as Extreme Cache Pools.</p> <p>Total Free Capacity = Total Capacity - Total Used Capacity</p>
Total Capacity	<p>The total capacity of the RAID groups is displayed. The "Total Capacity" is the total capacity of all the RAID groups in the storage system.</p> <p>The "Total Capacity" includes the capacity of the RAID groups that configure TPPs, the capacity of the RAID groups that configure FTRPs, the capacity of the RAID groups that are registered as REC Disk Buffers, and the capacity of the RAID groups that are registered as Extreme Cache Pools.</p>

Thin Provisioning Pool

The usage of TPP is displayed. This item is displayed when "Thin Provisioning Settings" is enabled.

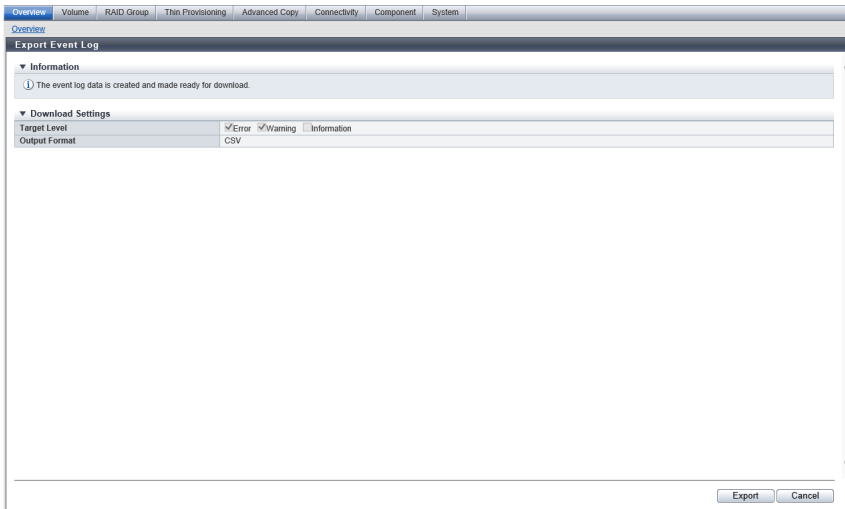
Item	Description
Pie chart	The pie chart indicates the total used physical capacity and the total free physical capacity in the TPPs. Blue: Total used physical capacity Gray: Total free physical capacity
Thin Provisioning Pool Count	The number of TPPs registered in the storage system is displayed.
Volume Count	The number of volumes registered in the storage system is displayed. The "Volume Count" displays the number of "TPV" type volumes.
Total Used Physical Capacity	The total used physical capacity of the TPPs is displayed. "Total Used Physical Capacity" is the total physical capacity of all the TPPs that are allocated to the volumes.
Total Free Physical Capacity	The total free physical capacity of the TPPs is displayed. "Total Free Physical Capacity" is the total physical capacity of all the TPPs that are not allocated to the volumes. Total Free Physical Capacity = Total Physical Capacity - Total Used Physical Capacity
Total Physical Capacity	The total physical capacity of the TPPs is displayed. The "Total Physical Capacity" is the total physical capacity of all the TPPs in the storage system.
Maximum Pool Capacity	The maximum pool capacity is displayed. The maximum pool capacity is the maximum total capacity for TPPs and FTRPs that can be created in the storage system. The maximum pool capacity is specified by using the [Set Thin Provisioning] function. Refer to the [Set Thin Provisioning] function for details.

Snap Data Pool

The usage of SDP is displayed. This item is displayed when the Advanced Copy license or the Unified Storage license has been registered.

Item	Description
Pie chart	The pie chart indicates the total used capacity and the total free capacity in the SDP. Blue: Total used capacity Gray: Total free capacity
Snap Data Pool Count	The number of SDPs that are registered in the storage system is displayed. SDP is available after creating SDPVs. One SDP can be created in the storage system.
Total Used Capacity	The total used capacity of the SDP is displayed. The "Total Used Capacity" is the total capacity of all the SDPs that are used for volumes.
Total Free Capacity	The total free capacity of the SDP is displayed. The "Total Free Capacity" is the total unused capacity of all the SDPs. Total Free Capacity = Total Capacity - Total Used Capacity
Total Capacity	The total capacity of the SDP is displayed. The "Total Capacity" is the total capacity of all the SDPs in the storage system.

■ Display Contents (Export Event Log)



Download Settings

Item	Description
Target Level	The target levels of the event logs that are to be downloaded are displayed. The target levels are "Error" and "Warning" (checkboxes are selected). The target levels cannot be modified.
Output Format	"CSV" is displayed.

■ Operating Procedures (Export Event Log)

Note

- The event logs that can be exported can be checked in the [Display/Delete Event Log] screen. Refer to the [Display/Delete Event Log] function for details. The event logs whose level is "❌" (Error) and "⚠️" (Warning) can be exported from the [Display/Delete Event Log] screen. Note that "ℹ️" (Information) level event logs cannot be exported.

Procedure ▶▶▶

- 1 Click the [Export] button on the [Overview] screen.
→ The [Export Event Log] screen appears.
- 2 Click the [Export] button.
→ Event log export starts. The progress screen is displayed.
After the event log export is finished, a screen to execute downloading the file is displayed.
- 3 Click the [Download] button to save the exported event log.
→ A dialog box to download the file appears.
- 4 Save the event log file.
The default file name is "EventLog_serial number for the storage system_YYYY-MM-DD_hh-mm-ss.csv". (YYYY-MM-DD_hh-mm-ss: the date and time when the download screen (Step 3) is displayed.)

5 Click the [Done] button to return to the [Overview] screen.



2. Volume

- "[Volume Overview](#)" (page 41)
- "[Display Function List](#)" (page 41)
- "[Action List](#)" (page 42)

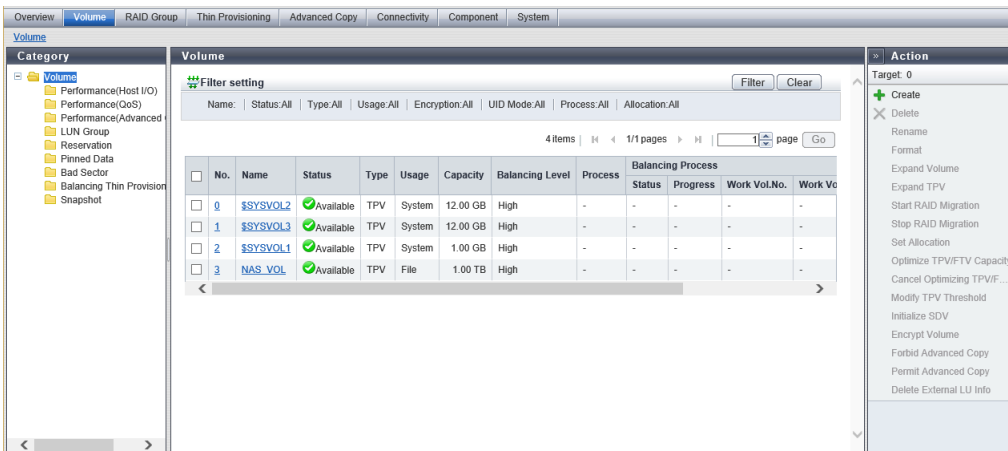
Overview

A volume is a logical drive space in the storage system.

The server recognizes the volume as a unit of RAID configuration.

Up to 128 TB can be configured per volume. Note that the maximum capacity of a volume differs depending of the OS of the server.

Display Function List



Category	Function	Description
Volume	" Volume (Basic Information) " (page 44)	The basic information of volumes, such as the status and the capacity, is displayed.
Performance (Host I/O)	" Performance (Host I/O) " (page 172)	The performance information of each volume for Host I/O, and the tuning set state of each volume, are displayed.
Performance (QoS)	" Performance (QoS) " (page 198)	The performance information of the volume QoS for Host I/O is displayed.
Performance (Advanced Copy)	" Performance (Advanced Copy) " (page 206)	The performance information of each volume for Advanced Copy is displayed.
LUN Group	" LUN Group " (page 210)	The LUN groups of each volume are displayed.
Reservation	" Reservation " (page 212)	The volume reservation status from the host is displayed.
Pinned Data	" Pinned Data " (page 216)	The volume information which failed to write back in a drive is displayed.
Bad Sector	" Bad Sector " (page 227)	Each volume status whether or not a bad sector has occurred is displayed.
Balancing Thin Provisioning Volume	" Balancing Thin Provisioning Volume " (page 230)	The balancing status of each volume is displayed. This function is available only for Thin Provisioning.
Snapshot	" Snapshot " (page 237)	The snapshot configuration information of the NAS user volume is displayed.

■ Action List

Action	Function	Description
Volume		
Create	"Create Volume" (page 61)	Create volumes.
Delete	"Delete Volume" (page 104)	Delete the selected volume.
Rename	"Rename Volume" (page 107)	Change the selected volume name.
Format	"Format Volume" (page 110)	Format the selected volume.
Expand Volume	"Expand Volume" (page 113)	Expand the selected volume capacity by using the LUN Concatenation function.
Expand TPV	"Expand Thin Provisioning Volume" (page 119)	Expand the selected Thin Provisioning volume capacity. This function is available only for Thin Provisioning.
Start RAID Migration	"Start RAID Migration" (page 123)	Migrate the selected volume to a different RAID group or to the Thin Provisioning Pool.
Stop RAID Migration	"Stop RAID Migration" (page 150)	Cancel the selected RAID migration in progress.
Stop External Volume Data Synchronization	"Stop External Volume Data Synchronization" (page 151)	Stop the data synchronization between the migration source volume and the migration destination volume after the RAID migration is completed.
Set Allocation	"Set Allocation" (page 152)	Change the allocation method for the selected TPVs and FTVs.
Optimize TPV/FTV Capacity	"Optimize TPV/FTV Capacity" (page 155)	Start optimization for the selected TPV or FTV.
Cancel Optimizing TPV/FTV Capacity	"Cancel Optimizing TPV/FTV Capacity" (page 157)	Cancel optimization for the selected TPV or FTV.
Delete SDPV	"Delete Snap Data Pool Volume" (page 158)	Delete the selected Snap Data Pool Volume (SDPV), and reduce the Snap Data Pool capacity.
Force Delete SDPV	"Force Delete Snap Data Pool Volume" (page 159)	Forcibly delete the selected Snap Data Pool Volume (SDPV), and reduce the Snap Data Pool capacity.
Modify TPV Threshold	"Modify Thin Provisioning Volume Threshold" (page 160)	Change the threshold of Thin Provisioning volume. This function is available only for Thin Provisioning.
Initialize SDV	"Initialize Snap Data Volume" (page 162)	Initialize the selected Snap Data Volumes (SDV).
Encrypt Volume	"Encrypt Volume" (page 163)	Encrypt the selected volumes.
Forbid Advanced Copy	"Forbid Advanced Copy" (page 165)	Forbid Advanced Copy to the selected volume.
Permit Advanced Copy	"Permit Advanced Copy" (page 167)	Release the forbidden Advanced Copy setting to the selected volume.
Reconfigure NAS Volume	"Reconfigure NAS Volume" (page 168)	Reconfigure the file system format for the NAS user volume to support volume expansion.
Delete External LU Info	"Delete External LU Information" (page 169)	Delete the External LU Information.
Change Data Reduction Processing CM	"Change Data Reduction Processing CM" (page 170)	Change the Data Reduction Processing CM that is allocated to the Deduplication/Compression Volume.
Performance (Host I/O)		

2. Volume

Action	Function	Description
Modify Cache Parameters	" Modify Cache Parameters " (page 180)	Change the tuning parameters of the selected volume.
Export Cache Parameters	" Export Cache Parameters " (page 191)	Export the tuning parameter status of all the volumes.
Export Performance Information	" Export Performance Information " (page 194)	Export the performance information.
Set ALUA	" Set ALUA " (page 196)	Set ALUA.
Performance (QoS)		
Set QoS	" Set Volume QoS " (page 202)	Configure the bandwidth limit (maximum performance limit) for the volume.
Set Volume QoS Pattern	" Set Volume QoS Pattern " (page 205)	Set the QoS patterns of the volume.
Performance (Advanced Copy)		
Export Performance Information	" Export Performance Information " (page 194)	Export the performance information.
Reservation		
Release Reservation	" Release Reservation " (page 215)	Forcibly release the reserved status of the selected volume.
Pinned Data		
Destage Pinned Data	" Destage Pinned Data " (page 220)	Write back the pinned data in the selected volume to a disk.
Delete Pinned Data	" Delete Pinned Data " (page 220)	Delete pinned data in the selected volume.
Export Pinned Data	" Export Pinned Data " (page 221)	Export the pinned data information of all the volumes.
Data Container Volume Diagnosis	" Data Container Volume Diagnosis " (page 222)	Check whether pinned data was generated in the volume where the control information for the Deduplication/Compression function is stored.
Bad Sector		
Clear Bad Sector	" Clear Bad Sector " (page 229)	Delete the bad sector in the selected volume.
Data Container Volume Diagnosis	" Data Container Volume Diagnosis " (page 222)	Check whether bad sector was generated in the volume where the control information for the Deduplication/Compression function is stored.
Balancing Thin Provisioning Volume		
Start Balancing	" Start Balancing Thin Provisioning Volume " (page 234)	Balance the usage ratio for the selected Thin Provisioning volume disks (RAID group). This function is available only for Thin Provisioning.
Stop Balancing	" Stop Balancing Thin Provisioning Volume " (page 236)	Cancel balancing of the selected Thin Provisioning volume. This function is available only for Thin Provisioning.
Snapshot		
Set Snapshot	" Set Snapshot " (page 240)	Create snapshot destination SDVs for a NAS user volume and set an acquisition schedule.
Delete Snapshot	" Delete Snapshot " (page 248)	Delete the snapshot configuration information.
Start Snapshot	" Start Snapshot " (page 249)	Restart the snapshot acquisition.
Stop Snapshot	" Stop Snapshot " (page 250)	Suspend the snapshot acquisition.

Volume (Basic Information)

- "[Overview](#)" (page 44)
- "[User Privileges](#)" (page 44)
- "[Display Contents](#)" (page 44)
- "[Filter Setting](#)" (page 60)

Overview

This function displays the basic information of volumes.

Caution

- When attempting to display the list of volumes while a meta cache redistribution is being performed for NAS volumes (NAS user volumes or NAS backup volumes), the process may be delayed for a maximum of two minutes.

Note

- In this manual, "volumes" include "[External Volumes](#)" if differentiation is not specifically required.

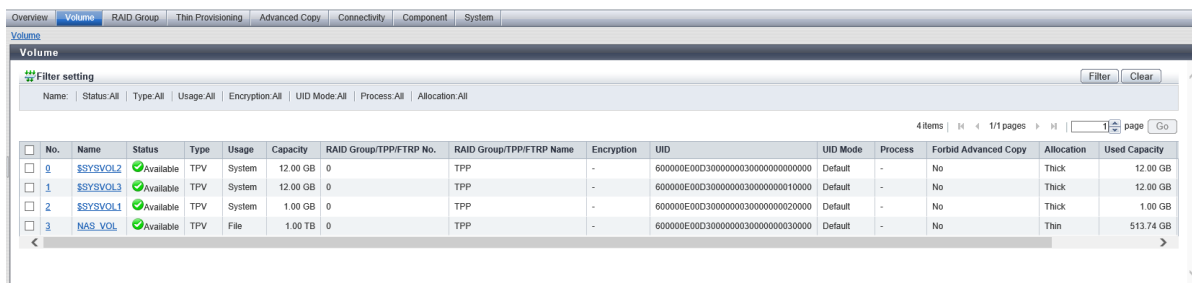
User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	✓
Admin	✓
StorageAdmin	✓
AccountAdmin	
SecurityAdmin	✓
Maintainer	✓

Refer to "[A. User Roles and Policies](#)" (page 1580)" for details on the policies and roles.

Display Contents



In this screen, the basic information of volumes is displayed in a list.

2. Volume
Volume (Basic Information)

Volume List

Item	Description
No.	<p>The volume number is displayed.</p> <p>The volume number can be automatically selected or manually specified when creating a volume. When using an automatically selected volume number, the volume number is allocated in ascending order.</p> <p>Click this item to display the "[Volume Detail] Screen ([Basic] Tab)" (page 51).</p>
Name	<p>The volume name is displayed.</p> <p>Click this item to display the "[Volume Detail] Screen ([Basic] Tab)" (page 51).</p>
Status	<p>The volume status is displayed.</p> <p>When the volume status is normal, "✔Available" is displayed.</p> <p>Refer to "'Volume Status' (page 1604)" for details.</p>
Type	<p>The volume type is displayed.</p> <p>Standard</p> <p>WSV</p> <p>TPV</p> <p>FTV</p> <p>SDV</p> <p>SDPV</p> <p>Temporary</p>
Usage	<p>The usage of the volume is displayed.</p> <ul style="list-style-type: none"> • Block The volumes that are used for the SAN. • Block/Dedupe&Comp The volumes that have both the Deduplication and Compression functions enabled. • Block/Dedupe The volumes that have the Deduplication function enabled. • Block/Comp The volumes that have the Compression function enabled. • File The volumes that are used for the NAS. • System The system volumes described below. Refer to "Usage Details" in the [Volume Detail] screen ([Basic] tab) for details. <ul style="list-style-type: none"> - System volumes for the NAS system - System volumes for the Virtual Volume function - Data Container Volume • Migration An External Volume that is used for data migrations. • Veeam The Veeam Snapshot Volumes that have both the Deduplication and Compression functions disabled. • Dedupe&Comp/Veeam The Veeam Snapshot Volumes that have both the Deduplication and Compression functions enabled. • Dedupe/Veeam The Veeam Snapshot Volumes that have the Deduplication function enabled. • Comp/Veeam The Veeam Snapshot Volumes that have the Compression function enabled.
Capacity	<p>The volume capacity is displayed.</p> <p>When the volume type is "SDV", the virtual capacity is displayed.</p>

2. Volume

Volume (Basic Information)

Item	Description
RAID Group/TPP/FTRP No.	<p>The following number is displayed:</p> <ul style="list-style-type: none"> For "WSV" type volumes The RAID group number to which the representative volume belongs is displayed. For "TPV" type volumes The TPP number to which the volume belongs is displayed. For "FTV" type volumes The FTRP number to which the volume belongs is displayed. For "Standard" type volumes whose "Usage" is "Migration" The External RAID Group number to which the External Volume belongs is displayed. If the type is not one of the types listed above, the RAID group number to which the volume belongs is displayed.
RAID Group/TPP/FTRP Name	<p>The following name is displayed:</p> <ul style="list-style-type: none"> For "WSV" type volumes The RAID group name to which the representative volume belongs is displayed. For "TPV" type volumes The TPP name to which the volume belongs is displayed. For "FTV" type volumes The FTRP name to which the volume belongs is displayed. For "Standard" type volumes whose "Usage" is "Migration" The External RAID Group name to which the External Volume belongs is displayed. If the type is not one of the types listed above, the RAID group name to which the volume belongs is displayed.
Encryption	<p>The encryption status is displayed. For the ETERNUS DX60 S5, this item is not displayed.</p> <ul style="list-style-type: none"> CM A volume that is encrypted by CM. "-" (hyphen) A volume that is not encrypted (plain text volume). SED A volume that is encrypted by SED.
UID	<p>The Universal Identifier (UID) is displayed. The UID is an identifier (storage system name) to specify a volume from the open system server. The UID status is displayed in the "UID Mode" field. A "-" (hyphen) is displayed for the Data Container Volume. 32-digit capital letters and numeric characters (hexadecimal)</p> <div style="background-color: #f0f0f0; padding: 10px;"> <p>Note</p> <ul style="list-style-type: none"> For External Volumes that inherit the External LU Information, the UID of the External Volumes is displayed. For External Volumes that do not inherit the External LU Information, the UID that is assigned by the storage system (local storage system) is displayed. If the External LU Information is deleted, the UID that is assigned by the storage system is displayed. Refer to the [Delete External LU Information] function for details. </div>

2. Volume

Volume (Basic Information)

Item	Description
UID Mode	<p>The UID status is displayed.</p> <p>A "-" (hyphen) is displayed for the Data Container Volume.</p> <ul style="list-style-type: none">• Default This status is displayed for the following volumes.<ul style="list-style-type: none">- Volumes that are created with the storage system- Volumes that do not inherit the External LU Information (*1)• Custom This status is displayed for one of the following volumes.<ul style="list-style-type: none">- Volumes where the UIDs that are changed with the "set volume" CLI command are applied- Volumes that are used for the Storage Cluster function• External This status is displayed for volumes that inherit the External LU Information (*1). <p>*1 : This status is displayed for volumes before, during, and after a data migration of the Non-disruptive Storage Migration.</p> <p>Note</p> <ul style="list-style-type: none">• If the External LU Information is deleted, this item is changed from "External" to "Default". Refer to the [Delete External LU Information] function for details.

2. Volume
Volume (Basic Information)

Item	Description
Process	<p>A process that is being performed for the volume is displayed. If multiple processes are currently being performed, the processes are separated with a ":" (colon) and displayed in the "xx:yy:zz" format. "Encrypting", "Formatting", "Migrating", or "Balancing" is displayed as "xx". "Optimizing Capacity", "Reserved Optimizing Capacity", "Automatic Stop", or "Manual Stop" is displayed as "yy". "Optimizing Capacity" or "Reserved Optimizing Capacity" is displayed as "zz".</p> <p>Note that "Automatic Stop" and "Manual Stop" are displayed only if the Non-disruptive Storage Migration License has been registered.</p> <p>If no process is being performed, a "-" (hyphen) is displayed.</p> <ul style="list-style-type: none"> • Encrypting Encryption is being performed. • Formatting Formatting is being performed. • Migrating RAID migration is being performed. • Balancing TPV balancing or FTRP balancing is being performed. • Optimizing Capacity Capacity optimization is being performed in a TPV or an FTV. • Reserved Optimizing Capacity Capacity optimization is being reserved (*1) for a TPV or an FTV. • Automatic Stop The data synchronization between the migration source volume and the migration destination volume is automatically stopped. • Manual Stop The data synchronization between the migration source volume and the migration destination volume is manually stopped. <p>*1 : If "Start Optimizing TPV/FTV Capacity after migration" is enabled for the RAID migration function, the migration source volume is reserved for capacity optimization.</p> <div style="background-color: #f0f0f0; padding: 10px; margin-top: 10px;"> <p>Note</p> <ul style="list-style-type: none"> • If "Automatic Stop" or "Manual Stop" is selected for "Data Sync after Migration" when starting a data migration for Non-disruptive Storage Migration using the [Start RAID Migration] function, "Migrating : Automatic Stop" or "Migrating : Manual Stop" is displayed for "Process" of the migration source volume. If "Manual Stop" is selected, "Migrating : Manual Stop" is displayed for "Process" of the migration source volume during a data synchronization between the migration source volume and the migration destination volume even if the migration has been completed. </div>
Forbid Advanced Copy	<p>The protection status of the volume or the volume attribute (such as mirroring reservation) is displayed. "No" is displayed for Data Container Volumes.</p> <ul style="list-style-type: none"> • Yes The volume is protected. The volume cannot be used as a copy destination volume. • No The volume is not protected. The volume can be used as a copy destination volume. • DLM (Dynamic LUN Mirroring) An attribute that is to be set to a volume being created as the REC copy destination by the Dynamic LUN Mirroring function regardless of whether the volume is protected. If this attribute is displayed, the volume might be the one that is left in the storage system due to unsuccessful creation. • ODX (Offloaded Data Transfer) An ODX Buffer volume. The ODX Buffer volume cannot be protected.

2. Volume

Volume (Basic Information)

Item	Description
Storage Cluster	<p>When the volume is being used by the Storage Cluster function, "Enable" is displayed. When no volumes are used for the Storage Cluster function, "Disable" is displayed.</p> <p>This item is only displayed when "Enable" is selected for the Storage Cluster function.</p>
Virtual Volume	<p>When the volume is being used by the Virtual Volume function, "Enable" is displayed. When no volumes are used for the Virtual Volume function, "Disable" is displayed. For \$VVOL_META, "Disable" is displayed even if the relevant volume is being used for the Virtual Volume function. "\$VVOL_META" is a system volume that is used for storing the management information (metadata) of the Virtual Volume function.</p> <p>This item is only displayed when "Enable" is selected for the Virtual Volume function.</p>
Allocation	<p>The allocation method for the volume is displayed.</p> <p>A "-" (hyphen) is displayed when the volume type is other than "TPV" or "FTV".</p> <ul style="list-style-type: none"> • Thin Physical area is allocated to the target area of the volume when a write I/O is received. • Thick Physical area is allocated to the whole area of the volume when volumes are created.
Used Capacity	<p>The used capacity (physically allocated capacity) of volume is displayed.</p> <p>A "-" (hyphen) is displayed in the following conditions:</p> <ul style="list-style-type: none"> • The volume type is not "TPV" or "FTV" • Deduplication/Compression Volumes (*1) <p>*1 : To check the used capacity of the Deduplication/Compression Volumes, see the used capacity of the Data Container Volume in the TPP to which the Deduplication/Compression Volumes belong. The used capacity of the Data Container Volume is equivalent to the total used capacity of the Deduplication/Compression Volumes in the relevant TPP.</p>
Original Data Size	<p>The pre-compression capacity (logically allocated capacity) of the data written to a volume is displayed.</p> <p>For volumes other than the Deduplication/Compression Volumes, the same value as "Used Capacity" is displayed.</p> <p>A "-" (hyphen) is displayed in the following conditions:</p> <ul style="list-style-type: none"> • The volume type is not "TPV" or "FTV" • The volume type is "TPV" and the usage is "System" • The volume type is "FTV" and the usage is "System" • The pre-compression data capacity cannot be obtained <p>This item is displayed only when the Deduplication/Compression function is enabled.</p>
Used Rate	<p>The volume utilization (0 to 100 %) is displayed.</p> <ul style="list-style-type: none"> • For Deduplication/Compression Volumes, the ratio of the pre-compression data capacity to the volume capacity is displayed. Used Rate = Original Data Size ÷ Capacity • For other volumes, the ratio of the physically allocated capacity to the volume capacity is displayed. Used Rate = Used Capacity ÷ Capacity <p>A "-" (hyphen) is displayed when the volume type is other than "TPV" and "FTV".</p>

2. Volume
Volume (Basic Information)

Item	Description
Threshold	<p>The threshold for monitoring the volume utilization (0 to 100 %) is displayed.</p> <p>If the "Used Rate" value exceeds the "Threshold", a Host Sense Key Code Qualifier is notified.</p> <p>A "-" (hyphen) is displayed in the following conditions:</p> <ul style="list-style-type: none"> • The volume type is not "TPV" or "FTV" • Data Container Volumes <div style="background-color: #f0f0f0; padding: 10px;"> <p>Note</p> <ul style="list-style-type: none"> • To change the threshold of TPVs and Deduplication/Compression Volumes, use the [Modify Thin Provisioning Volume Threshold] function. • The threshold for TPPs can be checked in the [Threshold] screen. Refer to the [Threshold (Thin Provisioning Pool)] function for details. • The threshold for FTRPs can be checked in the [Flexible Tier Pool] screen. Refer to the [Flexible Tier Pool (Basic Information)] function for details. </div>
Data Reduction Processing CM	<p>For Deduplication/Compression Volumes and Data Container Volumes, a CM that controls data deduplication/compression is displayed.</p> <p>For the other volumes, a "-" (hyphen) is displayed.</p> <p>This item is displayed only when the Deduplication/Compression function is enabled.</p> <p>For the ETERNUS DX900 S5 or the ETERNUS DX8900 S4 CE#x CM#y</p> <p>For the other models CM#y</p> <p>x: CE number y: CM number</p> <div style="background-color: #f0f0f0; padding: 10px;"> <p>Note</p> <ul style="list-style-type: none"> • The Data Reduction Processing CM for Deduplication/Compression Volumes can be changed from Web GUI. Refer to the [Change Data Reduction Processing CM] function for details. • The Data Reduction Processing CM for Data Container Volumes cannot be changed from Web GUI. Use CLI to change the setting. </div>
External LU Information	<p>Whether the volume inherits the External LU Information is displayed.</p> <p>This item displays "Inherited" for External Volumes that inherit the External LU Information while "Usage" is "Migration" (if a data migration has not been performed or if a data migration is being performed).</p> <p>A "-" (hyphen) is displayed for the following volumes.</p> <ul style="list-style-type: none"> • Volumes (of which "Usage" is "Block") that have inherited the External LU Information if a data migration has already been performed • External Volumes that do not inherit the External LU Information • Volumes of which the External LU Information is deleted • Volumes (internal volumes) <p>This item is displayed only if the Non-disruptive Storage Migration License has been registered.</p>

2. Volume

Volume (Basic Information)

Item	Description
Snapshot Name	<p>For volumes that can be operated from Veeam Backup & Replication (hereinafter referred to as "Veeam B&R"), the following names are displayed.</p> <ul style="list-style-type: none"> • If the volume is a copy destination of the Veeam session (or if the volume is a Veeam Snapshot Volume), the snapshot name is displayed. This is the name that is displayed on the operation screen of Veeam B&R. • If the volume is a copy destination of the SnapOPC+ session, the volume name is displayed. This is the same as the "Name" that is displayed in the volume list. <p>For the other volumes, a "-" (hyphen) is displayed.</p> <p>This item is displayed when the Veeam Storage Integration License has been registered in a storage system other than the ETERNUS DX8100 S4.</p>

When the selected volume is a WSV or a volume that is concatenated by the [LUN Concatenation] function, the [Used RAID Group] tab is displayed. For display items, refer to the "[Volume Detail] Screen ([Used RAID Group] Tab)" (page 58).

[Volume Detail] Screen ([Basic] Tab)

Volume Information

The volume number, volume name, type, and usage are displayed.

Item	Description
Status	<p>The volume status is displayed.</p> <p>When the volume status is normal, "✔Available" is displayed.</p> <p>Refer to "'Volume Status' (page 1604)" for details.</p>
Used Status	<p>The used status of the Data Container Volume is displayed.</p> <ul style="list-style-type: none"> • ✔Normal The Data Container Volume usage is less than 80 %. Or both Deduplication and Compression are disabled. • ⚠Attention The Data Container Volume usage is 80 % or larger, or there is no free space in the Data Container Volume. • 🕒Unknown A status other than the ones listed above <p>This item is displayed when the volume type is "TPV" or "FTV".</p>
Capacity	<p>The volume capacity is displayed with a unit that is determined according to the actual volume size.</p>
Capacity on RAID Group	<p>The volume capacity is displayed with a unit that is determined according to the volume size secured in the RAID group or External RAID Group.</p> <p>While the capacity that is specified by the user when creating the volume is displayed in the "Capacity" field described above, the volume capacity that is actually secured in units of the basic volume size in the RAID group is displayed in this field.</p> <p>This item is displayed when the volume type is "Standard", "WSV", "SDV", "SDPV", or "Temporary".</p>
Used Capacity	<p>The used capacity (physically allocated capacity) of volume is displayed.</p> <p>A "-" (hyphen) is displayed for the Deduplication/Compression Volume.</p> <p>This item is displayed when the volume type is "TPV" or "FTV".</p>

2. Volume
Volume (Basic Information)

Item	Description																		
Original Data Size	<p>The pre-compression capacity (logically allocated capacity) of the data written to a volume is displayed. For volumes other than the Deduplication/Compression Volumes, the same value as "Used Capacity" is displayed. A "-" (hyphen) is displayed in the following conditions:</p> <ul style="list-style-type: none"> The volume type is "TPV" and the usage is "System" The volume type is "FTV" and the usage is "System" The pre-compression data capacity cannot be obtained <p>This item is displayed when the Deduplication/Compression function is enabled and the volume type is "TPV" or "FTV".</p>																		
Used Rate	<p>The volume utilization (0 to 100 %) is displayed.</p> <ul style="list-style-type: none"> For Deduplication/Compression Volumes, the ratio of the pre-compression data capacity to the volume capacity is displayed. Used Rate = Original Data Size ÷ Capacity For other volumes, the ratio of the physically allocated capacity to the volume capacity is displayed. Used Rate = Used Capacity ÷ Capacity <p>This item is displayed when the volume type is "TPV" or "FTV".</p>																		
Threshold	<p>The threshold for monitoring the volume utilization (0 to 100 %) is displayed. If the "Used Rate" value exceeds the "Threshold", a Host Sense Key Code Qualifier is notified. A "-" (hyphen) is displayed for the Data Container Volume. This item is displayed when the volume type is "TPV" or "FTV".</p> <p>8 KB 32 KB 256 KB</p>																		
NAS FS Block Size	<p>The block size of the NAS file system (NAS user volume) is displayed. This item is displayed only when the usage details of the volume is "NAS Data". The maximum NAS user volume capacity and the maximum file size vary depending on the block size of the NAS file system. For details, refer to the following table.</p> <p>Maximum NAS User Volume Capacity and the Maximum File Size of Each "NAS FS Block Size"</p> <table border="1"> <thead> <tr> <th rowspan="2"></th> <th rowspan="2">NAS FS Version (*1)</th> <th colspan="3">NAS FS Block Size</th> </tr> <tr> <th>8 KB</th> <th>32 KB</th> <th>256 KB</th> </tr> </thead> <tbody> <tr> <td>Maximum NAS user volume capacity</td> <td>5</td> <td>32 TB</td> <td>128 TB</td> <td>128 TB</td> </tr> <tr> <td>Maximum file size (*2)</td> <td>5</td> <td>1 TB</td> <td>4 TB</td> <td>32 TB</td> </tr> </tbody> </table> <p>*1 : The version of the NAS file system (NAS user volume). Refer to "NAS FS Version" (page 52) for details. *2 : The "file size" indicates the size of the user data that is created in the shared folder.</p>		NAS FS Version (*1)	NAS FS Block Size			8 KB	32 KB	256 KB	Maximum NAS user volume capacity	5	32 TB	128 TB	128 TB	Maximum file size (*2)	5	1 TB	4 TB	32 TB
	NAS FS Version (*1)			NAS FS Block Size															
		8 KB	32 KB	256 KB															
Maximum NAS user volume capacity	5	32 TB	128 TB	128 TB															
Maximum file size (*2)	5	1 TB	4 TB	32 TB															
NAS FS Version	<p>The NAS file system (NAS user volume) version is displayed. This item is displayed only when the usage details of the volume is "NAS Data". For the maximum NAS user volume capacity for each "NAS FS Version", refer to "Maximum NAS User Volume Capacity and the Maximum File Size of Each "NAS FS Block Size" (page 52).</p> <table border="1"> <thead> <tr> <th>NAS FS Version</th> <th>Expand Volume</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td>5</td> <td>Available (*1)</td> <td>"NAS FS Block Size" is "8 KB", "32 KB", or "256 KB". When the version is "5" or later, the quota information can be configured for each shared folder.</td> </tr> </tbody> </table> <p>*1 : Refer to the [Reconfigure NAS Volume] function and the [Expand Thin Provisioning Volume] function for details.</p>	NAS FS Version	Expand Volume	Description	5	Available (*1)	"NAS FS Block Size" is "8 KB", "32 KB", or "256 KB". When the version is "5" or later, the quota information can be configured for each shared folder.												
NAS FS Version	Expand Volume	Description																	
5	Available (*1)	"NAS FS Block Size" is "8 KB", "32 KB", or "256 KB". When the version is "5" or later, the quota information can be configured for each shared folder.																	

2. Volume Volume (Basic Information)

Item	Description
RAID Group No.	The RAID group number or External RAID Group number to which the volume belongs is displayed. If the type is "WSV", the RAID group number to which the representative volume belongs is displayed. This item is not displayed when the volume type is "TPV" or "FTV".
RAID group name	The RAID group name or External RAID Group name to which the volume belongs is displayed. If the type is "WSV", the RAID group name to which the representative volume belongs is displayed. This item is not displayed when the volume type is "TPV" or "FTV".
Thin Provisioning Pool No.	The TPP number to which the volume belongs is displayed. This item is displayed only when the volume type is "TPV".
Thin Provisioning Pool Name	The TPP name to which the volume belongs is displayed. This item is displayed only when the volume type is "TPV".
FTRP No.	The FTRP number to which the volume belongs is displayed. This item is displayed only when the volume type is "FTV".
FTRP name	The FTRP name to which the volume belongs is displayed. This item is displayed only when the volume type is "FTV".
Encryption	The encryption status of the volume is displayed. For the ETERNUS DX60 S5, this item is not displayed. CM "- " (hyphen) SED
Data Integrity	The volume protection method is displayed. <ul style="list-style-type: none"> • Default Data is protected within the storage system. • T10-DIF Data is protected with a T10-DIF (Data Integrity Field) compatible method in the storage system and the host paths. This method is available only when the host interface is FC.
Wide Stripe Size	The Wide Stripe Size is displayed. "Wide Stripe Size" is the size of the WSV Unit that is allocated to each RAID group in series. A "- " (hyphen) is displayed when the volume type is other than "WSV". <ul style="list-style-type: none"> • Normal An integral multiple of the basic size for each RAID level (*1). The maximum size is 16 MB or smaller. • Small An integral multiple of the basic size for each RAID level (*1). The maximum size is 2 MB or smaller. Note that when the basic size for a RAID group is larger than 2 MB, the basic size is specified. <p>*1 : The basic size (stripe size) when creating a volume. Refer to "Basic Size for each RAID Level" for details.</p>
Reserved Deletion	The "Reserved Deletion" state of the SDPV is displayed. If an SDPV is currently being used and the SDPV is deleted by using the [Delete Snap Data Pool Volume] function, the target SDPV status changes to "Reserved Deletion". A "- " (hyphen) is displayed when the volume type is other than "SDPV". <ul style="list-style-type: none"> • Yes SDPVs are in the "Reserved Deletion" state. • No SDPVs are not in the "Reserved Deletion" state.

2. Volume
Volume (Basic Information)

Item	Description																						
UID	<p>The UID is displayed.</p> <p>A "-" (hyphen) is displayed for the Data Container Volume.</p> <p>32-digit capital letters and numeric characters (hexadecimal)</p> <div style="background-color: #f0f0f0; padding: 10px; margin-top: 10px;"> <p>Note</p> <ul style="list-style-type: none"> • For External Volumes that inherit the External LU Information, the UID of the External Volumes is displayed. For External Volumes that do not inherit the External LU Information, the UID that is assigned by the storage system (local storage system) is displayed. • If the External LU Information is deleted, the UID that is assigned by the storage system is displayed. Refer to the [Delete External LU Information] function for details. </div>																						
UID Mode	<p>The UID status is displayed.</p> <p>A "-" (hyphen) is displayed for the Data Container Volume.</p> <p>Default Custom External</p> <div style="background-color: #f0f0f0; padding: 10px; margin-top: 10px;"> <p>Note</p> <ul style="list-style-type: none"> • If the External LU Information is deleted, this item is changed from "External" to "Default". Refer to the [Delete External LU Information] function for details. </div>																						
Storage Cluster	<p>When the volume is being used by the Storage Cluster function, "Enable" is displayed. When no volumes are used for the Storage Cluster function, "Disable" is displayed.</p> <p>This item is only displayed when "Enable" is selected for the Storage Cluster function.</p>																						
Virtual Volume	<p>When the volume is being used by the Virtual Volume function, "Enable" is displayed. When no volumes are used for the Virtual Volume function, "Disable" is displayed. For \$VVOL_META, "Disable" is displayed even if the relevant volume is being used for the Virtual Volume function.</p> <p>This item is only displayed when "Enable" is selected for the Virtual Volume function.</p>																						
Allocation	<p>The allocation method for the volume is displayed.</p> <p>A "-" (hyphen) is displayed when the volume type is other than "TPV" or "FTV".</p> <p>Thin Thick</p>																						
Usage Details	<p>The detailed usage of the volume is displayed.</p> <table border="1" style="width: 100%; border-collapse: collapse; margin-top: 10px;"> <thead> <tr> <th>Usage</th> <th>Usage Details</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td>Block</td> <td>Block</td> <td>The volumes that are used for the SAN.</td> </tr> <tr> <td>Block/ Dedupe&Comp</td> <td>Block Deduplication and Compression Enabled</td> <td>The Deduplication/Compression Volumes. The volumes that have both the Deduplication and Compression functions enabled.</td> </tr> <tr> <td>Block/Dedupe</td> <td>Block Deduplication Enabled</td> <td>The Deduplication/Compression Volumes. The volumes that have the Deduplication function enabled.</td> </tr> <tr> <td>Block/Comp</td> <td>Block Compression Enabled</td> <td>The Deduplication/Compression Volumes. The volumes that have the Compression function enabled.</td> </tr> <tr> <td rowspan="3">File</td> <td>NAS Data</td> <td>The user volumes that are used for the NAS. The NAS Data type volumes are created by Web GUI.</td> </tr> <tr> <td>NAS Backup</td> <td>The backup volumes that are used for the NAS. The NAS Backup type volumes are created by CLI or ETERNUS SF Storage Cruiser.</td> </tr> <tr> <td>NAS Snapshot</td> <td>The snapshot destination SDVs that are used for NAS.</td> </tr> </tbody> </table>	Usage	Usage Details	Description	Block	Block	The volumes that are used for the SAN.	Block/ Dedupe&Comp	Block Deduplication and Compression Enabled	The Deduplication/Compression Volumes. The volumes that have both the Deduplication and Compression functions enabled.	Block/Dedupe	Block Deduplication Enabled	The Deduplication/Compression Volumes. The volumes that have the Deduplication function enabled.	Block/Comp	Block Compression Enabled	The Deduplication/Compression Volumes. The volumes that have the Compression function enabled.	File	NAS Data	The user volumes that are used for the NAS. The NAS Data type volumes are created by Web GUI.	NAS Backup	The backup volumes that are used for the NAS. The NAS Backup type volumes are created by CLI or ETERNUS SF Storage Cruiser.	NAS Snapshot	The snapshot destination SDVs that are used for NAS.
Usage	Usage Details	Description																					
Block	Block	The volumes that are used for the SAN.																					
Block/ Dedupe&Comp	Block Deduplication and Compression Enabled	The Deduplication/Compression Volumes. The volumes that have both the Deduplication and Compression functions enabled.																					
Block/Dedupe	Block Deduplication Enabled	The Deduplication/Compression Volumes. The volumes that have the Deduplication function enabled.																					
Block/Comp	Block Compression Enabled	The Deduplication/Compression Volumes. The volumes that have the Compression function enabled.																					
File	NAS Data	The user volumes that are used for the NAS. The NAS Data type volumes are created by Web GUI.																					
	NAS Backup	The backup volumes that are used for the NAS. The NAS Backup type volumes are created by CLI or ETERNUS SF Storage Cruiser.																					
	NAS Snapshot	The snapshot destination SDVs that are used for NAS.																					

2. Volume
Volume (Basic Information)

Item	Description		
	Usage	Usage Details	Description
			NAS Snapshots are automatically created when performing the [Set Snapshot] function.
System	NAS CM#0 System (*1)		The system volumes that are used for CM#0 in the NAS system.
	NAS CM#1 System (*1)		The system volumes that are used for CM#1 in the NAS system.
	NAS FS Management (*1)		The system volumes that are used for NAS system file management.
	NAS CM#0 EX System (*2)		The NAS expanded system volume that is used to store NAS monitoring logs for CM#0 in the NAS system.
	NAS CM#1 EX System (*2)		The NAS expanded system volume that is used to store NAS monitoring logs for CM#1 in the NAS system.
	VVOL Metadata		The system volumes that are used for storing the management information (metadata) of the Virtual Volume function. This volume is automatically created when the Virtual Volume function is set to "Enable" and when VVOL is created from ETERNUS SF Storage Cruiser for the first time.
	Data Container (*3)		The Data Container Volumes. The container volumes that are used for the Deduplication/Compression function.
Migration	Migration		An External Volume that is used for data migrations.
Veeam	Veeam		The Veeam Snapshot Volumes that have both the Deduplication and Compression functions disabled.
Dedupe&Comp/Veeam	Dedupe&Comp/Veeam		The Veeam Snapshot Volumes that have both the Deduplication and Compression functions enabled.
Dedupe/Veeam	Dedupe/Veeam		The Veeam Snapshot Volumes that have the Deduplication function enabled.
Comp/Veeam	Comp/Veeam		The Veeam Snapshot Volumes that have the Compression function enabled.
	<p>*1 : The volume is created automatically when NAS Data volumes are created.</p> <p>*2 : The volume is created by executing the "create volume" CLI command. Web GUI cannot be used to create this volume. NAS volumes of which "Usage" is "System" are collectively referred to as "NAS system volumes" in this manual.</p> <p>*3 : The volume is created automatically when Deduplication/Compression (or the Deduplication/Compression function) for TPP is enabled.</p>		
Data Reduction Processing CM	<p>For Deduplication/Compression Volumes and Data Container Volumes, a CM that controls data deduplication/compression is displayed.</p> <p>For the other volumes, a "-" (hyphen) is displayed.</p> <p>This item is displayed only when the Deduplication/Compression function is enabled.</p> <p>For the ETERNUS DX900 S5 or the ETERNUS DX8900 S4 CE#x CM#y</p> <p>For the other models CM#y</p> <p>x: CE number y: CM number</p>		

2. Volume
Volume (Basic Information)

Item	Description															
Process	<p>A process that is being performed for the volume is displayed. If no process is being performed, a "-" (hyphen) is displayed. If multiple processes are currently being performed, the processes are separated with a ":" (colon) and displayed in the "xx:yy:zz" format. "Encrypting", "Formatting", "Migrating", or "Balancing" is displayed as "xx". "Optimizing Capacity", "Reserved Optimizing Capacity", "Automatic Stop", or "Manual Stop" is displayed as "yy". "Optimizing Capacity" or "Reserved Optimizing Capacity" is displayed as "zz". Note that "Automatic Stop" and "Manual Stop" are displayed only if the Non-disruptive Storage Migration License has been registered.</p> <p>Note</p> <ul style="list-style-type: none"> If "Automatic Stop" or "Manual Stop" is selected for "Data Sync after Migration" when starting a data migration for Non-disruptive Storage Migration using the [Start RAID Migration] function, "Migrating : Automatic Stop" or "Migrating : Manual Stop" is displayed for "Process" of the migration source volume. The following items are displayed if "Manual Stop" is selected and data synchronization is being performed between the migration source volumes and migration destination volumes even if the migration has been completed. <table border="1"> <thead> <tr> <th>Item</th> <th>Migration source volume</th> <th>Migration destination volume</th> </tr> </thead> <tbody> <tr> <td>Usage Details</td> <td>Migration</td> <td>Block</td> </tr> <tr> <td>Process</td> <td>Migrating: Manual Stop</td> <td>Migrating</td> </tr> <tr> <td>Migration Status</td> <td>Active</td> <td>Active</td> </tr> <tr> <td>Progress</td> <td>100 %</td> <td>100 %</td> </tr> </tbody> </table>	Item	Migration source volume	Migration destination volume	Usage Details	Migration	Block	Process	Migrating: Manual Stop	Migrating	Migration Status	Active	Active	Progress	100 %	100 %
Item	Migration source volume	Migration destination volume														
Usage Details	Migration	Block														
Process	Migrating: Manual Stop	Migrating														
Migration Status	Active	Active														
Progress	100 %	100 %														
Migration Status	<p>The RAID migration status is displayed. This item is not displayed when the process is other than "Migrating".</p> <ul style="list-style-type: none"> Reserved The RAID migration is in a reserved state. Active The RAID migration is operating normally. Error The RAID migration has been suspended due to an error. "-" (hyphen) A status other than the ones listed above. 															
Progress	<p>The progress of a process that is being performed is displayed with a bar and a rate (0 to 100 %). To display the latest progress, refresh the screen. If no process is being performed, or if the migration status is "Reserved", a "-" (hyphen) is displayed.</p>															

2. Volume

Volume (Basic Information)

Item	Description
Estimated Time Left	<p>The estimated remaining time before formatting is complete is displayed. To display the latest estimated remaining time, refresh the screen. This item is not displayed when the process is other than "Formatting".</p> <ul style="list-style-type: none"> • Calculating The storage system is calculating the estimated remaining time. • 30 days or more The estimated remaining time is 30 days or more. • x days y h z min. The estimated remaining time is more than one minute and less than 30 days. When the estimated remaining time is less than one day, the "days" value is omitted. When the estimated remaining time is less than one hour, the "days" and "h" values are omitted. • Less than 1 min. The estimated remaining time is less than one minute. <div style="background-color: #fff9c4; padding: 10px; margin-top: 10px;"> <p>Caution</p> <ul style="list-style-type: none"> • The estimated time that is left may increase or decrease depending on the I/O load when this parameter is used. </div>
Remaining Size	<p>The remaining size of the unformatted volume is displayed. To display the latest size, refresh the screen. This item is not displayed when the process is other than "Formatting".</p>
Optimizing Capacity Progress	<p>The progress of capacity optimization processes that are being performed is displayed with a bar and a rate (0 to 100 %). To display the latest progress for the capacity optimization, refresh the screen. When capacity optimization is not being performed, a "-" (hyphen) is displayed.</p> <p>When the storage system status is "Not Ready", the field is blank.</p>
Total Device Space	<p>The total space of the file system is displayed.</p> <p>The "Total Device Space" indicates the NAS user volume capacity that is available for the user.</p> <p>This item is displayed only when the usage details of the volume is "NAS Data".</p>
Used Device Space	<p>The used space in the file system is displayed.</p> <p>The "Used Device Space" indicates the NAS user volume capacity that has already been used by the user.</p> <p>This item is displayed only when the usage details of the volume is "NAS Data".</p>
Free Device Space	<p>The free space in the file system is displayed.</p> <p>The "Free Device Space" indicates the NAS user volume capacity that will be available for the user.</p> <p>This item is displayed only when the usage details of the volume is "NAS Data".</p>
File System Information	<p>The mount state of the file system is displayed.</p> <p>This item is displayed only when the usage details of the volume is "NAS Data".</p>
External LU Information	<p>Whether the volume inherits the External LU Information is displayed.</p> <p>This item displays "Inherited" for External Volumes that inherit the External LU Information while "Usage" is "Migration" (if a data migration has not been performed or if a data migration is being performed).</p> <p>A "-" (hyphen) is displayed for the following volumes.</p> <ul style="list-style-type: none"> • Volumes (of which "Usage" is "Block") that have inherited the External LU Information if a data migration has already been performed • External Volumes that do not inherit the External LU Information • Volumes of which the External LU Information is deleted • Volumes (internal volumes) <p>This item is displayed only if the Non-disruptive Storage Migration License has been registered.</p>

2. Volume

Volume (Basic Information)

Item	Description
Snapshot Name	<p>For volumes that can be operated from Veeam B&R, the following names are displayed.</p> <ul style="list-style-type: none"> If the volume is a copy destination of the Veeam session (or if the volume is a Veeam Snapshot Volume), the snapshot name is displayed. This is the name that is displayed on the operation screen of Veeam B&R. If the volume is a copy destination of the SnapOPC+ session, the volume name is displayed. This is the same as the "Name" that is displayed in the volume list. <p>For the other volumes, a "-" (hyphen) is displayed.</p> <p>This item is displayed when the Veeam Storage Integration License has been registered in a storage system other than the ETERNUS DX8100 S4.</p>

[Volume Detail] Screen ([Used RAID Group] Tab)

The [Used RAID Group] tab is not displayed when the volume type is "TPV" and "FTV".

Used RAID Group Information

The information for a RAID group that is being used is displayed in the following order. Note that sorting of the display contents is not available.

- When the volume type is "Standard", volumes are displayed in concatenation order with the [LUN Concatenation](#) function
- When the volume type is "WSV", volumes are displayed according to the concatenation number of the WSV Unit (the order of allocating the WSV unit to the RAID group)

Item	Description
RAID Group No.	The RAID group number to which the concatenated volume or WSV Unit belongs is displayed.
RAID Group Name	The RAID group name to which the concatenated volume or WSV Unit belongs is displayed.
Capacity	The capacity of the concatenated volume or the WSV Unit is displayed. The capacity is displayed with a unit that is determined according to the actual size.
Capacity on RAID Group	The capacity that is secured in the RAID group by the concatenated volume or the WSV Unit is displayed. The capacity is displayed with a unit that is determined according to the secured size.

[Volume Detail] Screen ([Snapshot] Tab)

The [Snapshot] tab is displayed only for NAS user volumes (volumes of which the "Usage Details" is "NAS Data").

Volume Information

The volume number, volume name, type, and usage ("File") are displayed.

Item	Description
Status	The NAS user volume status is displayed. Refer to ""Volume Status" (page 1604) for details.
Capacity	The NAS user volume capacity is displayed.
Usage Details	The usage details of the NAS user volume are displayed. NAS Data

2. Volume
Volume (Basic Information)

Item		Description
Snapshot	Mode	<p>The collection mode for the snapshot is displayed.</p> <p>If the snapshot is not set, a "-" (hyphen) is displayed.</p> <ul style="list-style-type: none"> • Automatic The snapshot is set from Web GUI, CLI, or ETERNUS SF Storage Cruiser. • Manual The snapshot is set from VMware vSphere Web Client. Refer to "ETERNUS vCenter Plug-in User's Guide" for details.
	Schedule	<p>Status of the scheduled operation for snapshot is displayed.</p> <p>If the snapshot is not set or if the collection mode (or the "Mode" setting) for snapshot is set to "Manual", a "-" (hyphen) is displayed.</p> <p>Active Inactive</p>
	Session Status	<p>The session status for the snapshot is displayed.</p> <p>If the snapshot is not set, a "-" (hyphen) is displayed.</p> <ul style="list-style-type: none"> • Normal Snapshot performs normally. • Error Some snapshots cannot be referenced due to an error. If the session status of even one generation is error in the "Snapshot Information" field, "Error" is displayed for this item.
	Schedule Day	<p>The snapshot acquisition schedule (set day) is displayed.</p> <p>If the snapshot schedule is specified for all the days of the week, "Every Day" is displayed.</p> <p>If the snapshot is not set or if the collection mode (or the "Mode" setting) for snapshot is set to "Manual", a "-" (hyphen) is displayed.</p>
	Schedule Time	<p>The snapshot acquisition schedule (set time) is displayed.</p> <p>If the snapshot schedule is specified for all hours, "Every Hour" is displayed.</p> <p>If the snapshot is not set or if the collection mode (or the "Mode" setting) for snapshot is set to "Manual", a "-" (hyphen) is displayed.</p>
	Number of Generations	<p>The number of generations for the snapshot is displayed.</p> <p>If the snapshot is not set, a "-" (hyphen) is displayed.</p> <p>ETERNUS DX100 S5: 1 - 64</p> <p>ETERNUS DX200 S5: 1 - 128</p> <p>ETERNUS DX500 S5: 1 - 128</p> <p>ETERNUS DX600 S5: 1 - 128</p>
	RAID Group No.	<p>The RAID group number that the snapshot destination SDV belongs to is displayed.</p> <p>If the snapshot is not set, a "-" (hyphen) is displayed.</p>
	RAID Group Name	<p>The RAID group name that the snapshot destination SDV belongs to is displayed.</p> <p>If the snapshot is not set, a "-" (hyphen) is displayed.</p>

Snapshot Information

Item	Description
Snapshot Date	<p>The date and time (YYYY-MM-DD hh:mm:ss) of when the snapshot was acquired is displayed in descending order.</p> <p>If the snapshot is not set, a "-" (hyphen) is displayed.</p>

2. Volume

Volume (Basic Information)

Item	Description
Session Status	The session status for the snapshot is displayed. If the snapshot is not set, a "-" (hyphen) is displayed. <ul style="list-style-type: none"> • Normal Snapshot performs normally. • Error The snapshot is stopped due to an error.
Volume No.	The volume number for the snapshot destination SDV is displayed.
Volume Name	The volume name for the snapshot destination SDV is displayed.

■ Filter Setting

Function Description

Filter setting is a function used to display a list of only the volumes meeting all the specified conditions. No filtering is set by default. The following table shows conditions that can be specified.

Item	Description	Setting values
Name	Input the volume name that is to be displayed. When not using the volume name for filtering, leave this item blank.	Volume name Blank
Status	Select the volume status that is to be displayed.	All Refer to "Volume Status" (page 1604) .
Type	Select the volume type that is to be displayed. "TPV" and "FTV" are displayed as options only when the Thin Provisioning function is enabled.	All Standard TPV FTV WSV SDV SDPV Temporary
Usage	Select the usage of the volume that is to be displayed. "Block/Dedupe&Comp", "Block/Dedupe", and "Block/Comp" are displayed as options only if the Deduplication/Compression function is enabled. "Migration" is displayed as an option only if the Non-disruptive Storage Migration License has been registered. "Veeam", "Dedupe&Comp/Veeam", "Dedupe/Veeam", and "Comp/Veeam" are displayed as options only if the Veeam Storage Integration License has been registered.	All Block Block/Dedupe&Comp Block/Dedupe Block/Comp File System Migration Veeam Dedupe&Comp/Veeam Dedupe/Veeam Comp/Veeam
Encryption	Select the encryption status of the volume that is to be displayed.	All CM "-" (hyphen) SED
UID Mode	Select the UID status of the volume that is to be displayed.	All Default Custom External "-" (hyphen)

2. Volume

Volume (Basic Information)

Item	Description	Setting values
Process	Select the current process of the volume that is to be displayed. "Automatic Stop" and "Manual Stop" are displayed as options only if the Non-disruptive Storage Migration License has been registered.	All Encrypting Formatting Migrating Balancing Optimizing Capacity Reserved Optimizing Capacity Automatic Stop Manual Stop "-" (hyphen)
Storage Cluster	Select the Storage Cluster function usage status for the volume that is to be displayed. This item is only displayed when "Enable" is selected for the Storage Cluster function.	All Enable Disable
Virtual Volume	Select the Virtual Volume function usage status for the volume that is to be displayed. This item is only displayed when "Enable" is selected for the Virtual Volume function.	All Enable Disable
Allocation	Select the allocation method of the volume that is to be displayed.	All Thin Thick

Create Volume

- ["■ Overview" \(page 61\)](#)
- ["■ User Privileges" \(page 63\)](#)
- ["■ Settings" \(page 64\)](#)
- ["■ Display Contents" \(page 92\)](#)
- ["■ Operating Procedures" \(page 95\)](#)
 - ["Creating Standard Type Volumes, SDVs, or SDPVs" \(page 95\)](#)
 - ["Creating TPVs" \(page 97\)](#)
 - ["Creating WSVs" \(page 99\)](#)
 - ["Creating NAS User Volumes" \(page 100\)](#)
 - ["Creating Deduplication/Compression Volumes" \(page 102\)](#)

■ Overview

This function creates new volumes.
The following types of volumes can be created.

- Standard
The most commonly used volumes. Volumes are created in RAID groups or [External RAID Groups](#).
- Wide Striping Volume (WSV)
Volumes that are configured by multiple RAID group areas that are concatenated with striping to improve performance.
- Thin Provisioning Volume (TPV)
Volumes that are created in TPPs. TPVs can also be used as the copy destination for SnapOPC or SnapOPC+.

2. Volume

Volume (Basic Information)

- **Snap Data Volume (SDV)**
Copy destination volumes for SnapOPC or SnapOPC+ that are created in the RAID group.
- **Snap Data Pool Volume (SDPV)**
Volumes used as expansion areas for SDV that are created in the RAID group.
- **NAS Volume**
Volumes used for NAS system operation (hereinafter referred to as "NAS user volume") in the Unified Storage environment that are created in TPPs.
- **Deduplication/Compression Volume**
Volumes that have Deduplication, Compression, or both Deduplication and Compression enabled. The volumes are created in TPPs that have the Deduplication/Compression function enabled.

Caution

- The ETERNUS DX60 S5 does not support the encryption function.
- Volumes are formatted automatically when they are created in RAID groups or TPPs. If the error message "An internal resource is insufficient." appears after volumes are created, a format of volumes may have failed. Check the "Status" of the created volumes in the [Volume] screen. Refer to the [Volume (Basic Information)] function for details. Volumes in the "🟡Readying" state have not been formatted. Wait until the currently running format processes are complete and reformat the relevant volumes. Refer to the [Format Volume] function for details.
- The maximum number of volumes that can be created is reduced in the following conditions:
 - When [TPPs](#) exist in the storage system
 - When concatenated volumes exist in the storage system
 - When [REC Disk Buffers](#) exist in the storage system
 - When Extreme Cache exists in the storage system
 - When Extreme Cache Pools exist in the storage system
 - When volumes undergoing [RAID migration](#) exist
 - When volumes undergoing Balancing TPV exist
 - When the Automated Storage Tiering feature is enabled
 - When Deduplication, Compression, or both Deduplication and Compression are enabled for the TPP
 - When the Veeam Storage Integration License is registered

Note

- Volumes are formatted automatically when they are created in RAID groups or TPPs. Standard, WSV, TPV, and SDV can be accessed from the host when host affinity is set after volume creation. NAS user volumes can be accessed from the host when NAS interface is set and shared folder is created after volume creation.
- [External Volumes](#) are not formatted after a volume creation. They inherit the External LU Information of the External RAID Group (or the External Drive).
- When a volume is created manually (*1), the volume number can be specified.

*1: Volumes can be created manually for WSVs or when drives are selected manually for Standard type volumes, SDVs, SDPVs, TPVs, NAS volumes, or Deduplication/Compression Volumes.
- When "Automatic" is selected to create a volume or when "Manual" is selected but a volume number is not specified, the volume number is allocated when a volume is created from the smallest unused decimal number in ascending order.
- When "Manual" is selected, create the specified number of volumes by using the maximum free space that is available in the RAID group. Specifying a "Capacity" value is not required. "Standard", "WSV", and "SDPV" type volumes are created by using the maximum free space.
- This function cannot be used to create an ODX Buffer volume. Refer to the [Create ODX Buffer Volume] function for details.
- The Extreme Cache mode (enabled or disabled) of the storage system and the set states of the Extreme Cache mode for each volume are not linked. Regardless of the mode of the Extreme Cache for the storage system, the default state of Extreme Cache for each volume is "Enable". Note that External Volumes do not use Extreme Cache. Refer to the [Setup Extreme Cache] function in the [System] navigation for details about the Extreme Cache mode of the ETERNUS DX500 S5/DX600 S5/DX900 S5 and the ETERNUS DX8900 S4.
- The Extreme Cache Pool mode (enabled or disabled) of the storage system and the set states of Extreme Cache Pool for each volume are not linked. Regardless of the mode of the Extreme Cache Pool for the storage system, the default state of Extreme Cache Pool for each volume is "Enable". Note that External Volumes do not use Extreme Cache Pool. Refer to the [Setup Extreme Cache Pool] function in the [System] navigation for details about the Extreme Cache Pool mode of the ETERNUS DX100 S5/DX200 S5.
- Enabling or disabling Extreme Cache for each volume can be performed with Web GUI, CLI, or ETERNUS SF Storage Cruiser. Use the [Modify Cache Parameters] function to change the setting from Web GUI (for the ETERNUS DX500 S5/DX600 S5/DX900 S5 and the ETERNUS DX8900 S4).
- Enabling or disabling Extreme Cache Pool for each volume can be performed with Web GUI or CLI. Use the [Modify Cache Parameters] function to change the setting from Web GUI (for the ETERNUS DX100 S5/DX200 S5).
- In this manual, "volumes" include "External Volumes" if differentiation is not specifically required.

■ User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	✓
StorageAdmin	✓
AccountAdmin	
SecurityAdmin	

2. Volume

Volume (Basic Information)

Default role	Availability of executions
Maintainer	✓

Refer to ["A. User Roles and Policies" \(page 1580\)](#) for details on the policies and roles.

■ Settings

In this screen, specify the details of the volumes that are to be created.

When creating Standard type volumes, SDVs, or SDPVs

- Creating volumes in a RAID group
 - There are two methods to select a RAID group; "Automatic" and "Manual".
 - Up to 128 volumes can be created in a RAID group. Note that ["\[The maximum number of volumes that can be created for each model\]" \(page 79\)](#) is applied to the total number of volumes in RAID groups, External RAID Groups, and Pools (TPPs and FTRPs).
 - For "RAID6-FR" type RAID groups, only "Standard" volumes can be created.
 - To create an SDV or SDPV, the Advanced Copy license is required.
 - The following list shows the conditions for creating SDPVs.
 - The volume capacity must be 2 TB or less
 - The volume capacity must be a multiple of SDPE capacity (1 GB/2 GB/4 GB) (*1)
 - *1 : To check the current SDPE capacity, refer to the [Snap Data Pool] screen in the [Advanced Copy] navigation.
 - Creating SDPVs in RAID groups with the same RAID level, drive type, number of drives is recommended.
- Creating External Volumes in an External RAID Group
 - Select the "Enable" checkbox in the "Use External Drive" field.
 - The only available selection method for External RAID Groups is "Manual".
 - For External RAID Groups, only "Standard" volumes can be created. For the created External Volumes, "Usage" and "Usage Details" are "Migration".
 - The number of volumes cannot be specified when creating External Volumes in the External RAID Group. One External Volume is created in one External RAID Group.
- For details on the setting items according to each volume type, refer to ["Setting Items for Each Volume Type When Selecting "Automatic" or "Setting Items for Each Volume Type When Selecting "Manual"."](#)

When creating TPVs

- Volumes are created in TPPs.
- There are two methods to select a TPP; "Automatic" and "Manual".
- When a TPP is created, a control volume is created for each RAID group that configures a TPP. Therefore, the maximum number of volumes that can be created in a TPP is calculated by using the following formula.

Number of volumes that can be created in a TPP = Maximum number of volumes - Number of RAID groups that configure the relevant TPP

Note that ["\[The maximum number of volumes that can be created for each model\]" \(page 79\)](#) is applied to the total number of volumes in RAID groups, External RAID Groups, and Pools (TPPs and FTRPs).

- When creating TPVs, "Enable" the Thin Provisioning function. Refer to the [Set Thin Provisioning] function for details.
- The maximum total logical capacity of the TPVs that can be created in the storage system depends on the maximum pool capacity specified with the [Set Thin Provisioning] function. To check the maximum pool capacity, use the [Settings (Thin Provisioning)] function.
- The total logical capacity of the TPVs that can be created at a time is 2 PB.
- The total logical capacity of the TPVs that can be created in a single TPP is 48 PB.
- For details on the setting items, refer to ["Setting Items for Each Volume Type When Selecting "Automatic" or "Setting Items for Each Volume Type When Selecting "Manual"."](#)

2. Volume

Volume (Basic Information)

When creating WSVs

- The only available selection method for RAID groups is "Manual".
- The conditions for RAID groups to configure WSVs are as follows:
 - The RAID level (RAID1+0/RAID5/RAID6/RAID5+0/RAID1/RAID0) must be the same
 - The number of member drives in the RAID group must be the same
 - The Stripe Depth value must be the same
 - The drive type (Online/Nearline/SSD/Online SED/Nearline SED/SSD SED) must be the same
(Since the access performance of WSVs is reduced, selecting the same drive type for the "Drive Type" in the "Select RAID Group Information" field is recommended. Selecting "Online/Nearline" and "Online SED/Nearline SED" is not recommended.)
 - The SSD type (SSD-H/SSD-M/SSD-L/SSD-H SED/SSD-M SED/SSD-L SED) must be the same
(Since the access performance of WSVs is reduced, use the same SSD type. The SSD type that configures a RAID group can be checked in the [RAID Group Detail] screen ([Drive] tab).)
 - The drive speed must be the same
(RAID groups configured with different speed drives can be selected. Note that this reduces the access performance for WSVs. It is recommended to select the same speed drives. The speed of the drives that configure a RAID group can be checked in the [RAID Group Detail] screen ([Drive] tab).)
 - The sector format (Advanced Format (AF) compliant/non-AF-compliant) must be the same
(Selecting RAID groups that are configured with drives of the same sector format is recommended.)
 - The key group set state must be the same
(If the drive type is "Online SED", "Nearline SED", "SSD SED", or "Online SED/Nearline SED", RAID groups can be selected regardless of the key group setting (enabled or disabled). However, selecting the same key group set state is recommended. The key group set state can be checked with the "Encryption" field in the [Select RAID Groups] screen.)
 - The sequential unused area must be the same size or bigger than the capacity of the volumes that are to be concatenated
- The number of concatenated RAID groups is from 2 to 64.
- The WSV capacity is from 24 MB to 128 TB.
- To expand the WSV capacity, use the RAID migration function instead of the LUN Concatenation function. Refer to the [Start RAID Migration] function for details.
- RAID group capacity expansion for RAID groups which configure WSVs is not available (LDE cannot be performed). Refer to the [Expand RAID Group] function for details.
- For details on the setting items, refer to "[Setting Items for Each Volume Type When Selecting "Manual"](#)".

When creating NAS user volumes

- NAS user volumes can only be created in a Unified Storage environment using the ETERNUS DX100 S5/DX200 S5 and the ETERNUS DX500 S5/DX600 S5.
- Volumes are created in TPPs.
- There are two methods to select a TPP; "Automatic" and "Manual".
- The NAS user volumes (TPVs for the NAS environment) and TPVs for the SAN environment can be created in the same TPP.
- There are two types of NAS volumes; NAS user volumes and NAS backup volumes. The NAS backup volume cannot be created with Web GUI. To create a NAS backup volume, use CLI or ETERNUS SF Storage Cruiser. The number of NAS backup volumes that can be created for each model is the same as NAS user volumes.
- The maximum number and the capacity of NAS user volumes for each model are described below. The total capacity of NAS user volumes (TPVs for NAS), NAS backup volumes, and NAS system volumes (25 GB) must not exceed the maximum pool capacity specified with the [Set Thin Provisioning] function. Refer to the [Settings (Thin Provisioning)] function for details.

Model	Maximum number of NAS user volumes	NAS user volume capacity (*1)
ETERNUS DX100 S5	2	400 GB - 128 TB (*2)
ETERNUS DX200 S5	4	The smallest volume capacity that is available for the user is 100 GB.
ETERNUS DX500 S5	4	

2. Volume

Volume (Basic Information)

When creating NAS user volumes		
Model	Maximum number of NAS user volumes	NAS user volume capacity (*1)
ETERNUS DX600 S5	8	When the first volume is created, an additional "25 GB" is used for the system volume.

*1 : 300 GB of the created volume is used as the system area. The capacity that can be used is "specified capacity - 300 GB".

*2 : The maximum NAS user volume capacity and the maximum file size vary depending on the specified "NAS FS Block Size" when creating volumes. The new volume capacity must not be more than the maximum NAS user volume capacity.

Maximum NAS User Volume Capacity and the Maximum File Size of Each "NAS FS Block Size"

	NAS FS Block Size		
	8 KB	32 KB	256 KB
Maximum NAS user volume capacity	32 TB	128 TB	128 TB
Maximum file size (*3)	1 TB	4 TB	32 TB

*3 : The "file size" indicates the size of the user data that is created in the shared folder.

- When the NAS user volume is created, three system volumes are automatically created per storage system in the same TPP.

The following NAS system volumes are created:

Volume name	Usage	Usage details	Capacity
\$SYSVOL1	System	NAS FS Management	1 GB
\$SYSVOL2		NAS CM#0 System	12 GB
\$SYSVOL3		NAS CM#1 System	12 GB

- Only one NAS user volume can be created at a time.
- NAS volumes are displayed as "TPV" in the volume list screen. TPVs for SAN and the NAS volumes (TPVs for NAS) can be identified by "Usage" and "Usage Details". Refer to the [Volume (Basic Information)] function for details.
- The NAS expanded system volumes for storing the NAS monitoring logs cannot be created from Web GUI. Execute the "create volume" CLI command. NAS expanded system volumes can be checked in "Usage" and "Usage Details". Refer to the [Volume (Basic Information)] function for details.
- For details on the setting items according to each volume type, refer to "[Setting Items for Each Volume Type When Selecting "Automatic"](#)" or "[Setting Items for Each Volume Type When Selecting "Manual"](#)".

Caution

- Procedures for when the NAS user volume creation is not completed successfully

Procedure ▶▶▶

- 1** Confirm that the general status (detail) of the storage system and the status of the NAS Engine are both "✔Normal". If the status is not "✔Normal", the storage system requires maintenance.
The storage system general status (detail) can be checked in the [Storage] screen. Refer to the [Storage] function for details.
The NAS Engine status can be checked in the [Internal Parts] tab of the [Controller Module Detail] screen. Refer to the [Controller Module] function for details.
- 2** If the NAS user volume was created, delete the relevant volume. If the NAS user volume cannot be deleted, the storage system requires maintenance.
For the NAS user volume, "File" is displayed as the usage in the volume list screen ("NAS Data" is displayed as the usage details of the volume detailed information screen). Refer to the [Volume (Basic Information)] function for details.
- 3** Create the NAS user volume again. Confirm that the volume creation was successfully completed.



2. Volume

Volume (Basic Information)

When creating Deduplication/Compression Volumes

- [Deduplication/Compression Volumes](#) can be created if all of the following conditions are satisfied.
 - The ETERNUS DX200 S5, the ETERNUS DX500 S5/DX600 S5/DX900 S5, the ETERNUS DX8900 S4, or the ETERNUS AF250 S3/AF650 S3 is used
 - The Thin Provisioning function is enabled
 - The Thin Provisioning Pool capacity is not in a depleted state
 - Deduplication/Compression for the storage system is enabled
 - The Deduplication, Compression, or both Deduplication and Compression setting (hereinafter referred to as "Deduplication/Compression setting of the TPP" in this manual) is enabled for the TPP where the Deduplication/Compression Volumes are to be created
 - The status of the [Data Container Volume](#) in the TPP where the Deduplication/Compression Volumes are to be created is not "🟡Readying", "🔴Not Ready", "🔴Broken", or "🔴Data Lost"
- [Deduplication/Compression Volumes](#) are TPVs for SAN that have Deduplication, Compression, or both Deduplication and Compression enabled. Note that only "Compression" is available for the ETERNUS DX900 S5 or the ETERNUS DX8900 S4. The volumes are created in TPPs that have the same Deduplication/Compression setting.
- There are two methods to select a TPP; "Automatic" and "Manual".
- Deduplication, Compression, or both Deduplication and Compression for data are performed synchronously with the host I/O.
- For the Deduplication/Compression Volume, a physical capacity as large as the chunk size is used for each volume regardless of the host I/O when the volume is created. Make sure to check the free space in the TPP before creating the volume.
- The total logical capacity of the Deduplication/Compression Volumes that can be created at a time is 2 PB.
- The total logical capacity of the Deduplication/Compression Volumes that can actually be created in a single TPP by the customer is limited to the logical capacity of the Data Container Volume in the relevant TPP.
 - If the efficiency of the Deduplication/Compression function cannot be estimated, setting the total logical capacity of the Deduplication/Compression Volumes smaller than the logical capacity of the Data Container Volume is recommended.
 - If the efficiency of the Deduplication/Compression function can be estimated, the total logical capacity of the Deduplication/Compression Volumes must be less than or equal to ten times the logical capacity of the Data Container Volume.
- If the Deduplication/Compression setting for the TPP is enabled, Deduplication/Compression target volumes (volumes that have Deduplication/Compression enabled) and non-Deduplication/Compression target volumes (TPVs that have Deduplication/Compression disabled) can be created in the same TPP. If both volumes exist, the performance of the non-Deduplication/Compression target volumes (TPVs) may be degraded. To reduce performance degradation of non-Deduplication/Compression target volumes (TPVs), do not create these volumes in the same TPP.
- If Deduplication/Compression Volumes larger than the logical capacity of the Data Container Volume are deleted or formatted repeatedly, creation of the Deduplication/Compression Volume may fail due to a temporary capacity shortage. If this error occurs, wait a few minutes before starting this function.
- Non-Deduplication/Compression target volumes (TPVs) can be changed to Deduplication/Compression target volumes. Also, Compression target volumes (Compression Volumes) can be changed to non-Compression target volumes. Refer to the [Start RAID Migration] function for details.
- "Provisioned Capacity" for TPVs that are created in the storage system does not include the Deduplication/Compression Volume capacity. Refer to the [Thin Provisioning Pool (Basic Information)] function for details.
- The following information for Deduplication/Compression Volumes can be checked. Refer to the [Volume (Basic Information)] function for details.
 - Pre-compression data capacity (Original Data Size) that is written to the relevant TPV.
 - Usage rate that uses the pre-compression data capacity as the used capacity.
- The following performance information for Deduplication/Compression Volumes can be checked. Refer to the [Performance (Host I/O)] function for details.
 - The compression rate of the data that is written to the Deduplication/Compression Volume from the host.
 - The percentage of data that is not suited for the basic data size of the compression process (Unaligned I/O Rate).
- For details on the setting items according to each volume type, refer to "[Setting Items for Each Volume Type When Selecting "Automatic"](#)" or "[Setting Items for Each Volume Type When Selecting "Manual"](#)".

2. Volume Volume (Basic Information)

The screenshot shows the 'Create Volume' dialog box with the following settings:

- Name:** EXVolume
- Capacity:** 1 GB
- Type:** Standard (selected)
- Capacity of source volume (only SDV):** GB
- Allocation:** Thin (selected)
- NAS FS Block Size:** 256 KB
- RAID Group / TPP Selection:** Automatic (selected)
- Data Integrity:** Default (selected)
- Automatic Setting:**
 - Drive Type:** Online
 - RAID Level:** High Performance (RAID1+0)
 - Key Group:** (empty)

Setting Items for Each Volume Type When Selecting "Automatic" (Required settings: ✓)

Setting items	Standard	Block -TPV	NAS -TPV	Dedup -TPV	SDV	SDPV
New Volume	Name	✓	✓	✓	✓	✓
	Capacity	✓	✓	✓	-	✓
	Type	✓	✓	✓	✓	✓
	Capacity of source volume (only SDV)	-	-	-	-	✓
	Deduplication	-	-	-	✓	-
	Compression	-	-	-	✓	-
	Allocation	-	✓	✓	-	-
	NAS FS Block Size	-	-	✓	-	-
	RAID Group / TPP Selection	Automatic				
Data Integrity	✓	-	-	-	-	-
Automatic Setting	Drive Type	✓	✓	✓	✓	✓
	RAID Level	✓	✓	✓	✓	✓
	Key Group	✓	-	-	-	✓
	Number of Volumes	✓	✓	"1" (fixed)	✓	✓
	Start of Suffix	✓	✓	-	✓	✓
	Digits of Suffix	✓	✓	-	✓	✓
	Encryption by CM	✓	✓	✓	✓	✓

2. Volume
Volume (Basic Information)

Setting Items for Each Volume Type When Selecting "Manual" (Required settings: ✓)

Setting items		Setting items for normal use								
		Standard	External -Standard (*1)	Block -TPV	NAS -TPV	Dedup -TPV	SDV	SDPV	WSV (*2)	
New Volume	Name	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Capacity	✓	-	✓	✓	✓	-	✓	✓	
	Type	✓	✓	✓	✓	✓	✓	✓	✓	
	Capacity of source volume ⓘ only SDV	-	-	-	-	-	✓	-	-	
	Use External Drive		✓	-	-	-	-	-	-	
	Deduplication	-	-		-	✓	-	-	-	
	Compression	-	-		-	✓	-	-	-	
	Allocation	-	-	✓	✓	-	-	-	-	
	NAS FS Block Size	-	-	-	✓	-	-	-	-	
	RAID Group / TPP Selection	Manual	-	Manual			-	-	-	
Data Integrity	✓	-	-	-	-	-	-	-		

Setting items		Setting items when "Volume No." is specified								Setting items when "Use all Largest Free Space" is specified		
		Standard	External -Standard (*1)	Block -TPV	NAS -TPV	Dedup -TPV	SDV	SDPV	WSV (*2)	Standard	SDPV	WSV (*2)
New Volume	Name	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Capacity	✓	-	✓	✓	✓	-	✓	✓	-	-	-
	Type	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Capacity of source volume ⓘ only SDV	-	-	-	-	-	✓	-	-	-	-	-
	Use External Drive		✓	-	-	-	-	-	-	-	-	-
	Deduplication	-	-		-	✓	-	-	-	-	-	-
	Compression	-	-		-	✓	-	-	-	-	-	-
	Allocation	-	-	✓	✓	-	-	-	-	-	-	-
	NAS FS Block Size	-	-	-	✓	-	-	-	-	-	-	-
	RAID Group / TPP Selection	Manual	-	Manual			-	-	-	Manual	-	-
Data Integrity	✓	-	-	-	-	-	-	-	✓	-	-	

2. Volume
Volume (Basic Information)

Setting items		Setting items for normal use							
		Standard	External -Standard (*1)	Block -TPV	NAS -TPV	Dedup -TPV	SDV	SDPV	WSV (*2)
Manual Setting or Manual Setting (Volume Information)	Use all Largest Free Space		-						
	Volume No.								
	Start of Suffix	✓	✓	✓	-	✓	✓	✓	✓
	Digits of Suffix	✓	✓	✓	-	✓	✓	✓	✓
	Encryption by CM	✓	-	-	-	-	✓	✓	✓
	Number of Volumes (RAID group)	✓	-	-	-	-	✓	✓	-
	Number of Volumes (TPP)	-	-	✓	-	✓	-	-	-
	Number of Volumes (WSV)	-	-	-	-	-	-	-	✓
	Checkbox to select External RAID Groups	-	✓	-	-	-	-	-	-
Manual Setting (Select RAID Group Information)	Drive Type	-	-	-	-	-	-	-	✓
	RAID Level	-	-	-	-	-	-	-	✓
	Number of Member Drives	-	-	-	-	-	-	-	✓

2. Volume
Volume (Basic Information)

Setting items		Setting items when "Volume No." is specified								Setting items when "Use all Largest Free Space" is specified		
		Standard	External -Standard (*1)	Block -TPV	NAS -TPV	Dedup -TPV	SDV	SDPV	WSV (*2)	Standard	SDPV	WSV (*2)
Manual Setting or Manual Setting (Volume Information)	Use all Largest Free Space		-							✓	✓	✓
	Volume No.	✓	✓	✓	✓	✓	✓	✓	✓			
	Start of Suffix	-	-	-	-	-	-	-	-	✓	✓	✓
	Digits of Suffix	-	-	-	-	-	-	-	-	✓	✓	✓
	Encryption by CM	✓	-	-	-	-	✓	✓	✓	✓	✓	✓
	Number of Volumes (RAID group)	"1" (fixed)	-	-	-	-	"1" (fixed)	"1" (fixed)	-	✓	✓	-
	Number of Volumes (TPP)	-	-	"1" (fixed)	-	"1" (fixed)	-	-	-	-	-	-
	Number of Volumes (WSV)	-	-	-	-	-	-	-	"1" (fixed)	-	-	✓
Checkbox to select External RAID Groups	-	Select one checkbox.	-	-	-	-	-	-	-	-	-	
Manual Setting (Select RAID Group Information)	Drive Type	-	-	-	-	-	-	-	✓	-	-	✓
	RAID Level	-	-	-	-	-	-	-	✓	-	-	✓
	Number of Member Drives	-	-	-	-	-	-	-	✓	-	-	✓

*1 : External Volumes that are created in the External RAID Groups. It is referred to as "External-Standard" in this manual.

*2 : The following items are advanced settings. It is not necessary to change the default value for normal use.

- "Wide Stripe Size" and "Concatenation Order" under the "Manual Setting (Volume Information)" field.
- "Stripe Depth" under the "Manual Setting (Select RAID Group Information)" field.

2. Volume
Volume (Basic Information)

New Volume

Item	Description	Setting values
Name	<p>Specify the volume name.</p> <p>An existing volume name cannot be specified. Volume names starting with "\$SYSVOL", "\$VVOL_META", or "\$DATA_CNTNR" cannot be used.</p> <p>When creating multiple volumes at the same time, the new volumes are named automatically. Refer to "Naming Conventions for Creating Volumes" (page 95) for details.</p>	<p>Up to 32 alphanumeric characters, symbols (except ",", (comma) and "?"), and spaces</p>
Capacity	<p>Specify the volume capacity and select the unit of capacity.</p> <p>Up to a 15-digit number including the "." (decimal point) can be input. Note that when "MB" is selected, the specified value is rounded down to the nearest whole number.</p> <p>When "GB" or "TB" is selected, the specified value is converted to "MB" and rounded down to the nearest whole number.</p>	<p>When creating Standard volumes, WSVs, or TPVs: 24 MB - 128 TB (numeric characters)</p> <p>When creating SDPVs: 1 GB - 2 TB (numeric characters)</p> <p>When creating NAS volumes: 400 GB - 128 TB (numeric characters) (When the NAS FS block size is "256 KB" or "32 KB") 400 GB - 32 TB (numeric characters) (When the NAS FS block size is "8 KB") 1 GB - 2 TB (numeric characters)</p> <p>Unit: MB/GB/TB</p>

2. Volume
Volume (Basic Information)

Item	Description	Setting values
	<p>Caution</p> <ul style="list-style-type: none"> • An error screen appears in the following conditions: <ul style="list-style-type: none"> - Free space in the RAID group is insufficient - The total capacity of TPVs or Deduplication/Compression Volumes that can be created in a single operation exceeds 2 PB. <ul style="list-style-type: none"> • For Automatic Setting Total capacity = Capacity × Number of volumes • For Manual Setting Total capacity = Capacity × Total number of volumes for each TPP • If "Use all Largest Free Space" is selected when creating volumes manually, inputting the capacity is not required. The specified value and unit are not used. • If the same capacity is entered in the same format (digits and units (GB/TB)) as the "Largest Free Space", all of the largest free space is used. To add the capacity without adjustments, input the capacity in units of MB. • Create any of the following types of volumes in advance when using SnapOPC or SnapOPC+. <ul style="list-style-type: none"> - SDV and SDPV (the SDV is created with the minimum necessary capacity) - TPV • The NAS user volume uses 300 GB of the specified capacity as the system area. Take the system area in consideration and specify the capacity. • When a NAS user volume is created, three system volumes (\$SYSVOL1 - 3) are automatically created in the same TPP for each storage system. If free space for \$SYSVOL 1 - 3 (25 GB) is not available in the TPP, a NAS user volume cannot be created. If \$SYSVOL1 - 3 have already been created in the storage system, free space for creating new \$SYSVOL1 - 3 is not required. • The maximum NAS user volume capacity varies depending on the selected "NAS FS Block Size". • The maximum logical capacity of Deduplication/Compression Volumes (or the total logical capacity of Deduplication/Compression Volumes in a TPP) varies depending on the logical capacity of the Data Container Volume in the relevant TPP. If the efficiency of the Deduplication/Compression function cannot be estimated, setting the maximum logical capacity of the Deduplication/Compression Volumes smaller than the logical capacity of the Data Container Volume is recommended. • When creating multiple volumes in a RAID group, the maximum number of volumes that can be created for the user capacity may be reduced. To use the entire user capacity, the volume size must be an exact multiple of the basic size (stripe size). Refer to "Basic Size for each RAID Level" for details. • If all of the following conditions are satisfied, the capacity cannot be entered. <ul style="list-style-type: none"> - "Standard" is selected for "Type" - The "Enable" checkbox in the "Use External Drive" field is selected 	

2. Volume
Volume (Basic Information)

Item	Description	Setting values
	<p>Note</p> <ul style="list-style-type: none"> To create a volume that is larger than the largest free space, concatenate the free spaces in the RAID group to the existing volume. These volumes cannot be created by only using this function. Refer to the [Expand Volume] function for details. When creating an SDV, 24 (MB) + "Capacity of source volume ⓘonly SDV" × 0.1 [%] is automatically secured in the storage system. This setting is not required. "24 (MB)" is the smallest volume capacity. "Capacity of source volume ⓘonly SDV" × 0.1 [%] is the capacity that is used for the controlling information area in the SDV. The same input condition as the TPVs for SAN is applied for the Deduplication/Compression Volume capacity. The number of entered characters includes the "." (decimal point) and the "0" before the decimal point. (Example) 0.1234567890123 (15 characters) 	
Type	<p>Specify the volume type.</p> <p>When the [Create Volume] function is executed from the RAID group list, "Standard", "Snap Data Volume", or "Snap Data Pool Volume" is displayed. If the selected RAID group type is "RAID6-FR", only "Standard" volumes are displayed.</p> <p>When the [Create Volume] function is executed from the Thin Provisioning Pool list, only "Thin Provisioning Volume" is displayed.</p> <p>When the Advanced Copy function license has been registered, "Snap Data Volume" is displayed.</p> <p>When the Advanced Copy function license has been registered or when the storage system is being used in the Unified Storage environment, "Snap Data Pool Volume" is displayed.</p> <p>"NAS Volume" is displayed only when all of the following conditions are satisfied:</p> <ul style="list-style-type: none"> The storage system is used in the Unified Storage environment. The logged in (current) user has the "NAS Management" policy. The maximum number of NAS user volumes has not been created in the storage system. <p>Note that a NAS user volume can be created only when the NAS backup volume exists in the storage system.</p> <p>Note</p> <ul style="list-style-type: none"> To create a volume in the External RAID Group, select "Standard". 	<p>Standard</p> <p>Wide Striping Volume</p> <p>Thin Provisioning Volume</p> <p>Snap Data Volume</p> <p>Snap Data Pool Volume</p> <p>NAS Volume</p>
Capacity of source volume ⓘonly SDV	<p>Specify the copy source volume capacity and select the unit of capacity.</p> <p>This item can only be specified when "Snap Data Volume" is selected for "Type".</p>	<p>24 MB - 128 TB</p> <p>(numeric characters)</p> <p>Unit: TB/GB/MB</p>

2. Volume
Volume (Basic Information)

Item	Description	Setting values
Use External Drive	<p>To create a volume using an External Drive, select the "Enable" checkbox.</p> <p>This checkbox can be selected or cleared only when "Standard" is specified for "Type".</p> <p>If the "Enable" checkbox is selected, the External RAID Group List is displayed.</p> <p>This item is displayed only if the Non-disruptive Storage Migration License has been registered.</p> <p>Note</p> <ul style="list-style-type: none"> • One External RAID Group consists of one External Drive. Refer to the [Create External RAID Group] function for details. • One External Volume is created in one External RAID Group. If multiple External RAID Groups are selected to create volumes, the number of External Volumes that are created is equal to the number of External RAID Groups. 	<p>"Enable" checkbox</p> <p>Selected</p> <p>Cleared</p>
Deduplication Compression	<p>Select whether to use the volume as a Deduplication or Compression target volume.</p> <p>This item is only displayed when the Deduplication/Compression for the storage system is enabled. This item can only be specified when "Thin Provisioning Volume" is selected for "Type".</p> <p>Volumes are created in the TPP according to the selected items.</p> <p>Refer to "Volumes That Are Created in the TPP According to the Selected Items" for details.</p>	<p>Enable</p> <p>Disable</p>
Allocation	<p>Select the allocation method of the volume.</p> <ul style="list-style-type: none"> • Thin Physical area is allocated to the target area of the volume when a write I/O is received. • Thick Physical area is allocated to the whole area of the volume when volumes are created. <p>This item can only be specified when meeting all the following conditions.</p> <ul style="list-style-type: none"> • "Type" is "Thin Provisioning Volume" or "NAS Volume" • Both "Deduplication" and "Compression" are "Disable" 	<p>Thin</p> <p>Thick</p>
NAS FS Block Size	<p>Select the block size of the NAS file system (NAS user volume).</p> <p>By selecting an appropriate "NAS FS Block Size" for the user data size (file size) to be created, the storage efficiency of the NAS user volume improves.</p> <p>This item is displayed only when "NAS Volume" can be selected as the volume type.</p> <p>Caution</p> <ul style="list-style-type: none"> • The maximum NAS user volume capacity varies depending on the selected "NAS FS Block Size". Refer to "Maximum NAS User Volume Capacity and the Maximum File Size of Each "NAS FS Block Size"" (page 66) for details. • If backing up the NAS user volumes, the NAS backup volumes are set with the same "NAS FS Block Size" as the NAS user volumes. • If restoring the NAS backup volumes, the NAS user volumes are set with the same "NAS FS Block Size" as the NAS backup volumes. • "NAS FS Block Size" cannot be changed after the NAS user volume is created. To change "NAS FS Block Size", delete the NAS user volume and create it again. <p>Note</p> <ul style="list-style-type: none"> • Multiple NAS user volumes with different "NAS FS Block Size" settings can exist in the same TPP. 	<p>256 KB</p> <p>32 KB</p> <p>8 KB</p>

2. Volume
Volume (Basic Information)

Item	Description	Setting values
RAID Group / TPP Selection	<p>Specify the selection method for the RAID group or the Thin Provisioning Pool.</p> <ul style="list-style-type: none"> • Automatic The RAID group or Thin Provisioning Pool in which the volume is to be created is selected automatically. • Manual The RAID group or Thin Provisioning Pool in which the volume is to be created is selected manually. <p>When the [Create Volume] function is executed from the RAID group list or the Thin Provisioning Pool list, only "Manual" is displayed.</p> <p>Caution</p> <ul style="list-style-type: none"> • For the conditions described below, "Manual" is automatically selected for this item. Note that "Automatic" cannot be selected. <ul style="list-style-type: none"> - "Wide Striping Volume" is selected for "Type" - "Standard" is selected for "Type" and the "Enable" checkbox in the "Use External Drive" field is selected 	Automatic Manual
Data Integrity	<p>Specify the volume protection method.</p> <ul style="list-style-type: none"> • Default Data is protected within the storage system. • T10-DIF Data is protected with a T10-DIF (Data Integrity Field) compatible method in the storage system and the host paths. This method is available only when the host interface is FC. <p>This item can only be specified when meeting all the following conditions.</p> <ul style="list-style-type: none"> • "Standard" is selected for "Type" • The "Enable" checkbox in the "Use External Drive" field is cleared <p>Caution</p> <ul style="list-style-type: none"> • The data protection method cannot be changed after the volume is created. • "T10-DIF" is supported in Oracle Linux 6 and later. 	Default T10-DIF

Volumes That Are Created in the TPP According to the Selected Items (Available: ✓, N/A: -)

Condition		Volumes that are to be created	Deduplication/Compression setting for the destination TPP			
Deduplication	Compression		Only Deduplication is enabled	Only Compression is enabled	Both Deduplication and Compression are enabled	Both Deduplication and Compression are disabled
Enable	Enable	Deduplication/Compression Volumes where both Deduplication and Compression are enabled	-	-	✓	-

2. Volume
Volume (Basic Information)

Condition		Volumes that are to be created	Deduplication/Compression setting for the destination TPP			
Deduplication	Compression		Only Deduplication is enabled	Only Compression is enabled	Both Deduplication and Compression are enabled	Both Deduplication and Compression are disabled
Enable	Disable	Deduplication/Compression Volumes where only Deduplication is enabled	✓	-	-	-
Disable	Enable	Deduplication/Compression Volumes where only Compression is enabled	-	✓	-	-
Disable	Disable	TPVs for SAN where both Deduplication and Compression are disabled	✓	✓	✓	✓

Automatic Setting

Item	Description	Setting values
Drive Type	<p>Specify the drive type.</p> <p>The installed drive determines the selectable drive types that are displayed as options.</p> <p>If "Enable" is selected for "Deduplication" or "Compression", the drive types of the TPPs that have the Deduplication/Compression setting enabled are displayed.</p> <p>If "Disable" is selected for "Deduplication" and "Compression", the drive types of all the TPPs that are registered in the storage system are displayed.</p> <div style="background-color: #f0f0f0; padding: 10px; margin-top: 10px;"> <p>Note</p> <ul style="list-style-type: none"> • When "Online" is selected, volumes are created in a RAID group that is configured with only "Online" type drives, or in a RAID group that is configured with both "Online" and "Nearline" type drives. • When "Online SED" is selected, volumes are created in a RAID group that is configured with only "Online SED" type drives, or in a RAID group that is configured with both "Online SED" and "Nearline SED" type drives. • When "SSD" is selected, volumes are created in a RAID group that is configured with a single SSD type (SSD-H/SSD-M/SSD-L) or configured with multiple SSD types (SSD-H/SSD-M/SSD-L). • When "SSD SED" is selected, volumes are created in a RAID group that is configured with a single SSD type (SSD-H SED/SSD-M SED/SSD-L SED) or configured with multiple SSD types (SSD-H SED/SSD-M SED/SSD-L SED). </div>	Online Nearline SSD Online SED Nearline SED SSD SED

2. Volume
Volume (Basic Information)

Item	Description	Setting values
RAID Level	<p>Select the RAID level.</p> <p>The specified volume type and drive type determine the selectable RAID levels that are displayed as options.</p> <p>If "Enable" is selected for "Deduplication" or "Compression", the RAID levels of the TPPs that have the Deduplication/Compression setting enabled are displayed.</p> <p>If "Disable" is selected for "Deduplication" and "Compression", the RAID levels of all TPPs that are registered in the storage system are displayed.</p>	<p>High Performance (RAID1+0)</p> <p>High Capacity (RAID5)</p> <p>High Reliability (RAID6)</p> <p>High Reliability (RAID6-FR)</p> <p>Reliability (RAID5+0)</p> <p>Mirroring (RAID1)</p> <p>Striping (RAID0)</p>
Key Group	<p>When creating volumes in the RAID group that configures the key group (*1), select "Enable". When creating volumes in a RAID group that is not registered in the key group, select "Disable".</p> <p>This setting is only available if the volume type is "Standard", "SDV", or "SDPV", and if the drive type is "Online SED", "Nearline SED", or "SSD SED". Only the available setting (Enable or Disable) is displayed as an option. For other drive types, the field is blank.</p> <p>*1 : The key group combines all of the RAID groups that use the same SED authentication key.</p>	<p>Enable</p> <p>Disable</p> <p>Blank</p>
Number of Volumes	<p>Specify the number of volumes to be created.</p> <p>[The maximum number of volumes that can be created for each model]</p> <ul style="list-style-type: none"> • ETERNUS DX60 S5: 1024 • ETERNUS DX100 S5: 4096 • ETERNUS DX200 S5: 8192 • ETERNUS DX500 S5/DX600 S5: 16384 • ETERNUS DX900 S5: 65535 • ETERNUS DX8100 S4: 16384 • ETERNUS DX8900 S4: 65535 • ETERNUS AF150 S3: 4096 • ETERNUS AF250 S3: 8192 • ETERNUS AF650 S3: 16384 <p>Note</p> <ul style="list-style-type: none"> • For the ETERNUS DX900 S5 or the ETERNUS DX8900 S4, up to 1024 volumes can be created at a time. Note that this limitation does not apply to other models. • Only one NAS user volume can be created at a time. 	<p>For volumes other than "NAS Volume"</p> <p>ETERNUS DX60 S5: 1 (Default) - 1024</p> <p>ETERNUS DX100 S5: 1 (Default) - 4096</p> <p>ETERNUS DX200 S5: 1 (Default) - 8192</p> <p>ETERNUS DX500 S5/DX600 S5: 1 (Default) - 16384</p> <p>ETERNUS DX900 S5: 1 (Default) - 1024</p> <p>ETERNUS DX8100 S4: 1 (Default) - 16384</p> <p>ETERNUS DX8900 S4: 1 (Default) - 1024</p> <p>ETERNUS AF150 S3: 1 (Default) - 4096</p> <p>ETERNUS AF250 S3: 1 (Default) - 8192</p> <p>ETERNUS AF650 S3: 1 (Default) - 16384</p> <p>For "NAS Volume" 1 (fixed)</p>
Start of Suffix	<p>Select the suffix starting number to be added to the name of volumes that are to be created. This item must be set if the default value "0" is changed.</p> <p>If "1" is specified for "Number of Volumes", "Start of Suffix" cannot be selected.</p> <p>This item is not displayed when "NAS Volume" is selected for "Type".</p>	<p>0 (Default) - 99999</p>

2. Volume
Volume (Basic Information)

Item	Description	Setting values
Digits of Suffix	Select the number of digits to be added to the name of volumes that are to be created. This item must be set if the default value "1" is changed. If "1" is specified for "Number of Volumes", "Digits of Suffix" cannot be selected. This item is not displayed when "NAS Volume" is selected for "Type".	For the ETERNUS DX60 S5/ DX100 S5/DX200 S5 and ETERNUS AF150 S3/AF250 S3: 1 - 4 For the other models: 1 (Default) - 5
Encryption by CM	Select whether to encrypt (On) or not encrypt (Off) the new volumes. "On" cannot be selected in the following conditions. <ul style="list-style-type: none"> The encryption mode is disabled "Online SED", "Nearline SED", or "SSD SED" is selected for "Drive Type" The combination of this setting and the drive type setting defines the RAID group or Thin Provisioning Pool in which the volumes are created. For the ETERNUS DX60 S5, this item is not displayed. <ul style="list-style-type: none"> When the drive type is "Online SED", "Nearline SED", or "SSD SED": Volumes are created in the RAID group or the TPP configured by relevant SED type. If other drive types are selected: <ul style="list-style-type: none"> When "On" is specified Volumes that are encrypted by CM are created. When creating a TPV, the volume is created in the TPP that is encrypted by CM. When "Off" is specified Volumes that are not encrypted are created. When creating a TPV, the volume is created in the TPP that is not encrypted. 	On Off

Manual Setting (When Creating Standard Type Volumes, SDVs, or SDPVs)

Item	Description	Setting values
Use all Largest Free Space	Select the "Enable" checkbox to create the specified number of volumes with the largest available free space in the RAID group. This checkbox can be selected or cleared only when "Type" is "Standard" or "SDPV". If the "Enable" checkbox is selected, the specified number of volumes in the "Number of Volumes" field are created in the free space that is displayed as "Largest Free Space" for each RAID group. <div style="background-color: #fff9c4; padding: 10px;"> <p>Caution</p> <ul style="list-style-type: none"> When the "Enable" checkbox is selected, the input capacity and the selected unit for "New Volume" become unavailable. The capacity for volumes that are to be created is not displayed. Use the [Volume] screen to check the volume capacity after volume creation is complete. If all of the following conditions are satisfied, this item cannot be set. <ul style="list-style-type: none"> "Standard" is selected for "Type" The "Enable" checkbox in the "Use External Drive" field is selected </div>	"Enable" checkbox Selected Cleared

2. Volume
Volume (Basic Information)

Item	Description	Setting values
Start of Suffix	<p>Select the suffix starting number to be added to the name of volumes that are to be created. This item must be set if the default value "0" is changed.</p> <p>"Start of Suffix" cannot be selected in the following conditions.</p> <ul style="list-style-type: none"> • "0" or "1" is specified for "Number of Volumes" • "Number of Volumes" is fixed to "1" (number of volumes cannot be specified) • The number of selected checkboxes for the External RAID Group is "0" or "1" 	0 (Default) - 99999
Digits of Suffix	<p>Select the number of digits to be added to the name of volumes that are to be created. This item must be set if the default value "1" is changed.</p> <p>"Digits of Suffix" cannot be selected in the following conditions.</p> <ul style="list-style-type: none"> • "0" or "1" is specified for "Number of Volumes" • "Number of Volumes" is fixed to "1" (number of volumes cannot be specified) • The number of selected checkboxes for the External RAID Group is "0" or "1" 	<p>For the ETERNUS DX60 S5/ DX100 S5/DX200 S5 and the ETERNUS AF150 S3/AF250 S3: 1 - 4</p> <p>For the other models: 1 (Default) - 5</p>
Volume No.	<p>When specifying the volume number for a new volume, select the "Set Value" checkbox and input the volume number.</p> <div style="background-color: #fff9c4; padding: 5px;"> <p>Caution</p> <ul style="list-style-type: none"> • An existing volume number cannot be specified. </div>	<p>"Set Value" checkbox Selected Cleared Volume No. Numeric characters (decimal) The following volume numbers can be used for each model:</p> <p>ETERNUS DX60 S5: 0 (Default) - 1023</p> <p>ETERNUS DX100 S5: 0 (Default) - 4095</p> <p>ETERNUS DX200 S5: 0 (Default) - 8191</p> <p>ETERNUS DX500 S5/DX600 S5: 0 (Default) - 16383</p> <p>ETERNUS DX900 S5: 0 (Default) - 65534</p> <p>ETERNUS DX8100 S4: 0 (Default) - 16383</p> <p>ETERNUS DX8900 S4: 0 (Default) - 65534</p> <p>ETERNUS AF150 S3: 0 (Default) - 4095</p> <p>ETERNUS AF250 S3: 0 (Default) - 8191</p> <p>ETERNUS AF650 S3: 0 (Default) - 16383</p>

2. Volume
Volume (Basic Information)

Item	Description	Setting values
Encryption by CM	<p>Select whether to encrypt (On) or not encrypt (Off) the new volumes. When the encryption mode is disabled, "On" cannot be selected. For the ETERNUS DX60 S5, this item is not displayed.</p> <p>Caution</p> <ul style="list-style-type: none"> When creating volumes (specifying a number greater than or equal to 1 for "Number of Volumes") for a RAID group with "Online SED", "Nearline SED", or "SSD SED" as the drive type, select "Off" for this item. If all of the following conditions are satisfied, this item cannot be selected. <ul style="list-style-type: none"> "Standard" is selected for "Type" The "Enable" checkbox in the "Use External Drive" field is selected 	<p>On Off</p>

RAID Group List

Item	Description	Setting values
RAID Group Name	The RAID group name is displayed.	
Drive Type	<p>The type of drive that configures the RAID group is displayed. If multiple drive types are used in the RAID group, the drive type is displayed as described below.</p> <ul style="list-style-type: none"> If only "Online" type drives are used or if both "Online" and "Nearline" type drives are used, "Online" is displayed. If only "Online SED" type drives are used or if both "Online SED" and "Nearline SED" type drives are used, "Online SED" is displayed. If a single SSD type (SSD-H/SSD-M/SSD-L) is used or if multiple SSD types (SSD-H/SSD-M/SSD-L) are used, "SSD" is displayed. If a single SSD type (SSD-H SED/SSD-M SED/SSD-L SED) is used or if multiple SSD types (SSD-H SED/SSD-M SED/SSD-L SED) are used, "SSD SED" is displayed. 	
RAID Level	<p>The RAID level is displayed. Only RAID groups with a RAID level that can create the specified volume type are displayed on the list.</p> <p>High Performance (RAID1+0) High Capacity (RAID5) High Reliability (RAID6) High Reliability (RAID6-FR) Reliability (RAID5+0) Mirroring (RAID1) Striping (RAID0)</p>	
Number of Drives	The number of drives is displayed.	

2. Volume

Volume (Basic Information)

Item	Description	Setting values
Number of Volumes	<p>Specify the number of volumes to be created in each RAID group.</p> <p>Click the [Recalculation of Max Count] button to display the maximum number of volumes that can be created in each RAID group with the specified capacity. When the volume capacity is not specified (including when "Use all Largest Free Space" is selected), the maximum number of volumes that can be created for each RAID group is displayed.</p> <p>When "Encryption by CM" is "On", volumes cannot be created in a RAID group with "Online SED", "Nearline SED", or "SSD SED" for the drive type. For details on the maximum number of volumes for each model, refer to "[The maximum number of volumes that can be created for each model]" (page 79).</p> <div style="background-color: #f0f0f0; padding: 10px;"> <p>Note</p> <ul style="list-style-type: none"> When "Volume No." is specified, only one volume can be created at a time. Input "1" for "Number of Volumes". For the ETERNUS DX900 S5 or the ETERNUS DX8900 S4, the total number of the volumes that can be created at a time is 1024. Note that this limitation does not apply to other models. </div>	1 - 128 0 (Default)
Total Capacity	The total capacity of the RAID groups is displayed.	
Total Free Space	The total capacity of free space in the RAID group is displayed. "Free space" means an area in the RAID group where no volume is created, and dispersed areas which became free by creating and deleting a volume.	
Largest Free Space	The maximum capacity of free space in the RAID group is displayed.	
Encryption	<p>If "Online SED", "Nearline SED", or "SSD SED" is selected for the drive type, the encryption status (the set state of the key group) is displayed.</p> <p>If other drive types are selected, a "-" (hyphen) is displayed.</p> <ul style="list-style-type: none"> SED (Enabled Key Group) The RAID groups that are configured by SEDs are registered in the key group SED (Disabled Key Group) The RAID groups that are configured by SEDs are not registered in the key group 	

External RAID Group List

The External RAID Group list is displayed only when all of the conditions described below are satisfied.

- The Non-disruptive Storage Migration License is registered
- The "Enable" checkbox in the "Use External Drive" field is selected

2. Volume
Volume (Basic Information)

Item	Description
Checkbox to select External RAID Groups	<p>Select the checkbox for the External RAID Group to create volumes. One External Volume is created in one External RAID Group. If multiple External RAID Groups are selected to create volumes, the number of External Volumes that are created is equal to the number of External RAID Groups. Select the checkbox to the left of "RAID Group Name" to select all External RAID Groups. [The maximum number of External Volumes that can be created for each model]</p> <ul style="list-style-type: none"> • ETERNUS DX60 S5: 512 • ETERNUS DX100 S5: 2048 • ETERNUS DX200 S5: 4096 • ETERNUS DX500 S5/DX600 S5: 8192 • ETERNUS DX900 S5: 16384 • ETERNUS DX8900 S4: 16384 • ETERNUS AF150 S3: 2048 • ETERNUS AF250 S3: 4096 • ETERNUS AF650 S3: 8192 <p>Note</p> <ul style="list-style-type: none"> • The maximum number of volumes that can be created for each model includes the External Volumes. For details on the maximum number of volumes for each model, refer to "[The maximum number of volumes that can be created for each model]" (page 79). • External RAID Groups in which an External Volume has already been created are not displayed in the External RAID Group list.
RAID Group Name	The External RAID Group name is displayed.
Usage	<p>The usage of the External RAID Group is displayed.</p> <ul style="list-style-type: none"> • Migration An External RAID Group that is used for data migrations.
External LU Information	<p>Whether the External RAID Group inherits the External LU Information is displayed. For External RAID Groups that are created from External Drives that inherit the External LU Information, "Inherited" is displayed. For External RAID Groups that are created from External Drives that do not inherit the External LU Information, a "-" (hyphen) is displayed.</p>
Total Capacity	The total capacity of the External RAID Groups is displayed.

Manual Setting (When Creating TPVs, NAS User Volumes, or Deduplication/Compression Volumes)

Item	Description	Setting values
Start of Suffix	<p>Select the suffix starting number to be added to the name of volumes that are to be created. This item must be set if the default value "0" is changed. If "0" or "1" is specified for "Number of Volumes", "Start of Suffix" cannot be selected. This item is not displayed when "NAS Volume" is selected for "Type".</p>	0 (Default) - 99999

2. Volume

Volume (Basic Information)

Item	Description	Setting values
Digits of Suffix	Select the number of digits to be added to the name of volumes that are to be created. This item must be set if the default value "1" is changed. If "0" or "1" is specified for "Number of Volumes", "Digits of Suffix" cannot be selected. This item is not displayed when "NAS Volume" is selected for "Type".	For the ETERNUS DX60 S5/DX100 S5/DX200 S5 and ETERNUS AF150 S3/AF250 S3: 1 (Default) - 4 For the other models: 1 (Default) - 5
Volume No.	When specifying the volume number for a new volume, select the "Set Value" checkbox and input the volume number. Caution <ul style="list-style-type: none"> An existing volume number cannot be specified. 	"Set Value" checkbox Selected Cleared Volume No. Numeric characters (decimal) The following volume numbers can be used for each model: ETERNUS DX60 S5: 0 (Default) - 1023 ETERNUS DX100 S5: 0 (Default) - 4095 ETERNUS DX200 S5: 0 (Default) - 8191 ETERNUS DX500 S5/DX600 S5: 0 (Default) - 16383 ETERNUS DX900 S5: 0 (Default) - 65534 ETERNUS DX8100 S4: 0 (Default) - 16383 ETERNUS DX8900 S4: 0 (Default) - 65534 ETERNUS AF150 S3: 0 (Default) - 4095 ETERNUS AF250 S3: 0 (Default) - 8191 ETERNUS AF650 S3: 0 (Default) - 16383

TPP List

Item	Description	Setting values
Thin Provisioning Pool Name	The TPP name is displayed.	

2. Volume
Volume (Basic Information)

Item	Description	Setting values
Drive Type	<p>The type of drive that configures the TPP is displayed.</p> <p>If multiple drive types are used in the TPP, the drive type is displayed as described below.</p> <ul style="list-style-type: none"> • If only "Online" type drives are used or if both "Online" and "Nearline" type drives are used, "Online" is displayed. • If only "Online SED" type drives are used or if both "Online SED" and "Nearline SED" type drives are used, "Online SED" is displayed. • If a single SSD type (SSD-H/SSD-M/SSD-L) is used or if multiple SSD types (SSD-H/SSD-M/SSD-L) are used, "SSD" is displayed. • If a single SSD type (SSD-H SED/SSD-M SED/SSD-L SED) is used or if multiple SSD types (SSD-H SED/SSD-M SED/SSD-L SED) are used, "SSD SED" is displayed. 	
RAID Level	<p>The RAID level is displayed.</p> <p>High Performance (RAID1+0)</p> <p>High Capacity (RAID5)</p> <p>High Reliability (RAID6)</p> <p>High Reliability (RAID6-FR)</p> <p>Mirroring (RAID1)</p> <p>Striping (RAID0)</p>	
Number of Volumes	<p>Specify the number of volumes to be created in each TPP.</p> <p>If "Enable" is selected for "Deduplication" or "Compression", the number of volumes can be specified only for TPPs that have the Deduplication/Compression setting enabled.</p> <p>For details on the maximum number of volumes for each model, refer to "[The maximum number of volumes that can be created for each model]" (page 79).</p> <div style="background-color: #f0f0f0; padding: 10px; margin-top: 10px;"> <p>Note</p> <ul style="list-style-type: none"> • When "Volume No." is specified, only one volume can be created at a time. Input "1" for "Number of Volumes". • This item is not displayed when "NAS Volume" is selected for "Type". Only one NAS user volume can be created at a time. • For the ETERNUS DX900 S5 or the ETERNUS DX8900 S4, the total number of the volumes that can be created at a time is 1024. Note that this limitation does not apply to other models. </div>	<p>ETERNUS DX60 S5: 1 - 1024</p> <p>ETERNUS DX100 S5: 1 - 4096</p> <p>ETERNUS DX200 S5: 1 - 8192</p> <p>ETERNUS DX500 S5/DX600 S5: 1 - 16384</p> <p>ETERNUS DX900 S5: 1 - 1024</p> <p>ETERNUS DX8100 S4: 1 - 16384</p> <p>ETERNUS DX8900 S4: 1 - 1024</p> <p>ETERNUS AF150 S3: 1 - 4096</p> <p>ETERNUS AF250 S3: 1 - 8192</p> <p>ETERNUS AF650 S3: 1 - 16384</p> <p>0 (Default)</p>
Total Capacity	The total capacity of the TPP is displayed.	

2. Volume Volume (Basic Information)

Item	Description	Setting values
Total Free Space	The total capacity of free space in the TPP is displayed. "Free space" means an area in the TPP where no volume is allocated, and dispersed areas which became free by creating and deleting a volume.	
Encryption	The TPP encryption status is displayed. <ul style="list-style-type: none"> • CM Encryption by CM • "-" (hyphen) The TPP is not encrypted. • SED Encryption by SED 	
Deduplication	The Deduplication status (whether the setting is enabled and the state of the Deduplication) for the TPP is displayed. <ul style="list-style-type: none"> • Enable Deduplication for the TPP is enabled and Deduplication is in the normal state. • Disable Deduplication for the TPP is disabled. • Error Deduplication for the TPP is enabled and Deduplication is in the error state. • "-" (hyphen) Deduplication for the TPP is enabled and the information cannot be obtained. This item is displayed only when Deduplication/Compression for the storage system is enabled. This item is not displayed when NAS user volumes are created.	
Compression	The Compression status (whether the setting is enabled and the state of the Compression) for the TPP is displayed. <ul style="list-style-type: none"> • Enable Compression for the TPP is enabled and Compression is in the normal state. • Disable Compression for the TPP is disabled. • Error Compression for the TPP is enabled and Compression is in the error state. • "-" (hyphen) Compression for the TPP is enabled and the information cannot be obtained. This item is displayed only when Deduplication/Compression for the storage system is enabled. This item is not displayed when NAS user volumes are created.	

Manual Setting (When Creating WSVs)

WSVs are created by concatenating volumes that are the same size in multiple RAID groups. Input the volume information for WSVs and the selection information for RAID groups, and specify the RAID groups that are to be concatenated.

Caution

- RAID group capacity expansion for RAID groups which configure WSVs is not available (LDE cannot be performed).

Volume Information

In this screen, select the basic information for WSVs.

2. Volume
Volume (Basic Information)

Item	Description	Setting values
Use all Largest Free Space	<p>Select the "Enable" checkbox to create the specified number of WSVs with the largest available free space in the selected RAID group.</p> <p>WSVs are created by concatenating spaces with the same capacity in multiple RAID groups. If the "Enable" checkbox is selected, the specified number of WSVs in the "Number of Volumes" field are created using the smallest "Largest Free Space" value in the concatenated RAID groups.</p> <p>Caution</p> <ul style="list-style-type: none"> • When the "Enable" checkbox is selected, the input capacity and the selected unit for "New Volume" become unavailable. • The capacity for volumes that are to be created is not displayed. Use the [Volume] screen to check the volume capacity after volume creation is complete. 	<p>"Enable" checkbox Selected Cleared</p>
Number of Volumes	<p>Specify the number of volumes to be created. Note that "1" is displayed when "Manual" is selected for "Concatenation Order". In this case, the number of volumes cannot be specified. For details on the maximum number of volumes for each model, refer to "[The maximum number of volumes that can be created for each model]" (page 79).</p> <p>Caution</p> <ul style="list-style-type: none"> • When "Volume No." is specified, only one volume can be created at a time. Input "1" for "Number of Volumes". 	<p>1 - 128 0 (Default)</p>
Start of Suffix	<p>Select the suffix starting number to be added to the name of volumes that are to be created. This item must be set if the default value "0" is changed.</p> <p>If "0" or "1" is specified for "Number of Volumes", "Start of Suffix" cannot be selected.</p> <p>This item is displayed when "Automatic" is selected for "Concatenation Order".</p>	<p>0 (Default) - 99999</p>
Digits of Suffix	<p>Select the number of digits to be added to the name of volumes that are to be created. This item must be set if the default value "1" is changed.</p> <p>If "0" or "1" is specified for "Number of Volumes", "Digits of Suffix" cannot be selected.</p> <p>This item is displayed when "Automatic" is selected for "Concatenation Order".</p>	<p>For the ETERNUS DX60 S5/DX100 S5/DX200 S5 and ETERNUS AF150 S3/AF250 S3: 1 (Default) - 4</p> <p>For the other models: 1 (Default) - 5</p>

2. Volume
Volume (Basic Information)

Item	Description	Setting values
Volume No.	<p>When specifying the volume number for a new volume, select the "Set Value" checkbox and input the volume number.</p> <div style="background-color: #fff9c4; padding: 5px; margin-top: 10px;"> <p>Caution</p> <ul style="list-style-type: none"> An existing volume number cannot be specified. </div>	<p>"Set Value" checkbox Selected Cleared Volume No. Numeric characters (decimal) The following volume numbers can be used for each model: ETERNUS DX60 S5: 0 (Default) - 1023 ETERNUS DX100 S5: 0 (Default) - 4095 ETERNUS DX200 S5: 0 (Default) - 8191 ETERNUS DX500 S5/ DX600 S5: 0 (Default) - 16383 ETERNUS DX900 S5: 0 (Default) - 65534 ETERNUS DX8100 S4: 0 (Default) - 16383 ETERNUS DX8900 S4: 0 (Default) - 65534 ETERNUS AF150 S3: 0 (Default) - 4095 ETERNUS AF250 S3: 0 (Default) - 8191 ETERNUS AF650 S3: 0 (Default) - 16383</p>

2. Volume
Volume (Basic Information)

Item	Description	Setting values
Wide Stripe Size	<p>Select the Wide Stripe Size ("Normal" or "Small") for the volumes. "Wide Stripe Size" is the size of the WSV Unit that is allocated to each RAID group in series. It is not necessary to change the default value (Normal) for normal use.</p> <ul style="list-style-type: none"> • Normal An integral multiple of the basic size for each RAID level (*1). The maximum size is 16 MB or smaller. The actual size varies according to the RAID group type, the number of member drives, and Stripe Depth. Select "Normal" to improve random write access performance. • Small An integral multiple of the basic size for each RAID level. The maximum size is 2 MB or smaller. The actual size varies according to the RAID group type, the number of member drives, and Stripe Depth. Note that because the segment size of the volume is small and many host accesses among multiple RAID groups occur, the performance may be reduced according to the amount of host I/O. <p>*1: The basic size (stripe size) when creating a volume. Refer to "Basic Size for each RAID Level" for details.</p> <div style="background-color: #fff9c4; padding: 5px; margin-top: 10px;"> <p>Caution</p> <ul style="list-style-type: none"> • If the basic size of the RAID group is 2 MB or more, the basic size is specified for Wide Stripe Size even when "Small" is selected. • This function cannot be used to change the "Wide Stripe Size" setting after WSVs are created. To change the "Wide Stripe Size" value, use [Start RAID Migration]. </div>	Normal (Default) Small
Concatenation Order	<p>Select the concatenation order of RAID groups from "Automatic" or "Manual". It is not necessary to change the default value (Automatic) for normal use.</p> <ul style="list-style-type: none"> • Automatic The concatenation order of RAID groups is specified automatically. If multiple WSVs are already registered, the next available RAID group that enables the Controlling CM allocation to be distributed evenly is selected as [1] for the concatenation order. If multiple RAID groups satisfy this condition, the RAID group with the smallest RAID group number is selected as [1] in the concatenation order. RAID groups are concatenated starting from [1] (first) in ascending order. The last RAID group is concatenated to the first RAID group. Volumes that belong to the RAID group that is first in the concatenation order are called "representative volumes". • Manual The concatenation order of the RAID groups is specified manually. 	Automatic (Default) Manual
Encryption by CM	<p>Select whether to encrypt (On) or not encrypt (Off) the new volumes. When the encryption mode is disabled, "On" cannot be selected. For the ETERNUS DX60 S5, this item is not displayed.</p> <div style="background-color: #fff9c4; padding: 5px; margin-top: 10px;"> <p>Caution</p> <ul style="list-style-type: none"> • When specifying "Online SED", "Nearline SED", "SSD SED", or "Online SED/Nearline SED" for the drive type, select "Off" for this item. </div>	On Off

Select RAID Group Information

Input the selection information for RAID groups that are to be concatenated. WSVs are created by concatenating free areas that are the same size in multiple RAID groups with the same conditions.

Item	Description	Setting values
Drive Type	<p>Select the type of drive that configures a RAID group. The installed drive determines the selectable drive types that are displayed. If there are no RAID groups in which volumes can be created, the field is blank.</p> <p>Note</p> <ul style="list-style-type: none"> • When "Online" is selected, a RAID group that is configured with only "Online" type drives, or a RAID group that is configured with both "Online" and "Nearline" type drives is specified. • When "Online SED" is selected, a RAID group that is configured with only "Online SED" type drives, or a RAID group that is configured with both "Online SED" and "Nearline SED" type drives is specified. • When "SSD" is selected, RAID groups that are configured with a single SSD type (SSD-H/SSD-M/SSD-L) or configured with multiple SSD types (SSD-H/SSD-M/SSD-L) are specified. • When "SSD SED" is selected, RAID groups that are configured with a single SSD type (SSD-H SED/SSD-M SED/SSD-L SED) or configured with multiple SSD types (SSD-H SED/SSD-M SED/SSD-L SED) are specified. • When "Online/Nearline" is selected, a RAID group that is configured with only "Online" type drives, a RAID group that is configured with only "Nearline" type drives, or a RAID group that is configured with both "Online" and "Nearline" type drives is specified. • When "Online SED/Nearline SED" is selected, a RAID group that is configured with only "Online SED" type drives, a RAID group that is configured with only "Nearline SED" type drives, or a RAID group that is configured with both "Online SED" and "Nearline SED" type drives is specified. 	<p>Online Nearline SSD Online/Nearline Online SED Nearline SED SSD SED Online SED/Nearline SED Blank</p>
RAID Level	<p>Select the RAID level. If there are no RAID groups in which volumes can be created, the field is blank.</p>	<p>High Performance (RAID1+0) High Capacity (RAID5) High Reliability (RAID6) Reliability (RAID5+0) Mirroring (RAID1) Striping (RAID0) Blank</p>

2. Volume

Volume (Basic Information)

Item	Description	Setting values
Number of Member Drives	Select the number of member drives in the RAID group. The selectable number of member drives, which is determined by the specified RAID level, is displayed. If there are no RAID groups in which volumes can be created, the field is blank.	High Performance (RAID1+0): 4, 6, 8, 10, 12, 14, 16, 18, 20, 22, 24, 26, 28, 30, 32 High Capacity (RAID5): 3 - 16 High Reliability (RAID6): 5 - 16 Reliability (RAID5+0): 6, 8, 10, 12, 14, 16, 18, 20, 22, 24, 26, 28, 30, 32 Mirroring (RAID1): 2 Striping (RAID0): 2 - 16
Stripe Depth	Select the Stripe Depth of the RAID group. The selectable Stripe Depth varies depending on the specified RAID level. Refer to "Available Stripe Depth Value" (page 268) for details. If "Mirroring (RAID1)" is selected as the RAID level, a "-" (hyphen) is displayed. If there are no RAID groups in which volumes can be created, the field is blank.	64 KB (Default) 128 KB 256 KB 512 KB 1024 KB "-" (hyphen) Blank
Number of Concatenation RAID Groups	The number of RAID groups that are to be concatenated is displayed. Click the [Select RAID Groups] button to add or delete RAID groups. The "Number of Concatenation RAID Groups" value is changed. This field is blank when no RAID groups are selected.	

Function Button

Button	Description
[Select RAID Groups]	Click this item to display the "[Select RAID Groups] Screen" (page 93) . Select the RAID groups that are to be concatenated in the [Select RAID Groups] screen.

Function Link

Item	Description
Setting Concatenation Order	Click this item to display the "[Setting Concatenation Order] Screen" (page 94) . Change the concatenation order of the RAID groups in the [Setting Concatenation Order] screen. This link is not displayed when "Concatenation Order" is "Automatic". Select the RAID groups in the [Select RAID Groups] screen to change the concatenation order.

■ Display Contents

Selected RAID Group List

A list of RAID groups that configure the WSV is displayed. When no RAID groups are selected, only the item name is displayed.

The RAID group list is displayed in concatenation order. Note that displayed items cannot be sorted by clicking the item name.

2. Volume
Volume (Basic Information)

Item	Description
No.	The RAID group number is displayed.
RAID Group Name	The RAID group name is displayed.
Drive Type	The type of drive that configures the RAID group is displayed. Online Nearline SSD Online SED Nearline SED SSD SED
Total Capacity	The total capacity of the RAID groups is displayed.
Total Free Space	The total capacity of free space in the RAID group is displayed. "Free space" means an area in the RAID group where no volume is created, and dispersed areas which became free by creating and deleting a volume.
Largest Free Space	The maximum capacity of free space in the RAID group is displayed.
Encryption	The encryption status (the set state of the key group) of the RAID group is displayed. This item is displayed only when "Online SED", "Nearline SED", "SSD SED", or "Online SED/Nearline SED" is selected for the "Select RAID Group Information" field. SED (Enabled Key Group) SED (Disabled Key Group)

[Select RAID Groups] Screen

In this screen, select RAID groups that are to be concatenated. In the [Select RAID Groups] screen, a list of the RAID groups that satisfy the conditions (drive type, RAID level, number of member drives, and Stripe Depth) specified in the "Select RAID Group Information" field is displayed. Note that RAID groups in the following conditions are not displayed on the list:

- RAID groups that belong to TPPs
- RAID groups that belong to FTRPs
- RAID groups that are registered as REC Disk Buffers
- RAID groups that are registered as Extreme Cache Pools
- RAID groups in which volumes other than Standard, WSV, SDV, or SDPV types are registered
- RAID group which "Usage" is "Temporary"

Caution

- When the drive type is "Online SED", "Nearline SED", "SSD SED", or "Online SED/Nearline SED", setting the same "Encryption" settings (the set state of the key group) is recommended for all of the RAID groups that configure the WSV.

Item	Description
Checkbox to select RAID groups	Select the checkbox for the RAID group to be selected.
No.	The RAID group number is displayed.
RAID Group Name	The RAID group name is displayed.

2. Volume

Volume (Basic Information)

Item	Description
Drive Type	<p>The type of drive that configures the RAID group is displayed.</p> <p>If multiple drive types are used in the RAID group, the drive type is displayed as described below.</p> <ul style="list-style-type: none"> • If only "Online" type drives are used or if both "Online" and "Nearline" type drives are used, "Online" is displayed. • If only "Online SED" type drives are used or if both "Online SED" and "Nearline SED" type drives are used, "Online SED" is displayed. • If a single SSD type (SSD-H/SSD-M/SSD-L) is used or if multiple SSD types (SSD-H/SSD-M/SSD-L) are used, "SSD" is displayed. • If a single SSD type (SSD-H SED/SSD-M SED/SSD-L SED) is used or if multiple SSD types (SSD-H SED/SSD-M SED/SSD-L SED) are used, "SSD SED" is displayed.
Total Capacity	The total capacity of the RAID groups is displayed.
Total Free Space	<p>The total capacity of free space in the RAID group is displayed.</p> <p>"Free space" means an area in the RAID group where no volume is created, and dispersed areas which became free by creating and deleting a volume.</p>
Largest Free Space	<p>The maximum capacity of free space in the RAID group is displayed.</p> <div style="background-color: #fff9c4; padding: 10px; border: 1px solid #ccc;"> <p>Caution</p> <ul style="list-style-type: none"> • WSVs are created by concatenating free areas that are the same size in multiple RAID groups. This means that sequential free areas that are larger than the concatenation capacity are required in the RAID groups. </div>
Encryption	<p>The encryption status (the set state of the key group) of the RAID group is displayed.</p> <p>This item is displayed only when "Online SED", "Nearline SED", "SSD SED", or "Online SED/Nearline SED" is selected for the "Select RAID Group Information" field.</p> <ul style="list-style-type: none"> • SED (Enabled Key Group) The RAID groups that are configured by SEDs are registered in the key group • SED (Disabled Key Group) The RAID groups that are configured by SEDs are not registered in the key group

[Setting Concatenation Order] Screen

In this screen, change the concatenation order of the RAID groups. For details on RAID group information, refer to the "[\[Select RAID Groups\] Screen](#)" (page 93).

Item	Description
Radio buttons to select a RAID group	Select the RAID group to change (raise or drop) the concatenation order for.

Function Button

Button	Description
[Up]	<p>Raises the concatenation order up by one for the RAID group that is selected with the radio button.</p> <p>If the RAID group is already on top of the list, the order cannot be changed.</p>
[Down]	<p>Drops the concatenation order down by one for the RAID group that is selected with the radio button.</p> <p>If the RAID group is already at the bottom of the list, the order cannot be changed.</p>

Naming Conventions for Creating Volumes

- When creating multiple volumes at the same time, the volume name is automatically applied to the volumes according to the specified "Name", selected "Start of Suffix", and selected "Digits of Suffix". (Example) When the specified volume name is "Volume" (six characters), "Start of Suffix" is "90", "Digits of Suffix" is "2", and the number of volumes is "11": the volume names "Volume90" to "Volume100" are applied to the volumes.
- If the automatically applied volume name exceeds 32 characters due to the "Start of Suffix" and "Digits of Suffix" settings, the excess characters are deleted from the specified "Name", and replaced with a "~".
(Example) When the specified volume name is "ETERNUS_DXAF_Standard-XX_VolumeX" (32 characters), "Start of Suffix" is "90", "Digits of Suffix" is "2", and the number of volumes is "11": the volume names "ETERNUS_DXAF_Standard-XX_Volu~90" to "ETERNUS_DXAF_Standard-XX_Vol~100" are applied to the volumes.
- When a volume name including the suffix number already exists, the suffix number is increased by one (+1). The suffix number is increased by one (+1) until no volume names overlap.

Note

- If "Start of Suffix" starts with "0" and it exceeds "Digits of Suffix", the zeros are deleted from "Start of Suffix" and then applied to the volume name.
(Example 1) When the specified volume name is "Volume", "Start of Suffix" is "000", and "Digits of Suffix" is "1": The volume name "Volume0" is applied to the volume.
(Example 2) When the specified volume name is "Volume", "Start of Suffix" is "00005", and "Digits of Suffix" is "2": The volume name "Volume05" is applied to the volume.

■ Operating Procedures

Creating Standard Type Volumes, SDVs, or SDPVs

Automatically Selecting Destinations to Create Standard Type Volumes, SDVs, or SDPVs

Procedure ▶▶▶

- 1 Click [Create] in [Action].
- 2 Select "Standard", "Snap Data Volume", or "Snap Data Pool Volume" for "Type".
- 3 Select "Automatic" for "RAID Group / TPP Selection".
- 4 Specify the volume detailed information, and click the [Create] button.
→ A confirmation screen appears.

Caution

- An error screen appears in the following conditions:
 - The "Name" is not entered
 - The "Name" does not satisfy the input conditions
 - The "Capacity" is not entered
 - The "Capacity" does not satisfy the input conditions
 - The SDPV capacity that is specified for "Capacity" is not a multiple of the SDPE capacity (1 GB/2 GB/4 GB)
 - The number of volumes that is specified for "Number of Volumes" exceeds the maximum number of volumes that can be created
 - Free space in the RAID group is insufficient

- 5 Click the [OK] button.
→ Volume creation starts.
- 6 Click the [Done] button to return to the [Volume] screen.



Manually Selecting Destinations to Create Standard Type Volumes, SDVs, or SDPVs

Procedure ▶▶▶

- 1 Click [Create] in [Action].
- 2 Select "Standard", "Snap Data Volume", or "Snap Data Pool Volume" for "Type".
- 3 Select "Manual" for "RAID Group / TPP Selection".

Note

- If "Standard" is selected for "Type" and the "Enable" checkbox in the "Use External Drive" field is selected, "Manual" is automatically selected for "RAID Group / TPP Selection".

- 4 Specify the detailed information of new volumes and select the RAID group or External RAID Group in which the volumes are to be created. Click the [Create] button.
→ A confirmation screen appears.

Note

- When specifying the "Volume No.", select the "Set Value" checkbox and input the number.
- When using the maximum free space in the RAID group to create volumes without specifying the capacity, select the "Enable" checkbox for "Use all Largest Free Space", and then input the number of volumes. This setting is available for "Standard" and "SDPV" type volumes.
- The External RAID Group list is displayed only when all of the conditions described below are satisfied. Select External RAID Groups to create the volume.
 - "Standard" is selected for "Type"
 - The "Enable" checkbox in the "Use External Drive" field is selected
- Select the checkbox to the left of "RAID Group Name" to select all External RAID Groups.

Caution

- An error screen appears in the following conditions:
 - The "Name" is not entered
 - The "Name" does not satisfy the input conditions
 - The "Capacity" does not satisfy the input conditions
 - The SDPV capacity that is specified for "Capacity" is not a multiple of the SDPE capacity (1 GB/2 GB/4 GB)
 - The "Enable" checkbox for "Use all Largest Free Space" is cleared and "Capacity" is not entered
 - The "Enable" checkbox for "Use all Largest Free Space" is selected and the capacity of the created volume is 23 MB or less
 - The "Enable" checkbox for "Use all Largest Free Space" is selected and the capacity of the created volume is larger than the maximum capacity
 - The "Set Value" checkbox is selected and "Volume No." is not entered
 - The input value of "Volume No." exceeds the settable range
 - The specified "Volume No." is already used
 - "Volume No." is specified and total number of values that are specified for "Number of Volumes" is not "1"
 - The number of volumes that is specified for "Number of Volumes" exceeds the maximum number of volumes that can be created
 - Free space in the RAID group is insufficient
 - LDE is being performed in the RAID group to which the target volume belongs
 - The RAID group or the External RAID Group is blocked
 - The status of the RAID group is "❌Broken"
 - The status of the External RAID Group is other than "✅Available"
 - No External RAID Groups are selected (when "Use External Drive" is enabled)

5 Click the [OK] button.
→ Volume creation starts.

6 Click the [Done] button to return to the [Volume] screen.



Creating TPVs

Caution

- If TPPs with different chunk sizes exist in the storage system, the entire maximum pool capacity that is specified in "Set Thin Provisioning" might not be usable to create TPVs. Refer to the [Set Thin Provisioning] function for details.
- If the "Provisioned Capacity" (or the total logical capacity) of the created volumes in the TPP exceeds the total capacity of the creation destination TPP (or if the "Provisioned Rate" (or the capacity rate) exceeds "100 %"), a warning message appears in the result screen. Check the TPP used state and add drives to expand the TPP capacity as required. Check the [Thin Provisioning Pool Detail] screen for "Provisioned Rate". Refer to the [Thin Provisioning Pool (Basic Information)] function for details.

Automatically Selecting Destinations to Create TPVs

Procedure ▶▶▶

- 1 Click [Create] in [Action].
- 2 Select "Thin Provisioning Volume" for "Type".
- 3 Select "Automatic" for "RAID Group / TPP Selection".
- 4 Specify the volume detailed information, and click the [Create] button.
→ A confirmation screen appears.

Caution

- An error screen appears in the following conditions:
 - The "Name" is not entered
 - The "Name" does not satisfy the input conditions
 - The "Capacity" is not entered
 - The "Capacity" does not satisfy the input conditions
 - The number of volumes that is specified for "Number of Volumes" exceeds the maximum number of volumes that can be created

- 5 Click the [OK] button.
→ Volume creation starts.
- 6 Click the [Done] button to return to the [Volume] screen.



Manually Selecting Destinations to Create TPVs

Procedure ▶▶▶

- 1 Click [Create] in [Action].
- 2 Select "Thin Provisioning Volume" for "Type".
- 3 Select "Manual" for "RAID Group / TPP Selection".
- 4 Specify the detailed information of new volumes and select the TPP in which the volumes are to be created. Click the [Create] button.
→ A confirmation screen appears.

Note

- When specifying the "Volume No.", select the "Set Value" checkbox and input the number.

Caution

- The "Encryption by CM" setting cannot be changed.
- An error screen appears in the following conditions:
 - The "Name" is not entered
 - The "Name" does not satisfy the input conditions
 - The "Capacity" does not satisfy the input conditions
 - The "Set Value" checkbox is selected and "Volume No." is not entered
 - The input value of "Volume No." exceeds the settable range
 - The specified "Volume No." is already used
 - "Volume No." is specified and total number of values that are specified for "Number of Volumes" is not "1"
 - The number of volumes that is specified for "Number of Volumes" exceeds the maximum number of volumes that can be created
 - RAID groups that configure a TPP are blocked
 - The status of RAID groups that configure a TPP is "✖Broken"

- 5 Click the [OK] button.
→ Volume creation starts.
- 6 Click the [Done] button to return to the [Volume] screen.



Creating WSVs

Procedure ▶▶▶

- 1 Click [Create] in [Action].
- 2 Select "Wide Striping Volume" for "Type".
- 3 Input the detailed information of the volumes that are to be created, specify the selection information of the RAID group, and then click the [Select RAID Groups] button.
→ The "[Select RAID Groups] Screen" (page 93) appears.

Note

- When specifying the "Volume No.", select the "Set Value" checkbox and input the number.
 - When using the maximum free space in the selected RAID groups to create WSVs without specifying the capacity, select the "Enable" checkbox for "Use all Largest Free Space", and then input the number of WSVs.
- 4 Select the RAID group that is to be concatenated (multiple selections can be made) and click the [OK] button.
→ The display returns to the initial screen.
 - 5 After selecting RAID groups is complete, click the [Create] button.
→ A confirmation screen appears.

Caution

- An error screen appears in the following conditions:
 - The "Name" is not entered
 - The "Name" does not satisfy the input conditions
 - The "Capacity" does not satisfy the input conditions
 - The "Enable" checkbox for "Use all Largest Free Space" is cleared and "Capacity" is not entered
 - The "Enable" checkbox for "Use all Largest Free Space" is selected and the capacity of the created WSV is 23 MB or less
 - The "Enable" checkbox for "Use all Largest Free Space" is selected and the capacity of the created WSV is larger than the maximum capacity
 - The "Set Value" checkbox is selected and "Volume No." is not entered
 - The input value of "Volume No." exceeds the settable range
 - "Volume No." is specified and "Number of Volumes" is not "1"
 - The "Number of Concatenation RAID Groups" field is left blank, "1" is specified, or a value that is "65" or more is specified
 - The maximum free space in the selected RAID group is smaller than the volume size that is to be concatenated
 - LDE is being performed in the RAID group to which the target volume belongs
 - The RAID group is blocked
 - The status of the RAID group is "Broken"

Note

- To change the concatenation order of the RAID groups, select "Manual" for "Concatenation Order" in the Volume Information field. Click the [Concatenation Order] link to display the "[Setting Concatenation Order] Screen" (page 94). The concatenation order of the RAID groups can be changed in the [Setting Concatenation Order] screen.

- 6 Click the [OK] button.
→ Volume creation starts.
- 7 Click the [Done] button to return to the [Volume] screen.



Creating NAS User Volumes

Caution

- If the "Provisioned Capacity" (or the total logical capacity) of the created volumes in the TPP exceeds the total capacity of the creation destination TPP (or if the "Provisioned Rate" (or the capacity rate) exceeds "100 %"), a warning message appears in the result screen. Check the TPP used state and add drives to expand the TPP capacity as required. Check the [Thin Provisioning Pool Detail] screen for "Provisioned Rate". Refer to the [Thin Provisioning Pool (Basic Information)] function for details.

Automatically Selecting Destinations to Create NAS User Volumes

Procedure ▶▶▶

- 1 Click [Create] in [Action].
- 2 Select "NAS Volume" for "Type".
- 3 Select "Automatic" for "RAID Group / TPP Selection".
- 4 Specify the volume detailed information, and click the [Create] button.
→ A confirmation screen appears.

Caution

- An error screen appears in the following conditions:
 - The "Name" is not entered
 - The "Name" does not satisfy the input conditions
 - The "Capacity" is not entered
 - The "Capacity" does not satisfy the input conditions

- 5 Click the [OK] button.
→ Volume creation starts.
- 6 Click the [Done] button to return to the [Volume] screen.

Caution

- If the NAS user volume creation fails, refer to ""[Procedures for when the NAS user volume creation is not completed successfully](#)" (page 67)".



Manually Selecting Destinations to Create NAS User Volumes

Procedure ▶▶▶

- 1 Click [Create] in [Action].
- 2 Select "NAS Volume" for "Type".
- 3 Select "Manual" for "RAID Group / TPP Selection".
- 4 Specify the detailed information of new volumes and select the TPP in which the volumes are to be created. Click the [Create] button.
→ A confirmation screen appears.

Note

- When specifying the "Volume No.", select the "Set Value" checkbox and input the number.

Caution

- The "Encryption by CM" setting cannot be changed.
- An error screen appears in the following conditions:
 - The "Name" is not entered
 - The "Name" does not satisfy the input conditions
 - The "Capacity" does not satisfy the input conditions
 - The "Set Value" checkbox is selected and "Volume No." is not entered
 - The input value of "Volume No." exceeds the settable range
 - The specified "Volume No." is already used
 - RAID groups that configure a TPP are blocked
 - The status of RAID groups that configure a TPP is "✖Broken"

- 5 Click the [OK] button.
→ Volume creation starts.
- 6 Click the [Done] button to return to the [Volume] screen.

Caution

- If the NAS user volume creation fails, refer to [""Procedures for when the NAS user volume creation is not completed successfully" \(page 67\)"](#).



Creating Deduplication/Compression Volumes

Automatically Selecting Destinations to Create Deduplication/Compression Volumes

Procedure ▶▶▶

- 1 Click [Create] in [Action].
- 2 Select "Thin Provisioning Volume" for "Type" and set "Enable" for "Deduplication", "Compression", or both "Deduplication" and "Compression".
- 3 Select "Automatic" for "RAID Group / TPP Selection".
- 4 Specify the volume detailed information, and click the [Create] button.
→ A confirmation screen appears.

Caution

- An error screen appears in the following conditions:
 - The "Name" is not entered
 - The "Name" does not satisfy the input conditions
 - The "Capacity" is not entered
 - The "Capacity" does not satisfy the input conditions
 - The number of volumes that is specified for "Number of Volumes" exceeds the maximum number of volumes that can be created
 - The Deduplication status of the TPP where volumes are to be created is "Disable", "Error", or a "-" (hyphen)
 - The Compression status of the TPP where volumes are to be created is "Disable", "Error", or a "-" (hyphen)

- 5 Click the [OK] button.
→ Volume creation starts.
- 6 Click the [Done] button to return to the [Volume] screen.



Manually Selecting Destinations to Create Deduplication/Compression Volumes

Procedure ▶▶▶

- 1 Click [Create] in [Action].
- 2 Select "Thin Provisioning Volume" for "Type" and set "Enable" for "Deduplication", "Compression", or both "Deduplication" and "Compression".
- 3 Select "Manual" for "RAID Group / TPP Selection".
- 4 Specify the detailed information of new volumes and select the TPP in which the volumes are to be created. Click the [Create] button.
→ A confirmation screen appears.

Note

- When specifying the "Volume No.", select the "Set Value" checkbox and input the number.

Caution

- The "Encryption by CM" setting cannot be changed.
- An error screen appears in the following conditions:
 - The "Name" is not entered
 - The "Name" does not satisfy the input conditions
 - The "Capacity" does not satisfy the input conditions
 - The "Set Value" checkbox is selected and "Volume No." is not entered
 - The input value of "Volume No." exceeds the settable range
 - The specified "Volume No." is already used
 - "Volume No." is specified and total number of values that are specified for "Number of Volumes" is not "1"
 - The number of volumes that is specified for "Number of Volumes" exceeds the maximum number of volumes that can be created
 - The Deduplication status of the selected TPP is "Disable", "Error", or a "-" (hyphen)
 - The Compression status of the selected TPP is "Disable", "Error", or a "-" (hyphen)
 - RAID groups that configure a TPP are blocked
 - The status of RAID groups that configure a TPP is "❌Broken"

- 5 Click the [OK] button.
→ Volume creation starts.
- 6 Click the [Done] button to return to the [Volume] screen.



Delete Volume

- ["■ Overview" \(page 104\)](#)
- ["■ User Privileges" \(page 107\)](#)
- ["■ Operating Procedures" \(page 107\)](#)

■ Overview

This function deletes volumes.

[Standard](#) type volumes, [WSVs](#), [TPVs](#), [SDVs](#), and [Temporary](#) type volumes can be deleted.

Caution

- When a volume is deleted, access to data in the target volume is not allowed.
- When NAS user volumes are deleted, Quota information is also deleted.
- If NAS volumes (NAS user volumes or NAS backup volumes) are deleted while a meta cache redistribution is being performed, the process may be delayed for a maximum of two minutes.
- The following volumes cannot be deleted:
 - Volumes that are registered in a [LUN group](#)
 - Volumes that are mapped with applications other than Web GUI
 - Volumes (migration source volumes or migration destination volumes) undergoing [RAID migration](#)
 - A copy source or destination volume (*1) of the [Advanced Copy](#) that is being executed
 - *1: If the data merge process has not been performed, [Veeam Snapshot Volumes](#) can be deleted even if the Advanced Copy is being executed.
 - Volumes undergoing TPV balancing (work volumes and target TPVs for balancing)
 - Volumes undergoing FTRP balancing (work volumes)
 - Volumes with Storage Migration paths
 - ODX Buffer volumes undergoing [ODX](#)
 - NAS user volumes that contain shared folders
 - NAS user volumes with [snapshot](#) settings
 - Snapshot destination SDV
 - Volumes that are used for the Storage Cluster function
 - Deduplication/Compression Volumes when the status of the [Data Container Volume](#) that is created in the TPP to which the relevant volumes belong is "🟡Readying", "🔴Not Ready", "🔴Broken", or "🔴Data Lost"
- By repeating creation and deletion of volumes, free space may be dispersed in the RAID group.
- Up to 128 volumes can be deleted at once.
- Multiple volumes whose "Usage" is "Veeam", "Dedupe&Comp/Veeam", "Dedupe/Veeam", or "Comp/Veeam" cannot be selected with a single operation. In this case, delete one "Veeam", "Dedupe&Comp/Veeam", "Dedupe/Veeam", or "Comp/Veeam" volume at a time.

Note

- When deleting **SDPVs**, refer to the [Delete Snap Data Pool Volume] function or the [Force Delete Snap Data Pool Volume] function.
- This function can be used to delete an ODX Buffer volume.
- This function can be used to delete an **External Volume** that is created in the **External RAID Group**. If External Volumes are deleted, the **External LU Information** that is inherited from the **external storage system** is also deleted.
- If External Volumes are deleted, delete the following items. Refer to the [Delete External RAID Group] function and the [Delete External Drive] function for details.
 - External RAID Group that was used to create the External Volume
 - **External Drive** that was used to create the External RAID Group
- This function can delete NAS user volumes, NAS backup volumes, and snapshot destination SDVs. The NAS system volumes must be deleted by CLI.
- When the Deduplication/Compression function for the TPP is disabled, Data Container Volumes in the relevant TPP are automatically deleted. Refer to the [Set Deduplication/Compression] function for details.
- Use the [Volume] screen to check whether the volume is used for the Storage Cluster function. Refer to the [Volume (Basic Information)] function for details.
- When volumes are registered in LUN groups, or a message "The specified volumes have already been mapped. They cannot be deleted." is displayed, use the following procedure to delete the volumes from LUN groups.

Procedure ▶▶▶

- 1** Check all the LUN groups in which volumes are registered in the [LUN Group] screen under the [Volume] navigation.
- 2** Select a LUN group in which the volume is registered in the [LUN Group] screen under the [Connectivity] navigation, and then click [Modify LUN Group] in [Action].
- 3** Delete "allocation information of host LUN and volume number" in the [Modify LUN Group] screen.
- 4** When a volume is registered in multiple LUN groups, repeat Step 2 and Step 3. (LUN groups in which a volume is registered can be checked with the [LUN Group] field in the [Modify LUN Group] screen in Step 3.)
- 5** If the location information of the port ("CE#x CM#y CA#z Port#w" or "CM#y CA#z Port#w") is displayed in the [LUN Group] field in Step 1 or Step 3, the volume is mapped with applications other than Web GUI. Use the relevant application to delete the volume from the port mapping information.
- 6** Confirm that "LUN Group Count" is "0" in the [LUN Group] field under the [Volume] navigation.
- 7** Use this function to delete volumes.

It is not necessary to delete a host affinity when deleting volumes with the host affinity setting from a LUN group. If all of the volumes in a LUN group are not needed, delete the host affinity, and then click the [Delete LUN Group] button to delete the LUN group with volumes in Step 2.

■ User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	✓
StorageAdmin	✓
AccountAdmin	
SecurityAdmin	
Maintainer	✓

Refer to "[A. User Roles and Policies](#)" (page 1580) for details on the policies and roles.

■ Operating Procedures

Procedure ▶▶▶

- 1 Select the volume that is to be deleted (multiple selections can be made) and click [Delete] in [Action].
→ A confirmation screen appears.

Caution

- [Delete] cannot be clicked under the following conditions:
 - The type of the selected volume is "FTV"
 - NAS system volumes are selected
 - Data Container Volumes are selected

- 2 Click the [OK] button.
→ Deletion of a volume starts.

Note

- When a TPV is deleted, the physical allocating capacity of the relevant TPV is formatted. The physical allocating capacity is released after formatting is complete.

- 3 Click the [Done] button to return to the [Volume] screen.



Rename Volume

- "[■ Overview](#)" (page 107)
- "[■ User Privileges](#)" (page 108)
- "[■ Settings](#)" (page 108)
- "[■ Display Contents](#)" (page 108)
- "[■ Operating Procedures](#)" (page 110)

■ Overview

This function changes the volume name.

Caution

- For the ETERNUS DX900 S5 or the ETERNUS DX8900 S4, up to 1024 volumes can be renamed at the same time. Note that this limitation does not apply to other models.

■ User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	✓
StorageAdmin	✓
AccountAdmin	
SecurityAdmin	
Maintainer	✓

Refer to ["A. User Roles and Policies" \(page 1580\)](#) for details on the policies and roles.

■ Settings

In this screen, specify a new volume name.

Rename Setting

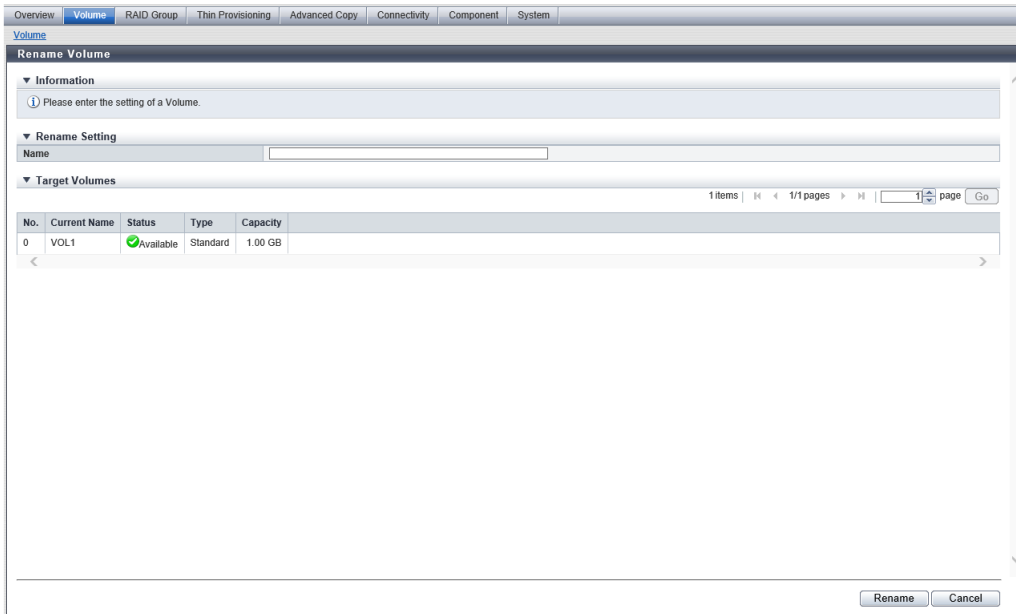
Item	Description	Setting values
Name	Input a new volume name. When one volume is selected, an existing volume name cannot be used. Volume names starting with "\$SYSVOL", "\$VOL_META", or "\$DATA_CNTNR" cannot be used.	Up to 32 alphanumeric characters, symbols (except "," (comma) and "?"), and spaces
Start of Suffix	Select the suffix starting number to be added to the new volume name. When changing multiple volume names, the suffix number is added to the volume names with consecutive numbers in ascending order starting with the selected suffix number. Refer to "Naming Conventions for Renaming Volumes" (page 109) for details. When changing only one volume name, "Start of Suffix" is not displayed.	0 (Default) - 99999
Digits of Suffix	Select the number of digits to be added to the new volume name. When changing only one volume name, "Digits of Suffix" is not displayed.	For the ETERNUS DX60 S5/DX100 S5/DX200 S5 and ETERNUS AF150 S3/AF250 S3: 1 (Default) - 4 For the other models: 1 (Default) - 5

■ Display Contents

Detailed information of the selected volume is displayed.

2. Volume

Volume (Basic Information)



Target Volume

Item	Description
No.	The volume number is displayed.
Current Name	The current volume name is displayed.
Status	The volume status is displayed. Refer to "Volume Status" (page 1604) for details.
Type	The volume type is displayed. Standard WSV TPV FTV SDV SDPV
Capacity	The volume capacity is displayed.

Naming Conventions for Renaming Volumes

- When changing multiple volume names at the same time, the volume name is automatically applied to the volumes according to the specified "Name", selected "Start of Suffix", and selected "Digits of Suffix".
(Example) When the specified volume name is "Volume" (six characters), "Start of Suffix" is "90", "Digits of Suffix" is "2", and the number of volumes is "11": the volume names "Volume90" to "Volume100" are applied to the volumes.
- If the automatically applied volume name exceeds 32 characters due to the "Start of Suffix" and "Digits of Suffix" settings, the excess characters are deleted from the specified "Name", and replaced with a "~".
(Example) When the specified volume name is "ETERNUS_DXAF_Standard-XX_VolumeX" (32 characters), "Start of Suffix" is "90", "Digits of Suffix" is "2", and the number of volumes is "11": the volume names "ETERNUS_DXAF_Standard-XX_Volu~90" to "ETERNUS_DXAF_Standard-XX_Vol~100" are applied to the volumes.

- When a volume name including the suffix number already exists, the suffix number is increased by one (+1). The suffix number is increased by one (+1) until no volume names overlap.

Note

- If "Start of Suffix" starts with "0" and it exceeds "Digits of Suffix", the zeros are deleted from "Start of Suffix" and then applied to the volume name.
(Example 1) When the specified volume name is "Volume", "Start of Suffix" is "000", and "Digits of Suffix" is "1": the volume name "Volume0" is applied to the volume.
(Example 2) When the specified volume name is "Volume", "Start of Suffix" is "00005", and "Digits of Suffix" is "2": the volume name "Volume05" is applied to the volume.

■ Operating Procedures

Procedure ▶▶▶

- 1 Select the volume that is to be renamed (multiple selections can be made) and click [Rename] in [Action].

Caution

- [Rename] cannot be clicked under the following conditions:
 - The usage of the selected volume is "System"
 - For the ETERNUS DX900 S5 or the ETERNUS DX8900 S4, the number of selected volumes exceeds 1024

- 2 Specify the parameters, and click the [Rename] button.
→ A confirmation screen appears.

Caution

- An error screen appears in the following conditions:
 - The volume name is not input
 - The value in the "Name" does not satisfy the input conditions
 - An existing volume name is entered (when one volume is selected)

- 3 Click the [OK] button.
→ Renaming of the volume starts.
- 4 Click the [Done] button to return to the [Volume] screen.



Format Volume

- "■ Overview" (page 110)
- "■ User Privileges" (page 112)
- "■ Operating Procedures" (page 112)

■ Overview

This function formats the selected volume. The data stored in the volume will be deleted by formatting. [Standard](#) type volumes, [WSVs](#), [SDVs](#), [SDPVs](#), [TPVs](#), and [FTVs](#) can be formatted.

Caution

- When formatting a TPV where the allocation method is "Thin", the physical allocation area that is used by the target TPV is released.
- When formatting a TPV where the allocation method is "Thick", the physical allocation area that is used by the target TPV is not released. The physical allocation area that is used by the target TPV is released when the TPV is deleted.
- This function cannot be used under the following conditions:
 - The RAID group diagnosis is being performed in the storage system
 - The disk diagnosis is being performed in the storage system
 - [Pinned data](#) exists in the storage system
- The following volumes cannot be formatted:
 - Volumes for which "Status" is "Broken", "Data Lost", or "Not Ready"
 - Volumes undergoing [RAID Migration](#)
 - A copy source volume or a copy destination volume of an [Advanced Copy](#) (local/remote) that is being performed
 - Volumes registered in a RAID group undergoing [LDE](#)
 - ODX Buffer volumes undergoing [ODX](#)
 - NAS user volumes that contain shared folders
 - Volumes that are used for the Storage Cluster function
 - Deduplication/Compression Volumes when the status of the [Data Container Volume](#) that is created in the TPP to which the relevant volumes belong is "Readying", "Not Ready", "Broken", or "Data Lost"
 - A Data Container Volume that belongs to the TPP where Advanced Copy or RAID Migration is being performed for the created Deduplication/Compression Volumes
 - Deduplication/Compression Volumes and Data Container Volume that belong to the TPP where the capacity is insufficient
- Do not format the volumes with Storage Migration paths.
- For the ETERNUS DX900 S5 or the ETERNUS DX8900 S4, up to 1024 volumes can be formatted at a time. Note that this limitation does not apply to other models.
- If a Data Container Volume format is stopped due to a hardware error or drive error, restart the volume format.
- If Deduplication/Compression Volumes larger than the logical capacity of the Data Container Volume are deleted or formatted repeatedly, creation of the Deduplication/Compression Volume may fail due to a temporary capacity shortage.
- If Deduplication/Compression Volumes belonging to a TPP with an insufficient capacity are formatted, an error occurs. In this case, the data and the used physical allocation area are released, but the target Deduplication/Compression Volumes cannot be used normally. Expand the TPP capacity and format Deduplication/Compression Volumes again.
- If the error message "An internal resource is insufficient." appears after volumes are formatted, a format of volumes may have failed. Check the "Status" of the formatted volumes in the [Volume] screen. Refer to the [Volume (Basic Information)] function for details. Volumes in the "Readying" state have not been formatted. Wait until the current formatting process is complete and then reformat the relevant volumes.

Note

- Formatting newly created volumes is not required since these volumes are formatted automatically.
- To format NAS system volumes and Data Container Volumes, "Maintenance Operation" policy is required.
- The allocation method for the volume can be checked in the [Volume] screen. Refer to the [Volume (Basic Information)] function for details.

■ User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	✓
StorageAdmin	✓
AccountAdmin	
SecurityAdmin	
Maintainer	✓

Refer to "'A. User Roles and Policies" (page 1580)" for details on the policies and roles.

■ Operating Procedures

Procedure ▶▶▶

- 1 Select the volume to be formatted (multiple selections can be made) and click [Format] in [Action].
→ A confirmation screen appears.

Caution

- [Format] cannot be clicked under the following conditions:
 - The selected volume is used for the Virtual Volume function
 - The usage of the selected FTV is "System"
 - NAS expanded system volumes are selected
 - For the ETERNUS DX900 S5 or the ETERNUS DX8900 S4, the number of selected volumes exceeds 1024
 - [External Volumes](#) (or volumes whose "Usage" is "Migration") are selected
- If the format target TPV fulfills all of the following conditions, an error screen appears.
 - Allocation method is "Thick"
 - The volume status is "🟡Readying"
 - The free space in the TPP to which the TPV belongs is insufficient

- 2 Click the [OK] button.
→ Formatting of a volume starts.
- 3 Click the [Done] button to return to the [Volume] screen.



Expand Volume

- "[■ Overview](#)" (page 113)
- "[■ User Privileges](#)" (page 115)
- "[■ Settings](#)" (page 116)
- "[■ Operating Procedures](#)" (page 118)





■ Overview

This function concatenates a new volume to the selected volume by using the [LUN Concatenation](#) function to expand the volume capacity that can be used from the server.

Volume expansion provides the following features:

- Volume capacity can be expanded by using the free space in an existing RAID group.
- Free space that is 1 GB or more can be concatenated.
- A volume with a maximum capacity of 128 TB can be created. (The maximum capacity of ODX Buffer volume is 1 TB.)
- Concatenation can be performed among multiple RAID groups.
- Any RAID level can be applied for a concatenation source volume and a concatenation destination volume. Concatenation can be performed regardless of the RAID level for the concatenation source volume and the concatenation destination volume.
- Data can be accessed from the host in the same way regardless of the concatenation status (before, during, or after concatenation).
- When the number of volumes in a concatenated volume is 15 or less, volumes can be added to the existing concatenated volume.

Requirements for concatenating a volume

- The volume type is "[Standard](#)"
- The volume capacity is 1 GB or larger
- When the concatenation source volume is a concatenated volume, the volume must satisfy the following requirements:
 - The number of volumes in the concatenated volume must be 15 or less
 - The capacity of the concatenated volume must be less than 128 TB
(If the concatenated volume is configured with the ODX Buffer volume, the volume must be less than 1 TB)
- The volume status is not "Broken", "Data Lost", "Not Ready", or "Readying"
- [RAID migration](#) is not being performed (the target volume is not used as a migration source or a migration destination)
- There are no [Advanced Copy](#) sessions (local or remote) for which the copy range is "Totally" (*1)
- [LDE](#) is not being performed for the RAID group to which the target volume belongs
- Encryption is not being performed for the target volume
- A Storage Migration path is not created in the target volume
- "Cache Page Capacity" is not specified (*2)
- Not used for the Storage Cluster function
- Data protection by "T10-DIF (Data Integrity Field)" is not enabled
- The volume is not an [External Volume](#)

2. Volume
Volume (Basic Information)

*1: "Totally" is specified for the copy range in the following conditions:

- When performing a LUN to LUN copy session with the ETERNUS SF AdvancedCopy Manager Copy Control Module (CCM)
- When performing a copy session with ETERNUS SF AdvancedCopy Manager Adapter for VMware Site Recovery Manager
- When performing a copy session with ETERNUS VSS Hardware Provider
- When performing a [SnapOPC+](#) session that is specified with Web GUI or CLI

*2: A "-" (hyphen) is specified for "Cache Page Capacity" by using the [Modify Cache Parameters] function. Note that "-" (hyphen) is the default value.

Requirements to obtain free space from RAID groups

- The volume status is not "✖Broken"
- The RAID group is not blocked
- [LDE](#) is not being performed in the target RAID group
- The RAID group is not an [External RAID Group](#)
- The RAID group must satisfy the following requirements:
 - The RAID group must contain [Standard](#) type volumes, [WSVs](#), [SDVs](#), or [SDPVs](#). If this is not the case, the RAID group must not contain any volumes.
 - The RAID group must not belong to [TPPs](#)
 - The RAID group must not belong to [FTRPs](#)
 - RAID groups that are not registered as [REC Disk Buffers](#)
 - RAID groups that are not registered as Extreme Cache Pools
- The number of volumes registered in the target RAID group is less than 128
- The free space for the RAID group is 1 GB or larger
- The drive type for configuring the RAID group where the concatenation source volume belongs and the drive type for configuring the concatenation destination RAID group must be the following combination of drive types

		Concatenation destination drive type					
		Online	Nearline	SSD	Online SED	Nearline SED	SSD SED
Concatenation source drive type	Online	OK	OK (but not recommended)	NG	NG	NG	NG
	Nearline	OK (but not recommended)	OK	NG	NG	NG	NG
	SSD	NG	NG	OK	NG	NG	NG
	Online SED	NG	NG	NG	OK	OK (but not recommended)	NG
	Nearline SED	NG	NG	NG	OK (but not recommended)	OK	NG
	SSD SED	NG	NG	NG	NG	NG	OK

OK: Concatenation is available OK (but not recommended): Concatenation is available, but not a recommended configuration NG: Concatenation is not available

Recommended conditions to obtain free space from RAID groups

- Set the same values for the following items to RAID groups where the concatenation source volume belongs and to RAID groups that will be concatenated.
 - RAID level
 - Drive speed
 - Drive type (Online/Nearline)
 - Drive type (Online SED/Nearline SED)
 - SSD type (SSD-H/SSD-M/SSD-L/SSD-H SED/SSD-M SED/SSD-L SED)
 - Key group setting status (SED (Enabled Key Group)/SED (Disabled Key Group))

The speed and SSD type of the drive that configures a RAID group can be checked in the [RAID Group Detail] screen ([Drive] tab).

Caution

- Backing up the data before performing volume expansion is recommended.
- This function cannot be used under the following conditions:
 - The maximum number of volumes are already registered in the storage system
 - The hot controller firmware upgrade is being performed in the storage system
 - A RAID group diagnosis or a disk diagnosis is being performed in the storage system
- Expanded volume capacity must be recognized by the server.

Note

- The encryption status of volumes after concatenation is the same as the concatenation source volume.
- Areas in concatenated volumes are formatted automatically. For format progress, refer to the [Volume Detail] screen. Refer to the [Volume (Basic Information)] function for details.
- To expand the **TPV** capacity, refer to the [Expand Thin Provisioning Volume] function.
- Volume capacity expansion (LUN Concatenation) can be performed even when the concatenation source volume is being formatted.
- If a volume capacity expansion fails, a work volume (or a "Temporary" type volume) is displayed in the volume list. Delete the work volume and perform this function again.

■ User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	✓
StorageAdmin	✓
AccountAdmin	
SecurityAdmin	
Maintainer	✓

Refer to ""[A. User Roles and Policies](#)" (page 1580)" for details on the policies and roles.

■ Settings

In this screen, add capacity to the existing volume.

Setting Volume

Item	Description
No.	The volume number is displayed.
Name	The volume name is displayed.
Type	The volume type is displayed. Standard (fixed)
Drive Type	The type of drives that configure the RAID group to which volumes belong is displayed. If multiple drive types are used in the RAID group, the drive type is displayed as described below. <ul style="list-style-type: none"> • If only "Online" type drives are used or if both "Online" and "Nearline" type drives are used, "Online" is displayed. • If only "Online SED" type drives are used or if both "Online SED" and "Nearline SED" type drives are used, "Online SED" is displayed. • If a single SSD type (SSD-H/SSD-M/SSD-L) is used or if multiple SSD types (SSD-H/SSD-M/SSD-L) are used, "SSD" is displayed. • If a single SSD type (SSD-H SED/SSD-M SED/SSD-L SED) is used or if multiple SSD types (SSD-H SED/SSD-M SED/SSD-L SED) are used, "SSD SED" is displayed.
Encryption	The encryption status (the set state of the key group) of the RAID group to which the volume belongs is displayed. When no key groups are created or when the RAID groups are managed by a common key, "SED (Disabled Key Group)" is displayed. This item is displayed if the drive type is "Online SED", "Nearline SED", or "SSD SED". <ul style="list-style-type: none"> • SED (Enabled Key Group) The RAID groups that are configured by SEDs are registered in the key group (*1) • SED (Disabled Key Group) The RAID groups that are configured by SEDs are not registered in the key group (*1) <p>*1 : The key group combines all of the RAID groups that use the same SED authentication key.</p>
Volume Capacity	The current volume capacity is displayed.
Concatenation Count	The current number of concatenated volumes is displayed.

Manual Setting

Item	Description
Volume Capacity after expand	The volume capacity after concatenation is displayed. The capacity that is entered in the [Add Capacity] screen is added to the current volume capacity. Current volume capacity = Volume capacity after expansion (Default)
Concatenation Count after expand	The number of concatenated volumes after concatenation is displayed. The concatenation count after expansion is increased by one (+1) every time when the capacity is added in the [Add Capacity] screen. Current concatenation count = Concatenation count after expansion (Default)

Add Capacity

The settings that are specified in the [Add Capacity] screen are displayed.

2. Volume
Volume (Basic Information)

Item	Description
Capacity	The volume capacity and units of capacity that are specified in the [Add Capacity] screen are displayed.
RAID Group	The names of the RAID groups that are specified in the [Add Capacity] screen are displayed.
Encryption	The encryption status (the set state of the key group) of the RAID groups that are specified in the [Add Capacity] screen is displayed. This item is displayed if the drive type is "Online SED", "Nearline SED", or "SSD SED". SED (Enabled Key Group) SED (Disabled Key Group)

[Add Capacity] screen

In this screen, select the RAID group to obtain free space from and specify the capacity that is to be added.

Capacity

Item	Description	Setting values
Capacity	<p>Input the capacity that is to be concatenated and select the units of capacity. Up to a 15-digit number including the "." (decimal point) can be input. Note that when "MB" is selected, the specified value is rounded down to the nearest whole number. When "GB" or "TB" is selected, the specified value is converted to "MB" and rounded down to the nearest whole number.</p> <div style="background-color: #fff9c4; padding: 5px; margin: 5px 0;"> <p>Caution</p> <ul style="list-style-type: none"> If the same capacity is entered in the same format (digits and units (GB/TB)) as the "Largest Free Space", all of the largest free space is used. To add the capacity without adjustments, input the capacity in units of MB. </div> <div style="background-color: #e0e0e0; padding: 5px; margin: 5px 0;"> <p>Note</p> <ul style="list-style-type: none"> The number of entered characters includes the "." (decimal point) and the "0" before the decimal point. (Example) 0.1234567890123 (15 characters) </div>	<p>Capacity that is to be concatenated 1 GB - The "Largest Free Space" of the relevant RAID group Unit: TB/GB/MB</p>

RAID Group List

Item	Description
Radio button	<p>Select the radio button of the RAID group to obtain free space from.</p> <div style="background-color: #fff9c4; padding: 5px; margin: 5px 0;"> <p>Caution</p> <ul style="list-style-type: none"> When the drive type is "Online SED", "Nearline SED", or "SSD SED", selecting a RAID group with the same key group setting (Enabled Key Group/Disabled Key Group) as the RAID group to which the concatenation source volume belongs is recommended. </div>
Name	The RAID group name is displayed.

2. Volume

Volume (Basic Information)

Item	Description
Status	The RAID group status is displayed. Refer to "RAID Group Status" (page 1605) for details.
Drive Type	The type of drive that configures the RAID group is displayed. If multiple drive types are used in the RAID group, the drive type is displayed as described below. <ul style="list-style-type: none"> • If only "Online" type drives are used or if both "Online" and "Nearline" type drives are used, "Online" is displayed. • If only "Online SED" type drives are used or if both "Online SED" and "Nearline SED" type drives are used, "Online SED" is displayed. • If a single SSD type (SSD-H/SSD-M/SSD-L) is used or if multiple SSD types (SSD-H/SSD-M/SSD-L) are used, "SSD" is displayed. • If a single SSD type (SSD-H SED/SSD-M SED/SSD-L SED) is used or if multiple SSD types (SSD-H SED/SSD-M SED/SSD-L SED) are used, "SSD SED" is displayed.
RAID Level	The level of RAID group is displayed. High Performance (RAID1+0) High Capacity (RAID5) High Reliability (RAID6) High Reliability (RAID6-FR) Reliability (RAID5+0) Mirroring (RAID1) Striping (RAID0)
Total Capacity	The total capacity of the RAID groups is displayed.
Total Free Space	The total free space of the RAID group is displayed. "Free space" means an area in the RAID group where no volume is created, and dispersed areas which became free by creating and deleting a volume.
Largest Free Space	The capacity of the largest unused area in the RAID group is displayed.
Encryption	The encryption status (the set state of the key group) of the RAID group is displayed. This item is displayed if the drive type is "Online SED", "Nearline SED", or "SSD SED". SED (Enabled Key Group) SED (Disabled Key Group)

Function Button

Button	Description
[Add]	Selects the RAID group to obtain free space from. Click this item to display the [Add Capacity] screen.
[Delete]	Deletes the capacity of RAID group that is selected in the [Add Capacity] screen. If no RAID groups are selected, the [Delete] button is not displayed.

■ Operating Procedures

Procedure ▶▶▶

- 1 Select the volume to be expanded and click [Expand Volume] in [Action].

Caution

- [Expand Volume] cannot be clicked when [External Volumes](#) (or volumes whose "Usage" is "Migration") are selected.

- 2 Click the [Add] button.
→ The [Add Capacity] screen is displayed.
- 3 Select the RAID group to obtain the free space from, specify the capacity to be concatenated, and click the [OK] button.
→ Returns to the [Expand Volume] screen.
- 4 Repeat Step 2 and Step 3 to select RAID groups and specify the capacity. After completing these settings, click the [Expand] button.
→ A confirmation screen appears.
- 5 Click the [OK] button.
→ Expansion of a volume starts.
- 6 Click the [Done] button to return to the [Volume] screen.



Expand Thin Provisioning Volume

- ["■ Overview" \(page 119\)](#)
- ["■ User Privileges" \(page 121\)](#)
- ["■ Settings" \(page 122\)](#)
- ["■ Operating Procedures" \(page 122\)](#)

■ Overview

This function expands the capacity of [Thin Provisioning Volumes \(TPVs\)](#).

Requirements for Expanding a TPV

- TPVs that are to be expanded must be one of the following volumes:
 - TPVs for SAN
 - ODX Buffer volumes (TPV)
 - NAS user volumes
 - Deduplication/Compression Volumes
 - [Data Container Volume](#)
- The capacity does not exceed the following maximum values
 - For ODX Buffer volumes, the capacity must not be more than 1 TB
 - For TPVs for SAN or Deduplication/Compression Volumes, the capacity must not be more than 128 TB
 - For NAS user volumes, the capacity must not be more than the maximum volume capacity of each "NAS FS Block Size" (*1)
 - For Data Container Volumes, the capacity must not be more than the following maximum values (*2)
 - ETERNUS DX200 S5: 384 TB (6 PB)
 - ETERNUS DX500 S5: 1 PB (16 PB)
 - ETERNUS DX600 S5: 1.5 PB (24 PB)
 - ETERNUS DX900 S5: 8 PB (48 PB)
 - ETERNUS DX8900 S4: 8 PB (48 PB)
 - ETERNUS AF250 S3: 384 TB (6 PB)

2. Volume
Volume (Basic Information)

- ETERNUS AF650 S3: 1.5 PB (24 PB)
- Volumes that are not Veeam Snapshot Volumes
- There are no [Advanced Copy](#) sessions for which the copy range is "Totally" (*3)
- Balancing is not being performed in the target TPV
- [RAID Migration](#) is not being performed in the target TPV
- A Storage Migration path is not created in the target volume
- Not used for the Storage Cluster function
- Copy sessions are not set for NAS user volumes
- Snapshots are not set for NAS user volumes
- For the Data Container Volumes, the status of the relevant Data Container Volume is other than "🟡 Ready", "🔴 Not Available", "🔴 Not Ready", "🔴 Broken", or "🔴 Data Lost"
- For the Deduplication/Compression Volumes, the status of the Data Container Volume in the TPP to which the Deduplication/Compression Volumes belong is other than "🟡 Ready", "🔴 Not Available", "🔴 Not Ready", "🔴 Broken", or "🔴 Data Lost"

*1 : The following table shows the maximum NAS user volume capacity and the maximum file size of each "NAS FS Block Size".

	NAS FS Version (*4)	NAS FS Block Size		
		8 KB	32 KB	256 KB
Maximum NAS user volume capacity	5	32 TB	128 TB	128 TB
Maximum file size (*5)	5	1 TB	4 TB	32 TB

*2 : Values in parentheses indicate the maximum capacity when the chunk size is "336 MB".

*3 : "Totally" is specified for the copy range in the following conditions:

- When performing a LUN to LUN copy session with the ETERNUS SF AdvancedCopy Manager Copy Control Module (CCM)
- When performing a copy session with ETERNUS SF AdvancedCopy Manager Adapter for VMware Site Recovery Manager
- When performing a copy session with ETERNUS VSS Hardware Provider
- When performing a [SnapOPC+](#) session that is specified with Web GUI or CLI

*4 : The version of the NAS file system (NAS user volume). Refer to "[NAS FS Version](#)" (page 52)" for details.

*5 : The "file size" indicates the size of the user data that is created in the shared folder.

Caution

- This function cannot be performed when there is no TPV in the storage system.
- If TPPs with different chunk sizes exist in the storage system, the entire maximum pool capacity that is specified in "Set Thin Provisioning" might not be usable to expand TPVs. Refer to the [Set Thin Provisioning] function for details.
- The total capacity of TPVs in a TPP must be smaller than the total capacity that can be used to expand the TPP. The value of "total capacity that can be used to expand the TPP" is displayed in the "Total Capacity after expand" field of the [Expand Thin Provisioning Pool] screen. Refer to the [Expand Thin Provisioning Pool] function for details.
- This function cannot be performed when there is no free space for expansion in the storage system.
- Expanded TPV capacity must be recognized by the server.
- When the file system format for the NAS user volume does not support a capacity expansion, a message appears. Convert the file system format and perform this function again. Refer to the [Reconfigure NAS Volume] function for details.
- If the NAS user volume capacity is expanded while an automatic meta cache redistribution is being performed, the process may be delayed for a maximum of five minutes. If the automatic meta cache redistribution is not complete within five minutes, an error occurs for this function.
- If the total logical capacity of the Deduplication/Compression Volumes that are to be created in the same TPP exceeds the capacity of the Data Container Volume, the logical capacity of the Data Container Volume must be expanded.
- To expand Data Container Volumes, stop or suspend the Advanced Copy session for all the Deduplication/Compression Volumes in the TPP to which the target Data Container Volume belongs.

Note

- The maximum total capacity of the TPVs that can be created in the storage system depends on the maximum pool capacity specified with the [Set Thin Provisioning] function. To check the maximum pool capacity, use the [Settings (Thin Provisioning)] function. Note that the total logical capacity of TPVs does not include the Deduplication/Compression Volume capacity.
- The allocation method for the TPV can be checked in the [Volume] screen. Refer to the [Volume (Basic Information)] function for details.
- The "NAS FS Block Size" and the "NAS FS Version" for the NAS user volume can be checked in the [Volume Detail] screen. Refer to the [Volume (Basic Information)] function for details.

■ User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	✓
StorageAdmin	✓
AccountAdmin	
SecurityAdmin	
Maintainer	✓

2. Volume
Volume (Basic Information)

Refer to "[A. User Roles and Policies](#)" (page 1580) for details on the policies and roles.

■ Settings

In this screen, input a TPV capacity after expansion.

Target Thin Provisioning Volume

Item	Description
No.	The volume number is displayed.
Name	The volume name is displayed. For Data Container Volumes: \$DATA_CNTNRx (x: TPP number) For the other volumes: Volume name
Type	The volume type is displayed. TPV (fixed)
Volume Capacity	The current TPV capacity is displayed. For Data Container Volumes: 32 TB - 48 PB For ODX Buffer volumes: 1 GB - 1 TB For the other volumes: 24 MB - 128 TB

Volume Setting

Item	Description	Setting values
Volume Capacity after expand	Input the TPV capacity after expansion and select the units of capacity. Up to a 15-digit number including the "." (decimal point) can be input. Note that when "MB" is selected, the specified value is rounded down to the nearest whole number. When "GB" or "TB" is selected, the specified value is converted to "MB" and rounded down to the nearest whole number.	For Data Container Volumes: 33554433 MB - 48 PB For ODX Buffer volumes: 1025 MB - 1 TB For NAS user volumes: • 409601 MB - 128 TB (When the NAS FS block size is "256 KB" or "32 KB") • 409601 MB - 32 TB (When the NAS FS block size is "8 KB") For the other volumes: 25 MB - 128 TB Unit: PB/TB/GB/MB Current TPV capacity < TPV capacity after expansion

■ Operating Procedures

Procedure ▶▶▶

- 1 Select the TPV to be expanded and click [Expand TPV] in [Action].

Caution

- If NAS system volumes or NAS backup volumes are selected, [Expand TPV] cannot be clicked.

- 2 Input the TPV capacity after expansion, and click the [Expand] button.
→ A confirmation screen appears.
- 3 Click the [OK] button.
→ Expansion of a TPV starts.

Caution

- When expanding the TPV where the allocation method is "Thick" and the free space in the TPP is insufficient, an error screen appears.

- 4 Click the [Done] button to return to the [Volume] screen.

Caution

- If the "Provisioned Capacity" (or the total logical capacity) of the volumes that exist within the TPP exceeds the total capacity of the TPP (or if the "Provisioned Rate" (or the capacity rate) exceeds "100 %") after the volume capacity expansion, a warning message appears in the result screen. Check the TPP used state and add drives to expand the TPP capacity as required. Check the [Thin Provisioning Pool Detail] screen for "Provisioned Rate". Refer to the [Thin Provisioning Pool (Basic Information)] function for details.



Start RAID Migration

- ["■ Overview" \(page 123\)](#)
- ["■ User Privileges" \(page 131\)](#)
- ["■ Settings" \(page 131\)](#)
- ["■ Operating Procedures" \(page 148\)](#)

■ Overview

This function starts [RAID migration](#) (hereinafter referred to as migration). After migration is complete, the migration source volume is automatically deleted.

Migration provides the following features:

- Load balancing of host access.
- Volume types can be changed when migrating volumes.
(Except for volumes that are used for the Storage Cluster function.)
- Volume capacity expansion is available when migrating volumes.
(Only when the volume type is "Standard" or "WSV". Except for volumes that are used for the Storage Cluster function.)
- The RAID level of the volume can be changed.
- The number of concatenations for WSVs can be increased or reduced.
- The Wide Stripe Size for WSVs can be changed.
- Deduplication or Compression can be changed (enabled or disabled).
- Data migration can be performed for the [External Volumes](#) (Non-disruptive Storage Migration).
- Because creation and format of new volumes and host interface establishment are automatically performed, users are allowed to access the data anytime without being affected by the migration.

Migration Type (Migration is available: ✓, Migration is not available: Blank)

The combinations of volume types that can be migrated are shown below.
For "ODX Buffer Volumes", the available combinations are dependent on the volume type.

Migration source volume	Migration destination volume					
	Standard	Standard (LUN Concatenation)	Standard (*1) (External)	WSV	TPV	FTV
Standard	✓			✓	✓(*2)	✓(*2)
Standard (LUN Concatenation)	✓			✓	✓(*2)	✓(*2)
Standard (*1) (External)	✓			✓	✓(*2)	✓(*2)
WSV	✓			✓	✓(*2)	✓(*2)
TPV (*3)	✓(*4)			✓(*4)	✓	✓
FTV (*5)	✓(*4)			✓(*4)	✓	✓

- *1 : This indicates the [External Volumes](#). It is referred to as "Standard (External)" in this manual. As a "Standard" volume, it can be migrated to "Standard", "WSV", "TPV", or "FTV" type volumes. However, this volume cannot be used as a migration destination.
- *2 : When migration from "Standard" or "WSV" to "TPV" or "FTV" is performed, 100 % of the logical capacity of the "Standard" or "WSV" is allocated as the physical capacity for the "TPV" or "FTV". When "Start Optimizing TPV/FTV Capacity after migration" is enabled, the physical area that is filled with zeros can be released after the migration is complete.
- *3 : Only "TPV" can be selected as the migration destination when the migration source TPV is a NAS user volume, a NAS backup volume, or a NAS system volume.
- *4 : When migration from "TPV" or "FTV" to "Standard" or "WSV" is performed, 100 % of the logical capacity of the "TPV" or "FTV" is allocated as the logical capacity for the "Standard" or "WSV".
- *5 : If the migration source FTV usage is "System", only "FTV" can be selected as the migration destination. (A migration is not allowed for VVOLs. However, "\$VVOL_META" can be migrated. "\$VVOL_META" is a system volume that is used for storing the management information (metadata) of the Virtual Volume function.)

Combinations of Volume Types for Which Capacity Expansion Is Available (Capacity expansion is available: ✓, Capacity expansion is available (not recommended) ✓, Migration is not available: -)

The combinations of volume types for which capacity expansion can be performed are shown below.
For "ODX Buffer Volumes", the available combinations are dependent on the volume type.

Migration source volume	Migration destination volume					
	Standard	Standard (LUN Concatenation)	Standard (External)	WSV	TPV	FTV
Standard	✓(*1)	-		✓		
Standard (LUN Concatenation)	✓	-		✓		
Standard (External)	✓(*2)	-		✓(*2)		
WSV	✓	-		✓		
TPV		-				
FTV		-				

- *1 : The maximum ODX Buffer volume capacity is 1 TB.
- *2 : For migrations where the migration source volume is an [External Volume](#) (Standard (External)), setting the same capacity as the migration source volume for the migration destination volume is recommended.

Combinations of the Deduplication and Compression Settings for Which Migration Is Available (Migration is available: ✓, N/A: -)

The combinations of migration source volumes and migration destination volumes when "Deduplication" and "Compression" are enabled or disabled for the migration destination volume are shown below. For "ODX Buffer Volumes", the available combinations are dependent on the volume type.

Migration source volume	Deduplication or Compression settings for migration destination volume		Migration destination (*1)					FTR P
			RAID Group	TPP				
	Deduplication	Compression		Only Deduplication is enabled	Only Compression is enabled	Deduplication and Compression are enabled	Deduplication and Compression are disabled	
Standard	Enable	Enable				✓		
Standard (LUN Concatenation)	Enable	Disable		✓				
Standard (External)	Enable	Disable		✓				
WSV	Disable	Enable			✓			
TPV (Only Deduplication is enabled)	Disable	Disable	✓	✓	✓	✓	✓	✓
TPV (Only Compression is enabled)								
TPV (Deduplication and Compression are enabled)								
TPV (Deduplication and Compression are disabled)								
FTV								
TPV (NAS volume)	Disable (*2)	Disable (*2)	-	-	-	-	✓	-

*1 : "Wide Striping Volume" can be selected as the migration destination. If "Wide Striping Volume" is selected, "Deduplication" and "Compression" are fixed to "Disable". For the available migration combinations when "Wide Striping Volume" is selected, refer to "[Migration Type](#)".

*2 : If the migration source TPV is a NAS volume (NAS user volume, NAS backup volume, or NAS system volume), "Deduplication" and "Compression" are fixed to "Disable" because the Deduplication/Compression function is not supported.

Combinations of Encryption Conditions for Which Migration Is Available (Migration is available: ✓)

The combinations of encryption conditions for which migration can be performed are shown in the following table.

Security priority	Encryption setting for the migration source volume	Encryption setting for the migration destination volume			
		None	by CM (*1)	use SED (Disabled Key Group) (*2)	use SED (Enabled Key Group) (*3)
Yes	None	✓	✓	✓	✓
	by CM	✓	✓	✓	✓
	use SED (Disabled Key Group)	✓	✓	✓	✓
	use SED (Enabled Key Group)	✓	✓	✓	✓

2. Volume
Volume (Basic Information)

Security priority	Encryption setting for the migration source volume	Encryption setting for the migration destination volume			
		None	by CM (*1)	use SED (Disabled Key Group) (*2)	use SED (Enabled Key Group) (*3)
No (*4)	None	✓	✓	✓	✓
	by CM		✓	✓	✓
	use SED (Disabled Key Group)		✓	✓	✓
	use SED (Enabled Key Group)				✓

*1 : When the [encryption mode](#) is disabled, "by CM" cannot be selected.

*2 : [SEDs](#) that are managed by the common key (the RAID groups are not registered in the key group).

*3 : [SEDs](#) for which the SED authentication key is managed by the key server (the RAID groups are registered in the key group). In this case, only RAID groups can be selected as the migration destination. Note that TPPs and FTRPs cannot be selected.

*4 : If a user without the "Security Setting" policy logs into Web GUI, migration to reduce the security level cannot be performed.

Requirements for a Migration Source Volume

- The volume type is "Standard", "WSV", "TPV", or "FTV"
- The volume status is not "Broken"
- A format is not being performed (only when the volume type is "Standard" or "WSV")
- Migration is not being performed (the target volume is not being used as a migration source or a migration destination)
- TPV balancing is not being performed
- FTRP balancing is not being performed (*1)
- [LDE](#) is not being performed for the RAID group to which the target volume belongs
- Encryption is not being performed for the target volume
- A Storage Migration path is not created in the target volume
- For the [Deduplication/Compression Volumes](#), the status of the [Data Container Volume](#) that is created in the TPP to which the relevant Deduplication/Compression Volumes belong is not "Readying", "Not Available", "Not Ready", "Broken", or "Data Lost"

*1 : When an FTRP balancing session is started, FTV balancing starts in the FTSPs. Refer to the [Start Balancing Flexible Tier Pool] function for details.

Requirements for a Migration Destination RAID Group

- The maximum number of volumes are not set in the destination RAID group
Migration creates new volumes. The maximum number of volumes that can be created depends on the storage system model.

2. Volume

Volume (Basic Information)

Model	The maximum number of volumes (per RAID group)	The maximum number of volumes (per storage system)
ETERNUS DX60 S5	128	1024
ETERNUS DX100 S5		4096
ETERNUS DX200 S5		8192
ETERNUS DX500 S5		16384
ETERNUS DX600 S5		
ETERNUS DX900 S5		65535
ETERNUS DX8100 S4		16384
ETERNUS DX8900 S4		65535
ETERNUS AF150 S3		4096
ETERNUS AF250 S3		8192
ETERNUS AF650 S3		16384

- "Standard", "WSV", "Snap Data Volume (SDV)", or "Snap Data Pool Volume (SDPV)" is registered in the RAID group or the RAID group is not being used
- The status of the RAID group is "✔️Available"
- The free space of the RAID group is more than the capacity of the migration source volume (*1)
- The RAID group does not belong to a [TPP](#)
- The RAID group does not belong to an [FTRP](#)
- The RAID group is not registered as an [REC Disk Buffer](#)
- The RAID group is not registered as an Extreme Cache Pool
- The RAID group is not blocked
- The RAID group is not the same RAID group as the RAID group to which the migration source volume belongs
- LDE is not being performed in the target RAID group

*1: If the migration source is a TPV or an FTV, the capacity of the migration source volume indicates the logical capacity of the TPV or the FTV.
 If the migration source is a [Deduplication/Compression Volume](#) and "Disable" is selected for "Deduplication" and "Compression", the capacity of the migration source volume indicates the logical capacity of the Deduplication/Compression Volume.

Requirements for RAID Groups that Configure a Migration Destination WSV

- "Standard", "WSV", "SDV", or "SDPV" is registered in the RAID group or the RAID group is not being used
- The status of the RAID group is "✔️Available"
- The maximum number of volumes are not created in the RAID group (*1)
- The RAID group does not belong to a TPP
- The RAID group does not belong to an FTRP
- The RAID group is not registered as an REC Disk Buffer
- The RAID group is not registered as an Extreme Cache Pool
- The RAID group is not blocked
- LDE is not being performed in the target RAID group

- When using existing RAID groups (RAID groups configure the migration source WSV) to increase the number of concatenations, the RAID groups that are added must satisfy the following conditions:
 - The RAID group is the same RAID level as the existing RAID groups
 - The number of member drives in the RAID group is the same as the existing RAID groups
 - The Stripe Depth value is the same as the existing RAID groups
 - The drive type is the same as the existing RAID groups
 - The drive speed is the same as the existing RAID groups (recommended)
 - The SSD type (SSD-H/SSD-M/SSD-L/SSD-H SED/SSD-M SED/SSD-L SED) is the same as the existing RAID groups
 - The key group setting is the same as the existing RAID groups (recommended)
 - When using existing RAID groups to increase the number of concatenations, all of the RAID groups, including the existing RAID groups, must have sequential free area to migrate volumes (*2)
 - When reducing the number of concatenations, all of the RAID groups that configure a WSV must have sequential free area to migrate volumes (*2)
 - The number of concatenations for RAID group must be 2 - 64
- *1 : When the migration destination is a WSV, one volume for each RAID group that configures striping is required (the same number of volumes as the number of RAID groups in total).
- *2 : Because the volume (a part of the WSV that is striped by each RAID group) is moved into the free area in the same RAID group when migration is performed, another sequential free area is required as a migration destination in addition to the currently used area in the RAID group.

Requirements for a Migration Destination TPP

- The status of the TPP is "✅Available", "🟡Partially Ready", or "⚠️Exposed"
 - The TPP capacity is equal to or larger than the capacity of the migration source volume (*1)
 - The sum of the total logical capacity for all the volumes in the pool and the capacity of the work volume is smaller than the maximum pool capacity (*2) (*3)
 - The TPP is not the same as the TPP to which the migration source volume belongs (*4)
 - The capacity of the migration destination TPP is not exhausted (*5)
 - For TPPs where Deduplication, Compression, or both are enabled, the status of the Data Container Volume in the relevant TPP is not "🟡Ready", "❌Not Available", "❌Not Ready", "❌Broken", or "❌Data Lost"
- *1 : If the migration source is a TPV or an FTV, the capacity indicates the used capacity (physical capacity that is allocated from a TPP or an FTRP).
If the migration source is a [Deduplication/Compression Volume](#) and "Disable" is selected for "Deduplication" and "Compression", the capacity of the migration source volume indicates the logical capacity of the Deduplication/Compression Volume.
- *2 : The maximum pool capacity is the maximum total capacity for TPPs and FTRPs that can be created in the storage system. Refer to the [Create Thin Provisioning Pool] function for details.
- *3 : When a RAID migration is performed, an area for a work volume (or the migration destination TPV with the same capacity as the migration source) is temporarily acquired in the migration destination TPP. Therefore, if the sum of the work volume capacity and the total logical capacity of the volumes (TPVs and FTVs) in all the existing pools (TPPs and FTRPs) exceeds the maximum pool capacity, a work volume cannot be created, and this function becomes unavailable.
- *4 : Note that the same TPP as the migration source volume can be selected for the following conditions.
- A migration from a [Deduplication/Compression Volume](#) to a TPV (when "Deduplication" and "Compression" for the migration destination are disabled)

2. Volume

Volume (Basic Information)

- A migration from a TPV to a [Deduplication/Compression Volume](#) (when the "Deduplication" and "Compression" settings for the migration destination are the same as the TPP to which the migration source volume belongs)

*5: If "Deduplication" or "Compression" for the migration destination volume is enabled and the migration destination TPP capacity is exhausted, an error occurs. Start the migration after expanding the TPP capacity.

Requirements for a Migration Destination FTRP

- The status of the FTRP is "✅Available", "⚠️Partially Ready", or "⚠️Exposed"
- The FTRP capacity is equal to or larger than the capacity of the migration source volume (*1)
- The capacity of the migration source volume is equal to or less than the maximum pool capacity (*2) for each model
- The FTRP is not the same as the FTRP to which the migration source volume belongs

*1: If the migration source is a TPV or an FTV, the capacity indicates the used capacity (physical capacity that is allocated from a TPP or an FTRP).

If the migration source is a [Deduplication/Compression Volume](#) and "Disable" is selected for "Deduplication" and "Compression", the capacity of the migration source volume indicates the logical capacity of the Deduplication/Compression Volume.

*2: The maximum pool capacity is the maximum total capacity for TPPs and FTRPs that can be created in the storage system. Refer to the [Create Thin Provisioning Pool] function for details.

Caution

- To change the data protection method (Default/T10-DIF) for the migration destination, perform the following procedure.
 - Stop host access in advance.
 - Reboot the server after the migration is complete.
- After the migration of the [External Volume](#) is successfully completed, the migration source External Volume is deleted. Delete the "External RAID Groups", "External Drives", and "Non-disruptive Storage Migration License" after the migration is complete. Refer to the [Delete External RAID Group] function, the [Delete External Drive] function, and the [Delete Non-disruptive Storage Migration License] function for details.
- Migration cannot be performed under the following conditions:
 - The maximum number of volumes are already registered in the storage system
 - The RAID group diagnosis is being performed in the storage system
 - The disk diagnosis is being performed in the storage system
 - The RAID group to which the migration source volume belongs is blocked or failed
 - Advanced Copy is being performed by specifying the whole volume in the migration source volume and the settings for the volume capacity that is to be expanded are performed before and after migration
 - The total number of migration sessions, TPV balancing sessions, and FTV balancing sessions (*1) that are running in the storage system at the same time is 32
 - The total capacity of migration sessions, TPV balancing sessions, and FTV balancing sessions (*1) that are running in the storage system at the same time is 128 TB
 - The total capacity of the [Deduplication/Compression Volumes](#) in a single TPP exceeds ten times the logical capacity of the Data Container Volume (*2)
 - The migration source volume is the data migration destination of Storage Migration

- The migration source and the migration destination are in the following conditions.
 - The migration source is either of the following.
 - TPVs that are used as copy destination volumes of SnapOPC or SnapOPC+
 - FTVs that are used as copy destination volumes of SnapOPC or SnapOPC+
 - The migration destination is either of the following.
 - RAID groups
 - TPPs that have Deduplication or Compression enabled

*1 : When an FTRP balancing session is started, FTV balancing starts in the FTSPs. Refer to the [Start Balancing Flexible Tier Pool] function for details.

*2 : If the efficiency of the Deduplication/Compression function cannot be estimated, setting the total logical capacity of the [Deduplication/Compression Volumes](#) smaller than the logical capacity of the Data Container Volume is recommended.

- A volume cannot be expanded when the type of migration source volume is "TPV" or the type of migration destination is "TPP".
- A volume cannot be expanded when the type of migration source volume is "FTV" or the type of migration destination is "FTRP".
- Even if the volume type is "Standard", the maximum ODX Buffer volume capacity is 1 TB.
- A migration source volume and a migration destination volume that are undergoing migration cannot be deleted.
- When performing migration for volumes for which "Cache Page Capacity" is changed using the [Modify Cache Parameters] function, the "Cache Page Capacity" setting is reset to the initial value (Unlimited).
- When the destination volume capacity is expanded by migration, the expanded volume capacity must be recognized by the server after migration. Refer to the manuals of each OS or file system for information about server operation.
- When "⚠Attention" or "🚫Warning" is displayed in the "Used Status" field for the migration destination TPP after migration, the used capacity of the relevant TPP is exceeding the threshold. In this case, expand TPP capacity by using the [Expand Thin Provisioning Pool] function. Refer to "Thin Provisioning Pool (Basic Information)" for TPP usage.
- When "⚠Attention" or "🚫Warning" is displayed in the "Used Status" field for the migration destination FTRP after migration, the used capacity of the relevant FTRP is exceeding the threshold. Use ETERNUS SF Storage Cruiser to expand the capacity of the appropriate FTSP (for which expansion is determined to be necessary based upon the performance and usage). Refer to "Flexible Tier Pool (Basic Information)" for FTRP usage.

Note

- By using this function, [External Volumes](#) are migrated to the volumes in the [local storage system](#). After the migration is completed, the migrated volumes can be handled equivalently to normal volumes.
- Progress of migration can be checked on the [Volume Detail] screen ([Basic] tab). Refer to the [Volume (Basic Information)] function for details.
- If the migration source and migration destination are both "WSV", not only can the migration of a WSV to other multiple RAID groups be performed, but also the number of concatenations for the existing RAID group can be changed.
- When the [capacity optimization](#) is reserved after migrating from "Standard" to "TPV" or from "Standard" to "FTV", the physical area that is filled with zeros is released and the Thin Provisioning function can be used efficiently. For volumes that are reserved for optimizing capacity, "Reserved Optimizing Capacity" is displayed in the "Process" field on the [Volume] screen. When the capacity optimization is performed after the migration is complete, the progress of capacity optimization can be checked with "Optimizing Capacity Progress" on the [Volume Detail] screen ([Basic] tab). Refer to the [Volume (Basic Information)] function for details.

■ **User Privileges**

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	✓
StorageAdmin	✓
AccountAdmin	
SecurityAdmin	
Maintainer	✓

Refer to "[A. User Roles and Policies](#)" (page 1580) for details on the policies and roles.

■ **Settings**

In this screen, specify the volume capacity, the encryption status, and the RAID migration destination.

Setting Volume

When the destination RAID group, TPP, or FTRP is not selected, information of the migration source volume is displayed. Specify the capacity of the volume after migration and the encryption status, and then select the destination RAID group, TPP, or FTRP.

Item	Description	Setting values
Volume No.	The volume number is displayed. The volume number after migration is the same number as the migration source volume.	
Name	The volume name is displayed. The volume name after migration is the same name as the migration source volume.	

2. Volume
Volume (Basic Information)

Item	Description	Setting values
Migration Destination	<p>Select the migration destination from "RAID Group / Thin Provisioning Pool / Flexible Tier Pool" or "Wide Striping Volume".</p> <ul style="list-style-type: none"> RAID Group / Thin Provisioning Pool / Flexible Tier Pool (Default) Migration destination is a RAID group, a TPP, or an FTRP. The type of the destination volume is "Standard", "TPV", or "FTV". Wide Striping Volume Multiple RAID groups are used as the migration destination. The type of the destination volume is "WSV". <p>Caution</p> <ul style="list-style-type: none"> In the following conditions, select "RAID Group / Thin Provisioning Pool / Flexible Tier Pool" for "Migration Destination". <ul style="list-style-type: none"> An ODX Buffer volume is selected as a migration source volume A NAS user volume, a NAS backup volume, or a NAS system volume is selected as a migration source volume (Only "Thin Provisioning Pool" can be selected as the migration destination.) A migration source FTV usage is "System" (Only "Flexible Tier Pool" can be selected as the migration destination.) For the volume used by the Storage Cluster function, the type (Standard/WSV/TPV/FTV) cannot be changed. Select the migration destination to match the migration source volume type. 	RAID Group / Thin Provisioning Pool / Flexible Tier Pool (Default) Wide Striping Volume
RAID Group / Thin Provisioning Pool / Flexible Tier Pool	<p>When the migration destination is selected, the name of the selected RAID group, TPP, or FTRP is displayed.</p> <p>When the migration destination is a "WSV" type volume, the RAID group name to which the representative volume belongs is displayed.</p> <p>When the migration destination is not selected, the field is blank.</p>	
Volume Capacity	<p>When this function starts, the capacity of the migration source volume is displayed.</p> <p>When expanding the volume capacity after migration, enter the volume capacity and select the unit of capacity.</p> <p>Up to a 15-digit number including the "." (decimal point) can be input. Note that when "MB" is selected, the specified value is rounded down to the nearest whole number. When "GB" or "TB" is selected, the specified value is converted to "MB" and rounded down to the nearest whole number.</p> <p>Caution</p> <ul style="list-style-type: none"> The ODX Buffer volume capacity can be expanded up to 1 TB. For migrations where the migration source volume is an External Volume (or a volume whose "Usage" is "Migration"), setting the same capacity as the migration source volume for the migration destination volume is recommended. If the same capacity is entered in the same format (digits and units (GB/TB)) as the "Largest Free Space", all of the largest free space is used. To add the capacity without adjustments, input the capacity in units of MB. Volume capacity cannot be expanded in the following conditions: <ul style="list-style-type: none"> "TPV" or "FTV" is selected as the migration source volume The migration source volume is used for the Storage Cluster function "Thin Provisioning Pool" or "Flexible Tier Pool" is selected as the migration destination 	Migration source volume capacity ≤ Volume capacity ≤ The maximum free space in the migration destination

2. Volume
Volume (Basic Information)

Item	Description	Setting values
FTSP Priority	<p>Select either "Automatic" or the FTSP number that belongs to the migration destination FTRP for the FTSP number to which priority is given.</p> <p>When "RAID Group / Thin Provisioning Pool / Flexible Tier Pool" is selected as the migration destination and FTRP is not selected from the migration destination list, only "Automatic" is displayed as the available option. If FTRP is specified, "Automatic" and the FTSP numbers that belong to the migration destination FTRP are displayed. If "FTSP number" is selected and the specified FTRP is changed, the "FTSP Priority" setting returns to the default value ("Automatic").</p> <p>"FTSP Priority" indicates the FTSP number to which priority is given for allocating physical capacity as the volume migration destination when multiple FTSPs exists in the migration destination FTRP.</p> <div style="background-color: #f0f0f0; padding: 10px;"> <p>Note</p> <ul style="list-style-type: none"> When "Automatic" is selected, the physical area is allocated to an FTSP for which the drive type is "Online". If no free space exists in "Online" type drives and migration is not available, the physical area is allocated to an FTSP for which the drive type is "Nearline". If "Nearline" is also not available for migration, the physical area is allocated to an FTSP for which the drive type is "SSD". Migration to an FTRP cannot be performed if "SSD" is not available for migration. "Online SED", "Nearline SED", and "SSD SED" type FTSPs are treated as follows. <ul style="list-style-type: none"> "Online SED" type FTSPs are used as "Online" type FTSPs "Nearline SED" type FTSPs are used as "Nearline" type FTSPs "SSD SED" type FTSPs are used as "SSD" type FTSPs When "FTSP number" is selected, the physical area is allocated to the selected FTSP. If there is no free space in the selected FTSP and migration is not available, the migration destination FTSP number is determined as having the same priority ("Online" → "Nearline" → "SSD") as when "Automatic" is selected. The drive type for FTSPs can be checked from the [Flexible Tier Pool Detail] screen (Flexible Tier Sub Pool). Refer to the [Flexible Tier Pool (Basic Information)] function for details. </div>	<p>When FTRP is not selected from the Select Migration Destination list Automatic</p> <p>When FTRP is selected from the Select Migration Destination list Automatic (Default)</p> <p>The FTSP number that belongs to the migration destination FTRP</p>
Encryption	<p>When this function starts, the encryption status of the migration source volume is displayed. Select the encryption status of the volume after migration. There are no limitations for the encryption status of migration source and destination volumes. Note that when migrating an encrypted volume to an unencrypted volume, the user must have the "Security Setting" policy. Refer to "Combinations of Encryption Conditions for Which Migration Is Available" for details.</p> <p>For the ETERNUS DX60 S5, this item is not displayed.</p> <div style="background-color: #fff9c4; padding: 10px;"> <p>Caution</p> <ul style="list-style-type: none"> When "use SED (Disabled Key Group)" or "use SED (Enabled Key Group)" is specified for "Encryption", select "Online SED", "Nearline SED", or "SSD SED" for the migration destination. When "None" or "by CM" is specified for "Encryption", select "Online", "Nearline", or "SSD" for the migration destination. When the encryption mode is disabled, "by CM" cannot be selected. </div>	<p>None</p> <p>by CM</p> <p>use SED (Disabled Key Group)</p> <p>use SED (Enabled Key Group)</p>

2. Volume
Volume (Basic Information)

Item	Description	Setting values															
Deduplication	<p>When this function starts, information that indicates whether the migration source volume is a target for Deduplication or Compression is displayed.</p> <p>Select whether to use the volume after the migration as a Deduplication or Compression target volume.</p> <p>This item is displayed only when Deduplication/Compression for the storage system is enabled.</p> <p>This item is only available when "RAID Group / Thin Provisioning Pool / Flexible Tier Pool" is selected for "Migration Destination". The selectable migration destination changes depending on whether this setting is enabled or disabled. Refer to "Combinations of the Deduplication and Compression Settings for Which Migration Is Available" for details.</p> <p>Volumes are migrated to the following destination volumes according to the selected items.</p> <table border="1"> <thead> <tr> <th>Deduplication</th> <th>Compression</th> <th>Migration destination volume</th> </tr> </thead> <tbody> <tr> <td>Enable</td> <td>Enable</td> <td>Deduplication/Compression Volumes where both Deduplication and Compression are enabled</td> </tr> <tr> <td>Enable</td> <td>Disable</td> <td>Deduplication/Compression Volumes where only Deduplication is enabled</td> </tr> <tr> <td>Disable</td> <td>Enable</td> <td>Deduplication/Compression Volumes where only Compression is enabled</td> </tr> <tr> <td>Disable</td> <td>Disable</td> <td>TPVs for SAN where both Deduplication and Compression are disabled</td> </tr> </tbody> </table>	Deduplication	Compression	Migration destination volume	Enable	Enable	Deduplication/Compression Volumes where both Deduplication and Compression are enabled	Enable	Disable	Deduplication/Compression Volumes where only Deduplication is enabled	Disable	Enable	Deduplication/Compression Volumes where only Compression is enabled	Disable	Disable	TPVs for SAN where both Deduplication and Compression are disabled	Enable
Deduplication		Compression	Migration destination volume														
Enable	Enable	Deduplication/Compression Volumes where both Deduplication and Compression are enabled															
Enable	Disable	Deduplication/Compression Volumes where only Deduplication is enabled															
Disable	Enable	Deduplication/Compression Volumes where only Compression is enabled															
Disable	Disable	TPVs for SAN where both Deduplication and Compression are disabled															
Compression	Disable																
<p>Note</p> <ul style="list-style-type: none"> The "Data Reduction Processing CM" after the migration is determined based on the Deduplication/Compression state of the volume. <table border="1"> <thead> <tr> <th colspan="2">The Deduplication/Compression state of the volume</th> <th rowspan="2">"Data Reduction Processing CM" of the migration destination volume</th> </tr> <tr> <th>Migration source volume</th> <th>Migration destination volume</th> </tr> </thead> <tbody> <tr> <td>Enable</td> <td>Enable</td> <td>The Data Reduction Processing CM of the migration source Deduplication/Compression Volume is passed on to the migration destination Deduplication/Compression Volume.</td> </tr> <tr> <td>Disable</td> <td>Enable</td> <td>The Data Reduction Processing CM of the migration destination Deduplication/Compression Volume is allocated automatically.</td> </tr> <tr> <td>Enable Disable</td> <td>Disable</td> <td>The Data Reduction Processing CM is not allocated to the migration destination volume. The Controlling CM of the RAID group to which the volume belongs manages the migration destination volume.</td> </tr> </tbody> </table> <p>The Data Reduction Processing CM of the Deduplication/Compression Volumes can be changed from Web GUI after a migration. Refer to the [Change Data Reduction Processing CM] function for details.</p>			The Deduplication/Compression state of the volume		"Data Reduction Processing CM" of the migration destination volume	Migration source volume	Migration destination volume	Enable	Enable	The Data Reduction Processing CM of the migration source Deduplication/Compression Volume is passed on to the migration destination Deduplication/Compression Volume.	Disable	Enable	The Data Reduction Processing CM of the migration destination Deduplication/Compression Volume is allocated automatically.	Enable Disable	Disable	The Data Reduction Processing CM is not allocated to the migration destination volume. The Controlling CM of the RAID group to which the volume belongs manages the migration destination volume.	
The Deduplication/Compression state of the volume		"Data Reduction Processing CM" of the migration destination volume															
Migration source volume	Migration destination volume																
Enable	Enable	The Data Reduction Processing CM of the migration source Deduplication/Compression Volume is passed on to the migration destination Deduplication/Compression Volume.															
Disable	Enable	The Data Reduction Processing CM of the migration destination Deduplication/Compression Volume is allocated automatically.															
Enable Disable	Disable	The Data Reduction Processing CM is not allocated to the migration destination volume. The Controlling CM of the RAID group to which the volume belongs manages the migration destination volume.															

2. Volume
Volume (Basic Information)

Item	Description	Setting values
Allocation	<p>Select the allocation method of the volume after migration.</p> <ul style="list-style-type: none"> • Thin Physical area is allocated to the target area of the volume when a write I/O is received. • Thick Physical area is allocated to the whole area of the volume when volumes are created. <p>This item can only be specified when meeting all the following conditions.</p> <ul style="list-style-type: none"> • Both "Deduplication" and "Compression" are "Disable" • "Migration Destination" is "RAID Group / Thin Provisioning Pool / Flexible Tier Pool" • "Select Migration Destination" is "Thin Provisioning Pool" or "Flexible Tier Pool" <div style="background-color: #fff9c4; padding: 5px; margin-top: 10px;"> <p>Caution</p> <ul style="list-style-type: none"> • If the migration source FTV usage is "System", "Thin" cannot be selected. </div>	Thin Thick

2. Volume Volume (Basic Information)

Item	Description	Setting values															
Data Sync after Migration	<p>Select how to stop the data synchronization between the migration source volume and the migration destination volume.</p> <p>This item is displayed only if the External Volume (or a volume whose "Usage" is "Migration") is selected as the migration source volume.</p> <ul style="list-style-type: none"> • Automatic Stop The data synchronization is automatically stopped when the migration is completed. The migration source External Volume is automatically deleted. If the data synchronization between the migration source and migration destination volumes can be stopped every time a data migration of the Non-disruptive Storage Migration is completed, select "Automatic Stop". • Manual Stop The data synchronization is manually stopped when the migration is completed. If the data must be synchronized between the migration source and migration destination volumes until all data migrations of the Non-disruptive Storage Migration are completed, select "Manual Stop". <p>Caution</p> <ul style="list-style-type: none"> • Up to 32 RAID migration processes can be performed simultaneously. If "Manual Stop" is selected, the total number of External Volumes to be migrated must be 32 or less. <p>Note</p> <ul style="list-style-type: none"> • If "Manual Stop" is selected, the migration source volume is not deleted even if the RAID migration is completed. Migration source volumes and migration destination volumes are displayed in the volume list. <table border="1"> <thead> <tr> <th>Item</th> <th>Migration source volume</th> <th>Migration destination volume</th> </tr> </thead> <tbody> <tr> <td>No.</td> <td>Migration source volume number</td> <td>Temporary volume number (smallest unused number)</td> </tr> <tr> <td>Name</td> <td>Migration source volume name</td> <td>Temporary volume name (volume names that start with "RMIG")</td> </tr> <tr> <td>Type</td> <td>Standard</td> <td>Standard</td> </tr> <tr> <td>Usage</td> <td>Migration</td> <td>Block</td> </tr> </tbody> </table> <p>If the data synchronization is stopped after all migrations are completed, the migration source External Volume is deleted. At that time, the volume number and the volume name of the migration destination is changed to the volume number and volume name of the migration source. Refer to the [Stop External Volume Data Synchronization] function for details.</p>	Item	Migration source volume	Migration destination volume	No.	Migration source volume number	Temporary volume number (smallest unused number)	Name	Migration source volume name	Temporary volume name (volume names that start with "RMIG")	Type	Standard	Standard	Usage	Migration	Block	Automatic Stop Manual Stop
Item	Migration source volume	Migration destination volume															
No.	Migration source volume number	Temporary volume number (smallest unused number)															
Name	Migration source volume name	Temporary volume name (volume names that start with "RMIG")															
Type	Standard	Standard															
Usage	Migration	Block															

2. Volume
Volume (Basic Information)

Item	Description	Setting values
Start Optimizing TPV/FTV Capacity after migration	<p>Select "Enable" or "Disable" for the capacity optimization of source volumes after migration is complete. When capacity optimization after migration is enabled, the destination volume is reserved to optimize the capacity.</p> <p>"Capacity optimization" is a function that releases the physical area when data in the block (*1) that is allocated to a TPV or an FTV is filled with zeros.</p> <p>*1 : Volume allocation unit</p> <p>This item can only be specified when meeting all the following conditions.</p> <ul style="list-style-type: none"> • Both "Deduplication" and "Compression" are "Disable" • "Allocation" is "Thin" • "Migration Destination" is "RAID Group / Thin Provisioning Pool / Flexible Tier Pool" • "Select Migration Destination" is "Thin Provisioning Pool" or "Flexible Tier Pool" <p>Caution</p> <ul style="list-style-type: none"> • Do not select "Enable" if the migration source is a NAS user volume, a NAS backup volume, or a NAS system volume. 	<p>Enable</p> <p>Disable</p>
Data Integrity	<p>When this function starts, the data protection method of the migration source volume is displayed.</p> <p>Select the data protection method of the volume after migration.</p> <ul style="list-style-type: none"> • Default Data is protected within the storage system. • T10-DIF Data is protected with a T10-DIF (Data Integrity Field) compatible method in the storage system and the host paths. This method is available only when the host interface is FC. <p>This item can only be specified when meeting all the following conditions.</p> <ul style="list-style-type: none"> • The selected migration source volume is a volume other than the External Volume (or a volume whose "Usage" is not "Migration") • Both "Deduplication" and "Compression" are "Disable" • "Migration Destination" is "RAID Group / Thin Provisioning Pool / Flexible Tier Pool" • "Select Migration Destination" is "RAID Group" <p>If this item is disabled, "Default" is set for the storage system.</p> <p>Caution</p> <ul style="list-style-type: none"> • When "T10-DIF" is selected for "Data Integrity", a migration to WSV, TPV, or FTV cannot be performed. • "T10-DIF" is supported in Oracle Linux 6 and later. 	<p>Default</p> <p>T10-DIF</p>

When "RAID Group / Thin Provisioning Pool / Flexible Tier Pool" is selected for the migration destination, refer to ["Select Migration Destination" \(page 137\)](#). When "Wide Striping Volume" is selected for the migration destination, refer to ["Wide Striping Volume Setting" \(page 140\)](#).

Select Migration Destination

The selectable RAID groups, TPPs, or FTRPs for the migration destination are displayed. The RAID groups, TPPs, or FTRPs that are displayed depend on the volume capacity and encryption status. The following are not displayed as a migration destination

- RAID groups, TPPs (*1), or FTRPs where the migration source volume belongs
- [External RAID Groups](#)

2. Volume

Volume (Basic Information)

*1: If the migration source or migration destination is a "[Deduplication/Compression Volume](#)", there are cases when the same TPP as the migration source volume can be selected. Refer to "[Requirements for a Migration Destination TPP](#)" (page 128) for details.

Item	Description
"Select Migration Destination" radio button	Specify the destination RAID group, the TPP, or the FTRP with the radio button.
Type	The type is displayed. RAID Group Thin Provisioning Pool Flexible Tier Pool
Name	The RAID group name, the TPP name, or the FTRP name is displayed.
Status	The RAID group status, the TPP status, or the FTRP status is displayed. Refer to " RAID Group Status " (page 1605) and " TPP Status " for details.
Drive Type	The type of drive that configures the RAID group or the TPP is displayed. If the type is "Flexible Tier Pool", a "-" (hyphen) is displayed. If multiple drive types are used in the RAID group or TPP, the drive type is displayed as described below. <ul style="list-style-type: none"> • If only "Online" type drives are used or if both "Online" and "Nearline" type drives are used, "Online" is displayed. • If only "Online SED" type drives are used or if both "Online SED" and "Nearline SED" type drives are used, "Online SED" is displayed. • If a single SSD type (SSD-H/SSD-M/SSD-L) is used or if multiple SSD types (SSD-H/SSD-M/SSD-L) are used, "SSD" is displayed. • If a single SSD type (SSD-H SED/SSD-M SED/SSD-L SED) is used or if multiple SSD types (SSD-H SED/SSD-M SED/SSD-L SED) are used, "SSD SED" is displayed.
RAID Level	The RAID level of the RAID group or TPP is displayed. If the type is "Flexible Tier Pool", a "-" (hyphen) is displayed. High Performance (RAID1+0) High Capacity (RAID5) High Reliability (RAID6) High Reliability (RAID6-FR) Reliability (RAID5+0) Mirroring (RAID1) Striping (RAID0)
Total Capacity	The total capacity for RAID group, TPP, or FTRP is displayed.
Total Free Space	The total capacity of free space in the RAID group, the TPP, or the FTRP is displayed. "Free space" means an area where no volume is created, and dispersed areas which became free by creating and deleting a volume in the RAID group, the TPP, or the FTRP.
Largest Free Space	The capacity of the largest unused area in the RAID group, the TPP, or the FTRP is displayed.

2. Volume
Volume (Basic Information)

Item	Description
Encryption	<p>The encryption status of the RAID group or the TPP is displayed. The displayed contents vary depending on "Type".</p> <p>When the type is "RAID Group":</p> <ul style="list-style-type: none"> • "-" (hyphen) Not encrypted • SED (Disabled Key Group) Encrypted by SEDs (a RAID group that is configured by SEDs is not registered in the key group) • SED (Enabled Key Group) Encrypted by SEDs (a RAID group that is configured by SEDs is registered in the key group) <p>When the type is "Thin Provisioning Pool":</p> <ul style="list-style-type: none"> • CM Encryption by CM • "-" (hyphen) Not encrypted • SED Encryption by SED <p>When the type is "Flexible Tier Pool":</p> <ul style="list-style-type: none"> • CM Encryption by CM • "-" (hyphen) Not encrypted
Deduplication	<p>The Deduplication status (whether the setting is enabled and the state of the Deduplication) of the migration destination TPP is displayed.</p> <ul style="list-style-type: none"> • Enable Deduplication for the TPP is enabled and Deduplication is in the normal state. • Disable Deduplication for the TPP is disabled. • Error Deduplication for the TPP is enabled and Deduplication is in the error state. • "-" (hyphen) Deduplication for the TPP is enabled and the information cannot be obtained. Or the migration destination is a RAID group or an FTRP. <p>This item is displayed only when Deduplication/Compression for the storage system is enabled.</p>
Compression	<p>The Compression status (whether the setting is enabled and the state of the Compression) of the migration destination TPP is displayed.</p> <ul style="list-style-type: none"> • Enable Compression for the TPP is enabled and Compression is in the normal state. • Disable Compression for the TPP is disabled. • Error Compression for the TPP is enabled and Compression is in the error state. • "-" (hyphen) Compression for the TPP is enabled and the information cannot be obtained. Or the migration destination is a RAID group or an FTRP. <p>This item is displayed only when Deduplication/Compression for the storage system is enabled.</p>

Wide Striping Volume Setting

WSVs are created by concatenating volumes that are the same size in multiple RAID groups. Input the volume information for the migration destination WSV and the selection information for the RAID groups, and then specify the RAID groups that are to be concatenated.

WSV specifications

- The conditions for RAID groups to configure WSVs are as follows:
 - The RAID level (RAID1+0/RAID5/RAID6/RAID5+0/RAID1/RAID0) must be the same
 - The number of member drives in the RAID group must be the same
 - The Stripe Depth value must be the same
 - The drive type (Online/Nearline/SSD/Online SED/Nearline SED/SSD SED) must be the same
(Since the access performance of WSVs is reduced, selecting the same drive type for the "Drive Type" in the "Select RAID Group Information" field is recommended. Selecting "Online/Nearline" and "Online SED/Nearline SED" is not recommended.)
 - The SSD type (SSD-H/SSD-M/SSD-L/SSD-H SED/SSD-M SED/SSD-L SED) must be the same
(Since the access performance of WSVs is reduced, use the same SSD type. The SSD type that configures a RAID group can be checked in the [RAID Group Detail] screen ([Drive] tab).)
 - The drive speed must be the same
(RAID groups configured with different speed drives can be selected. Note that this reduces the access performance for WSVs. It is recommended to select the same speed drives. The speed of the drives that configure a RAID group can be checked in the [RAID Group Detail] screen ([Drive] tab).)
 - The sector format (AF-compliant/non-AF-compliant) must be the same
(Selecting RAID groups that are configured with drives of the same sector format is recommended.)
 - The key group set state must be the same
(If the drive type is "Online SED", "Nearline SED", "SSD SED", or "Online SED/Nearline SED", RAID groups can be selected regardless of the key group setting (enabled or disabled). However, selecting the same key group set state is recommended. The key group set state can be checked with the "Encryption" field in the [Select RAID Groups] screen.)
 - The sequential unused area must be the same size or bigger than the capacity of the volumes that are to be concatenated
- The number of concatenated RAID groups is from 2 to 64.
- The WSV capacity is from 24 MB to 128 TB.
- When changing the number of concatenations for a WSV, specifying the existing RAID groups is required. Refer to "Note" for details.
- RAID group capacity expansion for RAID groups which configure WSVs is not available (LDE cannot be performed). Refer to the [Expand RAID Group] function for details.

Note

- When changing the number of concatenations for a WSV, check "Wide Stripe Size" for the WSV, the specifications of the existing RAID groups (RAID level, Stripe Depth, drive type, disk speed, and number of member drives), and the RAID group number of all the concatenated RAID groups. The following describes how to check the specifications.

Procedure ▶▶▶

- 1** Click the [No.] link or the [Name] link of the migration source WSV in the volume list.
 - 2** A detailed information screen for the WSV is displayed. Check "Wide Stripe Size" in the [Basic] tab screen.
 - 3** Click the [Used RAID Group] tab to display the concatenation information of the WSV. Check "RAID Group No." and "Concatenation Order" that are configured for the WSV. The display order of the RAID group information indicates the "Concatenation Order".
 - 4** Filter the RAID group list by the RAID group number that configures a WSV, and then click the [No.] link or the [Name] link of the RAID group. Any RAID group can be specified because the RAID groups in the WSV have the same specifications.
 - 5** A detailed information screen for the RAID group is displayed. Check "RAID Level" and "Stripe Depth" in the [Basic] tab screen.
 - 6** Click the [Drive] tab to display the information of the drives that are configured for the RAID group. Check "Type", "Speed", and "Number of Member Drives". For "Number of Member Drives", use the displayed number of drives.
-



Volume Information

In this screen, input the volume information of the migration destination WSV.

2. Volume
Volume (Basic Information)

Item	Description	Setting values
Wide Stripe Size	<p>Select the Wide Stripe Size ("Normal" or "Small") for the volumes.</p> <p>"Wide Stripe Size" is the size of the WSV Unit that is allocated to each RAID group in series. It is not necessary to change the default value (Normal) for normal use.</p> <ul style="list-style-type: none"> • Normal An integral multiple of the basic size for each RAID group (*1). The maximum size is 16 MB or smaller. The actual size varies according to the RAID group type, the number of member drives, and Stripe Depth. Select "Normal" to improve random write access performance. • Small An integral multiple of the basic size for each RAID group. The maximum size is 2 MB or smaller. The actual size varies according to the RAID group type, the number of member drives, and Stripe Depth. Note that because the segment size of the volume is small and many host accesses among multiple RAID groups occur, the performance may be reduced according to the amount of host I/O. <p>*1 : The basic size (stripe size) when creating a volume. Refer to "Basic Size for each RAID Level" for details.</p> <div style="background-color: #fff9c4; padding: 5px;"> <p>Caution</p> <ul style="list-style-type: none"> • If the basic size of the RAID group is 2 MB or more, the basic size is specified for Wide Stripe Size even when "Small" is selected. • When changing the number of concatenations for a WSV, select the same "Wide Stripe Size" as the migration source WSV. For procedure to check "Wide Stripe Size" for the migration source WSV, refer to "Note". </div> <div style="background-color: #e0e0e0; padding: 5px;"> <p>Note</p> <ul style="list-style-type: none"> • "Wide Stripe Size" for an existing WSV can be changed by using the migration function. </div>	Normal (Default) Small

2. Volume
Volume (Basic Information)

Item	Description	Setting values
Concatenation Order	<p>Select the concatenation order of RAID groups from "Automatic" or "Manual". It is not necessary to change the default value (Automatic) for normal use.</p> <ul style="list-style-type: none"> Automatic The concatenation order of RAID groups is specified automatically. If multiple WSVs are already registered, the next available RAID group that enables the Controlling CM allocation to be distributed evenly is selected as [1] for the concatenation order. If multiple RAID groups satisfy this condition, the RAID group with the smallest RAID group number is selected as [1] in the concatenation order. RAID groups are concatenated starting from [1] (first) in ascending order. The last RAID group is concatenated to the first RAID group. Volumes that belong to the RAID group that is first in the concatenation order are called "representative volumes". Manual The concatenation order of RAID groups is specified manually. <p>Caution</p> <ul style="list-style-type: none"> When changing the number of concatenations for a WSV, specify the same concatenation order as the migration source WSV. For the procedure to check the concatenation order of migration source WSVs, refer to "Note". When "Manual" is selected for "Concatenation Order", the concatenation order can be changed. It is not necessary to change the default value (Automatic) if the concatenation order after migration can be changed. 	Automatic (Default) Manual

Select RAID Group Information

In this screen, input information for the RAID group that configures the migration destination WSV.

Caution

- When changing the number of concatenations for a WSV, select the same "Drive Type", "RAID Level", "Number of Member Drives", and "Stripe Depth" as the migration source WSV. For the procedure to check the specifications of an existing RAID group, refer to "Note".

2. Volume
Volume (Basic Information)

Item	Description	Setting values
Drive Type	<p>Select the type of drive that configures a RAID group. The installed drive determines the selectable drive types that are displayed. If there are no RAID groups in which volumes can be created, the field is blank.</p> <p>Note</p> <ul style="list-style-type: none"> • When "Online" (Default) is selected, a RAID group that is configured with only "Online" type drives, or a RAID group that is configured with both "Online" and "Nearline" type drives is specified. • When "Online SED" is selected, a RAID group that is configured with only "Online SED" type drives, or a RAID group that is configured with both "Online SED" and "Nearline SED" type drives is specified. • When "SSD" is selected, RAID groups that are configured with a single SSD type (SSD-H/SSD-M/SSD-L) or configured with multiple SSD types (SSD-H/SSD-M/SSD-L) are specified. • When "SSD SED" is selected, RAID groups that are configured with a single SSD type (SSD-H SED/SSD-M SED/SSD-L SED) or configured with multiple SSD types (SSD-H SED/SSD-M SED/SSD-L SED) are specified. • When "Online/Nearline" is selected, a RAID group that is configured with only "Online" type drives, a RAID group that is configured with only "Nearline" type drives, or a RAID group that is configured with both "Online" and "Nearline" type drives is specified. • When "Online SED/Nearline SED" is selected, a RAID group that is configured with only "Online SED" type drives, a RAID group that is configured with only "Nearline SED" type drives, or a RAID group that is configured with both "Online SED" and "Nearline SED" type drives is specified. 	<p>Online Nearline SSD Online/Nearline Online SED Nearline SED SSD SED Online SED/Nearline SED Blank</p>
RAID Level	<p>Select the RAID level. If there are no RAID groups in which volumes can be created, the field is blank.</p>	<p>High Performance (RAID1+0) High Capacity (RAID5) High Reliability (RAID6) Reliability (RAID5+0) Mirroring (RAID1) Striping (RAID0) Blank</p>

2. Volume
Volume (Basic Information)

Item	Description	Setting values
Number of Member Drives	Select the number of member drives in the RAID group. The selectable number of member drives, which is determined by the specified RAID level, is displayed. If there are no RAID groups in which volumes can be created, the field is blank.	High Performance (RAID1+0): 4, 6, 8, 10, 12, 14, 16, 18, 20, 22, 24, 26, 28, 30, 32 High Capacity (RAID5): 3 - 16 High Reliability (RAID6): 5 - 16 Reliability (RAID5+0): 6, 8, 10, 12, 14, 16, 18, 20, 22, 24, 26, 28, 30, 32 Mirroring (RAID1): 2 Striping (RAID0): 2 - 16
Stripe Depth	Select the Stripe Depth of the RAID group. The selectable Stripe Depth varies depending on the specified RAID level. Refer to "Available Stripe Depth Value" (page 268) for details. If "Mirroring (RAID1)" is selected as the RAID level, a "-" (hyphen) is displayed. If there are no RAID groups in which volumes can be created, the field is blank.	64 KB 128 KB 256 KB 512 KB 1024 KB "-" (hyphen) Blank
Number of Concatenation RAID Groups	The number of RAID groups that are to be concatenated is displayed. Click the [Select RAID Groups] button to add or delete RAID groups. The "Number of Concatenation RAID Groups" value is changed. This field is blank when no RAID groups are selected.	

Selected RAID Group List

A list of RAID groups that configure the migration destination WSV is displayed. When no RAID groups are selected, only the item name is displayed.
The RAID group list is displayed in concatenation order. Note that displayed items cannot be sorted by clicking the item name.

Item	Description
No.	The RAID group number is displayed.
RAID Group Name	The RAID group name is displayed.
Drive Type	The type of drive that configures the RAID group is displayed. Online Nearline SSD Online SED Nearline SED SSD SED
Total Capacity	The total capacity of the RAID groups is displayed.
Total Free Space	The total capacity of free space in the RAID group is displayed. "Free space" means an area in the RAID group where no volume is created, and dispersed areas which became free by creating and deleting a volume.
Largest Free Space	The maximum capacity of free space in the RAID group is displayed.

2. Volume
Volume (Basic Information)

Item	Description
Encryption	The encryption status (the set state of the key group) of the RAID group is displayed. This item is displayed if the drive type is "Online SED", "Nearline SED", or "SSD SED". SED (Enabled Key Group) SED (Disabled Key Group)

Function Button

Button	Description
[Select RAID Groups]	Click this item to display the "[Select RAID Groups] Screen" (page 146). Select the RAID groups that are to be concatenated in the [Select RAID Groups] screen.

Function Link

Item	Description
Setting Concatenation Order	Click this item to display the "[Setting Concatenation Order] Screen" (page 147). Change the concatenation order of the RAID groups in the [Setting Concatenation Order] screen. This link is not displayed when "Concatenation Order" is "Automatic". When no RAID groups are selected, only the item name is displayed for "Setting Concatenation Order".

[Select RAID Groups] Screen

In this screen, select RAID groups that are to be concatenated. In the [Select RAID Groups] screen, a list of the RAID groups that satisfy the conditions (drive type, RAID level, number of member drives, and Stripe Depth) specified in the "Select RAID Group Information" field is displayed. Note that RAID groups in the following conditions are not displayed on the list:

- RAID groups that belong to TPPs
- RAID groups that belong to FTRPs
- RAID groups that are registered as REC Disk Buffers
- RAID groups that are registered as Extreme Cache Pools
- RAID groups in which volumes other than Standard, WSV, SDV, or SDPV types are registered
- RAID group which "Usage" is "Temporary"

Caution

- When increasing the number of concatenations for a WSV, select all of the existing RAID groups for concatenation and the new RAID groups. When reducing the number of concatenations for a WSV, select the RAID groups that will remain for concatenation from the existing RAID group list. For the procedure to check existing RAID groups, refer to "Note".
- When the drive type is "Online SED", "Nearline SED", or "SSD SED", setting the same "Encryption" settings (the set state of the key group) is recommended for all of the RAID groups that configure the WSV.

Item	Description
Checkbox to select RAID groups	Select the checkbox for the RAID group to be selected.
No.	The RAID group number is displayed.

2. Volume
Volume (Basic Information)

Item	Description
RAID Group Name	The RAID group name is displayed.
Drive Type	<p>The type of drive that configures the RAID group is displayed.</p> <p>If multiple drive types are used in the RAID group, the drive type is displayed as described below.</p> <ul style="list-style-type: none"> • If only "Online" type drives are used or if both "Online" and "Nearline" type drives are used, "Online" is displayed. • If only "Online SED" type drives are used or if both "Online SED" and "Nearline SED" type drives are used, "Online SED" is displayed. • If a single SSD type (SSD-H/SSD-M/SSD-L) is used or if multiple SSD types (SSD-H/SSD-M/SSD-L) are used, "SSD" is displayed. • If a single SSD type (SSD-H SED/SSD-M SED/SSD-L SED) is used or if multiple SSD types (SSD-H SED/SSD-M SED/SSD-L SED) are used, "SSD SED" is displayed.
Total Capacity	The total capacity of the RAID groups is displayed.
Total Free Space	<p>The total capacity of free space in the RAID group is displayed.</p> <p>"Free space" means an area in the RAID group where no volume is created, and dispersed areas which became free by creating and deleting a volume.</p>
Largest Free Space	<p>The maximum capacity of free space in the RAID group is displayed.</p> <div style="background-color: #fff9c4; padding: 10px; border: 1px solid #ccc;"> <p>Caution</p> <ul style="list-style-type: none"> • WSVs are created by concatenating volumes that are the same size in multiple RAID groups. This means that sequential free areas that are larger than the concatenation capacity are required in the RAID groups. </div>
Encryption	<p>The encryption status (the set state of the key group) of the RAID group is displayed.</p> <p>This item is displayed if the drive type is "Online SED", "Nearline SED", or "SSD SED".</p> <p>SED (Enabled Key Group) SED (Disabled Key Group)</p>

[Setting Concatenation Order] Screen

In this screen, change the concatenation order of the RAID groups. For details on RAID group information, refer to the "[\[Select RAID Groups\] Screen](#)" (page 146).

Item	Description
Radio buttons to select a RAID group	Select the RAID group to change (raise or drop) the concatenation order for.

Function Button

Button	Description
[Up]	<p>Raises the concatenation order up by one for the RAID group that is selected with the radio button.</p> <p>If the RAID group is already on top of the list, the order cannot be changed.</p>
[Down]	<p>Drops the concatenation order down by one for the RAID group that is selected with the radio button.</p> <p>If the RAID group is already at the bottom of the list, the order cannot be changed.</p>

■ Operating Procedures

When the Migration Destination Volume Is "Standard", "TPV", or "FTV"

Procedure ▶▶▶

- 1 Select the volume that to be migrated and click [Start RAID Migration] in [Action].

Caution

- [Start RAID Migration] cannot be clicked if one of the following volumes is selected.
 - Volumes that are used for the Virtual Volume function (excluding "\$VVOL_META")
 - NAS expanded system volumes
 - Data Container Volumes

- 2 Select "RAID Group / Thin Provisioning Pool / Flexible Tier Pool" for "Migration Destination". Set the volume information after migration, select the destination RAID group, the TPP, or the FTRP, and then click the [Start] button.

→ A confirmation screen appears.

Caution

- An error screen appears in the following conditions:
 - The "Volume Capacity" is not entered
 - "Volume Capacity" does not satisfy the input conditions
 - "Enable" is selected for "Start Optimizing TPV/FTV Capacity after migration" when capacity optimization is being performed in the migration source volume
 - "Enable" is selected for "Start Optimizing TPV/FTV Capacity after migration" when the migration source volume is an ODX Buffer volume

- 3 Click the [OK] button.

→ Migration starts.

- 4 Click the [Done] button to return to the [Volume] screen.

Caution

- If the "Provisioned Capacity" (or the total logical capacity) of the volumes in the migration destination TPP exceeds the total capacity of the migration destination TPP (or if the "Provisioned Rate" (or the capacity rate) exceeds "100 %") after the migration was started, a warning message appears in the result screen. Check the TPP used state and add drives to expand the TPP capacity as required. Check the [Thin Provisioning Pool Detail] screen for "Provisioned Rate". Refer to the [Thin Provisioning Pool (Basic Information)] function for details.



When the Migration Destination Volume Is "WSV"

Procedure ▶▶▶

- 1 Select the volume that to be migrated and click [Start RAID Migration] in [Action].

Caution

- [Start RAID Migration] cannot be clicked if one of the following volumes is selected.
 - Volumes that are used for the Virtual Volume function (excluding "\$VVOL_META")
 - NAS expanded system volumes
 - Data Container Volumes

- 2 Select "Wide Striping Volume "for "Migration Destination". Input the volume capacity, the encryption status, and the detailed information of volumes after migration, specify the selection information for the RAID groups, and click the [Select RAID Groups] button.
→ The "[Select RAID Groups] Screen" (page 146) appears.
- 3 Select the RAID group that is to be concatenated (multiple selections can be made) and click the [OK] button.
→ The display returns to the initial screen.
- 4 After selecting RAID groups is complete, click the [Start] button.
→ A confirmation screen appears.

Caution

- An error screen appears in the following conditions:
 - The capacity is not specified for "Volume Capacity"
 - "Volume Capacity" does not satisfy the input conditions
 - The "Number of Concatenation RAID Groups" field is left blank, "1" is specified, or a value that is "65" or more is specified
 - The maximum free space in the selected RAID group is smaller than the volume size that is to be concatenated
 - LDE is being performed in the target RAID group
 - An ODX Buffer volume is selected as a migration source volume

Note

- To change the concatenation order of the RAID groups, select "Manual" for "Concatenation Order" in the Volume Information field. Click the [Concatenation Order] link to display the "[Setting Concatenation Order] Screen" (page 147). The concatenation order of the RAID groups can be changed in the [Setting Concatenation Order] screen.

- 5 Click the [OK] button.
→ Migration starts.
- 6 Click the [Done] button to return to the [Volume] screen.



Stop RAID Migration

- "[Overview](#)" (page 150)
- "[User Privileges](#)" (page 150)
- "[Operating Procedures](#)" (page 150)

■ Overview

This function stops [RAID migration](#) (hereinafter referred to as migration).

Caution

- This function stops the migration currently in progress. Therefore, this function cannot be executed when migration is not being performed for the selected volume.
- Do not use this function to stop a data synchronization after the migration is completed. Refer to the [Stop External Volume Data Synchronization] function for details. If "Manual Stop" is selected for "Data Sync after Migration" when a data migration is started for the Non-disruptive Storage Migration using the [Start RAID Migration] function, the data synchronization state occurs.

Note

- If migration is stopped, the reservation for Zero Reclamation is released.
- When migration is stopped, data in the migration source volume can be accessed normally.
- This function can stop migrations whose migration source is an [External Volume](#).

■ User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	✓
StorageAdmin	✓
AccountAdmin	
SecurityAdmin	
Maintainer	✓

Refer to "[A. User Roles and Policies](#)" (page 1580)" for details on the policies and roles.

■ Operating Procedures

Procedure ▶▶▶

- 1 Select the volume for which migration is to be stopped (multiple selections can be made) and click [Stop RAID Migration] in [Action].
→ A confirmation screen appears.
- 2 Click the [OK] button.
→ The stop migration process starts.
- 3 Click the [Done] button to return to the [Volume] screen.



Stop External Volume Data Synchronization

- ["■ Overview" \(page 151\)](#)
- ["■ User Privileges" \(page 151\)](#)
- ["■ Operating Procedures" \(page 151\)](#)

■ Overview

This function stops the data synchronization between the migration source volume and the migration destination volume after the [RAID migration](#) (hereinafter referred to as migration) is completed and deletes the migration source volume.

This function is available only if the Non-disruptive Storage Migration License has been registered.

Volume Requirements for This Function

- Volumes whose "Usage" is "Migration" (or [External Volumes](#))
- Volumes whose "Process" is "Migrating : Manual Stop"
- Volumes whose "Migration Status" in the Volume Detail screen is "Active" and whose "Progress" is "100 %" (or RAID migration is completed)

Note

- After this function is executed, the volume number and the volume name of the migration destination are changed to the volume number and volume name of the migration source.

■ User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	✓
StorageAdmin	✓
AccountAdmin	
SecurityAdmin	
Maintainer	✓

Refer to "["A. User Roles and Policies" \(page 1580\)](#)" for details on the policies and roles.

■ Operating Procedures

Procedure ▶▶▶

- 1 Select the migration source volume of the Non-disruptive Storage Migration whose data synchronization is to be stopped (multiple selections can be made) and click [Stop External Volume Data Synchronization] in [Action].
→ A confirmation screen appears.
- 2 Click the [OK] button.
→ The data synchronization of the External Volume is stopped.
- 3 Click the [Done] button to return to the [Volume] screen.



Set Allocation

- ["■ Overview" \(page 152\)](#)
- ["■ User Privileges" \(page 153\)](#)
- ["■ Settings" \(page 153\)](#)
- ["■ Display Contents" \(page 154\)](#)
- ["■ Operating Procedures" \(page 155\)](#)

■ Overview

This function changes the allocation method for the existing [Thin Provisioning Volumes \(TPVs\)](#) and [Flexible Tier Volumes \(FTVs\)](#).

There are two allocation modes. The default value is "Thin".

- Thin
Physical area is allocated to the target area of the volume when a write I/O is received.
This method virtualizes and allocates the storage capacity to reduce the physical capacity of the storage.
- Thick
Physical area is allocated to the whole area of the volume when volumes are created.
This method is used for volumes such as those allocated for the system area to prevent system halts due to pool exhaustion during operations.

Caution

- This function is available for "TPV" or "FTV" type volumes. Note that this function cannot be used for "TPV" type volumes that are used as [Deduplication/Compression Volumes](#) or [Data Container Volumes](#).
- If the allocation method is changed from "Thick" to "Thin", optimize the capacity. If a capacity optimization is not performed, the used capacity (the physical capacity that is allocated to volumes in the entire TPP) is not reduced. Refer to the [Optimize TPV/FTV Capacity] function for details.
- This function cannot be used if the allocation method is changed from "Thin" to "Thick" when the free space in the TPP or FTRP has been insufficient.
- This function cannot be used when the capacity releasing from the server is being performed.
- This function cannot be used if one of the following conditions is true for the selected volume:
 - A capacity optimization is being performed or a capacity optimization is being reserved when the allocation method is changed to "Thick"
 - RAID migration is being performed
 - TPV balancing is being performed
 - FTRP balancing is being performed
 - The selected volume belongs to a TPP with a "❌Broken" state
 - The selected volume belongs to an FTRP with a "❌Broken" state
 - The selected volume is a work volume that is created during a RAID migration

Note

- The volume allocation method can be selected when creating a "TPV" or a "NAS Volume". The default value is "Thin". Refer to the [Create Volume] function for details.
- For "TPV" type ODX Buffer volumes, the volume allocation method can be selected during volume creation. Refer to the [Create ODX Buffer Volume] function for details.
- For "FTV" type volumes and for "FTV" type ODX Buffer volumes, the volume allocation method is specified during volume creation with CLI or ETERNUS SF Storage Cruiser.
- The volume allocation method can also be changed when performing a RAID migration. Refer to the [Start RAID Migration] function for details.

■ **User Privileges**

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	✓
StorageAdmin	✓
AccountAdmin	
SecurityAdmin	
Maintainer	✓

Refer to "[A. User Roles and Policies](#)" (page 1580) for details on the policies and roles.

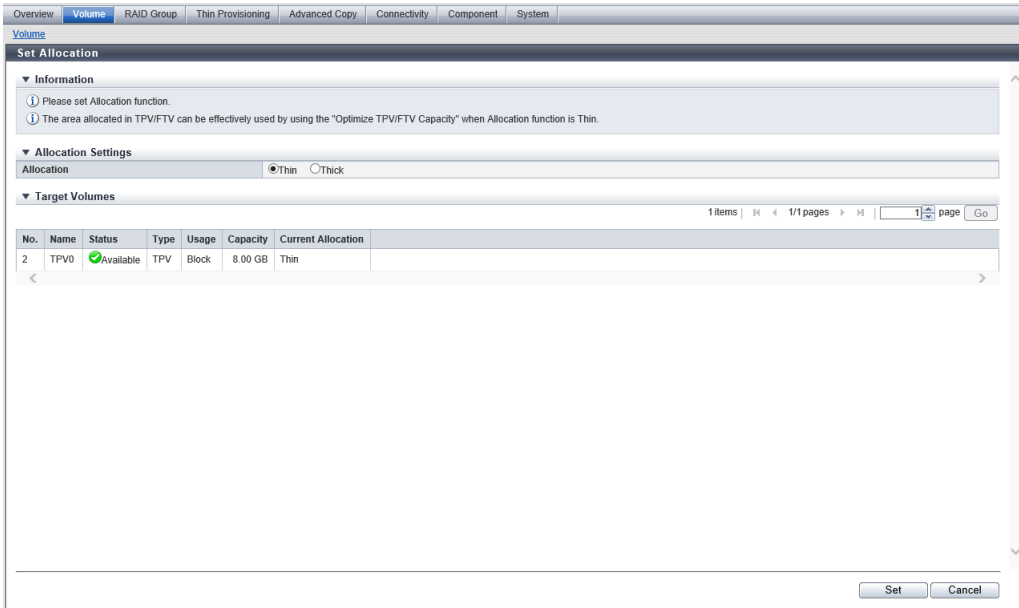
■ **Settings**

Allocation Settings

Item	Description	Setting values
Allocation	Select the allocation method. Caution <ul style="list-style-type: none"> • Regardless of the allocation method (Thin or Thick) of the selected volume, "Thin" is selected when this function starts. 	Thin Thick

2. Volume Volume (Basic Information)

■ Display Contents



Target Volume

Item	Description
No.	The volume number is displayed.
Name	The volume name is displayed.
Status	The volume status is displayed. Refer to "Volume Status" (page 1604) for details.
Type	The volume type is displayed. TPV FTV
Usage	The usage of the volume is displayed. <ul style="list-style-type: none"> Block The volumes that are used for the SAN. File The volumes that are used for the NAS. System The system volumes. Refer to "Usage Details" in the [Volume Detail] screen ([Basic] tab) for details. Veeam The volumes that are used for Veeam Storage Integration.
Capacity	The volume capacity is displayed.
Current Allocation	The current allocation method of the volume is displayed. Thin Thick

■ Operating Procedures

Procedure ▶▶▶

- 1 Select which volume to change the allocation method for (multiple selections can be made) and click [Set Allocation] in [Action].

Caution

- [Set Allocation] cannot be clicked under the following conditions:
 - Even if the selected volume type is "FTV", the usage is "System"
 - The NAS expanded system volumes are selected
 - The [Deduplication/Compression Volumes](#) are selected
 - The [Data Container Volumes](#) are selected

- 2 Select the allocation method, and click the [Set] button.
→ A confirmation screen appears.
- 3 Click the [OK] button.
→ Setting of the allocation method starts.
- 4 Click the [Done] button to return to the [Volume] screen.



Optimize TPV/FTV Capacity

- "[■ Overview](#)" (page 155)
- "[■ User Privileges](#)" (page 156)
- "[■ Operating Procedures](#)" (page 156)

■ Overview

This function [optimizes capacity](#) for a TPV or an FTV.

Volume Requirements for Optimizing Capacity:

- Volume type is [TPV](#) or [FTV](#)
- Volumes without the "🟡Readying" state, the "🔴Not Ready" state, or the "🔴Broken" state
- Volumes that are not undergoing the capacity optimization or volumes that are not reserved for optimization
- Volumes that are not ODX Buffer volumes
- Volumes that are not undergoing [RAID migration](#)
- Volumes that are not undergoing TPV balancing
- FTVs that are not undergoing FTRP balancing
- Allocation method is not "Thick"

Caution

- Do not execute capacity optimization for NAS user volumes, NAS backup volumes, and NAS system volumes.

Note

- The Thin Provisioning function and the Flexible Tier (Automated Storage Tiering) function can be effectively used by using the [Optimize TPV/FTV Capacity] function when system configurations or system environment modifications are performed. Examples of when to use the [Optimize TPV/FTV Capacity] function are as follows:
 - After the initialization of the OS or the file system (such as writing 0 data to all the volumes) is complete
 - After RAID migration from "Standard" to "TPV" is complete
 - After RAID migration from "Standard" to "FTV" is complete
- The progress of the optimizing can be checked with "Optimizing Capacity Progress" on the [Volume Detail] screen (Basic). Refer to the [Volume (Basic Information)] function for details.
- The optimizing capacity can be reserved for the source volume of the RAID migration. Refer to the [Start RAID Migration] function for details.

■ **User Privileges**

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	✓
StorageAdmin	✓
AccountAdmin	
SecurityAdmin	
Maintainer	✓

Refer to ""A. User Roles and Policies" (page 1580)" for details on the policies and roles.

■ **Operating Procedures**

Procedure ▶▶▶

- 1 Select which volumes to start optimization for (multiple selections can be made), and click [Optimize TPV/FTV Capacity] in [Action].
→ A confirmation screen appears.

Caution

- [Optimize TPV/FTV Capacity] cannot be clicked under the following conditions:
 - If the selected volume type is "FTV", but the usage is "System"
 - The NAS expanded system volumes are selected
 - The [Deduplication/Compression Volumes](#) are selected
- If the controller firmware is being applied, an error screen appears.

- 2 Click the [OK] button.
→ The optimization of the TPV capacity or the FTV capacity starts.
- 3 Click the [Done] button to return to the [Volume] screen.



Cancel Optimizing TPV/FTV Capacity

- "[Overview](#)" (page 157)
- "[User Privileges](#)" (page 157)
- "[Operating Procedures](#)" (page 157)

■ Overview

This function cancels [optimizing TPV/FTV capacity](#).

Caution

- TPV/FTV capacity optimization cannot be suspended and restarted (restarting capacity optimization from where it was stopped). If TPV/FTV capacity optimization is stopped and then started again, the TPV/FTV capacity optimization process starts from the first volume at the top again.
- This function cannot release the volumes that are reserved for TPV/FTV capacity optimization. The reservation status of TPV/FTV capacity optimization is released only when [RAID migration](#) is stopped.

Note

- The progress of TPV/FTV capacity optimization can be checked with "Process" on the [Volume] screen. Refer to the [Volume (Basic Information)] function for details.

■ User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	✓
StorageAdmin	✓
AccountAdmin	
SecurityAdmin	
Maintainer	✓

Refer to "[A. User Roles and Policies](#)" (page 1580)" for details on the policies and roles.

■ Operating Procedures

Procedure ▶▶▶

- 1 Select the volume to stop optimization (multiple selections can be made), and click [Cancel Optimizing TPV/FTV Capacity] in [Action].
→ A confirmation screen appears.
- 2 Click the [OK] button.
→ Optimization of the TPV capacity or the FTV capacity stops.
- 3 Click the [Done] button to return to the [Volume] screen.



Delete Snap Data Pool Volume

- ["■ Overview" \(page 158\)](#)
- ["■ User Privileges" \(page 158\)](#)
- ["■ Operating Procedures" \(page 158\)](#)

■ Overview

A **Snap Data Pool Volume (SDPV)** is a logical volume that is created in the **SDP**. This function deletes SDPVs to reduce SDP capacity.

Caution

- A license must be registered for the Advanced Copy function or the Unified Storage environment is required to use this function.

Note

- If the target SDPV is currently being used, it will be deleted after the SDPV is released.

■ User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	✓
StorageAdmin	✓
AccountAdmin	
SecurityAdmin	
Maintainer	✓

Refer to ["A. User Roles and Policies" \(page 1580\)](#) for details on the policies and roles.

■ Operating Procedures

Procedure ▶▶▶

- 1 Select the SDPV that is to be deleted (multiple selections can be made) and click [Delete SDPV] in [Action].
→ A confirmation screen appears.
- 2 Click the [OK] button.
→ Deletion of SDPV starts.

Note

- If the SDPV is currently being used, the target SDPV status is changed to "Reserved Deletion". The "Reserved Deletion" state can be checked in the [Volume Detail (Basic)] screen. Refer to the [Volume (Basic Information)] function for details.

- 3 Click the [Done] button to return to the [Volume] screen.



Force Delete Snap Data Pool Volume

- "[■ Overview](#)" (page 159)
- "[■ User Privileges](#)" (page 159)
- "[■ Operating Procedures](#)" (page 159)

■ Overview

A [Snap Data Pool Volume \(SDPV\)](#) is a logical volume that is created in the [SDP](#). This function forcibly deletes an SDPV regardless of whether it being used or not to reduce SDP capacity.

Caution

- A license must be registered for the Advanced Copy function or the Unified Storage environment is required to use this function.
- If the target SDPV is being used by a [copy session](#), an error stops the copy session, and then the SDPV is deleted.

Note

- An SDPV that is in the "Reserved Deletion" state can be deleted.

■ User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	✓
StorageAdmin	✓
AccountAdmin	
SecurityAdmin	
Maintainer	✓

Refer to "[A. User Roles and Policies](#)" (page 1580)" for details on the policies and roles.

■ Operating Procedures

Procedure ▶▶▶

- 1 Select the SDPV to be forcibly deleted (multiple selections can be made) and click [Force Delete SDPV] in [Action].
→ A confirmation screen appears.
- 2 Click the [OK] button.
→ Forcible deletion of SDPV starts.
- 3 Click the [Done] button to return to the [Volume] screen.



Modify Thin Provisioning Volume Threshold

- "[■ Overview](#)" (page 160)
- "[■ User Privileges](#)" (page 160)
- "[■ Settings](#)" (page 160)
- "[■ Display Contents](#)" (page 160)
- "[■ Operating Procedures](#)" (page 162)

■ Overview

This function changes the threshold for monitoring the usage ratio of [Thin Provisioning Volume \(TPV\)](#). The usage ratio is the ratio of used capacity (physically allocated capacity) to the logical TPV capacity. The targets of this function are TPVs and [Deduplication/Compression Volumes](#).

Note

- This function changes the threshold of a TPV that is created by using the [Create Volume] function.
- The same threshold can be applied for multiple TPVs in a single operation.

■ User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	✓
StorageAdmin	✓
AccountAdmin	
SecurityAdmin	
Maintainer	✓

Refer to "[A. User Roles and Policies](#)" (page 1580) for details on the policies and roles.

■ Settings

In this screen, set the TPV threshold.

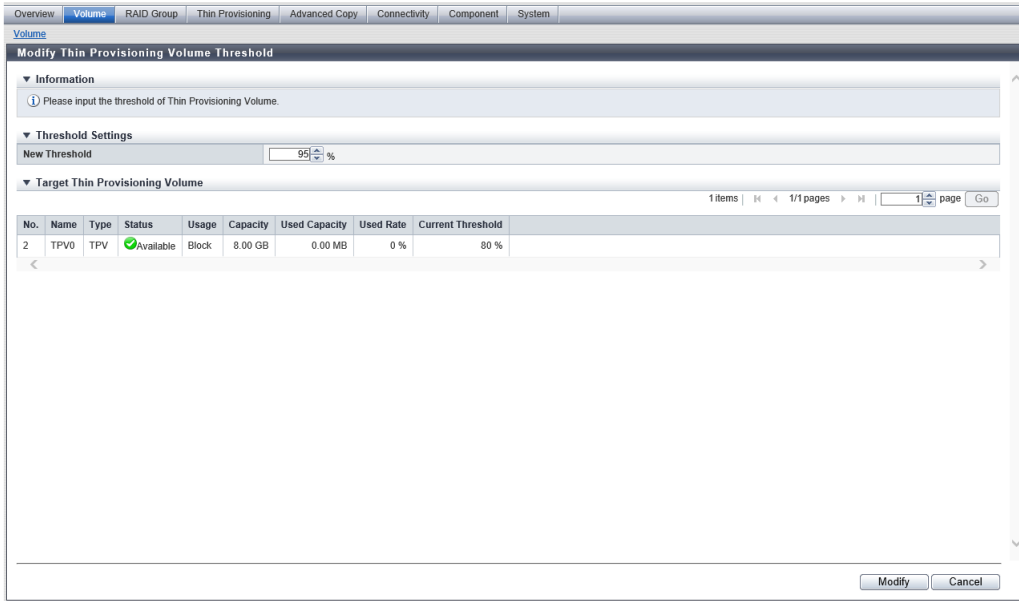
Threshold Setting

Item	Description	Setting values
New Threshold	Set a new threshold for the TPV.	1 - 100 %
	If the TPV usage ratio exceeds the threshold, a Host Sense Key Code Qualifier is notified.	80 % (Default)

■ Display Contents

The TPV selected in the [Volumes] screen is displayed. Confirm the TPV for which the threshold is to be set.

2. Volume Volume (Basic Information)



Target Thin Provisioning Volume

Item	Description
No.	The volume number is displayed.
Name	The volume name is displayed.
Type	The volume type is displayed. TPV (fixed)
Status	The volume status is displayed. Refer to "Volume Status" (page 1604) for details.
Usage	The usage of the volume is displayed. <ul style="list-style-type: none"> Block The volumes that are used for the SAN. Block/Dedupe&Comp The volumes that have both the Deduplication and Compression functions enabled. Block/Dedupe The volumes that have the Deduplication function enabled. Block/Comp The volumes that have the Compression function enabled. File The volumes that are used for the NAS. System The system volumes. Refer to "Usage Details" in the [Volume Detail] screen ([Basic] tab) for details. Veeam The Veeam Snapshot Volumes that have both the Deduplication and Compression functions disabled. Dedupe&Comp/Veeam The Veeam Snapshot Volumes that have both the Deduplication and Compression functions enabled. Dedupe/Veeam The Veeam Snapshot Volumes that have the Deduplication function enabled. Comp/Veeam The Veeam Snapshot Volumes that have the Compression function enabled.
Capacity	The volume capacity is displayed.

2. Volume

Volume (Basic Information)

Item	Description
Used Capacity	The used capacity (physically allocated capacity) of volume is displayed. A "-" (hyphen) is displayed for the Deduplication/Compression Volume.
Original Data Size	The pre-compression capacity (logically allocated capacity) of the data written to a volume is displayed. For volumes other than the Deduplication/Compression Volumes, the same value as "Used Capacity" is displayed. If the pre-compression data capacity cannot be obtained, a "-" (hyphen) is displayed.
Used Rate	The volume utilization (0 to 100 %) is displayed. <ul style="list-style-type: none">For Deduplication/Compression Volumes, the ratio of the pre-compression data capacity to the volume capacity is displayed. Used Rate = Original Data Size ÷ CapacityFor other volumes, the ratio of the physically allocated capacity to the volume capacity is displayed. Used Rate = Used Capacity ÷ Capacity
Current Threshold	The threshold (1 to 100 %) currently set for the volume is displayed.

■ Operating Procedures

Procedure ▶▶▶

- 1 Select the TPV for which the threshold is to be changed (multiple selections can be made) and click [Modify TPV Threshold] in [Action].

Caution

- [Modify TPV Threshold] cannot be clicked if NAS expanded system volumes or [Data Container Volumes](#) are selected.

- 2 Specify a new threshold, and click the [Modify] button.
→ A confirmation screen appears.
- 3 Click the [OK] button.
→ Setting of the TPV threshold starts.
- 4 Click the [Done] button to return to the [Volume] screen.



Initialize Snap Data Volume

- "[■ Overview](#)" (page 162)
- "[■ User Privileges](#)" (page 163)
- "[■ Operating Procedures](#)" (page 163)

■ Overview

This function initializes an [Snap Data Volume \(SDV\)](#).

An SDV is a copy destination volume for [SnapOPC](#) and [SnapOPC+](#) that includes a data area and a copy control information area. SDV initialization is performed when the capacity that can be used for the data area is insufficient due to a large amount of writing being requested from the host to an SDV for any reason (such as an operation mistake). SDV initialization is also performed when no more writing is allowed due to a notification being reported to the host for a writing request that exceeds the SDV capacity.

Caution

- After initializing an SDV, any data that is stored in the SDV cannot be accessed. Make sure to backup the required data.
- This function cannot be used under the following conditions:
 - The target volume status is not "✔Available"
 - [Advanced Copy](#) is being performed in the target volume
 - [Snapshot](#) is set for the target volume

Note

- When an SDV is initialized, the area that is allocated from the [SDPV](#) to the SDV is released.

■ **User Privileges**

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	✔
StorageAdmin	✔
AccountAdmin	
SecurityAdmin	
Maintainer	✔

Refer to "[A. User Roles and Policies](#)" (page 1580)" for details on the policies and roles.

■ **Operating Procedures**

Procedure ▶▶▶

- 1 Select the SDV to be initialized (multiple selections can be made) and click [Initialize SDV] in [Action].
→ A confirmation screen appears.
- 2 Click the [OK] button.
→ Initialization of the SDV starts.
- 3 Click the [Done] button to return to the [Volume] screen.



Encrypt Volume

- "[Overview](#)" (page 163)
- "[User Privileges](#)" (page 164)
- "[Operating Procedures](#)" (page 165)

■ **Overview**

This function encrypts existing volumes.
"[Standard](#)", "[WSV](#)", and "[SDV](#)" type volumes can be encrypted.

Caution

- When using this function, enable the encryption mode. Refer to the [Setup Encryption Mode] function for details.
- This function is used to prevent data leakage due to removal of drives, and cannot prevent data leakage caused by server access.
- Encrypted volumes cannot be changed to non-encrypted volumes.
- Canceling volume encryption is not possible.
- This function cannot be used under the following conditions:
 - A RAID group diagnosis is being performed
 - A disk diagnosis is being performed
 - The hot controller firmware upgrade is being performed
 - The disk firmware is being applied
 - The status of the storage system is not "Normal"
- The following volumes cannot be encrypted:
 - Volumes without the "✔Available" state
 - Volumes undergoing [RAID Migration](#)
 - Volumes undergoing encryption
 - Volumes undergoing formatting or [LUN Concatenation](#)
 - Volumes registered in a RAID group undergoing [LDE](#)
 - Volumes in which the drives that configure the RAID group are undergoing rebuild, copyback, or redundant copy
 - Volumes in which the drives that configure the RAID group are "[Online SEDs](#)", "[Nearline SEDs](#)", or "[SSD SEDs](#)"
 - Volumes that belong to a RAID group where the RAID level is "RAID6-FR"
 - Volumes with Storage Migration paths
 - Volumes that are used for the Storage Cluster function
- The following performance may be degraded for encrypted volumes compared with non-encrypted volumes:
 - Access to the encrypted volumes
 - Copy transfer of encrypted volumes
- Up to 64 volumes can be encrypted at the same time. Note that if concatenated volumes are selected, the maximum number of volumes that can be encrypted is less than 64.

Note

- [TPVs](#) cannot be encrypted with this function. TPVs that are created in an encrypted [TPP](#) are encrypted.

■ User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	

2. Volume

Volume (Basic Information)

Default role	Availability of executions
Admin	✓
StorageAdmin	✓
AccountAdmin	
SecurityAdmin	
Maintainer	✓

Refer to "[A. User Roles and Policies](#)" (page 1580) for details on the policies and roles.

■ Operating Procedures

Procedure ▶▶▶

- 1 Select the volume that is to be encrypted (multiple selections can be made) and click [Encrypt Volume] in [Action].
→ A confirmation screen appears.

Caution

- [Encrypt Volume] cannot be clicked under the following conditions:
 - [External Volumes](#) (or volumes whose "Usage" is "Migration") are selected
 - Volumes which belong to a RAID group for which the Stripe Depth value is changed (*1) are selected
- *1 : A RAID group for which the Stripe Depth value in the [RAID Group Detail] screen of the [RAID Group (Basic Information)] screen is 128KB or more. Note that the Stripe Depth value for RAID1 cannot be changed.

- 2 Click the [OK] button.
→ Encryption of the volume starts.
- 3 Click the [Done] button to return to the [Volume] screen.



Forbid Advanced Copy

- "[Overview](#)" (page 165)
- "[User Privileges](#)" (page 166)
- "[Operating Procedures](#)" (page 166)

■ Overview

This function protects a volume so that the volume cannot be registered as the copy destination volume of [Advanced Copy](#).

[Forbid Advanced Copy] is a function that protects the data in the selected volumes by forbidding the volume to be the copy destination of the [copy sessions](#) or restoration setting. When the Advanced Copy function is used by multiple software, the same volumes may be used by multiple software, resulting in unexpected data corruption. This function is available to protect the data in the copy source that is to be deleted.

"[Standard](#)", "[WSV](#)", "[TPV](#)", and "[FTV](#)" type volumes can be protected.

Caution

- If an Advanced Copy license is not registered, volume protection cannot be enabled.
- Do not protect the [External Volumes](#) (or volumes whose "Usage" is "Migration").
- The following volumes cannot be protected:
 - ODX Buffer volumes
 - NAS system volumes
 - [Data Container Volume](#)
 - Veeam Snapshot Volumes
 - Volumes that are already protected
 - Volumes that are used for the Storage Cluster function

Note

- Volumes that are already being used as the copy destination volumes can also be protected.

■ User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	✓
StorageAdmin	✓
AccountAdmin	
SecurityAdmin	
Maintainer	✓

Refer to "[A. User Roles and Policies](#)" (page 1580) for details on the policies and roles.

■ Operating Procedures

Procedure ▶▶▶

- 1 Select the volume to be protected (multiple selections can be made) and click [Forbid Advanced Copy] in [Action].
→ A confirmation screen appears.

Caution

- [Forbid Advanced Copy] cannot be clicked if one of the following volumes is selected.
 - The volume type is not "Standard", "WSV", "TPV", or "FTV"
 - The volume usage is "System", "Veeam", "Dedupe&Comp/Veeam", "Dedupe/Veeam", or "Comp/Veeam"
 - The "Forbid Advanced Copy" setting for the volume is "Yes" or "ODX"

- 2 Click the [OK] button.
→ Setting of the copy destination protect starts.

- 3 Click the [Done] button to return to the [Volume] screen.



Permit Advanced Copy

- ["■ Overview" \(page 167\)](#)
- ["■ User Privileges" \(page 167\)](#)
- ["■ Operating Procedures" \(page 167\)](#)

■ Overview

This function releases the protected volumes.
Released volumes can be used as the copy destination volume.

■ User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	✓
StorageAdmin	✓
AccountAdmin	
SecurityAdmin	
Maintainer	✓

Refer to ["A. User Roles and Policies" \(page 1580\)](#) for details on the policies and roles.

■ Operating Procedures

Procedure ▶▶▶

- 1 Select the protected volume to be released (multiple selections can be made) and click [Permit Advanced Copy] in [Action].
→ A confirmation screen appears.

Caution

- [Permit Advanced Copy] cannot be clicked if one of the following volumes is selected.
 - The volume type is not "Standard", "WSV", "TPV", or "FTV"
 - The volume usage is "System", "Veeam", "Dedupe&Comp/Veeam", "Dedupe/Veeam", or "Comp/Veeam"
 - The "Forbid Advanced Copy" setting for the volume is "No" or "ODX"

- 2 Click the [OK] button.
→ Releasing copy destination protect of the volume starts.
- 3 Click the [Done] button to return to the [Volume] screen.



Reconfigure NAS Volume

- ["■ Overview" \(page 168\)](#)
- ["■ User Privileges" \(page 168\)](#)
- ["■ Operating Procedures" \(page 169\)](#)

■ Overview

This function reconfigures the file system format for the NAS user volume to support volume expansion. This function is used in a Unified Storage environment.

Caution

- This function is not supported for the ETERNUS DX60 S5, the ETERNUS DX900 S5, the ETERNUS DX8100 S4/DX8900 S4, and the ETERNUS AF150 S3/AF250 S3/AF650 S3.
- Perform the following operations before reconfiguring the NAS user volume.
 - Perform a CIFS unmount and an NFS unmount from the client. A file system format conversion process takes a maximum of 15 minutes.
 - Backup data in the NAS user volume to a different area (if reconfiguration fails, data cannot be recovered). If reconfiguration fails, data can be recovered from the backed up data.

Note

- This function converts the file system format of the NAS user volume. Conversion targets are volumes of which the "Usage Details" are "NAS Data". Refer to the [Volume (Basic Information)] function for details.
- If the following conditions are all satisfied, the maximum NAS user volume capacity can be expanded by converting the file system format with this function. The version and the block size of the NAS file system (or the NAS user volume) are displayed in the [Volume Detail] screen. Refer to the [Volume (Basic Information)] function for details.
 - NAS file system version is "3"
 - The block size of the NAS file system is "8 KB" or "32 KB"

■ User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	✓
StorageAdmin	✓
AccountAdmin	
SecurityAdmin	
Maintainer	✓

Refer to ["A. User Roles and Policies" \(page 1580\)](#) for details on the policies and roles.

■ Operating Procedures

Procedure ▶▶▶

- 1 Select the NAS user volume (TPV) that is to be reconfigured and click [Reconfigure NAS Volume] in [Action].
→ A confirmation screen appears.

Note

- A confirmation message that indicates the NAS file system version is updated to "5" is displayed.

- 2 Click the [OK] button.
→ Reconfiguration of the NAS volume starts.

Caution

- If the NAS user volume has been accessed, an error screen appears.

- 3 Click the [Done] button to return to the [Volume] screen.
-



Delete External LU Information

- "[■ Overview](#)" (page 169)
- "[■ User Privileges](#)" (page 170)
- "[■ Operating Procedures](#)" (page 170)

■ Overview

This function deletes the [External LU Information](#).
Use this function after the data migration is complete.

Caution

- This function must be performed after a Non-disruptive Storage Migration from a storage system other than the ETERNUS storage system to this storage system is complete. Do not use this function if the Non-disruptive Storage Migration has been performed from the ETERNUS storage system to this storage system. If this function is used, the External LU Information is deleted and host access to the migration destination volume becomes unavailable.
- Before starting this function, stop the host access to the migration destination volume.
- After this function is performed, the server must be rebooted and the migration destination volume must be re-recognized.

Note

- This function can be performed regardless of whether the Non-disruptive Storage Migration License has been registered.
- Performing this function changes the following.
 - The External LU Information (such as the UID, the vendor ID, and the product ID) of the volume is restored to the LU information of the local storage system
 - The value of "UID Mode" in the [Volume] screen is changed from "External" to "Default"

■ User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	✓
StorageAdmin	✓
AccountAdmin	
SecurityAdmin	
Maintainer	✓

Refer to "'A. User Roles and Policies" (page 1580)" for details on the policies and roles.

■ Operating Procedures

Procedure ▶▶▶

- 1 Select the volume to delete the External LU Information (multiple selections can be made) and click [Delete External LU Info] in [Action].
→ A confirmation screen appears.

Caution

- [Delete External LU Info] cannot be clicked under the following conditions:
 - A volume whose "Usage" is "Migration" (or an [External Volume](#) before or during a data migration) is selected
 - A volume whose "UID Mode" is not "External" is selected

- 2 Click the [OK] button.
→ Deletion of the External LU Information starts.
- 3 Click the [Done] button to return to the [Volume] screen.



Change Data Reduction Processing CM

- "[■ Overview](#)" (page 170)
- "[■ User Privileges](#)" (page 171)
- "[■ Settings](#)" (page 171)
- "[■ Display Contents](#)" (page 171)
- "[■ Operating Procedures](#)" (page 172)

■ Overview

This function changes the Data Reduction Processing CM that is allocated to the [Deduplication/Compression Volume](#).

"Data Reduction Processing CM" is a CM that controls the data reduction process during a deduplication/compression. This function is used to perform a memory balancing and load distribution of the CMs during a data reduction process.

This function is displayed only when the Deduplication/Compression function is enabled.

Caution

- The ETERNUS DX100 S5/DX200 S5 and the ETERNUS AF150 do not support this function.
- This function cannot change the Data Reduction Processing CMs for Data Container Volumes. Use CLI to change the setting. Note that the "Maintenance Operation" policy is required for this operation.
- This function cannot be used under the following conditions:
 - A CE or a BBU that is not in the "✔Normal" state exists
 - A CM that is in a state other than "✔Normal" and "⚠Warning" exists when "Automatic" is selected for "New Data Reduction Processing CM"
 - A CM that is not in the "✔Normal" state exists if an option other than "Automatic" is selected for "New Data Reduction Processing CM"

■ User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	✔
StorageAdmin	✔
AccountAdmin	
SecurityAdmin	
Maintainer	✔

Refer to "[A. User Roles and Policies](#)" (page 1580) for details on the policies and roles.

■ Settings

Select the new Data Reduction Processing CM.

Data Reduction Processing CM Settings

Item	Description	Setting values
New Data Reduction Processing CM	Select the new Data Reduction Processing CM. "Automatic" and the normal CM number ("CE#x CM#y" or "CM#y") that is installed are displayed as options. If "Automatic" is selected, the controlling CM is assigned to balance the load of the data reduction process in the normal CMs.	Automatic For the ETERNUS DX900 S5 or the ETERNUS DX8900 S4 CE#x CM#y For the other models CM#y x: CE number y: CM number

■ Display Contents

Detailed information of the selected Deduplication/Compression Volume is displayed.

Target Thin Provisioning Volume

Item	Description
No.	The volume number is displayed.
Name	The volume name is displayed.
Type	The volume type is displayed. TPV
Usage	The usage of the volume is displayed. <ul style="list-style-type: none">• Block/Dedupe&Comp The volumes that have both the Deduplication and Compression functions enabled.• Block/Dedupe The volumes that have the Deduplication function enabled.• Block/Comp The volumes that have the Compression function enabled.
Status	The volume status is displayed. Refer to "Volume Status" (page 1604) for details.
Current Data Reduction Processing CM	The Data Reduction Processing CM that is currently allocated to the volume is displayed. For the ETERNUS DX900 S5 or the ETERNUS DX8900 S4 CE#x CM#y For the other models CM#y x: CE number y: CM number

■ Operating Procedures

Procedure ▶▶▶

- 1 Select the Deduplication/Compression Volume to change the Data Reduction Processing CM (multiple selections can be made) and click [Change Data Reduction Processing CM] in [Action].

Caution

- [Change Data Reduction Processing CM] cannot be clicked if a volume other than the Deduplication/Compression Volume is selected.

- 2 Select a new Data Reduction Processing CM, and click the [Change] button.
→ A confirmation screen appears.
- 3 Click the [OK] button.
→ Changing Data Reduction Processing CM starts.
- 4 Click the [Done] button to return to the [Volume] screen.



Performance (Host I/O)

- ["Overview" \(page 173\)](#)
- ["User Privileges" \(page 173\)](#)
- ["Display Contents" \(page 173\)](#)

- ["Filter Setting" \(page 179\)](#)

■ Overview

This function displays the performance information of the volumes for Host I/O.

Note

- Performance information is obtained when performance monitoring is operated from Web GUI, CLI, or any other monitoring software. Refer to the [Start/Stop Performance Monitoring] function for details on how to start performance monitoring with Web GUI.
- The interval for acquiring performance information can be specified when starting the monitoring. When using Web GUI, the default interval is 30 seconds.
- The average performance values during the specified interval are displayed.
- When the performance monitoring function is stopped, "0" is displayed as the performance information.
- This function displays the parameters that are set in the [Modify Cache Parameters] function (Cache Page Capacity, PL, FP, MWC, PSDC, SDDC, SS, SDS, and SPMC).
- This function displays the parameter (ALUA) that is set in the [Set ALUA] function.
- In this manual, "volumes" include ["External Volumes"](#) if differentiation is not specifically required.

■ User Privileges

Availability of Executions in the Default Role

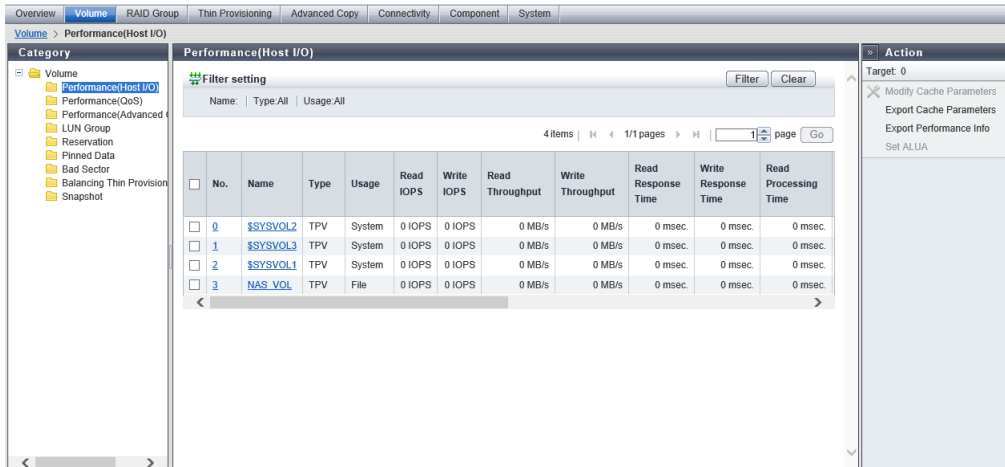
Default role	Availability of executions
Monitor	
Admin	✓
StorageAdmin	✓
AccountAdmin	
SecurityAdmin	
Maintainer	✓

Refer to ["A. User Roles and Policies" \(page 1580\)](#) for details on the policies and roles.

■ Display Contents

In this screen, the performance information of the volumes for Host I/O is displayed. When the performance monitoring function is stopped, "0" is displayed as the performance information.

2. Volume Performance (Host I/O)



Volume List

Item	Description
No.	The volume number is displayed. Click this item to display the [Volume Detail] screen ([Basic] tab) .
Name	The volume name is displayed. Click this item to display the [Volume Detail] screen ([Basic] tab) .
Type	The volume type is displayed. Standard WSV TPV FTV SDV SDPV Temporary

2. Volume Performance (Host I/O)

Item	Description
Usage	<p>The usage of the volume is displayed.</p> <ul style="list-style-type: none"> • Block The volumes that are used for the SAN. • Block/Dedupe&Comp The volumes that have both the Deduplication and Compression functions enabled. • Block/Dedupe The volumes that have the Deduplication function enabled. • Block/Comp The volumes that have the Compression function enabled. • File The volumes that are used for the NAS. • System The system volumes described below. Refer to "Usage Details" in the [Volume Detail] screen ([Basic] tab) for details. <ul style="list-style-type: none"> - System volumes for the NAS system - System volumes for the Virtual Volume function - Data Container Volume • Migration An External Volume that is used for data migrations. • Veeam The Veeam Snapshot Volumes that have both the Deduplication and Compression functions disabled. • Dedupe&Comp/Veeam The Veeam Snapshot Volumes that have both the Deduplication and Compression functions enabled. • Dedupe/Veeam The Veeam Snapshot Volumes that have the Deduplication function enabled. • Comp/Veeam The Veeam Snapshot Volumes that have the Compression function enabled.
Read IOPS	<p>The number of reads per second is displayed. A "-" (hyphen) is displayed for the Data Container Volume.</p>
Write IOPS	<p>The number of writes per second is displayed. A "-" (hyphen) is displayed for the Data Container Volume.</p>
Read Throughput	<p>The amount of transferred data that is read per second is displayed. A "-" (hyphen) is displayed for the Data Container Volume.</p>
Write Throughput	<p>The amount of transferred data that is written per second is displayed. A "-" (hyphen) is displayed for the Data Container Volume.</p>
Data Compression Rate	<p>The compression rate (1 to 100 %) of the data that is written to the Deduplication/Compression Volume from the host is displayed. A "-" (hyphen) is displayed for a volume other than the Deduplication/Compression Volume. This item is displayed only when the Deduplication/Compression function is enabled.</p> <div style="background-color: #f0f0f0; padding: 10px; margin-top: 10px;"> <p>Note</p> <ul style="list-style-type: none"> • The compression rate of the data that is written when monitoring the performance information is displayed. Note that this value does not indicate the compression rate for the volume capacity. </div>

2. Volume Performance (Host I/O)

Item	Description
Unaligned I/O Rate	<p>The percentage (1 to 100 %) of data unsuited for the basic data size of the compression process among the data read/written from the host to the Deduplication/Compression Volume is displayed.</p> <p>A "-" (hyphen) is displayed for a volume other than the Deduplication/Compression Volume.</p> <p>This item is displayed only when the Deduplication/Compression function is enabled.</p> <div style="background-color: #fff9c4; padding: 10px; margin-top: 10px;"> <p>Caution</p> <ul style="list-style-type: none"> If the Unaligned I/O rate is high, the relevant volume performance may be greatly influenced by the Deduplication/Compression process. Disabling both Deduplication and Compression for the relevant volume may improve the performance. Select "Disable" for Deduplication and Compression and then migrate from the Deduplication/Compression Volume to the TPV. Refer to the [Start RAID Migration] function for details. </div>
Read Response Time	<p>The average read response time per host I/O is displayed.</p> <p>A "-" (hyphen) is displayed for the Data Container Volume.</p>
Write Response Time	<p>The average write response time per host I/O is displayed.</p> <p>A "-" (hyphen) is displayed for the Data Container Volume.</p>
Read Processing Time	<p>The average read processing time per host I/O is displayed.</p> <p>A "-" (hyphen) is displayed for the Data Container Volume.</p>
Write Processing Time	<p>The average write processing time per host I/O is displayed.</p> <p>A "-" (hyphen) is displayed for the Data Container Volume.</p>
Read Cache Hit Rate	<p>The cache hit rate (0 to 100 %) (for read) is displayed.</p> <p>A "-" (hyphen) is displayed for the Data Container Volume.</p>
Write Cache Hit Rate	<p>The cache hit rate (0 to 100 %) (for write) is displayed.</p> <p>A "-" (hyphen) is displayed for the Data Container Volume.</p>
Prefetch Cache Hit Rate	<p>The cache hit rate (0 to 100 %) (for prefetch) is displayed.</p> <p>A "-" (hyphen) is displayed for the Data Container Volume.</p>
Extreme Cache Cache Hit Rate	<p>The cache hit rate (0 to 100 %) of Extreme Cache for read I/O is displayed.</p> <p>This item is displayed when Extreme Cache or Extreme Cache Pool is enabled for the storage system.</p> <p>A "-" (hyphen) is usually displayed for the following volumes:</p> <ul style="list-style-type: none"> Extreme Cache and Extreme Cache Pool for the relevant volume are disabled Volume type is "SDV" or "SDPV" Volumes that are created in a RAID group or a TPP configured with SSDs or SSD SEDs Data Container Volumes ODX Buffer volumes <div style="background-color: #e0e0e0; padding: 10px; margin-top: 10px;"> <p>Note</p> <ul style="list-style-type: none"> Enabling or disabling Extreme Cache for each volume can be performed with Web GUI, CLI, or ETERNUS SF Storage Cruiser. Use the [Modify Cache Parameters] function to change the setting from Web GUI (for the ETERNUS DX500 S5/DX600 S5/DX900 S5 and the ETERNUS DX8900 S4). Enabling or disabling Extreme Cache Pool for each volume can be performed with Web GUI or CLI. Use the [Modify Cache Parameters] function to change the setting from Web GUI (for the ETERNUS DX100 S5/DX200 S5). </div>
Cache Page Capacity	<p>The cache page capacity is displayed.</p> <p>When the cache page capacity is "-" (hyphen), there is no limit for the cache capacity.</p> <p>A "-" (hyphen) is displayed when the volume type is "TPV", "FTV", or "WSV".</p> <p>Note that a "-" (hyphen) is displayed for a "Standard" type volume that is concatenated by the LUN Concatenation function.</p>

2. Volume Performance (Host I/O)

Item	Description
PL	The prefetch limit is displayed. If PL is "0", prefetch is not performed.
FP	The selected usage for the Force Prefetch Mode, which performs forcible prefetching for cache, is displayed. <ul style="list-style-type: none"> • ON: Perform prefetch even if the sequential characteristics of the data access is not detected. • OFF: Perform prefetch only when the sequential characteristics of the data access is detected.
MWC	The value of the Multi Writeback Count is displayed. A "-" (hyphen) is displayed when the volume type is "TPV" or "FTV". Note that a "-" (hyphen) is displayed for a "Standard" type volume that is concatenated by the LUN Concatenation function.
PSDC	The number of times that sequentiality of data access (Read I/O) is detected (value of the Prefetch Sequential Detect Count) is displayed. If any sequential data is accessed for the number of times specified for PSDC, such access is determined as sequential access and prefetch is performed.
SDDC	The number of times that sequentiality of data access (Write I/O) is detected (value of the Sequential Dirty Detect Count) is displayed. If any sequential data is accessed for the number of times specified for SDDC, such access is determined as sequential access and prefetch is performed.
SS	The value of the parameter (Sequential Slope) to determine the sequentiality of data access (Read I/O) is displayed. If the difference in addresses between the end LBA of the previous I/O and the start LBA of the current I/O is within (SS setting + 1), it is determined as sequential data.
SDS	The value of the parameter (Sequential Dirty Slope) to determine sequential data access (Write I/O) is displayed. If the difference in addresses between the end LBA of the previous I/O and the start LBA of the current I/O is within (SDS setting + 1), it is determined as sequential data.
SPMC	The value of the parameter (Sequential Parallel Multi I/O Count) to determine the sequentiality of data access (Read I/O and Write I/O) is displayed. If the difference in addresses between the start address of the previous I/O and the start address of the received I/O is within (I/O size × Specified value), it is determined as sequential data.
ALUA	The set state for Asymmetric Logical Unit Access (ALUA) is displayed. A "-" (hyphen) is displayed for any volumes that cannot be mapped (*1). <ul style="list-style-type: none"> • Follow Host Response Use the same "Asymmetric / Symmetric Logical Unit Access" setting as the host response for the host group or the host. • ACTIVE / ACTIVE All of the paths to the volume are regarded as being recommended paths. The use of a multipath driver determines which paths are used. • ACTIVE-ACTIVE / PREFERRED_PATH There are recommended paths and non-recommended paths for each volume. By using a CA port in the Controlling CM of a RAID group in which the volume belongs for the recommended paths (other ports are regarded as non-recommended paths), data migration between CMs (cross access) can be reduced. <p>*1: The following volumes cannot be mapped.</p> <ul style="list-style-type: none"> • "SDPV" or "Temporary" type volumes • ODX Buffer volumes • "Usage" is "File" or "System"

"[Volume Detail] Screen ([Basic] Tab)" (page 51)

Click the [Performance (Host I/O)] tab to display the detailed information.

[Performance (Host I/O)] Screen

The volume number, volume name, type, and usage are displayed.

Item	Description
Read IOPS	The number of reads per second is displayed.
Write IOPS	The number of writes per second is displayed.
Read Throughput	The amount of transferred data that is read per second is displayed.
Write Throughput	The amount of transferred data that is written per second is displayed.
Data Compression Rate	The compression rate (1 to 100 %) of the data that is written to the Deduplication/Compression Volume from the host is displayed. A "-" (hyphen) is displayed for a volume other than the Deduplication/Compression Volume. This item is displayed only when the Deduplication/Compression function is enabled.
Unaligned I/O Rate	The percentage (1 to 100 %) of data unsuited for the basic data size of the compression process among the data written from the host to the Deduplication/Compression Volume is displayed. A "-" (hyphen) is displayed for a volume other than the Deduplication/Compression Volume. This item is displayed only when the Deduplication/Compression function is enabled.
Read Response Time	The average read response time per host I/O is displayed.
Write Response Time	The average write response time per host I/O is displayed.
Read Processing Time	The average read processing time per host I/O is displayed.
Write Processing Time	The average write processing time per host I/O is displayed.
Read Cache Hit Rate	The cache hit rate (0 to 100 %) (for read) is displayed.
Write Cache Hit Rate	The cache hit rate (0 to 100 %) (for write) is displayed.
Prefetch Cache Hit Rate	The cache hit rate (0 to 100 %) (for prefetch) is displayed.
Extreme Cache Cache Hit Rate	The cache hit rate (0 to 100 %) of Extreme Cache for read I/O is displayed. This item is displayed when Extreme Cache or Extreme Cache Pool is enabled for the storage system. A "-" (hyphen) is usually displayed for the following volumes: <ul style="list-style-type: none"> • Extreme Cache and Extreme Cache Pool for the relevant volume are disabled • Volume type is "SDV" or "SDPV" • Volumes that are created in a RAID group or a TPP configured with SSDs or SSD SEDs • Data Container Volumes • ODX Buffer volumes
Cache Page Capacity	The cache page capacity is displayed. When the cache page capacity is "-" (hyphen), there is no limit for the cache capacity. A "-" (hyphen) is displayed when the volume type is "TPV", "FTV", or "WSV". Note that a "-" (hyphen) is displayed for a "Standard" type volume that is concatenated by the LUN Concatenation function.
PL	The prefetch limit is displayed.
FP	The selected usage for the Force Prefetch Mode, which performs forcible prefetching for cache, is displayed.
MWC	The value of the Multi Writeback Count is displayed. A "-" (hyphen) is displayed when the volume type is "TPV" or "FTV". Note that a "-" (hyphen) is displayed for a "Standard" type volume that is concatenated by the LUN Concatenation function.
PSDC	The number of times that sequential data access is detected (value of the Prefetch Sequential Detect Count) is displayed.

2. Volume Performance (Host I/O)

Item	Description
SDDC	The number of times that sequentiality of data access (Write I/O) is detected (value of the Sequential Dirty Detect Count) is displayed.
SS	The value of the parameter (Sequential Slope) to determine the sequentiality of data access (Read I/O) is displayed.
SDS	The value of the parameter (Sequential Dirty Slope) to determine sequential data access (Write I/O) is displayed.
SPMC	The value of the parameter (Sequential Parallel Multi I/O Count) to determine the sequentiality of data access (Read I/O and Write I/O) is displayed.
ALUA	The set state for Asymmetric Logical Unit Access (ALUA) is displayed. A "-" (hyphen) is displayed for any volumes that cannot be mapped. Follow Host Response ACTIVE / ACTIVE ACTIVE-ACTIVE / PREFERRED_PATH

■ Filter Setting

Function Description

Filter setting is a function used to display a list of only the volumes meeting all the specified conditions. No filtering is set by default. The following table shows conditions that can be specified.

Item	Description	Setting values
Name	Input the volume name that is to be displayed. When not using the volume name for filtering, leave this item blank.	Volume name Blank
Type	Select the volume type that is to be displayed. "TPV" and "FTV" are displayed as options only when the Thin Provisioning function is enabled.	All Standard TPV FTV WSV SDV SDPV Temporary
Usage	Select the usage of the volume that is to be displayed. "Block/Dedupe&Comp", "Block/Dedupe", and "Block/Comp" are displayed as options only if the Deduplication/Compression function is enabled. "Migration" is displayed as an option only if the Non-disruptive Storage Migration License has been registered. "Veeam", "Dedupe&Comp/Veeam", "Dedupe/Veeam", and "Comp/Veeam" are displayed as options only if the Veeam Storage Integration License has been registered.	All Block Block/Dedupe&Comp Block/Dedupe Block/Comp File System Migration Veeam Dedupe&Comp/Veeam Dedupe/Veeam Comp/Veeam

Modify Cache Parameters

- ["■ Overview" \(page 180\)](#)
- ["■ User Privileges" \(page 181\)](#)
- ["■ Settings" \(page 181\)](#)
- ["■ Display Contents" \(page 189\)](#)
- ["■ Operating Procedures" \(page 190\)](#)

■ Overview

This function changes the cache parameters of each volume.

Performance of the storage system varies depending on the cache hit ratio. The storage system detects sequentiality when a host requests Read/Write. If sequentiality is detected when a Read request is issued, the cache hit ratio is improved by reading the sequential data into the cache memory in advance. The characteristics of Read/Write requests from the host depends on the system. Performance of the storage system may improve by specifying a cache parameter that is suitable for the system that is being used.

The parameters to specify are as follows:

- **Cache Page Capacity**
Specify the cache capacity that is used by volumes.
- **Prefetch Limit (PL)**
Specify the value to calculate the amount of data that is to be read from the drive in advance (amount of data to prefetch from the drive) when the cache detects the sequentiality of data access (Read I/O).
- **Force Prefetch Mode (FP)**
Specify whether to perform prefetch even if the sequentiality of data access (Read I/O) is not detected.
- **Multi Writeback Count (MWC)**
Specify the number of processes that can be written back at the same time.
- **Prefetch Sequential Detect Count (PSDC)**
Specify the number of times for sequential data detection to determine the sequentiality of data access (Read I/O).
- **Sequential Dirty Detect Count (SDDC)**
Specify the number of times for sequential data detection to determine the sequentiality of data access (Write I/O).
- **Sequential Slope (SS)**
A parameter to determine the sequentiality of data access (Read I/O). Specify the number of LBAs by which the previous I/O and the current I/O are considered as sequential data.
- **Sequential Dirty Slope (SDS)**
A parameter to determine the sequentiality of data access (Write I/O). Specify the number of LBAs by which the previous I/O and the current I/O are considered as sequential data.
- **Sequential Parallel Multi I/O Count (SPMC)**
A parameter to determine the sequentiality of data access (Read I/O and Write I/O). Specify the number of I/Os by which the previous I/O and the current I/O are considered as sequential data.
- **Extreme Cache**
Specify whether to "Enable" or "Disable" Extreme Cache for the volumes (for the ETERNUS DX500 S5/ DX600 S5/DX900 S5 and the ETERNUS DX8900 S4).
- **Extreme Cache Pool**
Specify whether to "Enable" or "Disable" Extreme Cache Pool for the volumes (for the ETERNUS DX100 S5/DX200 S5).

Caution

- For **TPV**, specify the MWC for each **TPP**. Refer to the [Modify Cache Parameters (TPP)] function for details.
- Cache parameters cannot be changed when pinned data exists in the storage system.
- Cache parameters for **Deduplication/Compression Volumes** cannot be specified.
- Do not set the cache parameters for the **External Volumes** (or volumes whose "Usage" is "Migration").

Note

- The same cache parameter can be applied for multiple volumes in a single operation.

■ User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	✓
StorageAdmin	✓
AccountAdmin	
SecurityAdmin	
Maintainer	✓

Refer to "[A. User Roles and Policies](#)" (page 1580) for details on the policies and roles.

■ Settings

In this screen, change the cache parameters. Refer to "[Volume Types for Which Cache Parameters Should Be Specified](#)" for the volume types for which the parameters should be specified.

Parameters Setting

Item	Description	Setting values
Cache Page Capacity	<p>Specify the cache capacity that is used by volumes.</p> <p>When "-" (hyphen) is selected, the cache capacity is not limited. It is not necessary to change the default value for normal use.</p> <p>If multiple volumes with different settings are selected and [Modify Cache Parameters] is clicked, a "-" (hyphen) is displayed for the field.</p> <p>(Advantage of limiting the cache capacity)</p> <p>If volumes with a high I/O load exist, data in a low I/O load volume may not be stored in the cache memory and the cache hit ratio for the low I/O load volume is reduced. By limiting the cache capacity that is used by high I/O load volumes, a reduction in performance when low I/O load volumes are accessed can be prevented.</p> <p>(Disadvantage of limiting the cache capacity)</p> <p>The cache hit ratio for high I/O load volumes is lowered and the access performance for the volumes may be reduced.</p> <div style="background-color: #fff9c4; padding: 10px; margin-top: 10px;"> <p>Caution</p> <ul style="list-style-type: none"> • Note that this parameter is not used to specify the capacity of dedicated cache for the relevant volume. This parameter limits the cache capacity that can be used for the relevant volume. Although a volume with this parameter cannot use a cache memory that exceeds the specified value, other volumes can use the entire cache, which includes the specified capacity. • The cache page capacity must be changed when the I/O load of the volume is low. • If write data in the cache memory exceeds the specified cache page capacity for a volume, the cache page capacity cannot be changed. • The cache page capacity cannot be changed for concatenated volumes that are created by the LUN Concatenation function. • The specified cache page capacity includes the mirror area. Note that the maximum cache capacity used by read I/O is a half the specified value. • When the cache page capacity is limited, the capacity cannot be expanded for the relevant volume. Reset the cache page capacity to the default value before expanding the volume capacity. • If the cache page capacity is set, Extreme Cache and Extreme Cache Pool of the specified volume are not used (the enabling/disabling of the Extreme Cache and Extreme Cache Pool settings is not changed). </div>	<p>"-" (hyphen) (Default)</p> <p>32.50 MB</p> <p>65.00 MB</p> <p>130.00 MB</p> <p>260.00 MB</p> <p>520.00 MB</p> <p>1040.00 MB (*1)</p> <p>2080.00 MB (*2)</p> <p>*1 : This item cannot be selected for the ETERNUS DX60 S5.</p> <p>*2 : This item cannot be selected for the ETERNUS DX60 S5/DX100 S5.</p>
Prefetch Limit (PL)	<p>Specify the prefetch limit of the volume.</p> <p>If "0" is specified for the "Prefetch Limit (PL)", data prefetch is not performed. It is not necessary to change the default value for normal use.</p> <p>If multiple volumes with different settings are selected and [Modify Cache Parameters] is clicked, the field is blank.</p> <p>(Advantage of specifying a large value)</p> <p>When specifying larger PL, the amount of data that is read from a drive for a single read process is increased. As a result, the number of times that data needs to be read (Staging) from the drive is reduced.</p> <p>(Disadvantage of specifying a large value)</p> <p>When a large "Prefetch Limit" value is specified, the amount of data that is read from a disk for a single read process is increased. As a result, the amount of data that is read (Staging) from the disk for a single read process increases and requested data may not be read before the next read or write request from the host is issued.</p>	<p>0 - 64</p> <p>8 (Default)</p> <p>Blank</p>

2. Volume
Performance (Host I/O)

Item	Description	Setting values
Force Prefetch Mode (FP)	<p>Select whether to enable (ON) or disable (OFF) the Force Prefetch Mode to forcibly fetch the cache in advance. It is not necessary to change the default value for normal use.</p> <p>If multiple volumes with different settings are selected and [Modify Cache Parameters] is clicked, "OFF" is selected for the field.</p> <p>This setting is required to improve the sequential read access performance.</p> <p>(Advantage when the "Force Prefetch Mode" is "ON")</p> <p>When a number of sequential accesses are performed for one volume, the storage system may regard as random accesses occurs. By selecting "ON" for "Force Prefetch Mode", prefetching is forcibly performed in such a case.</p> <p>(Disadvantage when the "Force Prefetch Mode" is "ON")</p> <p>For random read access, unnecessary data is read from the drive and random read access performance may be reduced.</p>	OFF (Default) ON
Multi Writeback Count (MWC)	<p>Specify the value of the Multi Writeback Count. It is not necessary to change the default value for normal use.</p> <p>The Multi Writeback Count cannot be specified for volumes that are concatenated by the LUN Concatenation function.</p> <p>If multiple volumes with different settings are selected and [Modify Cache Parameters] is clicked, the field is blank.</p> <p>(Advantage of specifying a large value)</p> <p>When specifying larger MWC, sequential write access performance is improved. Note that this is not effective when a number of random write accesses occur.</p> <p>(Disadvantage of specifying a large value)</p> <p>Depending on the ratio of read access and write access, read access performance may be reduced.</p> <div style="background-color: #f0f0f0; padding: 5px;"> <p>Note</p> <ul style="list-style-type: none"> The setting values available for Multi Writeback Count vary depending on the RAID level and drive configuration. Refer to "Allowed Input for MWC" (page 187) for details. </div>	1 - 16 Blank Refer to " Allowed Input for MWC " (page 187) for the default value.
Prefetch Sequential Detect Count (PSDC)	<p>Specify the value of the Prefetch Sequential Detect Count. It is not necessary to change the default value for normal use.</p> <p>If multiple volumes with different settings are selected and [Modify Cache Parameters] is clicked, the field is blank.</p> <p>(Advantage of specifying a large value)</p> <p>If the host splits data into multiple pieces and performs read access in succession, the access may be determined as sequential access even if it is actually random access. When specifying larger PSDC, the required number to detect sequential data for determining sequential data access is increased and a reduction in performance due to incorrect prefetch can be avoided.</p> <p>(Disadvantage of specifying a large value)</p> <p>Depending on the amount of sequential data, a large PSDC slows the determination of sequential data access and performance may be reduced.</p>	1 - 255 5 (Default) Blank

2. Volume
Performance (Host I/O)

Item	Description	Setting values
Sequential Dirty Detect Count (SDDC)	<p>Specify the value of the Sequential Dirty Detect Count. It is not necessary to change the default value for normal use.</p> <p>If multiple volumes with different settings are selected and [Modify Cache Parameters] is clicked, the field is blank.</p> <p>(Advantage of specifying a large value)</p> <p>If the host splits data into multiple pieces and performs write access in succession, the access may be determined as sequential access even if it is actually random access. When specifying larger SDDC, the required number to detect sequential data for determining sequential data access is increased and a reduction in performance due to incorrect prefetch can be avoided.</p> <p>(Disadvantage of specifying a large value)</p> <p>Depending on the amount of sequential data, a large SDDC slows the determination of sequential data access and performance may be reduced.</p>	<p>1 - 255</p> <p>5 (Default)</p> <p>Blank</p>
Sequential Slope (SS)	<p>Specify the value of the Sequential Slope. If the following equation is true for sequential data access (Read I/O), the access is determined as sequential access. It is not necessary to change the default value for normal use.</p> <p>If multiple volumes with different settings are selected and [Modify Cache Parameters] is clicked, the field is blank.</p> <p>$(\text{End LBA of the previous I/O} + 1) + \text{Sequential Slope (SS)} \geq \text{Start LBA of the current I/O}$</p> <p>(Advantage of specifying a large value)</p> <p>The following access can be also determined as sequential access.</p> <ul style="list-style-type: none"> • A sequential access that does not have successive LBAs. • A sequential access that issues multiple host I/Os at the same time and is unable to be received in the order of LBAs. <p>(Disadvantage of specifying a large value)</p> <p>A larger SS may cause random access to be determined as sequential access, resulting in reduced performance due to incorrect prefetching.</p>	<p>0 - 4096</p> <p>128 (Default)</p> <p>Blank</p>
Sequential Dirty Slope (SDS)	<p>Specify the value of the Sequential Dirty Slope. If the following equation is true for sequential data access (Write I/O), the access is determined as sequential access. It is not necessary to change the default value for normal use.</p> <p>If multiple volumes with different settings are selected and [Modify Cache Parameters] is clicked, the field is blank.</p> <p>$(\text{End LBA of the previous I/O} + 1) + \text{Sequential Dirty Slope (SDS)} \geq \text{Start LBA of the current I/O}$</p> <p>(Advantage of specifying a large value)</p> <p>The following access can be also determined as sequential access.</p> <ul style="list-style-type: none"> • A sequential access that does not have successive LBAs. • A sequential access that issues multiple host I/Os at the same time and is unable to be received in the order of LBAs. <p>(Disadvantage of specifying a large value)</p> <p>A larger SDS may cause random access to be determined as sequential access, resulting in reduced performance due to incorrect prefetching.</p>	<p>0 - 4096</p> <p>128 (Default)</p> <p>Blank</p>

2. Volume
Performance (Host I/O)

Item	Description	Setting values
Sequential Parallel Multi I/O Count (SPMC)	<p>Specify the value of the Sequential Parallel Multi I/O Count. It is not necessary to change the default value for normal use.</p> <p>If multiple volumes with different settings are selected and [Modify Cache Parameters] is clicked, the field is blank.</p> <p>(Advantage of specifying a large value)</p> <p>If data access (Read I/O and Write I/O) for the large sequential area is divided into multiple commands and issued at once, the I/O processing order may be changed in the CM and access may be considered as non-sequential access. SPMC is used to determine if there is an I/O whose LBA (of the starting address) starts within the specified value from the previous I/O is sequential access. Compared with "SS" and "SDS" which determines the sequential access by LBA numbers, SPMC can be used for large I/Os.</p> <p>(Disadvantage of specifying a large value)</p> <p>A larger SPMC may cause random access to be determined as sequential access, resulting in reduced performance due to incorrect prefetching. Also, SPMC is not expected to have an effect on data access with multiple I/O sizes.</p>	<p>0 - 32</p> <p>The default value varies depending on the model.</p> <p>ETERNUS DX60 S5: 2</p> <p>ETERNUS DX100 S5: 4</p> <p>ETERNUS DX200 S5: 8</p> <p>ETERNUS DX500 S5: 8</p> <p>ETERNUS DX600 S5: 12</p> <p>ETERNUS DX900 S5: 12</p> <p>ETERNUS DX8100 S4: 8</p> <p>ETERNUS DX8900 S4: 12</p> <p>ETERNUS AF150 S3: 4</p> <p>ETERNUS AF250 S3: 8</p> <p>ETERNUS AF650 S3: 12</p> <p>Blank</p>
Extreme Cache	<p>Select whether to "Enable" or "Disable" the Extreme Cache. It is not necessary to change the default value for normal use.</p> <p>If multiple volumes are selected when starting this function and different Extreme Cache settings have been specified for each volume, "Enable" is selected for this item.</p> <p>This item is displayed when Extreme Cache is enabled for the storage system.</p> <div style="background-color: #fff9c4; padding: 10px;"> <p>Caution</p> <ul style="list-style-type: none"> • Extreme Cache is supported in the ETERNUS DX500 S5/DX600 S5/DX900 S5 and the ETERNUS DX8900 S4. Note that "Extreme Cache" and "Current Extreme Cache" are not displayed for the other models. • When selecting volumes that cannot use this parameter as the target of this function, this item is not selected and cannot be specified. • The Extreme Cache setting for the following volumes are fixed to "Disable" and cannot be changed. <ul style="list-style-type: none"> - Volumes that are created in a RAID group configured with SSDs or SSD SEDs (Standard, Standard (LUN Concatenation), and WSV) - Volumes that are created in a TPP configured with SSDs or SSD SEDs (TPV) - ODX Buffer volumes </div>	<p>Enable (Default)</p> <p>Disable</p>

2. Volume
Performance (Host I/O)

Item	Description	Setting values
Extreme Cache Pool	<p>Select whether to "Enable" or "Disable" the Extreme Cache Pool. It is not necessary to change the default value for normal use.</p> <p>If multiple volumes are selected when starting this function and different Extreme Cache settings have been specified for each volume, "Enable" is selected for this item.</p> <p>This item is displayed when Extreme Cache Pool is enabled for the storage system.</p> <div style="background-color: #fff9c4; padding: 10px; margin-top: 10px;"> <p>Caution</p> <ul style="list-style-type: none"> • Extreme Cache Pool is supported in the ETERNUS DX100 S5/DX200 S5. Note that "Extreme Cache Pool" and "Current Extreme Cache Pool" are not displayed for the other models. • When selecting volumes that cannot use this parameter as the target of this function, this item is not selected and cannot be specified. • The Extreme Cache Pool setting for the following volumes are fixed to "Disable" and cannot be changed. <ul style="list-style-type: none"> - Volumes that are created in a RAID group configured with SSDs or SSD SEDs (Standard, Standard (LUN Concatenation), and WSV) - Volumes that are created in a TPP configured with SSDs or SSD SEDs (TPV) - ODX Buffer volumes </div>	<p>Enable (Default)</p> <p>Disable</p>

Volume Types for Which Cache Parameters Should Be Specified (Should be specified: ✓)

Item	Volume Type						
	Standard	SDV	SDPV	Standard (LUN Concatenation)	TPV	FTV	WSV
Cache Page Capacity	✓	✓	✓				
Prefetch Limit (PL)	✓	✓	✓	✓	✓		✓
Force Prefetch Mode (FP)	✓	✓	✓	✓	✓		✓
Multi Writeback Count (MWC)	✓	✓	✓		(*1)		✓
Prefetch Sequential Detect Count (PSDC)	✓	✓	✓	✓	✓		✓
Sequential Dirty Detect Count (SDDC)	✓	✓	✓	✓	✓		✓
Sequential Slope (SS)	✓	✓	✓	✓	✓		✓
Sequential Dirty Slope (SDS)	✓	✓	✓	✓	✓		✓
Sequential Parallel Multi I/O Count (SPMC)	✓	✓	✓	✓	✓		✓
Extreme Cache	✓			✓	✓		✓
Extreme Cache Pool	✓			✓	✓		✓

*1: Specify the parameter for each TPP. Refer to the [Modify Cache Parameters (TPP)] function for details.

Note

- The cache parameters for FTVs cannot be set with Web GUI. Use CLI to set the parameters.

Allowed Input for MWC

Allowed Input for MWC When Using the Default Stripe Depth Value

When using the default Stripe Depth value, refer to the following table for the allowed MWC value:

RAID level	Drive configuration (*1)	Allowed input for MWC (Default)
		Stripe Depth = 64 KB (Default)
RAID0	2D	1 - 16 (4)
	3D	1 - 10 (3)
	4D	1 - 8 (2)
	5D	1 - 6 (2)
	6D	1 - 5 (2)
	7D	1 - 4 (2)
	8D	1 - 4 (1)
	9D	1 - 3 (1)
	10D	1 - 3 (1)
	11D - 16D	1 - 2 (1)
RAID1	1D+1M	1 - 16 (8)
RAID1+0	2D+2M	1 - 16 (4)
	3D+3M	1 - 10 (3)
	4D+4M	1 - 8 (2)
	5D+5M	1 - 6 (2)
	6D+6M	1 - 5 (2)
	7D+7M	1 - 4 (2)
	8D+8M	1 - 4 (1)
	9D+9M	1 - 3 (1)
	10D+10M	1 - 3 (1)
	11D+11M - 16D+16M	1 - 2 (1)
RAID5	2D+1P	1 - 8 (4)
	3D+1P	1 - 8 (3)
	4D+1P	1 - 8 (2)
	5D+1P	1 - 6 (2)
	6D+1P	1 - 5 (2)
	7D+1P	1 - 4 (2)
	8D+1P	1 - 4 (1)
	9D+1P	1 - 3 (1)
	10D+1P	1 - 3 (1)
	11D+1P - 15D+1P	1 - 2 (1)
RAID5+0	(2D+1P) × 2	4 (fixed)
	(3D+1P) × 2	2 (fixed)
	(4D+1P) × 2	2 (fixed)
	(5D+1P) × 2 - (15D+1P) × 2	1 (fixed)

2. Volume
Performance (Host I/O)

RAID level	Drive configuration (*1)	Allowed input for MWC (Default)			
		Stripe Depth = 64 KB (Default)			
RAID6	3D+2P	1 - 8 (3)			
	4D+2P	1 - 8 (2)			
	5D+2P	1 - 6 (2)			
	6D+2P	1 - 5 (2)			
	7D+2P	1 - 4 (2)			
	8D+2P	1 - 4 (1)			
	9D+2P	1 - 3 (1)			
	10D+2P	1 - 3 (1)			
	11D+2P - 14D+2P	1 - 2 (1)			
RAID6-FR	(3D+2P)x2+1HS (3D+2P)x6+1HS	1 - 8 (3)			
	(4D+2P)x2+1HS (4D+2P)x5+1HS	1 - 8 (2)			
	(5D+2P)x4+1HS	1 - 6 (2)			
	(6D+2P)x2+1HS	1 - 5 (2)			
	(8D+2P)x3+1HS	1 - 4 (1)			
	(9D+2P)x2+1HS	1 - 3 (1)			
	(12D+2P)x2+1HS (13D+2P)x2+1HS	1 - 2 (1)			

*1 : D: Data drives, M: Mirror drives, P: Parity drives, HS: Hot Spares

Allowed Input for MWC When the Stripe Depth Value Is Tuned

When the Stripe Depth value is tuned, refer to the following table for the allowed MWC value:

RAID level	Drive configuration (*1)	Allowed input for MWC (Default)			
		When the Stripe Depth is ...			
		128KB	256KB	512KB	1024KB
RAID0	2D	1 - 8 (4)	1 - 4 (4)	1 - 2 (2)	1 (fixed)
	3D	1 - 5 (3)	1 - 2 (2)	1 (fixed)	1 (fixed)
	4D	1 - 4 (2)	1 - 2 (2)	1 (fixed)	1 (fixed)
	5D	1 - 3 (2)	1 (fixed)	1 (fixed)	1 (fixed)
	6D	1 - 2 (2)	1 (fixed)	1 (fixed)	1 (fixed)
	7D	1 - 2 (2)	1 (fixed)	1 (fixed)	1 (fixed)
	8D	1 - 2 (1)	1 (fixed)	1 (fixed)	1 (fixed)
	9D - 16D	1 (fixed)	1 (fixed)	1 (fixed)	1 (fixed)

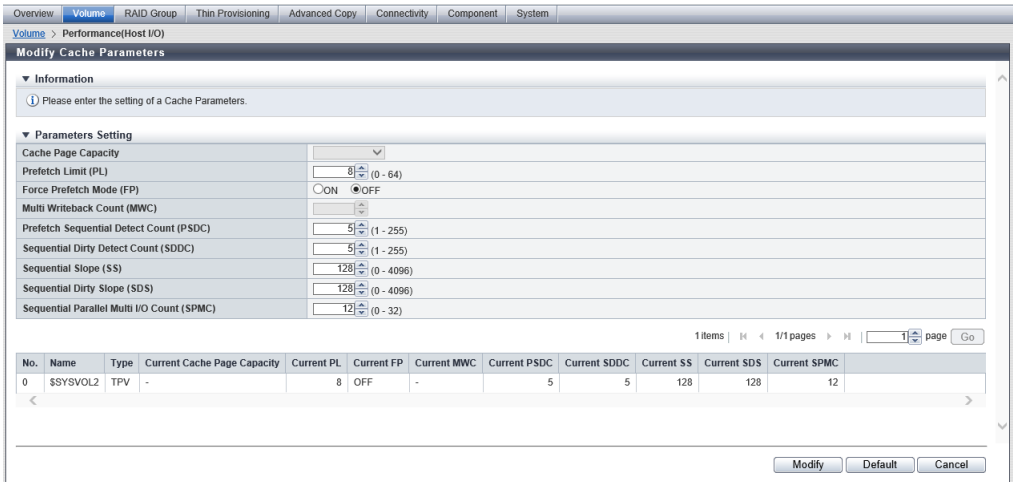
2. Volume
Performance (Host I/O)

RAID level	Drive configuration (*1)	Allowed input for MWC (Default)			
		When the Stripe Depth is ...			
		128KB	256KB	512KB	1024KB
RAID1+0	2D+2M	1 - 8 (4)	1 - 4 (4)	1 - 2 (2)	1 (fixed)
	3D+3M	1 - 5 (3)	1 - 2 (2)	1 (fixed)	1 (fixed)
	4D+4M	1 - 4 (2)	1 - 2 (2)	1 (fixed)	1 (fixed)
	5D+5M	1 - 3 (2)	1 (fixed)	1 (fixed)	1 (fixed)
	6D+6M	1 - 2 (2)	1 (fixed)	1 (fixed)	1 (fixed)
	7D+7M	1 - 2 (2)	1 (fixed)	1 (fixed)	1 (fixed)
	8D+8M	1 - 2 (1)	1 (fixed)	1 (fixed)	1 (fixed)
	9D+9M - 16D+16M	1 (fixed)	1 (fixed)	1 (fixed)	1 (fixed)
RAID5	2D+1P	1 - 4 (4)	1 - 2 (2)	1 (fixed)	-
	3D+1P	1 - 4 (3)	1 - 2 (2)	1 (fixed)	-
	4D+1P	1 - 4 (2)	1 - 2 (2)	1 (fixed)	-
	5D+1P	1 - 3 (2)	1 (fixed)	-	-
	6D+1P	1 - 2 (2)	1 (fixed)	-	-
	7D+1P	1 - 2 (2)	1 (fixed)	-	-
	8D+1P	1 - 2 (1)	1 (fixed)	-	-
	9D+1P - 15D+1P	1 (fixed)	-	-	-

*1 : D: Data drives, M: Mirror drives, P: Parity drives, "-": Stripe Depth expansion is not available

■ Display Contents

In this screen, detailed information and cache parameter setting information for the selected volume are displayed.



Item	Description
No.	The volume number is displayed.
Name	The volume name is displayed.

2. Volume Performance (Host I/O)

Item	Description
Type	The volume type is displayed. Standard WSV TPV FTV SDV SDPV
Current Cache Page Capacity	The value of the current cache page capacity setting is displayed.
Current PL	The value of the current Prefetch Limit setting is displayed.
Current FP	When the Force Prefetch Mode is enabled, "On" is displayed. When the mode is disabled, "Off" is displayed.
Current MWC	The value of the current Multi Writeback Count setting is displayed.
Current PSDC	The value of the current Prefetch Sequential Detect Count setting is displayed.
Current SDDC	The value of the current Sequential Dirty Detect Count setting is displayed.
Current SS	The value of the current Sequential Slope setting is displayed.
Current SDS	The value of the current Sequential Dirty Slope setting is displayed.
Current SPMC	The value of the current Sequential Parallel Multi I/O Count setting is displayed.
Current Extreme Cache	The current Extreme Cache status is displayed. A "-" (hyphen) is displayed for volumes that do not support the Extreme Cache. This item is displayed when Extreme Cache is enabled for the storage system.
Current Extreme Cache Pool	The current Extreme Cache Pool status is displayed. A "-" (hyphen) is displayed for volumes that do not support the Extreme Cache Pool. This item is displayed when Extreme Cache Pool is enabled for the storage system.

■ Operating Procedures

Procedure ▶▶▶

- 1 Select which volume to change the cache parameters for (multiple selections can be made) and click [Modify Cache Parameters] in [Action].

Caution

- [Modify Cache Parameters] cannot be clicked under the following conditions:
 - The usage is "Block/Dedupe&Comp", "Block/Dedupe", "Block/Comp", or "File"
 - The process is "Migration"
 - NAS expanded system volumes are selected

- 2 Change the cache parameters and click the [Modify] button.
→ A confirmation screen appears.

Note

- If the [Default] button is clicked before the [Modify] button, the default cache parameters are restored.

Caution

- An error screen appears in the following conditions:
 - Pinned data exists in the storage system
 - The Extreme Cache for the storage system is enabled and the target volume status is not "✔️Available"

- 3 Click the [OK] button.
→ The cache parameter modification starts.
- 4 Click the [Done] button to return to the screen when starting this function in Step 1.



Export Cache Parameters

- ["■ Overview" \(page 191\)](#)
- ["■ User Privileges" \(page 192\)](#)
- ["■ Display Contents" \(page 192\)](#)
- ["■ Operating Procedures" \(page 193\)](#)

■ Overview

This function exports the setting information of the cache parameters for all the volumes at the same time.

Note

- The following cache parameters can be exported.
 - Cache Page Capacity
 - Prefetch Limit (PL)
 - Force Prefetch Mode (FP)
 - Multi Writeback Count (MWC)
 - Prefetch Sequential Detect Count (PSDC)
 - Sequential Dirty Detect Count (SDDC)
 - Sequential Slope (SS)
 - Sequential Dirty Slope (SDS)
 - Sequential Parallel Multi I/O Count (SPMC)
 - Extreme Cache
 - Extreme Cache Pool
- Cache parameters can be exported from "Standard", "WSV", "TPV", "FTV", "SDV", and "SDPV" type volumes. Note that "Cache Page Capacity" cannot be exported from "WSV", "TPV", and "FTV" type volumes. Note that "Extreme Cache" and "Extreme Cache Pool" cannot be downloaded from "SDV" and "SDPV" type volumes.
- MWC for each TPP can also be exported.
- Cache parameters for [Deduplication/Compression Volumes](#) cannot be obtained.

■ User Privileges

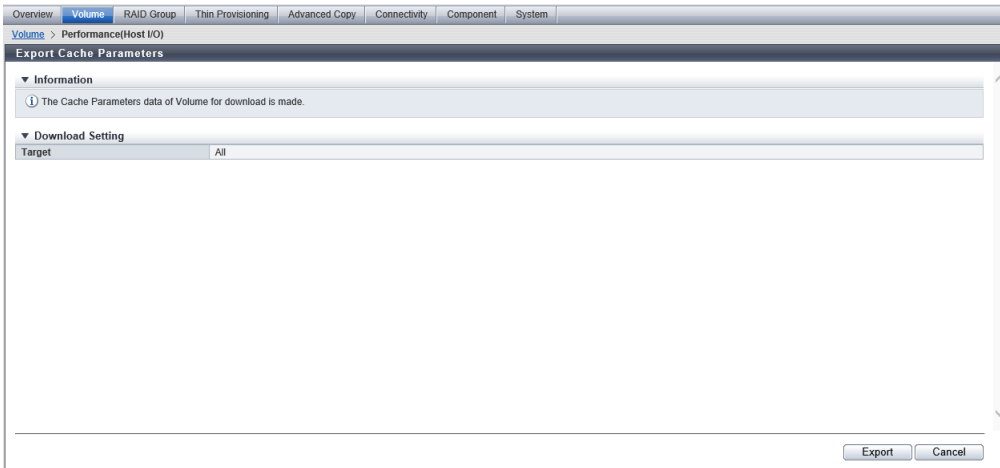
Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	✓
StorageAdmin	✓
AccountAdmin	
SecurityAdmin	
Maintainer	✓

Refer to ""A. User Roles and Policies" (page 1580)" for details on the policies and roles.

■ Display Contents

Cache parameters for all the volumes are exported.



Download Setting

Item	Description
Target	The cache parameter that is to be exported is displayed.

Cache Control Parameter List Information

Item	Description
Model Name	The model name of the storage system is displayed.
Serial No.	The serial number of the storage system is displayed.

Item	Description
Volume	The volume number is displayed. When the volume is concatenated by LUN Concatenation or when the volume type is "WSV", "(concatenation order / total number of concatenated volumes)" is displayed after the volume number.
Name	The volume name is displayed.

2. Volume Performance (Host I/O)

Item	Description
Type	The volume type is displayed. Standard WSV TPV FTV SDV SDPV
Cache Page Capacity	The cache page capacity of the volume is displayed. A "-" (hyphen) is displayed when the volume type is "WSV", "TPV", or "FTV". Note that a "-" (hyphen) is displayed for a "Standard" type volume that is concatenated by the LUN Concatenation function.
PL	The Prefetch Limit (PL) of the volume is displayed.
FP	When the Force Prefetch Mode of the volume is enabled, "ON" is displayed. When the mode is disabled, "OFF" is displayed.
MWC	The Multi Writeback Count of the volume is displayed. A "-" (hyphen) is displayed when the volume type is "TPV" or "FTV". Note that a "-" (hyphen) is displayed for a "Standard" type volume that is concatenated by the LUN Concatenation function.
PSDC	The Prefetch Sequential Detect Count of the volume is displayed.
SDDC	The Sequential Dirty Detect Count of the volume is displayed.
SS	The Sequential Slope of the volume is displayed.
SDS	The Sequential Dirty Slope of the volume is displayed.
SPMC	The Sequential Parallel Multi I/O Count of the volume is displayed.
Extreme Cache	When Extreme Cache for the volume is enabled, "ON" is displayed. If disabled, "OFF" is displayed. A "-" (hyphen) is displayed for volumes that do not support the Extreme Cache. This item is displayed when Extreme Cache is enabled for the storage system.
Extreme Cache Pool	When Extreme Cache Pool for the volume is enabled, "ON" is displayed. If disabled, "OFF" is displayed. A "-" (hyphen) is displayed for volumes that do not support the Extreme Cache Pool. This item is displayed when Extreme Cache Pool is enabled for the storage system.

When TPPs are registered, the MWC for each TPP is exported.

Item	Description
TPP No.	The TPP number is displayed.
Name	The TPP name is displayed.
MWC	The Multi Writeback Count of the volume is displayed.

■ Operating Procedures

Procedure ▶▶▶

- 1 Click [Export Cache Parameters] in [Action].
- 2 Click the [Export] button.
→ Exporting of the cache parameters is executed.
After the cache parameters are exported, a dialog box to download the file appears.
- 3 Click the [Download] button.
→ A dialog box to download the file appears.

- 4 Save the setting information file of the cache parameter.
The default file name is "CacheParam_serial number for the ETERNUS DX_YYYY-MM-DD_hh-mm-ss.txt".
(YYYY-MM-DD_hh-mm-ss: the date and time when the download screen (Step 3) is displayed.)
→ Downloading the setting information file starts.
- 5 Click the [Done] button to return to the screen when starting this function in Step 1.



Export Performance Information

- ["■ Overview" \(page 194\)](#)
- ["■ User Privileges" \(page 195\)](#)
- ["■ Operating Procedures" \(page 195\)](#)

■ Overview

This function exports the following performance information in a single operation and saves it as a text file.

- Performance (Host I/O)
- Performance (Advanced Copy)
- Performance (CA)
- Performance (CM)
- Performance (Drive)
- Performance (PFM)

Caution

- If the performance monitoring is stopped, "0" is output for all the performance information.
- Note that the dedicated information for the NAS system performance (such as Samba operations per second and NFS operations per second) cannot be obtained with Web GUI. Use CLI to obtain these information.

Note

- "Performance (Host I/O)" is the performance information of volumes for Host I/O. Note that the performance information for [Data Container Volumes](#) cannot be obtained.
- "Performance (Advanced Copy)" is the performance information of volumes for the Advanced Copy function. Note that the performance information for Data Container Volumes cannot be obtained.
- The target CA for exporting information of "Performance (CA)" is FC, iSCSI, and SAS. The performance information of CAs that are installed in the storage system is exported. Note that the performance information for FC port which port mode is "Initiator" cannot be obtained.
- "Performance (Drive)" is the drive usage. Note that the performance information for [External Drives](#) cannot be obtained.
- "Performance (PFM)" is obtained only when PFM is installed in the ETERNUS DX500 S5/DX600 S5/DX900 S5 and the ETERNUS DX8900 S4.
- The "Extreme Cache Hit Rate" is output as a performance information for the "Performance (Host I/O)" and "Performance (Advanced Copy)" only when the "Extreme Cache" or "Extreme Cache Pool" for the storage system is enabled. Note that a "-" (hyphen) is output for volumes where "Extreme Cache" and "Extreme Cache Pool" are disabled.

■ User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	✓
Admin	✓
StorageAdmin	✓
AccountAdmin	
SecurityAdmin	✓
Maintainer	✓

Refer to "[A. User Roles and Policies](#)" (page 1580) for details on the policies and roles.

■ Operating Procedures

Procedure ▶▶▶

- 1 Click [Export Performance Info] in [Action].
- 2 Click the [Export] button.
→ The registered performance information in the storage system is exported.
After the performance information export is finished, a screen to execute downloading the file is displayed.
- 3 Click the [Download] button.
→ A dialog box to download the file appears.
- 4 Save the downloaded performance information file.
The default file name is "Perform_serial number for the storage system_YYYY-MM-DD_hh-mm-ss.txt".
(YYYY-MM-DD_hh-mm-ss: the date and time when the download screen (Step 3) is displayed.)

→ Downloading the performance information file starts.

5 Click the [Done] button to return to the screen when starting this function in Step 1.



Set ALUA

- "[Overview](#)" (page 196)
- "[User Privileges](#)" (page 196)
- "[Settings](#)" (page 197)
- "[Display Contents](#)" (page 197)
- "[Operating Procedures](#)" (page 198)

■ Overview

This function sets Asymmetric Logical Unit Access (ALUA) for volumes.

ALUA can be set for "Standard", "WSV", "SDV", "TPV", and "FTV" type volumes that are to be mapped. Use this function only when controlling paths for each volume. For normal operation, paths for all the volumes in the LUN group with the host affinity setting are controlled according to the "Asymmetric / Symmetric Logical Unit Access" setting of the host response that is allocated to the host group or the host.

Caution

- Rebooting the server is required after changing the ALUA settings.
- The ALUA setting is enabled when all of the following conditions are satisfied.
 - The target volume is registered in a [LUN group](#).
 - The [host affinity](#) is set for the relevant LUN group.
 - The TPGS mode for the relevant host affinity setting of the host group or the TPGS mode for the host response that is assigned to the host is "Enable (Default)".
- When ALUA for the volume is not "Follow Host Response", ALUA is given priority over the "Asymmetric / Symmetric Logical Unit Access" setting that is specified for the host group with the host affinity setting or for the host response that is assigned to the host.
- For volumes that are used with the Virtual Volume function, ALUA cannot be set.

Note

- For the ALUA setting of each volume, refer to the "Performance (Host I/O)" screen.
- If the ALUA setting is not changed by using this function, "Follow Host Response" is specified for all of the volumes that can be mapped.

■ User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	✓
StorageAdmin	✓
AccountAdmin	

2. Volume
Performance (Host I/O)

Default role	Availability of executions
SecurityAdmin	
Maintainer	✓

Refer to "[A. User Roles and Policies](#)" (page 1580)" for details on the policies and roles.

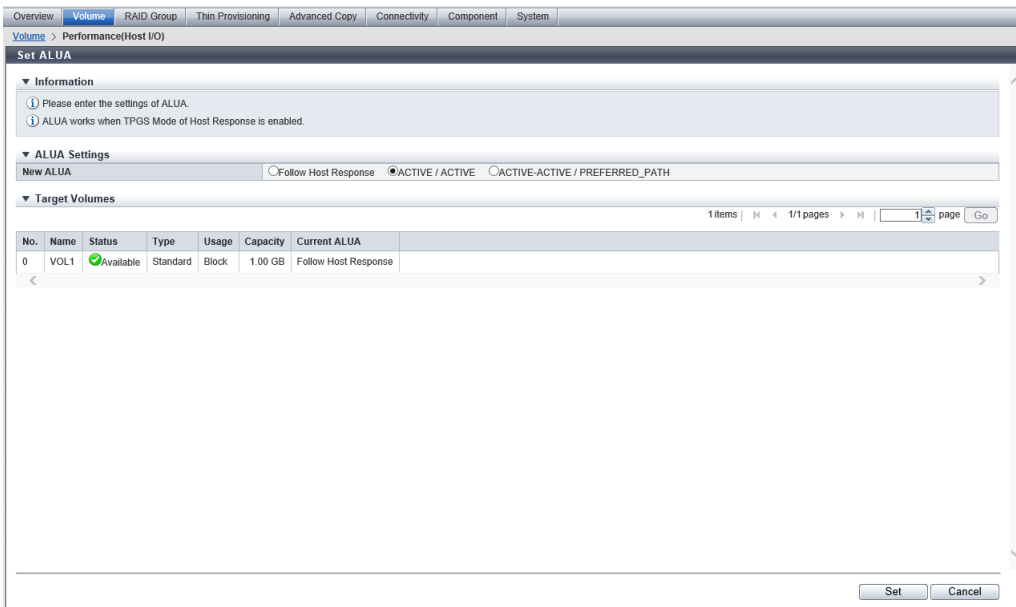
■ Settings

ALUA Settings

Item	Description	Setting values
New ALUA	<p>Select the ALUA (access type from the host to the volume) that is specified for volumes.</p> <ul style="list-style-type: none"> Follow the Host Response Use the same "Asymmetric / Symmetric Logical Unit Access" setting as the host response for the host group or the host. ACTIVE / ACTIVE All of the paths to the volume are regarded as being recommended paths. The use of a multipath driver determines which paths are used. ACTIVE-ACTIVE / PREFERRED_PATH There are recommended paths and non-recommended paths for each volume. By using a CA port in the Controlling CM of a RAID group in which the volume belongs for the recommended paths (other ports are regarded as non-recommended paths), data migration between CMs (cross access) can be reduced. 	<p>Follow Host Response ACTIVE / ACTIVE ACTIVE-ACTIVE / PREFERRED_PATH</p>

■ Display Contents

The current ALUA for the target volume is displayed.



Item	Description
No.	The volume number is displayed.
Name	The volume name is displayed.
Status	The volume status is displayed. Refer to " Volume Status " (page 1604)" for details.

2. Volume Performance (QoS)

Item	Description
Type	The volume type is displayed. Standard WSV TPV FTV SDV
Usage	The usage of the volume is displayed. Refer to "Usage" in " Volume (Basic Information) " (page 44) for details.
Capacity	The volume capacity is displayed. The displayed unit for the capacity ("MB", "GB", or "TB") is determined by the volume capacity.
Current ALUA	The current ALUA is displayed. Follow Host Response ACTIVE / ACTIVE ACTIVE-ACTIVE / PREFERRED_PATH

■ Operating Procedures

Procedure ▶▶▶

- 1 Select which volumes to set ALUA for (multiple selections can be made) and click [Set ALUA] in [Action].

Caution

- If a volume that cannot be mapped is selected, [Set ALUA] cannot be clicked. Conditions for volumes that cannot be mapped are as follows.
 - "SDPV" or "Temporary" type volumes
 - ODX Buffer volumes
 - "Usage" is "File", "System", or "Migration"

- 2 Select a new ALUA, and click the [Set] button.
→ A confirmation screen appears.
- 3 Click the [OK] button.
→ Setting of ALUA starts.
- 4 Click the [Done] button to return to the [Performance (Host I/O)] screen.



Performance (QoS)

- "[Overview](#)" (page 198)
- "[User Privileges](#)" (page 199)
- "[Display Contents](#)" (page 199)
- "[Filter Setting](#)" (page 201)

■ Overview

This function displays the performance information of the volume QoS for Host I/O. IOPS, throughput, and the bandwidth limit for each volume can be checked.

Caution

- The ETERNUS DX60 S5 does not support this function.

Note

- The target volume types for this function are Standard, SDV, WSV, TPV (including NAS user volumes and [Deduplication/Compression Volumes](#)), and FTV. Note that the performance information is not displayed for ODX Buffer volumes, NAS backup volumes, NAS system volumes, and [Data Container Volumes](#).
- This function displays the performance information of volume QoS regardless of whether the QoS mode is enabled or disabled. If the QoS mode is disabled, the default bandwidth limit ("Unlimited") is displayed for all items.
- Performance information is obtained when performance monitoring is operated from Web GUI, CLI, or any other monitoring software. Refer to the [Start/Stop Performance Monitoring] function for details on how to start performance monitoring with Web GUI.
- The interval for acquiring performance information can be specified when starting the monitoring. When using Web GUI, the default interval is 30 seconds.
- The average performance values during the specified interval are displayed.
- In this manual, "volumes" include "[External Volumes](#)" if differentiation is not specifically required.

■ User Privileges

Availability of Executions in the Default Role

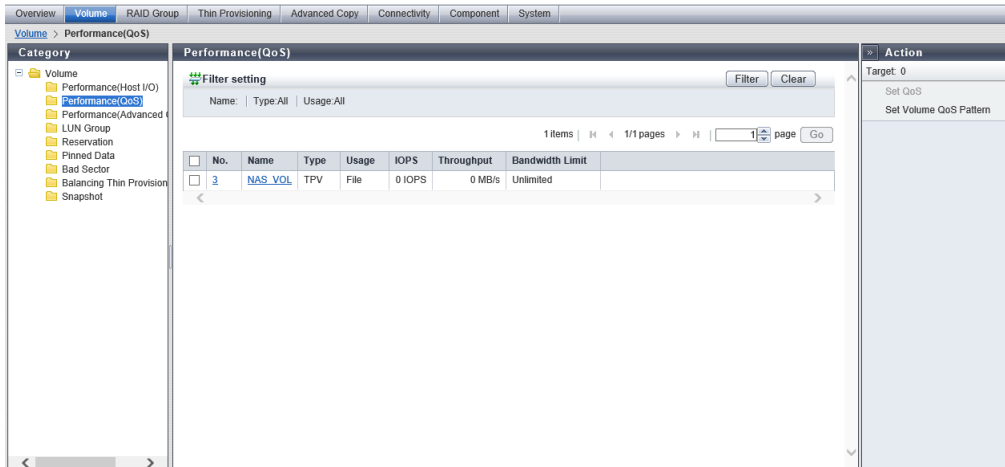
Default role	Availability of executions
Monitor	✓
Admin	✓
StorageAdmin	✓
AccountAdmin	
SecurityAdmin	✓
Maintainer	✓

Refer to "[A. User Roles and Policies](#)" (page 1580) for details on the policies and roles.

■ Display Contents

In this screen, the performance information of the volume QoS is displayed.

2. Volume Performance (QoS)



Volume List

Item	Description
No.	The volume number is displayed. Click this item to display the "[Volume Detail] Screen ([Basic] Tab)" (page 51).
Name	The volume name is displayed. Click this item to display the "[Volume Detail] Screen ([Basic] Tab)" (page 51).
Type	The volume type is displayed. Standard TPV FTV WSV SDV

2. Volume Performance (QoS)

Item	Description
Usage	<p>The usage of the volume is displayed.</p> <ul style="list-style-type: none"> • Block The volumes that are used for the SAN. • Block/Dedupe&Comp The volumes that have both the Deduplication and Compression functions enabled. • Block/Dedupe The volumes that have the Deduplication function enabled. • Block/Comp The volumes that have the Compression function enabled. • File The volumes that are used for the NAS. • System The system volumes for the Virtual Volume function. Refer to "Usage Details" in the [Volume Detail] screen ([Basic] tab) for details. • Migration An External Volume that is used for data migrations. • Veeam The Veeam Snapshot Volumes that have both the Deduplication and Compression functions disabled. • Dedupe&Comp/Veeam The Veeam Snapshot Volumes that have both the Deduplication and Compression functions enabled. • Dedupe/Veeam The Veeam Snapshot Volumes that have the Deduplication function enabled. • Comp/Veeam The Veeam Snapshot Volumes that have the Compression function enabled.
IOPS	IOPS, the total number of reads and writes per second, is displayed.
Throughput	Throughput, the total amount of read data and write data transferred per second, is displayed.
Bandwidth Limit	<p>The bandwidth limit for the volume is displayed.</p> <p>If the bandwidth limit has not been configured for the volume, the default value ("Unlimited") is displayed. Refer to "Bandwidth Limit" (page 823)" for details.</p>

■ Filter Setting

Function Description

Filter setting is a function used to display a list of only the volumes meeting all the specified conditions. No filtering is set by default. The following table shows conditions that can be specified.

Item	Description	Setting values
Name	<p>Input the volume name that is to be displayed.</p> <p>When not using the volume name for filtering, leave this item blank.</p>	<p>Volume name</p> <p>Blank</p>
Type	<p>Select the volume type that is to be displayed.</p> <p>"TPV" and "FTV" are displayed as options only when the Thin Provisioning function is enabled.</p>	<p>All</p> <p>Standard</p> <p>TPV</p> <p>FTV</p> <p>WSV</p> <p>SDV</p> <p>SDPV</p> <p>Temporary</p>

2. Volume Performance (QoS)

Item	Description	Setting values
Usage	Select the usage of the volume that is to be displayed. "Block/Dedupe&Comp", "Block/Dedupe", and "Block/Comp" are displayed as options only if the Deduplication/Compression function is enabled. "Migration" is displayed as an option only if the Non-disruptive Storage Migration License has been registered. "Veeam", "Dedupe&Comp/Veeam", "Dedupe/Veeam", and "Comp/Veeam" are displayed as options only if the Veeam Storage Integration License has been registered.	All Block Block/Dedupe&Comp Block/Dedupe Block/Comp File System Migration Veeam Dedupe&Comp/Veeam Dedupe/Veeam Comp/Veeam

Set Volume QoS

- ["■ Overview" \(page 202\)](#)
- ["■ User Privileges" \(page 203\)](#)
- ["■ Settings" \(page 203\)](#)
- ["■ Display Contents" \(page 203\)](#)
- ["■ Operating Procedures" \(page 204\)](#)

■ Overview

This function sets the bandwidth limit (the maximum performance limit) for the volume. By setting the volume QoS, the total performance from multiple CA ports to the target volume can be limited.

Caution

- The target volume types for this function are Standard, SDV, WSV, TPV (including NAS user volumes and [Deduplication/Compression Volumes](#)), and FTV. Note that a volume QoS cannot be set for ODX Buffer volumes, NAS backup volumes, NAS system volumes, and [Data Container Volumes](#).
- Do not set a bandwidth limit for NAS user volumes and snapshot destination SDVs.
- Do not set the bandwidth limit for [External Volumes](#) (or volumes whose "Usage" is "Migration").
- If the QoS Priority function is enabled, the bandwidth limit cannot be set.
- This function can be used, irrespective of whether the QoS mode has been enabled or disabled. However, if the QoS mode has been disabled, the host starts the operation within the configured bandwidth limit only when the QoS mode is enabled.
- To set a bandwidth limit for the volumes that are used with the Virtual Volume function, use ETERNUS SF Storage Cruiser.

Note

- To check whether the QoS mode is enabled or disabled, check the "Action" field of the [Host-LU QoS] screen under the [Connectivity] navigation. Refer to the [Enable/Disable QoS] function for details.
- To limit the performance from a specific CA port to the target volume, set the Host-LU QoS. Refer to the [Set Host-LU QoS] function for details.

2. Volume Performance (QoS)

■ User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	✓
StorageAdmin	✓
AccountAdmin	
SecurityAdmin	
Maintainer	✓

Refer to ["A. User Roles and Policies" \(page 1580\)](#) for details on the policies and roles.

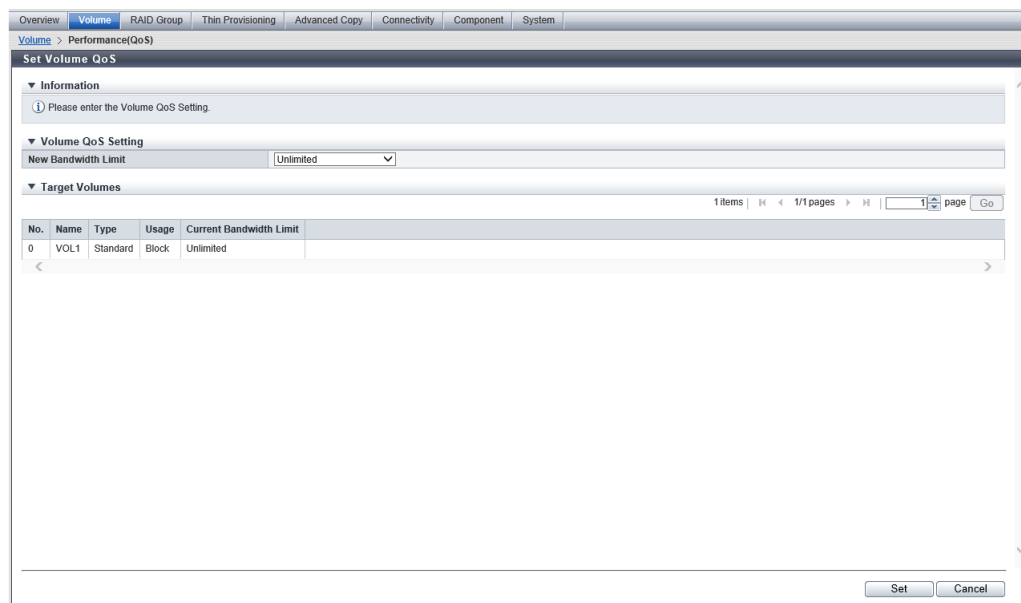
■ Settings

Volume QoS Setting

Item	Description	Setting values
New Bandwidth Limit	Select the maximum performance in IOPS (throughput value). When not setting the performance limit, select "Unlimited".	Refer to the "Volume QoS" column in "Bandwidth Limit" (page 823) for the setting value and the default value.
Limit	The bandwidth limit can be changed using the [Set Volume QoS Pattern] function or the "set qos-bandwidth-limit" CLI command. If the value is changed, that value is displayed as an option for this item.	

■ Display Contents

In this screen, information for the volume selected from the volume list is displayed.



Target Volumes

Item	Description
No.	The volume number is displayed.
Name	The volume name is displayed.
Type	The volume type is displayed. Standard TPV FTV WSV SDV
Usage	The usage of the volume is displayed. <ul style="list-style-type: none"> • Block The volumes that are used for the SAN. • Block/Dedupe&Comp The volumes that have both the Deduplication and Compression functions enabled. • Block/Dedupe The volumes that have the Deduplication function enabled. • Block/Comp The volumes that have the Compression function enabled. • File The volumes that are used for the NAS. • Veeam The Veeam Snapshot Volumes that have both the Deduplication and Compression functions disabled. • Dedupe&Comp/Veeam The Veeam Snapshot Volumes that have both the Deduplication and Compression functions enabled. • Dedupe/Veeam The Veeam Snapshot Volumes that have the Deduplication function enabled. • Comp/Veeam The Veeam Snapshot Volumes that have the Compression function enabled.
Current Bandwidth Limit	The bandwidth limit currently set for the volume is displayed. Refer to the "Volume QoS" column in " Bandwidth Limit " (page 823) for details.

■ Operating Procedures

Procedure ▶▶▶

- 1 Select which volumes to set the bandwidth limit (multiple selections can be made) and click [Set QoS] in [Action].
- 2 Select a new bandwidth limit, and click the [Set] button.
→ A confirmation screen appears.
- 3 Click the [OK] button.
→ Setting of the volume QoS starts.
- 4 Click the [Done] button to return to the [Performance (QoS)] screen.



Set Volume QoS Pattern

- ["■ Overview" \(page 205\)](#)
- ["■ User Privileges" \(page 205\)](#)
- ["■ Settings" \(page 206\)](#)
- ["■ Operating Procedures" \(page 206\)](#)

■ Overview

This function sets the QoS patterns of the volume.

The maximum bandwidth limit of the volume QoS can be changed by setting a volume QoS pattern.

Caution

- If the Automated QoS function of ETERNUS SF Storage Cruiser is used, set the IOPS and throughput values that correspond to the bandwidth limit (No.1 to No.15) in descending order. If values are not in descending order, the Automated QoS function may not operate as expected.

Note

- This function can be used, irrespective of whether the QoS mode has been enabled or disabled.
- The volume QoS patterns set with this function are applied to the options of the volume QoS bandwidth limit. Refer to the [Set Volume QoS] function for details.
- The following QoS patterns can be set.
 - Use the [Set Host QoS Pattern] function to set the host QoS patterns.
 - Use the [Set Port QoS Pattern] function to set the port QoS patterns.
 - Use the [Set LU QoS Pattern] function to set the host LUN QoS patterns.
- The bandwidth limit can also be changed with the "set qos-bandwidth-limit" CLI command. If the bandwidth limit is changed by using CLI, that value is also applied to the bandwidth limit that is specified with Web GUI.

■ User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	✓
StorageAdmin	✓
AccountAdmin	
SecurityAdmin	
Maintainer	✓

Refer to ["A. User Roles and Policies" \(page 1580\)](#) for details on the policies and roles.

■ Settings

QoS Pattern Settings

Item	Description	Setting values
No.	The pattern number (0 to 15) of the volume QoS is displayed.	
IOPS	Enter the maximum performance (IOPS). Note that "No.0" (Unlimited) cannot be changed. The current value is displayed when this function starts.	No.0 "Unlimited" No.1 - No.15 60 - 4294967295 Refer to the "Volume QoS" column in "" Bandwidth Limit " (page 823)" for the default value.
Throughput (MB/s)	Enter the maximum performance (throughput value). Note that "No.0" (Unlimited) cannot be changed. The current value is displayed when this function starts.	No.0 "Unlimited" No.1 - No.15 1 - 2097151 Refer to the "Volume QoS" column in "" Bandwidth Limit " (page 823)" for the default value.

■ Operating Procedures

Procedure ▶▶▶

- 1 Click [Set Volume QoS Pattern] in [Action].
- 2 Specify parameters, and click the [Set] button.
→ A confirmation screen appears.

Note

- The volume QoS patterns (No.1 to No.15) can be reset to the default value. Click the [Default] button to display the default value and click the [Set] button. Refer to the "Volume QoS" column in ""[Bandwidth Limit](#)" (page 823)" for the settings content.
- Note that initializing a specific volume QoS No. is not available.

- 3 Click the [OK] button.
→ The volume QoS pattern setting starts.
- 4 Click the [Done] button to return to the [Performance (QoS)] screen.

Performance (Advanced Copy)

- "[■ Overview](#)" (page 207)
- "[■ User Privileges](#)" (page 207)
- "[■ Display Contents](#)" (page 207)
- "[■ Filter Setting](#)" (page 209)

■ Overview

This function displays the performance information of the volumes for Advanced Copy.

Note

- The performance information of the [Data Container Volume](#) is not displayed.
- Performance information is obtained when performance monitoring is operated from Web GUI, CLI, or any other monitoring software. Refer to the [Start/Stop Performance Monitoring] function for details on how to start performance monitoring with Web GUI.
- The interval for acquiring performance information can be specified when starting the monitoring. When using Web GUI, the default interval is 30 seconds.
- The average performance values during the specified interval are displayed.
- When the performance monitoring function is stopped, "0" is displayed as the performance information.
- In this manual, "volumes" include "[External Volumes](#)" if differentiation is not specifically required.

■ User Privileges

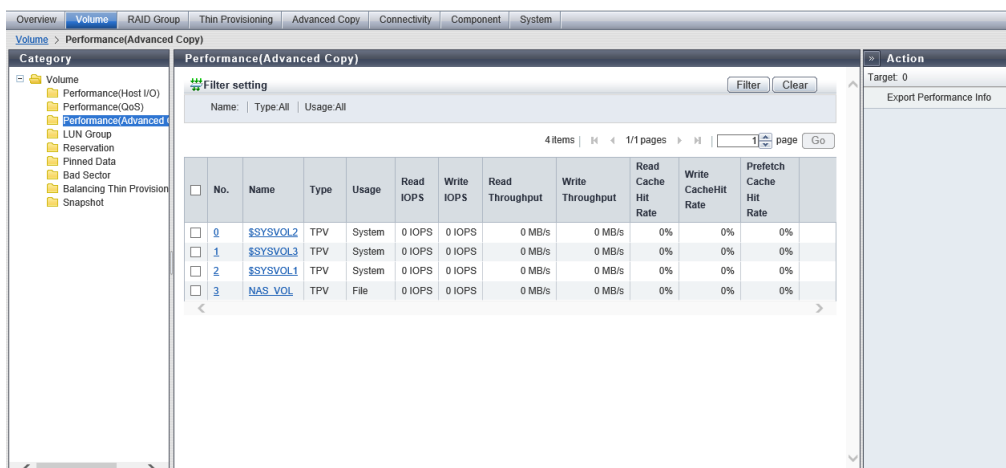
Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	✓
Admin	✓
StorageAdmin	✓
AccountAdmin	
SecurityAdmin	✓
Maintainer	✓

Refer to "[A. User Roles and Policies](#)" (page 1580) for details on the policies and roles.

■ Display Contents

In this screen, the performance information of the volumes for Advanced Copy is displayed. When the performance monitoring function is stopped, "0" is displayed as the performance information.



2. Volume
Performance (Advanced Copy)

Volume List

Item	Description
No.	The volume number is displayed. Click this item to display the [Volume Detail] screen ([Basic] tab) .
Name	The volume name is displayed. Click this item to display the [Volume Detail] screen ([Basic] tab) .
Type	The volume type is displayed. Standard WSV TPV FTV SDV SDPV Temporary
Usage	The usage of the volume is displayed. <ul style="list-style-type: none"> • Block The volumes that are used for the SAN. • Block/Dedupe&Comp The volumes that have both the Deduplication and Compression functions enabled. • Block/Dedupe The volumes that have the Deduplication function enabled. • Block/Comp The volumes that have the Compression function enabled. • File The volumes that are used for the NAS. • System The system volumes for the Virtual Volume function. Refer to "Usage Details" in the [Volume Detail] screen ([Basic] tab) for details. • Migration An External Volume that is used for data migrations. • Veeam The Veeam Snapshot Volumes that have both the Deduplication and Compression functions disabled. • Dedupe&Comp/Veeam The Veeam Snapshot Volumes that have both the Deduplication and Compression functions enabled. • Dedupe/Veeam The Veeam Snapshot Volumes that have the Deduplication function enabled. • Comp/Veeam The Veeam Snapshot Volumes that have the Compression function enabled.
Read IOPS	The number of reads per second is displayed.
Write IOPS	The number of writes per second is displayed.
Read Throughput	The amount of transferred data that is read per second is displayed.
Write Throughput	The amount of transferred data that is written per second is displayed.
Read Cache Hit Rate	The cache hit rate (0 to 100 %) (for read) is displayed.
Write Cache Hit Rate	The cache hit rate (0 to 100 %) (for write) is displayed.
Prefetch Cache Hit Rate	The cache hit rate (0 to 100 %) (for prefetch) is displayed.

2. Volume Performance (Advanced Copy)

Item	Description
Extreme Cache Cache Hit Rate	<p>The cache hit rate (0 to 100 %) of Extreme Cache for read I/O is displayed.</p> <p>This item is displayed when Extreme Cache or Extreme Cache Pool is enabled for the storage system. A "-" (hyphen) is usually displayed for the following volumes:</p> <ul style="list-style-type: none"> • Extreme Cache and Extreme Cache Pool for the relevant volume are disabled • Volume type is "SDV" or "SDPV" • Volumes that are created in a RAID group or a TPP configured with SSDs or SSD SEDs • ODX Buffer volumes <p>Note</p> <ul style="list-style-type: none"> • Enabling or disabling Extreme Cache for each volume can be performed with Web GUI, CLI, or ETERNUS SF Storage Cruiser. Use the [Modify Cache Parameters] function to change the setting from Web GUI (for the ETERNUS DX500 S5/DX600 S5/DX900 S5 and the ETERNUS DX8900 S4). • Enabling or disabling Extreme Cache Pool for each volume can be performed with Web GUI or CLI. Use the [Modify Cache Parameters] function to change the setting from Web GUI (for the ETERNUS DX100 S5/DX200 S5).

"[Volume Detail] Screen ([Basic] Tab)" (page 51)

Click the [Performance Information (Advanced Copy)] tab to display the detailed information.

[Performance (Advanced Copy)] Screen

The volume number, volume name, type, and usage are displayed.

Item	Description
Read IOPS	The number of reads per second is displayed.
Write IOPS	The number of writes per second is displayed.
Read Throughput	The amount of transferred data that is read per second is displayed.
Write Throughput	The amount of transferred data that is written per second is displayed.
Read Cache Hit Rate	The cache hit rate (0 to 100 %) (for read) is displayed.
Write Cache Hit Rate	The cache hit rate (0 to 100 %) (for write) is displayed.
Prefetch Cache Hit Rate	The cache hit rate (0 to 100 %) (for prefetch) is displayed.
Extreme Cache Cache Hit Rate	<p>The cache hit rate (0 to 100 %) of Extreme Cache for read I/O is displayed.</p> <p>This item is displayed when Extreme Cache or Extreme Cache Pool is enabled for the storage system. A "-" (hyphen) is usually displayed for the following volumes:</p> <ul style="list-style-type: none"> • Extreme Cache and Extreme Cache Pool for the relevant volume are disabled • Volume type is "SDV" or "SDPV" • Volumes that are created in a RAID group or a TPP configured with SSDs or SSD SEDs • ODX Buffer volumes

■ Filter Setting

Function Description

Filter setting is a function used to display a list of only the volumes meeting all the specified conditions. No filtering is set by default. The following table shows conditions that can be specified.

2. Volume LUN Group

Item	Description	Setting values
Name	Input the volume name that is to be displayed. When not using the volume name for filtering, leave this item blank.	Volume name Blank
Type	Select the volume type that is to be displayed. "TPV" and "FTV" are displayed as options only when the Thin Provisioning function is enabled.	All Standard TPV FTV WSV SDV SDPV Temporary
Usage	Select the usage of the volume that is to be displayed. "Block/Dedupe&Comp", "Block/Dedupe", and "Block/Comp" are displayed as options only if the Deduplication/Compression function is enabled. "Migration" is displayed as an option only if the Non-disruptive Storage Migration License has been registered. "Veeam", "Dedupe&Comp/Veeam", "Dedupe/Veeam", and "Comp/Veeam" are displayed as options only if the Veeam Storage Integration License has been registered.	All Block Block/Dedupe&Comp Block/Dedupe Block/Comp File System Migration Veeam Dedupe&Comp/Veeam Dedupe/Veeam Comp/Veeam

Export Performance Information

Refer to ["Export Performance Information" \(page 194\)](#) for details.

LUN Group

- ["■ Overview" \(page 210\)](#)
- ["■ User Privileges" \(page 210\)](#)
- ["■ Display Contents" \(page 211\)](#)
- ["■ Filter Setting" \(page 212\)](#)

■ Overview

This function displays the [LUN groups](#) of each volume.

■ User Privileges

Availability of Executions in the Default Role

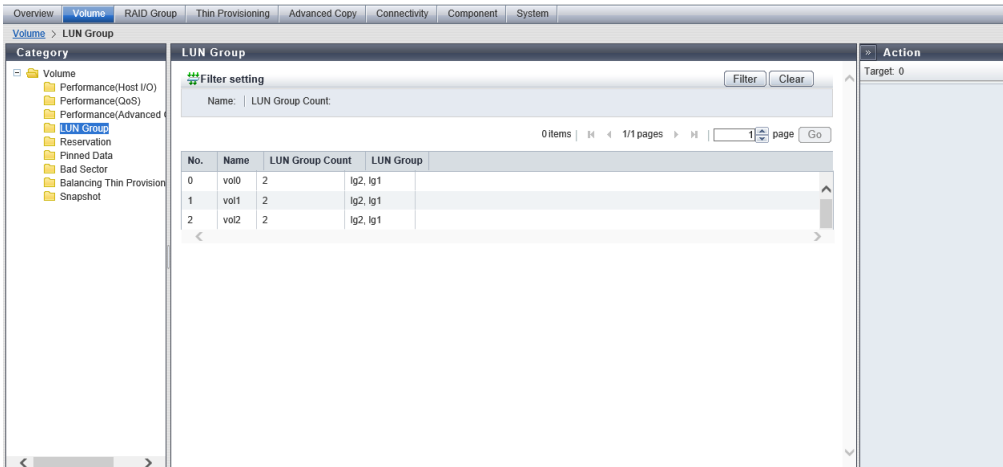
Default role	Availability of executions
Monitor	✓
Admin	✓
StorageAdmin	✓
AccountAdmin	

2. Volume LUN Group

Default role	Availability of executions
SecurityAdmin	✓
Maintainer	✓

Refer to ["A. User Roles and Policies" \(page 1580\)](#) for details on the policies and roles.

■ Display Contents



Volume List

In this screen, the LUN groups of each volume are displayed.

Item	Description
No.	The volume number is displayed.
Name	The volume name is displayed.
LUN Group Count	The total number of LUN groups for the volume and the number of ports to which the volume is allocated is displayed.
LUN Group	<p>The LUN group names of the volume are displayed. If the host, ports, and LUNs are allocated without specifying a host group or port group, the location information of the ports is displayed. If the volume is registered in multiple LUN groups or the volume is allocated to multiple ports, multiple LUN group names and the location information of the ports are displayed.</p> <p>When the volume does not belong to any LUN groups, or the volume is not allocated to any ports, a "-" (hyphen) is displayed.</p> <p>For the ETERNUS DX900 S5 or the ETERNUS DX8900 S4 CE#x CM#y CA#z Port#w</p> <p>For the other models CM#y CA#z Port#w</p> <p>x: CE number y: CM number z: CA number w: Port number</p>
Storage Cluster	<p>When the volume is being used by the Storage Cluster function, "Enable" is displayed. When no volumes are used for the Storage Cluster function, "Disable" is displayed.</p> <p>This item is only displayed when "Enable" is selected for the Storage Cluster function.</p>

■ Filter Setting

Function Description

Filter setting is a function used to display a list of only the volume meeting all the specified conditions. No filtering is set by default. The following table shows conditions that can be specified.

Item	Description	Setting values
Name	Input the volume name that is to be displayed. Volume names matching or partially matching the entered name are displayed. When not using the volume name for filtering, leave this item blank.	Volume name Blank
LUN Group Count	Input the number of LUN groups of the volume that is to be displayed. When not using the LUN group count for filtering, leave this item blank.	LUN group count Blank
Storage Cluster	Select "Enable" if the volume that is to be displayed uses the Storage Cluster function. Select "Disable" if the volume that is to be displayed does not use the Storage Cluster function. This item is only displayed when "Enable" is selected for the Storage Cluster function.	All Enable Disable

Reservation

- ["■ Overview" \(page 212\)](#)
- ["■ User Privileges" \(page 212\)](#)
- ["■ Display Contents" \(page 213\)](#)
- ["■ Filter Setting" \(page 215\)](#)

■ Overview

This function displays the reservation status of the volumes that are specified by a host.

Note

- The reservation status for volumes where the usage is "Block", "Block/Dedupe&Comp", "Block/Dedupe", "Block/Comp", "Migration", "Veeam", "Dedupe&Comp/Veeam", "Dedupe/Veeam", or "Comp/Veeam" is displayed. Refer to the [Volume (Basic Information)] function for details.
- In this manual, "volumes" include ["External Volumes"](#) if differentiation is not specifically required.

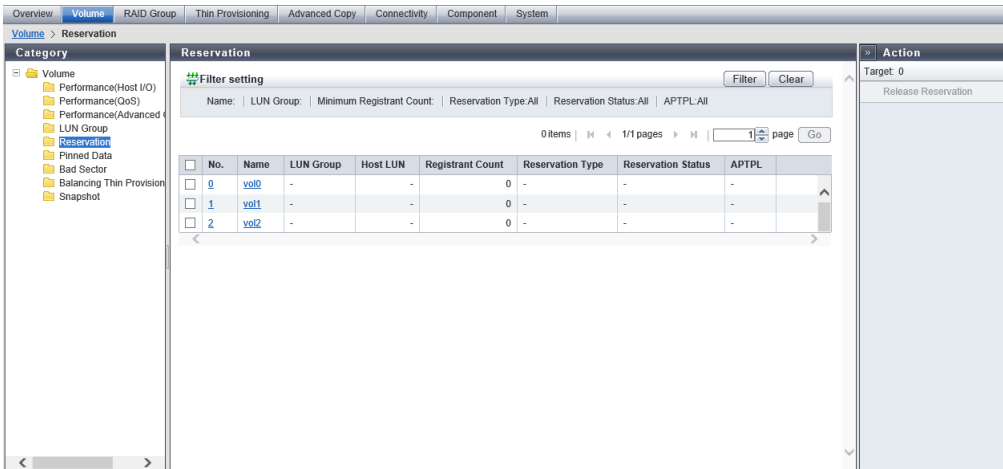
■ User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	✓
Admin	✓
StorageAdmin	✓
AccountAdmin	
SecurityAdmin	✓
Maintainer	✓

Refer to ["A. User Roles and Policies" \(page 1580\)](#) for details on the policies and roles.

■ Display Contents



Volume List

Item	Description
No.	The volume number is displayed. Click this item to display the "[Volume Detail] Screen ([Basic] Tab)" (page 214).
Name	The volume name is displayed. Click this item to display the "[Volume Detail] Screen ([Basic] Tab)" (page 214).
LUN Group	When the host affinity setting is specified for a host that reserves the volume, the LUN group name is displayed. If the host, ports, and LUNs are directly allocated (mapped), the location information of the ports is displayed. When the volume is not reserved, a "-" (hyphen) is displayed. LUN group name For the ETERNUS DX900 S5 or the ETERNUS DX8900 S4 CE#x CM#y CA#z Port#w For the other models CM#y CA#z Port#w x: CE number y: CM number z: CA number w: Port number
Host LUN	The host LUN, which is allocated to the volume, is displayed. When the volume is not reserved, a "-" (hyphen) is displayed.
Registrant Count	The number of reservation keys registered in the volume is displayed.
Reservation Type	When the volume is in persistent reservation status, one of the following persistent reservation types is displayed. When the volume is in reservation status other than persistent reservation status, or when the volume is not reserved, a "-" (hyphen) is displayed. <ul style="list-style-type: none"> • WE (Write Exclusive) • EA (Exclusive Access) • WE_RO (Write Exclusive-Registrants Only) • EA_RO (Exclusive Access-Registrants Only) • WE_AR (Write Exclusive-All Registrants) • EA_AR (Exclusive Access-All Registrants)

2. Volume Reservation

Item	Description
Reservation Status	<p>The volume reservation status is displayed.</p> <ul style="list-style-type: none"> • Yes In persistent reservation status • No In reservation status, but not in persistent reservation status • "-" (hyphen) Not in reservation status.
APTPL (*1)	<p>Whether or not persistent reservation information is kept after the storage system has been shutdown/rebooted is displayed. When the volume is in reservation status other than persistent reservation status, "No" is displayed. When the volume is not reserved, a "-" (hyphen) is displayed.</p> <p>*1 : Activate Persist Through Power Loss</p> <ul style="list-style-type: none"> • Yes The persistent reservation information is kept. • No The persistent reservation information is not kept.

[Volume Detail] Screen ([Basic] Tab)

Click the [Reservation] tab to display the detailed information.

[Reservation] Screen

When reservation keys are registered in volumes, up to 64 host information is displayed. When no reservation keys are registered in volumes, information for the host that reserves the volumes is displayed.

The volume number, volume name, and type are displayed.

Item	Description
Host WWN/iSCSI Name	The WWN or the iSCSI name of the host that can access the volume is displayed.
CA Port	<p>The location information of the CA port that connects to the host is displayed.</p> <p>For the ETERNUS DX900 S5 or the ETERNUS DX8900 S4 CE#x CM#y CA#z Port#w</p> <p>For the other models CM#y CA#z Port#w</p> <p>x: CE number y: CM number z: CA number w: Port number</p>
Reservation Key	<p>The reservation key that is used for persistent reservation of the volume is displayed.</p> <p>When no reservation keys exist, a "-" (hyphen) is displayed.</p>
Hold Reservation	<p>Whether the target reservation key is used for persistent reservation is displayed.</p> <p>When the volume is in reservation status other than persistent reservation status, "No" is displayed.</p> <ul style="list-style-type: none"> • Yes In persistent reservation status • No Not in persistent reservation status

■ Filter Setting

Function Description

Filter setting is a function used to display a list of only the volumes meeting all the specified conditions. No filtering is set by default. The following table shows conditions that can be specified.

Item	Description	Setting values
Name	Input the volume name that is to be displayed. When not using the volume name for filtering, leave this item blank.	Volume name Blank
LUN Group	Input the LUN group name or the port location information for the volume that is to be displayed. When not using the LUN group name or the port location information for filtering, leave this item blank.	LUN group name For the ETERNUS DX900 S5 or the ETERNUS DX8900 S4 CE#x CM#y CA#z Port#w For the other models CM#y CA#z Port#w x: CE number y: CM number z: CA number w: Port number Blank
Minimum Registrant Count	Input the minimum number of registrants for the volume that is to be displayed. When not using the minimum registrant count, leave this item blank.	Registrant count Blank
Reservation Type	Select the reservation type of the volume that is to be displayed.	All WE EA WE-RO EA-RO WE-AR EA-AR "-" (hyphen)
Reservation Status	Select the reservation status of the volume that is to be displayed.	All Yes No "-" (hyphen)
APTPL	Select the APTPL of the volume that is to be displayed.	All Yes No "-" (hyphen)

Release Reservation

- ["■ Overview" \(page 216\)](#)
- ["■ User Privileges" \(page 216\)](#)
- ["■ Operating Procedures" \(page 216\)](#)

■ Overview

This function releases the reservation status of volumes that are specified by the host. Reservation and release reservation of a volume is normally performed from the host. This function must be used only when a reservation of a volume cannot be released due to errors in the host.

This function provides the following features:

- Releasing the volume reservation status
- Releasing the volume persistent reservation status
- Deleting all the reservation keys that are registered in the storage system

Caution

- Be sure to pay attention when releasing reserve status as it may cause data corruption. Check the status of the target volume before using this function.
- This function does not support [Data Container Volumes](#).

■ User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	✓
StorageAdmin	✓
AccountAdmin	
SecurityAdmin	
Maintainer	✓

Refer to "[A. User Roles and Policies](#)" (page 1580) for details on the policies and roles.

■ Operating Procedures

Procedure ▶▶▶

- 1 Select the volumes to release the reservation (multiple selections can be made), and click [Release Reservation] in [Action].
→ A confirmation screen appears.
- 2 Click the [OK] button.
→ Releasing volume reservation status starts.
- 3 Click the [Done] button to return to the [Reservation] screen.



Pinned Data

- "[■ Overview](#)" (page 217)
- "[■ User Privileges](#)" (page 217)
- "[■ Display Contents](#)" (page 217)

- ["Filter Setting" \(page 219\)](#)

Overview

Volumes including [pinned data](#) are displayed.

Note

- When a system message that indicates the detection of pinned data is displayed in the [Overview] screen, or when a "Pinned data" event is notified by Host Sense Key Code Qualifier or SNMP Trap, use this function to check the detected pinned data. Use the [Setup Event Notification] function to specify whether to perform event notification when pinned data is detected. Refer to the [Setup Event Notification] function for details. Note that writing back, deleting, and saving pinned data can be performed by a maintenance engineer who has the "Maintenance Operation" policy.
- Deduplication/Compression Volumes are not displayed in the pinned data list.
- Pinned data is not created for [External Volumes](#).

User Privileges

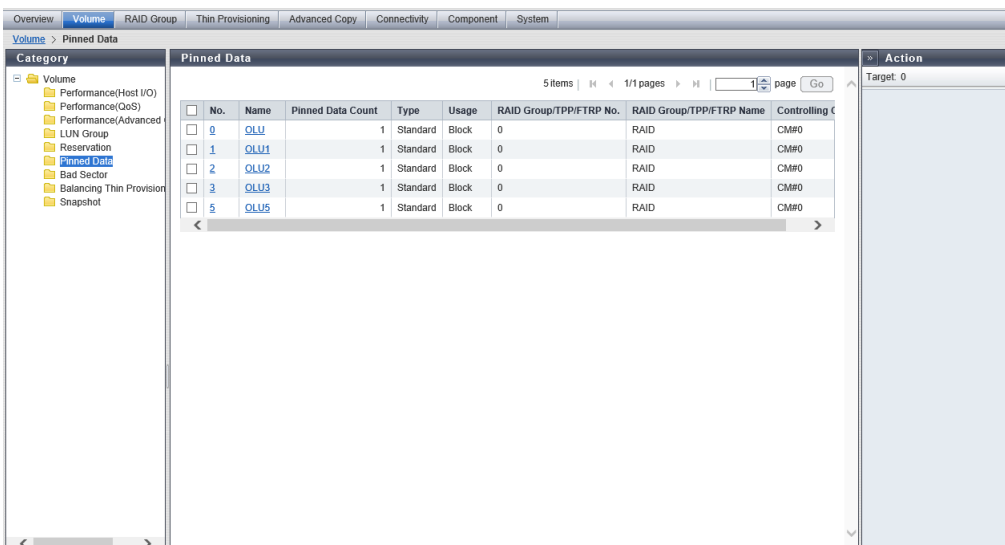
Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	✓
Admin	✓
StorageAdmin	✓
AccountAdmin	
SecurityAdmin	✓
Maintainer	✓

Refer to ["A. User Roles and Policies" \(page 1580\)](#) for details on the policies and roles.

Display Contents

The volumes containing pinned data and the number of pinned data are displayed.



Volume List

Item	Description
No.	The volume number is displayed. Click this item to display the [Volume Detail] screen ([Basic] tab).
Name	The volume name is displayed. Click this item to display the [Volume Detail] screen ([Basic] tab).
Pinned Data Count	The number of pinned data is displayed.
Type	The volume type is displayed. Standard WSV TPV FTV SDV SDPV Temporary
Usage	The usage of the volume is displayed. <ul style="list-style-type: none"> • Block The volumes that are used for the SAN. • File The volumes that are used for the NAS. • System The system volumes. Refer to "Usage Details" in the [Volume Detail] screen ([Basic] tab) for details. • Veeam The volumes that are used for Veeam Storage Integration.
RAID Group/TPP/ FTRP No.	The following number is displayed: <ul style="list-style-type: none"> • For "WSV" type volumes The RAID group number to which the representative volume belongs is displayed. • For "TPV" type volumes The TPP number to which the volume belongs is displayed. • For "FTV" type volumes The FTRP number to which the volume belongs is displayed. • If the type is not one of the types listed above, the RAID group number to which the volume belongs is displayed.
RAID Group/TPP/ FTRP Name	The following name is displayed: <ul style="list-style-type: none"> • For "WSV" type volumes The RAID group name to which the representative volume belongs is displayed. • For "TPV" type volumes The TPP name to which the volume belongs is displayed. • For "FTV" type volumes The FTRP name to which the volume belongs is displayed. • If the type is not one of the types listed above, the RAID group name to which the volume belongs is displayed.

2. Volume Pinned Data

Item	Description
Controlling CM	The Controlling CM of the RAID group to which the volume belongs is displayed. For the ETERNUS DX900 S5 or the ETERNUS DX8900 S4 CE#x CM#y For the other models CM#y x: CE number y: CM number

"[Volume Detail] Screen ([Basic] Tab)" (page 51)

Click the [Pinned Data] tab to display the detailed information.

[Pinned Data] Screen

The volume number, volume name, type, and usage are displayed.

Item	Description
LBA	The location of the pinned data in the volume is displayed using a Logical Block Address (LBA) (hexadecimal).
RC	The cause (Reason Code) of the created pinned data is displayed (hexadecimal).
SK	The Sense Key (SK) part is displayed from the sense information that is output when the pinned data is created (hexadecimal).
ASC	The Additional Sense Code (ASC) part is displayed from the sense information that is output when the pinned data is created (hexadecimal).
ASCQ	The Additional Sense Code Qualifier (ASCQ) part is displayed from the sense information that is output when the pinned data is created (hexadecimal).

■ Filter Setting

Function Description

Filter setting is a function used to display a list of only the pinned data meeting all the specified conditions.

No filtering is set by default. The following table shows conditions that can be specified.

Item	Description	Setting values
LBA	Input the LBA that is to be displayed. When not using the LBA for filtering, leave this item blank.	LBA Blank
RC	Input the RC that is to be displayed. When not using the RC for filtering, leave this item blank.	RC Blank
SK	Input the SK that is to be displayed. When not using the SK for filtering, leave this item blank.	SK Blank
ASC	Input the ASC that is to be displayed. When not using the ASC for filtering, leave this item blank.	ASC Blank
ASCQ	Input the ASCQ that is to be displayed. When not using the ASCQ for filtering, leave this item blank.	ASCQ Blank

Destage Pinned Data

- "[■ Overview](#)" (page 220)
- "[■ User Privileges](#)" (page 220)
- "[■ Operating Procedures](#)" (page 220)

■ Overview

This function is used to write back the [pinned data](#) in the cache memory to the volume.

Note

- Deduplication/Compression Volumes are not displayed in the pinned data list.

■ User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	
StorageAdmin	
AccountAdmin	
SecurityAdmin	
Maintainer	✓

Refer to "[A. User Roles and Policies](#)" (page 1580) for details on the policies and roles.

■ Operating Procedures

Procedure ▶▶▶

- 1 Select the volume to write back pinned data (multiple selections can be made), and click [Destage Pinned Data] in [Action].
→ A confirmation screen appears.

Caution

- [Destage Pinned Data] cannot be clicked if NAS expanded system volumes are selected.

- 2 Click the [OK] button.
→ Destage pinned data starts.
- 3 Click the [Done] button to return to the [Pinned Data] screen.



Delete Pinned Data

- "[■ Overview](#)" (page 221)
- "[■ User Privileges](#)" (page 221)
- "[■ Operating Procedures](#)" (page 221)

■ Overview

This function deletes [Pinned data](#) in the cache memory.

Caution

- Deleting pinned data may result in data loss. When deleting pinned data, careful attention is required such as creating backup data beforehand.

Note

- Deduplication/Compression Volumes are not displayed in the pinned data list.

■ User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	
StorageAdmin	
AccountAdmin	
SecurityAdmin	
Maintainer	✓

Refer to "[A. User Roles and Policies](#)" (page 1580) for details on the policies and roles.

■ Operating Procedures

Procedure ▶▶▶

- 1 Select the volume to delete pinned data (multiple selections can be made), and click [Delete Pinned Data] in [Action].
→ A confirmation screen appears.

Caution

- [Delete Pinned Data] cannot be clicked if NAS expanded system volumes are selected.

- 2 Click the [OK] button.
→ Deletion of the pinned data starts.
- 3 Click the [Done] button to return to the [Pinned Data] screen.

Export Pinned Data

- "[Overview](#)" (page 221)
- "[User Privileges](#)" (page 222)
- "[Operating Procedures](#)" (page 222)

■ Overview

This function saves the [pinned data](#) in all the volumes to a file in binary format.

■ User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	
StorageAdmin	
AccountAdmin	
SecurityAdmin	
Maintainer	✓

Refer to "[A. User Roles and Policies](#)" (page 1580) for details on the policies and roles.

■ Operating Procedures

Procedure ▶▶▶

- 1 Click [Export Pinned Data] in [Action].
- 2 Click the [Export] button.
→ Export pinned data starts.
After the pinned data is exported, a dialog box to download the file appears.
- 3 Click the [Download] button.
→ A dialog box to download the file appears.
- 4 Save the pinned data file.
The default file name is "PinnedData_serial number for the ETERNUS DX_YYYY-MM-DD_hh-mm-ss.dat".
(YYYY-MM-DD_hh-mm-ss: the date and time when the download screen (Step 3) is displayed.)
→ The pinned data file download starts.
- 5 Click the [Done] button to return to the [Pinned Data] screen.



Data Container Volume Diagnosis

- "[■ Overview](#)" (page 222)
- "[■ User Privileges](#)" (page 224)
- "[■ Display Contents](#)" (page 225)
- "[■ Operating Procedures](#)" (page 226)

■ Overview

If [pinned data](#) or [bad sectors](#) are created in the [Data Container Volume](#) where the Deduplication/Compression control information is stored, multiple Deduplication/Compression Volumes may be broken.

This function extracts broken [Deduplication/Compression Volumes](#) from pinned data or bad sectors of Data Container Volumes.

Caution

- This function is displayed only when the Deduplication/Compression function for the storage system is enabled. Refer to the [Set Deduplication/Compression Mode] function for details.
- This function can only be performed on one volume at a time.
- To use this function, the following operations must be performed for all Deduplication/Compression Volumes in the TPP to which the diagnosis target volume belongs.
 - Stop I/O for the relevant volumes.
 - Stop or suspend the Advanced Copy session for the relevant volumes.
- This function cannot be performed when the diagnosis target volume is in the "🟡Readying", "🔴Not Ready", "🔴Broken", or "🔴Data Lost" state.
- Pinned data and bad sectors cannot be checked at the same time. Refer to ""Flow of the Data Container Volume diagnosis" (page 224)" for details.
 - If this function is started in the [Pinned Data] screen or the [Pinned Data] tab, a check for broken data due to pinned data starts. Refer to the [Pinned Data] function for details.
 - If this function is started in the [Bad Sector] screen, a check for broken data due to bad sectors starts. Refer to the [Bad Sector] function for details.

Note

- If pinned data or bad sectors are created, recover the Deduplication/Compression Volumes using the following procedure.

Procedure ▶▶▶

- 1** Use this function to extract the broken Deduplication/Compression Volumes.
- 2** Format all the broken Deduplication/Compression Volumes that were extracted in Step 1.
- 3** If backup data exist, restore the backup data to the relevant Deduplication/Compression Volumes.

-
- After the diagnosis is complete, click the [Restart] button to return to the [Start Deduplication/Compression Data] screen. When the diagnosis is restarted, if no error occurs in the relevant volume, a message to that effect appears. Click the [Done] button to return to the screen when starting this function.

Flow of the Data Container Volume diagnosis

The procedures described below show the flow of the diagnosis when pinned data or bad sectors are created in the Data Container Volumes. A diagnosis must be performed for each factor (pinned data or bad sectors) and for each volume.

- Pinned data diagnosis

Procedure ▶▶▶

- 1 Use the [Pinned Data] screen to check whether pinned data exist in Data Container Volumes.
- 2 If pinned data exist in Data Container Volumes, perform the following procedure.
 - (1) Select a single Data Container Volume with pinned data, and then use this function to start the diagnosis.
 - (2) After the diagnosis has started, click the [Done] button to finish this function.
 - (3) Start this function again to check the diagnosis state of the volume selected in Step a.
 - (4) After the diagnosis is complete, return to the [Pinned Data] screen.

- Bad sector diagnosis

Procedure ▶▶▶

- 1 Use the [Bad Sector] screen to check whether bad sectors exist in Data Container Volumes.
- 2 If bad sectors exist in Data Container Volumes, perform the following procedure.
 - (1) Select a single Data Container Volume with bad sector, and then use this function to start the diagnosis.
 - (2) After the diagnosis has started, click the [Done] button to finish this function.
 - (3) Start this function again to check the diagnosis state of the volume selected in Step a.
 - (4) After the diagnosis is complete, return to the [Bad Sector] screen.

■ User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	
StorageAdmin	
AccountAdmin	
SecurityAdmin	
Maintainer	✓

Refer to "[A. User Roles and Policies](#)" (page 1580) for details on the policies and roles.

■ Display Contents

[Start Data Container Volume Diagnosis] Screen

Target Volume

Item	Description
No.	The volume number of the target volume is displayed.
Name	The name of the target volume is displayed. \$DATA_CNTNRx x: TPP number
Type	The type for the target volume is displayed. TPV

[Data Container Volume Diagnosis Progress] Screen or [Data Container Volume Diagnosis Complete] Screen

Target Volume

Item	Description
No.	The volume number of the target volume is displayed. If the volume is waiting for the diagnosis to start or an error is detected, a "-" (hyphen) is displayed.
Name	The name of the target volume is displayed. If the volume is waiting for the diagnosis to start or an error is detected, a "-" (hyphen) is displayed. \$DATA_CNTNRx x: TPP number
Type	The type for the target volume is displayed. If the volume is waiting for the diagnosis to start or an error is detected, a "-" (hyphen) is displayed. TPV
Process	The diagnosis status of the target volume is displayed. Click the [Reload] button to update the diagnosis status. If the volume is waiting for the diagnosis to start or an error is detected, a "-" (hyphen) is displayed. Diagnosing Complete Error End
Progress	The progress (0 to 100 %) of the diagnosis for the target volume is displayed. Click the [Reload] button to update the progress rate. If the volume is waiting for the diagnosis to start or an error is detected, a "-" (hyphen) is displayed.
Completion Time	The completion time (YYYY-MM-DD hh:mm:ss) of the diagnosis for the target volume is displayed. Click the [Reload] button to update the completion time. When the volume is waiting for the diagnosis to start, when the volume is being diagnosed, or when an error is detected, a "-" (hyphen) is displayed.

Broken Deduplication/Compression Volume List

Item	Description
No.	The volume number of the broken Deduplication/Compression Volume is displayed.
Name	The volume name of the broken Deduplication/Compression Volume is displayed.

■ Operating Procedures

When Starting a Diagnosis

Procedure ▶▶▶

- 1 Select the Data Container Volume that is to be diagnosed and click [Data Container Volume Diagnosis] in [Action].
→ The "[Start Data Container Volume Diagnosis] Screen" (page 225) appears.
- 2 Click the [Start] button.
→ A confirmation screen appears.

Caution

- An error occurs in the following conditions:
 - Multiple bad sectors have independently occurred in the target volume
 - The number of pinned data in the target volume exceeds the maximum recoverable number

- 3 Click the [OK] button.
→ The Data Container Volume diagnosis starts.
- 4 Click the [Done] button to return to the screen when starting this function in Step 1.

Note

- Select the diagnosis target volume again and click [Data Container Volume Diagnosis] in [Action] to check the diagnosis progress.

When Checking the Progress of the Diagnosis and the Results of the Diagnosis

Procedure ▶▶▶

- 1 Select the Data Container Volume that is being diagnosed and click [Data Container Volume Diagnosis] in [Action].
The displayed screen varies depending on the Data Container Volume diagnosis progress.
 - When the Data Container Volume diagnosis is being performed
→ The "[Data Container Volume Diagnosis Progress] Screen or [Data Container Volume Diagnosis Complete] Screen" (page 225) appears. Proceed to Step 2.
 - When the Data Container Volume diagnosis is completed
→ The "[Data Container Volume Diagnosis Progress] Screen or [Data Container Volume Diagnosis Complete] Screen" (page 225) appears. Proceed to Step 3.

Caution

- When selecting the Data Container Volume that is not being diagnosed and clicking [Data Container Volume Diagnosis] in [Action], the following screen appears.
 - When the Data Container Volume diagnosis is being performed, the [Diagnosing Data Container Volume] screen appears. Click the [OK] button to return to the screen when starting this function in Step 1. A diagnosis is performed one volume at a time.
 - When the Data Container Volume diagnosis has already been completed, the "[Start Data Container Volume Diagnosis] Screen" (page 225) appears. Click the [Start] button to start the Data Container Volume diagnosis for the specified volume.

2 Click the [Reload] button to display the latest progress state.
The displayed screen varies depending on the Data Container Volume diagnosis progress.

- When the Data Container Volume diagnosis is being performed
 - The "[Data Container Volume Diagnosis Progress] Screen or [Data Container Volume Diagnosis Complete] Screen" (page 225) appears. Click the [Reload] button to display the latest progress state.
- When the Data Container Volume diagnosis is completed
 - The "[Data Container Volume Diagnosis Progress] Screen or [Data Container Volume Diagnosis Complete] Screen" (page 225) appears. Proceed to Step 3.

Caution

- An error occurs in the following conditions:
 - Multiple bad sectors have independently occurred in the target volume
 - The number of pinned data in the target volume exceeds the maximum recoverable number

Note

- If the [OK] button is clicked when a diagnosis is being performed, the screen returns to the screen when starting this function in Step 1.

3 Click the [Done] button to return to the screen when starting this function in Step 1.

Note

- After the diagnosis is completed, click the [Restart] button to display the "[Start Data Container Volume Diagnosis] Screen" (page 225).



Bad Sector

- "[■ Overview](#)" (page 227)
- "[■ User Privileges](#)" (page 228)
- "[■ Display Contents](#)" (page 228)

■ Overview

This function displays the bad sector.

Note

- When data for rebuild, copyback, or redundant copy is not read normally, bad sector information is recorded.
- When a system message that indicates the detection of bad sector is displayed in the [Overview] screen, or when a "Bad data" event is notified by Host Sense Key Code Qualifier or SNMP Trap, use this function to check the detected bad sector.
Use the [Setup Event Notification] function to specify whether to perform event notification when a bad sector is detected. Refer to the [Setup Event Notification] function for details. Note that the deletion of bad sector can be performed by a maintenance engineer who has the "Maintenance Operation" policy.
- Deduplication/Compression Volumes are not displayed in the bad sector list.
- A bad sector is not created for [External Volumes](#).

User Privileges

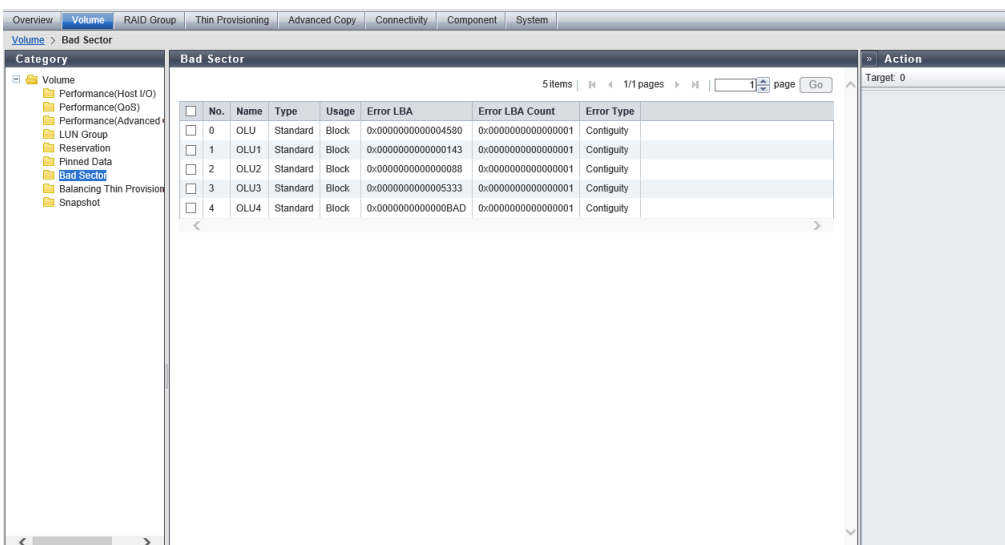
Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	✓
Admin	✓
StorageAdmin	✓
AccountAdmin	
SecurityAdmin	✓
Maintainer	✓

Refer to ["A. User Roles and Policies" \(page 1580\)](#) for details on the policies and roles.

Display Contents

In this screen, the bad sector information is displayed.



Volume List

Item	Description
No.	The volume number is displayed.
Name	The volume name is displayed. When the volume type is WSV or when the volume is concatenated by LUN Concatenation, "volume name (n/m)" is displayed. n: nth volume in the concatenation order m: number of concatenated volumes
Type	The volume type is displayed. Standard WSV TPV FTV SDV SDPV Temporary
Usage	The usage of the volume is displayed. <ul style="list-style-type: none"> • Block The volumes that are used for the SAN. • File The volumes that are used for the NAS. • System The system volumes. Refer to "Usage Details" in the [Volume Detail] screen ([Basic] tab) for details. • Veeam The volumes that are used for Veeam Storage Integration.
Error LBA	The start position of the bad sector information in the volume is displayed using a Logical Block Address (LBA) (hexadecimal). When the volume type is WSV or when the volume is concatenated by LUN Concatenation, the LBA for each volume that is concatenated (*1) is displayed. A "-" (hyphen) is displayed when the error type is "Dispersion". *1: Each volume is displayed in "volume name (n/m)" format (n: nth volume in the concatenation order, m: number of concatenated volumes). Refer to the [Volume (Basic Information)] function for details.
Error LBA Count	The number of LBAs from Error LBA of the bad sector information in the volume is displayed (hexadecimal). When the volume type is WSV or when the volume is concatenated by LUN Concatenation, the LBA Count for each volume that is concatenated (*1) is displayed. A "-" (hyphen) is displayed when the error type is "Dispersion". *1: Each volume is displayed in "volume name (n/m)" format (n: nth volume in the concatenation order, m: number of concatenated volumes). Refer to the [Volume (Basic Information)] function for details.
Error Type	The number of bad sector information in the volume is displayed. <ul style="list-style-type: none"> • When one bad sector information exists in the volume: "Contiguity" • When multiple number of bad sector information exist in the volume: "Dispersion"

Clear Bad Sector

- ["■ Overview" \(page 230\)](#)
- ["■ User Privileges" \(page 230\)](#)
- ["■ Operating Procedures" \(page 230\)](#)

■ Overview

This function deletes the location information of [bad sector](#) created in the volumes.

Caution

- Executing this function does not delete actual bad sectors.
- This function cannot be used while the storage system is under maintenance.

■ User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	
StorageAdmin	
AccountAdmin	
SecurityAdmin	
Maintainer	✓

Refer to "[A. User Roles and Policies](#)" (page 1580) for details on the policies and roles.

■ Operating Procedures

Procedure ▶▶▶

- 1 Select the bad sector that is to be deleted (multiple selections can be made) and click [Clear Bad Sector] in [Action].
→ A confirmation screen appears.

Caution

- [Clear Bad Sector] cannot be clicked if NAS expanded system volumes are selected.

- 2 Click the [OK] button.
→ Clear bad sector starts.
- 3 Click the [Done] button to return to the [Bad Sector] screen.



Data Container Volume Diagnosis

Refer to "[Data Container Volume Diagnosis](#)" (page 222) for details.

Balancing Thin Provisioning Volume

- "[Overview](#)" (page 231)
- "[User Privileges](#)" (page 231)
- "[Display Contents](#)" (page 231)
- "[Filter Setting](#)" (page 233)

Overview

This function displays the information of balancing [Thin Provisioning Volumes \(TPVs\)](#).

Caution

- When using the Thin Provisioning function, "Enable" the Thin Provisioning. Refer to the [Set Thin Provisioning] function for details.

Note

- [Deduplication/Compression Volumes](#) and [Data Container Volumes](#) are not displayed in the TPV list because they are not targets for balancing.
- To check whether the Thin Provisioning function is enabled or disabled, use the [Settings (Thin Provisioning)] function.

User Privileges

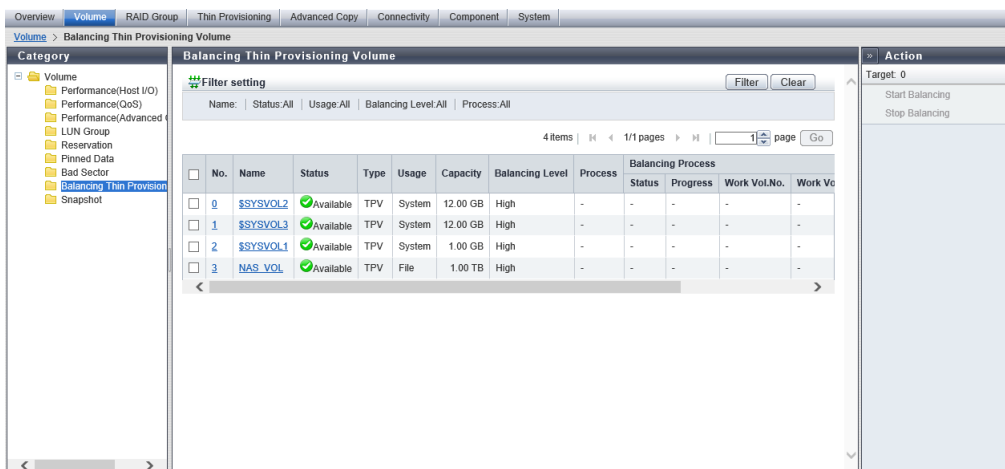
Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	✓
Admin	✓
StorageAdmin	✓
AccountAdmin	
SecurityAdmin	✓
Maintainer	✓

Refer to "[A. User Roles and Policies](#)" (page 1580)" for details on the policies and roles.

Display Contents

A list of TPV balancing status is displayed.



TPV List

Item	Description
No.	The volume number is displayed. Click this item to display the "[Volume Detail] Screen ([Balancing TPV] Tab)" (page 233).
Name	The volume name is displayed. Click this item to display the "[Volume Detail] Screen ([Balancing TPV] Tab)" (page 233).
Status	The volume status is displayed. Refer to "'Volume Status' (page 1604)" for details.
Type	The volume type is displayed. TPV (fixed)
Usage	The usage of the volume is displayed. <ul style="list-style-type: none"> Block The volumes that are used for the SAN. File The volumes that are used for the NAS. System The system volumes described below. Refer to "Usage Details" in the [Volume Detail] screen ([Basic] tab) for details. <ul style="list-style-type: none"> - System volumes for the NAS system - System volumes for the Virtual Volume function Veeam The volumes that are used for Veeam Storage Integration.
Capacity	The volume capacity is displayed. The volume capacity is displayed with "MB", "GB", or "TB". The unit of measurement for the capacity is determined according to the actual volume size. Even if "MB" is selected to create a volume, the capacity is displayed with GB when the volume capacity is larger than 1023.99 MB. When the volume capacity is larger than 1023.99 GB, the capacity is displayed with TB.
Balancing Level	The balancing level of the volume is displayed. <ul style="list-style-type: none"> When the volume is balanced, "High" is displayed When the volume is almost balanced, "Middle" is displayed When the volume is not balancing well, "Low" is displayed When the storage system is abnormal, a "-" (hyphen) is displayed
Process	A process that is being performed for the volume is displayed. If multiple processes are currently being performed, the processes are separated with a ":" (colon) and displayed in the "xx:yy" format. "Balancing", "Formatting", or "Migrating" is displayed as "xx". "Optimizing Capacity" or "Reserved Optimizing Capacity" is displayed as "yy". If no process is being performed, a "-" (hyphen) is displayed. <ul style="list-style-type: none"> Balancing TPV balancing is being performed. Formatting Formatting is being performed. Migrating RAID migration is being performed. Optimizing Capacity Capacity optimization is being performed in a TPV or an FTV. Reserved Optimizing Capacity Capacity optimization is being reserved (*1) for a TPV or an FTV. <p>*1: If "Start Optimizing TPV/FTV Capacity after migration" is enabled for the RAID migration function, the migration source volume is reserved for capacity optimization.</p>

2. Volume

Balancing Thin Provisioning Volume

Item		Description
Balancing Process	Status	The status of the TPV balancing is displayed. When the process is not "Balancing", a "-" (hyphen) is displayed. <ul style="list-style-type: none"> • When the process is operating normally, "Active" is displayed • When the process is stopped due to an error, "Error" is displayed
	Progress	The progress (0 to 100 %) of TPV balancing is displayed. When the process is not "Balancing", a "-" (hyphen) is displayed.
	Work Vol.No.	The volume number undergoing TPV balancing is displayed. When the process is not "Balancing", a "-" (hyphen) is displayed.
	Work Vol.Name	The volume name undergoing TPV balancing is displayed. When the process is not "Balancing", a "-" (hyphen) is displayed.
	Error code	The error code (hexadecimal) of TPV balancing is displayed when an error occurs. When the process is not "Balancing", a "-" (hyphen) is displayed.
	Elapsed Time	The elapsed time of TPV balancing is displayed. The displayed time is the elapsed time at the point when this screen is displayed. When the process is not "Balancing", a "-" (hyphen) is displayed. X h Y min. Z sec. - X: 1 - Y: 0 to 59 Z: 0 to 59

[Volume Detail] Screen ([Balancing TPV] Tab)

[Balancing TPV] Screen

The volume number, volume name, type, and usage are displayed.

Item	Description
No.	The RAID group number that configures the TPP to which the target TPV belongs is displayed.
RAID Group	The name of the RAID group that configures the TPP to which the target TPV belongs is displayed.
Used Capacity	The capacity of each RAID group that is currently allocated to the target TPV is displayed. Note that it is not the capacity after re-allocating the physical capacity in the relevant TPV to the RAID groups in the TPP.

■ Filter Setting

Function Description

Filter setting is a function used to display a list of only the volumes meeting all the specified conditions. No filtering is set by default. The following table shows conditions that can be specified.

Item	Description	Setting values
Name	Input the volume name that is to be displayed. When not using the volume name for filtering, leave this item blank.	Volume name Blank
Status	Select the volume status that is to be displayed.	All Refer to ""Volume Status" (page 1604)".

2. Volume

Balancing Thin Provisioning Volume

Item	Description	Setting values
Usage	Select the usage of the volume that is to be displayed. "Migration" is displayed as an option only if the Non-disruptive Storage Migration License has been registered. "Veeam" is displayed as an option only if the Veeam Storage Integration License has been registered.	All Block File System Migration Veeam
Balancing Level	Select the balancing level of the volume that is to be displayed.	All High Middle Low "- " (hyphen)
Process	Select the process of the volume that is to be displayed. "Automatic Stop" and "Manual Stop" are displayed as options only if the Non-disruptive Storage Migration License has been registered.	All Encrypting Formatting Migrating Balancing Optimizing Capacity Reserved Optimizing Capacity Automatic Stop Manual Stop "- " (hyphen)

Start Balancing Thin Provisioning Volume

- ["■ Overview" \(page 234\)](#)
- ["■ User Privileges" \(page 235\)](#)
- ["■ Operating Procedures" \(page 236\)](#)

■ Overview

This function relocates the physical allocating area of the [Thin Provisioning Volume \(TPV\)](#) to equalize the used capacity of TPVs among the RAID groups that configure the [Thin Provisioning Pool \(TPP\)](#). When multiple TPVs in the same TPP are accessed, the [Thin Provisioning](#) function allocates physical area by using the RAID groups of the TPP one by one in the access order. Therefore the physical area of TPVs may be unequally allocated among the RAID groups. This phenomenon also occurs when expanding the capacity of a TPP. In this case, the physical area is allocated unevenly among the newly added and existing RAID groups. This function is to solve the unequal allocation among RAID groups, and balance the physical allocating area in each RAID group. I/O load is dispersed among the RAID groups in the TPP and access performance may be improved.

Requirements for a TPV to be balanced

- The volume type is "TPV"
- The volume status is "🟢Available"
- [RAID migration](#) is not being performed (the target volume is not used as a migration source or a migration destination)
- An [Advanced Copy](#) is not being performed (the target volume is not being used as a copy source or a copy destination)
- A Remote Advanced Copy is not being performed (the target volume is not being used as a copy source or a copy destination)

- ODX is not being performed
- TPV balancing is not being performed
- Capacity optimization for TPV is not being performed
- Not used as Deduplication/Compression Volumes
- Not used as Data Container Volumes

Requirements for a TPP in which the target TPV is registered

- The volume status is "Available"
- The free space in the TPP is the same or larger than the capacity of the TPV that is to be balanced
- When the allocation mode for the TPV is "Thick", the free physical capacity for allocating the whole area exists

Caution

- The TPV balancing cannot be performed in the following conditions:
 - The maximum number of volumes are already registered in the storage system
 - When the total number of TPV balancing sessions, RAID migration sessions, and FTV balancing sessions (*1) that are running in the storage system at the same time is 32
 - When the total capacity for the TPV balancing sessions, the RAID migration sessions, and the FTV balancing sessions (*1) that are running in the storage system is 128 TB
 - The TPP capacity that can be registered in the storage system is insufficient
 - The sum of the total logical capacity for all the volumes in the pool and the capacity of the work volume exceeds the maximum pool capacity (*2)
- *1 : When an FTRP balancing session is started, FTV balancing starts in the FTSPs. Refer to the [Start Balancing Flexible Tier Pool] function for details.
- *2 : When a TPV balancing is performed, an area for a work volume (or the migration destination TPV with the same capacity as the migration source) is temporarily acquired in the TPP to which the target TPV belongs. Therefore, if the sum of the work volume capacity and the total logical capacity of the volumes (TPVs and FTVs) in all the existing pools (TPPs and FTRPs) exceeds the maximum pool capacity, a work volume cannot be created, and this function becomes unavailable.
- This function balances the physical allocating area of the TPV among RAID groups of the TPP to which the TPV belongs. It is not able to balance TPV by RAID migration of the TPV to other TPPs.

Note

- TPV balancing can be performed during the work I/O.
- The progress of a balancing TPV can be checked in the [Balancing TPV] screen.
- The allocation method for the TPV can be checked in the [Volume] screen. Refer to the [Volume (Basic Information)] function for details.

■ User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	✓

2. Volume

Balancing Thin Provisioning Volume

Default role	Availability of executions
StorageAdmin	✓
AccountAdmin	
SecurityAdmin	
Maintainer	✓

Refer to "[A. User Roles and Policies](#)" (page 1580) for details on the policies and roles.

■ Operating Procedures

Procedure ▶▶▶

- 1 Select the TPV to be balanced and click [Start Balancing] in [Action].
→ A confirmation screen appears.

Caution

- [Start Balancing] cannot be clicked if NAS expanded system volumes are selected.

- 2 Click the [OK] button.
→ TPV balancing starts.
- 3 Click the [Done] button to return to the [Balancing Thin Provisioning Volume] screen.

Stop Balancing Thin Provisioning Volume

- "[■ Overview](#)" (page 236)
- "[■ User Privileges](#)" (page 236)
- "[■ Operating Procedures](#)" (page 237)

■ Overview

This function stops [Thin Provisioning Volume \(TPV\)](#) balancing.

Caution

- This function cannot be used when balancing is not being performed for a TPV.
- This function cannot be used when the specified TPV balancing is already complete.

Note

- When TPV balancing is stopped, data in volumes that are not balanced yet can be accessed normally.

■ User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	✓

2. Volume Snapshot

Default role	Availability of executions
StorageAdmin	✓
AccountAdmin	
SecurityAdmin	
Maintainer	✓

Refer to "[A. User Roles and Policies](#)" (page 1580) for details on the policies and roles.

■ Operating Procedures

Procedure ▶▶▶

- 1 Select the volume for which balancing is to be stopped and click [Stop Balancing] in [Action].
→ A confirmation screen appears.
- 2 Click the [OK] button.
→ TPV balancing stops.
- 3 Click the [Done] button to return to the [Balancing Thin Provisioning Volume] screen.



Snapshot

- "[■ Overview](#)" (page 237)
- "[■ User Privileges](#)" (page 237)
- "[■ Display Contents](#)" (page 238)
- "[■ Filter Setting](#)" (page 239)

■ Overview

This function displays the [snapshot](#) configuration information of the NAS user volume.
This function is displayed in a Unified Storage environment.

Caution

- This function is not supported for the ETERNUS DX60 S5, the ETERNUS DX900 S5, the ETERNUS DX8100 S4/DX8900 S4, and the ETERNUS AF150 S3/AF250 S3/AF650 S3.

■ User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	✓
Admin	✓
StorageAdmin	✓
AccountAdmin	
SecurityAdmin	✓

2. Volume Snapshot

Default role	Availability of executions
Maintainer	✓

Refer to ["A. User Roles and Policies" \(page 1580\)](#) for details on the policies and roles.

■ Display Contents

The snapshot configuration information of the NAS user volume is displayed.

Snapshot Information List

Item	Description
No.	The NAS user volume number is displayed. Click this item to display the "[Volume Detail] Screen ([Basic] Tab)" (page 51) .
Name	The NAS user volume name is displayed. Click this item to display the "[Volume Detail] Screen ([Basic] Tab)" (page 51) .
Status	The NAS user volume status is displayed. When the volume status is normal, "✓Available" is displayed. Refer to "Volume Status" (page 1604) for details.
Capacity	The NAS user volume capacity [TB/GB/MB] is displayed.

2. Volume Snapshot

Item		Description
Snapshot	Mode	<p>The collection mode for the snapshot is displayed.</p> <p>If the snapshot is not set, a "-" (hyphen) is displayed.</p> <ul style="list-style-type: none"> • Automatic The snapshot is set from Web GUI, CLI, or ETERNUS SF Storage Cruiser. • Manual The snapshot is set from VMware vSphere Web Client. Refer to "ETERNUS vCenter Plug-in User's Guide" for details.
	Schedule	<p>Status of the scheduled operation for snapshot is displayed.</p> <p>If the snapshot is not set or if the collection mode (or the "Mode" setting) for snapshot is set to "Manual", a "-" (hyphen) is displayed.</p> <p>Active Inactive</p>
	Session Status	<p>The session status for the snapshot is displayed.</p> <p>If the snapshot is not set, a "-" (hyphen) is displayed.</p> <ul style="list-style-type: none"> • Normal Snapshot performs normally. • Error Some snapshots cannot be referenced due to an error. If the session status of even one generation is error on the "Snapshot" tab of the [Volume Detail] screen, "Error" is displayed for this item.
	Schedule Day	<p>The snapshot acquisition schedule (set day) is displayed.</p> <p>If the snapshot schedule is specified for all the days of the week, "Every Day" is displayed.</p> <p>If the snapshot is not set or if the collection mode (or the "Mode" setting) for snapshot is set to "Manual", a "-" (hyphen) is displayed.</p>
	Schedule Time	<p>The snapshot acquisition schedule (set time) is displayed.</p> <p>If the snapshot schedule is specified for all hours, "Every Hour" is displayed.</p> <p>If the snapshot is not set or if the collection mode (or the "Mode" setting) for snapshot is set to "Manual", a "-" (hyphen) is displayed.</p>
	Number of Generations	<p>The number of generations for the snapshot is displayed.</p> <p>If the snapshot is not set, a "-" (hyphen) is displayed.</p> <p>ETERNUS DX100 S5: 1 - 64</p> <p>ETERNUS DX200 S5: 1 - 128</p> <p>ETERNUS DX500 S5: 1 - 128</p> <p>ETERNUS DX600 S5: 1 - 128</p>
	RAID Group No.	<p>The RAID group number that the snapshot destination SDV belongs to is displayed.</p> <p>If the snapshot is not set, a "-" (hyphen) is displayed.</p>
	RAID Group Name	<p>The RAID group name that the snapshot destination SDV belongs to is displayed.</p> <p>If the snapshot is not set, a "-" (hyphen) is displayed.</p>

■ Filter Setting

Filter setting is a function used to display a list of only the volumes meeting all the specified conditions. No filtering is set by default. The following table shows conditions that can be specified.

Item	Description	Setting values
Name	<p>Input the volume name that is to be displayed.</p> <p>When not using the volume name for filtering, leave this item blank.</p>	<p>Volume name</p> <p>Blank</p>

2. Volume Snapshot

Item	Description	Setting values
Status	Select the volume status that is to be displayed.	All Refer to " Volume Status " (page 1604)".
Mode	Select the snapshot collection mode of the volume that is to be displayed. To display volumes without the snapshot setting, select "-" (hyphen).	All Automatic Manual "-" (hyphen)
Schedule	Select the scheduled snapshot operation status of the volume that is to be displayed. To display volumes without the snapshot setting, select "-" (hyphen).	All Active Inactive "-" (hyphen)
Session Status	Select the snapshot session status of the volume that is to be displayed. To display volumes without the snapshot setting, select "-" (hyphen).	All Normal Error "-" (hyphen)

Set Snapshot

- "[Overview](#)" (page 240)
- "[User Privileges](#)" (page 243)
- "[Settings](#)" (page 243)
- "[Operating Procedures](#)" (page 247)

■ Overview

This function creates a [snapshot](#) destination [SDV](#) for a NAS user volume and sets an acquisition schedule. This function is displayed in a Unified Storage environment.

Snapshot Acquisition Methods

There are two methods to acquire a snapshot depending on the usage.

- Snapshots for file servers
The snapshot is set from Web GUI, CLI, or ETERNUS SF Storage Cruiser. Use this function to set the snapshot from Web GUI. In this case, "Automatic" is displayed in the "Mode" field of the [Snapshot] screen.
- Snapshots for virtual machines
The snapshot is set from VMware vSphere Web Client. Refer to "ETERNUS vCenter Plug-in User's Guide" for details. In this case, "Manual" is displayed in the "Mode" field of the [Snapshot] screen.

Initial Snapshot Setting (*1)

- SDVs are automatically created in proportion to the specified number of generations.
- The logical capacity of SDVs is the same as the NAS user volumes. (*2)
- The base name for SDVs can be specified.
- The RAID group to store SDVs can be selected. (*3)
- If the collection mode is "Automatic", the acquisition schedule (day of the week and time) can be set.
- If the collection mode is "Automatic" and the snapshot setting is successfully completed, a snapshot is automatically acquired.

2. Volume Snapshot

*1 : "Initial snapshot setting" is when the snapshot is first configured from a non-configured state, or the first time a configuration is performed after the [Delete Snapshot] function has been executed.

*2 : SDVs in proportion to the specified number of generations all have the same capacity.

*3 : SDVs in proportion to the specified number of generations are stored in the selected RAID group.

Snapshot Setting Modification

- The number of generations can be changed.
- When increasing the number of generations, unused SDVs are automatically created.
- If the collection mode is "Automatic", the number of generations can be smaller than the number of snapshot sessions.
In this case, SDVs are deleted from the unused SDVs first, and then older generation SDVs.
- If the collection mode is "Automatic", the acquisition schedule (day of the week and time) can be changed.
- When the snapshot is "Active", the snapshot start state is continued.

Requirements for RAID Groups that Store the snapshot Destination SDVs

- The RAID group status is not "❌Broken", "❌No Drive Path", or "❌SED Locked"
- The maximum number of volumes or the maximum volume capacity that can be registered in a RAID group has not been reached
(SDVs are created in proportion to the specified number of generations in the same RAID group in each NAS user volume.)
- RAID groups where volumes are already created or are unused
(Snapshot destination SDVs for multiple NAS user volumes can be created in the same RAID group.)
- The RAID group must not belong to [TPPs](#)
- The RAID group must not belong to [FTRPs](#)
- RAID groups that are not registered as [REC Disk Buffers](#)
- RAID groups that are not registered as Extreme Cache Pools

Number of Snapshot Generations

The following table shows the maximum number of NAS user volumes and the maximum number of generations for each model.

Model	Maximum number of NAS user volumes	Maximum number of generations (per NAS user volume)	Maximum number of generations (*1) (per storage system)
ETERNUS DX100 S5	2	64	64
ETERNUS DX200 S5	4	128	128
ETERNUS DX500 S5	4	128	128
ETERNUS DX600 S5	8	128	256

*1 : The total number of generations in the storage system (or the total number of generations for the "Automatic" and "Manual" modes). For example, when the ETERNUS DX500 S5 is used and 64 generations of snapshots are created for two NAS user volumes, snapshots cannot be configured for the third NAS user volume.

Caution

- This function cannot be used for a NAS user volume if the status is "❌Not Ready", "❌Broken", or "❌Data Lost".
- If a snapshot acquisition is reserved while redistributing the meta cache, the start time of the snapshot acquisition may be delayed.
- This function uses the same copy tables, SDP, and SnapOPC+ sessions as the Advanced Copy function. If the SDP capacity becomes insufficient while the snapshot is being used, the snapshot acquisition may fail. To monitor the SDP capacity in advance, enabling the "SDP Usage Rate Over (Lv1, Lv2, Lv3)" event notifications is recommended. Refer to the [Setup Event Notification] function for details.
- If the NAS user volume is updated and insufficient capacity cannot be supplemented with SDPVs, the SnapOPC+ session that is used with snapshot is in an Error Suspend state.
- A copy table size according to the number of snapshot generations is required. For a (rough estimate of) NAS user volume capacity where the snapshot setting is available, refer to "Configuration/Operation Guide (NAS)".

Note

- Because this function uses SnapOPC+ generation management, the copy table size must be set in advance.
The copy table size can be calculated using the formula ("The Table Size for EC/REC and for OPC/QuickOPC/SnapOPC/SnapOPC+ without OPC Restoration (S1)") described in "How to Calculate the Copy Table Size". The number of generations is equivalent to the number of SnapOPC+ sessions. Refer to the [Modify Copy Table Size] function for details.
- To set snapshots, SDPVs must be created in advance.
Create encrypted SDPVs if the snapshot is acquired from the encrypted NAS user volumes.
Create unencrypted SDPVs if the snapshot is acquired from the unencrypted NAS user volumes.
SDPVs with different encryption methods (encryption by CM or encryption by SED) from the NAS user volumes can also be used.
- If the NAS user volumes created in the encrypted TPP are selected and this function is executed, SDVs encrypted by the CM are created as snapshot destinations.
- To change the snapshot destination SDV name or the storage destination RAID group, execute the [Delete Snapshot] function and then use the [Set Snapshot] function again. If the [Delete Snapshot] function is executed, snapshots (SnapOPC+ sessions for all the generations), acquisition schedules for snapshots, and snapshot destination SDVs for all the generations are deleted. Refer to the [Delete Snapshot] function for details.
- For snapshot destination SDVs, "File" is displayed for the usage of the volume list and "NAS Snapshot" is displayed for the usage details. Refer to the [Volume (Basic Information)] function for details.
- Snapshot settings can be checked. Refer to the [Snapshot] function for details.
- The snapshot status (SnapOPC+ session status) can be checked. Refer to the [Advanced Copy (All Sessions)] function for details.
- The snapshot can be stopped. Refer to the [Stop Snapshot] function for details.
- After stopping the process, the snapshot process can be restarted. Refer to the [Start Snapshot] function for details.
- The snapshot settings can be deleted. Refer to the [Delete Snapshot] function for details.

■ User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	✓
StorageAdmin	✓
AccountAdmin	
SecurityAdmin	
Maintainer	✓

Refer to ["A. User Roles and Policies" \(page 1580\)](#) for details on the policies and roles.

■ Settings

In this screen, set the snapshot destination SDV for the NAS user volume and the acquisition schedule.

Snapshot Setting

Item	Description	Setting values
Name	<p>Input a snapshot destination SDV name.</p> <p>If the "Use the volume name to setup snapshot" checkbox is cleared, a "Name" can be specified.</p> <p>If the "Use the volume name to setup snapshot" checkbox is selected, the selected NAS user volume name for the snapshot destination SDV is used. In this case, a "Name" cannot be specified.</p> <p>The following names are automatically set for SDVs in proportion to the specified number of generations.</p> <hr/> <p>"Name" + "\$snap_N" (N: Number of generations between 1 - 128)</p> <hr/> <p>If the volume name that is appended with "\$snap_N" exceeds 32 characters, the excess number of characters is deleted from the volume name. Refer to "Naming Conventions for Creating Volumes" (page 95) for details. The snapshot name can be set only when the snapshot setting is performed for the first time.</p>	<p>"Use the volume name to setup snapshot" checkbox Selected Cleared Name Up to 16 alphanumeric characters, symbols (except ",", "(", ")", and " "), and spaces Blank</p>
Number of Generations	<p>Specify the number of snapshot generations.</p> <p>SDVs are automatically created in proportion to the specified number of generations.</p>	<p>ETERNUS DX100 S5: 1 - 64</p> <p>ETERNUS DX200 S5: 1 - 128</p> <p>ETERNUS DX500 S5: 1 - 128</p> <p>ETERNUS DX600 S5: 1 - 128</p> <p>All models: 7 (Default)</p>

2. Volume Snapshot

Item	Description	Setting values
Mode	<p>Select the collection mode for the snapshot.</p> <p>The collection mode can be set only when the snapshot setting is performed for the first time.</p> <ul style="list-style-type: none">• Automatic Snapshots are collected automatically according to the acquisition schedule that is set from Web GUI, CLI, or ETERNUS SF Storage Cruiser.• Manual This setting is not used for normal operation. Snapshots are collected from VMware vSphere Web Client in environments where ETERNUS vCenter Plug-in is used. All snapshot operations are performed from VMware vSphere Web Client. <p>Caution</p> <ul style="list-style-type: none">• Note that "Automatic" and "Manual" cannot be set at the same time for a single NAS user volume.• To change the collection mode, delete the snapshots for the relevant NAS user volume and then reconfigure to the desired mode.	Automatic Manual

2. Volume Snapshot

Item		Description	Setting values												
Schedule	Day of the Week	Select the checkboxes of the days to acquire snapshots. This item is only available when "Automatic" is selected for "Mode".	Monday Tuesday Wednesday Thursday Friday Saturday Sunday All selected												
	Time	Specify the acquisition time for snapshots from "Time Interval" or "Advanced Setting". This item is only available when "Automatic" is selected for "Mode".	Time Interval Advanced Setting For "Time Interval" Every Hour 2 3 4 6 8 12 24 (Default) For "Advanced Setting" 0:00 1:00 2:00 3:00 4:00 5:00 6:00 7:00 8:00 9:00 10:00 11:00 12:00 13:00 14:00 15:00 16:00 17:00 18:00 19:00 20:00 21:00 22:00 23:00												
		<table border="1"> <thead> <tr> <th>Option</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td rowspan="9">Time Interval</td> <td>Every Hour Acquire snapshots every hour from 0:00. 0:00, 1:00, 2:00, 3:00, 4:00, 5:00, 6:00, 7:00, 8:00, 9:00, 10:00, 11:00, 12:00, 13:00, 14:00, 15:00, 16:00, 17:00, 18:00, 19:00, 20:00, 21:00, 22:00, 23:00</td> </tr> <tr> <td>2 Acquire snapshots every two hours from 0:00. 0:00, 2:00, 4:00, 6:00, 8:00, 10:00, 12:00, 14:00, 16:00, 18:00, 20:00, 22:00</td> </tr> <tr> <td>3 Acquire snapshots every three hours from 0:00. 0:00, 3:00, 6:00, 9:00, 12:00, 15:00, 18:00, 21:00</td> </tr> <tr> <td>4 Acquire snapshots every four hours from 0:00. 0:00, 4:00, 8:00, 12:00, 16:00, 20:00</td> </tr> <tr> <td>6 Acquire snapshots every six hours from 0:00. 0:00, 6:00, 12:00, 18:00</td> </tr> <tr> <td>8 Acquire snapshots every eight hours from 0:00. 0:00, 8:00, 16:00</td> </tr> <tr> <td>12 Acquire snapshots every 12 hours from 0:00. 0:00, 12:00</td> </tr> <tr> <td>24 Acquire snapshots every 24 hours from 0:00. 0:00</td> </tr> <tr> <td>Advanced Setting Click the [Browse...] button to display the "[Schedule Time Settings] Screen" (page 245). Select the time to acquire snapshots between 0:00 - 23:00 (multiple selections can be made).</td> </tr> </tbody> </table>	Option	Description	Time Interval	Every Hour Acquire snapshots every hour from 0:00. 0:00, 1:00, 2:00, 3:00, 4:00, 5:00, 6:00, 7:00, 8:00, 9:00, 10:00, 11:00, 12:00, 13:00, 14:00, 15:00, 16:00, 17:00, 18:00, 19:00, 20:00, 21:00, 22:00, 23:00	2 Acquire snapshots every two hours from 0:00. 0:00, 2:00, 4:00, 6:00, 8:00, 10:00, 12:00, 14:00, 16:00, 18:00, 20:00, 22:00	3 Acquire snapshots every three hours from 0:00. 0:00, 3:00, 6:00, 9:00, 12:00, 15:00, 18:00, 21:00	4 Acquire snapshots every four hours from 0:00. 0:00, 4:00, 8:00, 12:00, 16:00, 20:00	6 Acquire snapshots every six hours from 0:00. 0:00, 6:00, 12:00, 18:00	8 Acquire snapshots every eight hours from 0:00. 0:00, 8:00, 16:00	12 Acquire snapshots every 12 hours from 0:00. 0:00, 12:00	24 Acquire snapshots every 24 hours from 0:00. 0:00	Advanced Setting Click the [Browse...] button to display the "[Schedule Time Settings] Screen" (page 245). Select the time to acquire snapshots between 0:00 - 23:00 (multiple selections can be made).	
Option	Description														
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	Advanced Setting Click the [Browse...] button to display the "[Schedule Time Settings] Screen" (page 245). Select the time to acquire snapshots between 0:00 - 23:00 (multiple selections can be made).														
		<p>Note</p> <ul style="list-style-type: none"> Setting a different acquisition time for each day is not possible. 													

[Schedule Time Settings] Screen

Specify the time to acquire a snapshot.

Schedule Time Settings

Item	Description	Setting values
Time	Select the checkbox for the time when acquiring a snapshot.	0:00 1:00 2:00 3:00 4:00 5:00 6:00 7:00 8:00 9:00 10:00 11:00 12:00 13:00 14:00 15:00 16:00 17:00 18:00 19:00 20:00 21:00 22:00 23:00 All cleared

Select RAID Group

In this screen, select RAID groups to create the snapshot destination SDVs. SDVs for all the generations are created in the selected RAID group.

The RAID group can be selected only in the initial snapshot setting.

Item	Description
Radio buttons to select a RAID group	Select the radio button for a RAID group to create the snapshot destination SDVs.
No.	The RAID group number is displayed.
Name	The RAID group name is displayed.
Status	The RAID group status is displayed. Refer to ""RAID Group Status" (page 1605)" for details.
Drive Type	The drive type of the RAID group is displayed. Online Nearline SSD Online SED Nearline SED SSD SED

Item	Description
RAID Level	The level of RAID group is displayed. High Performance (RAID1+0) High Capacity (RAID5) High Reliability (RAID6) High Reliability (RAID6-FR) Reliability (RAID5+0) Mirroring (RAID1) Striping (RAID0)
Total Capacity	The total capacity [TB/GB] of the RAID groups is displayed.
Total Free Space	The total free space [TB/GB] of the RAID groups is displayed.
Largest Free Space	The maximum free space [TB/GB] in the RAID group is displayed.

■ Operating Procedures

Initial Snapshot Setting

Procedure ▶▶▶

- 1 Select the NAS user volume to setup snapshot and click [Set Snapshot] in [Action].
- 2 Input the snapshot information, and click the [Set] button.
→ A confirmation screen appears.

Caution

- An error screen appears in the following conditions:
 - The "Name" does not satisfy the input conditions
 - The total for the "Number of Generations" exceeds the maximum number for each model
 - Encrypted SDPVs are not created when the NAS user volumes are encrypted (or when the total capacity of the encrypted area in the SDP is "0") (*1)
 - Unencrypted SDPVs are not created when the NAS user volumes are not encrypted (or when the total capacity of the unencrypted area in the SDP is "0") (*1)

*1: Refer to the [Snap Data Pool] function for details about the total capacity of encrypted and unencrypted areas in the SDP.

- 3 Click the [OK] button.
→ The snapshot setting starts.
- 4 Click the [Done] button to return to the [Snapshot] screen.



Snapshot Setting Modification

Procedure ▶▶▶

- 1 Select the NAS user volume to setup snapshot and click [Set Snapshot] in [Action].
- 2 Input the snapshot information, and click the [Set] button.
→ A confirmation screen appears.

Caution

- If the number of generations is reduced when changing the settings, a warning message appears.
- An error screen appears in the following conditions:
 - The total for the "Number of Generations" exceeds the maximum number for each model
 - SDVs for additional generations cannot be created (the maximum number of volumes has already been created)
 - SDVs for additional generations cannot be created (insufficient capacity)
 - The number of generations is smaller than the number of snapshot sessions (when "Manual" is selected for "Mode")

- 3 Click the [OK] button.
→ The snapshot setting starts.
- 4 Click the [Done] button to return to the [Snapshot] screen.



Delete Snapshot

- ["■ Overview" \(page 248\)](#)
- ["■ User Privileges" \(page 248\)](#)
- ["■ Operating Procedures" \(page 249\)](#)

■ Overview

This function deletes the [snapshot](#) configuration information. This function is displayed in a Unified Storage environment. The following snapshot configuration information is deleted:

- Snapshot (SnapOPC+ sessions for all the generations)
- Snapshot acquisition schedule (number of generations, day of the week, and time)
- Snapshot destination SDVs for all the generations

Requirements for Deleting Snapshot Configuration Information

- No copy sessions other than snapshots are set in the snapshot destination SDVs

Note

- This function is available only when the snapshot status is "Active" or "Inactive" for the selected NAS user volume. Refer to the [Snapshot] function for details about snapshot status.
- When acquiring the snapshot again after executing this function, register the snapshot configuration information. Refer to the [Set Snapshot] function for details.

■ User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	✓

2. Volume Snapshot

Default role	Availability of executions
StorageAdmin	✓
AccountAdmin	
SecurityAdmin	
Maintainer	✓

Refer to "[A. User Roles and Policies](#)" (page 1580)" for details on the policies and roles.

■ Operating Procedures

Procedure ▶▶▶

- 1 Select which NAS user volumes to delete snapshot for and click [Delete Snapshot] in [Action].
→ A confirmation screen appears.
- 2 Click the [OK] button.
→ The snapshot deletion starts.
- 3 Click the [Done] button to return to the [Snapshot] screen.



Start Snapshot

- "[■ Overview](#)" (page 249)
- "[■ User Privileges](#)" (page 249)
- "[■ Operating Procedures](#)" (page 250)

■ Overview

This function restarts the [snapshot](#) acquisition.

This function is displayed in a Unified Storage environment.

Note

- To acquire the snapshot again after deleting the snapshot settings, registration of the snapshot configuration information is required. Refer to the [Set Snapshot] function for details.

■ User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	✓
StorageAdmin	✓
AccountAdmin	
SecurityAdmin	
Maintainer	✓

Refer to "[A. User Roles and Policies](#)" (page 1580)" for details on the policies and roles.

■ Operating Procedures

Procedure ▶▶▶

- 1 Select which NAS user volumes to start snapshot for (multiple selections can be made) and click [Start Snapshot] in [Action].
→ A confirmation screen appears.

Caution

- [Start Snapshot] cannot be clicked if one of the following NAS user volumes is selected.
 - Snapshot is not set
 - Snapshot has already started
 - The collection mode for snapshot is set to "Manual" (or the "Mode" setting for the selected snapshot is "Manual")

- 2 Click the [OK] button.
→ The snapshot starts.
- 3 Click the [Done] button to return to the [Snapshot] screen.



Stop Snapshot

- "[■ Overview](#)" (page 250)
- "[■ User Privileges](#)" (page 250)
- "[■ Operating Procedures](#)" (page 251)

■ Overview

This function suspends the [snapshot](#) acquisition.

The snapshot that is being stopped cannot be acquired, but snapshots that have already been acquired before stopping the schedule are saved.

This function is displayed in a Unified Storage environment.

Note

- This function stops snapshots (SnapOPC+ sessions for all generations).
- After stopping the process, the snapshot process can be restarted. Refer to the [Start Snapshot] function for details.

■ User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	✓
StorageAdmin	✓
AccountAdmin	
SecurityAdmin	

2. Volume Snapshot

Default role	Availability of executions
Maintainer	✓

Refer to ["A. User Roles and Policies" \(page 1580\)](#) for details on the policies and roles.

■ Operating Procedures

Procedure ▶▶▶

- 1 Select which NAS user volumes to stop snapshot for (multiple selections can be made) and click [Stop Snapshot] in [Action].
→ A confirmation screen appears.

Caution

- [Stop Snapshot] cannot be clicked if one of the following NAS user volumes is selected.
 - Snapshot is not set
 - Snapshot is being stopped
 - The collection mode for snapshot is set to "Manual" (or the "Mode" setting for the selected snapshot is "Manual")

- 2 Click the [OK] button.
→ The snapshot stops.
- 3 Click the [Done] button to return to the [Snapshot] screen.



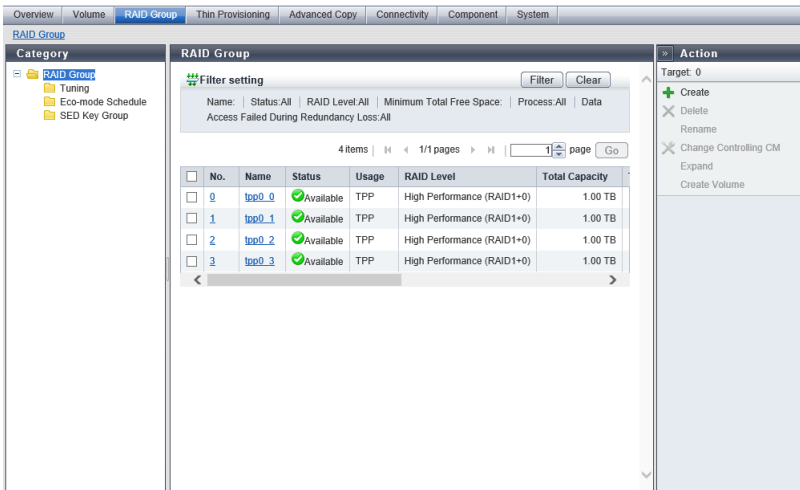
3. RAID Group

- [" RAID Group Overview" \(page 252\)](#)
- [" RAID Group Display Function List" \(page 252\)](#)
- [" RAID Group Action List" \(page 252\)](#)

Overview

A RAID group is a group of drives that configure a RAID level.

Display Function List



Category	Function	Description
RAID Group	"RAID Group (Basic Information)" (page 253)	The basic information of RAID groups, such as the status and the capacity, is displayed.
Tuning	"Tuning" (page 305)	The RAID group tuning information is displayed.
Eco-mode Schedule	"Eco-mode Schedule (RAID Group)" (page 313)	The Eco-mode operation status of each RAID group is displayed.
SED Key Group	"SED Key Group" (page 320)	The key group settings for the RAID groups that are configured with SEDs are displayed.
External RAID Group	"External RAID Group" (page 328)	The External RAID Group list is displayed.

Action List

Action	Function	Description
RAID Group		

3. RAID Group

RAID Group (Basic Information)

Action	Function	Description
Create	"Create RAID Group" (page 261)	Create a new RAID group.
Delete	"Delete RAID Group" (page 275)	Delete the selected RAID group.
Rename	"Rename RAID Group" (page 276)	Change the selected RAID group name.
Change Controlling CM	"Change Controlling CM" (page 279)	Change the Controlling CM of the selected RAID group.
Expand	"Expand RAID Group" (page 284)	Expand the selected RAID group capacity by using the Logical Device Expansion function.
Recover RAID Group	"Recover RAID Group" (page 293)	Recover the failed RAID groups.
Start Diagnosis	"Start RAID Group Diagnosis" (page 297)	Diagnose the selected RAID group.
Tuning		
Modify RAID Group Parameters	"Modify RAID Group Parameters" (page 308)	Change the tuning parameters of the selected RAID group.
Eco-mode Schedule		
Assign Eco-mode	"Assign Eco-mode Schedule (RAID Group)" (page 316)	Assign Eco-mode schedule to the selected RAID group.
SED Key Group		
Set Key Group	"Set Key Group (RAID Group)" (page 323)	Register or delete any RAID groups that are configured with SEDs in the key group.
Recovery SED	"Recovery SED" (page 326)	Recover the RAID groups that are in locked status.
External RAID Group		
Create	"Create External RAID Group" (page 331)	Create External RAID Groups from External Drives.
Delete	"Delete External RAID Group" (page 334)	Delete the registered External RAID Groups.
Recover	"Recover External RAID Group" (page 335)	Recover the External RAID Groups in the error response state.

RAID Group (Basic Information)

- ["■ Overview" \(page 253\)](#)
- ["■ User Privileges" \(page 253\)](#)
- ["■ Display Contents" \(page 254\)](#)
- ["■ Filter Setting" \(page 260\)](#)

■ Overview

This function displays the basic information of RAID groups.

■ User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	✓
Admin	✓
StorageAdmin	✓
AccountAdmin	

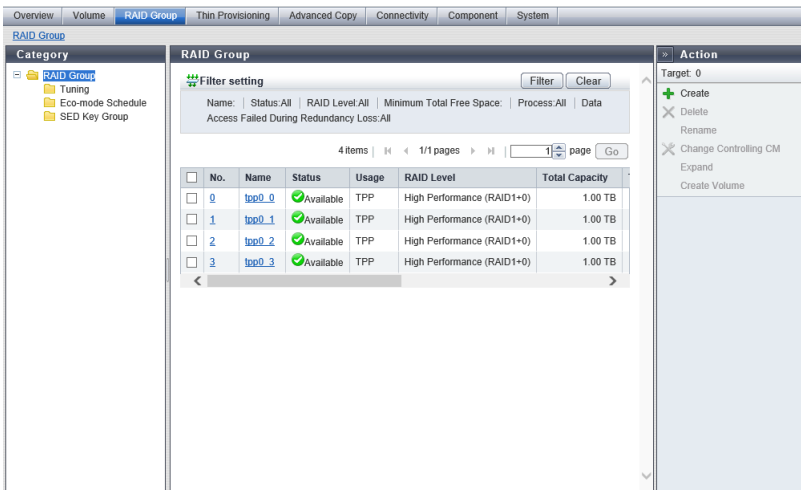
3. RAID Group RAID Group (Basic Information)

Default role	Availability of executions
SecurityAdmin	✓
Maintainer	✓

Refer to ["A. User Roles and Policies" \(page 1580\)](#) for details on the policies and roles.

■ Display Contents

In this screen, the basic information of RAID groups is displayed.



RAID Group List

Item	Description
No.	The RAID group number is displayed. The number is allocated in ascending order. Click this item to display the "[RAID Group Detail] Screen ([Basic] Tab)" (page 256) .
Name	The RAID group name is displayed. Click this item to display the "[RAID Group Detail] Screen ([Basic] Tab)" (page 256) .
Status	The RAID group status is displayed. Refer to "RAID Group Status" (page 1605) for details.

3. RAID Group RAID Group (Basic Information)

Item	Description
Usage	<p>The usage of the RAID group is displayed.</p> <ul style="list-style-type: none"> • Standard A RAID group that is used for creating "Standard", "SDV", or "SDPV" type volumes • Standard / WSV A RAID group that is used for creating the following volumes: <ul style="list-style-type: none"> - "WSV" and "Standard" - "WSV" and "SDV" - "WSV" and "SDPV" • WSV A RAID group that is used for creating "WSV" type volumes • TPP A RAID group that belongs to a TPP • FTRP A RAID group that belongs to an FTRP • RDB A RAID group that is registered as an REC Disk Buffer • Extreme Cache Pool A RAID group that is registered as an Extreme Cache Pool • Temporary A RAID group that is temporarily created while LDE is being performed • "-" (hyphen) A RAID group that is not used
RAID Level	<p>The RAID level is displayed.</p> <p>High Performance (RAID1+0) High Capacity (RAID5) High Reliability (RAID6) High Reliability (RAID6-FR) Reliability (RAID5+0) Mirroring (RAID1) Striping (RAID0)</p>
Total Capacity	<p>The total capacity of the RAID groups is displayed.</p> <p>TB is displayed for 1 TB or more and GB is displayed for 1 GB or more. The total capacity is displayed up to the second decimal place.</p>
Total Free Space	<p>The total free space in the RAID groups is displayed.</p> <p>TB is displayed for 1 TB or more and GB is displayed for 1 GB or more. The total capacity is displayed up to the second decimal place.</p> <p>"Free space" means an area in the RAID group where no volume is created, and dispersed areas which became free by creating and deleting a volume.</p> <p>A "-" (hyphen) is displayed when "Usage" is "Temporary".</p>
Controlling CM	<p>The Controlling CM of the RAID group is displayed.</p> <p>For the ETERNUS DX900 S5 or the ETERNUS DX8900 S4 CE#x CM#y For the other models CM#y x: CE number y: CM number</p>

3. RAID Group RAID Group (Basic Information)

Item	Description
Process	<p>A process that is being performed for the RAID group is displayed.</p> <p>If no process is being performed, a "-" (hyphen) is displayed.</p> <ul style="list-style-type: none"> Recovering Rebuild, copyback, redundant copy, or recovery of the RAID group is being performed. Expanding Expansion of the RAID group by LDE is being performed. Formatting Formatting is being performed.
Data Access Failed During Redundancy Loss	<p>The state when access to the data in the RAID group has failed is displayed.</p> <p>If data access fails when the RAID group redundancy is lost, "Yes" is displayed.</p> <p>For states other than the above, a "-" (hyphen) is displayed.</p>

[RAID Group Detail] Screen ([Basic] Tab)

A detailed information for the RAID group is displayed.

RAID Group Information

Item	Description
Status	<p>The RAID group status is displayed.</p> <p>Refer to "RAID Group Status" (page 1605) for details.</p>
RAID Level	<p>The RAID level is displayed.</p> <p>High Performance (RAID1+0) High Capacity (RAID5) High Reliability (RAID6) High Reliability (RAID6-FR) Reliability (RAID5+0) Mirroring (RAID1) Striping (RAID0)</p>
Fast Recovery Configuration	<p>The drive configuration in the Fast Recovery RAID group is displayed.</p> <p>This item is displayed only when the RAID level is "RAID6-FR".</p> <p>(3D+2P)x2+1HS (4D+2P)x2+1HS (6D+2P)x2+1HS (9D+2P)x2+1HS (12D+2P)x2+1HS (5D+2P)x4+1HS (13D+2P)x2+1HS (8D+2P)x3+1HS (4D+2P)x5+1HS (3D+2P)x6+1HS</p> <p>D: Data drives P: Parity drives HS: Hot Spares</p>
Total Capacity	<p>The total capacity of the RAID groups is displayed.</p> <p>In addition, the total capacity is displayed in units of MB enclosed with parentheses.</p>
Total Free Space	<p>The total free space in the RAID groups is displayed.</p> <p>In addition, the total free space is displayed in units of MB enclosed with parentheses.</p> <p>A "-" (hyphen) is displayed for a RAID group that is temporarily created while LDE is being performed.</p>

3. RAID Group RAID Group (Basic Information)

Item	Description
Controlling CM	<p>The Controlling CM of the RAID group is displayed.</p> <p>For the ETERNUS DX900 S5 or the ETERNUS DX8900 S4 CE#x CM#y</p> <p>For the other models CM#y</p> <p>x: CE number y: CM number</p>
Eco-mode Schedule	<p>The Eco-mode schedule name that is assigned to the RAID group is displayed.</p> <p>If the Eco-mode is controlled with FUJITSU ETERNUS SF Storage Management Software, "External" is displayed.</p> <p>When no Eco-mode schedule has been assigned, the field is blank.</p>
Eco-mode Action	<p>The Eco-mode schedule action status is displayed.</p> <p>When no Eco-mode schedule has been assigned, a "-" (hyphen) is displayed.</p> <ul style="list-style-type: none"> • Drive power off The power for the drive is turned off during Eco-mode operation. • Drive motor off The drive motor is stopped during Eco-mode operation. • Drive always on The Eco-mode is disabled and the drive is always on.
Motor Status	<p>The drive motor status is displayed.</p> <ul style="list-style-type: none"> • Active The drive motors are activated. • In the Boot Process The drive motors are starting up. • Idle The drive motors are stopped. • In the Stop Process The drive motors are being stopped. • Power Off The drive power is being turned off.
Fast Recovery Drive	<p>When the hot spare area in the Fast Recovery RAID group is used (*1), the location information for the data recovery source drive is displayed. If Fast Recovery (*2) is not used, the field is blank.</p> <p>This item is displayed only when the RAID level is "RAID6-FR".</p> <p>CE Slot#y CE#x Slot#y DE#zz Slot#y</p> <p>x: CE number y: Slot number zz: DE number</p> <p>*1 : From the start of a high-speed rebuild until the completion of copyback from a hot spare to a replaced normal drive.</p> <p>*2 : High-speed rebuilding when one drive fails in the Fast Recovery RAID group.</p>
Process	<p>A process that is being performed for the RAID group is displayed.</p> <p>If no process is being performed, a "-" (hyphen) is displayed.</p>
Progress	<p>The progress of a process that is being performed is displayed with a bar and a rate (0 to 100 %). To display the latest progress, refresh the screen. If no process is being performed, a "-" (hyphen) is displayed.</p>

3. RAID Group RAID Group (Basic Information)

Item	Description
Estimated Time Left	<p>The estimated remaining time before recovering is complete is displayed. To display the latest estimated remaining time, refresh the screen. This item is not displayed when the process is other than "Recovering".</p> <ul style="list-style-type: none"> Calculating The storage system is calculating the estimated remaining time. 30 days or more The estimated remaining time is 30 days or more. x days y h z min. The estimated remaining time is more than one minute and less than 30 days. When the estimated remaining time is less than one day, the "days" value is omitted. When the estimated remaining time is less than one hour, the "days" and "hours" values are omitted. Less than 1 min. The estimated remaining time is less than one minute. <p>x: 1 - 29 y: 0 - 23 z: 0 - 59</p> <div style="background-color: #fff9c4; padding: 5px;"> <p>Caution</p> <ul style="list-style-type: none"> The estimated time that is left may increase or decrease depending on the I/O load when this parameter is used. </div>
Remaining Size	<p>The remaining size of the unrecovered RAID group is displayed. To display the latest size, refresh the screen. This item is not displayed when the process is other than "Recovering".</p> <div style="background-color: #fff9c4; padding: 5px;"> <p>Caution</p> <ul style="list-style-type: none"> The remaining physical capacity in the drive that is being recovered is displayed. Note that the remaining size may be larger than the capacity that is currently being used by users. </div>
Stripe Depth	<p>The Stripe Depth (*1) of the RAID group is displayed. A "-" (hyphen) is displayed when the RAID level is "RAID1".</p> <p>64 KB 128 KB 256 KB 512 KB 1024 KB</p> <p>*1: This is the number of logical blocks assigned to one drive per stripe when a volume is striped to configuring drives of a RAID group. Normally, it is 64KB.</p>
Data Access Failed During Redundancy Loss	<p>The state when access to the data in the RAID group has failed is displayed. If data access fails when the RAID group redundancy is lost, "Yes" is displayed. For states other than the above, a "-" (hyphen) is displayed.</p>

[RAID Group Detail] Screen ([Volume Layout] Tab)

The detailed information of the volume layout is displayed. Note that the [Volume Layout] tab is not displayed for RAID groups registered as Extreme Cache Pools or for temporary RAID groups created while LDE is being performed.

RAID Group Used Summary

Item	Description
Start LBA	The start Logical Block Address (LBA) (hexadecimal) of the volume is displayed.

3. RAID Group

RAID Group (Basic Information)

Item	Description
Capacity	The volume capacity is displayed.
Volume No.	The volume number is displayed. Unused space is displayed as "Free".
Volume Name	The volume name is displayed.
Volume Status	The volume status is displayed. Refer to ""Volume Status" (page 1604) for details.
Volume Type	The volume type is displayed. Standard WSV SDV SDPV

[RAID Group Detail] Screen ([Drives] Tab)

Detailed information of the drives that are used in the RAID group is displayed.

RAID Group Drives Information

Item	Description
Enclosure	The number of the enclosure where the drive is installed is displayed. CE : Controller Enclosure (2.5" and 3.5") DE : Drive Enclosure (2.5", 3.5", and 3.5" high density DEs) CE CE#x DE#yy x: CE number y: DE number
Slot No.	The number of the slot where the drive is installed is displayed. 2.5" CE/DE: 0 - 23 3.5" CE/DE: 0 - 11 3.5" high density DE: 0 - 59
Status	The drive status is displayed. Refer to ""Drive Status" (page 1607) for details.

3. RAID Group RAID Group (Basic Information)

Item	Description
Type	<p>The drive type displayed for this item is a combination of the following.</p> <ul style="list-style-type: none"> • Drive size <ul style="list-style-type: none"> - For 2.5-inch drives: 2.5" - For 3.5-inch drives: 3.5" • Drive type <ul style="list-style-type: none"> - For SAS disks: Online - For Nearline SAS disks: Nearline - For SSDs, the following items are displayed depending on the SSD type. <ul style="list-style-type: none"> • For SSD-Hs (12 Gbit/s): SSD-H (*1) • For SSD-Ms (12 Gbit/s): SSD-M (*1) • For SSD-Ls (12 Gbit/s): SSD-L (*1) <p>Note that "SED" is also displayed for self encrypting drives and "AF" is also displayed for Advanced Format compliant drives.</p> <p>*1: The displayed item varies depending on the interface speed (bandwidth) or the capacity of the reserved space. Unless otherwise specified, "SSD-H", "SSD-M", and "SSD-L" are collectively referred to as "SSD". In addition, there may be cases when "SSD SED" is used as the collective term for self encrypting SSD-Hs, SSD-Ms, and SSD-Ls.</p>
Capacity	<p>The capacity of the drive is displayed.</p> <div style="background-color: #fff9c4; padding: 10px; border: 1px solid #ccc;"> <p>Caution</p> <ul style="list-style-type: none"> • The displayed drive capacity may differ from the product's actual capacity. For example, the drive capacity of a "1.92 TB SSD" is displayed as "2.00 TB" and the capacity of an "18 TB Nearline SAS disk" is displayed as "17.9 TB". </div>
Speed	<p>The drive speed is displayed.</p> <p>For SSD or SSD SED, a "-" (hyphen) is displayed.</p> <p>15000 rpm 10000 rpm 7200 rpm</p>
Usage	<p>The usage of the drive is displayed.</p> <ul style="list-style-type: none"> • Data A drive that is used for user data or an unused drive • Global Hot Spare A drive that is registered as a Global Hot Spare • Dedicated Hot Spare A drive that is registered as a Dedicated Hot Spare
Data Access Failed	<p>The state when access to the data in the drive has failed is displayed.</p> <p>If data access fails when the RAID group redundancy is lost, "Yes" is displayed.</p> <p>For states other than the above, a "-" (hyphen) is displayed.</p>

■ Filter Setting

Function Description

Filter setting is a function used to display a list of only the RAID groups meeting all the specified conditions.

No filtering is set by default. The following table shows conditions that can be specified.

3. RAID Group RAID Group (Basic Information)

Item	Description	Setting values
Name	Input the RAID group name that is to be displayed. RAID groups matching or partially matching the entered name are displayed. When not using the RAID group name for filtering, leave this item blank.	RAID group name Blank
Status	Select the status of the RAID group that is to be displayed. When not using the RAID group status for filtering, select "All".	All Refer to "RAID Group Status" (page 1605) .
RAID Level	Select the RAID level of the RAID group that is to be displayed. When not using the RAID level for filtering, select "All".	All High Performance (RAID1+0) High Capacity (RAID5) High Reliability (RAID6) High Reliability (RAID6-FR) Reliability (RAID5+0) Mirroring (RAID1) Striping (RAID0)
Minimum Total Free Space	Input the minimum capacity of total free space for the RAID groups that are to be displayed and select the units of capacity. When the total free space of the RAID group is not used for filtering, leave this item blank or specify "0".	Total free space Unit: TB/GB/MB 0 MB
Process	Select the process that is being performed for the RAID group to be displayed. When not using the process that is being performed for filtering, select "All".	All Recovering Expanding Formatting "-" (hyphen)
Data Access Failed During Redundancy Loss	Select the status of "Data Access Failed During Redundancy Loss" for the RAID group that is to be displayed. When not using the status of "Data Access Failed During Redundancy Loss" for filtering, select "All".	All "-" (hyphen) Yes

Create RAID Group

- ["Overview" \(page 261\)](#)
- ["User Privileges" \(page 264\)](#)
- ["Settings" \(page 264\)](#)
- ["Operating Procedures" \(page 274\)](#)

■ Overview

This function creates a RAID group.
A RAID group is a group of drives that configure a RAID level.

Features and Required Number of Drives for Each RAID Level

The following table shows the features and the required number of drives for each RAID level.
Actual RAID group configurations (or the number of available drives) vary depending on the maximum number of drives that can be installed in the storage system.

3. RAID Group RAID Group (Basic Information)

RAID level (*1)	Feature	Required number of drives (*2)
High Performance (RAID1+0)	The high I/O performance of RAID0 (striping) is combined with the reliability of RAID1 (mirroring).	2D+2M - 16D+16M
High Capacity (RAID5)	Data divided into units of blocks and parity information that is created from the data are allocated across multiple drives to allow data redundancy.	2D+1P - 15D+1P
High Reliability (RAID6)	The use of double parity allows the full recovery of lost data even in the event that two of the drives fail.	3D+2P - 14D+2P
High Reliability (RAID6-FR)	Configure a single RAID group with multiple RAID redundant sets and reserved areas equivalent to a hot spare. Distributing data in RAID groups allows high-speed rebuilding when the first drive fails. A recovery can be performed with up to two drive failures, however when the second drive fails, the rebuild is operated at a normal speed. Several restrictions apply to the RAID groups and volumes of this RAID level. Refer to "Restrictions for RAID6-FR" (page 262) for details.	(3D+2P)x2+1HS (4D+2P)x2+1HS (6D+2P)x2+1HS (9D+2P)x2+1HS (12D+2P)x2+1HS (5D+2P)x4+1HS (13D+2P)x2+1HS (8D+2P)x3+1HS (4D+2P)x5+1HS (3D+2P)x6+1HS
Reliability (RAID5+0)	Multiple RAID5 volumes are RAID0 striped. For large capacity configurations, use of RAID5+0 instead of RAID5 results in enhanced performance, improved reliability, and shorter rebuilding times. Several restrictions apply to the RAID groups of this RAID level. Refer to "Restrictions for RAID5+0" (page 263) for details.	(2D+1P) × 2 - (15D+1P) × 2
Mirroring (RAID1)	Data is mirrored to two drives (mirroring). If one drive fails, the other drive continues operation.	1D+1M
Striping (RAID0)	Data is split in unit of blocks and stored across multiple drives (striping). RAID0 has no data redundancy.	2D - 16D

*1 : The RAID levels in the table above, setting value fields, and display contents fields for descriptions are written according to how they actually appear in Web GUI. Other fields and descriptions in this manual use "RAIDxx" as an abbreviation for the RAID levels.

*2 : D: Data drives, M: Mirror drives, P: Parity drives, HS: Hot Spares

Restrictions for RAID6-FR

The following restrictions apply to RAID groups (hereinafter referred to as "Fast Recovery RAID groups") that were created with RAID6-FR and volumes created in those RAID groups.

- The following operations that use LDE cannot be performed for Fast Recovery RAID groups.
 - Changing the RAID level to "RAID6-FR"
 - Changing the RAID level from "RAID6-FR"
 - Expanding the RAID group capacity by adding drives
- "Standard (including concatenation volumes by means of LUN Concatenation)" and ODX Buffer volumes can be created in the Fast Recovery RAID group.
- Encrypted volumes can be created in the Fast Recovery RAID groups. However, encrypting volumes that exist in Fast Recovery RAID groups is not allowed.
- The Stripe Depth for a Fast Recovery RAID group is fixed at "64KB".
- The Copybackless function is not performed when the first drive fails in a Fast Recovery RAID group. A high-speed rebuild is performed in a hot spare area within the RAID group, and when the failed drive is exchanged for a normal drive, copyback is performed.

Restrictions for RAID5+0

The following restrictions apply to RAID groups that are created with "RAID5+0".

- The following operations that use LDE cannot be performed.
 - Changing the RAID level to "RAID5+0"
 - Changing the RAID level from "RAID5+0"
 - Expanding the RAID group capacity by adding drives
- The Stripe Depth for a new RAID group is fixed at "64KB".

The Maximum Number of RAID Groups for Each Model

The maximum number of RAID groups varies depending on each model. The following table shows the maximum number of RAID groups for each model.

Model	The maximum number of RAID groups
ETERNUS DX60 S5	48
ETERNUS DX100 S5	72
ETERNUS DX200 S5	132
ETERNUS DX500 S5	288
ETERNUS DX600 S5	528
ETERNUS DX900 S5	1152
ETERNUS DX8100 S4	24
ETERNUS DX8900 S4	3456
ETERNUS AF150 S3	12
ETERNUS AF250 S3	132
ETERNUS AF650 S3	528

Drive Combinations That Can Configure a RAID Group

The following table shows the drive combinations that can configure a RAID group.

	Online	Nearline	SSD	Online SED	Nearline SED	SSD SED
Online	OK	OK (but not recommended)	NG	NG	NG	NG
Nearline	OK (but not recommended)	OK	NG	NG	NG	NG
SSD	NG	NG	OK	NG	NG	NG
Online SED	NG	NG	NG	OK	OK (but not recommended)	NG
Nearline SED	NG	NG	NG	OK (but not recommended)	OK	NG
SSD SED	NG	NG	NG	NG	NG	OK

OK: RAID groups can be created OK (but not recommended): RAID groups can be created, but not a recommended configuration NG: RAID groups cannot be created

3. RAID Group

RAID Group (Basic Information)

Caution

- For the ETERNUS DX60 S5 and the ETERNUS AF150 S3, SEDs cannot be used for configuring a RAID group.
- RAID0 has no data redundancy. The use of RAID1+0, RAID5, RAID6, RAID6-FR, RAID5+0, or RAID1 is recommended.

■ User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	✓
StorageAdmin	✓
AccountAdmin	
SecurityAdmin	
Maintainer	✓

Refer to ["A. User Roles and Policies" \(page 1580\)](#) for details on the policies and roles.

■ Settings

In this screen, create a RAID group.

There are two methods to create RAID groups: automatic drive selection and manual drive selection.

New RAID Group

Input the name of the RAID group that is to be newly created and select the create mode.

Item	Description	Setting values
Name	Input a RAID group name that is to be created. When creating a single RAID group, an existing RAID group name cannot be used.	Up to 16 alphanumeric characters, symbols (except ",", (comma) and "?"), and spaces
Create Mode	Select the create mode of the RAID group. <ul style="list-style-type: none">• Automatic Select a drive to create a RAID group automatically.• Manual Select a drive to create a RAID group manually.	Automatic Manual

3. RAID Group
RAID Group (Basic Information)

Automatic Setting

Item	Description	Setting values
Number of RAID Groups	<p>Input the number of RAID groups that are to be created.</p> <p>When creating multiple RAID groups at a time, the new RAID groups are named automatically. Refer to "Naming Conventions for Creating RAID Groups" (page 266) for details.</p>	<p>For the ETERNUS DX60 S5: 1 - 48</p> <p>For the ETERNUS DX100 S5: 1 - 72</p> <p>For the ETERNUS DX200 S5: 1 - 132</p> <p>For the ETERNUS DX500 S5: 1 - 288</p> <p>For the ETERNUS DX600 S5: 1 - 528</p> <p>For the ETERNUS DX900 S5: 1 - 1152</p> <p>For the ETERNUS DX8100 S4: 1 - 24</p> <p>For the ETERNUS DX8900 S4: 1 - 3456</p> <p>For the ETERNUS AF150 S3: 1 - 12</p> <p>For the ETERNUS AF250 S3: 1 - 132</p> <p>For the ETERNUS AF650 S3: 1 - 528</p> <p>0 (Default)</p>
Drive Type	<p>Select the type of drive that configures a RAID group from the list box. Only the drives that are installed in the storage system are displayed.</p> <div style="background-color: #fff9c4; padding: 10px; margin-top: 10px;"> <p>Caution</p> <ul style="list-style-type: none"> • If drives that satisfy all of the following conditions are installed in the storage system, select the drives manually. <ul style="list-style-type: none"> - The drive types are the same - The drive capacities are the same - The sector format (AF-compliant/non-AF-compliant) is different • When using SSDs, the SSD types (SSD-H/SSD-M/SSD-L) cannot be specified. SSDs that are the same type and have the necessary capacity are selected. If SSDs with the same type are not available, RAID groups cannot be created. Note that if multiple RAID groups are created at once, different SSD types may be used for each RAID group. SSD types have no order of priority. <p>When using SSD SEDs, the SSD types (SSD-H SED/SSD-M SED/SSD-L SED) cannot be specified. If "SSD SED" is selected for the drive type, drives are operated in the same way as SSDs.</p> </div>	<p>Online Nearline SSD Online SED Nearline SED SSD SED</p>

3. RAID Group

RAID Group (Basic Information)

Item	Description	Setting values
RAID Level	<p>Select the level of RAID group that is to be created.</p> <p>Caution</p> <ul style="list-style-type: none"> Several restrictions apply to RAID groups and volumes in the "RAID6-FR" type RAID group. Refer to "Restrictions for RAID6-FR" (page 262) for details. Several restrictions apply to RAID groups that are created with "RAID5+0". Refer to "Restrictions for RAID5+0" (page 263) for details. If "RAID1+0", "RAID5", or "RAID5+0" is selected for the RAID level, RAID groups cannot be created with drives that are 6 TB or larger (except SSDs and SSD SEDs). 	High Performance (RAID1+0) High Capacity (RAID5) High Reliability (RAID6) High Reliability (RAID6-FR) Reliability (RAID5+0) Mirroring (RAID1) Striping (RAID0)
Select Drives	<p>Select the requirements that are given priority when creating a Fast Recovery RAID group with automatic drive configuration.</p> <p>This item is available only when the RAID level is "RAID6-FR".</p> <ul style="list-style-type: none"> Minimize number of using drives Minimize the number of drives in the RAID group to achieve high-speed rebuilding. Refer to "Drive Configuration for Fast Recovery RAID Groups" (page 267) for details. Prioritize rebuild rate Use more drives in a RAID group and distribute data to achieve high-speed rebuilding. Refer to "Drive Configuration for Fast Recovery RAID Groups" (page 267) for details. 	Minimize number of using drives Prioritize rebuild rate
Minimum Capacity per RAID Group	<p>Input the RAID group capacity that is to be created and select the units of capacity.</p> <p>A RAID group is automatically created with a capacity of the entered value or higher.</p>	Numeric characters Unit: TB/GB/MB

Naming Conventions for Creating RAID Groups

- When creating multiple RAID groups at a time, a name is automatically added to a RAID group with the specified "Name" and a suffix number "x" (serial numbers starting with "0").
(Example) Specified RAID group name: RAIDGroup_aaaa (14 characters) → Name for created RAID group: RAIDGroup_aaaa0, RAIDGroup_aaaa1, etc.
- When the RAID group name including the suffix number "x" has more than 16 characters, the excess number of characters is deleted from the "Name", starting with the last character and a suffix number "~x" will be added. Then, the name will contain only 16 characters.
(Example) Specified RAID group name: RAIDGroup_aaaabb (16 characters) → Name for created RAID group: RAIDGroup_aaaa~0, RAIDGroup_aaaa~1, etc.
- When a RAID group name including the suffix number already exists, the suffix number is increased by one (+1). The suffix number is increased by one (+1) until no RAID group names overlap.

3. RAID Group
RAID Group (Basic Information)

Manual Setting

Item	Description	Setting values
RAID Level	<p>Select the level of RAID group that is to be created.</p> <p>Caution</p> <ul style="list-style-type: none"> Several restrictions apply to RAID groups and volumes in the "RAID6-FR" type RAID group. Refer to ""Restrictions for RAID6-FR" (page 262)" for details. Several restrictions apply to RAID groups that are created with "RAID5+0". Refer to ""Restrictions for RAID5+0" (page 263)" for details. 	<p>High Performance (RAID1+0) High Capacity (RAID5) High Reliability (RAID6) High Reliability (RAID6-FR) Reliability (RAID5+0) Mirroring (RAID1) Striping (RAID0)</p>
Controlling CM	<p>Specify the Controlling CM of the RAID group to be created. "Automatic" and the normal CM number ("CE#x CM#y" or "CM#y") that is installed are displayed as options. Select "Automatic" for normal operations. When "Automatic" is selected, the Controlling CM that is to be allocated is determined by the RAID group number. Refer to ""Automatic Controlling CM Setting" (page 281)" for details.</p>	<p>For the ETERNUS DX900 S5 or the ETERNUS DX8900 S4 Automatic CE#x CM#y For the other models Automatic CM#y x: CE number y: CM number</p>
Fast Recovery Configuration	<p>Select the drive configuration for a Fast Recovery RAID group. Select the drive configuration from "No. of drives in the configuration", "capacity efficiency", and "rebuilding speed" according to your environment. Refer to ""Drive Configuration for Fast Recovery RAID Groups" (page 267)" for details. The more redundant sets there are, the faster the rebuilding becomes. This item is blank when the RAID level is not "RAID6-FR".</p>	<p>For the ETERNUS DX60 S5 or the ETERNUS AF150 S3 (3D+2P)x2+1HS (4D+2P)x2+1HS (6D+2P)x2+1HS (9D+2P)x2+1HS Blank For the other models (3D+2P)x2+1HS (4D+2P)x2+1HS (6D+2P)x2+1HS (9D+2P)x2+1HS (12D+2P)x2+1HS (5D+2P)x4+1HS (13D+2P)x2+1HS (8D+2P)x3+1HS (4D+2P)x5+1HS (3D+2P)x6+1HS Blank D: Data drives P: Parity drives HS: Hot Spares</p>
Minimum Capacity per RAID Group	<p>The capacity of RAID group that is to be created is displayed. The "Minimum Capacity per RAID Group" is automatically calculated from the selected RAID level and drives.</p>	

Drive Configuration for Fast Recovery RAID Groups

The drive layout in the storage system is the same as "RAID6". When using automatic configuration, the drive configuration that satisfies the specified capacity is determined according to the following order.

3. RAID Group
RAID Group (Basic Information)

No. of drives in the configuration (per RAID group)	Redundant sets + HS (*1)	Capacity efficiency (*2) (%)	Rebuilding speed (*3) (Rate)	Number of data drives	Selection order when configuring automatically	
					"Minimize number of using drives" is selected	"Prioritize rebuild rate" is selected
11	(3D+2P)x2+1HS	54.5	2.20	6	1	5
13	(4D+2P)x2+1HS	61.5	2.17	8	2	6
17	(6D+2P)x2+1HS	70.6	2.13	12	3	7
23	(9D+2P)x2+1HS	78.3	2.09	18	4	8
29	(12D+2P)x2+1HS	82.8	2.07	24	5	9
31	(13D+2P)x2+1HS	83.9	2.06	26	6	10
31	(3D+2P)x6+1HS	58.1	6.20	18	Not selected	1
31	(4D+2P)x5+1HS	64.5	5.17	20	Not selected	2
29	(5D+2P)x4+1HS	70.0	4.14	20	Not selected	3
31	(8D+2P)x3+1HS	77.4	3.10	24	Not selected	4

*1 : Fast Recovery RAID groups are described as "Redundant sets + HS".

RAID6 ((Number of data drives (D) + Number of parity drives (P)) × Number of redundant sets + Number of hot spares (HS))

↑

Redundant sets

(Example) "RAID6 ((3D+2P)x2+1HS)" is described as "(3D+2P)x2+1HS".

*2 : The ratio of the user capacity to physical drive capacity.

*3 : Rate when the rebuilding speed for the basic "RAID6 (D+P)" configuration is "1". The rate varies depending on the workload of the storage system and system environment.

Advanced Setting

Perform the advanced settings for RAID groups

Item	Description	Setting values
Stripe Depth	<p>Stripe Depth should be selected only when advanced tuning needs to be performed for each RAID group. It is not necessary to change the default value for normal use.</p> <p>The setting is not available when the RAID level is "RAID1". Available Stripe Depth value varies depending on the RAID level. Refer to "Available Stripe Depth Value" (page 268) for details.</p> <div style="background-color: #f0f0f0; padding: 10px; margin-top: 10px;"> <p>Note</p> <ul style="list-style-type: none"> Specifying a larger value for the Stripe Depth can reduce the number of drives to access. For RAID1+0, reducing the number of commands issued to drives improves the performance of access to the specified RAID group. For RAID5, however, specifying a larger value for the Stripe Depth might decrease the sequential write performance. In addition, several restrictions apply to a RAID group whose Stripe Depth has been changed and volumes created for such RAID group. Refer to "Restrictions for Stripe Depth Modification" (page 269) for details. </div>	<p>64 KB (Default)</p> <p>128 KB</p> <p>256 KB</p> <p>512 KB</p> <p>1024 KB</p>

Available Stripe Depth Value

The Stripe Depth values available for each RAID level are as follows:

3. RAID Group RAID Group (Basic Information)

RAID level	Available Stripe Depth value
RAID1	-
RAID1+0, RAID0	64 KB, 128 KB, 256 KB, 512 KB, 1024 KB
RAID5 (2+1) - RAID5 (4+1)	64 KB, 128 KB, 256 KB, 512 KB
RAID5 (5+1) - RAID5 (8+1)	64 KB, 128 KB, 256 KB
RAID5 (9+1) - RAID5 (15+1)	64 KB, 128 KB
RAID5+0	64 KB
RAID6	64 KB
RAID6-FR	64 KB

Restrictions for Stripe Depth Modification

Note that the following restrictions apply to a RAID group whose Stripe Depth has been changed and volumes created for such RAID group.

- The Stripe Depth of the RAID groups already created cannot be changed .
- When selecting drives automatically to create a RAID group, the Stripe Depth cannot be changed.
- The capacity cannot be expanded if the Stripe Depth of the RAID group has been changed (LDE is not available).
- Encryption cannot be performed for volumes that are created in a RAID group whose Stripe Depth has been changed.

Drive Selection

Drives can be selected from the list or the installation image. To switch between the list and the installation image, click the tab.

3. RAID Group
RAID Group (Basic Information)

Requirements for selecting drives

- The drive requirements for creating RAID groups are listed below.
 - The drive status is " Present"
 - The drives are not registered in any RAID group, [TPP](#), [FTRP](#), [REC Disk Buffer](#), or Extreme Cache Pool
 - The drives are not registered as hot spares
 - The drive type ([Online/Nearline/SSD/Online SED/Nearline SED/SSD SED](#)) must be the same (Although "Online" type drives and "Nearline" type drives can be used in the same RAID group, using only "Online" type drives or using only "Nearline" type drives is recommended. Also, "Online SED" type drives and "Nearline SED" type drives can be used in the same RAID group, but using only "Online SED" type drives or using only "Nearline SED" type drives is recommended. This is because the available capacity and the access performance may be reduced when these drives are used in the same RAID group.)
 - If "RAID1+0", "RAID5", or "RAID5+0" is selected for the RAID level, drives that are 6 TB or larger (except SSDs and SSD SEDs) cannot be specified
- Drive recommendations for creating RAID groups are listed below.
 - Select drives that are the same size and the same speed. If drives of different capacities exist in a RAID group, the smallest capacity becomes the standard, and all other drives are regarded as having the same capacity as the smallest drive. In this case, the remaining drive space is not used. In addition, if drives of different speeds exist in a RAID group, the access performance of the RAID group is reduced by the slower drives.
 - Select the same sector format of drives (AF-compliant/non-AF-compliant).
 - If the host connection environment does not support Advanced Format (AF), select non-AF-compliant drives (*1). If AF-compliant drives (*2) are selected, a data format conversion occurs and the drive access performance is reduced. When the host to be connected supports AF, both AF-compliant and non-AF-compliant drives can be selected.
 - *1 : Drives (such as 2.5" Online and 2.5" Nearline) where "AF" is not displayed for the type.
 - *2 : Drives (such as 2.5" Online AF and 2.5" Nearline AF) where "AF" is displayed for the type.
 - When "RAID1+0" or "RAID1" is selected for the RAID level, allocate the drives (mirroring pair drives) by dividing them into two or more connection lines (for the ETERNUS DX500 S5/DX600 S5/DX900 S5 and the ETERNUS AF650 S3).
 - When "RAID5", "RAID6", or "RAID6-FR" is selected for the RAID level, allocate the drives (multiple drives configuring a striping) by dividing them into two or more connection lines (for the ETERNUS DX500 S5/DX600 S5/DX900 S5 and the ETERNUS AF650 S3).
 - If "RAID1" is selected for the RAID level, using drives other than SSD is recommended.
- There are conditions for the ETERNUS DX8100 S4/DX8900 S4 drive layout. Refer to [""Conditions for the ETERNUS DX8100 S4/DX8900 S4 Drive Layout" \(page 272\)"](#) for details. Note that these conditions are not applied to other models.

[Tabular] Tab

Click the [Tabular] tab to select drives from the list. Only unused drives are displayed on the list. There are conditions for the ETERNUS DX8100 S4/DX8900 S4 drive layout. Refer to [""Conditions for the ETERNUS DX8100 S4/DX8900 S4 Drive Layout" \(page 272\)"](#) for details. Note that these conditions are not applied to other models.

Item	Description
Checkbox to select drives	Select the checkbox for the drive that is to be used.


3. RAID Group RAID Group (Basic Information)

Item	Description
Enclosure	<p>The enclosure where the drive is installed is displayed.</p> <p>CE: Controller Enclosure (2.5" and 3.5") DE: Drive Enclosure (2.5", 3.5", and 3.5" high density DEs)</p> <p>CE CE#x DE#yy x: CE number yy: DE number</p>
Slot No.	<p>The slot number of the enclosure where the drive is installed is displayed.</p> <p>2.5" CE/DE: 0 - 23 3.5" CE/DE: 0 - 11 3.5" high density DE: 0 - 59</p>
Type	<p>The drive type displayed for this item is a combination of the following.</p> <ul style="list-style-type: none"> • Drive size <ul style="list-style-type: none"> - For 2.5-inch drives: 2.5" - For 3.5-inch drives: 3.5" • Drive type <ul style="list-style-type: none"> - For SAS disks: Online - For Nearline SAS disks: Nearline - For SSDs, the following items are displayed depending on the SSD type. <ul style="list-style-type: none"> • For SSD-Hs (12 Gbit/s): SSD-H (*1) • For SSD-Ms (12 Gbit/s): SSD-M (*1) • For SSD-Ls (12 Gbit/s): SSD-L (*1) <p>Note that "SED" is also displayed for self encrypting drives and "AF" is also displayed for Advanced Format compliant drives.</p> <p>*1: The displayed item varies depending on the interface speed (bandwidth) or the capacity of the reserved space. Unless otherwise specified, "SSD-H", "SSD-M", and "SSD-L" are collectively referred to as "SSD". In addition, there may be cases when "SSD SED" is used as the collective term for self encrypting SSD-Hs, SSD-Ms, and SSD-Ls.</p>
Capacity	<p>The capacity of the drive is displayed.</p> <div style="background-color: #fff9c4; padding: 10px; border: 1px solid #ccc;"> <p>Caution</p> <ul style="list-style-type: none"> • The displayed drive capacity may differ from the product's actual capacity. For example, the drive capacity of a "1.92 TB SSD" is displayed as "2.00 TB" and the capacity of an "18 TB Nearline SAS disk" is displayed as "17.9 TB". </div>
Speed	<p>The drive speed is displayed.</p> <p>For SSD or SSD SED, a "-" (hyphen) is displayed.</p> <p>15000 rpm 10000 rpm 7200 rpm</p>

[Graphic] Tab

Click the [Graphic] tab to select drives from the drive installation image. The installation images of all the drives installed in the storage system are displayed. Checkboxes are displayed for unused drives. There are conditions for the ETERNUS DX8100 S4/DX8900 S4 drive layout. Refer to ["Conditions for the ETERNUS DX8100 S4/DX8900 S4 Drive Layout" \(page 272\)](#) for details. Note that these conditions are not applied to other models.

3. RAID Group RAID Group (Basic Information)

Item	Description	Setting values
DE selection list box	Select the DE group. Options are displayed in the list box when at least one CE or DE in the DE group is installed in the storage system. Refer to "" DE selection list box " (page 273)" for details on the options and DE groups for each model.	DE#0x DE#1x DE#2x DE#3x DE#4x DE#5x DE#6x DE#7x DE#8x DE#9x DE#Ax DE#Bx DE#Cx DE#Dx DE#Ex DE#Fx
DE	Only the CEs or the DEs in the selected DE group that are installed in the storage system are displayed. CE CE#x DE#yy x: CE number yy: DE number	
Checkbox to select drives	Select the checkbox for the drive that is to be used. Checkboxes are displayed for unused drives. For 2.5" CEs or 2.5" DEs, drives are displayed from left to right in ascending order of the slot number. For 3.5" CEs, 3.5" DEs, or 3.5" high density DEs, drives are displayed from bottom left to top right in ascending order of the slot number. Placing the mouse pointer on the  icon displays the detailed information of the drive.	

Conditions for the ETERNUS DX8100 S4/DX8900 S4 Drive Layout

The drive layout to configure RAID groups in the ETERNUS DX8100 S4/DX8900 S4 must satisfy the conditions described below.

RAID groups cannot be created if the required conditions are not satisfied.

For the ETERNUS DX8100 S4

RAID level	Drive layout conditions	
RAID1	Required	Allocate mirroring pair drives to different DEs.
RAID1+0	Required	Allocate mirroring pair drives to different DEs.
	Recommended	Allocate striping drives to as many DEs as possible.
RAID5 RAID5+0 RAID6 RAID6-FR	Recommended	Distribute member drives to as many DEs as possible.

3. RAID Group RAID Group (Basic Information)

For the ETERNUS DX8900 S4

RAID level	Drive layout conditions	
RAID1	Required	Allocate mirroring pair drives to different DEs.
	Recommended	Allocate mirroring pair drives to DEs (*1) under different CEs when possible. Allocate mirroring pair drives to different SAS cascades (*2) when possible.
RAID1+0	Required	Allocate mirroring pair drives to different DEs.
	Recommended	Allocate striping drives to DEs under as many CEs as possible. Allocate striping drives to as many SAS cascades (*2) as possible.
RAID5	Required	Allocate member drives to different DEs.
	Recommended	Distribute member drives to DEs under as many CEs as possible. Distribute member drives to as many SAS cascades (*2) as possible.
RAID5+0	Required	Allocate two or less member drives to the same DE. Member drives in the same DE must belong to different redundant groups.
	Recommended	Distribute member drives to DEs under as many CEs as possible. Distribute member drives to as many SAS cascades (*2) as possible.
RAID6	Required	Allocate two or less member drives to the same DE.
RAID6-FR	Recommended	Distribute member drives to DEs under as many CEs as possible. Distribute member drives to as many SAS cascades (*2) as possible.

*1 : DEs under different CEs have different numbers as the first digit of the DE number.

*2 : "SAS cascade" for the ETERNUS DX8900 S4 refers to DEs that are attached to one drive interface port. The DEs that are allocated to the same SAS cascade configuration are as follows:

DE#x1, DE#x2, and DE#x3 that are connected to CE#x/DI Port#0 (x: 0 - B)

DE#x4, DE#x5, DE#x6, and DE#x7 that are connected to CE#x/DI Port#1 (x: 0 - B)

DE#x8, DE#x9, DE#xA, and DE#xB that are connected to CE#x/DI Port#2 (x: 0 - B)

DE#xC, DE#xD, DE#xE, and DE#xF that are connected to CE#x/DI Port#3 (x: 0 - B)

(Example) DE#01, DE#02, and DE#03 that are connected to CE#0/DI Port#0 are on the same SAS cascade.

DE selection list box

Model	Option	DE group
ETERNUS DX60 S5	DE#0x	CE, DE#01 - DE#03 (for 3.5" DEs)
ETERNUS DX100 S5	DE#0x	CE, DE#01 - DE#0A
ETERNUS DX200 S5	DE#0x	CE, DE#01 - DE#0A
ETERNUS DX500 S5	DE#0x	CE, DE#01 - DE#05
	DE#1x	DE#10 - DE#15
	DE#2x	DE#20 - DE#25
	DE#3x	DE#30 - DE#35
ETERNUS DX600 S5	DE#0x	CE, DE#01 - DE#0A
	DE#1x	DE#10 - DE#1A
	DE#2x	DE#20 - DE#2A
	DE#3x	DE#30 - DE#3A

3. RAID Group RAID Group (Basic Information)

Model	Option	DE group
ETERNUS DX900 S5	DE#0x	CE#0, DE#01 - DE#0F
	DE#1x	CE#1, DE#11 - DE#1F
	DE#Cx	DE#C0 - DE#CF
	DE#Dx	DE#D0 - DE#DF
	DE#Ex	DE#E0 - DE#EF
	DE#Fx	DE#F0 - DE#FF
ETERNUS DX8100 S4	DE#0x	CE
	DE#1x	DE#10
ETERNUS DX8900 S4	DE#0x	CE#0 (*1), DE#01 - DE#0F
	DE#1x	CE#1 (*1), DE#11 - DE#1F
	DE#2x	CE#2 (*1), DE#21 - DE#2F
	DE#3x	CE#3 (*1), DE#31 - DE#3F
	DE#4x	CE#4 (*1), DE#41 - DE#4F
	DE#5x	CE#5 (*1), DE#51 - DE#5F
	DE#6x	CE#6 (*1), DE#61 - DE#6F
	DE#7x	CE#7 (*1), DE#71 - DE#7F
	DE#8x	CE#8 (*1), DE#81 - DE#8F
	DE#9x	CE#9 (*1), DE#91 - DE#9F
	DE#Ax	CE#A (*1), DE#A1 - DE#AF
	DE#Bx	CE#B (*1), DE#B1 - DE#BF
ETERNUS AF150 S3	DE#0x	CE
ETERNUS AF250 S3	DE#0x	CE, DE#01 - DE#0A
ETERNUS AF650 S3	DE#0x	CE, DE#01 - DE#0A
	DE#1x	DE#10 - DE#1A
	DE#2x	DE#20 - DE#2A
	DE#3x	DE#30 - DE#3A

*1: Only 2.5" drives can be installed.

■ Operating Procedures

Automatically Selecting Drives to Create RAID Groups

Procedure ▶▶▶

- 1 Click [Create] in [Action].
- 2 Select "Automatic" for "Create Mode".
- 3 Specify the RAID group detailed information, and click the [Create] button.
→ A confirmation screen appears.

Caution

- An error screen appears in the following conditions:
 - The "Name" overlaps with an existing name (when one RAID group is created)
 - The "Name" does not satisfy the input conditions
 - RAID groups cannot be created by using the drives that are installed in the storage system

3. RAID Group RAID Group (Basic Information)

- 4 Click the [OK] button.
→ RAID group creation starts.
- 5 Click the [Done] button to return to the [RAID Group] screen.



Manually Selecting Drives to Create RAID Groups

Procedure ▶▶▶

- 1 Click [Create] in [Action].
- 2 Select "Manual" for "Create Mode".
- 3 Specify the RAID group detailed information.
- 4 Select drives using a list of the drives or the installation location image.

Note

- When the number of drives for each RAID level and the number of selected drives does not match, the [Create] button cannot be clicked.

- 5 Click the [Create] button.
→ A confirmation screen appears.

Caution

- An error screen appears in the following conditions:
 - The "Name" overlaps with an existing RAID group name
 - The "Name" does not satisfy the input conditions
 - The drive layout does not satisfy the required conditions
(Refer to ""[Conditions for the ETERNUS DX8100 S4/DX8900 S4 Drive Layout](#)" (page 272)" for details.)
 - The specified Stripe Depth is not allowed for the RAID level

- 6 Click the [OK] button.
→ RAID group creation starts.
- 7 Click the [Done] button to return to the [RAID Group] screen.



Delete RAID Group

- "[■ Overview](#)" (page 275)
- "[■ User Privileges](#)" (page 276)
- "[■ Operating Procedures](#)" (page 276)

■ Overview

This function deletes the registered RAID groups in the storage system.

When a RAID group is deleted, the status of the drives that configured the RAID group change to data drives that are not used by any RAID group.

Caution

- The following RAID groups cannot be deleted:
 - RAID groups in which volumes are registered
 - RAID groups that are registered in [TPPs](#) or [FTRPs](#)
 - RAID groups that are registered as [REC Disk Buffers](#)
 - RAID groups that are registered as Extreme Cache Pools
- When deleting a RAID group where volumes are registered, delete the volumes in advance.
- Up to 128 RAID groups can be deleted at once.

■ **User Privileges**

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	✓
StorageAdmin	✓
AccountAdmin	
SecurityAdmin	
Maintainer	✓

Refer to "[A. User Roles and Policies](#)" (page 1580) for details on the policies and roles.

■ **Operating Procedures**

Procedure ▶▶▶

- 1 Select the RAID group that is to be deleted (multiple selections can be made) and click [Delete] in [Action].
→ A confirmation screen appears.
- 2 Click the [OK] button.
→ The RAID group deletion starts.
- 3 Click the [Done] button to return to the [RAID Group] screen.



Rename RAID Group

- "[Overview](#)" (page 276)
- "[User Privileges](#)" (page 277)
- "[Settings](#)" (page 277)
- "[Display Contents](#)" (page 277)
- "[Operating Procedures](#)" (page 279)

■ **Overview**

This function changes the name of RAID groups that are registered in the storage system. Multiple RAID groups can be renamed with a single operation.

3. RAID Group RAID Group (Basic Information)

Caution

- The following RAID groups cannot be renamed.
 - RAID groups that configure [FTSPs](#)
 - RAID groups that are registered as Extreme Cache Pools
 - RAID group which "Usage" is "Temporary"

■ User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	✓
StorageAdmin	✓
AccountAdmin	
SecurityAdmin	
Maintainer	✓

Refer to "[A. User Roles and Policies](#)" (page 1580) for details on the policies and roles.

■ Settings

Specify a new RAID group name.

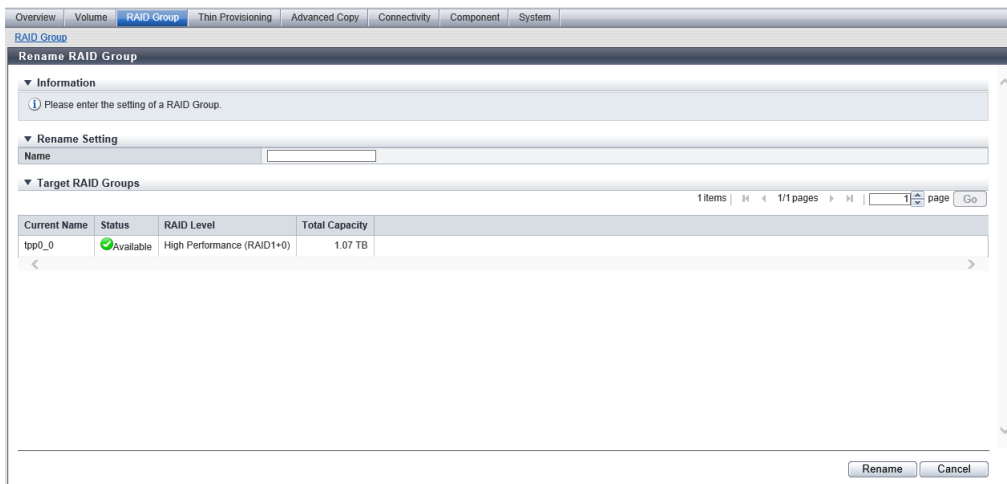
Rename Setting

Item	Description	Setting values
Name	Specify a new RAID group name. When changing the name of a single RAID group, an existing RAID group name cannot be used.	Up to 16 alphanumeric characters, symbols (except "," (comma) and "?"), and spaces
Start of Suffix	Input the starting number of the suffix that is to be added to the new RAID group name. When changing multiple RAID group names, the suffix number is added to the RAID group names with consecutive numbers in ascending order starting with the entered suffix number. Refer to " Naming Conventions for Renaming RAID Groups " (page 278) for details. When changing only one RAID Group name, the "Start of Suffix" field is not displayed.	Numeric characters ("0" - "99999") Decimal number 1 - 5 digits

■ Display Contents

The information of the selected RAID group is displayed.

3. RAID Group RAID Group (Basic Information)



Target RAID Groups

Item	Description
Current Name	The current RAID group name is displayed.
Status	The RAID group status is displayed. Refer to "RAID Group Status" (page 1605) for details.
RAID Level	The RAID level is displayed. High Performance (RAID1+0) High Capacity (RAID5) High Reliability (RAID6) High Reliability (RAID6-FR) Reliability (RAID5+0) Mirroring (RAID1) Striping (RAID0)
Total Capacity	The total capacity of the RAID groups is displayed.

Naming Conventions for Renaming RAID Groups

- When changing multiple volume names, the specified "Name" and the suffix numbers "x" are automatically added to RAID groups. However, if the start suffix is "00" or "000", "0" will be added to the "Name".
(Example) Specified RAID group name: RAIDGroup_aaaa (14 characters) and specifying "1" for "Start of Suffix" → Name for created RAID group: RAIDGroup_aaaa1, RAIDGroup_aaaa2, etc.
- When the RAID group name including the suffix number has more than 16 characters, the excess number of characters is deleted from the "Name", starting with the last character and a suffix number "~x" will be added. Then, the name will contain only 16 characters.
(Example) Specified RAID group name: RAIDGroup_aaaabb (16 characters) and specifying "100" for "Start of Suffix" → Name for created RAID group: RAIDGroup_aa~100, RAIDGroup_aa~101, etc.
- When a RAID group name including the suffix number already exists, the suffix number is increased by one (+1). The suffix number is increased by one (+1) until no RAID group names overlap.

■ Operating Procedures

Procedure ▶▶▶

- 1 Select the RAID group to be renamed (multiple selections can be made) and click [Rename] in [Action].
- 2 Input the new "Name" and the "Start of Suffix", and click the [Rename] button.
→ A confirmation screen appears.

Caution

- An error screen appears in the following conditions:
 - The "Name" is not entered
 - The "Name" does not satisfy the input conditions
 - The existing RAID group name is entered (when one RAID group is selected)
 - The "Start of Suffix" is not specified (when multiple RAID groups are selected)
 - The value in the "Start of Suffix" does not satisfy the input conditions (when multiple RAID groups are selected)

- 3 Click the [OK] button.
→ Renaming of RAID group starts.
 - 4 Click the [Done] button to return to the [RAID Group] screen.
-



Change Controlling CM

- ["■ Overview" \(page 279\)](#)
- ["■ User Privileges" \(page 280\)](#)
- ["■ Settings" \(page 281\)](#)
- ["■ Display Contents" \(page 283\)](#)
- ["■ Operating Procedures" \(page 284\)](#)

■ Overview

This function changes the Controlling CM that is allocated to the RAID group. Unequal loading between the CMs can be resolved by changing the Controlling CM.

Caution

- The work I/O performance of the entire storage system is lowered because the storage system status is changed to Write Through mode while the Controlling CM is being changed. Therefore, it is recommended to change the Controlling CM when work I/O is low. It may take up to several tens of minutes for changing the Controlling CM.
- This function cannot be used under the following conditions:
 - A CE that is in a state other than "✔Normal" and "ⓘUndefined" exists
 - A CM that is in a state other than "✔Normal" and "⚠Warning" exists
 - A BBU (BTU/BCU) that is in a state other than "✔Normal" exists
 - Formatting is being performed in the volumes that are registered in the target RAID group
 - Encryption is being performed in the target RAID group
 - The target RAID group status is not "✔Available"
 - The rebuild, copyback, or redundancy copy is being performed in the target RAID group
 - If the target RAID group belongs to the TPPs where Deduplication, Compression, or both are enabled, the status of the [Data Container Volume](#) in the relevant TPP is "🔄Readying", "❌Not Available", "❌Not Ready", "❌Broken", or "❌Data Lost"
 - The cache mode of the storage system is "Write Through Mode"
 - [LDE](#) is being performed in the storage system
 - [LUN Concatenation](#) is being performed in the storage system
 - The [RAID migration](#) is being performed in the storage system
 - The RAID group diagnosis is being performed in the storage system
 - The disk diagnosis is being performed in the storage system
 - The TPV balancing is being performed in the storage system
 - The FTRP balancing is being performed in the storage system
 - [Pinned data](#) exists in the storage system

Note

- The Controlling CM can be changed for RAID groups that configure [TPPs](#).

■ **User Privileges**

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	✔
StorageAdmin	✔
AccountAdmin	
SecurityAdmin	
Maintainer	✔

Refer to ""[A. User Roles and Policies](#)" (page 1580)" for details on the policies and roles.

■ Settings

In this screen, select the Controlling CM of the RAID group.

Change Controlling CM Setting

Item	Description	Setting values
New Controlling CM	Select the new Controlling CM. "Automatic" and the normal CM number ("CE#x CM#y" or "CM#y") that is installed are displayed as options. Select "Automatic" for normal operations. When "Automatic" is selected, the Controlling CM that is to be allocated is determined by the RAID group number. Refer to ""Automatic Controlling CM Setting" (page 281)" for details.	For the ETERNUS DX900 S5 or the ETERNUS DX8900 S4 Automatic CE#x CM#y For the other models Automatic CM#y x: CE number y: CM number

Automatic Controlling CM Setting

The Controlling CM is determined by the value of the remainder when the RAID group number is divided by the number of controllers. If CMs are not installed or if a failed CM exists, the controlling CM is assigned to balance the load in the normal CMs.

When Using Storage Systems Other than the ETERNUS DX900 S5 or the ETERNUS DX8900 S4, and All the CMs Are Installed in a Normal State:

Remainder when dividing the RAID group number by the number of CMs (2)	Controlling CM assignment
0	CM#0
1	CM#1

When Using the ETERNUS DX900 S5 or the ETERNUS DX8900 S4, and All the CMs Are Installed in a Normal State:

Remainder when dividing the RAID group number by the number of CMs	Number of CMs (Number of CEs)											
	2 (1CE)	4 (2CE)	6 (3CE)	8 (4CE)	10 (5CE)	12 (6CE)	14 (7CE)	16 (8CE)	18 (9CE)	20 (10CE)	22 (11CE)	24 (12CE)
0	CE#0 CM#0	CE#0 CM#0	CE#0 CM#0	CE#0 CM#0	CE#0 CM#0	CE#0 CM#0	CE#0 CM#0	CE#0 CM#0	CE#0 CM#0	CE#0 CM#0	CE#0 CM#0	CE#0 CM#0
1	CE#0 CM#1	CE#1 CM#1	CE#2 CM#1	CE#3 CM#1	CE#4 CM#1	CE#5 CM#1	CE#6 CM#1	CE#7 CM#1	CE#8 CM#1	CE#9 CM#1	CE#A CM#1	CE#B CM#1
2	-	CE#1 CM#0	CE#1 CM#0	CE#1 CM#0	CE#1 CM#0	CE#1 CM#0	CE#1 CM#0	CE#1 CM#0	CE#1 CM#0	CE#1 CM#0	CE#1 CM#0	CE#1 CM#0

3. RAID Group
RAID Group (Basic Information)

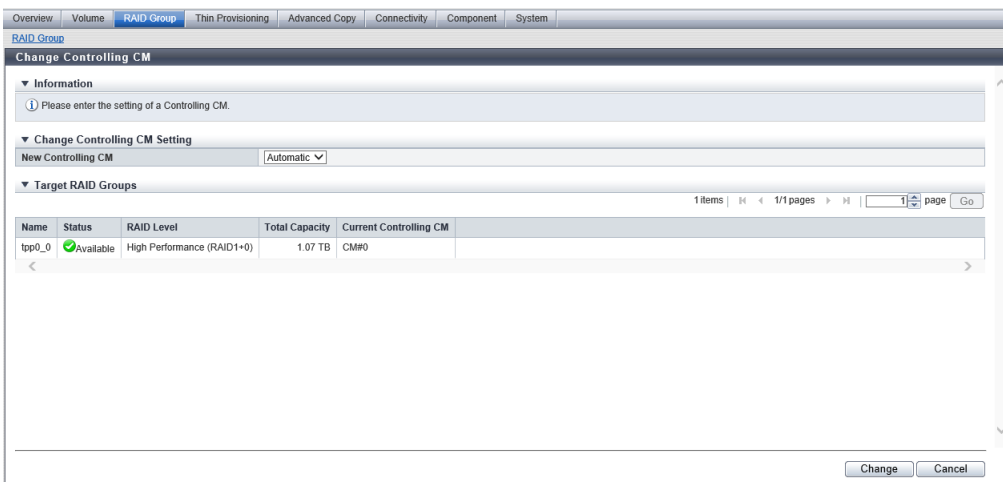
Remainder when dividing the RAID group number by the number of CMs	Number of CMs (Number of CEs)											
	2 (1CE)	4 (2CE)	6 (3CE)	8 (4CE)	10 (5CE)	12 (6CE)	14 (7CE)	16 (8CE)	18 (9CE)	20 (10CE)	22 (11CE)	24 (12CE)
3	-	CE#0 CM#1	CE#1 CM#1	CE#2 CM#1	CE#3 CM#1	CE#4 CM#1	CE#5 CM#1	CE#6 CM#1	CE#7 CM#1	CE#8 CM#1	CE#9 CM#1	CE#A CM#1
4	-	-	CE#2 CM#0	CE#2 CM#0	CE#2 CM#0	CE#2 CM#0	CE#2 CM#0	CE#2 CM#0	CE#2 CM#0	CE#2 CM#0	CE#2 CM#0	CE#2 CM#0
5	-	-	CE#0 CM#1	CE#1 CM#1	CE#2 CM#1	CE#3 CM#1	CE#4 CM#1	CE#5 CM#1	CE#6 CM#1	CE#7 CM#1	CE#8 CM#1	CE#9 CM#1
6	-	-	-	CE#3 CM#0	CE#3 CM#0	CE#3 CM#0	CE#3 CM#0	CE#3 CM#0	CE#3 CM#0	CE#3 CM#0	CE#3 CM#0	CE#3 CM#0
7	-	-	-	CE#0 CM#1	CE#1 CM#1	CE#2 CM#1	CE#3 CM#1	CE#4 CM#1	CE#5 CM#1	CE#6 CM#1	CE#7 CM#1	CE#8 CM#1
8	-	-	-	-	CE#4 CM#0	CE#4 CM#0	CE#4 CM#0	CE#4 CM#0	CE#4 CM#0	CE#4 CM#0	CE#4 CM#0	CE#4 CM#0
9	-	-	-	-	CE#0 CM#1	CE#1 CM#1	CE#2 CM#1	CE#3 CM#1	CE#4 CM#1	CE#5 CM#1	CE#6 CM#1	CE#7 CM#1
10	-	-	-	-	-	CE#5 CM#0	CE#5 CM#0	CE#5 CM#0	CE#5 CM#0	CE#5 CM#0	CE#5 CM#0	CE#5 CM#0
11	-	-	-	-	-	CE#0 CM#1	CE#1 CM#1	CE#2 CM#1	CE#3 CM#1	CE#4 CM#1	CE#5 CM#1	CE#6 CM#1
12	-	-	-	-	-	-	CE#6 CM#0	CE#6 CM#0	CE#6 CM#0	CE#6 CM#0	CE#6 CM#0	CE#6 CM#0
13	-	-	-	-	-	-	CE#0 CM#1	CE#1 CM#1	CE#2 CM#1	CE#3 CM#1	CE#4 CM#1	CE#5 CM#1
14	-	-	-	-	-	-	-	CE#7 CM#0	CE#7 CM#0	CE#7 CM#0	CE#7 CM#0	CE#7 CM#0
15	-	-	-	-	-	-	-	CE#0 CM#1	CE#1 CM#1	CE#2 CM#1	CE#3 CM#1	CE#4 CM#1
16	-	-	-	-	-	-	-	-	CE#8 CM#0	CE#8 CM#0	CE#8 CM#0	CE#8 CM#0
17	-	-	-	-	-	-	-	-	CE#0 CM#1	CE#1 CM#1	CE#2 CM#1	CE#3 CM#1
18	-	-	-	-	-	-	-	-	-	CE#9 CM#0	CE#9 CM#0	CE#9 CM#0
19	-	-	-	-	-	-	-	-	-	CE#0 CM#1	CE#1 CM#1	CE#2 CM#1
20	-	-	-	-	-	-	-	-	-	-	CE#A CM#0	CE#A CM#0
21	-	-	-	-	-	-	-	-	-	-	CE#0 CM#1	CE#1 CM#1

3. RAID Group
RAID Group (Basic Information)

Remainder when dividing the RAID group number by the number of CMs	Number of CMs (Number of CEs)											
	2 (1CE)	4 (2CE)	6 (3CE)	8 (4CE)	10 (5CE)	12 (6CE)	14 (7CE)	16 (8CE)	18 (9CE)	20 (10CE)	22 (11CE)	24 (12CE)
22	-	-	-	-	-	-	-	-	-	-	-	CE#B CM#0
23	-	-	-	-	-	-	-	-	-	-	-	CE#0 CM#1

■ Display Contents

The information of the selected RAID group is displayed.



Target RAID Groups

Item	Description
Name	The RAID group name is displayed.
Status	The RAID group status is displayed. Refer to "RAID Group Status" (page 1605) for details.
RAID Level	The RAID level is displayed. High Performance (RAID1+0) High Capacity (RAID5) High Reliability (RAID6) High Reliability (RAID6-FR) Reliability (RAID5+0) Mirroring (RAID1) Striping (RAID0)
Total Capacity	The total capacity of the RAID groups is displayed.

3. RAID Group
RAID Group (Basic Information)

Item	Description
Current Controlling CM	The current Controlling CM of the RAID group are displayed. For the ETERNUS DX900 S5 or the ETERNUS DX8900 S4 CE#x CM#y For the other models CM#y x: CE number y: CM number

■ Operating Procedures

Procedure ▶▶▶

- 1 Select the RAID group to change the Controlling CM (multiple selections can be made) and click [Change Controlling CM] in [Action].

Caution

- [Change Controlling CM] cannot be clicked if a RAID group whose "Usage" is "Extreme Cache Pool" is selected.

- 2 Select the Controlling CM after changing, and click the [Change] button.
→ A confirmation screen appears.
- 3 Click the [OK] button.
→ Changing Controlling CM starts.

Caution

- During Controlling CM change, the storage system status is changed from Write Back mode to Write Through mode.

- 4 Click the [Done] button to return to the [RAID Group] screen.



Expand RAID Group

- "■ Overview" (page 284)
- "■ User Privileges" (page 287)
- "■ Display Contents" (page 287)
- "■ Settings" (page 288)
- "■ Operating Procedures" (page 292)

■ Overview

This function adds drives to the existing RAID group by using the [Logical Device Expansion \(LDE\)](#) function to dynamically expand the RAID group capacity. This function can also dynamically change the RAID level of an existing RAID group.

RAID group expansion provides the following features without stopping the storage system operation:

- RAID group expansion add drives to the existing RAID group in units of one drive. This enables capacity expansion of RAID groups with smaller number of drive expansion.
- RAID groups can be expanded and any existing data in these RAID groups is retained.

Requirements for RAID Groups to Expand Capacity

- The RAID group status is "✔Available"
- [Standard](#) type volumes, [SDVs](#), or [SDPVs](#) are registered
- [WSVs](#) are not registered
- Not registered in [TPP](#)
- Not registered in [FTRP](#)
- Not registered as an [REC Disk Buffer](#)
- Not registered as an Extreme Cache Pool
- RAID level is not "RAID5+0" or "RAID6-FR"
- The RAID group is not blocked
- Rebuild, copyback, or redundant copy is not being performed
- The Controlling CM is not being changed
- One of the following functions is not being performed for the volume that is registered in the RAID group
 - Format Volume
 - Expand Volume
 - [RAID Migration](#)
 - Encrypt Volume
- Storage Migration paths are not created in the volume that is registered in the RAID group
- Is not a RAID group with the stripe size expanded (*1)

*1: A RAID group with more than 128KB of "Stripe Depth" specified in the [RAID Group Detail] screen of [RAID Group (Basic Information)]. Note that the Stripe Depth value for RAID1 cannot be changed.

Requirements for the Storage System to Expand Capacity

- The cache mode is "Write Back Mode"
- All the CMs are in the normal state
- The battery status is "✔Normal"
- LDE is not being performed
- RAID group diagnosis is not being performed
- Disk diagnosis is not being performed
- Application of controller firmware is not being performed
- Application of disk firmware is not being performed

3. RAID Group
RAID Group (Basic Information)

Caution

- Before expanding the RAID group, back up data in all the logical volumes that are stored in the target RAID group to a different location (if not, data cannot be recovered when expansion fails). If expansion fails, data can be recovered from the backed up data.
- The expansion of capacity can only be performed for one RAID group at a time.
- RAID group expansion cannot be suspended.
- The following operations cannot be used for RAID groups in which RAID group expansion is being performed:
 - Format Volume
 - Create Volume
 - Encrypt Volume
 - RAID Migration for the volume
 - Expand Volume
 - Hot Preventive Maintenance
 - RAID Group Diagnosis
 - Disk Diagnosis
- For some combinations of RAID levels, LDE cannot be used. Refer to "[Availability of LDE for Each Combination of RAID Levels](#)" for details.

Note

- RAID groups can be expanded when the RAID group capacity after performing expansion is the same or larger than the current RAID group capacity.
- When expanding the drive capacity that configures a RAID group, use the [Start RAID Migration] function instead of this function.

Availability of LDE for Each Combination of RAID Levels (LDE is Available: ✓)

The following table shows the availability of LDE functions (changing RAID levels or capacity expansion by adding drives).

		RAID level after changing						
		RAID0	RAID1	RAID1+0	RAID5	RAID5+0	RAID6	RAID6-FR
RAID level before changing	RAID0	✓		✓	✓		✓	
	RAID1			✓	✓		✓	
	RAID1+0			✓	✓		✓	
	RAID5			✓	✓		✓	
	RAID5+0							
	RAID6			✓	✓		✓	
	RAID6-FR							

3. RAID Group
RAID Group (Basic Information)

■ User Privileges

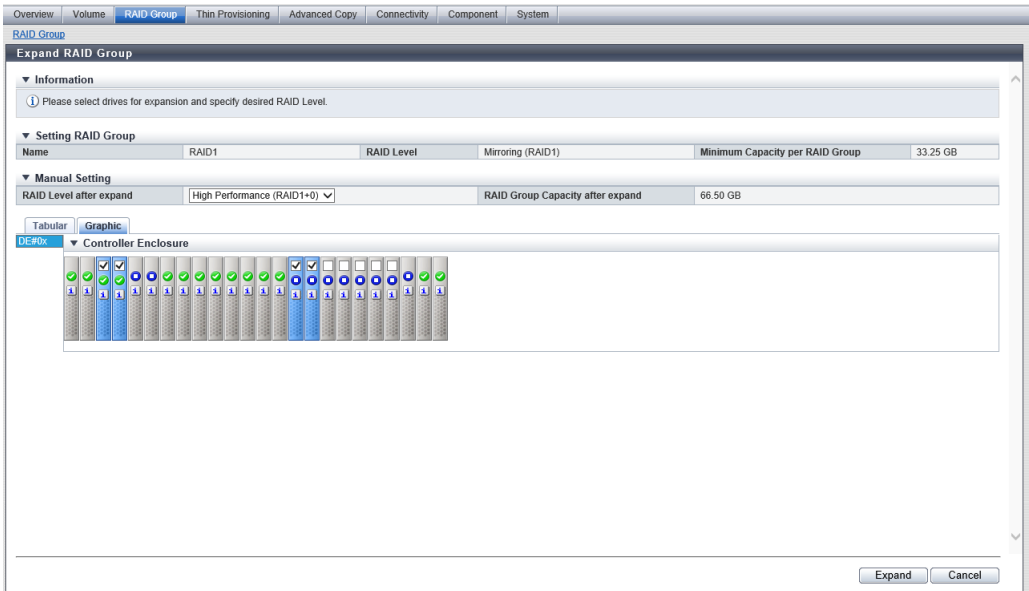
Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	✓
StorageAdmin	✓
AccountAdmin	
SecurityAdmin	
Maintainer	✓

Refer to ""A. User Roles and Policies" (page 1580)" for details on the policies and roles.

■ Display Contents

In this screen, the RAID groups for which capacity is to be expanded are displayed.



Setting RAID Group

Item	Description
Name	The RAID group name is displayed.
RAID Level	The current RAID level is displayed. High Performance (RAID1+0) High Capacity (RAID5) High Reliability (RAID6) Mirroring (RAID1) Striping (RAID0)
Minimum Capacity per RAID Group	The current capacity of the RAID group is displayed.

■ Settings

Manual Setting

Item	Description	Setting values
RAID Level after expand	Select the RAID level after expansion is performed. The selectable RAID levels are displayed as options in the list box.	High Performance (RAID1+0) High Capacity (RAID5) High Reliability (RAID6) Striping (RAID0) The currently set RAID level is the default value. However, "High Performance (RAID1+0)" is displayed if the current RAID level is RAID1.
RAID Group Capacity after expand	The RAID group capacity after expansion is displayed. The capacity is automatically calculated from the selected RAID level and drives. If no drives are selected or if RAID groups cannot be configured with the selected drives, a "-" (hyphen) is displayed.	

Drive Selection

Drives can be selected from the list or the installation image. To switch between the list and the installation image, click the tab.

3. RAID Group RAID Group (Basic Information)

Requirements for selecting drives

- The drive requirements for adding to RAID groups are listed below.
 - The drive status is " Present"
 - The drives are not registered in any RAID group, [TPP](#), [FTRP](#), [REC Disk Buffer](#), or Extreme Cache Pool
 - The drives are not registered as hot spares
 - The drive type ([Online/Nearline/SSD/Online SED/Nearline SED/SSD SED](#)) must be the same (Although "Online" type drives and "Nearline" type drives can be used in the same RAID group, using only "Online" type drives or using only "Nearline" type drives is recommended. Also, "Online SED" type drives and "Nearline SED" type drives can be used in the same RAID group, but using only "Online SED" type drives or using only "Nearline SED" type drives is recommended. This is because the available capacity and the access performance may be reduced when these drives are used in the same RAID group.)
 - Drives that have the same or larger capacity than the drive with the smallest capacity in the expansion target RAID group
 - If "RAID1+0" or "RAID5" is selected for the RAID level after an expansion, drives that are 6 TB or larger (except SSDs and SSD SEDs) cannot be specified.
(Note that when drives that are 6 TB or larger (except SSDs and SSD SEDs) already exist in the RAID group before the expansion, these drives can be used after changing the RAID level.)
- Drive recommendations for adding to RAID groups are listed below.
 - Use drives that have the same capacity and speed as the drives that configure the expansion target RAID group. If drives of different capacities exist in a RAID group, the smallest capacity becomes the standard for the RAID group after expansion, and all other drives are regarded as having the same capacity as the smallest drive. In this case, the remaining drive space is not used. In addition, if drives of different speeds exist in a RAID group, the access performance of the RAID group is reduced by the slower drives.
 - When the Dedicated Hot Spare is registered for the expansion target RAID group, use the drive smaller than the Dedicated Hot Spare capacity.
 - Select the same sector format of drive (AF-compliant/non-AF-compliant) as the drives that are used to configure the expansion target RAID group.
 - When "RAID1+0" is selected for the RAID level after an expansion, allocate the drives (mirroring pair drives) by dividing them into two or more connection lines (for the ETERNUS DX500 S5/DX600 S5/DX900 S5 and the ETERNUS AF650 S3).
 - When "RAID5" or "RAID6" is selected for the RAID level after an expansion, allocate the drives (multiple drives configuring a striping) by dividing them into two or more connection lines (for the ETERNUS DX500 S5/DX600 S5/DX900 S5 and the ETERNUS AF650 S3).
- There are conditions for the ETERNUS DX8900 S4 drive layout. Refer to "[Conditions for the ETERNUS DX8900 S4 Drive Layout](#)" (page 291)" for details. Note that these conditions are not applied to other models.

[Tabular] Tab

Click the [Tabular] tab to select drives from the list. The drives that are being used in the selected RAID group and the unused drives that can be used for expansion are displayed on the list. There are conditions for the ETERNUS DX8900 S4 drive layout. Refer to "[Conditions for the ETERNUS DX8900 S4 Drive Layout](#)" (page 291)" for details. Note that these conditions are not applied to other models.

Item	Description
Checkbox to select drives	<p>The checkbox for the drive being used in the selected RAID group is selected.</p> <p>Select the checkbox for the drive that is to be used after expansion.</p> <p>Clear the checkbox for the drive that is not used after expansion.</p> <p>When selecting drives, refer to "Requirements for selecting drives" (page 289)".</p>

3. RAID Group RAID Group (Basic Information)


Item	Description
Enclosure	<p>The enclosure where the drive is installed is displayed.</p> <p>CE: Controller Enclosure (2.5" and 3.5") DE: Drive Enclosure (2.5", 3.5", and 3.5" high density DEs)</p> <p>CE#x DE#yy x: CE number yy: DE number</p>
Slot No.	<p>The slot number of the enclosure where the drive is installed is displayed.</p> <p>2.5" CE/DE: 0 - 23 3.5" CE/DE: 0 - 11 3.5" high density DE: 0 - 59</p>
Drive Type	<p>The drive type displayed for this item is a combination of the following.</p> <ul style="list-style-type: none"> • Drive size <ul style="list-style-type: none"> - For 2.5-inch drives: 2.5" - For 3.5-inch drives: 3.5" • Drive type <ul style="list-style-type: none"> - For SAS disks: Online - For Nearline SAS disks: Nearline - For SSDs, the following items are displayed depending on the SSD type. <ul style="list-style-type: none"> • For SSD-Hs (12 Gbit/s): SSD-H (*1) • For SSD-Ms (12 Gbit/s): SSD-M (*1) • For SSD-Ls (12 Gbit/s): SSD-L (*1) <p>Note that "SED" is also displayed for self encrypting drives and "AF" is also displayed for Advanced Format compliant drives.</p> <p>*1: The displayed item varies depending on the interface speed (bandwidth) or the capacity of the reserved space. Unless otherwise specified, "SSD-H", "SSD-M", and "SSD-L" are collectively referred to as "SSD". In addition, there may be cases when "SSD SED" is used as the collective term for self encrypting SSD-Hs, SSD-Ms, and SSD-Ls.</p>
Capacity	<p>The capacity of the drive is displayed.</p> <div style="background-color: #fff9c4; padding: 10px; border: 1px solid #ccc;"> <p>Caution</p> <ul style="list-style-type: none"> • The displayed drive capacity may differ from the product's actual capacity. For example, the drive capacity of a "1.92 TB SSD" is displayed as "2.00 TB" and the capacity of an "18 TB Nearline SAS disk" is displayed as "17.9 TB". </div>
Speed	<p>The drive speed is displayed.</p> <p>For SSD or SSD SED, a "-" (hyphen) is displayed.</p> <p>15000 rpm 10000 rpm 7200 rpm</p>
RAID Group	<p>For the drive being used, the RAID group number and the RAID group name are displayed.</p> <p>For the unused drive, a "-" (hyphen) is displayed.</p>

[Graphic] Tab

Click the [Graphic] tab to select drives from the drive installation image. The installation images of all the drives installed in the storage system are displayed.

3. RAID Group
RAID Group (Basic Information)

There are conditions for the ETERNUS DX8900 S4 drive layout. Refer to ["Conditions for the ETERNUS DX8900 S4 Drive Layout" \(page 291\)](#) for details. Note that these conditions are not applied to other models.

Item	Description	Setting values
DE selection list box	Select the DE group. Options are displayed in the list box when at least one CE or DE in the DE group is installed in the storage system. Refer to "DE selection list box" (page 273) for details on the options and DE groups for each model.	DE#0x DE#1x DE#2x DE#3x DE#4x DE#5x DE#6x DE#7x DE#8x DE#9x DE#Ax DE#Bx DE#Cx DE#Dx DE#Ex DE#Fx
DE	Only the CEs or the DEs in the selected DE group that are installed in the storage system are displayed. CE#x DE#yy x: CE number yy: DE number	
Checkbox to select drives	The checkbox for the drive being used in the selected RAID group is selected. Select the checkbox for the drive that is to be used after expansion. Clear the checkbox for the drive that is not used after expansion. For 2.5" CEs or 2.5" DEs, drives are displayed from left to right in ascending order of the slot number. For 3.5" CEs, 3.5" DEs, or 3.5" high density DEs, drives are displayed from bottom left to top right in ascending order of the slot number. Placing the mouse pointer on the  icon displays the detailed information of the drive. When selecting drives, refer to "Requirements for selecting drives" (page 289) .	

Conditions for the ETERNUS DX8900 S4 Drive Layout

The drive layout to configure RAID groups in the ETERNUS DX8900 S4 must satisfy the conditions described below.

RAID groups cannot be created if the required conditions are not satisfied.

RAID level after changing	Drive layout conditions	
RAID1+0	Required	Allocate mirroring pair drives to different DEs.
	Recommended	Allocate striping drives to DEs under as many CEs as possible. Allocate striping drives to as many SAS cascades (*1) as possible.
RAID5	Required	Allocate member drives to different DEs.
	Recommended	Distribute member drives to DEs under as many CEs as possible. Distribute member drives to as many SAS cascades (*1) as possible.

3. RAID Group
RAID Group (Basic Information)

RAID level after changing	Drive layout conditions	
RAID6	Required	Allocate two or less member drives to the same DE.
	Recommended	Distribute member drives to DEs under as many CEs as possible. Distribute member drives to as many SAS cascades (*1) as possible.

*1: "SAS cascade" for the ETERNUS DX8900 S4 refers to DEs that are attached to one drive interface port. The DEs that are allocated to the same SAS cascade configuration are as follows:

- DE#x1, DE#x2, and DE#x3 that are connected to CE#x/DI Port#0 (x: 0 - B)
 - DE#x4, DE#x5, DE#x6, and DE#x7 that are connected to CE#x/DI Port#1 (x: 0 - B)
 - DE#x8, DE#x9, DE#xA, and DE#xB that are connected to CE#x/DI Port#2 (x: 0 - B)
 - DE#xC, DE#xD, DE#xE, and DE#xF that are connected to CE#x/DI Port#3 (x: 0 - B)
- (Example) DE#01, DE#02, and DE#03 that are connected to CE#0/DI Port#0 are on the same SAS cascade.

Caution

- The requirements for selecting drives to change the RAID level are listed below.
 - When the RAID level before and after LDE is not changed:
 - The drives that are used in the RAID group before LDE was performed cannot be deleted.
 - When the RAID level is changed after LDE:
 - The number of RAID group data drives (*1) after LDE cannot be less than the number before LDE.

*1: "Number of data drives" indicates the number of logical drives in RAID groups that contain user data. This number is different for each RAID level, as shown below.

RAID Level	Drive configuration (*2)	Number of data drives
RAID1+0	nD + nM	n
RAID5	nD + 1P	n
RAID6	nD + 2P	n
RAID1	1D + 1M	1
RAID0	nD	n

*2: D: Data drives, M: Mirror drives, P: Parity drives

- Drives that are not used after changing the RAID level can be deleted from the RAID group. However, not all of the drives can be deleted from a RAID group.

■ Operating Procedures

Procedure ▶▶▶

- 1 Select the RAID group that is to be expanded and click [Expand] in [Action].

Caution

- [Expand] cannot be clicked when the following RAID group is selected.
 - The RAID level is "RAID5+0" or "RAID6-FR".
 - The usage is "Extreme Cache Pool"
 - WSVs are registered
 - The stripe size is not "64KB"

- 2 Select the RAID level after expansion and the drives that are to be used after expansion. Click the [Expand] button.
→ A confirmation screen appears.

Caution

- An error screen appears in the following conditions:
 - The selected number of drives exceeds the maximum number
 - The drive layout does not satisfy the required conditions
(Refer to ""Conditions for the ETERNUS DX8900 S4 Drive Layout" (page 291)" for details.)

- 3 Click the [OK] button.
→ RAID group expansion starts.
- 4 Click the [Done] button to return to the [RAID Group] screen.



Recover RAID Group

- ["■ Overview" \(page 293\)](#)
- ["■ User Privileges" \(page 294\)](#)
- ["■ Settings" \(page 294\)](#)
- ["■ Display Contents" \(page 294\)](#)
- ["■ Operating Procedures" \(page 297\)](#)

■ Overview

This function recovers the RAID groups that are in failed status.
There are two methods available for recovery:

- Force Recover RAID Group
The RAID groups are forcibly recovered by changing the drive status.
- Conduct Drive Maintenance
If forcible recovery of the RAID groups is not possible, perform the following operations to recover the RAID group:

Procedure ▶▶▶

- 1 Back up any data that can be recovered (if required)
- 2 Perform hot maintenance for any drives with the "❌Broken" state
- 3 Format all the volumes in the RAID group
- 4 Restore backed up data and recover the data



Requirements for Recovering a RAID Group

- The RAID group status is "❌Broken"
- A drive with the "❌Failed Usable" state exists in the RAID group
- No error occurs for writing from the host to the "❌Failed Usable" drive
- No error occurs for accessing all the drives in the RAID group

3. RAID Group
RAID Group (Basic Information)

- The RAID group is not blocked

Caution

- If the forcibly recovery of a RAID group is interrupted, the RAID group is blocked. However, a forcible recovery of the RAID group can be performed again.
- Follow the Support Department instructions when this function is required.

Note

- After a RAID group is recovered, perform hot maintenance for any drives with the "Broken" state.

■ User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	
StorageAdmin	
AccountAdmin	
SecurityAdmin	
Maintainer	✓

Refer to "A. User Roles and Policies" (page 1580) for details on the policies and roles.

■ Settings

Select the RAID group recovering method.

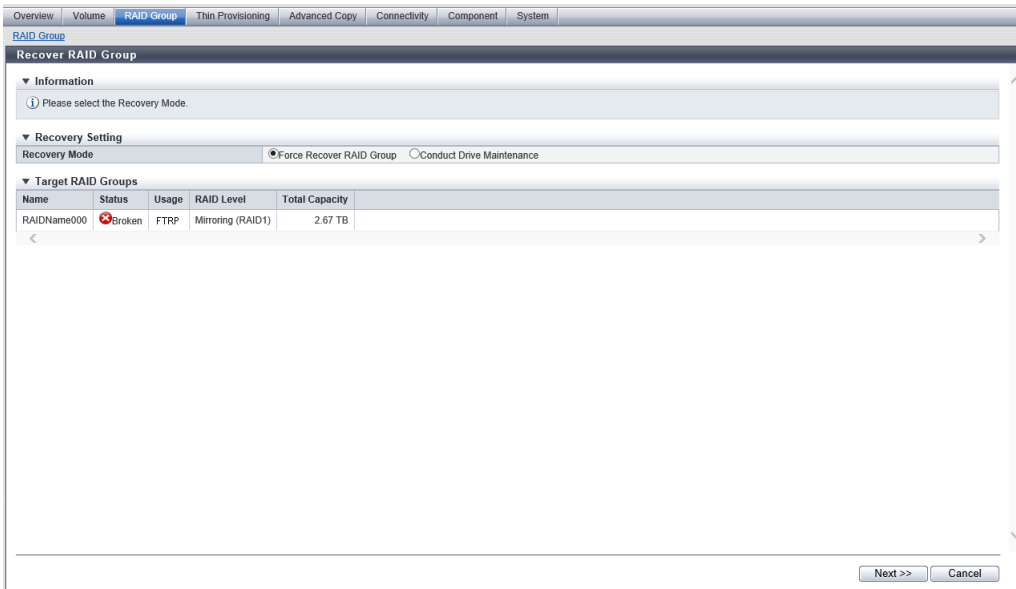
Recovery Setting

Item	Description	Setting values
Recovery Mode	Select the RAID group recovering method. <ul style="list-style-type: none"> • Force Recover RAID Group The RAID groups are forcibly recovered by changing the drive status. • Conduct Drive Maintenance The RAID groups are recovered by performing the drive hot maintenance. 	Force Recover RAID Group Conduct Drive Maintenance


■ Display Contents

In this screen, the RAID groups that are selected in the [RAID Group] screen are displayed.


3. RAID Group RAID Group (Basic Information)



Target RAID Groups

Item	Description
Name	The RAID group name is displayed.
Status	The RAID group status is displayed.  Broken
Usage	The usage of the RAID group is displayed. Standard Standard / WSV WSV TPP FTRP RDB Temporary
RAID Level	The RAID level is displayed. High Performance (RAID1+0) High Capacity (RAID5) High Reliability (RAID6) High Reliability (RAID6-FR) Reliability (RAID5+0) Mirroring (RAID1) Striping (RAID0)
Total Capacity	The total capacity of the RAID groups is displayed.

[Force Recover RAID Group] Screen


Drives can be checked from the list or the installation image. To switch between the list and the installation image, click the tab. Only the drives with the " Broken" state in the selected RAID group are displayed.

3. RAID Group
RAID Group (Basic Information)

[Tabular] Tab

Item	Description
Enclosure	<p>The enclosure where the drive is installed is displayed.</p> <p>CE: Controller Enclosure (2.5" and 3.5") DE: Drive Enclosure (2.5", 3.5", and 3.5" high density DEs)</p> <p>CE CE#x DE#yy x: CE number yy: DE number</p>
Slot No.	<p>The slot number of the enclosure where the drive is installed is displayed.</p> <p>2.5" CE/DE: 0 - 23 3.5" CE/DE: 0 - 11 3.5" high density DE: 0 - 59</p>
Type	<p>The drive type displayed for this item is a combination of the following.</p> <ul style="list-style-type: none"> • Drive size <ul style="list-style-type: none"> - For 2.5-inch drives: 2.5" - For 3.5-inch drives: 3.5" • Drive type <ul style="list-style-type: none"> - For SAS disks: Online - For Nearline SAS disks: Nearline - For SSDs, the following items are displayed depending on the SSD type. <ul style="list-style-type: none"> • For SSD-Hs (12 Gbit/s): SSD-H (*1) • For SSD-Ms (12 Gbit/s): SSD-M (*1) • For SSD-Ls (12 Gbit/s): SSD-L (*1) <p>Note that "SED" is also displayed for self encrypting drives and "AF" is also displayed for Advanced Format compliant drives.</p> <p>*1: The displayed item varies depending on the interface speed (bandwidth) or the capacity of the reserved space. Unless otherwise specified, "SSD-H", "SSD-M", and "SSD-L" are collectively referred to as "SSD". In addition, there may be cases when "SSD SED" is used as the collective term for self encrypting SSD-Hs, SSD-Ms, and SSD-Ls.</p>
Capacity	<p>The capacity of the drive is displayed.</p>
Speed	<p>The drive speed is displayed.</p> <p>For SSD or SSD SED, a "-" (hyphen) is displayed.</p> <p>15000 rpm 10000 rpm 7200 rpm</p>

[Graphic] Tab

Item	Description
(Drive display)	<p>For 2.5" CEs or 2.5" DEs, the slot numbers are applied from left to right in ascending order. For 3.5" CEs, 3.5" DEs, or 3.5" high density DEs, the slot numbers are applied from the bottom left to the top right in ascending order.</p> <p>Placing the mouse pointer on the  icon displays the detailed information of the drive.</p>

■ Operating Procedures

When Selecting "Force Recover RAID Group"

Procedure ▶▶▶

- 1 Select the RAID group that is to be recovered and click [Recover RAID Group] in [Action].
- 2 Select "Force Recover RAID Group" for the recovery mode, and click the [Next >>] button.
→ Preparation for forcible recovery starts.
- 3 Perform the maintenance operation according to the procedure displayed in the "[Force Recover RAID Group] Screen" (page 295).
- 4 After completing maintenance for all of the drives, click the [Recover] button.
→ A confirmation screen appears.
- 5 Click the [OK] button.
→ Forcible recovery starts.
- 6 Click the [Done] button to return to the [RAID Group] screen.



When Selecting "Conduct Drive Maintenance"

Procedure ▶▶▶

- 1 Select the RAID group that is to be recovered and click [Recover RAID Group] in [Action].
- 2 Select "Conduct Drive Maintenance" for the recovery mode, and click the [Next >>] button.
- 3 Click the [Recover] button.
→ A confirmation screen appears.
- 4 Click the [OK] button.
→ Preparation for recovery starts.
- 5 Click the [Done] button to return to the [RAID Group] screen.
- 6 Perform hot maintenance of the drives.



Start RAID Group Diagnosis

- "■ Overview" (page 297)
- "■ User Privileges" (page 298)
- "■ Settings" (page 299)
- "■ Display Contents" (page 299)
- "■ Operating Procedures" (page 304)

■ Overview

This function is used to check the integrity of the RAID group during restoration from an error status of the storage system, such as simultaneous failure of multiple CMs and multiple drive failure, especially where the integrity of the user data is a concern.

This enables the starting and stopping of RAID group diagnosis.

Requirements for Starting the RAID Group Diagnosis

- The status of the RAID group is "Available"
- The RAID level is not "RAID0"
- Volumes are created in the RAID group
- The RAID group is not blocked
- The RAID group is not registered as an Extreme Cache Pool
- One of the following functions is not being performed for the target RAID group
 - Format Volume (*)
 - Expand Volume (*)
 - Encrypt Volume (*)
 - RAID Migration (*)
 - Expand RAID Group (*)
 - Rebuild, Copyback, or Redundant Copy
 - RAID Group Diagnosis (*)
 - Disk Diagnosis (*)
 - Capacity releasing of the RAID group which belongs to a TPP
 - Capacity releasing of the RAID group which belongs to an FTRP
 - Balancing TPV (*)
 - Balancing FTRP (*)

*: Note that RAID group diagnosis cannot be started even when these functions are performed for other RAID groups in the storage system.

Caution

- RAID group diagnosis starts in cold mode. Before starting the RAID group diagnosis, stop host access.
- Do not start the RAID group diagnosis while functions ([Advanced Copy](#), Initialize SDV, etc.) for accessing the drive are running.
- If RAID group diagnosis is already running, a new RAID group diagnosis cannot be started.
- Once a RAID group diagnosis is started, other functions cannot be executed until the diagnosis is complete and the diagnosis results (diagnosis detailed information and error detailed information) are cleared.
- Do not perform RAID group diagnosis for RAID groups that have volumes with Storage Migration paths.
- When selecting multiple RAID groups to start a RAID diagnosis, the diagnosis cannot be started if one of the selected RAID group does not satisfy the required conditions. Refer to "[Requirements for Starting the RAID Group Diagnosis](#)" (page 298) for details.

■ User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	

3. RAID Group
RAID Group (Basic Information)

Default role	Availability of executions
Admin	
StorageAdmin	
AccountAdmin	
SecurityAdmin	
Maintainer	✓

Refer to ""A. User Roles and Policies" (page 1580)" for details on the policies and roles.

■ Settings

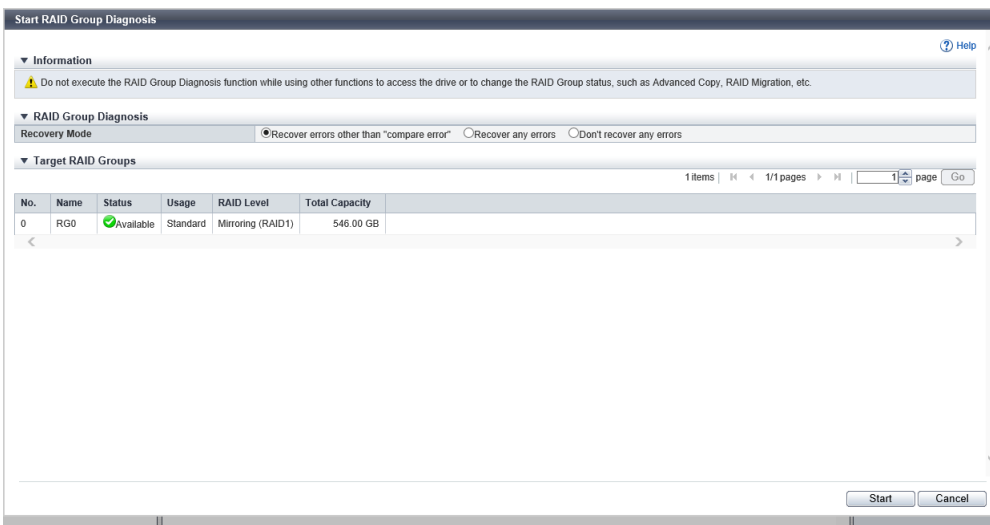
Select the recovery mode when executing RAID group diagnosis.

RAID Group Diagnosis

Item	Description	Setting values
Recovery Mode	<p>Select the recovery mode.</p> <p>In any of the following modes, the RAID group diagnosis continues without stopping even when an error occurs.</p> <ul style="list-style-type: none"> Recover errors other than "compare error" If errors other than the compare error occur, the storage system will automatically recover these errors. Recover any errors The location where an error occurred is automatically recovered. The recovery process varies depending on the RAID level, but this refers to the process for recovering the redundancy of the RAID group, such as by copying user data, regenerating parity, etc. Don't recover any errors The location where an error occurred is not automatically recovered. 	<p>Recover errors other than "compare error"</p> <p>Recover any errors</p> <p>Don't recover any errors</p>

■ Display Contents

The information of the selected RAID group is displayed.



3. RAID Group RAID Group (Basic Information)

Target RAID Groups

Item	Description
No.	The RAID group number is displayed.
Name	The RAID group name is displayed.
Status	The RAID group status is displayed. Refer to " "RAID Group Status" (page 1605) " for details.
Usage	The usage of the RAID group is displayed. <ul style="list-style-type: none"> • Standard A RAID group that is used for creating "Standard", "SDV", or "SDPV" type volumes. • Standard / WSV A RAID group that is used for creating the following volumes: <ul style="list-style-type: none"> - "WSV" and "Standard" - "WSV" and "SDV" - "WSV" and "SDPV" • WSV A RAID group that is used for creating "WSV" type volumes. • TPP A RAID group that belongs to a TPP. • FTRP A RAID group that belongs to an FTRP. • RDB A RAID group that is registered as an REC Disk Buffer. • Temporary A RAID group that is temporarily created while LDE is being performed.
RAID Level	The RAID level is displayed. High Performance (RAID1+0) High Capacity (RAID5) High Reliability (RAID6) High Reliability (RAID6-FR) Reliability (RAID5+0) Mirroring (RAID1)
Total Capacity	The total capacity of the RAID groups is displayed.

[Display RAID Group Diagnosis Information] Screen

This screen displays the RAID group diagnosis progress. Detailed diagnosis results can be checked by clicking the [Name] link.

RAID Group Diagnosis

Item	Description
Diagnosis Status	The general status of all the RAID group diagnoses that are being performed is displayed. Before Diagnosis Diagnosing Complete Cancel
Recovery Mode	The recovery mode is displayed. Recover errors other than "compare error" Recover any errors Don't recover any errors

3. RAID Group RAID Group (Basic Information)

Item	Description
Diagnosis Progress	The general progress of all the RAID group diagnoses that are being performed is displayed as a ratio (0 to 100 %) and a bar.

Target RAID Groups

Item	Description
Checkbox	Select the RAID group for which the RAID group diagnosis is to be stopped.
No.	The RAID group number is displayed.
Name	The RAID group name is displayed. By clicking this item, "[Display Detailed RAID Group Diagnosis Information] Screen" (page 301) is displayed.
Status	The RAID group status is displayed. Refer to "'RAID Group Status' (page 1605)" for details.
RAID Level	The RAID level is displayed. High Performance (RAID1+0) High Capacity (RAID5) High Reliability (RAID6) High Reliability (RAID6-FR) Reliability (RAID5+0) Mirroring (RAID1)
Total Capacity	The total capacity of the RAID groups is displayed.
Diagnosis Status	The RAID group diagnosis status is displayed. Not Target Before Diagnosis Diagnosing Complete Cancel Error Stopped
Diagnosis Result	The RAID group diagnosis results are displayed. Normal Warning Error Cancel

Function Button

Button	Description
[Stop]	Stops the diagnosis for the selected RAID group (multiple selections can be made).
[Refresh]	Updates "Diagnosis Status" and "Diagnosis Result" of all the RAID group diagnoses.
[Done]	Completes all the RAID group diagnoses. By clicking this button, the RAID group diagnosis results are deleted. The [Done] button can be clicked when "Diagnosis Status" is not "Diagnosing".

[Display Detailed RAID Group Diagnosis Information] Screen

In this screen, the detailed diagnosis results are displayed.

3. RAID Group RAID Group (Basic Information)

RAID Group Diagnosis

Item	Description
Diagnosis Status	The RAID group diagnosis status is displayed. Not Target Before Diagnosis Diagnosing Complete Cancel Error Stopped
Recovery Mode	The recovery mode is displayed. Recover errors other than "compare error" Recover any errors Don't recover any errors
Diagnosis Result	The RAID group diagnosis results are displayed. Normal Warning Error Cancel
Diagnosis Progress	The progress of a RAID group diagnosis is displayed with a bar and a ratio (0 to 100 %).
RAID Group Diagnosis Completed LBA Count	The number of blocks where diagnosis has been complete in the RAID group is displayed.
RAID Group Total LBA Count	The total number of blocks in the RAID group is displayed.

Diagnosis Count

Item	Description
Compare Error	Recovery Succeeded The number of recovered compare errors that are detected during the RAID consistency check is displayed.
	Recovery Failed The number of compare errors that are detected during the RAID consistency check, but failed to recover is displayed.
Medium Error	Recovery Succeeded The number of recovered medium errors that are detected is displayed.
	Recovery Failed The number of medium errors that are detected, but failed to recover is displayed.
CRC Error	Recovery Succeeded The number of recovered Cyclic Redundancy Code (CRC) errors that are detected is displayed. CRC error is detected by "Check Code check" performed for the RAID groups of all RAID types. Check Code check verifies the data contents by checking whether the CRC of the Check Code that is added to one block (512 bytes) of user data is the same as the CRC generated from the user data.
	Recovery Failed The number of CRC errors that are detected, but failed to recover is displayed.
Block ID Error	Recovery Succeeded The number of recovered Block ID errors that are detected is displayed. Block ID error is detected by "Check Code check" performed for the RAID groups of all RAID types. Check Code check verifies whether the data is received from the user-specified address by checking the Block ID of the Check Code that is added to one block (512 bytes) of user data, RAID ID of the volume, and LBA.
	Recovery Failed The number of Block ID errors that are detected, but failed to recover is displayed.

3. RAID Group RAID Group (Basic Information)

Item		Description
Bad Data Flag Error	Recovery Succeeded	The number of recovered Bad Data flag errors that are detected is displayed. Bad Data Flag error is detected when the redundant data stored in the same area of both drives is missing.
	Recovery Failed	The number of Bad Data flag errors that are detected, but failed to recover is displayed.

Error Detail Information

The detailed error information is displayed.

Item	Description
No.	The number of detailed error information is displayed.
Error Status	The status of the detected error is displayed. Compare Error Medium Error CRC Error Block ID Error Bad Data Flag Error
Volume No.	The volume number where the error is detected is displayed. Note that a "-" (hyphen) is displayed in the following conditions. <ul style="list-style-type: none"> An error is detected in a TPP that is not assigned to a TPV An error is detected in an FTRP that is not assigned to an FTV The volume where an error is detected cannot be identified
Volume name	The volume name where an error is detected is displayed. Note that this item is blank in the following conditions. <ul style="list-style-type: none"> An error is detected in a TPP that is not assigned to a TPV An error is detected in an FTRP that is not assigned to an FTV The volume where an error is detected cannot be identified
CC	A "-" (hyphen) is displayed.
HH	A "-" (hyphen) is displayed.
Logical Volume LBA	The volume LBA where an error is detected is displayed. Note that a "-" (hyphen) is displayed in the following conditions. <ul style="list-style-type: none"> An error is detected in a TPP that is not assigned to a TPV An error is detected in an FTRP that is not assigned to an FTV The LBA of the volume where an error is detected cannot be identified
RAID Group LBA	The LBA of the RAID group where an error is detected is displayed.
Error Stripe No.	The stripe number where the error is detected is displayed. If there is no stripe, such as for RAID1, a "-" (hyphen) is displayed.
Location	The installation location of the drive where an error is detected is displayed. CE Slot#y CE#x Slot#y DE##zz Slot#y x: CE number y: Slot number zz: DE number
Error Drive LBA	The drive LBA where an error is detected is displayed.

■ Operating Procedures

Start RAID Group Diagnosis

Procedure ▶▶▶

- 1 Select the RAID group for which the RAID group diagnosis is to be started (multiple selections can be made) and click [Start Diagnosis] in [Action].

Caution

- [Start Diagnosis] cannot be clicked when the following RAID group is selected.
 - The RAID level is "RAID0"
 - The usage is "Extreme Cache Pool"
- If RAID group diagnosis or disk diagnosis is currently being executed in the storage system, a message to that effect appears.

- 2 Select the recovery mode, and click the [Start] button.
→ A confirmation screen appears.
- 3 Click the [OK] button.
→ RAID group diagnosis starts, and the "[Display RAID Group Diagnosis Information] Screen" (page 300) appears.

Note

- Click the [Name] link in the [Display RAID Group Diagnosis Information] screen to display the "[Display Detailed RAID Group Diagnosis Information] Screen" (page 301) for the selected RAID group.
- Click the [Refresh] button in the [Display RAID Group Diagnosis Information] screen to display the latest screen. When the progress rate of the diagnosis becomes "100 %", the diagnosis is regarded as completed.

- 4 After the diagnosis is complete, click the [Done] button.
→ A confirmation screen appears.

Note

- The [Done] button becomes available when all the RAID group diagnoses are completed or stopped.

- 5 Click the [OK] button.
→ Deletion of the RAID group diagnosis results is started.
- 6 Click the [Done] button to return to the [RAID Group] screen.



Stop RAID Group Diagnosis

Procedure ▶▶▶

- 1 Select the RAID group for which the RAID group diagnosis is to be stopped (multiple selections can be made) from the [Display RAID Group Diagnosis Information] screen and click the [Stop] button.
→ A confirmation screen appears.

3. RAID Group
RAID Group (Basic Information)

- 2 Click the [OK] button.
→ The RAID group diagnosis is stopped.
- 3 After the process for stopping the diagnosis is complete, the display returns to the [Display RAID Group Diagnosis Information] screen.



Tuning

- ["■ Overview" \(page 305\)](#)
- ["■ User Privileges" \(page 305\)](#)
- ["■ Display Contents" \(page 305\)](#)
- ["■ Filter Setting" \(page 307\)](#)

■ Overview

The RAID group tuning information is displayed.

■ User Privileges

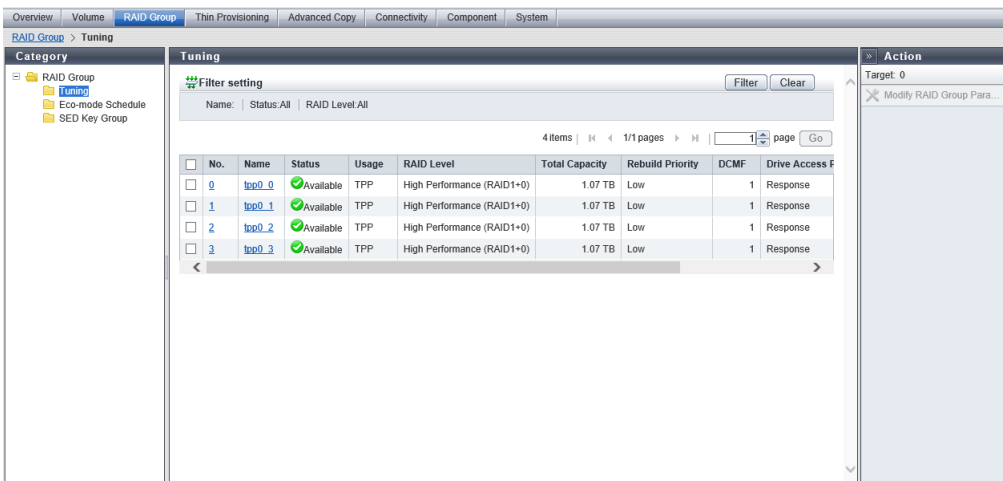
Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	✓
Admin	✓
StorageAdmin	✓
AccountAdmin	
SecurityAdmin	✓
Maintainer	✓

Refer to ["A. User Roles and Policies" \(page 1580\)](#) for details on the policies and roles.

■ Display Contents

The tuning information of the RAID groups is displayed on a list.



3. RAID Group
RAID Group (Basic Information)

RAID Group List

Item	Description
No.	The RAID group number is displayed. Click this item to display the " [RAID Group Detail] Screen ([Basic] Tab) " (page 256).
Name	The RAID group name is displayed. Click this item to display the " [RAID Group Detail] Screen ([Basic] Tab) " (page 256).
Status	The RAID group status is displayed. Refer to " "RAID Group Status" (page 1605)" for details.
Usage	The usage of the RAID group is displayed. <ul style="list-style-type: none"> • Standard A RAID group that is used for creating "Standard", "SDV", or "SDPV" type volumes • Standard / WSV A RAID group that is used for creating the following volumes: <ul style="list-style-type: none"> - "WSV" and "Standard" - "WSV" and "SDV" - "WSV" and "SDPV" • WSV A RAID group that is used for creating "WSV" type volumes • TPP A RAID group that belongs to a TPP • FTRP A RAID group that belongs to an FTRP • RDB A RAID group that is registered as an REC Disk Buffer • Extreme Cache Pool A RAID group that is registered as an Extreme Cache Pool • "-" (hyphen) A RAID group that is not used
RAID Level	The RAID level is displayed. High Performance (RAID1+0) High Capacity (RAID5) High Reliability (RAID6) High Reliability (RAID6-FR) Reliability (RAID5+0) Mirroring (RAID1) Striping (RAID0)
Total Capacity	The total capacity of the RAID groups is displayed.
Rebuild Priority	The rebuild priority of the RAID group is displayed. When the Rebuild Priority is "Low", give priority to host access. When the Rebuild Priority is "Middle", give the same priority as the host access to rebuild, copyback, and redundant copy. When the Rebuild Priority is "High", give priority to rebuild, copyback, and redundant copy. A "-" (hyphen) is displayed if the RAID group is registered as an Extreme Cache Pool.
DCMF	The Drive Command Multiplying Factor (DCMF) (1 to 10) is displayed. If the DCMF is changed, the number of commands issued to the drive is increased in multiples of the DCMF set value (if DCMF is "2", it is double).

3. RAID Group RAID Group (Basic Information)

Item	Description
Drive Access Priority	The drive access priority is displayed. When "Response" is specified, responses to host I/O are given priority over throughput. When "Throughput" is specified, throughput is given priority over responses to host I/O. When the drives that configure the target RAID group are SSDs or SSD SEDs , a "-" (hyphen) is displayed.
Throttle	The throttle value is displayed. A throttle is the ratio of the number of commands to be issued to a drive at the same time to the maximum number of issuance. When the throttle value is "100 %", the maximum number of commands specified for each drive (the default number of commands) are issued. If "Disable" is selected for "Drive Tuning Parameter Setting" of [Modify RAID Group Parameters], a "-" (hyphen) is displayed. This item is not displayed when logged in using a user account that has a "Monitor" role.
Ordered Cut	Ordered Cut (0 - 65535) is displayed. "Ordered Cut" is the number of commands for optimizing the drive access process (priority control). When "Ordered Cut" is "x", the command to perform the priority control is issued for every x commands issued, and priority control is performed for the command issued before this command. When "Ordered Cut" is "0", the interval for priority control (priority control at every "x" commands) cannot be specified. All of the commands issued to the drive are processed according to their priority settings. A "-" (hyphen) is displayed in the following conditions: <ul style="list-style-type: none"> "Disable" is selected for "Drive Tuning Parameter Setting" of [Modify RAID Group Parameters] Drives that configure the target RAID group are SSDs or SSD SEDs This item is not displayed when logged in using a user account that has a "Monitor" role.

Caution

- RAID groups in which LDE is being performed are not displayed in the list.

■ Filter Setting

Function Description

Filter setting is a function used to display a list of only the RAID groups meeting all the specified conditions.

No filtering is set by default. The following table shows conditions that can be specified.

Item	Description	Setting values
Name	Input the RAID group name that is to be displayed. RAID groups matching or partially matching the entered name are displayed. When not using the RAID group name for filtering, leave this item blank.	RAID group name Blank
Status	Select the status of the RAID group that is to be displayed. When not using the RAID group status for filtering, select "All".	All Refer to "RAID Group Status" (page 1605) .
RAID Level	Select the RAID level of the RAID group that is to be displayed. When not using the RAID level for filtering, select "All".	All High Performance (RAID1+0) High Capacity (RAID5) High Reliability (RAID6) High Reliability (RAID6-FR) Reliability (RAID5+0) Mirroring (RAID1) Striping (RAID0)

Modify RAID Group Parameters

- "[■ Overview](#)" (page 308)
- "[■ User Privileges](#)" (page 309)
- "[■ Settings](#)" (page 309)
- "[■ Display Contents](#)" (page 311)
- "[■ Operating Procedures](#)" (page 312)

■ Overview

This function tunes the following parameters of each RAID group.

- Parameters Setting
 - Rebuild Priority
Specify the level to give priority to rebuild, copyback, and redundant copy instead of host access. Specifying a larger "Rebuild Priority" value may improve rebuild, copyback, and redundant copy performance.
- Advanced Settings
 - DCMF
DCMF is a coefficient for the command issuance amount of the drive. Specify this parameter to improve the sequential writing access performance. The bigger the value is, the more commands issue.
 - Drive Access Priority
This mode controls the command issuance order during drive access. Changing the command issuance order improves the throughput for all of the drives.
 - Throttle
Throttle is the proportion of the number of commands that are issued to a drive at the same time to the maximum number of commands that can be issued. By limiting the number of commands that are issued at the same time to the drive, the load on the specific RAID group (drive) is reduced.
 - Ordered Cut
Ordered Cut is the number of commands for optimizing drive access processing (priority control). By performing the priority control of commands in increments of the specified number, a long queue time for low-priority commands can be eliminated.

Caution

- For normal use, it is not necessary to change the default values of the RAID group parameters.
- When the "Rebuild Priority" setting is changed, the priority is changed not only for a rebuild, copyback, and redundant copy that will be performed after the setting is changed, but also for any rebuild, copyback, and redundant copy operations that are currently being performed.
- When the target RAID group is registered as an [REC Disk Buffer](#), do not select "High" for the "Rebuild Priority" setting. Even if "High" is selected, rebuilding, copyback, and redundant copy are performed with "Middle" priority during host access.
- Specify the same RAID group parameters for all of the RAID groups that configure a [WSV](#). If different RAID group parameters are specified, the host access performance may be reduced.
- If "Usage" for the selected RAID group is "Extreme Cache Pool", "Rebuild Priority" cannot be specified.
- This function cannot be used under the following conditions:
 - LDE is being performed in the storage system
 - The target RAID group belongs to an FTSP

3. RAID Group
RAID Group (Basic Information)

Note

- When specifying "Throttle" or "Ordered Cut", select "Enable" for "Drive Tuning Parameter Setting" in advance.
- RAID groups that configure a WSV can be checked in the [Volume Detail] screen ([Used RAID Group] tab). Refer to the [Volume (Basic Information)] function for details.

■ **User Privileges**

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	✓
StorageAdmin	✓
AccountAdmin	
SecurityAdmin	
Maintainer	✓

Refer to "[A. User Roles and Policies](#)" (page 1580) for details on the policies and roles.

■ **Settings**

In this screen, specify the RAID group parameters.

Parameters Setting

Item	Description	Setting values
Rebuild Priority	<p>Specify the rebuild priority.</p> <p>It is not necessary to change the default value for normal use. When not changing the setting, select "Do not change".</p> <p>When host access is not performed, rebuild, copyback, and redundant copy to RAID groups that is not registered as REC Disk Buffers are performed with "High" priority regardless of the "Rebuild Priority" setting.</p> <p>The rebuild priority of a RAID group cannot be changed if it is registered as an Extreme Cache Pool.</p> <ul style="list-style-type: none"> • Low Perform rebuild, copyback, and redundant copy with a normal priority. • Middle Give the same priority as the host access to rebuild, copyback, and redundant copy. • High Give priority to rebuild, copyback, and redundant copy over host access. <p>(Advantage of selecting "Middle" or "High") Rebuild, copyback, and redundant copy performance may improve when "Middle" or "High" is specified because priority is given to rebuild, copyback, and redundant copy instead of host access.</p> <p>(Disadvantage of selecting "Middle" or "High") Note that specifying higher "Rebuild Priority" may cause the degradation of RAID group performance (throughput) when rebuild, copyback, or redundant copy is being performed in the target RAID group.</p>	<p>Do not change</p> <p>Low (*1)</p> <p>Middle</p> <p>High (*2)</p> <p>*1 : Default (RAID level is not "RAID6-FR")</p> <p>*2 : Default (RAID level is "RAID6-FR")</p>

Advanced Settings

Item	Description	Setting values
DCMF	<p>Select "Change" and specify the Disk Command Multiplying Factor (DCMF).</p> <p>It is not necessary to change the default value for normal use. The maximum number of commands issued to a drive is changed to a multiple represented by the specified value. (If "DCMF" is "2", the number of commands is doubled. If "DCMF" is "3", the number of commands is tripled.) When not changing the setting, select "Do not change".</p> <p>(Advantage of a large value) The higher the DCMF value is, the more drive throughput is available, improving sequential performance.</p> <p>(Disadvantage of a large value) Note that high DCMF value may result in a high load on the drive, decreasing performance.</p>	<p>Do not change</p> <p>Change</p> <p>1 (Default) - 10</p>
Drive Access Priority	<p>Select the drive access priority from "Response" or "Throughput".</p> <p>It is not necessary to change the default value for normal use. When not changing the setting, select "Do not change". This item is not displayed when a RAID group that is configured with SSDs or SSD SEDs is selected. For SSDs and SSD SEDs, this item is fixed to "Response".</p> <ul style="list-style-type: none"> • Response Commands are issued in order during drive access to speed up a response to the host. • Throughput The command issuance order is changed and data is collectively written to the same drive during drive access to improve the throughput for all of the drives. <p>(Advantage of selecting "Throughput") The throughput for all of the drives is improved when "Throughput" is selected because data is collectively written to the same drive.</p> <p>(Disadvantage of selecting "Throughput") The performance of each command response may be reduced when "Throughput" is selected because queuing processes for host I/O are not performed by using the FIFO (first in, first out) method.</p>	<p>Do not change</p> <p>Response</p> <p>(Default)</p> <p>Throughput</p>
Drive Tuning Parameter Setting	<p>Specify whether to "Enable" or "Disable" the following drive tuning parameters.</p> <ul style="list-style-type: none"> • Throttle • Ordered Cut <p>It is not necessary to change the default value for normal use. When not changing the "Throttle" and "Ordered Cut" setting values, select "Do not change". Note that "Do not change" is always selected when this function is started.</p> <div style="background-color: #fff9c4; padding: 10px; margin-top: 10px;"> <p>Caution</p> <ul style="list-style-type: none"> • When selecting multiple RAID groups as the target of this function and "Enable" is specified for the "Drive Tuning Parameter Setting", the "Throttle" and "Ordered Cut" values set in this screen are applied to the target RAID groups. </div>	<p>Do not change</p> <p>Enable (Default)</p> <p>Disable</p>

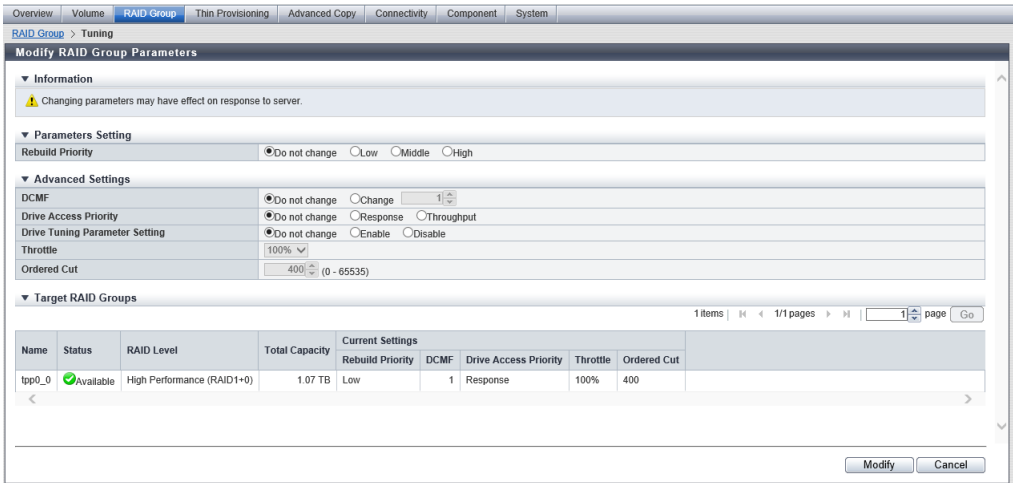
3. RAID Group
RAID Group (Basic Information)

Item	Description	Setting values
Throttle	<p>Select "Enable" for "Drive Tuning Parameter Setting" and specify "Throttle".</p> <p>"Throttle" is the proportion of the number of commands that are to be issued to a drive at the same time to the maximum number of command issuance. It is not necessary to change the default value for normal use. If a single RAID group is selected to start this function, the value that is currently set in the storage system is displayed. If multiple RAID groups are selected to start this function and the same value is specified for all the RAID groups in the storage system, that value is displayed. If a RAID group with a different "Throttle" exists in the storage system, "100 %" is displayed.</p> <p>(Advantage of a smaller value)</p> <p>Specifying a smaller number can limit the number of commands to be issued to a drive at the same time, resulting in reduction of the load onto the specific RAID group (drive). This setting can be used when the response performance of the specific RAID group (drive) is decreased due to a conflict between host I/Os or batch processes.</p> <p>(Disadvantage of a smaller value)</p> <p>Specifying a smaller throttle value decreases the number of commands processed by the drive at the same time, which might cause a longer queue time.</p> <div style="background-color: #fff9c4; padding: 10px; margin-top: 10px;"> <p>Caution</p> <ul style="list-style-type: none"> • If "Enable" is selected for "Drive Tuning Parameter Setting", not only is the "Throttle" value changed but the "Ordered Cut" value is changed as well. To keep the "Ordered Cut" value unchanged, specify the current parameter displayed in the "Current Settings" field. </div>	<p>100 %</p> <p>90 %</p> <p>80 %</p> <p>70 %</p> <p>60 %</p> <p>50 %</p> <p>40 %</p> <p>30 %</p> <p>20 %</p> <p>10 %</p>
Ordered Cut	<p>Select "Enable" for "Drive Tuning Parameter Setting" and specify "Ordered Cut".</p> <p>"Ordered Cut" is the number of commands to optimize drive access processing (priority control). When "Ordered Cut" is "x", the order is changed for every x commands based on the priority settings of the commands. It is not necessary to change the default value for normal use. If a single RAID group is selected to start this function, the value that is currently set in the storage system is displayed. If multiple RAID groups are selected to start this function and the same value is specified for all the RAID groups in the storage system, that value is displayed. If a RAID group with a different "Throttle" exists in the storage system, "0" is displayed.</p> <p>When "Ordered Cut" is "0", the number of commands for controlling the priority cannot be specified. All of the commands issued to the drive are processed according to their priority settings. The "Ordered Cut" value cannot be used for SSDs and SSD SEDs.</p> <p>(Advantage of a smaller value)</p> <p>Specifying a smaller value for [Ordered Cut] reduces the number of commands for priority control. Commands with lower priority are processed without delay.</p> <p>(Disadvantage of a smaller value)</p> <p>Specifying a smaller value for [Ordered Cut], priority control of commands is performed in increments for the specified number, which might cause a delay in processing commands with a higher priority.</p> <div style="background-color: #fff9c4; padding: 10px; margin-top: 10px;"> <p>Caution</p> <ul style="list-style-type: none"> • If "Enable" is selected for "Drive Tuning Parameter Setting", not only is the "Ordered Cut" value changed but the "Throttle" value is changed as well. To keep the "Throttle" value unchanged, specify the current parameter displayed in the "Current Settings" field. </div>	<p>0 - 65535</p> <p>400 (Default)</p>

■ Display Contents

The parameters of the selected RAID group is displayed.

3. RAID Group RAID Group (Basic Information)



Target RAID Groups

Item	Description	
Name	The RAID group name is displayed.	
Status	The RAID group status is displayed. Refer to "RAID Group Status" (page 1605) for details.	
RAID Level	The RAID level is displayed. High Performance (RAID1+0) High Capacity (RAID5) High Reliability (RAID6) High Reliability (RAID6-FR) Reliability (RAID5+0) Mirroring (RAID1) Striping (RAID0)	
Total Capacity	The total capacity of the RAID groups is displayed.	
Current Settings	Rebuild Priority	The current rebuild priority of the RAID group is displayed. A "-" (hyphen) is displayed if the RAID group is registered as an Extreme Cache Pool.
	DCMF	The current DCMF (1 to 10) of the RAID group is displayed.
	Drive Access Priority	The current drive access priority of the RAID group is displayed. When the drives that configure the target RAID group are SSDs or SSD SEDs, a "-" (hyphen) is displayed.
	Throttle	The current throttle of the RAID group is displayed. When "Drive Tuning Parameter Setting" is disabled, a "-" (hyphen) is displayed.
	Ordered Cut	The current ordered cut (0 to 65535) of the RAID group is displayed. When "Drive Tuning Parameter Setting" is disabled, or the configuration drives of the RAID group are SSDs or SSD SEDs, a "-" (hyphen) is displayed.

Operating Procedures

Procedure ▶▶▶

- 1 Select which RAID groups to change the RAID group parameters for (multiple selections can be made) and click [Modify RAID Group Parameters] in [Action].
- 2 Specify the RAID group parameters and click the [Modify] button.
→ A confirmation screen appears.

Caution

- The response performance to the server may be affected by changing RAID group parameters.

- 3 Click the [OK] button.
→ The RAID group parameter modification starts.
- 4 Click the [Done] button to return to the [RAID Group] screen.



Eco-mode Schedule (RAID Group)

- "[■ Overview](#)" (page 313)
- "[■ User Privileges](#)" (page 313)
- "[■ Display Contents](#)" (page 313)
- "[■ Filter Setting](#)" (page 315)

■ Overview

This function displays the set state of the [Eco-mode](#) that is applied for the RAID group.

Note

- To use the Eco-mode, it is required to create the common Eco-mode setup and Eco-mode schedule. Refer to the [Modify Eco-mode General Setting] function and the [Create Eco-mode Schedule] function for details.
- To assign the Eco-mode schedule to RAID groups, use the [Assign Eco-mode Schedule (RAID Group)] function.

■ User Privileges

Availability of Executions in the Default Role

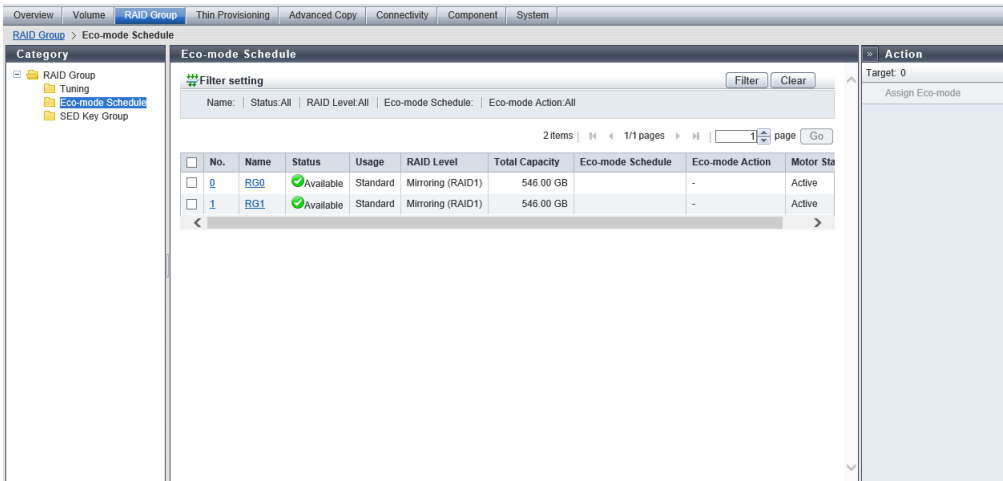
Default role	Availability of executions
Monitor	✓
Admin	✓
StorageAdmin	✓
AccountAdmin	
SecurityAdmin	✓
Maintainer	✓

Refer to "[A. User Roles and Policies](#)" (page 1580) for details on the policies and roles.

■ Display Contents

In this screen, the set state of the Eco-mode that is assigned to the RAID group is displayed.

3. RAID Group RAID Group (Basic Information)



RAID Group List

Item	Description
No.	The RAID group number is displayed. Click this item to display the "[RAID Group Detail] Screen ([Basic] Tab)" (page 256).
Name	The RAID group name is displayed. Click this item to display the "[RAID Group Detail] Screen ([Basic] Tab)" (page 256).
Status	The RAID group status is displayed. Refer to "'RAID Group Status" (page 1605)" for details.
Usage	The usage of the RAID group is displayed. <ul style="list-style-type: none"> Standard A RAID group that is used for creating "Standard", "SDV", or "SDPV" type volumes. Standard / WSV A RAID group that is used for creating the following volumes: <ul style="list-style-type: none"> "WSV" and "Standard" "WSV" and "SDV" "WSV" and "SDPV" WSV A RAID group that is used for creating "WSV" type volumes
RAID Level	The RAID level is displayed. High Performance (RAID1+0) High Capacity (RAID5) High Reliability (RAID6) High Reliability (RAID6-FR) Reliability (RAID5+0) Mirroring (RAID1) Striping (RAID0)
Total Capacity	The total capacity of the RAID groups is displayed.
Eco-mode Schedule	The Eco-mode schedule name that is assigned to the RAID group is displayed. If the Eco-mode is controlled with FUJITSU ETERNUS SF Storage Management Software, "External" is displayed. When no Eco-mode schedule has been assigned, the field is blank.

3. RAID Group RAID Group (Basic Information)

Item	Description
Eco-mode Action	<p>The Eco-mode schedule action status is displayed.</p> <p>When no Eco-mode schedule has been assigned, a "-" (hyphen) is displayed.</p> <ul style="list-style-type: none"> • Drive power off The power for the drive is turned off during Eco-mode operation. • Drive motor off The drive motor is stopped during Eco-mode operation. • Drive always on The Eco-mode is disabled and the drive is always on.
Motor Status	<p>The drive motor status is displayed.</p> <ul style="list-style-type: none"> • Active The drive motors are activated. • In the Boot Process The drive motors are starting up. • Idle The drive motors are stopped. • In the Stop Process The drive motors are being stopped. • Power Off The drive power is being turned off.

■ Filter Setting

Function Description

Filter setting is a function used to display a list of only the RAID groups meeting all the specified conditions.

No filtering is set by default. The following table shows conditions that can be specified.

Item	Description	Setting values
Name	<p>Input the RAID group name that is to be displayed.</p> <p>RAID groups matching or partially matching the entered name are displayed.</p> <p>When not using the RAID group name for filtering, leave this item blank.</p>	<p>RAID group name</p> <p>Blank</p>
Status	<p>Select the status of the RAID group that is to be displayed.</p> <p>When not using the RAID group status for filtering, select "All".</p>	<p>All</p> <p>Refer to ""RAID Group Status" (page 1605)".</p>
RAID Level	<p>Select the RAID level of the RAID group that is to be displayed.</p> <p>When not using the RAID level for filtering, select "All".</p>	<p>All</p> <p>High Performance (RAID1+0)</p> <p>High Capacity (RAID5)</p> <p>High Reliability (RAID6)</p> <p>High Reliability (RAID6-FR)</p> <p>Reliability (RAID5+0)</p> <p>Mirroring (RAID1)</p> <p>Striping (RAID0)</p>
Eco-mode Schedule	<p>Input the Eco-mode schedule name of the RAID group that is to be displayed.</p> <p>The RAID groups with an Eco-mode schedule that matching or partially matching the entered name are displayed.</p> <p>When not using the Eco-mode schedule for filtering, leave this item blank.</p>	<p>Eco-mode schedule name</p> <p>"External"</p> <p>Blank</p>

3. RAID Group
RAID Group (Basic Information)

Item	Description	Setting values
Eco-mode Action	<p>Select the Eco-mode action of the RAID group that is to be displayed.</p> <ul style="list-style-type: none"> To display RAID groups that will have the power cut to the drives during Eco-mode operation, select "Drive power off". To display RAID groups that will have the drive motors stopped during Eco-mode operation, select "Drive motor off". To display RAID groups that are always active by disabling Eco-mode, select "Drive always on". To display RAID groups without Eco-mode schedules, select "-" (hyphen). 	<p>All</p> <p>Drive power off</p> <p>Drive motor off</p> <p>Drive always on</p> <p>"-" (hyphen)</p>

Assign Eco-mode Schedule (RAID Group)

- ["■ Overview" \(page 316\)](#)
- ["■ User Privileges" \(page 318\)](#)
- ["■ Settings" \(page 318\)](#)
- ["■ Display Contents" \(page 319\)](#)
- ["■ Operating Procedures" \(page 320\)](#)

■ Overview

This function assigns the Eco-mode schedule to the RAID groups and sets the **Eco-mode** action. There are three Eco-mode actions; "Drive power off", "Drive motor off", and "Drive always on". To enable the Eco-mode, assign the Eco-mode schedule to a RAID group and select "Drive power off" or "Drive motor off" as the Eco-mode action. When Eco-mode is enabled, the drives are activated during the scheduled event period. In the time periods outside the scheduled event, the drive status is changed according to the specified Eco-mode actions. Refer to "Drive Status When Eco-mode Action Is Configured" for details.

If the RAID group is accessed from the host while the drives are turned off or the drive motors are stopped, the drives are activated and can be accessed within 1 - 5 minutes.

Drive Status When Eco-mode Action Is Configured

Eco-mode Schedule Setting			Eco-mode General Settings		
			Enabled		Disabled
			Drive power	Drive motor	
Eco-mode Action	Drive power off	During scheduled event term	Drive power is on	Drive motor is activated	Drive power is on or the drive motor runs regardless of the schedule.
		Times other than scheduled event term (*1)	Drive power is off	Drive motor is stopped	
	Drive motor off	During scheduled event term	Drive power is on	Drive motor is activated	
		Times other than scheduled event term (*1)	Drive power is on	Drive motor is stopped	
Drive always on			Drive power is on	Drive motor is always activated	
Eco-mode schedule is not assigned			Drive power is on	Drive motor is always activated	
Drives not registered in the RAID groups			Drive power is on	Drive motors are always stopped	

3. RAID Group RAID Group (Basic Information)

*1: If the RAID group is accessed, the drives are activated and can be accessed within 1 - 5 minutes.

Caution

- When using Eco-mode, make sure to set the date/time correctly. If the time/date of the storage system is wrong, processes used for stopping and starting the drive motor cannot be performed per the Eco-mode schedule.
- When "External" (drive motor management by FUJITSU ETERNUS SF Storage Management Software) is selected, it can be changed to the Eco-mode schedule. But when the Eco-mode schedule is selected, it cannot be changed to "External".
- If any of the following conditions occur during the Eco-mode scheduled time, the drive will be started even when the drive motor is inactive. The Eco-mode schedule is re-enabled when the conditions listed have finished. (*1)
 - The status of the RAID group is other than "Available"
 - Functions that change the RAID group or the volume configuration are being performed
 - Rebuild or copyback is being performed in the target RAID group
 - LDE is being performed in the target RAID group
 - Formatting is being performed in the volumes registered in the RAID group
 - RAID migration is being performed in the volumes registered in the RAID group
 - Advanced Copy is being performed in the volume registered in the RAID group (copy session status is not "Suspend" or the phase is not "Tracking")
 - Encryption is being performed in the volumes registered in the RAID group
 - During maintenance
 - A disk diagnosis or a RAID group diagnosis is being performed or G-List is being exported
 - A module error related to the access paths of the controller modules and drives is detected
- Specify the same Eco-mode schedule for all of the RAID groups that configure a WSV. If a different Eco-mode schedule is specified, activation of a stopped drive is required to accept the host access, and the performance of the response may be reduced. RAID groups that configure a WSV can be checked in the [Volume Detail] screen ([Used RAID Group] tab). Refer to the [Volume] function for details.
- If the server OS or software periodically accesses the storage system, the drive motor may not stop even when the Eco-mode is enabled. (*1)

*1: This does not only affect the motor stoppage, but includes the cutting of the drives power as well.

Note

- Before applying Eco-mode for RAID groups, use the [Modify Eco-mode General Setting] function to enable the Eco-mode setting for the storage system.
- Set the Eco-mode schedule using the [Create Eco-mode Schedule] function.
- To use Eco-mode for RAID groups registered in TPPs, assign the Eco-mode schedule to the TPPs. Refer to the [Assign Eco-mode Schedule (Thin Provisioning Pool)] function for details.
- Dedicated Hot Spares are operated according to the Eco-mode schedule of the assigned RAID groups even if they are not included in the relevant RAID group.
- Global Hot Spares are operated according to the Eco-mode schedule of the assigned RAID groups only when they are included in the RAID groups.

■ User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	✓
StorageAdmin	✓
AccountAdmin	
SecurityAdmin	
Maintainer	✓

Refer to "[A. User Roles and Policies](#)" (page 1580) for details on the policies and roles.

■ Settings

In this screen, set Eco-mode for the RAID group.

Eco-mode Schedule Settings

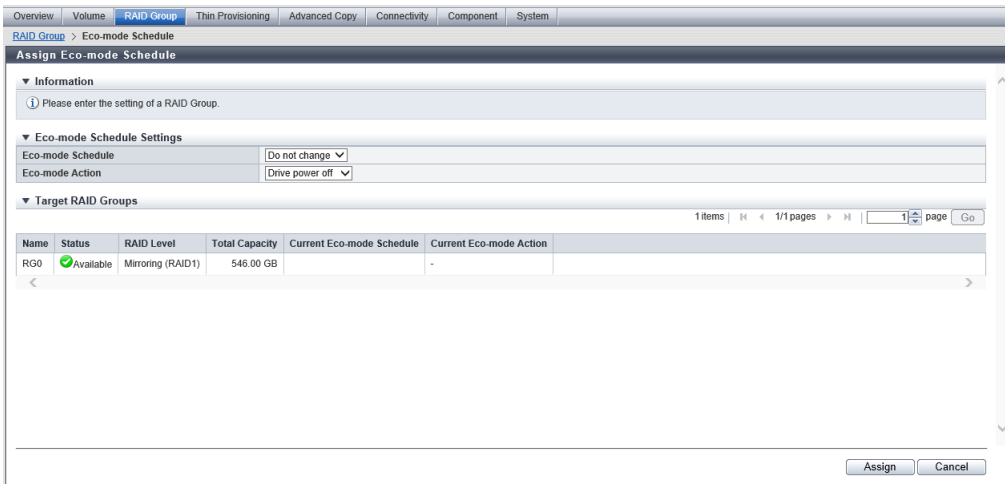
Item	Description	Setting values
Eco-mode Schedule	<p>Select the Eco-mode schedule that is to be assigned to the RAID group.</p> <ul style="list-style-type: none"> Do not change Do not change the current assignment. Disable Disable the Eco-mode. Eco-mode schedule name Assign the selected Eco-mode schedule. <div style="background-color: #fff9c4; padding: 10px; margin-top: 10px;"> <p>Caution</p> <ul style="list-style-type: none"> Eco-mode is not available for the following RAID groups: <ul style="list-style-type: none"> No volumes are created Volumes other than Standard, WSV, SDV, or SDPV types are registered A Storage Migration path is created in the volume Configured by SSDs or SSD SEDs Registered as an REC Disk Buffer Registered in TPPs Registered in Flexible Tier Sub Pools (FTSPs) Registered as an Extreme Cache Pool </div>	<p>Do not change Disable Eco-mode schedule name</p>

3. RAID Group
RAID Group (Basic Information)

Item	Description	Setting values
Eco-mode Action	<p>Select the Eco-mode action.</p> <p>The setting for this item becomes available if "Do not change" or "Eco-mode schedule name" is selected for "Eco-mode Schedule".</p> <ul style="list-style-type: none"> • Do not change Does not change the Eco-mode action (only the Eco-mode schedule can be changed). • Drive power off Enables the Eco-mode action and turns off the drives power during time periods outside the specified schedule. • Drive motor off Enables the Eco-mode action and stops the drives motors during time periods outside the specified schedule. • Drive always on Disables the Eco-mode action and the drive operates continuously regardless of the specified schedule. <p>Caution</p> <ul style="list-style-type: none"> • Eco-mode schedule can be assigned for the following RAID groups, but Eco-mode is not used. <ul style="list-style-type: none"> - A RAID group where SDPVs are registered - A RAID group where ODX Buffer volumes are registered 	<p>Do not change</p> <p>Drive power off</p> <p>Drive motor off</p> <p>Drive always on</p>

■ Display Contents

The detailed information of the selected RAID group is displayed.



Target RAID Groups

Item	Description
Name	The RAID group name is displayed.
Status	The RAID group status is displayed. Refer to ""RAID Group Status" (page 1605)" for details.

3. RAID Group RAID Group (Basic Information)

Item	Description
RAID Level	The RAID level is displayed. High Performance (RAID1+0) High Capacity (RAID5) High Reliability (RAID6) High Reliability (RAID6-FR) Reliability (RAID5+0) Mirroring (RAID1) Striping (RAID0)
Total Capacity	The total capacity of the RAID groups is displayed.
Current Eco-mode Schedule	The assignment status of the Eco-mode schedule for the RAID group is displayed. <ul style="list-style-type: none"> When an Eco-mode schedule has been assigned, "Eco-mode schedule name" is displayed. If the Eco-mode is controlled with FUJITSU ETERNUS SF Storage Management Software, "External" is displayed. When no Eco-mode schedule is assigned, the field is blank.
Current Eco-mode Action	The Eco-mode action status for the RAID group is displayed. When no Eco-mode schedule has been assigned, a "-" (hyphen) is displayed. <ul style="list-style-type: none"> Drive power off The power for the drive is turned off during Eco-mode operation. Drive motor off The drive motor is stopped during Eco-mode operation. Drive always on The Eco-mode is disabled and the drive is always on.

■ Operating Procedures

Procedure ▶▶▶

- 1 Select the RAID group to assign the Eco-mode schedule (multiple selections can be made) to and click [Assign Eco-mode] in [Action].

Note

- When selecting multiple RAID groups as the target of the Eco-mode, the same Eco-mode schedule is assigned to all the selected RAID groups.

- 2 Select the Eco-mode schedule that is to be assigned, select the Eco-mode action, and then click the [Assign] button.
→ A confirmation screen appears.
- 3 Click the [OK] button.
→ Assigning of the Eco-mode schedule starts.
- 4 Click the [Done] button to return to the [Eco-mode Schedule] screen.

SED Key Group

- "■ Overview" (page 321)
- "■ User Privileges" (page 321)
- "■ Display Contents" (page 321)
- "■ Filter Setting" (page 322)

Overview

This function displays the **key group** settings for the RAID groups that are configured with **SEDs**.

Note

- One key group can be created in the storage system.
- Use the [Key Group] screen to check the SED authentication key information and the SSL/KMIP certificate information that is used for the key group. Refer to the [Key Group] function for details.
- There are two types of SED keys: an SED authentication key that is managed by the key server and a common key that is stored in the storage system. If a RAID group that is configured with SEDs is registered in the key group, the relevant RAID group is managed by the SED authentication key. If the RAID group is not registered in the key group, the relevant RAID group is managed by the common key.
- RAID groups that are configured with SEDs can be added in the key group or deleted from the key group. Refer to the [Set Key Group (RAID Group)] function for details.

User Privileges

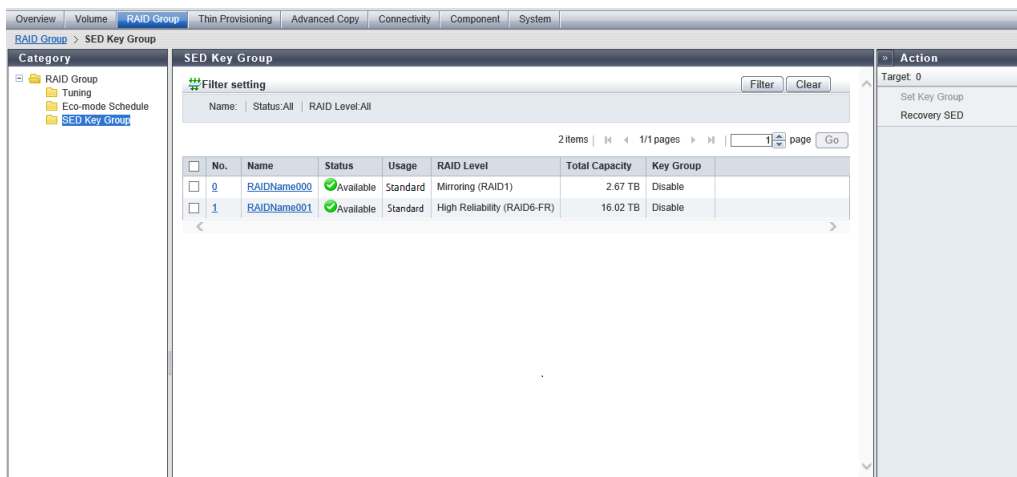
Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	✓
Admin	✓
StorageAdmin	✓
AccountAdmin	
SecurityAdmin	✓
Maintainer	✓

Refer to ["A. User Roles and Policies" \(page 1580\)](#) for details on the policies and roles.

Display Contents

In this screen, the basic information of a RAID group that is configured with SEDs and the registration status to the key group are displayed.



3. RAID Group RAID Group (Basic Information)

RAID Group List

Item	Description
No.	The RAID group number is displayed. Click this item to display the "[RAID Group Detail] Screen ([Basic] Tab)" (page 256).
Name	The RAID group name is displayed. Click this item to display the "[RAID Group Detail] Screen ([Basic] Tab)" (page 256).
Status	The RAID group status is displayed. Refer to "'RAID Group Status" (page 1605)" for details.
Usage	The usage of the RAID group is displayed. <ul style="list-style-type: none"> • Standard A RAID group that is used for creating "Standard", "SDV", or "SDPV" type volumes • Standard / WSV A RAID group that is used for creating the following volumes: <ul style="list-style-type: none"> - "WSV" and "Standard" - "WSV" and "SDV" - "WSV" and "SDPV" • WSV A RAID group that is used for creating "WSV" type volumes • TPP A RAID group that belongs to a TPP • FTRP A RAID group that belongs to an FTRP • RDB A RAID group that is registered as an REC Disk Buffer • "-" (hyphen) A RAID group that is not used
RAID Level	The RAID level is displayed. High Performance (RAID1+0) High Capacity (RAID5) High Reliability (RAID6) High Reliability (RAID6-FR) Reliability (RAID5+0) Mirroring (RAID1) Striping (RAID0)
Total Capacity	The total capacity of the RAID groups is displayed.
Key Group	The set state of the key group for the RAID groups is displayed. <ul style="list-style-type: none"> • If the relevant RAID group is registered in the key group: "Enable" • If one of the following conditions applies to the relevant RAID group: "Disable" <ul style="list-style-type: none"> - No common key is registered for the SEDs that configure the relevant RAID group - The relevant RAID group is not registered in the key group

■ Filter Setting

Function Description

Filter setting is a function used to display a list of only the RAID groups meeting all the specified conditions.

No filtering is set by default. The following table shows conditions that can be specified.

3. RAID Group RAID Group (Basic Information)

Item	Description	Setting values
Name	Input the RAID group name that is to be displayed. RAID groups matching or partially matching the entered name are displayed. When not using the RAID group name for filtering, leave this item blank.	RAID group name Blank
Status	Select the status of the RAID group that is to be displayed. When not using the RAID group status for filtering, select "All".	All Refer to " "RAID Group Status" (page 1605) ".
RAID Level	Select the RAID level of the RAID group that is to be displayed. When not using the RAID level for filtering, select "All".	All High Performance (RAID1+0) High Capacity (RAID5) High Reliability (RAID6) High Reliability (RAID6-FR) Reliability (RAID5+0) Mirroring (RAID1) Striping (RAID0)

Set Key Group (RAID Group)

- "[■ Overview](#)" (page 323)
- "[■ User Privileges](#)" (page 324)
- "[■ Settings](#)" (page 324)
- "[■ Display Contents](#)" (page 324)
- "[■ Operating Procedures](#)" (page 326)

■ Overview

This function adds or deletes RAID groups that are configured by SEDs in the [key group](#). RAID groups in the key group are managed by the SED authentication key that is obtained from the key server. One key group can be created in the storage system. If a RAID group is not registered in the key group, the RAID group is managed by the common key.

Caution

- When registering RAID groups in the key group, perform the following settings in advance.

Procedure ▶▶▶

- 1 Create a key group.
- 2 Allocate the master server or the slave server to the key group.
- 3 Set the key for the key group and confirm that the key status is "Normal".

Refer to the [Create Key Group] function and the [Update SED Authentication Key] function for details.

- RAID groups with a status other than "✔Available" cannot be added to the key group.

3. RAID Group RAID Group (Basic Information)

Note

- Information on the RAID groups that are configured by SEDs and registration status to the key group can be checked in the [SED Key Group] screen. Refer to the [SED Key Group] function for details.
- Use the [Key Group] screen to check the SED authentication key information and the SSL/KMIP certificate information that is used for the key group. Refer to the [Key Group] function for details.
- Even when volumes that belong to the key management target RAID group are being used, RAID groups can be added to or deleted from the key group.

■ User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	✓
StorageAdmin	
AccountAdmin	
SecurityAdmin	
Maintainer	

Refer to "[A. User Roles and Policies](#)" (page 1580) for details on the policies and roles.

■ Settings

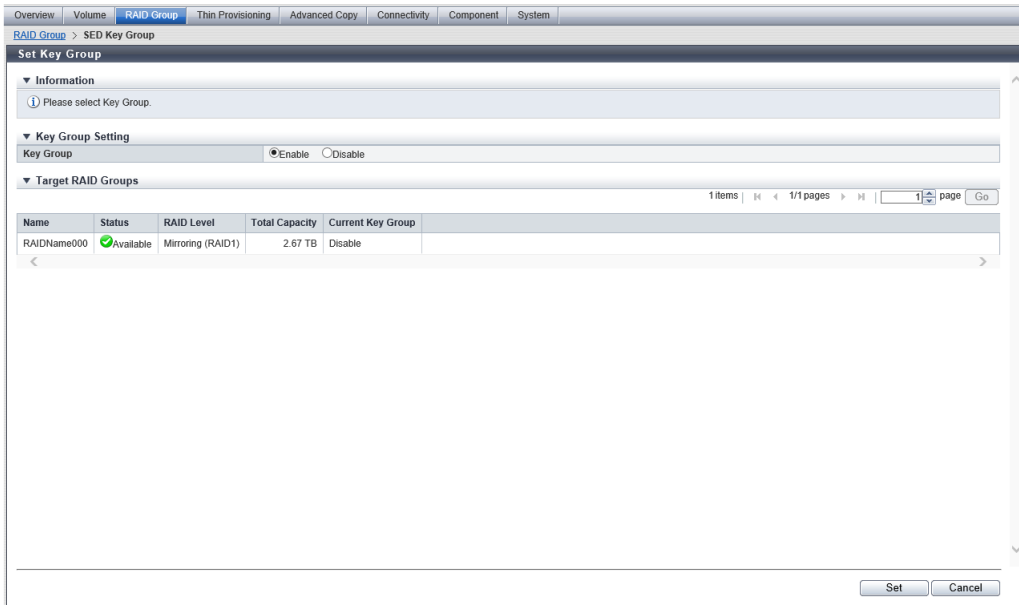
Key Group Setting

Item	Description	Setting values
Key Group	To add RAID groups to the key group, select "Enable". To delete RAID groups from the key group, select "Disable". If multiple RAID groups are selected when starting this function, all the selected RAID groups can be enabled or disabled in a single process.	Enable Disable

■ Display Contents

In this screen, detailed information of the selected RAID group is displayed.

3. RAID Group RAID Group (Basic Information)



Target RAID Groups

Item	Description
Name	The RAID group name is displayed.
Status	<p>The RAID group status is displayed. Refer to ""RAID Group Status" (page 1605)" for details.</p> <div style="background-color: #fff9c4; padding: 10px; border: 1px solid #ccc;"> <p>Caution</p> <ul style="list-style-type: none"> If there is a RAID group with a status other than "Available", an error occurs in key group settings for all the selected RAID groups. </div>
RAID Level	<p>The RAID level is displayed.</p> <ul style="list-style-type: none"> High Performance (RAID1+0) High Capacity (RAID5) High Reliability (RAID6) High Reliability (RAID6-FR) Reliability (RAID5+0) Mirroring (RAID1) Striping (RAID0)
Total Capacity	The total capacity of the RAID groups is displayed.
Current Key Group	<p>The set state of the key group for the RAID groups is displayed.</p> <ul style="list-style-type: none"> If the relevant RAID group is registered in the key group: "Enable" If the relevant RAID group is not registered in the key group: "Disable"

■ Operating Procedures

Procedure ▶▶▶

- 1 Select which RAID group to add to or delete from the key group (multiple selections can be made), and click [Set Key Group] in [Action].

Caution

- Settings for the selected RAID groups are applied in a single process. To add or delete multiple RAID groups, only select the RAID groups that are to be added or deleted (do not select all of the RAID groups).

- 2 Select the key group set state, and click the [Set] button.
→ A confirmation screen appears.

Caution

- An error screen appears in the following conditions:
 - If the status of the key in the key group is not "Normal", "Expiration", or "Modifying"
 - If "Enable" is selected but no key group has been created
 - If no master or slave server is applied to the key group when "Enable" is selected

- 3 Click the [OK] button.
→ Key group setting starts.
- 4 Click the [Done] button to return to the [SED Key Group] screen.



Recovery SED

- ["■ Overview" \(page 326\)](#)
- ["■ User Privileges" \(page 327\)](#)
- ["■ Operating Procedures" \(page 327\)](#)

■ Overview

This function recovers the RAID groups that are in locked status. "Locked status" indicates that the RAID group is blocked because the SED authentication key could not be obtained from the key server.

Recovery Target RAID Groups

- All RAID groups that are in the locked status in the storage system.

Conditions that Can Be Recovered by Using This Function

- Locked status when enabling or forcibly enabling a disk
- Locked status when forcibly recovering or forcibly enabling a RAID group
- Locked status when recovering from DE failure
- Locked status when applying disk firmware
- Locked status when starting an operation after a disk has been stopped by the Eco-mode

- Locked status when communication with the key server failed when starting or rebooting the storage system

Caution

- This function can recover only the RAID groups in locked status. Note that RAID groups in locked status with conditions other the ones listed above cannot be recovered. RAID groups with the "Broken" state may be recovered by using the [Recover RAID Group] function. Note that the [Recover RAID Group] function can be performed by a maintenance engineer who has the "Maintenance Operation" policy.

Note

- SED recovery from locked status is performed according to the "Recovery Mode" setting of the key group. The "Recovery Mode" setting can be checked in the [Key Group] screen. Refer to the [Key Group] function for details.
 - When "Recovery Mode" is "Automatic", the storage system monitors the RAID group periodically. If a locked RAID group is detected, recovery is performed on the RAID group by the storage system automatically.
 - When "Recovery Mode" is "Manual", use this function to manually recover the locked RAID group.
- "Recovery Mode" can be specified when creating a key group. Refer to the [Create Key Group] function for details.
- This function can be used even if a key group is not created or no locked RAID groups are exist. If there are no locked RAID groups that can be recovered, this function completes successfully.

■ User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	✓
StorageAdmin	
AccountAdmin	
SecurityAdmin	
Maintainer	

Refer to ""A. User Roles and Policies" (page 1580)" for details on the policies and roles.

■ Operating Procedures

Procedure ▶▶▶

- 1 Click [Recovery SED] in [Action].
→ A confirmation screen appears.
- 2 Click the [OK] button.
→ Recovery of the SED starts.
- 3 Click the [Done] button to return to the [SED Key Group] screen.



External RAID Group

- "■ Overview" (page 328)
- "■ User Privileges" (page 328)
- "■ Display Contents" (page 328)
- "■ Filter Setting" (page 331)

■ Overview

This function displays the [External RAID Group](#) list.
This function is displayed only if the Non-disruptive Storage Migration License has been registered.

Caution

- Creating an External RAID Group is required in advance. Refer to the [Create External RAID Group] function for details.

■ User Privileges

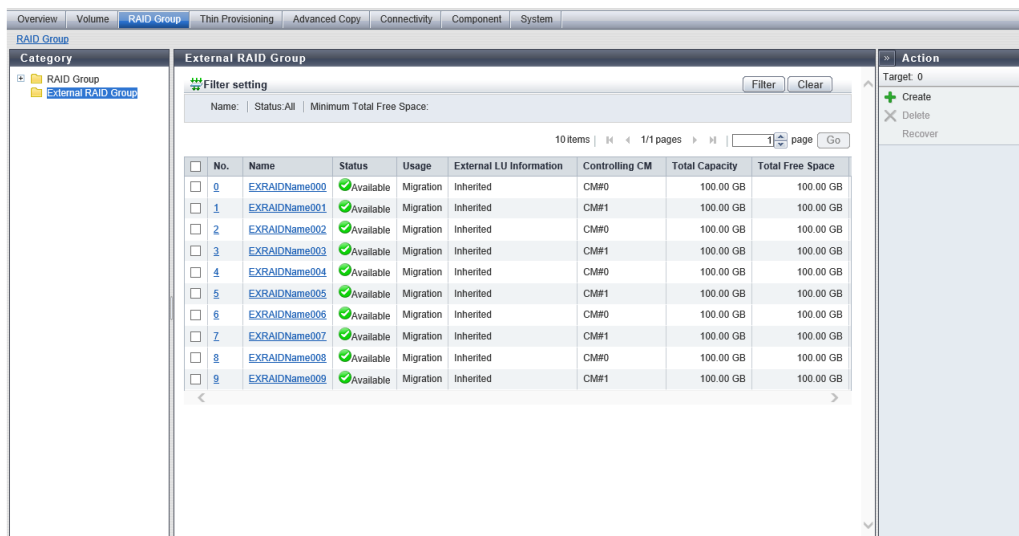
Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	✓
Admin	✓
StorageAdmin	✓
AccountAdmin	
SecurityAdmin	✓
Maintainer	✓

Refer to "'A. User Roles and Policies" (page 1580)" for details on the policies and roles.

■ Display Contents

The information of the External RAID Group is displayed.



External RAID Group List

Item	Description
No.	The External RAID Group number is displayed. Click this item to display the "[External RAID Group Detail] Screen ([Basic] Tab)" (page 329).
Name	The External RAID Group name is displayed. Click this item to display the "[External RAID Group Detail] Screen ([Basic] Tab)" (page 329).
Status	The External RAID group status is displayed. Refer to "'External RAID Group Status" (page 1606)" for details.
Usage	The usage of the External RAID Group is displayed. <ul style="list-style-type: none"> • Migration An External RAID Group that is used for data migrations.
External LU Information	Whether the External RAID Group inherits the "External LU Information" is displayed. If "External LU Information" is inherited, "Inherited" is displayed. If "External LU Information" is not inherited, a "-" (hyphen) is displayed.
Controlling CM	The Controlling CM of the External RAID Group is displayed. For the ETERNUS DX900 S5 or the ETERNUS DX8900 S4 CE#x CM#y For the other models CM#y x: CE number y: CM number
Total Capacity	The total capacity of the External RAID Group is displayed.
Total Free Space	The total free space in the External RAID Group is displayed. If External Volumes are created in the External RAID Group, "0.00 MB" is displayed for this item. If External Volumes are not created in the External RAID Group, the total capacity of the External RAID Group is displayed for this item. For example, if the total capacity of the External RAID Group is "2.00 GB", either of the following values is displayed for this item. <ul style="list-style-type: none"> • If an External Volume is created, "0.00 MB" is displayed. • If no External Volume is created, "2.00 GB" is displayed.

[External RAID Group Detail] Screen ([Basic] Tab)

A detailed information for the External RAID Group is displayed.

External RAID Group Information

Item	Description
Status	The External RAID group status is displayed. Refer to "'External RAID Group Status" (page 1606)" for details.
Usage	The usage of the External RAID Group is displayed. <ul style="list-style-type: none"> • Migration An External Drive that is used for data migrations.
External LU Information	Whether the External RAID Group inherits the "External LU Information" is displayed. If "External LU Information" is inherited, "Inherited" is displayed. If "External LU Information" is not inherited, a "-" (hyphen) is displayed.

3. RAID Group External RAID Group

Item	Description
Controlling CM	The Controlling CM of the External RAID Group is displayed. For the ETERNUS DX900 S5 or the ETERNUS DX8900 S4 CE#x CM#y For the other models CM#y x: CE number y: CM number
Total Capacity	The total capacity of the External RAID Group is displayed. In addition, the capacity is displayed in "bytes" within parentheses.
Total Free Space	The total free space in the External RAID Group is displayed. In addition, the capacity is displayed in "bytes" within parentheses. If External Volumes are created in the External RAID Group, "0.00 MB" is displayed for this item. If External Volumes are not created in the External RAID Group, the total capacity of the External RAID Group is displayed for this item.

[External RAID Group Detail] Screen ([External Drives] Tab)

The detailed information of the External Drives that are used in the External RAID Group is displayed.

External RAID Group Drives Information

Item	Description
No.	The External Drive number is displayed.
Status	The External Drive status is displayed. Refer to "External RAID Group Status" (page 1606) for details.
Usage	The usage of the External Drive is displayed.
External LU Information	Whether the External Drive inherits the "External LU Information" is displayed. If "External LU Information" is inherited, "Inherited" is displayed. If "External LU Information" is not inherited, a "-" (hyphen) is displayed.
Capacity	The capacity of the External Drive is displayed.
Serial No.	The serial number of the external storage system is displayed.
UID	The identifier (storage system name) that identifies the External Drive from the host is displayed. 32-digit capital letters and numeric characters (hexadecimal)
Vendor ID	The manufacturer name of the external storage system is displayed.
Product ID	The product name of the external storage system is displayed.
LUN Addressing	The format type of the LUN Addressing that is set for the External Drive is displayed. If LUN Addressing is not "PRHL (Peripheral device addressing)" or "FLAT (Flat space addressing)", a "-" (hyphen) is displayed.
LUN	The volume number (host LUN) of the External Drive is displayed. If the LUN Addressing is "PRHL" or "FLAT" 0 - 4095 (decimal) For the other conditions Volume number (16-digit hexadecimal)

■ Filter Setting

Function Description

Filter setting is a function used to display a list of only the External RAID Groups meeting all the specified conditions.

No filtering is set by default. The following table shows conditions that can be specified.

Item	Description	Setting values
Name	Input the External RAID Group name that is to be displayed. External RAID Groups matching or partially matching the entered name are displayed. When not using the External RAID Group name for filtering, leave this item blank.	External RAID Group name Blank
Status	Select the status of the External RAID group that is to be displayed.	All Refer to " External RAID Group Status " (page 1606)".
Minimum Total Free Space	Input the minimum capacity of total free space for the External RAID Groups that are to be displayed and select the units of capacity. When the total free space of the External RAID Group is not used for filtering, leave this item blank or specify "0".	Total free space [TB/GB/MB] 0 MB

Create External RAID Group

- "[Overview](#)" (page 331)
- "[User Privileges](#)" (page 332)
- "[Settings](#)" (page 332)
- "[Operating Procedures](#)" (page 333)

■ Overview

This function creates [External RAID Groups](#) from [External Drives](#).

This function is available only if the Non-disruptive Storage Migration License has been registered.

The maximum number of External RAID Groups that can be created in the storage system varies depending on each model. The following list shows the maximum number of External RAID Groups that can be created for each model.

- ETERNUS DX60 S5: 512
- ETERNUS DX100 S5: 2048
- ETERNUS DX200 S5: 4096
- ETERNUS DX500 S5/DX600 S5: 8192
- ETERNUS DX900 S5 or ETERNUS DX8900 S4: 16384
- ETERNUS AF150 S3: 2048
- ETERNUS AF250 S3: 4096
- ETERNUS AF650 S3: 8192

Caution

- Creating an External Drive is required in advance. Refer to the [Create External Drive] function for details.
- The Controlling CM of the External RAID Group is automatically allocated. The Controlling CM cannot be changed.
- The following operations are not available for the created External RAID Groups:
 - Changing the External RAID Group information (rename, change Controlling CM, expand capacity, modify parameters, and assign Eco-mode schedule)
 - Diagnosing External RAID Groups
 - Creating TPPs using External RAID Groups

Note

- One External RAID Group consists of one External Drive. If multiple External Drives are selected, the same number of External RAID Groups are created with a single operation.
- Created External RAID Groups are displayed in the [External RAID Group] screen. Refer to the [External RAID Group] function for details.
- External RAID Groups can be deleted. Refer to the [Delete External RAID Group] function for details.
- External RAID Groups can be recovered. Refer to the [Recover External RAID Group] function for details.

■ User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	✓
StorageAdmin	✓
AccountAdmin	
SecurityAdmin	
Maintainer	✓

Refer to "'A. User Roles and Policies" (page 1580)" for details on the policies and roles.

■ Settings

Input the name of the External RAID Group that is to be created and select the External Drive to create the External RAID Group.

New External RAID Group

Item	Description	Setting values
Name	Input an External RAID Group name that is to be created. If one External Drive is selected and an External RAID Group is created, existing External RAID Group names cannot be used. If multiple External Drives are selected and multiple External RAID Groups are created, the suffix number starting with "0" is added to the input name. Refer to "Naming Conventions for External RAID Groups" (page 333) for details.	Up to 16 alphanumeric characters, symbols (except ",", (comma) and "?"), and spaces

External Drive List

Item	Description
Checkbox to select External Drives	Select the checkbox for the External Drive that is to be used to create the External RAID Group. Select the checkbox to the left of "No." to select all External Drives.
No.	The External Drive number is displayed.
Usage	The usage of the External Drive is displayed. <ul style="list-style-type: none"> Migration An External Drive that is used for data migrations.
External LU Information	Whether the External Drive inherits the "External LU Information" is displayed. If "External LU Information" is inherited, "Inherited" is displayed. If "External LU Information" is not inherited, a "-" (hyphen) is displayed for this item.
Capacity	The capacity of the External Drive is displayed.

Naming Conventions for External RAID Groups

- When creating multiple External RAID Groups at a time, a name is automatically added to an External RAID Group with the specified "Name" and a suffix number "x" (serial numbers starting with "0").
(Example) Specified External RAID Group name: ExRAIDGroup_aa (14 characters) → Name for created External RAID Group: ExRAIDGroup_aa0, ExRAIDGroup_aa1, etc.
- When an External RAID Group name including the suffix number "x" has more than 16 characters, the excess number of characters is deleted from the "Name", starting with the last character and a suffix number "~x" will be added.
(Example) Specified External RAID Group name: ExRAIDGroup_abab (16 characters) → Name for created External RAID Group: ExRAIDGroup_ab~0, ExRAIDGroup_ab~1, etc.
- When an External RAID Group name including the suffix number already exists, the suffix number is increased by one (+1). The suffix number is increased by one (+1) until no External RAID Group names overlap.

■ Operating Procedures

Create an External RAID Group.

Procedure ▶▶▶

- 1 Click [Create] in [Action].
- 2 Specify the External RAID Group detailed information, and click the [Create] button.
→ A confirmation screen appears.

Note

- Select the checkbox to the left of "No." to create External RAID Groups with all External Drives.
- If no External Drives are selected, the [Create] button cannot be clicked.

Caution

- An error screen appears in the following conditions:
 - The "Name" is not entered
 - The "Name" does not satisfy the input conditions
 - The "Name" overlaps with an existing External RAID Group name (when one External RAID Group is created)
 - The status of the selected External Drive is not "Present"
 - The number of External RAID Groups for each model exceeds the maximum number

- 3** Click the [OK] button.
→ External RAID Group creation starts.
- 4** Click the [Done] button to return to the [External RAID Group] screen.



Delete External RAID Group

- ["■ Overview" \(page 334\)](#)
- ["■ User Privileges" \(page 334\)](#)
- ["■ Operating Procedures" \(page 335\)](#)

■ Overview

This function deletes the registered External RAID Groups.
This function is available only if the Non-disruptive Storage Migration License has been registered.

Caution

- [External RAID Groups](#) where External Volumes are registered cannot be deleted. Delete the External Volumes before starting this function. Refer to the [Delete Volume] function for details.

Note

- The list of External RAID Groups is displayed in the [External RAID Group] screen. Refer to the [External RAID Group] function for details.
- Use the [Volume] screen to check the External RAID Groups where External Volumes are registered. Refer to the [Volume (Basic Information)] function for details.

■ User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	

3. RAID Group

External RAID Group

Default role	Availability of executions
Admin	✓
StorageAdmin	✓
AccountAdmin	
SecurityAdmin	
Maintainer	✓

Refer to "[A. User Roles and Policies](#)" (page 1580) for details on the policies and roles.

■ Operating Procedures

Procedure ▶▶▶

- 1 Select the External RAID Group that is to be deleted (multiple selections can be made) and click [Delete] in [Action].
→ A confirmation screen appears.

Caution

- [Delete] cannot be clicked if an External RAID Group where an External Volume is registered is selected.

- 2 Click the [OK] button.
→ The External RAID Group deletion starts.
- 3 Click the [Done] button to return to the [External RAID Group] screen.

Recover External RAID Group

- "[Overview](#)" (page 335)
- "[User Privileges](#)" (page 335)
- "[Operating Procedures](#)" (page 336)

■ Overview

This function recovers the [External RAID Groups](#) in the error response state.
This function is available only if the Non-disruptive Storage Migration License has been registered.

■ User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	✓
StorageAdmin	✓
AccountAdmin	
SecurityAdmin	
Maintainer	✓

Refer to "[A. User Roles and Policies](#)" (page 1580)" for details on the policies and roles.

■ Operating Procedures

Procedure ▶▶▶

- 1 Select the External RAID Group that is to be recovered and click [Recover] in [Action].
→ A confirmation screen appears.

Caution

- [Recover] cannot be clicked if the selected External RAID Group is not in the "⊗Broken" state.

- 2 Click the [OK] button.
→ Recovery of the External RAID Group starts.

Caution

- If an error occurs in the access path to the External RAID Group, an error screen appears.

- 3 Click the [Done] button to return to the [External RAID Group] screen.
-



4. Thin Provisioning

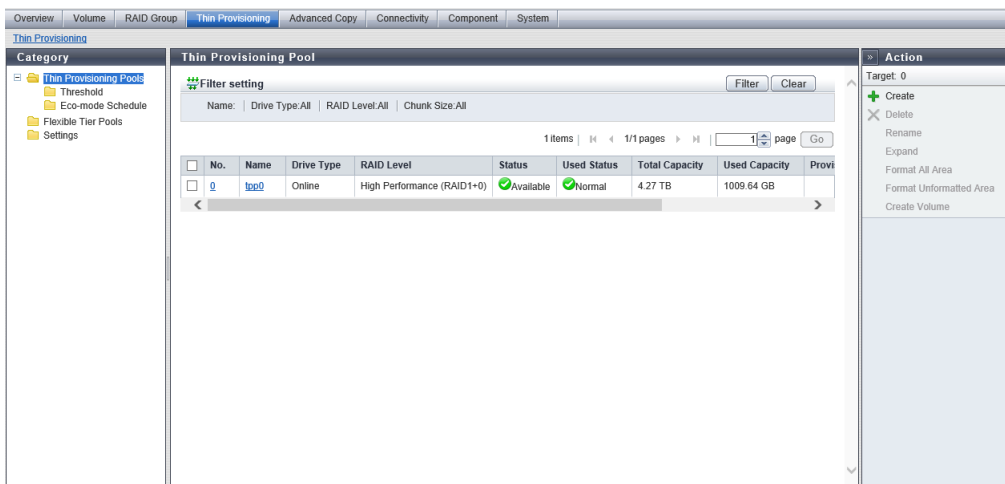
- ["■ Overview" \(page 337\)](#)
- ["■ Display Function List" \(page 337\)](#)
- ["■ Action List" \(page 337\)](#)

■ Overview

The Thin Provisioning function can create logical volumes with a larger capacity than the installed physical disks by virtualization.

A Thin Provisioning Pool is a space to store logical volume data which is configured using the Thin Provisioning function.

■ Display Function List



Category	Function	Description
Thin Provisioning Pools	"Thin Provisioning Pool (Basic Information)" (page 338)	The basic information of each Thin Provisioning Pool, such as the status and the capacity, is displayed.
Threshold	"Threshold (Thin Provisioning Pool)" (page 392)	The management threshold of each Thin Provisioning Pool is displayed.
Eco-mode Schedule	"Eco-mode Schedule (Thin Provisioning Pool)" (page 400)	The Eco-mode operation status of each Thin Provisioning Pool is displayed.
Flexible Tier Pools	"Flexible Tier Pool (Basic Information)" (page 408)	The Flexible Tier Pool (FTRP) list is displayed.
Settings	"Settings (Thin Provisioning)" (page 427)	The Thin Provisioning Pools Settings status is displayed.

■ Action List

Action	Function	Description
Thin Provisioning Pool		

4. Thin Provisioning

Thin Provisioning Pool (Basic Information)

Action	Function	Description
Create	"Create Thin Provisioning Pool" (page 348)	Create a new Thin Provisioning Pool.
Delete	"Delete Thin Provisioning Pool" (page 368)	Delete a Thin Provisioning Pool.
Rename	"Rename Thin Provisioning Pool" (page 369)	Change the selected Thin Provisioning Pool name.
Expand	"Expand Thin Provisioning Pool" (page 372)	Expand the selected Thin Provisioning Pool capacity.
Format All Area	"Format Thin Provisioning Pool (All Area)" (page 383)	Format all of the areas in the selected Thin Provisioning Pool.
Format Unformatted Area	"Format Thin Provisioning Pool (Unformatted Area)" (page 384)	Format the unformatted area in the selected Thin Provisioning Pool.
Set Deduplication/Compression	"Set Deduplication/Compression" (page 386)	Configure the Deduplication/Compression setting for the selected Thin Provisioning Pool.
Threshold		
Modify Threshold	"Modify Threshold Thin Provisioning Pool" (page 394)	Change the selected Thin Provisioning Pool management threshold.
Modify Cache Parameters	"Modify Cache Parameters (TPP)" (page 397)	Specify the cache parameter (MWC) for the selected Thin Provisioning Pool.
Eco-mode Schedule		
Assign Eco-mode	"Assign Eco-mode Schedule (Thin Provisioning Pool)" (page 403)	Change the Eco-mode action of the selected Thin Provisioning Pool.
Flexible Tier Pools		
Format All Area	"Format Flexible Tier Pool (All Area)" (page 420)	Format all of the areas in the selected Flexible Tier Pool (FTRP).
Format Unformatted Area	"Format Flexible Tier Pool (Unformatted Area)" (page 422)	Format the unformatted area in the selected Flexible Tier Pool (FTRP).
Start Balancing FTRP	"Start Balancing Flexible Tier Pool" (page 424)	Start balancing of the selected Flexible Tier Pool (FTRP).
Stop Balancing FTRP	"Stop Balancing Flexible Tier Pool" (page 426)	Stop balancing of the selected Flexible Tier Pool (FTRP).
Settings		
Set Thin Provisioning	"Set Thin Provisioning" (page 429)	Set the Thin Provisioning function.

Thin Provisioning Pool (Basic Information)

- ["■ Overview" \(page 338\)](#)
- ["■ User Privileges" \(page 339\)](#)
- ["■ Display Contents" \(page 339\)](#)
- ["■ Filter Setting" \(page 348\)](#)

■ Overview

This function shows the list of [Thin Provisioning Pools \(TPPs\)](#).

4. Thin Provisioning
Thin Provisioning Pool (Basic Information)

Caution

- When using the Thin Provisioning function, "Enable" the Thin Provisioning. Refer to the [Set Thin Provisioning] function for details.
- If the TPP usage exceeds the threshold, immediately add drives to expand the TPP capacity. The threshold can be checked in "Used Status" of the TPP list.

Note

- This function shows the TPP basic information, a list of the RAID groups that configure the TPP, and a list of the [TPVs](#) that are registered in the TPP.
- To check whether the Thin Provisioning function is enabled or disabled, use the [Settings (Thin Provisioning)] function.
- To check the threshold for monitoring the TPP used capacity, use the [Threshold (Thin Provisioning Pool)] function.
- To check the Eco-mode setting that is specified for the TPP, use the [Eco-mode Schedule (Thin Provisioning)] function.

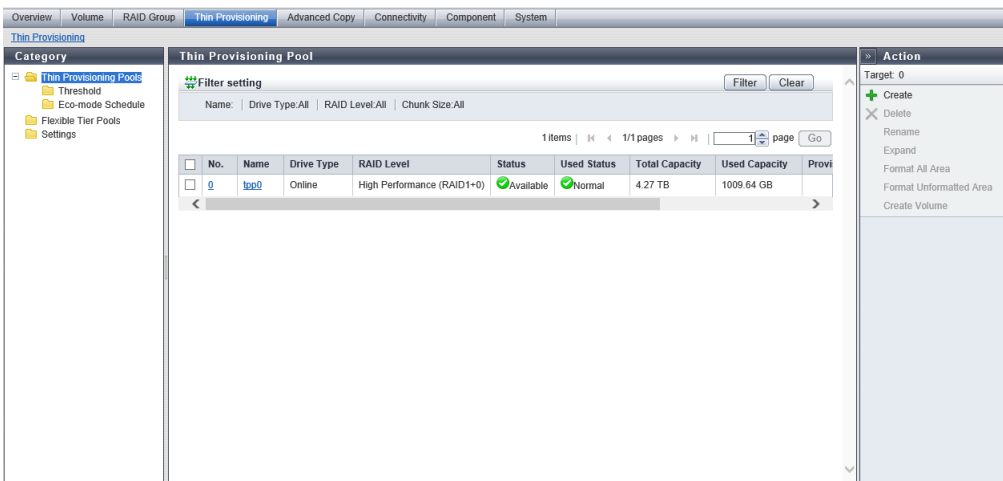
■ User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	✓
Admin	✓
StorageAdmin	✓
AccountAdmin	
SecurityAdmin	✓
Maintainer	✓




Refer to "'A. User Roles and Policies" (page 1580)" for details on the policies and roles.

■ Display Contents



TPP List

The list of TPPs created in the storage system is displayed.

Item	Description
No.	The TPP number is displayed. Click this item to display the "[Thin Provisioning Pool Detail] Screen ([Basic] Tab)" (page 342).
Name	The TPP name is displayed. Click this item to display the "[Thin Provisioning Pool Detail] Screen ([Basic] Tab)" (page 342).
Drive Type	The type of drive that configures the TPP is displayed. Online Nearline SSD Online SED Nearline SED SSD SED
RAID Level	The level of RAID group that configures the TPP is displayed. High Performance (RAID1+0) High Capacity (RAID5) High Reliability (RAID6) High Reliability (RAID6-FR) Mirroring (RAID1) Striping (RAID0)
Status	The TPP status is displayed. Refer to "'Thin Provisioning Pool Status' (page 1606)" for details.
Used Status	The used status of the TPP or the Data Container Volume is displayed. <ul style="list-style-type: none"> •  Normal TPP usage does not exceed the "Attention" threshold. •  Attention TPP usage exceeds the "Attention" threshold but does not exceed the "Warning" threshold. Or the Data Container Volume usage is 80 % or larger. •  Warning TPP usage exceeds the "Warning" threshold.
Total Capacity	The total capacity of TPP is displayed.
Used Capacity	The used capacity of TPP is displayed. "Used Capacity" indicates the total for the physically allocated capacities of the TPVs in the TPP.
Provisioned Rate	The ratio of the total logical capacity (*1) of TPVs in the TPP to the total capacity of the TPP is displayed. A "-" (hyphen) is displayed if Deduplication or Compression for a TPP is enabled. *1: The provisioned rate is calculated with the total logical capacity where the chunk size is taken into consideration.
Encryption	The TPP encryption status is displayed. <ul style="list-style-type: none"> • CM A TPP that is encrypted by CM • "-" (hyphen) A TPP that is not encrypted • SED A TPP that is encrypted by SED

4. Thin Provisioning

Thin Provisioning Pool (Basic Information)

Item	Description
Chunk Size	<p>The chunk size of the TPP is displayed.</p> <p>If the chunk size information cannot be obtained, a "-" (hyphen) is displayed.</p> <p>21 MB 42 MB 84 MB 168 MB 336 MB</p>
Deduplication	<p>The Deduplication status (whether the setting is enabled and the state of the Deduplication) for the TPP is displayed.</p> <ul style="list-style-type: none"> • Enable Deduplication for the TPP is enabled and Deduplication is in the normal state. • Disable Deduplication for the TPP is disabled. • Error Deduplication for the TPP is enabled and Deduplication is in the error state. • "-" (hyphen) Deduplication for the TPP is enabled and the information cannot be obtained. <p>This item is displayed only when Deduplication/Compression for the storage system is enabled.</p>
Compression	<p>The Compression status (whether the setting is enabled and the state of the Compression) for the TPP is displayed.</p> <ul style="list-style-type: none"> • Enable Compression for the TPP is enabled and Compression is in the normal state. • Disable Compression for the TPP is disabled. • Error Compression for the TPP is enabled and Compression is in the error state. • "-" (hyphen) Compression for the TPP is enabled and the information cannot be obtained. <p>This item is displayed only when Deduplication/Compression for the storage system is enabled.</p>
Data Size Before Reduction	<p>The total capacity of the pre-reduction data (logically allocated capacity) written to the Deduplication/Compression Volume in the TPP is displayed.</p> <p>A "-" (hyphen) is displayed in the following conditions:</p> <ul style="list-style-type: none"> • Deduplication and Compression for the TPP is disabled • The pre-reduction data capacity cannot be obtained <p>This item is only displayed when the Deduplication/Compression function for the storage system is enabled.</p> <div style="background-color: #f0f0f0; padding: 10px; margin-top: 10px;"> <p>Note</p> <ul style="list-style-type: none"> • The pre-reduction data capacity that is written to each volume can be checked with "Original Data Size" on the [Volume] screen. Refer to the [Volume (Basic Information)] function for details. </div>
Data Size After Reduction	<p>The total capacity of the post-reduction data (physically allocated capacity) written to the Deduplication/Compression Volume in the TPP is displayed.</p> <p>A "-" (hyphen) is displayed in the following conditions:</p> <ul style="list-style-type: none"> • Deduplication and Compression for the TPP is disabled • The post-reduction data capacity cannot be obtained <p>This item is only displayed when the Deduplication/Compression function for the storage system is enabled.</p>

4. Thin Provisioning

Thin Provisioning Pool (Basic Information)

Item	Description
Data Reduction Rate	<p>The data reduction rate for Deduplication, Compression, or both Deduplication and Compression of the TPP is displayed.</p> <p>If 10 TB of data is written to 3 TB after being reduced, "70 %" is displayed.</p> <p>A "-" (hyphen) is displayed in the following conditions:</p> <ul style="list-style-type: none"> • Statuses of Deduplication and Compression for a TPP are both "Disable" • Status of Deduplication or Compression for a TPP is "Error" or "-" (hyphen) • The Data Container Volume cannot be accessed <p>This item is displayed only when Deduplication/Compression for the storage system is enabled.</p>

[Thin Provisioning Pool Detail] Screen ([Basic] Tab)

Click the [No.] or [Name] link in the TPP list to display the corresponding TPP information. Click each tab to check the basic information, the list of RAID groups which configure the corresponding TPP, and the list of volumes registered in the TPP.

For details of the basic information, refer to ["Thin Provisioning Pool Information" \(page 342\)](#). For details of the RAID group list, refer to ["\[Thin Provisioning Pool Detail\] Screen \(\[RAID Group\] Tab\)" \(page 346\)](#). For details of the volume list, refer to the ["\[Thin Provisioning Pool Detail\] Screen \(\[Volume\] Tab\)" \(page 346\)](#).




Thin Provisioning Pool Information

In this screen, the basic information of the relevant TPP can be checked.

Item	Description
Drive Type	<p>The type of drive that configures the TPP is displayed.</p> <p>Online Nearline SSD Online SED Nearline SED SSD SED</p>
RAID Level	<p>The level of RAID group that configures the TPP is displayed.</p> <p>High Performance (RAID1+0) High Capacity (RAID5) High Reliability (RAID6) High Reliability (RAID6-FR) Mirroring (RAID1) Striping (RAID0)</p>
Fast Recovery Configuration	<p>The Fast Recovery configuration of the RAID group that configures TPPs is displayed.</p> <p>This item is displayed only when the RAID level is "RAID6-FR".</p> <p>(4D+2P)x2+1HS (6D+2P)x2+1HS (8D+2P)x3+1HS (4D+2P)x5+1HS</p> <p>D: Data drives P: Parity drives HS: Hot Spares</p>
Status	<p>The TPP status is displayed.</p> <p>Refer to "Thin Provisioning Pool Status" (page 1606) for details.</p>

4. Thin Provisioning

Thin Provisioning Pool (Basic Information)

Item	Description
Used Status	<p>The used status of the TPP or the Data Container Volume is displayed.</p> <ul style="list-style-type: none"> •  Normal TPP usage does not exceed the "Attention" threshold. •  Attention TPP usage exceeds the "Attention" threshold but does not exceed the "Warning" threshold. Or the Data Container Volume usage is 80 % or larger. •  Warning TPP usage exceeds the "Warning" threshold.
Total Capacity	<p>The total capacity of TPP is displayed. In addition, the total capacity is displayed in units of MB enclosed with parentheses.</p>
Used Capacity	<p>The used capacity of TPP is displayed. "Used Capacity" indicates the total for the physically allocated capacities of the TPVs in the TPP. In addition, the used capacity is displayed in units of MB enclosed with parentheses.</p>
Used Rate	<p>The usage rate of the TPP is displayed. Used Rate = Used Capacity ÷ Total Capacity</p>
Provisioned Capacity	<p>The total logical capacity of TPVs in the TPP is displayed. In addition, the total logical capacity is displayed in units of MB enclosed with parentheses. Note that "Provisioned Capacity" does not include the Data Container Volume capacity.</p>
Provisioned Rate	<p>The ratio of the total logical capacity (*1) of TPVs in the TPP to the total capacity of the TPP is displayed. A "-" (hyphen) is displayed if Deduplication or Compression for a TPP is enabled.</p> <p>*1: The provisioned rate is calculated with the total logical capacity where the chunk size is taken into consideration.</p>
Warning	<p>The TPP physical capacity "xxx", which is converted based on the TPP warning threshold, and the threshold (yy%) are displayed.</p>
Attention	<p>The TPP physical capacity "xxx", which is converted based on the TPP attention threshold, and the threshold (yy%) are displayed. When the attention threshold is omitted, a "-" (hyphen) is displayed.</p>
Encryption	<p>The TPP encryption status is displayed.</p> <p>CM Encryption by CM "-" (hyphen) Unencrypted SED Encryption by SED</p>
Chunk Size	<p>The chunk size of the TPP is displayed. If the chunk size information cannot be obtained, a "-" (hyphen) is displayed.</p> <p>21 MB 42 MB 84 MB 168 MB 336 MB</p>
MWC	<p>The Multi Writeback Count (MWC) of the TPP is displayed. This item is displayed only when a user account with the "RAID Group Management" policy is used to log in.</p>
Usage	<p>"TPV" is displayed when a TPV is registered in the TPP. If there are no TPVs in the TPP, a "-" (hyphen) is displayed.</p>

4. Thin Provisioning

Thin Provisioning Pool (Basic Information)

Item	Description
Eco-mode Schedule	<p>The Eco-mode schedule name that is assigned to the TPP is displayed.</p> <p>If the Eco-mode is controlled with FUJITSU ETERNUS SF Storage Management Software, "External" is displayed.</p> <p>When no Eco-mode schedule has been assigned, the field is blank.</p>
Eco-mode Action	<p>The Eco-mode schedule action status is displayed.</p> <p>When no Eco-mode schedule has been assigned, a "-" (hyphen) is displayed.</p> <ul style="list-style-type: none"> • Drive power off The power for the drive is turned off during Eco-mode operation. • Drive motor off The drive motor is stopped during Eco-mode operation. • Drive always on The Eco-mode is disabled and the drive is always on.
Motor Status	<p>The drive motor status is displayed.</p> <ul style="list-style-type: none"> • Active The drive motors are activated. • In the Boot Process The drive motors are starting up. • Idle The drive motors are stopped. • In the Stop Process The drive motors are being stopped. • Power Off The drive power is being turned off.
Process	<p>A process that is being performed for the TPP is displayed. If no process is being performed, a "-" (hyphen) is displayed.</p>
Progress	<p>The progress of a process that is being performed is displayed with a bar and a rate (0 to 100 %). To display the latest progress, refresh the screen. If no process is being performed, a "-" (hyphen) is displayed.</p>
Estimated Time Left	<p>The estimated remaining time before formatting is complete is displayed. To display the latest estimated remaining time, refresh the screen. This item is not displayed when the process is other than "Formatting".</p> <ul style="list-style-type: none"> • Calculating The storage system is calculating the estimated remaining time. • 30 days or more The estimated remaining time is 30 days or more. • x days y h z min. The estimated remaining time is more than one minute and less than 30 days. When the estimated remaining time is less than one day, the "days" value is omitted. When the estimated remaining time is less than one hour, the "days" and "h" values are omitted. • Less than 1 min. The estimated remaining time is less than one minute. <div style="background-color: #fff9c4; padding: 10px; margin-top: 10px;"> <p>Caution</p> <ul style="list-style-type: none"> • The estimated time that is left may increase or decrease depending on the I/O load when this parameter is used. </div>
Remaining Size	<p>The remaining size of the unformatted volume is displayed. To display the latest size, refresh the screen. This item is not displayed when the process is other than "Formatting".</p>

4. Thin Provisioning

Thin Provisioning Pool (Basic Information)

Item	Description
Stripe Depth	<p>The Stripe Depth value (*1) for the RAID groups that configure the TPP is displayed.</p> <p>If the RAID level is "RAID1", a "-" (hyphen) is displayed.</p> <p>64 KB 128 KB 256 KB 512 KB 1024 KB</p> <p>*1 : This is the number of logical blocks assigned to one drive per stripe when a volume is striped to configuring drives of a RAID group. Normally, it is 64KB.</p>
Deduplication	<p>The Deduplication status (whether the setting is enabled and the state of the Deduplication) for the TPP is displayed.</p> <p>This item is displayed only when Deduplication/Compression for the storage system is enabled.</p> <ul style="list-style-type: none"> • Enable • Disable • Error • "-" (hyphen)
Compression	<p>The Compression status (whether the setting is enabled and the state of the Compression) for the TPP is displayed.</p> <p>This item is displayed only when Deduplication/Compression for the storage system is enabled.</p> <ul style="list-style-type: none"> • Enable • Disable • Error • "-" (hyphen)
Data Size Before Reduction	<p>The total capacity of the pre-reduction data (logically allocated capacity) written to the Deduplication/Compression Volume in the TPP is displayed.</p> <p>A "-" (hyphen) is displayed in the following conditions:</p> <ul style="list-style-type: none"> • Deduplication and Compression for the TPP is disabled • The pre-reduction data capacity cannot be obtained <p>This item is only displayed when the Deduplication/Compression function for the storage system is enabled.</p>
Data Size After Reduction	<p>The total capacity of the post-reduction data (physically allocated capacity) written to the Deduplication/Compression Volume in the TPP is displayed.</p> <p>A "-" (hyphen) is displayed in the following conditions:</p> <ul style="list-style-type: none"> • Deduplication and Compression for the TPP is disabled • The post-reduction data capacity cannot be obtained <p>This item is only displayed when the Deduplication/Compression function for the storage system is enabled.</p>
Data Reduction Rate	<p>The data reduction rate for Deduplication, Compression, or both Deduplication and Compression of the TPP is displayed.</p> <p>If 10 TB of data is written to 3 TB after being reduced, "70 %" is displayed.</p> <p>A "-" (hyphen) is displayed in the following conditions:</p> <ul style="list-style-type: none"> • Statuses of Deduplication and Compression for a TPP are both "Disable" • Status of Deduplication or Compression for a TPP is "Error" or "-" (hyphen) • The Data Container Volumes cannot be accessed <p>This item is displayed only when Deduplication/Compression for the storage system is enabled.</p>

4. Thin Provisioning

Thin Provisioning Pool (Basic Information)

Item	Description
GC Speed	<p>The operation speed for releasing the physically allocated area that is no longer required (Garbage Collection) in the Deduplication/Compression Volume of the TPP due to reduction is displayed. This item is supplemental information to determine whether Garbage Collection is being performed with the Deduplication/Compression function.</p> <p>A "-" (hyphen) is displayed in the following conditions:</p> <ul style="list-style-type: none"> • Deduplication and Compression for the TPP is disabled • The operation speed cannot be obtained <p>This item is only displayed when the Deduplication/Compression function for the storage system is enabled.</p>
GC Remaining Size	<p>The capacity of the physically allocated area that is no longer required in the Deduplication/Compression Volume of the TPP due to reduction is displayed.</p> <p>This area is released by the Garbage Collection.</p> <p>A "-" (hyphen) is displayed in the following conditions:</p> <ul style="list-style-type: none"> • Deduplication and Compression for the TPP is disabled • The GC remaining size cannot be obtained <p>This item is only displayed when the Deduplication/Compression function for the storage system is enabled.</p>

[Thin Provisioning Pool Detail] Screen ([RAID Group] Tab)

In this screen, a list of the RAID groups that configure the relevant TPP is displayed. When no RAID groups are registered in the TPP, only the item name is displayed.

Thin Provisioning Pool Information

Item	Description
No.	<p>The RAID group number is displayed.</p> <p>Click this item to display the [RAID Group Detail] screen.</p>
Name	<p>The RAID group name is displayed.</p> <p>Click this item to display the [RAID Group Detail] screen.</p>
Status	<p>The RAID group status is displayed.</p> <p>Refer to ""RAID Group Status" (page 1605)" for details.</p>
RAID Level	<p>The RAID level is displayed.</p> <p>High Performance (RAID1+0)</p> <p>High Capacity (RAID5)</p> <p>High Reliability (RAID6)</p> <p>High Reliability (RAID6-FR)</p> <p>Mirroring (RAID1)</p> <p>Striping (RAID0)</p>
Total Capacity	<p>The total capacity of the RAID groups is displayed.</p>
Used Capacity	<p>The used capacity of the RAID groups is displayed.</p> <p>"Used Capacity" indicates the total for the physically allocated capacities of the TPVs in the RAID group.</p>

[Thin Provisioning Pool Detail] Screen ([Volume] Tab)

In this screen, the volumes that are registered in the TPP can be checked. When no volumes are registered in the TPP, only the item name is displayed.

4. Thin Provisioning
Thin Provisioning Pool (Basic Information)

Thin Provisioning Pool Information

Item	Description
No.	The volume number is displayed. Click this item to display the [Volume Detail] screen.
Name	The volume name is displayed. Click this item to display the [Volume Detail] screen.
Status	The volume status is displayed. Refer to "" Volume Status " (page 1604)" for details.
Type	The volume type is displayed. This volume list displays only the volumes whose type is "TPV".
Usage	The usage of the volume is displayed. <ul style="list-style-type: none"> • Block The volumes that are used for the SAN. • Block/Dedupe&Comp The volumes that have both the Deduplication and Compression functions enabled. • Block/Dedupe The volumes that have the Deduplication function enabled. • Block/Comp The volumes that have the Compression function enabled. • File The volumes that are used for the NAS. • System The system volumes. Refer to "Usage Details" in the [Volume Detail] screen ([Basic] tab) for details. • Veeam The Veeam Snapshot Volumes that have both the Deduplication and Compression functions disabled. • Dedupe&Comp/Veeam The Veeam Snapshot Volumes that have both the Deduplication and Compression functions enabled. • Dedupe/Veeam The Veeam Snapshot Volumes that have the Deduplication function enabled. • Comp/Veeam The Veeam Snapshot Volumes that have the Compression function enabled.
Allocation	The allocation method for the volume is displayed. <ul style="list-style-type: none"> • Thin Physical area is allocated to the target area of the volume when a write I/O is received. • Thick Physical area is allocated to the whole area of the volume when volumes are created.
Capacity	The volume capacity is displayed.
Used Capacity	The used capacity (physically allocated capacity) of volume is displayed.
Used Rate	The volume utilization (0 to 100 %) is displayed. Used Rate = Used Capacity ÷ Capacity
Threshold	The threshold (0 to 100 %) for monitoring the volume utilization is displayed. If the "Used Rate" value exceeds the "Threshold", a Host Sense Key Code Qualifier is notified.
Process	A process that is being performed for the TPP is displayed. If no process is being performed, a "-" (hyphen) is displayed. <ul style="list-style-type: none"> Balancing: TPV balancing is being performed. Formatting: Formatting is being performed. Migrating: RAID migration is being performed.

■ Filter Setting

Function Description

Filter setting is a function used to display a list of only the TPPs satisfying all the specified conditions. No filtering is set by default. The following table shows conditions that can be specified.

Item	Description	Setting values
Name	Input the TPP name that is to be displayed. TPPs matching or partially matching the entered name are displayed. When not using the TPP name for filtering, leave this item blank.	TPP name Blank
Drive Type	Select the drive type of the TPP that is to be displayed. When not using the drive type for filtering, select "All".	All Online Nearline SSD Online SED Nearline SED SSD SED
RAID Level	Select the RAID level of the TPP that is to be displayed. When not using the RAID level for filtering, select "All".	All High Performance (RAID1+0) High Capacity (RAID5) High Reliability (RAID6) High Reliability (RAID6-FR) Mirroring (RAID1) Striping (RAID0)
Chunk Size	Select the chunk size of the TPP that is to be displayed. When not using the chunk size for filtering, select "All".	All 21 MB 42 MB 84 MB 168 MB 336 MB
Deduplication	Select the Deduplication set state of the TPP that is to be displayed. When not using the Deduplication setting for filtering, select "All". This item is displayed only when Deduplication/Compression for the storage system is enabled.	All Enable Disable Error "-" (hyphen)
Compression	Select the Compression set state of the TPP that is to be displayed. When not using the Compression setting for filtering, select "All". This item is displayed only when Deduplication/Compression for the storage system is enabled.	All Enable Disable Error "-" (hyphen)

Create Thin Provisioning Pool

- ["■ Overview" \(page 349\)](#)
- ["■ User Privileges" \(page 351\)](#)
- ["■ Settings" \(page 351\)](#)
- ["■ Operating Procedures" \(page 366\)](#)

■ Overview

This function creates a [Thin Provisioning Pool \(TPP\)](#).

The Maximum Number of Pools, Maximum Pool Capacity, and Determined Chunk Size for Each Model

Model	Maximum number of pools (*1)	Maximum pool capacity (*2)	
ETERNUS DX60 S5	48	64 TB, 128 TB	2 PB
ETERNUS DX100 S5	72	128 TB, 256 TB	4 PB
ETERNUS DX200 S5	132	256 TB, 384 TB	6 PB
ETERNUS DX500 S5	256	384 TB, 512 TB, 1 PB	16 PB
ETERNUS DX600 S5	256	512 TB, 1 PB, 1.5 PB	24 PB
ETERNUS DX900 S5	256	512 TB, 1 PB, 2 PB, 4 PB, 8 PB	128 PB
ETERNUS DX8900 S4			
ETERNUS AF150 S3	12	128 TB, 256 TB	4 PB
ETERNUS AF250 S3	132	256 TB, 384 TB	6 PB
ETERNUS AF650 S3	256	512 TB, 1 PB, 1.5 PB	24 PB
Determined chunk size (*3)		21 MB	336 MB

- *1 : Up to 256 pools can be created. When the maximum installation number of drives of a model is 512 or less, the maximum number of pools is half the maximum installation number of drives. The maximum pool number is the maximum total number of TPPs and FTSPs that can be created in the storage system.
- *2 : The maximum pool capacity is specified when "Enable" is selected for the Thin Provisioning function. Refer to the [Set Thin Provisioning] function for details. The maximum pool capacity is the maximum total capacity for TPPs and FTRPs that can be created in the storage system.
- *3 : Chunk size is a physical capacity that is assigned to virtual logical volumes created in TPPs and FTRPs when a write occurs from the host. The chunk size is determined according to the Maximum Pool Capacity of the storage system when a new TPP is created. The chunk size for the created TPP cannot be changed. The chunk size for each pool is displayed in the TPP list and the FTRP list.

Caution

- When creating TPPs, enable the Thin Provisioning function. Refer to the [Set Thin Provisioning] function for details.
- For the ETERNUS DX60 S5 and the ETERNUS AF150 S3, SEDs cannot be used to configure a TPP.
- The ETERNUS DX60 S5 does not support the encryption function.
- When the [encryption mode](#) is disabled, a TPP encrypted by CM cannot be created.
- Once a TPP has been created, the encryption status cannot be changed.
- If TPPs with different chunk sizes exist in the storage system, the maximum pool capacity might not be used to create TPPs. Refer to the [Set Thin Provisioning] function for details.
- If the error message "The process was aborted because it exceeds executable format size." appears, TPPs cannot be created. Reduce the "Thin Provisioning Pool Total Capacity" and re-execute this function.
- TPPs cannot be created in the following conditions:
 - The maximum number of pools is already registered in the storage system
 - The maximum capacity of the pools is already registered in the storage system
 - The resources for creating TPPs (such as the number of RAID groups and volumes) are insufficient
(When the maximum number of RAID groups or volumes already exists in the storage system, TPPs cannot be created.)

Note

- After a TPP is created, the TPP is formatted automatically. Progress of formatting ("Progress", "Estimated Time Left", and "Remaining Size") can be checked in the [Thin Provisioning Pool (Basic Information)] function. Click the TPP name to display the basic information.
- To expand the TPP capacity after a TPP has been created, use the [Expand Thin Provisioning Pool] function.
- To rename a TPP after the TPP has been created, use the [Rename Thin Provisioning Pool] function.
- To change the threshold to monitor the TPP usage ratio after the TPP has been created, use the [Modify Threshold Thin Provisioning Pool] function.
- Deduplication, Compression, or both can be enabled for a TPP when it is created. Refer to [""Deduplication/Compression setting for TPPs" \(page 351\)"](#) for details. Note that the ETERNUS DX900 S5 or the ETERNUS DX8900 S4 supports Compression only.
- To check the current maximum pool capacity, use the [Settings (Thin Provisioning)] function.
- The chunk size is determined according to the "Maximum Pool Capacity" of the storage system when a new TPP is created. The chunk size can be specified when "Manual" is selected for "Create Mode".

4. Thin Provisioning

Thin Provisioning Pool (Basic Information)

Deduplication/Compression setting for TPPs

The following two methods are available to set Deduplication/Compression for the TPPs.

- Setting Deduplication/Compression during a TPP creation (recommended)
If "Enable" is selected for Deduplication, Compression, or both when a new TPP is created, a "TPP creation" and "Deduplication/Compression setting" can be performed with a single operation. Refer to the [Set Deduplication/Compression] function for details about the required conditions.
 - When "Automatic" is selected for "Create Mode"
A TPP with a chunk size of "21 MB" is created.
 - When "Manual" is selected for "Create Mode"
The chunk size of a TPP is determined by the maximum pool capacity.
 - If a maximum pool capacity for each model is specified, the chunk size can be selected when a new TPP is created. Refer to ["Advanced Setting" \(page 359\)](#) for details. The default chunk size is "21 MB".
 - In other cases, create a TPP of which the chunk size is "21 MB".
- Setting Deduplication/Compression after a TPP creation
Set Deduplication, Compression, or both for the created TPPs. With this method, users can create TPPs according to the customer environment. (For example, a user can specify RAID groups that configure the target TPP.)
Deduplication/Compression can also be enabled when the chunk size of the TPP is not "21 MB". Refer to the [Set Deduplication/Compression] function for details.

To set Deduplication/Compression for a TPP, the method described in "Setting Deduplication/Compression during a TPP creation" is recommended because a "TPP creation" and the "Deduplication/Compression setting of the TPP" can be performed with a single operation.

■ User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	✓
StorageAdmin	✓
AccountAdmin	
SecurityAdmin	
Maintainer	✓

Refer to ["A. User Roles and Policies" \(page 1580\)](#) for details on the policies and roles.

■ Settings

In this screen, create a TPP. There are two methods to create a TPP: automatic drive selection and manual drive selection.

New Thin Provisioning Pool

Input a name of the TPP to be newly created and select the RAID group selection mode.

Item	Description	Setting values
Name	Input a TPP name. An existing TPP name cannot be specified.	Up to 16 alphanumeric characters, symbols (except ",", (comma) and "?"), and spaces

4. Thin Provisioning

Thin Provisioning Pool (Basic Information)

Item	Description	Setting values
Create Mode	<p>Select a create mode of a TPP.</p> <ul style="list-style-type: none"> • Automatic Select a drive to create a RAID group automatically. • Manual Select a drive to create a RAID group manually. 	<p>Automatic</p> <p>Manual</p>

Automatic Setting

To create a new TPP automatically, select drive type, RAID level, and input total capacity of TPP. The Controlling CM for the RAID group that configures the TPP is allocated with the "Automatic" setting.

Item	Description	Setting values
Drive Type	<p>Select the type of drive that configures the TPP from the list box.</p> <p>Only the drives that are installed in the storage system are displayed.</p> <p>Caution</p> <ul style="list-style-type: none"> • If drives that satisfy all of the following conditions are installed in the storage system, select the drives manually. <ul style="list-style-type: none"> - The drive types are the same - The drive capacities are the same - The sector format (AF-compliant/non-AF-compliant) is different • When using SSDs, the SSD types (SSD-H/SSD-M/SSD-L) cannot be specified. SSDs that are the same type and have the necessary capacity in a RAID group to create TPPs are selected. If the number of SSDs with the same type is insufficient for configuring a RAID group, a TPP is not created. In this case, reduce the total capacity of the TPP. If multiple RAID groups are created in a TPP, different SSD types may be used for the RAID groups. SSD types have no order of priority. <p>When using SSD SEDs, the SSD types (SSD-H SED/SSD-M SED/SSD-L SED) cannot be specified. If "SSD SED" is selected for the drive type, drives are operated in the same way as SSDs.</p>	<p>Online</p> <p>Nearline</p> <p>SSD</p> <p>Online SED</p> <p>Nearline SED</p> <p>SSD SED</p>

4. Thin Provisioning

Thin Provisioning Pool (Basic Information)

Item	Description	Setting values
RAID Level	<p>Select the level of RAID group that configures the TPP from the list box.</p> <ul style="list-style-type: none"> High Performance (RAID1+0) RAID1+0 (2D+2M, 4D+4M, 8D+8M, 12D+12M) configuration is available. High Capacity (RAID5) RAID5 (3D+1P, 4D+1P, 6D+1P, 7D+1P, 8D+1P, 12D+1P) configuration is available. High Reliability (RAID6) RAID6 (4D+2P, 6D+2P, 7D+2P, 8D+2P) configuration is available. High Reliability (RAID6-FR) RAID6-FR ((4D+2P)x2+1HS, (6D+2P)x2+1HS, (8D+2P)x3+1HS, (4D+2P)x5+1HS) configuration is available. (*1) Mirroring (RAID1) RAID1 (1D+1M) configuration Striping (RAID0) RAID0 (4D) configuration <p>D: Data drives, M: Mirror drives, P: Parity drives</p> <p>*1: "RAID6-FR" groups that configure TPPs are called "Fast Recovery RAID groups".</p> <div style="background-color: #fff9c4; padding: 5px;"> <p>Caution</p> <ul style="list-style-type: none"> If "RAID1+0" or "RAID5" is selected for the RAID level, RAID groups cannot be created with drives that are 6 TB or larger (except SSDs and SSD SEDs). </div> <div style="background-color: #e0e0e0; padding: 5px;"> <p>Note</p> <ul style="list-style-type: none"> RAID0 has no data redundancy. Select "RAID1+0", "RAID5", "RAID6", "RAID6-FR", or "RAID1" for the RAID level. The number of RAID groups that configure a TPP is automatically determined by the selected drive type, the RAID level, the selected drives (only for RAID6-FR), the specified total capacity of the Thin Provisioning Pool, and the drives that are installed in the storage system. </div>	<p>High Performance (RAID1+0) High Capacity (RAID5) High Reliability (RAID6) High Reliability (RAID6-FR) Mirroring (RAID1) Striping (RAID0)</p>
Select Drives	<p>Select the requirements that are given priority when creating Fast Recovery RAID groups in the TPP with automatic drive configuration.</p> <p>This item is available only when the RAID level is "RAID6-FR".</p> <ul style="list-style-type: none"> Minimize number of using drives Minimize the number of drives in the RAID group to achieve high-speed rebuilding. Refer to "Drive Configuration for Fast Recovery RAID Groups" (page 358) for details. Prioritize rebuild rate Use more drives in a RAID group and distribute data to achieve high-speed rebuilding. Refer to "Drive Configuration for Fast Recovery RAID Groups" (page 358) for details. 	<p>Minimize number of using drives Prioritize rebuild rate</p>

4. Thin Provisioning

Thin Provisioning Pool (Basic Information)

Item	Description	Setting values
Thin Provisioning Pool Total Capacity	<p>Input a TPP capacity. Select the capacity unit from "PB", "TB", "GB", or "MB".</p> <p>A TPP is automatically created with a capacity of the input value or higher. For the maximum capacity, refer to ""The Maximum Number of Pools, Maximum Pool Capacity, and Determined Chunk Size for Each Model"" (page 349)".</p> <p>The maximum capacity that can be used to create new TPPs is displayed to the right of the setting field for "Thin Provisioning Pool Total Capacity". The maximum capacity of each pool is equivalent to the maximum pool capacity of each chunk size. Refer to ""The Maximum Number of Pools, Maximum Pool Capacity, and Determined Chunk Size for Each Model"" (page 349)" for details.</p> <p>For the ETERNUS DX900 S5 or the ETERNUS DX8900 S4, the maximum capacity of a single pool is "48 PB" (when the chunk size is 336 MB).</p> <p>(Max: xx.xx yy)</p> <p>xx.xx: The maximum capacity that can be used to create new TPPs</p> <p>yy: Unit [PB/TB/GB/MB]</p>	<p>Numeric characters</p> <p>Unit:</p> <p>PB/TB/GB/MB</p>
Encryption by CM	<p>Select the TPP encryption status.</p> <p>When the encryption mode is disabled or "Online SED", "Nearline SED", or "SSD SED" is selected for the drive type, "On" cannot be selected.</p> <p>For the ETERNUS DX60 S5, this item is not displayed.</p> <ul style="list-style-type: none"> • When creating TPP that is encrypted by CM, select "On" • When creating TPP that is not encrypted by CM, select "Off" 	<p>On</p> <p>Off</p>
Alarm	<p>Specify the threshold (%) for monitoring the TPP used capacity.</p> <p>There are two types of threshold: "Warning" and "Attention". Specify the threshold so that "Warning" is larger than "Attention". The "Attention" threshold can be omitted. When omitting the "Attention" threshold, clear the checkbox.</p>	<p>Warning threshold</p> <p>5 - 99 %</p> <p>90 % (Default)</p> <p>Attention threshold</p> <p>5 - 80 %</p> <p>75 % (Default)</p>
Chunk Size	<p>The chunk size that is determined according to the maximum pool capacity (*1) is displayed.</p> <p>If the chunk size information cannot be obtained, a "-" (hyphen) is displayed.</p> <p>If Deduplication, Compression, or both have been enabled, "21 MB" is displayed.</p> <p>21 MB</p> <p>336 MB</p> <p>"-" (hyphen)</p> <p>*1: The maximum pool capacity that is specified by using the [Set Thin Provisioning] function. The current value can be checked in the [Settings] screen. Refer to the [Settings (Thin Provisioning)] function for details.</p>	

4. Thin Provisioning

Thin Provisioning Pool (Basic Information)

Item	Description	Setting values															
Deduplication	Select whether to "Enable" or "Disable" Deduplication or Compression for the TPP.	Enable															
Compression	This item is only displayed when the Deduplication/Compression for the storage system is enabled. The following TPPs are created depending on the selected items.	Disable															
	<table border="1"> <thead> <tr> <th>Deduplication</th> <th>Compression</th> <th>TPPs that are to be created</th> </tr> </thead> <tbody> <tr> <td>Enable</td> <td>Enable</td> <td>TPPs where both Deduplication and Compression are enabled</td> </tr> <tr> <td>Enable</td> <td>Disable</td> <td>TPPs where only Deduplication is enabled</td> </tr> <tr> <td>Disable</td> <td>Enable</td> <td>TPPs where only Compression is enabled</td> </tr> <tr> <td>Disable</td> <td>Disable</td> <td>TPPs where both Deduplication and Compression are disabled</td> </tr> </tbody> </table>	Deduplication	Compression	TPPs that are to be created	Enable	Enable	TPPs where both Deduplication and Compression are enabled	Enable	Disable	TPPs where only Deduplication is enabled	Disable	Enable	TPPs where only Compression is enabled	Disable	Disable	TPPs where both Deduplication and Compression are disabled	
Deduplication	Compression	TPPs that are to be created															
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Enable	Disable	TPPs where only Deduplication is enabled															
Disable	Enable	TPPs where only Compression is enabled															
Disable	Disable	TPPs where both Deduplication and Compression are disabled															
	<p>Caution</p> <ul style="list-style-type: none"> To change the Deduplication/Compression setting for the existing TPP, after disabling both the Deduplication and Compression settings for the TPP, reconfigure the parameters. Refer to the [Set Deduplication/Compression] function for details. 																
	<p>Note</p> <ul style="list-style-type: none"> When Deduplication or Compression for the TPP is enabled, the Data Container Volume is automatically created in the relevant TPP. Refer to the [Set Deduplication/Compression] function for details. 																

Manual Setting

Select the drive type, the RAID level, and the drives that will configure the TPP to create a new TPP.

Item	Description	Setting values
Drive Type	Select the type of drive that configures the TPP from the list box. Only the drives that are installed in the storage system are displayed. Refer to ""Requirements for selecting drives" (page 363)" for details.	Online Nearline SSD Online SED Nearline SED SSD SED

4. Thin Provisioning
Thin Provisioning Pool (Basic Information)

Item	Description	Setting values														
RAID Level	<p>Select the level of RAID group that configures the TPP from the list box.</p> <p>The installed drives determine the selectable RAID levels that are displayed as options.</p> <ul style="list-style-type: none"> High Performance (RAID1+0) RAID1+0 (2D+2M, 4D+4M, 8D+8M, 12D+12M) configuration is available. High Capacity (RAID5) RAID5 (3D+1P, 4D+1P, 6D+1P, 7D+1P, 8D+1P, 12D+1P) configuration is available. High Reliability (RAID6) RAID6 (4D+2P, 6D+2P, 7D+2P, 8D+2P) configuration is available. High Reliability (RAID6-FR) RAID6-FR ((4D+2P)x2+1HS, (6D+2P)x2+1HS, (8D+2P)x3+1HS, (4D+2P)x5+1HS) configuration is available. (*1) Mirroring (RAID1) RAID1 (1D+1M) configuration Striping (RAID0) RAID0 (4D) configuration <p>D: Data drives, M: Mirror drives, P: Parity drives</p> <p>*1: "RAID6-FR" groups that configure TPPs are called "Fast Recovery RAID groups".</p> <p>The number of member drives in each RAID level is as follows:</p> <table border="1"> <thead> <tr> <th>RAID level</th> <th>Number of member drives</th> </tr> </thead> <tbody> <tr> <td>High Performance (RAID1+0)</td> <td>4, 8, 16, 24</td> </tr> <tr> <td>High Capacity (RAID5)</td> <td>4, 5, 7, 8, 9, 13</td> </tr> <tr> <td>High Reliability (RAID6)</td> <td>6, 8, 9, 10</td> </tr> <tr> <td>High Reliability (RAID6-FR)</td> <td>13, 17, 31</td> </tr> <tr> <td>Mirroring (RAID1)</td> <td>2</td> </tr> <tr> <td>Striping (RAID0)</td> <td>4</td> </tr> </tbody> </table> <p>Note</p> <ul style="list-style-type: none"> RAID0 has no data redundancy. Select "RAID1+0", "RAID5", "RAID6", "RAID6-FR", or "RAID1" for the RAID level. 	RAID level	Number of member drives	High Performance (RAID1+0)	4, 8, 16, 24	High Capacity (RAID5)	4, 5, 7, 8, 9, 13	High Reliability (RAID6)	6, 8, 9, 10	High Reliability (RAID6-FR)	13, 17, 31	Mirroring (RAID1)	2	Striping (RAID0)	4	<p>High</p> <p>Performance (RAID1+0)</p> <p>High Capacity (RAID5)</p> <p>High Reliability (RAID6)</p> <p>High Reliability (RAID6-FR)</p> <p>Mirroring (RAID1)</p> <p>Striping (RAID0)</p>
RAID level	Number of member drives															
High Performance (RAID1+0)	4, 8, 16, 24															
High Capacity (RAID5)	4, 5, 7, 8, 9, 13															
High Reliability (RAID6)	6, 8, 9, 10															
High Reliability (RAID6-FR)	13, 17, 31															
Mirroring (RAID1)	2															
Striping (RAID0)	4															
Fast Recovery Configuration	<p>Select the drive configuration for Fast Recovery RAID groups in the TPP.</p> <p>Select the drive configuration from "No. of drives in the configuration", "capacity efficiency", and "rebuilding speed" according to your environment. Refer to "Drive Configuration for Fast Recovery RAID Groups" (page 358) for details. The more redundant sets there are, the faster the rebuilding becomes.</p> <p>This item is blank when the RAID level is not "RAID6-FR".</p>	<p>For the ETERNUS DX60 S5</p> <p>(4D+2P)x2+1HS</p> <p>(6D+2P)x2+1HS</p> <p>Blank</p> <p>For the other models</p> <p>(4D+2P)x2+1HS</p> <p>(6D+2P)x2+1HS</p> <p>(8D+2P)x3+1HS</p> <p>(4D+2P)x5+1HS</p> <p>Blank</p> <p>D: Data drives</p> <p>P: Parity drives</p> <p>HS: Hot Spares</p>														

4. Thin Provisioning

Thin Provisioning Pool (Basic Information)

Item	Description	Setting values
Thin Provisioning Pool Total Capacity	<p>Total capacity of the TPP created with the selected RAID level and drive type is displayed. For the maximum capacity, refer to ""The Maximum Number of Pools, Maximum Pool Capacity, and Determined Chunk Size for Each Model" (page 349)".</p> <p>The maximum capacity that can be used to create new TPPs is displayed to the right of the setting field for "Thin Provisioning Pool Total Capacity". The maximum capacity of each pool is equivalent to the maximum pool capacity of each chunk size. Refer to ""The Maximum Number of Pools, Maximum Pool Capacity, and Determined Chunk Size for Each Model" (page 349)" for details.</p> <p>For the ETERNUS DX900 S5 or the ETERNUS DX8900 S4, the maximum capacity of a single pool is "48 PB" (when the chunk size is 336 MB).</p>	
Encryption by CM	<p>Select the TPP encryption status.</p> <p>When the encryption mode is disabled or "Online SED", "Nearline SED", or "SSD SED" is selected for the drive type, "On" cannot be selected.</p> <p>For the ETERNUS DX60 S5, this item is not displayed.</p> <ul style="list-style-type: none"> • When creating TPP that is encrypted by CM, select "On" • When creating TPP that is not encrypted by CM, select "Off" 	<p>On</p> <p>Off</p>
Alarm	<p>Specify the threshold (%) for monitoring the TPP used capacity.</p> <p>There are two types of threshold: "Warning" and "Attention". Specify the threshold so that "Warning" is larger than "Attention". The "Attention" threshold can be omitted. When omitting the "Attention" threshold, clear the checkbox.</p>	<p>Warning threshold</p> <p>5 - 99 %</p> <p>90 % (Default)</p> <p>Attention threshold</p> <p>5 - 80 %</p> <p>75 % (Default)</p>
Chunk Size	<p>The chunk size of the TPP is displayed.</p> <p>If the chunk size information cannot be obtained, a "-" (hyphen) is displayed.</p> <p>The display contents vary depending on the maximum pool capacity (*1) and the "Deduplication/Compression" settings. Refer to ""Displayed Chunk Size for Manual Settings" (page 359)" for details.</p> <p>21 MB</p> <p>42 MB</p> <p>84 MB</p> <p>168 MB</p> <p>336 MB</p> <p>*1 : The maximum pool capacity that is specified by using the [Set Thin Provisioning] function. The current value can be checked in the [Settings] screen. Refer to the [Settings (Thin Provisioning)] function for details.</p>	

4. Thin Provisioning

Thin Provisioning Pool (Basic Information)

Item	Description	Setting values															
Deduplication	Select whether to "Enable" or "Disable" Deduplication or Compression for the TPP.	Enable															
Compression	This item is only displayed when the Deduplication/Compression for the storage system is enabled. The following TPPs are created depending on the selected items.	Disable															
	<table border="1"> <thead> <tr> <th>Deduplication</th> <th>Compression</th> <th>TPPs that are to be created</th> </tr> </thead> <tbody> <tr> <td>Enable</td> <td>Enable</td> <td>TPPs where both Deduplication and Compression are enabled</td> </tr> <tr> <td>Enable</td> <td>Disable</td> <td>TPPs where only Deduplication is enabled</td> </tr> <tr> <td>Disable</td> <td>Enable</td> <td>TPPs where only Compression is enabled</td> </tr> <tr> <td>Disable</td> <td>Disable</td> <td>TPPs where both Deduplication and Compression are disabled</td> </tr> </tbody> </table>	Deduplication	Compression	TPPs that are to be created	Enable	Enable	TPPs where both Deduplication and Compression are enabled	Enable	Disable	TPPs where only Deduplication is enabled	Disable	Enable	TPPs where only Compression is enabled	Disable	Disable	TPPs where both Deduplication and Compression are disabled	
Deduplication	Compression	TPPs that are to be created															
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Enable	Disable	TPPs where only Deduplication is enabled															
Disable	Enable	TPPs where only Compression is enabled															
Disable	Disable	TPPs where both Deduplication and Compression are disabled															
	<p>Caution</p> <ul style="list-style-type: none"> To change the Deduplication/Compression setting for the existing TPP, after disabling both the Deduplication and Compression settings for the TPP, reconfigure the parameters. Refer to the [Set Deduplication/Compression] function for details. 																
	<p>Note</p> <ul style="list-style-type: none"> When Deduplication or Compression for the TPP is enabled, the Data Container Volume is automatically created in the relevant TPP. Refer to the [Set Deduplication/Compression] function for details. 																

Drive Configuration for Fast Recovery RAID Groups

The drive layout in the storage system is the same as "RAID6". When using automatic configuration, the drive configuration that satisfies the specified capacity is determined according to the following order.

No. of drives in the configuration (per RAID group)	Redundant sets + HS (*1)	Capacity efficiency (*2) (%)	Rebuilding speed (*3) (Rate)	Number of data drives	Selection order when configuring automatically	
					"Minimize number of using drives" is selected	"Prioritize rebuild rate" is selected
13	(4D+2P)x2+1HS	61.5	2.17	8	1	3
17	(6D+2P)x2+1HS	70.6	2.13	12	2	4
31	(8D+2P)x3+1HS	77.4	3.10	24	3	2
31	(4D+2P)x5+1HS	64.5	5.17	20	Not selected	1

*1 : Fast Recovery RAID groups are described as "Redundant sets + HS".

RAID6 ((Number of data drives (D) + Number of parity drives (P)) × Number of redundant sets + Number of hot spares (HS))

↑

Redundant sets

(Example) "RAID6 ((4D+2P)x2+1HS)" is described as "(4D+2P)x2+1HS".

*2 : The ratio of the user capacity to physical drive capacity.

*3 : Rate when the rebuilding speed for the basic "RAID6 (D+P)" configuration is "1". The rate varies depending on the workload of the storage system and system environment.

Displayed Chunk Size for Manual Settings

Maximum pool capacity	Deduplication	Compression	Chunk size (default)	Displayed content for "Chunk Size"
Maximum pool capacity for each model	Enable	Enable	21 MB	The default value is normally displayed. If "Advanced Setting" is used, the selected chunk size (21 MB, 42 MB, 84 MB, 168 MB, 336 MB) is displayed.
	Enable	Disable		
	Disable	Enable		
	Disable	Disable	336 MB	
	Not displayed	Not displayed		
Capacity values other than the maximum pool capacity for each model	Enable	Enable	21 MB	21 MB
	Enable	Disable		
	Disable	Enable		
	Disable	Disable		
	Not displayed	Not displayed		

Advanced Setting

Perform the advanced settings for TPPs.

Item	Description	Setting values
Stripe Depth	<p>Stripe Depth should be selected only when advanced tuning needs to be performed for each RAID group configuring the TPP. It is not necessary to change the default value for normal use.</p> <p>The setting is not available when the RAID level is "RAID1". When the "RAID Level" is "High Reliability (RAID6)", the value is fixed to "64KB". Available Stripe Depth value varies depending on the RAID level. Refer to "Available Stripe Depth Value" (page 360) for details.</p> <div style="background-color: #f0f0f0; padding: 10px; margin-top: 10px;"> <p>Note</p> <ul style="list-style-type: none"> Specifying a larger value for the Stripe Depth can reduce the number of drives to access. For RAID1+0, reducing the number of commands issued to drives improves the performance of access to the specified RAID group. For RAID5, however, specifying a larger value for the Stripe Depth might decrease the sequential write performance. In addition, several restrictions apply to a RAID group whose stripe depth has been changed. Refer to "Restrictions for Stripe Depth Modification" (page 360) for details. </div>	64 KB (Default) 128 KB 256 KB 512 KB 1024 KB

4. Thin Provisioning

Thin Provisioning Pool (Basic Information)

Item	Description	Setting values
Chunk Size	<p>Select the chunk size of the TPP that is to be created. It is not necessary to change the default value for normal use.</p> <p>Refer to ""The Maximum Pool Capacity of the Target TPP When the Chunk Size Is Changed" (page 360)" for the maximum pool capacity of the target TPP.</p> <p>Change the chunk size of the TPP for the following cases.</p> <ul style="list-style-type: none"> Exceeding the maximum pool capacity when the chunk size has been set to "21 MB" Performing an effective release of unnecessary physical TPP areas by setting the same chunk size for TPPs to which the copy source and copy destination TPVs belong when an REC is performed with an older model <p>This item is displayed when the maximum pool capacity is set for each model with the [Set Thin Provisioning] function.</p>	<p>21 MB (Default) (*1) 42 MB 84 MB 168 MB 336 MB (Default) (*2)</p> <p>*1 : When Deduplication/ Compression of the TPP is enabled.</p> <p>*2 : For the following cases: When Deduplication/ Compression of the TPP is disabled. When Deduplication/ Compression of the storage system is disabled.</p>

Available Stripe Depth Value

The Stripe Depth values available for each RAID level are as follows:

RAID level	Available Stripe Depth value
RAID1	-
RAID1+0, RAID0	64 KB, 128 KB, 256 KB, 512 KB, 1024 KB
RAID5 (3+1)	64 KB, 128 KB, 256 KB, 512 KB
RAID5 (4+1), RAID5 (6+1), RAID5 (7+1)	64 KB, 128 KB, 256 KB
RAID5 (8+1), RAID5 (12+1)	64 KB, 128 KB
RAID6	64 KB
RAID6-FR	64 KB

Restrictions for Stripe Depth Modification

The following restrictions are applied for RAID groups for which the Stripe Depth value is changed.

- Stripe Depth for RAID groups that configure the existing TPPs cannot be changed.
- When selecting drives automatically to create a TPP, the Stripe Depth cannot be changed.

The Maximum Pool Capacity of the Target TPP When the Chunk Size Is Changed

Chunk Size	Maximum Pool Capacity									
	ETERNUS DX60 S5	ETERNUS DX100 S5	ETERNUS DX200 S5	ETERNUS DX500 S5	ETERNUS DX600 S5	ETERNUS DX900 S5	ETERNUS DX8900 S4	ETERNUS AF150 S3	ETERNUS AF250 S3	ETERNUS AF650 S3
21 MB	128 TB	256 TB	384 TB	1 PB	1.5 PB	8 PB	8 PB	256 TB	384 TB	1.5 PB
42 MB	256 TB	512 TB	768 TB	2 PB	3 PB	16 PB	16 PB	512 TB	768 TB	3 PB
84 MB	512 TB	1 PB	1.5 PB	4 PB	6 PB	32 PB	32 PB	1 PB	1.5 PB	6 PB
168 MB	1 PB	2 PB	3 PB	8 PB	12 PB	64 PB	64 PB	2 PB	3 PB	12 PB
336 MB	2 PB	4 PB	6 PB	16 PB	24 PB	128 PB	128 PB	4 PB	6 PB	24 PB

RAID Group List

The list of RAID groups added to the TPP is displayed. Nothing is displayed in the initial list. Click the [Add] button to display the screen to add RAID groups.

Item	Description
RAID Level	<p>The RAID level is displayed.</p> <p>Click the [RAID Level] link to display the screen to edit the target RAID group.</p> <p>High Performance (RAID1+0) High Capacity (RAID5) High Reliability (RAID6) High Reliability (RAID6-FR) Mirroring (RAID1) Striping (RAID0)</p>
Drive Type	<p>The type of drive that configures the RAID group is displayed.</p> <p>If multiple drive types are used in the RAID group, the drive type is displayed as described below.</p> <ul style="list-style-type: none"> • If "Online" is selected for the drive type and the RAID group is configured with both "Online" and "Nearline" type drives, "Online" is displayed. • If "Online SED" is selected for the drive type and the RAID group is configured with both "Online SED" and "Nearline SED" type drives, "Online SED" is displayed. • If "SSD" is selected for the drive type and the RAID group is configured with "SSD-H", "SSD-M", or "SSD-L" type drive, "SSD" is displayed. • If "SSD SED" is selected for the drive type and the RAID group is configured with "SSD-H SED", "SSD-M SED", or "SSD-L SED" type drives, "SSD SED" is displayed.
Total Capacity	The total capacity of the RAID groups is displayed.

[Add RAID Group] Screen

When adding RAID groups, the following settings are also required:

RAID Group

Item	Description	Setting values
RAID Level	<p>The RAID level that is selected in the previous screen is displayed.</p> <p>High Performance (RAID1+0) High Capacity (RAID5) High Reliability (RAID6) High Reliability (RAID6-FR) Mirroring (RAID1) Striping (RAID0)</p>	
Fast Recovery Configuration	<p>The drive configuration in the Fast Recovery RAID group that is selected in the previous screen is displayed.</p> <p>This item is blank when the RAID level is not "RAID6-FR".</p> <p>(4D+2P)x2+1HS (6D+2P)x2+1HS (8D+2P)x3+1HS (4D+2P)x5+1HS Blank D: Data drives P: Parity drives HS: Hot Spares</p>	

4. Thin Provisioning

Thin Provisioning Pool (Basic Information)

Item	Description	Setting values
Controlling CM	Select the Controlling CM of the RAID group that is to be created. "Automatic" and the normal CM number ("CE#x CM#y") that is installed are displayed as options. Select "Automatic" for normal operations. When "Automatic" is selected, the Controlling CM that is to be allocated is determined by the RAID group number. Refer to "" Automatic Controlling CM Setting " (page 281)" for details.	For the ETERNUS DX900 S5 or the ETERNUS DX8900 S4 Automatic CE#x CM#y For the other models Automatic CM#y x: CE number y: CM number
RAID Group Total Capacity	Total capacity of the RAID group created with the selected RAID level and drives is displayed.	

Drive Selection

Drives can be selected from the list or the installation image. To switch between the list and the installation image, click the tab.

4. Thin Provisioning Thin Provisioning Pool (Basic Information)

Requirements for selecting drives

- The conditions for RAID groups in the TPP are as follows:
 - The RAID level (RAID1+0/RAID5/RAID6/RAID6-FR/RAID1/RAID0) must be the same
 - The number of member drives in the RAID group must be the same
 - The drive type (Online/Nearline/SSD/Online SED/Nearline SED/SSD SED) must be the same
(If "Online" is selected for the drive type, "Online" type drives and "Nearline" type drives can be used in the same RAID group. However, using only "Online" type drives is recommended. If "Online SED" is selected for the drive type, "Online SED" type drives and "Nearline SED" type drives can be used in the same RAID group. However, using only "Online SED" type drives is recommended. This is because the available capacity and the access performance may be reduced when these drives are used in the same RAID group.)
 - When the RAID level is "RAID1+0" or "RAID5", the drive must be smaller than 6 TB (except SSDs and SSD SEDs)
- The recommended drive configuration of the RAID group is shown as follows:
 - Select drives that are the same size and the same speed. If drives of different capacities exist in a RAID group, the smallest capacity becomes the standard, and all other drives are regarded as having the same capacity as the smallest drive. In this case, the remaining drive space is not used. In addition, if drives of different speeds exist in a RAID group, the access performance of the RAID group is reduced by the slower drives.
 - Select the same SSD type ([SSD-H/SSD-M/SSD-L/SSD-H SED/SSD-M SED/SSD-L SED](#)). If different types of SSDs exist in a RAID group, the access performance for all SSDs in the RAID group is adjusted to the SSD of the lowest interface speed.
 - Select the same sector format of drives (AF-compliant/non-AF-compliant).
 - If the host connection environment does not support Advanced Format (AF), select non-AF-compliant drives (*1). If AF-compliant drives (*2) are selected, a data format conversion occurs and the drive access performance is reduced. When the host to be connected supports AF, both AF-compliant and non-AF-compliant drives can be selected.
 - *1 : Drives (such as 2.5" Online and 2.5" Nearline) where "AF" is not displayed for the type.
 - *2 : Drives (such as 2.5" Online AF and 2.5" Nearline AF) where "AF" is displayed for the type.
 - When "RAID1+0" or "RAID1" is selected for the RAID level, allocate the drives (mirroring pair drives) by dividing them into two or more connection lines (for the ETERNUS DX500 S5/DX600 S5/DX900 S5 and the ETERNUS AF650 S3).
 - When "RAID5", "RAID6", or "RAID6-FR" is selected for the RAID level, allocate the drives (multiple drives configuring a striping) by dividing them into two or more connection lines (for the ETERNUS DX500 S5/DX600 S5/DX900 S5 and the ETERNUS AF650 S3).
 - If "RAID1" is selected for the RAID level, using drives other than SSD is recommended.
- There are conditions for the ETERNUS DX8900 S4 drive layout. Refer to ["Conditions for the ETERNUS DX8900 S4 Drive Layout" \(page 365\)](#) for details. Note that these conditions are not applied to other models.

[Tabular] Tab

Click the [Tabular] tab to select drives from the list. Only unused drives are displayed on the list. There are conditions for the ETERNUS DX8900 S4 drive layout. Refer to ["Conditions for the ETERNUS DX8900 S4 Drive Layout" \(page 365\)](#) for details. Note that these conditions are not applied to other models.

Item	Description
Checkbox to select drives	Select the checkbox for the drive that is to be used. When selecting drives, refer to "Requirements for selecting drives" (page 363) .
Enclosure	The enclosure where the drive is installed is displayed. CE : Controller Enclosure (2.5" and 3.5") DE : Drive Enclosure (2.5", 3.5", and 3.5" high density DEs) CE#x DE#yy x: CE number yy: DE number


4. Thin Provisioning
Thin Provisioning Pool (Basic Information)

Item	Description
Slot No.	The slot number of the enclosure, where the drive is installed, is displayed. 2.5" CE/DE: 0 - 23 3.5" CE/DE: 0 - 11 3.5" high density DE: 0 - 59
Type	The drive type displayed for this item is a combination of the following. <ul style="list-style-type: none"> • Drive size <ul style="list-style-type: none"> - For 2.5-inch drives: 2.5" - For 3.5-inch drives: 3.5" • Drive type <ul style="list-style-type: none"> - For SAS disks: Online - For Nearline SAS disks: Nearline - For SSDs, the following items are displayed depending on the SSD type. <ul style="list-style-type: none"> • For SSD-Hs (12 Gbit/s): SSD-H (*1) • For SSD-Ms (12 Gbit/s): SSD-M (*1) • For SSD-Ls (12 Gbit/s): SSD-L (*1) <p>Note that "SED" is also displayed for self encrypting drives and "AF" is also displayed for Advanced Format compliant drives.</p> <p>*1: The displayed item varies depending on the interface speed (bandwidth) or the capacity of the reserved space. Unless otherwise specified, "SSD-H", "SSD-M", and "SSD-L" are collectively referred to as "SSD". In addition, there may be cases when "SSD SED" is used as the collective term for self encrypting SSD-Hs, SSD-Ms, and SSD-Ls.</p>
Capacity	The capacity of the drive is displayed. <div style="background-color: #fff9c4; padding: 10px; margin-top: 10px;"> <p>Caution</p> <ul style="list-style-type: none"> • The displayed drive capacity may differ from the product's actual capacity. For example, the drive capacity of a "1.92 TB SSD" is displayed as "2.00 TB" and the capacity of an "18 TB Nearline SAS disk" is displayed as "17.9 TB". </div>
Speed	The drive speed is displayed. For SSD or SSD SED, a "-" (hyphen) is displayed. 15000 rpm 10000 rpm 7200 rpm

[Graphic] Tab

Click the [Graphic] tab to select drives from the drive installation image. The installation images of all the drives installed in the storage system are displayed. Checkboxes are displayed for unused drives. There are conditions for the ETERNUS DX8900 S4 drive layout. Refer to [""Conditions for the ETERNUS DX8900 S4 Drive Layout" \(page 365\)"](#) for details. Note that these conditions are not applied to other models.

4. Thin Provisioning
Thin Provisioning Pool (Basic Information)

Item	Description	Setting values
DE selection list box	Select the DE group. Options are displayed in the list box when at least one CE or DE in the DE group is installed in the storage system. Refer to "DE selection list box" (page 273) for details on the options and DE groups for each model.	DE#0x DE#1x DE#2x DE#3x DE#4x DE#5x DE#6x DE#7x DE#8x DE#9x DE#Ax DE#Bx DE#Cx DE#Dx DE#Ex DE#Fx
DE	Only the CEs or the DEs in the selected DE group that are installed in the storage system are displayed. CE#x DE#yy x: CE number yy: DE number	
Checkbox to select drives	Select the checkbox for the drive that is to be used. Checkboxes are displayed for unused drives. For 2.5" CEs or 2.5" DEs, drives are displayed from left to right in ascending order of the slot number. For 3.5" CEs, 3.5" DEs, or 3.5" high density DEs, drives are displayed from bottom left to top right in ascending order of the slot number. Placing the mouse pointer on the  icon displays the detailed information of the drive. When selecting drives, refer to "Requirements for selecting drives" (page 363) .	

Conditions for the ETERNUS DX8900 S4 Drive Layout

The drive layout to configure RAID groups in the ETERNUS DX8900 S4 must satisfy the conditions described below.

RAID groups cannot be created if the required conditions are not satisfied.

RAID level	Drive layout conditions	
RAID1	Required	Allocate mirroring pair drives to different DEs.
	Recommended	Allocate mirroring pair drives to DEs (*1) under different CEs when possible. Allocate mirroring pair drives to different SAS cascades (*2) when possible.
RAID1+0	Required	Allocate mirroring pair drives to different DEs.
	Recommended	Allocate striping drives to DEs under as many CEs as possible. Allocate striping drives to as many SAS cascades (*2) as possible.
RAID5	Required	Allocate member drives to different DEs.
	Recommended	Distribute member drives to DEs under as many CEs as possible. Distribute member drives to as many SAS cascades (*2) as possible.
RAID6	Required	Allocate two or less member drives to the same DE.
RAID6-FR	Recommended	Distribute member drives to DEs under as many CEs as possible. Distribute member drives to as many SAS cascades (*2) as possible.

4. Thin Provisioning

Thin Provisioning Pool (Basic Information)

*1 : DEs under different CEs have different numbers as the first digit of the DE number.

*2 : "SAS cascade" for the ETERNUS DX8900 S4 refers to DEs that are attached to one drive interface port. The DEs that are allocated to the same SAS cascade configuration are as follows:

DE#x1, DE#x2, and DE#x3 that are connected to CE#x/DI Port#0 (x: 0 - B)

DE#x4, DE#x5, DE#x6, and DE#x7 that are connected to CE#x/DI Port#1 (x: 0 - B)

DE#x8, DE#x9, DE#xA, and DE#xB that are connected to CE#x/DI Port#2 (x: 0 - B)

DE#xC, DE#xD, DE#xE, and DE#xF that are connected to CE#x/DI Port#3 (x: 0 - B)

(Example) DE#01, DE#02, and DE#03 that are connected to CE#0/DI Port#0 are on the same SAS cascade.

Function Button

Button	Description
[Add]	Adds a RAID group to the TPP. If the maximum pool capacity for each model is exceeded, the [Add] button cannot be clicked.
[Delete]	Deletes a RAID group from the TPP. If no RAID group has been added, the [Delete] button is not displayed.

Function Link

Link	Description
[RAID Level]	Displays the screen to edit the selected RAID group. This screen is used to change the Controlling CM of the RAID group or select the drive that configures the RAID group again. The checkbox for the drive selected for the RAID group is selected.

■ Operating Procedures

Automatically Selecting Drives to Create TPPs

Procedure ▶▶▶

- 1 Click [Create] in [Action].
- 2 Select "Automatic" for "Create Mode", specify the other parameters, and click the [Create] button.
→ A confirmation screen appears.

Caution

- An error screen appears in the following conditions:
 - The "Name" is not entered
 - The "Name" does not satisfy the input conditions
 - The "Name" already exists
 - The "Thin Provisioning Pool Total Capacity" field is not entered
 - The total value of TPP capacity to be created and existing pool capacity exceeds the maximum pool capacity for each model
 - A TPP that meets the specified conditions (drive type, RAID level, and capacity that is equal to or larger than the specified value) cannot be created with the installed drives in the storage system

Note

- Specify the threshold so that "Warning" is larger than "Attention".
- The "Attention" threshold can be omitted. When setting the "Attention" threshold, select the checkbox and then specify a threshold.

- 3 Click the [OK] button.
→ Create Thin Provisioning Pool starts.
- 4 Click the [Done] button to return to the [Thin Provisioning Pool] screen.



Manually Selecting Drives to Create TPPs

Procedure ▶▶▶

- 1 Click [Create] in [Action].
- 2 Select "Manual" for "Create Mode" and specify the other parameters.
- 3 Click the [Add] button.
→ The [Add RAID Group] screen is displayed.
- 4 Select the Controlling CM of the RAID group, select all the drives to be registered in the RAID group from the list or from the installation image, and then click the [OK] button.
→ The screen returns to the previous screen. The created RAID group is displayed in the RAID group list.

Caution

- An error screen appears in the following conditions:
 - The number of selected drives and the number of member drives of the specified RAID level do not match
 - The number of selected drives and the number of member drives of the existing RAID group do not match

Note

- Click the [RAID Level] link in the RAID group list for the existing RAID group to perform the following operations.
 - The number of member drives can be checked. The drives with the checkbox selected in the displayed screen are the member of the RAID group.
 - The Controlling CM and configuration drives of the RAID group can be changed.
- Click the [Delete] button of the target RAID group area in the RAID group list to delete the newly added RAID group.

- 5 When creating multiple RAID groups that configure a TPP, repeat Step 3 and Step 4.
- 6 After creating a RAID group that configures the TPP, click the [Create] button.
→ A confirmation screen appears.

Caution

- An error screen appears in the following conditions:
 - The "Name" is not entered
 - The "Name" does not satisfy the input conditions
 - The "Name" already exists
 - The total value of TPP capacity to be created and existing pool capacity exceeds the maximum pool capacity for each model
 - The drive layout does not satisfy the required conditions
(Refer to ""[Conditions for the ETERNUS DX8900 S4 Drive Layout](#)" (page 365)" for details.)
 - The "Stripe Depth" exceeds the allowable range specified for each RAID level

Note

- Specify the threshold so that "Warning" is larger than "Attention".
- The "Attention" threshold can be omitted. When setting the "Attention" threshold, select the checkbox and then specify a threshold.

- 7 Click the [OK] button.
→ Create Thin Provisioning Pool starts.
- 8 Click the [Done] button to return to the [Thin Provisioning Pool] screen.



Delete Thin Provisioning Pool

- "[Overview](#)" (page 368)
- "[User Privileges](#)" (page 369)
- "[Operating Procedures](#)" (page 369)

■ Overview

This function deletes a [Thin Provisioning Pool \(TPP\)](#).

Caution

- TPPs that have volumes registered cannot be deleted. When deleting a TPP, delete the volumes beforehand. To delete volumes, use the [Delete Volume] function.
- TPPs cannot be deleted if Deduplication or Compression is enabled. When deleting TPPs, disable Deduplication and Compression for the relevant TPPs in advance. Refer to the [Set Deduplication/Compression] function for details.

Note

- After deleting a TPP, all the RAID groups that configure the TPP are also deleted.
- Use the [Thin Provisioning Pool] screen to check whether Deduplication or Compression is set for the relevant TPP. Refer to the [Thin Provisioning Pool (Basic Information)] function for details.

■ User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	✓
StorageAdmin	✓
AccountAdmin	
SecurityAdmin	
Maintainer	✓

Refer to "[A. User Roles and Policies](#)" (page 1580) for details on the policies and roles.

■ Operating Procedures

This function deletes a TPP.

Procedure ▶▶▶

- 1 Select the TPP that is to be deleted (multiple selections can be made) and click [Delete] in [Action].
→ A confirmation screen appears.
- 2 Click the [OK] button.
→ Deletion of the Thin Provisioning Pool starts.
- 3 Click the [Done] button to return to the [Thin Provisioning Pool] screen.



Rename Thin Provisioning Pool

- "[■ Overview](#)" (page 369)
- "[■ User Privileges](#)" (page 369)
- "[■ Settings](#)" (page 370)
- "[■ Display Contents](#)" (page 370)
- "[■ Operating Procedures](#)" (page 371)

■ Overview

This function changes a [Thin Provisioning Pool \(TPP\)](#) name that is registered in the storage system. Multiple TPPs can be renamed with a single operation.

■ User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	✓
StorageAdmin	✓

4. Thin Provisioning

Thin Provisioning Pool (Basic Information)

Default role	Availability of executions
AccountAdmin	
SecurityAdmin	
Maintainer	✓

Refer to ["A. User Roles and Policies" \(page 1580\)](#) for details on the policies and roles.

■ Settings

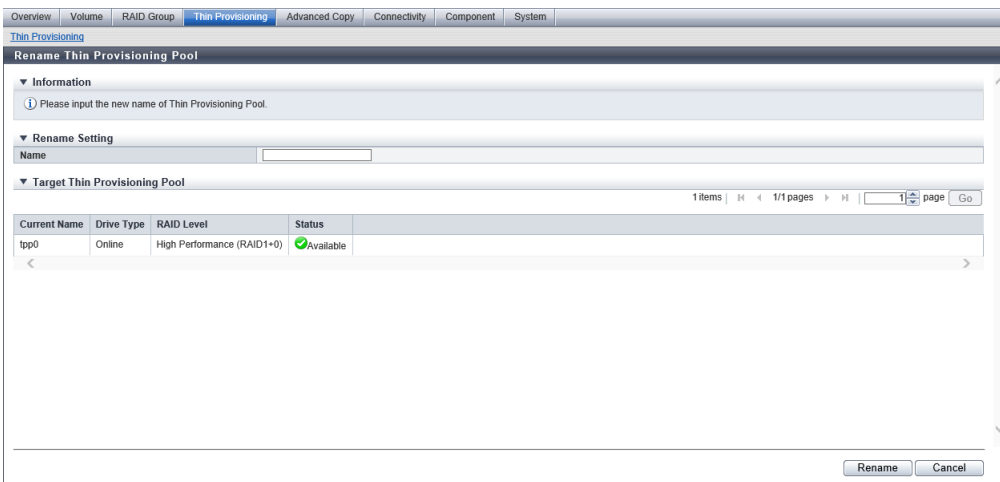
Input a new TPP name.

Rename Setting

Item	Description	Setting values
Name	Input a new TPP name. When changing the name of a single TPP, an existing TPP name cannot be used.	Up to 16 alphanumeric characters, symbols (except "," (comma) and "?"), and spaces
Start of Suffix	Input the starting number of the suffix that is to be added to the new TPP name. When changing multiple TPP names, the suffix number is added to the TPP names with consecutive numbers in ascending order starting with the entered suffix number. Refer to "Naming Conventions for Renaming TPPs" (page 371) for details. When changing only one TPP name, the "Start of Suffix" field is not displayed.	Numeric characters ("0" - "99999") Decimal number 1 - 5 digits 0 (Default)

■ Display Contents

Confirm the TPP that is to be renamed.



Target Thin Provisioning Pool

Item	Description
Current Name	The current TPP name is displayed.

4. Thin Provisioning

Thin Provisioning Pool (Basic Information)

Item	Description
Drive Type	The type of drive that configures the TPP is displayed. Online Nearline SSD Online SED Nearline SED SSD SED
RAID Level	The level of RAID group that configures the TPP is displayed. High Performance (RAID1+0) High Capacity (RAID5) High Reliability (RAID6) High Reliability (RAID6-FR) Mirroring (RAID1) Striping (RAID0)
Status	The TPP status is displayed. Refer to "Thin Provisioning Pool Status" (page 1606) for details.

Naming Conventions for Renaming TPPs

- A name is automatically added to a TPP with the specified "Name" and a suffix number "x". However, if the start suffix is "00" or "000", "0" will be added to the "Name".
(Example) Specified TPP name: ThinProvision0 (14 characters), starting number "1" → Name for renamed TPP: ThinProvision01, ThinProvision02, etc.
- When the TPP name including the suffix number has more than 16 characters, the excess number of characters is deleted from the "Name", starting with the last character and a suffix number "~x" will be added. Then, the name will contain only 16 characters.
(Example) Specified TPP name: ThinProvision_pl (16 characters), starting number "100" → Name for renamed TPP: ThinProvisio~100, ThinProvisi0~101, etc.
- When a TPP name including the suffix number already exists, the suffix number is increased by one (+1). The suffix number is increased by one (+1) until no TPP names overlap.

■ Operating Procedures

Rename the TPP.

Procedure ▶▶▶

- 1 Select the TPP that is to be renamed (multiple selections can be made) and click [Rename] in [Action].
- 2 Input the new TPP name and the suffix starting number (only when multiple TPPs are selected), and click the [Rename] button.
→ A confirmation screen appears.

Caution

- An error screen appears in the following conditions:
 - The "Name" is not entered
 - The "Name" does not satisfy the input conditions
 - An existing TPP name is entered (when one TPP is selected)
 - The "Start of Suffix" is not specified (when multiple TPPs are selected)
 - The value in the "Start of Suffix" does not satisfy the input conditions (when multiple TPPs are selected)

- 3 Click the [OK] button.
→ Renaming of Thin Provisioning Pool starts.
- 4 Click the [Done] button to return to the [Thin Provisioning Pool] screen.



Expand Thin Provisioning Pool

- ["■ Overview" \(page 372\)](#)
- ["■ User Privileges" \(page 373\)](#)
- ["■ Display Contents" \(page 373\)](#)
- ["■ Settings" \(page 375\)](#)
- ["■ Operating Procedures" \(page 381\)](#)

■ Overview

This function expands the capacity of a [Thin Provisioning Pool \(TPP\)](#).

For the maximum number of pools, maximum pool capacity, and determined chunk size for each model, refer to ["The Maximum Number of Pools, Maximum Pool Capacity, and Determined Chunk Size for Each Model" \(page 349\)](#).

Caution

- TPP capacity is expanded in units of RAID groups. The specifications for a RAID group (such as the RAID level, the drive type, and the number of member drives) that is to be added are the same as the existing RAID group.
- The chunk size is determined according to the "Maximum Pool Capacity" of the storage system when a new TPP is created. If TPPs with different chunk sizes exist in the storage system, the entire maximum pool capacity might not be usable to expand TPPs. Refer to the [Set Thin Provisioning] function for details.
- If the error message "The process was aborted because it exceeds executable format size." appears, TPPs cannot be expanded. Reduce the "Total Capacity after expand" and re-execute this function.
- TPP capacity cannot be expanded in the following conditions:
 - The maximum capacity of the pools is already registered in the storage system
 - The resources for creating TPPs (such as the number of RAID groups and volumes) are insufficient
(When the maximum number of RAID groups or volumes already exists, TPP capacity cannot be expanded)

4. Thin Provisioning
Thin Provisioning Pool (Basic Information)

Note

- After a TPP capacity is expanded, the expanded area of TPP is formatted automatically. Progress of formatting ("Progress", "Estimated Time Left", and "Remaining Size") can be checked in the [Thin Provisioning Pool (Basic Information)] function. Click the TPP name to display the basic information.
- If the RAID groups in the TPP are managed using the SED authentication key, register the RAID groups that are added to the relevant TPP in the key group of the same SED authentication key. Refer to the [Set Key Group (RAID Group)] function for details.
- To check the current maximum pool capacity, use the [Settings (Thin Provisioning)] function.

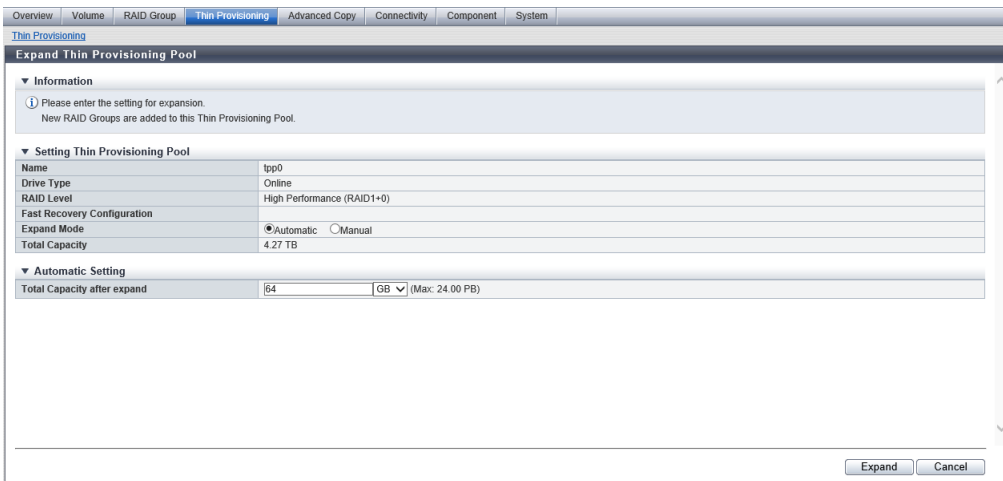
User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	✓
StorageAdmin	✓
AccountAdmin	
SecurityAdmin	
Maintainer	✓

Refer to "'A. User Roles and Policies" (page 1580)" for details on the policies and roles.

Display Contents



Setting Thin Provisioning Pool

Item	Description
Name	The TPP name is displayed.

4. Thin Provisioning

Thin Provisioning Pool (Basic Information)

Item	Description														
Drive Type	<p>The type of drive that configures the TPP is displayed.</p> <p>If multiple drive types are used in the TPP, the drive type is displayed as described below.</p> <ul style="list-style-type: none"> • If only "Online" type drives are used or if both "Online" and "Nearline" type drives are used, "Online" is displayed. • If only "Online SED" type drives are used or if both "Online SED" and "Nearline SED" type drives are used, "Online SED" is displayed. • If a single SSD type (SSD-H/SSD-M/SSD-L) is used or if multiple SSD types (SSD-H/SSD-M/SSD-L) are used, "SSD" is displayed. • If a single SSD type (SSD-H SED/SSD-M SED/SSD-L SED) is used or if multiple SSD types (SSD-H SED/SSD-M SED/SSD-L SED) are used, "SSD SED" is displayed. 														
RAID Level	<p>The level of RAID group that configures the TPP is displayed.</p> <ul style="list-style-type: none"> • High Performance (RAID1+0) RAID1+0 (2D+2M, 4D+4M, 8D+8M, or 12D+12M) configuration • High Capacity (RAID5) RAID5 (3D+1P, 4D+1P, 6D+1P, 7D+1P, 8D+1P, or 12D+1P) configuration • High Reliability (RAID6) RAID6 (4D+2P, 6D+2P, 7D+2P, or 8D+2P) configuration • High Reliability (RAID6-FR) RAID6-FR ((4D+2P)x2+1HS, (6D+2P)x2+1HS, (8D+2P)x3+1HS, or (4D+2P)x5+1HS) configuration (*1) • Mirroring (RAID1) RAID1 (1D+1M) configuration • Striping (RAID0) RAID0 (4D) configuration <p>D: Data drives, M: Mirror drives, P: Parity drives</p> <p>*1: "RAID6-FR" groups that configure TPPs are called "Fast Recovery RAID groups".</p> <p>The number of member drives in each RAID level is as follows:</p> <table border="1"> <thead> <tr> <th>RAID level</th> <th>Number of member drives</th> </tr> </thead> <tbody> <tr> <td>High Performance (RAID1+0)</td> <td>4, 8, 16, 24</td> </tr> <tr> <td>High Capacity (RAID5)</td> <td>4, 5, 7, 8, 9, 13</td> </tr> <tr> <td>High Reliability (RAID6)</td> <td>6, 8, 9, 10</td> </tr> <tr> <td>High Reliability (RAID6-FR)</td> <td>13, 17, 31</td> </tr> <tr> <td>Mirroring (RAID1)</td> <td>2</td> </tr> <tr> <td>Striping (RAID0)</td> <td>4</td> </tr> </tbody> </table>	RAID level	Number of member drives	High Performance (RAID1+0)	4, 8, 16, 24	High Capacity (RAID5)	4, 5, 7, 8, 9, 13	High Reliability (RAID6)	6, 8, 9, 10	High Reliability (RAID6-FR)	13, 17, 31	Mirroring (RAID1)	2	Striping (RAID0)	4
RAID level	Number of member drives														
High Performance (RAID1+0)	4, 8, 16, 24														
High Capacity (RAID5)	4, 5, 7, 8, 9, 13														
High Reliability (RAID6)	6, 8, 9, 10														
High Reliability (RAID6-FR)	13, 17, 31														
Mirroring (RAID1)	2														
Striping (RAID0)	4														
Fast Recovery Configuration	<p>The drive configuration for Fast Recovery RAID groups in the TPP is displayed.</p> <p>(4D+2P)x2+1HS (6D+2P)x2+1HS (8D+2P)x3+1HS (4D+2P)x5+1HS</p> <p>D: Data drives P: Parity drives HS: Hot Spares</p> <p>This item is blank when the RAID level is not "RAID6-FR".</p>														
Total Capacity	<p>The current total capacity of TPP is displayed.</p> <p>For the maximum capacity, refer to "The Maximum Number of Pools, Maximum Pool Capacity, and Determined Chunk Size for Each Model" (page 349).</p>														

■ Settings

The TPP capacity is expanded in units of RAID groups. There are two methods to expand a TPP: automatic drive selection and manual drive selection.

Item	Description	Setting values
Expand Mode	Select a expand mode of a TPP. <ul style="list-style-type: none"> • Automatic Select a drive to expand a TPP automatically. • Manual Select a drive to expand a TPP manually. 	Automatic Manual

Automatic Setting

Item	Description
Total Capacity after expand	<p>Input the total capacity of the TPP after expansion and select the unit (PB/TB/GB/MB) of capacity. Drives are automatically selected according to the existing RAID group specifications, and the TPP capacity is expanded to the entered value or higher. For the maximum capacity of TPP, refer to "The Maximum Number of Pools, Maximum Pool Capacity, and Determined Chunk Size for Each Model" (page 349).</p> <div style="background-color: #fff9c4; padding: 10px;"> <p>Caution</p> <ul style="list-style-type: none"> • If drives that satisfy all of the following conditions are installed in the storage system, select the drives manually. <ul style="list-style-type: none"> - The drive types are the same - The drive capacities are the same - The sector format (AF-compliant/non-AF-compliant) is different • When the TPP is configured with a drive type of SSD, SSDs with the same type (SSD-H/SSD-M/SSD-L) as the existing drives are selected. If RAID groups cannot be configured with SSDs of a relevant type, RAID groups are created in the storage system by selecting the most installed type among the SSDs with the same capacity. In this case, RAID groups with different SSD types exist in a TPP. Note that SSD types have no order of priority. If RAID groups cannot be created with any type of SSDs, TPP expansion is not available. <p>When the TPP is configured with a drive type of SSD SED, SSD SEDs with the same type (SSD-H SED/SSD-M SED/SSD-L SED/SSD SED) as the existing drives are selected. If "SSD SED" is selected for the drive type, drives are operated in the same way as SSDs.</p> <ul style="list-style-type: none"> • When the RAID level is "RAID1+0" or "RAID5", drives that are 6 TB or larger (except SSDs and SSD SEDs) are not selected. </div> <p>The maximum capacity that can be used to expand the TPP is displayed to the right of the setting field for "Total Capacity after expand". "Total Capacity after expand" includes the current TPP capacity. The value in this item must be larger than the existing capacity. The current TPP capacity is displayed in "Total Capacity".</p> <div style="background-color: #e0e0e0; padding: 10px;"> <p>Note</p> <ul style="list-style-type: none"> • For the ETERNUS DX900 S5 or the ETERNUS DX8900 S4, the maximum capacity of a single pool is "48 PB". If the maximum capacity that can be used to expand the TPP is larger than "48 PB", "48 PB" is displayed (when the chunk size is 336 MB). </div>

Manual Setting

In this screen, expand the TPP capacity manually.

4. Thin Provisioning
Thin Provisioning Pool (Basic Information)

Check the RAID group specification

Check the specifications of the existing RAID groups (number of member drives and drive type) in the TPP in advance. The following describes how to check the specifications.

Procedure ▶▶▶

- 1 From the TPP list in the [Thin Provisioning Pool (Basic Information)] screen, click the [No.] link or the [Name] link for the TPP to be expanded.
- 2 The basic information of the TPP is displayed. Click the [RAID Group] tab to switch the display.
- 3 The list of RAID groups that configure the TPP is displayed. Click the [No.] link or the [Name] link for the RAID group. Any RAID group can be specified because the RAID groups in the TPP have the same specifications.
- 4 Click the [Drives] tab in the RAID group detail screen. Check the drive type and the number of member drives that configure the RAID group.

Note

- The value same as the existing one is set for the stripe depth of newly added RAID groups.

Item	Description
Total Capacity after expand	<p>A "-" (hyphen) is displayed by default.</p> <p>After a RAID group is added to the TPP, the total capacity of the TPP after expansion is performed (total value of the current "Total Capacity" of TPP and the "Total Capacity" of RAID groups that are to be added) is displayed. For the maximum capacity, refer to "The Maximum Number of Pools, Maximum Pool Capacity, and Determined Chunk Size for Each Model" (page 349)".</p> <p>The maximum capacity that can be used to expand the TPP is displayed to the right of "Total Capacity after expand". "Total Capacity after expand" includes the current TPP capacity.</p> <div style="border: 1px solid #ccc; padding: 5px; margin-top: 10px;"> <p>Note</p> <ul style="list-style-type: none"> • For the ETERNUS DX900 S5 or the ETERNUS DX8900 S4, the maximum capacity of a single pool is "48 PB". If the maximum capacity that can be used to expand the TPP is larger than "48 PB", "48 PB" is displayed (when the chunk size is 336 MB). </div>

RAID Group List

The list of RAID groups to be newly added to the TPP is displayed. Nothing is displayed in the initial list. Click the [Add] button to display the screen to add RAID groups.

Item	Description
RAID Level	<p>The RAID level is displayed.</p> <p>Click the [RAID Level] link to display the screen to edit the target RAID group.</p> <p>High Performance (RAID1+0) High Capacity (RAID5) High Reliability (RAID6) High Reliability (RAID6-FR) Mirroring (RAID1) Striping (RAID0)</p>

4. Thin Provisioning

Thin Provisioning Pool (Basic Information)

Item	Description
Drive Type	<p>The type of drive that configures the RAID group is displayed.</p> <p>If multiple drive types are used in the RAID group, the drive type is displayed as described below.</p> <ul style="list-style-type: none"> • If only "Online" type drives are used or if both "Online" and "Nearline" type drives are used, "Online" is displayed. • If only "Online SED" type drives are used or if both "Online SED" and "Nearline SED" type drives are used, "Online SED" is displayed. • If a single SSD type (SSD-H/SSD-M/SSD-L) is used or if multiple SSD types (SSD-H/SSD-M/SSD-L) are used, "SSD" is displayed. • If a single SSD type (SSD-H SED/SSD-M SED/SSD-L SED) is used or if multiple SSD types (SSD-H SED/SSD-M SED/SSD-L SED) are used, "SSD SED" is displayed.
Total Capacity	The total capacity of the RAID groups is displayed.

[Add RAID Group] Screen

When adding RAID groups, the following settings are also required:

RAID Group

Item	Description	Setting values
RAID Level	<p>The level of RAID group that configures the TPP that is to be expanded is displayed.</p> <p>High Performance (RAID1+0) High Capacity (RAID5) High Reliability (RAID6) High Reliability (RAID6-FR) Mirroring (RAID1) Striping (RAID0)</p>	
Fast Recovery Configuration	<p>The drive configuration for Fast Recovery RAID groups in the expansion target TPP is displayed.</p> <p>(4D+2P)x2+1HS (6D+2P)x2+1HS (8D+2P)x3+1HS (4D+2P)x5+1HS D: Data drives P: Parity drives HS: Hot Spares</p> <p>This item is blank when the RAID level is not "RAID6-FR".</p>	
Controlling CM	<p>Select the Controlling CM of the RAID group that is to be created.</p> <p>"Automatic" and the normal CM number ("CE#x CM#y" or "CM#y") that is installed are displayed as options.</p> <p>Select "Automatic" for normal operations. When "Automatic" is selected, the Controlling CM that is to be allocated is determined by the RAID group number.</p> <p>Refer to ""Automatic Controlling CM Setting" (page 281)" for details.</p>	<p>For the ETERNUS DX900 S5 or the ETERNUS DX8900 S4 Automatic CE#x CM#y</p> <p>For the other models Automatic CM#y x: CE number y: CM number</p>
RAID Group Total Capacity	Total capacity of the RAID group created with the selected RAID level and drives is displayed.	

Drive Selection

Drives can be selected from the list or the installation image. To switch between the list and the installation image, click the tab.

Requirements for selecting drives

- The conditions for RAID groups in the TPP are as follows:
 - The RAID level (RAID1+0/RAID5/RAID6/RAID6-FR/RAID1/RAID0) must be the same
 - The number of member drives in the RAID group must be the same
 - The drive type (Online/Nearline/SSD/Online SED/Nearline SED/SSD SED) must be the same
(If "Online" is selected for the drive type, "Online" type drives and "Nearline" type drives can be used in the same RAID group. However, using only "Online" type drives is recommended. If "Online SED" is selected for the drive type, "Online SED" type drives and "Nearline SED" type drives can be used in the same RAID group. However, using only "Online SED" type drives is recommended. This is because the available capacity and the access performance may be reduced when these drives are used in the same RAID group.)
 - When the RAID level is "RAID1+0" or "RAID5", the drive must be smaller than 6 TB (except SSDs and SSD SEDs)
- The recommended drive configuration of the RAID group is shown as follows:
 - Select drives that are the same size and the same speed. If drives of different capacities exist in a RAID group, the smallest capacity becomes the standard, and all other drives are regarded as having the same capacity as the smallest drive. In this case, the remaining drive space is not used. In addition, if drives of different speeds exist in a RAID group, the access performance of the RAID group is reduced by the slower drives.
 - Select the same SSD type ([SSD-H/SSD-M/SSD-L/SSD-H SED/SSD-M SED/SSD-L SED](#)). If different types of SSDs exist in a RAID group, the access performance for all SSDs in the RAID group is adjusted to the SSD of the lowest interface speed.
 - Select the same sector format of drives (AF-compliant/non-AF-compliant).
 - If the host connection environment does not support Advanced Format (AF), select non-AF-compliant drives (*1). If AF-compliant drives (*2) are selected, a data format conversion occurs and the drive access performance is reduced. When the host to be connected supports Advanced Format (AF), both AF-compliant and non-AF-compliant drives can be selected.
 - *1 : Drives (such as 2.5" Online and 2.5" Nearline) where "AF" is not displayed for the type.
 - *2 : Drives (such as 2.5" Online AF and 2.5" Nearline AF) where "AF" is displayed for the type.
 - When "RAID1+0" or "RAID1" is selected for the RAID level, allocate the drives (mirroring pair drives) by dividing them into two or more connection lines (for the ETERNUS DX500 S5/DX600 S5/DX900 S5 and the ETERNUS AF650 S3).
 - When "RAID5", "RAID6", or "RAID6-FR" is selected for the RAID level, allocate the drives (multiple drives configuring a striping) by dividing them into two or more connection lines (for the ETERNUS DX500 S5/DX600 S5/DX900 S5 and the ETERNUS AF650 S3).
 - If "RAID1" is selected for the RAID level, using drives other than SSD is recommended.
- There are conditions for the ETERNUS DX8900 S4 drive layout. Refer to [""Conditions for the ETERNUS DX8900 S4 Drive Layout" \(page 380\)](#) for details. Note that these conditions are not applied to other models.

[Tabular] Tab

Click the [Tabular] tab to select drives from the list. Only unused drives are displayed on the list. There are conditions for the ETERNUS DX8900 S4 drive layout. Refer to [""Conditions for the ETERNUS DX8900 S4 Drive Layout" \(page 380\)](#) for details. Note that these conditions are not applied to other models.

Item	Description
Checkbox to select drives	Select the checkbox for the drive that is to be used. When selecting drives, refer to ""Requirements for selecting drives" (page 378) ".

4. Thin Provisioning


Thin Provisioning Pool (Basic Information)

Item	Description
Enclosure	<p>The enclosure where the drive is installed is displayed.</p> <p>CE: Controller Enclosure (2.5" and 3.5") DE: Drive Enclosure (2.5", 3.5", and 3.5" high density DEs)</p> <p>CE#x DE#yy x: CE number yy: DE number</p>
Slot No.	<p>The slot number of the enclosure, where the drive is installed, is displayed.</p> <p>2.5" CE/DE: 0 - 23 3.5" CE/DE: 0 - 11 3.5" high density DE: 0 - 59</p>
Type	<p>The drive type displayed for this item is a combination of the following.</p> <ul style="list-style-type: none"> • Drive size <ul style="list-style-type: none"> - For 2.5-inch drives: 2.5" - For 3.5-inch drives: 3.5" • Drive type <ul style="list-style-type: none"> - For SAS disks: Online - For Nearline SAS disks: Nearline - For SSDs, the following items are displayed depending on the SSD type. <ul style="list-style-type: none"> • For SSD-Hs (12 Gbit/s): SSD-H (*1) • For SSD-Ms (12 Gbit/s): SSD-M (*1) • For SSD-Ls (12 Gbit/s): SSD-L (*1) <p>Note that "SED" is also displayed for self encrypting drives and "AF" is also displayed for Advanced Format compliant drives.</p> <p>*1: The displayed item varies depending on the interface speed (bandwidth) or the capacity of the reserved space. Unless otherwise specified, "SSD-H", "SSD-M", and "SSD-L" are collectively referred to as "SSD". In addition, there may be cases when "SSD SED" is used as the collective term for self encrypting SSD-Hs, SSD-Ms, and SSD-Ls.</p>
Capacity	<p>The capacity of the drive is displayed.</p> <div style="background-color: #fff9c4; padding: 10px; border: 1px solid #ccc;"> <p>Caution</p> <ul style="list-style-type: none"> • The displayed drive capacity may differ from the product's actual capacity. For example, the drive capacity of a "1.92 TB SSD" is displayed as "2.00 TB" and the capacity of an "18 TB Nearline SAS disk" is displayed as "17.9 TB". </div>
Speed	<p>The drive speed is displayed.</p> <p>For SSD or SSD SED, a "-" (hyphen) is displayed.</p> <p>15000 rpm 10000 rpm 7200 rpm</p>

[Graphic] Tab

Click the [Graphic] tab to select drives from the drive installation image. The installation images of all the drives installed in the storage system are displayed. Checkboxes are displayed for unused drives. There are conditions for the ETERNUS DX8900 S4 drive layout. Refer to ["Conditions for the ETERNUS DX8900 S4 Drive Layout" \(page 380\)](#) for details. Note that these conditions are not applied to other models.

4. Thin Provisioning
Thin Provisioning Pool (Basic Information)

Item	Description	Setting values
DE selection list box	Select the DE group. Options are displayed in the list box when at least one CE or DE in the DE group is installed in the storage system. Refer to "DE selection list box" (page 273) for details on the options and DE groups for each model.	DE#0x DE#1x DE#2x DE#3x DE#4x DE#5x DE#6x DE#7x DE#8x DE#9x DE#Ax DE#Bx DE#Cx DE#Dx DE#Ex DE#Fx
DE	Only the CEs or the DEs in the selected DE group that are installed in the storage system are displayed. CE#x DE#yy x: CE number yy: DE number	
Checkbox to select drives	Select the checkbox for the drive that is to be used. Checkboxes are displayed for unused drives. For 2.5" CEs or 2.5" DEs, drives are displayed from left to right in ascending order of the slot number. For 3.5" CEs, 3.5" DEs, or 3.5" high density DEs, drives are displayed from bottom left to top right in ascending order of the slot number. Placing the mouse pointer on the  icon displays the detailed information of the drive. When selecting drives, refer to "Requirements for selecting drives" (page 378) .	

Conditions for the ETERNUS DX8900 S4 Drive Layout

The drive layout to configure RAID groups in the ETERNUS DX8900 S4 must satisfy the conditions described below.

RAID groups cannot be created if the required conditions are not satisfied.

RAID level	Drive layout conditions	
RAID1	Required	Allocate mirroring pair drives to different DEs.
	Recommended	Allocate mirroring pair drives to DEs (*1) under different CEs when possible. Allocate mirroring pair drives to different SAS cascades (*2) when possible.
RAID1+0	Required	Allocate mirroring pair drives to different DEs.
	Recommended	Allocate striping drives to DEs under as many CEs as possible. Allocate striping drives to as many SAS cascades (*2) as possible.
RAID5	Required	Allocate member drives to different DEs.
	Recommended	Distribute member drives to DEs under as many CEs as possible. Distribute member drives to as many SAS cascades (*2) as possible.
RAID6	Required	Allocate two or less member drives to the same DE.
RAID6-FR	Recommended	Distribute member drives to DEs under as many CEs as possible. Distribute member drives to as many SAS cascades (*2) as possible.

4. Thin Provisioning

Thin Provisioning Pool (Basic Information)

*1 : DEs under different CEs have different numbers as the first digit of the DE number.

*2 : "SAS cascade" for the ETERNUS DX8900 S4 refers to DEs that are attached to one drive interface port. The DEs that are allocated to the same SAS cascade configuration are as follows:

DE#x1, DE#x2, and DE#x3 that are connected to CE#x/DI Port#0 (x: 0 - B)

DE#x4, DE#x5, DE#x6, and DE#x7 that are connected to CE#x/DI Port#1 (x: 0 - B)

DE#x8, DE#x9, DE#xA, and DE#xB that are connected to CE#x/DI Port#2 (x: 0 - B)

DE#xC, DE#xD, DE#xE, and DE#xF that are connected to CE#x/DI Port#3 (x: 0 - B)

(Example) DE#01, DE#02, and DE#03 that are connected to CE#0/DI Port#0 are on the same SAS cascade.

Function Button

Button	Description
[Add]	Adds a RAID group to the TPP. If the maximum pool capacity for each model is exceeded, the [Add] button cannot be clicked.
[Delete]	Deletes a RAID group from the TPP. If no RAID group has been added, the [Delete] button is not displayed.

Function Link

Link	Description
[RAID Level]	Displays the screen to edit the selected RAID group. This screen is used to change the Controlling CM of the RAID group or select the drive that configures the RAID group again. The checkbox for the drive selected for the RAID group is selected.

■ Operating Procedures

Automatically Selecting Drives to Expand TPPs


Procedure ▶▶▶

- 1 Select the TPP that is to be expanded and click [Expand] in [Action].
- 2 Select "Automatic" for "Expand Mode", specify the TPP capacity after expansion, and click the [Expand] button.
→ A confirmation screen appears.

Caution

- An error screen appears in the following conditions:
 - The capacity is not specified for "Total Capacity after expand"
 - The entered value in the "Total Capacity after expand" is equal to or lower than the existing capacity
 - The total value of TPP capacity after expansion and existing pool capacity exceeds the maximum pool capacity for each model
 - The TPP capacity after the expansion exceeds the capacity that is available for expansions
 - The TPP cannot be expanded over the specified capacity in the drive installed in the storage system

- 3 Click the [OK] button.
→ Expansion of a Thin Provisioning Pool starts.

- 4 Click the [Done] button to return to the [Thin Provisioning Pool] screen.
-
- 

Manually Selecting Drives to Expand TPPs

Check the specifications of the existing RAID groups (number of member drives and drive type) in the TPP in advance. Refer to ["Check the RAID group specification" \(page 376\)](#) for details.

Procedure ▶▶▶

- 1 Select the TPP that is to be expanded and click [Expand] in [Action].
- 2 Select "Manual" for "Expand Mode".
- 3 Click the [Add] button.
→ The [Add RAID Group] screen is displayed.
- 4 Select the Controlling CM of the RAID group, select all the drives to be registered in the RAID group from the list or from the installation image, and then click the [OK] button.
→ The screen returns to the previous screen. The added RAID group is displayed in the RAID group list.

Caution

- When the number of selected drives is not an integral multiple of the number of member drives for the RAID group, the [OK] button cannot be clicked.


Note

- Click the [RAID Level] link in the RAID group list to change the Controlling CM and configuration drives of the newly added RAID group.
- Click the [Delete] button of the target RAID group area in the RAID group list to delete the newly added RAID group.

- 5 When adding multiple RAID groups to the TPP, repeat Step 3 and Step 4.
- 6 After adding a RAID group to the TPP, click the [Expand] button.
→ A confirmation screen appears.

Caution

- An error screen appears in the following conditions:
 - The total value of TPP capacity after expansion and existing pool capacity exceeds the maximum pool capacity for each model
 - The TPP capacity after the expansion exceeds the capacity that is available for expansions
 - The drive layout does not satisfy the required conditions
(Refer to ["Conditions for the ETERNUS DX8900 S4 Drive Layout" \(page 380\)](#) for details.)

- 7 Click the [OK] button.
→ Expansion of a Thin Provisioning Pool starts.
 - 8 Click the [Done] button to return to the [Thin Provisioning Pool] screen.
-
- 

Format Thin Provisioning Pool (All Area)

- ["■ Overview" \(page 383\)](#)
- ["■ User Privileges" \(page 383\)](#)
- ["■ Operating Procedures" \(page 384\)](#)

■ Overview

This function formats all of the areas in the [Thin Provisioning Pool \(TPP\)](#).

Caution

- When formatting all area in the TPPs, data stored in the [TPVs](#) in TPP will be deleted. Format TPV to use them again, after deleting data.
- If the target TPP includes a TPV that is performing one of the following operations, an error will stop the operation. Stop the relevant operation or wait until the operation is completed, and then format the TPP.
 - [RAID migration](#)
 - Balancing TPV
- This function cannot be used under the following conditions:
 - No TPPs can be formatted
 - The TPP includes a volume that is used for the Storage Cluster function
- If the error message "An internal resource is insufficient." appears after TPPs are formatted, a format of TPPs may have failed. Check the "Status" of the formatted TPPs in the [Thin Provisioning Pool] screen. Refer to the [Thin Provisioning Pool (Basic Information)] function for details. TPPs in the "🟡Readying" or "🟡Partially Ready" state have not been formatted. Perform either of the following procedures according to the status.
 - For the "🟡Readying" state, wait until the current formatting process is completed and then use this function to reformat the relevant TPPs.
 - For the "🟡Partially Ready" state, wait until the current formatting process is completed and then use the [Format Thin Provisioning Pool (Unformatted Area)] function to reformat the relevant TPPs.

Note

- TPPs with the status of "🟢Available", "🟡Partially Ready", "🟡Readying" or "⚠Exposed" can be formatted.
- Progress of formatting ("Progress", "Estimated Time Left", and "Remaining Size") can be checked in the [Thin Provisioning Pool (Basic Information)] function. Click the TPP name to display the basic information.
- To format TPVs, use the [Format Volume] function.
- When a TPP is created using the [Create Thin Provisioning Pool] function, the TPP is formatted automatically. In this case, it is not necessary to format the TPP by using this function.

■ User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	

4. Thin Provisioning

Thin Provisioning Pool (Basic Information)

Default role	Availability of executions
Admin	✓
StorageAdmin	✓
AccountAdmin	
SecurityAdmin	
Maintainer	✓

Refer to "[A. User Roles and Policies](#)" (page 1580) for details on the policies and roles.

■ Operating Procedures

Format all of the areas in a TPP.

Procedure ▶▶▶

- 1 Select the TPP that is to be formatted (multiple selections can be made) and click [Format All Area] in [Action].
→ A confirmation screen appears.

Caution

- When formatting all area in the TPPs, data stored in the TPVs in TPP will be deleted.
- An error will stop the RAID migration when a TPP, in which the currently migrating TPV belongs, is formatted.
- An error will stop the TPV balancing when a TPP, in which the currently balancing TPV belongs, is formatted.

- 2 Click the [OK] button.
→ Formatting of all area in the Thin Provisioning Pool starts.
- 3 Click the [Done] button to return to the [Thin Provisioning Pool] screen.

Caution

- To use a TPV in the TPP again after formatted with "All Area" selected for the mode, format the TPV.

Format Thin Provisioning Pool (Unformatted Area)

- "[■ Overview](#)" (page 384)
- "[■ User Privileges](#)" (page 385)
- "[■ Operating Procedures](#)" (page 385)

■ Overview

This function formats unformatted areas in the [Thin Provisioning Pool \(TPP\)](#).

Caution

- This function cannot be used under the following conditions:
 - No TPPs can be formatted
 - The status of the TPPs that are to be formatted is "Available"
 - The TPP includes a volume that is used for the Storage Cluster function
- If the error message "An internal resource is insufficient." appears after TPPs are formatted, a format of TPPs may have failed. Check the "Status" of the formatted TPPs in the [Thin Provisioning Pool] screen. Refer to the [Thin Provisioning Pool (Basic Information)] function for details. TPPs in the "Ready" or "Partially Ready" state have not been formatted. Perform either of the following procedures according to the status.
 - For the "Ready" state, wait until the current formatting process is completed and then use the [Format Thin Provisioning Pool (All Area)] function to reformat the relevant TPPs.
 - For the "Partially Ready" state, wait until the current formatting process is completed and then use this function to reformat the relevant TPPs.

Note

- TPPs with the status of "Partially Ready" or "Ready" can be formatted. Even if formatting is performed, the data that is stored in the TPVs of the target TPP is not deleted. The "Unformatted area" is a new area that is added to a TPP by the capacity expansion function.
- This function is only used when an error occurs during TPP capacity expansion and the expanded area cannot be formatted. When TPP capacity is successfully expanded, the TPP is automatically formatted. In this case, it is not necessary to format the TPP by using this function.
- Progress of formatting ("Progress", "Estimated Time Left", and "Remaining Size") can be checked in the [Thin Provisioning Pool (Basic Information)] function. Click the TPP name to display the basic information.

■ User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	✓
StorageAdmin	✓
AccountAdmin	
SecurityAdmin	
Maintainer	✓

Refer to "'A. User Roles and Policies" (page 1580)" for details on the policies and roles.

■ Operating Procedures

Format unformatted areas in a TPP.

Procedure ▶▶▶

- 1 Select the TPP that is to be formatted (multiple selections can be made) and click [Format Unformatted Area] in [Action].
→ A confirmation screen appears.
- 2 Click the [OK] button.
→ Formatting of unformatted area in the Thin Provisioning Pool starts.
- 3 Click the [Done] button to return to the [Thin Provisioning Pool] screen.



Set Deduplication/Compression

- "[■ Overview](#)" (page 386)
- "[■ User Privileges](#)" (page 388)
- "[■ Settings](#)" (page 389)
- "[■ Display Contents](#)" (page 390)
- "[■ Operating Procedures](#)" (page 391)

■ Overview

This function enables or disables Deduplication/Compression for [TPPs](#).

Deduplication and Compression can be set separately.

If Deduplication is enabled, the duplicated data blocks in a [TPP](#) are deleted. If Compression is enabled, the data blocks in a TPP are compressed.

Using this function can reduce the used area of the drive.

The following two methods are available to set Deduplication/Compression for the TPPs.

- Setting Deduplication/Compression during a TPP creation
Create TPPs and perform the Deduplication/Compression setting with a single operation. Refer to the [Create Thin Provisioning Pool] function for details.
To set Deduplication/Compression for a TPP, this method is recommended because a TPP creation and the Deduplication/Compression setting of the TPP can be performed with a single operation.
- Setting Deduplication/Compression after a TPP creation
Create TPPs for Deduplication/Compression and then use this function to set Deduplication/Compression for the TPPs.

The maximum number of TPPs where Deduplication or Compression can be enabled

Model	Maximum number of TPPs
ETERNUS DX200 S5	4
ETERNUS DX500 S5	4
ETERNUS DX600 S5	8
ETERNUS DX900 S5	8
ETERNUS DX8900 S4	8
ETERNUS AF250 S3	4
ETERNUS AF650 S3	8

Caution

- The following settings are required before executing this function. Note that this function is not displayed if the following settings are not performed.
 - Enable the Thin Provisioning function. Refer to the [Set Thin Provisioning] function for details.
 - Enable the Deduplication/Compression function for the storage system. For the ETERNUS DX900 S5 and the ETERNUS DX8900 S4, only Compression is supported. Refer to the [Set Deduplication/Compression Mode] function for details.
- If the I/O load in the storage system is high when the setting for Deduplication, Compression, or both (hereinafter referred to as "Deduplication/Compression setting") are enabled for the TPPs, changing the setting may take time. In this case, performing the Deduplication/Compression setting on one TPP at a time is recommended.
- To enable the Deduplication/Compression setting for the TPP, the free space within the TPP must be 4 GB or larger.
- If the Deduplication/Compression setting for the TPP fails (or "Error" is displayed in the "Current Deduplication" field and/or the "Current Compression" field), the setting may be corrected by disabling the Deduplication/Compression setting and then re-enabling it.
- The Deduplication/Compression setting cannot be enabled or disabled when the TPP status is not "🟢Available" or "⚠️Exposed".
- The Deduplication/Compression setting cannot be enabled for the selected TPPs in the following conditions.
 - The total number of existing TPPs where the Deduplication/Compression setting has already been enabled and the selected TPPs exceeds "[The maximum number of TPPs where Deduplication or Compression can be enabled](#)" (page 386)".
 - The total number of existing volumes and [Data Container Volumes](#) that are to be created in the selected TPP exceeds the maximum number of volumes for each model. (Refer to the [Create Volume] function for details.)
 - The total capacity of existing volumes and the capacity of Data Container Volumes that are to be created in the selected TPP exceed the maximum pool capacity for each model. (Refer to the [Settings (Thin Provisioning)] function for details.)
 - Eco-mode schedule is assigned to the selected TPPs.
- The Deduplication/Compression setting cannot be disabled for the selected TPPs in the following conditions.
 - [Deduplication/Compression Volumes](#) exist in the TPP
(To disable the setting, delete all the Deduplication/Compression Volumes in the relevant TPP in advance.)
 - The status of the Data Container Volume created in the TPP is "🟡Readying", "🔴Not Ready", "🔴Broken", or "🔴Data Lost"

4. Thin Provisioning Thin Provisioning Pool (Basic Information)

Note

- If Deduplication or Compression is enabled when a TPP is created, skip this function.
- When the Deduplication/Compression setting for the TPP is enabled, a Data Container Volume is automatically created in the relevant TPP. Refer to ["Volumes automatically created by enabling the Deduplication/Compression setting for TPPs" \(page 388\)](#) for details.
- When the Deduplication/Compression setting for the TPP is disabled, the Data Container Volume is automatically deleted from the relevant TPP.
- Set a volume (or TPV) as a Deduplication/Compression target or as a non-Deduplication/Compression target during a volume creation. Refer to the [Create Volume] function for details.
- Use the [Thin Provisioning Pool] screen to check whether the Deduplication/Compression setting is enabled for the relevant TPP. Refer to the [Thin Provisioning Pool (Basic Information)] function for details.

Volumes automatically created by enabling the Deduplication/Compression setting for TPPs

When the Deduplication/Compression setting for the TPP is enabled, a Data Container Volume is automatically created in the relevant TPP. The Data Container Volume is used to store data and meta data after the Deduplication/Compression setting is configured. Refer to ["Data Container Volume Specifications" \(page 388\)](#) for details.

Data Container Volume Specifications

Item	Data Container Volumes
Volume Type	TPV
Usage	System
Usage Details	Data Container
Number of Volumes	One per TPP
Volume Capacity (per volume)	32 TB (Default)
Volume Expansion	Available (*1)
Volume Name	Fixed to "\$DATA_CNTNRx" (x: TPP number)

*1: The following shows the maximum capacity of the Data Container Volume.

Model	Maximum capacity of Data Container Volume (when the chunk size is 21 MB)	Maximum capacity of Data Container Volume (when the chunk size is 336 MB)
ETERNUS DX200 S5 ETERNUS AF250 S3	384 TB	6 PB
ETERNUS DX500 S5	1 PB	16 PB
ETERNUS DX600 S5 ETERNUS AF650 S3	1.5 PB	24 PB
ETERNUS DX900 S5 ETERNUS DX8900 S4	8 PB	48 PB

■ User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	✓

4. Thin Provisioning
Thin Provisioning Pool (Basic Information)

Default role	Availability of executions
StorageAdmin	✓
AccountAdmin	
SecurityAdmin	
Maintainer	✓

Refer to "[A. User Roles and Policies](#)" (page 1580) for details on the policies and roles.

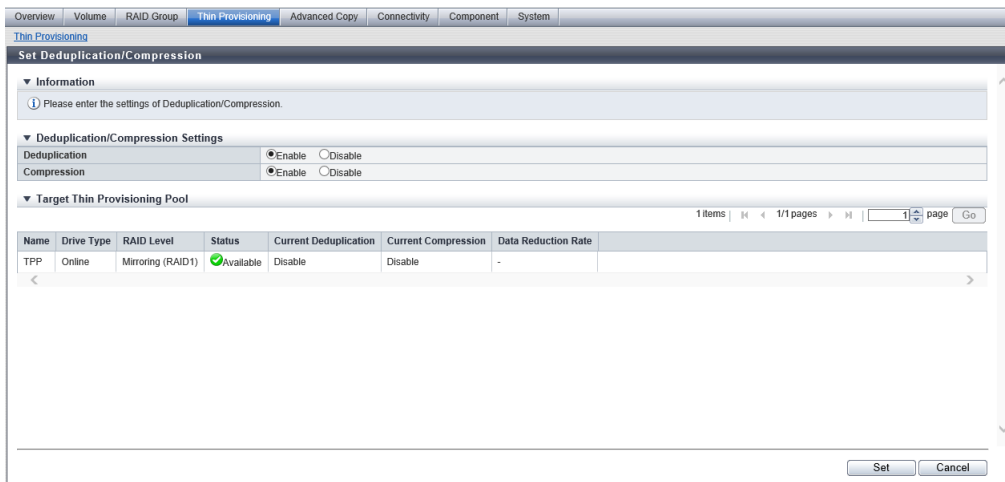
■ Settings

Deduplication/Compression Settings

Item	Description	Setting values																																						
Deduplication Compression	<p>Select whether to enable or disable the Deduplication or Compression setting for the selected TPP.</p> <p>For the ETERNUS DX900 S5 or the ETERNUS DX8900 S4, "Deduplication" is not displayed.</p> <p>If multiple TPPs are selected, the same setting is applied as a single process.</p> <p>The following table shows the available settings for Deduplication or Compression.</p> <table border="1"> <thead> <tr> <th rowspan="2">Current Deduplication</th> <th rowspan="2">Current Compression</th> <th colspan="2">Deduplication</th> <th colspan="2">Compression</th> </tr> <tr> <th>Enable</th> <th>Disable</th> <th>Enable</th> <th>Disable</th> </tr> </thead> <tbody> <tr> <td>Enable Error "- " (hyphen)</td> <td>Enable Error "- " (hyphen)</td> <td>-</td> <td>✓</td> <td>-</td> <td>✓</td> </tr> <tr> <td>Enable Error "- " (hyphen)</td> <td>Disable</td> <td>-</td> <td>✓</td> <td>-</td> <td>✓</td> </tr> <tr> <td>Disable</td> <td>Enable Error "- " (hyphen)</td> <td>-</td> <td>✓</td> <td>-</td> <td>✓</td> </tr> <tr> <td>Disable</td> <td>Disable</td> <td>✓</td> <td>✓</td> <td>✓</td> <td>✓</td> </tr> </tbody> </table> <p> <table border="1"> <tr> <td>✓</td> <td>: Available</td> </tr> <tr> <td>-</td> <td>: N/A</td> </tr> </table> </p>	Current Deduplication	Current Compression	Deduplication		Compression		Enable	Disable	Enable	Disable	Enable Error "- " (hyphen)	Enable Error "- " (hyphen)	-	✓	-	✓	Enable Error "- " (hyphen)	Disable	-	✓	-	✓	Disable	Enable Error "- " (hyphen)	-	✓	-	✓	Disable	Disable	✓	✓	✓	✓	✓	: Available	-	: N/A	<p>Enable Disable</p> <p>The default value for this parameter is described below.</p> <ul style="list-style-type: none"> If "Current Deduplication" or "Current Compression" is "Enable", "Error", or "- " (hyphen) Disable If "Current Deduplication" and "Current Compression" are "Disable" Enable
Current Deduplication	Current Compression			Deduplication		Compression																																		
		Enable	Disable	Enable	Disable																																			
Enable Error "- " (hyphen)	Enable Error "- " (hyphen)	-	✓	-	✓																																			
Enable Error "- " (hyphen)	Disable	-	✓	-	✓																																			
Disable	Enable Error "- " (hyphen)	-	✓	-	✓																																			
Disable	Disable	✓	✓	✓	✓																																			
✓	: Available																																							
-	: N/A																																							

4. Thin Provisioning Thin Provisioning Pool (Basic Information)

■ Display Contents



Target Thin Provisioning Pool

The list of the selected TPP is displayed.

Item	Description
Name	The TPP name is displayed.
Drive Type	The type of drive that configures the TPP is displayed. Online Nearline SSD Online SED Nearline SED SSD SED
RAID Level	The level of RAID group that configures the TPP is displayed. High Performance (RAID1+0) High Capacity (RAID5) High Reliability (RAID6) High Reliability (RAID6-FR) Mirroring (RAID1) Striping (RAID0)
Status	The TPP status is displayed. Refer to " Thin Provisioning Pool Status " (page 1606)" for details.
Current Deduplication	The current status of the Deduplication (whether the setting is enabled and the state of the Deduplication) for the TPP is displayed. For the ETERNUS DX900 S5 or the ETERNUS DX8900 S4, this item is not displayed. <ul style="list-style-type: none"> • Enable Deduplication for the TPP is enabled and Deduplication is in the normal state. • Disable Deduplication for the TPP is disabled. • Error Deduplication for the TPP is enabled and Deduplication is in the error state. • "-" (hyphen) Deduplication for the TPP is enabled and the information cannot be obtained.

4. Thin Provisioning Thin Provisioning Pool (Basic Information)

Item	Description
Current Compression	<p>The current status of the Compression (whether the setting is enabled and the state of the Compression) for the TPP is displayed.</p> <ul style="list-style-type: none"> • Enable Compression for the TPP is enabled and Compression is in the normal state. • Disable Compression for the TPP is disabled. • Error Compression for the TPP is enabled and Compression is in the error state. • "-" (hyphen) Compression for the TPP is enabled and the information cannot be obtained.
Data Reduction Rate	<p>The data reduction rate with the current Deduplication/Compression setting (Deduplication, Compression, or both) of the TPP is displayed.</p> <p>A "-" (hyphen) is displayed in the following conditions:</p> <ul style="list-style-type: none"> • Statuses of Deduplication and Compression for a TPP are both "Disable" • Status of Deduplication or Compression for a TPP is "Error" or "-" (hyphen) • The Data Container Volumes cannot be accessed

■ Operating Procedures

Procedure ▶▶▶

- 1 Select the TPP (multiple selections can be made) to configure Deduplication, Compression, or both, and click [Set Deduplication/Compression] in [Action].

Caution

- If the number of selected TPPs exceeds the maximum number that can be set with Deduplication or Compression, [Set Deduplication/Compression] cannot be clicked.

- 2 Select whether to enable or disable "Deduplication" and "Compression" and click the [Set] button.
→ A confirmation screen appears.

Caution

- An error screen appears in the following conditions:
 - The set number of TPPs for Deduplication or Compression exceeds the maximum value (when "Enable" is selected)
 - The total number of volumes exceeds the maximum value (when "Enable" is selected)
 - The total capacity of TPVs exceeds the maximum pool capacity (when "Enable" is selected)
 - Deduplication/Compression Volumes exist in the target TPP (when "Disable" is selected)

- 3 Click the [OK] button.
→ The Deduplication/Compression setting starts.
- 4 Click the [Done] button to return to the [Thin Provisioning Pool] screen.



Threshold (Thin Provisioning Pool)

- "[Overview](#)" (page 392)
- "[User Privileges](#)" (page 392)
- "[Display Contents](#)" (page 393)
- "[Filter Setting](#)" (page 394)

■ Overview

This function shows the threshold for monitoring the used capacity of a [Thin Provisioning Pool \(TPP\)](#).

Caution

- When using the Thin Provisioning function "Enable" the Thin Provisioning. Refer to the [\[Set Thin Provisioning\]](#) function for details.

Note

- To check whether the Thin Provisioning function is enabled or disabled, use the [\[Settings \(Thin Provisioning\)\]](#) function.
- If the TPP used capacity exceeds the threshold, notification is sent to the destination that was specified using the [\[Setup Event Notification\]](#) function.
- To change the threshold of TPP, use the [\[Modify Threshold Thin Provisioning Pool\]](#) function.

■ User Privileges

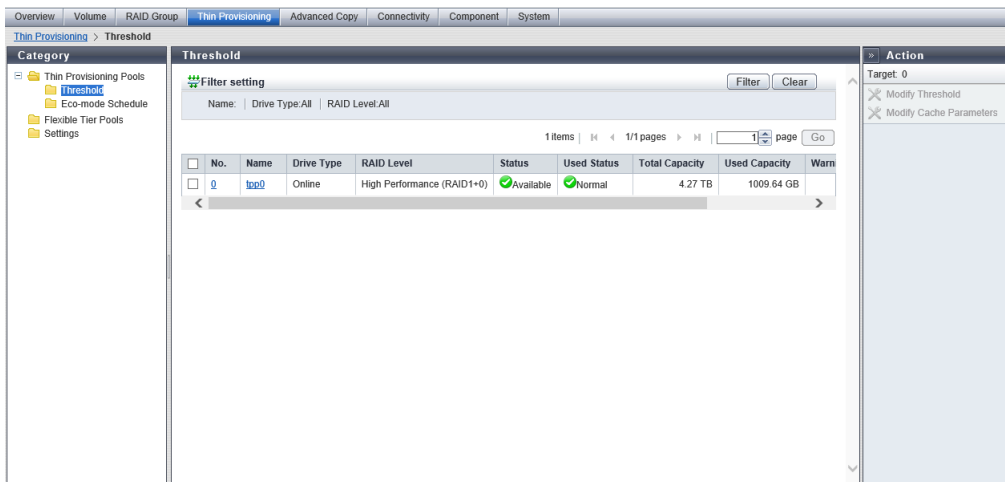
Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	✓
Admin	✓
StorageAdmin	✓
AccountAdmin	
SecurityAdmin	✓
Maintainer	✓

Refer to "[A. User Roles and Policies](#)" (page 1580)" for details on the policies and roles.

4. Thin Provisioning Threshold (Thin Provisioning Pool)

■ Display Contents



TPP List

The list of TPPs created in the storage system is displayed.

Item	Description
No.	The TPP number is displayed. Click this item to display the "[Thin Provisioning Pool Detail] Screen ([Basic] Tab)" (page 342).
Name	The TPP name is displayed. Click this item to display the "[Thin Provisioning Pool Detail] Screen ([Basic] Tab)" (page 342).
Drive Type	The type of drive that configures the TPP is displayed. Online Nearline SSD Online SED Nearline SED SSD SED
RAID Level	The level of RAID group that configures the TPP is displayed. High Performance (RAID1+0) High Capacity (RAID5) High Reliability (RAID6) High Reliability (RAID6-FR) Mirroring (RAID1) Striping (RAID0)
Status	The TPP status is displayed. Refer to "[Thin Provisioning Pool Status]" (page 1606)" for details.
Used Status	The used status of the TPP or the Data Container Volume is displayed. <ul style="list-style-type: none"> • Normal TPP usage does not exceed the "Attention" threshold. • Attention TPP usage exceeds the "Attention" threshold but does not exceed the "Warning" threshold. Or the Data Container Volume usage is 80 % or larger. • Warning TPP usage exceeds the "Warning" threshold.

4. Thin Provisioning Threshold (Thin Provisioning Pool)

Item	Description
Total Capacity	The total capacity of TPP is displayed.
Used Capacity	The used capacity of TPP is displayed. "Used Capacity" indicates the total for the physically allocated capacities of the TPVs in the TPP.
Warning	The warning threshold (5 to 99 %) for monitoring the TPP used capacity is displayed.
Attention	The attention threshold (5 to 80 %) for monitoring the TPP used capacity is displayed. When the attention threshold is omitted, "0 %" is displayed.
MWC	The Multi Writeback Count (MWC) (1 to 16) of the TPP is displayed. This item is displayed only when a user account that has a role with the "RAID Group Management" policy is used to log in.

■ Filter Setting

Function Description

Filter setting is a function used to display a list of only the TPPs satisfying all the specified conditions. No filtering is set by default. The following table shows conditions that can be specified.

Item	Description	Setting values
Name	Input the TPP name that is to be displayed. TPPs matching or partially matching the entered name are displayed. When not using the TPP name for filtering, leave this item blank.	TPP name Blank
Drive Type	Select the drive type of the TPP that is to be displayed. When not using the drive type for filtering, select "All".	All Online Nearline SSD Online SED Nearline SED SSD SED
RAID Level	Select the RAID level of the TPP that is to be displayed. When not using the RAID level for filtering, select "All".	All High Performance (RAID1+0) High Capacity (RAID5) High Reliability (RAID6) High Reliability (RAID6-FR) Mirroring (RAID1) Striping (RAID0)

Modify Threshold Thin Provisioning Pool

- ["■ Overview" \(page 394\)](#)
- ["■ User Privileges" \(page 395\)](#)
- ["■ Settings" \(page 395\)](#)
- ["■ Display Contents" \(page 395\)](#)
- ["■ Operating Procedures" \(page 396\)](#)

■ Overview

This function changes the threshold for monitoring the used capacity of a [Thin Provisioning Pool \(TPP\)](#). There are two types of threshold: "Warning" and "Attention".

4. Thin Provisioning Threshold (Thin Provisioning Pool)

Note

- This function can change the threshold of TPPs created using the [Create Thin Provisioning Pool] function.
- Using this function enables setting the same threshold to multiple TPPs with a single operation.
- Changes in the usage status of a TPP can be notified. The following statuses can be notified. Refer to the [Setup Event Notification] function for details.
 - From "🟢Normal" to "⚠️Attention"
 - From "🟢Normal" or "⚠️Attention" to "🔴Warning"
 - The TPP capacity is exhausted

■ User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	✔️
StorageAdmin	✔️
AccountAdmin	
SecurityAdmin	
Maintainer	✔️

Refer to "[A. User Roles and Policies](#)" (page 1580) for details on the policies and roles.

■ Settings

In this screen, change the TPP threshold.

Threshold Setting

Item	Description	Setting values
Warning	Change the warning threshold (%) for monitoring the TPP used capacity. Specify the warning threshold so that the "Warning" threshold is the same or larger than the "Attention" threshold.	5 - 99 % 90 % (Default)
Attention	Specify the attention threshold (%) for monitoring the TPP used capacity. Specify the Attention threshold so that the "Warning" threshold is the same or larger than the "Attention" threshold. The "Attention" threshold can be omitted. When setting the "Attention" threshold, select the checkbox.	Checkbox Selected 5 - 80 % Cleared Default: Checkbox is selected 75 %

■ Display Contents

In this screen, TPPs that are selected in the [Thin Provisioning Pool] screen are displayed. Confirm the TPP for which the threshold is to be changed.

4. Thin Provisioning
Threshold (Thin Provisioning Pool)

Target Thin Provisioning Pool

Item	Description
Name	The TPP name is displayed.
Drive Type	The type of drive that configures the TPP is displayed. Online Nearline SSD Online SED Nearline SED SSD SED
RAID Level	The level of RAID group that configures the TPP is displayed. High Performance (RAID1+0) High Capacity (RAID5) High Reliability (RAID6) High Reliability (RAID6-FR) Mirroring (RAID1) Striping (RAID0)
Status	The TPP status is displayed. Refer to "Thin Provisioning Pool Status" (page 1606) for details.
Total Capacity	The total capacity of TPP is displayed.
Current	Used Status
	The current usage of the TPP is displayed. <ul style="list-style-type: none"> • Normal TPP usage does not exceed the "Attention" threshold. • Attention TPP usage exceeds the "Attention" threshold but does not exceed the "Warning" threshold. Or the Data Container Volume usage is 80 % or larger. • Warning TPP usage exceeds the "Warning" threshold. TPP usage = Used Capacity ÷ Total Capacity
	Warning
	Attention
	The "Warning" threshold (5 to 99 %) currently set for the TPP is displayed. The "Attention" threshold (5 to 80 %) currently set for the TPP is displayed. When the "Attention" threshold is omitted, a "-" (hyphen) is displayed.

■ **Operating Procedures**

In this screen, change the TPP threshold.

Procedure ▶▶▶

- 1 Select the TPP for which the threshold is to be changed (multiple selections can be made) and click [Modify Threshold] in [Action].
- 2 Select a new threshold, and click the [Modify] button.
 → A confirmation screen appears.

Caution

- When "Warning" is not larger than "Attention", an error screen is displayed.

Note

- When changing a "Attention" threshold, select the checkbox and then select a new threshold.
- When omitting the "Attention" threshold, clear the checkbox.

- 3** Click the [OK] button.
→ The threshold settings for Thin Provisioning Pools starts.
- 4** Click the [Done] button to return to the [Threshold] screen.



Modify Cache Parameters (TPP)

- "[■ Overview](#)" (page 397)
- "[■ User Privileges](#)" (page 397)
- "[■ Settings](#)" (page 398)
- "[■ Display Contents](#)" (page 399)
- "[■ Operating Procedures](#)" (page 400)

■ Overview

This function changes the cache parameters of each [Thin Provisioning Pool \(TPP\)](#).

Performance of the storage system varies depending on the cache hit ratio. The storage system detects sequentiality when a host requests Read/Write. If sequentiality is detected when a Read request is issued, the cache hit rate is improved by reading the sequential data into the cache memory in advance. The characteristics of Read/Write requests from the host depends on the system. Performance of the storage system may improve by specifying a cache parameter that is suitable for the system that is being used.

The parameters to specify are as follows:

- Multi Writeback Count (MWC)
Specify the number of processes that can be written back at the same time.

Caution

- If [pinned data](#) exists in the storage system, MWC cannot be configured.

Note

- The same cache parameter can be applied for multiple TPPs in a single operation.
- Cache parameters, except the MWC, are specified for each [TPV](#). Refer to the [Modify Cache Parameters] function for details.

■ User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	✓
StorageAdmin	✓

4. Thin Provisioning Threshold (Thin Provisioning Pool)

Default role	Availability of executions
AccountAdmin	
SecurityAdmin	
Maintainer	✓

Refer to ["A. User Roles and Policies" \(page 1580\)](#) for details on the policies and roles.

■ Settings

In this screen, change the cache parameters.

Parameters Setting

Item	Description	Setting values
Multi Writeback Count (MWC)	Specify the value of the Multi Writeback Count. (Advantage of specifying a large value) When specifying larger MWC, sequential write access performance is improved. Note that this is not effective when a number of random write accesses occur. (Disadvantage of specifying a large value) Depending on the ratio of read access and write access, read access performance may be reduced.	1 - 16 (*1) Refer to "Allowed Input for MWC (TPP)" (page 398) for the default value.

*1: The setting values that are available for Multi Writeback Count vary depending on the RAID level and drive configuration.

Allowed Input for MWC (TPP)

Allowed Input for MWC When Using the Default Stripe Depth Value (TPP)

RAID level	Drive configuration (*1)	Allowed input for MWC (initial state)
		Stripe Depth = 64KB (default)
RAID0	4D	1 - 8 (2)
RAID1	1D+1M	1 - 16 (8)
RAID1+0	2D+2M	1 - 16 (4)
	4D+4M	1 - 8 (2)
	8D+8M	1 - 4 (1)
	12D+12M	1 - 2 (1)
RAID5	3D+1P	1 - 8 (3)
	4D+1P	1 - 8 (2)
	6D+1P	1 - 5 (2)
	7D+1P	1 - 4 (2)
	8D+1P	1 - 4 (1)
	12D+1P	1 - 2 (1)
RAID6	4D+2P	1 - 8 (2)
	6D+2P	1 - 5 (2)
	7D+2P	1 - 4 (2)
	8D+2P	1 - 4 (1)

4. Thin Provisioning Threshold (Thin Provisioning Pool)

RAID level	Drive configuration (*1)	Allowed input for MWC (initial state)			
		Stripe Depth = 64KB (default)			
RAID6-FR	(4D+2P)x2+1HS	1 - 8 (2)			
	(4D+2P)x5+1HS				
	(6D+2P)x2+1HS	1 - 5 (2)			
	(8D+2P)x3+1HS	1 - 4 (1)			

*1 : D: Data drives, M: Mirror drives, P: Parity drives

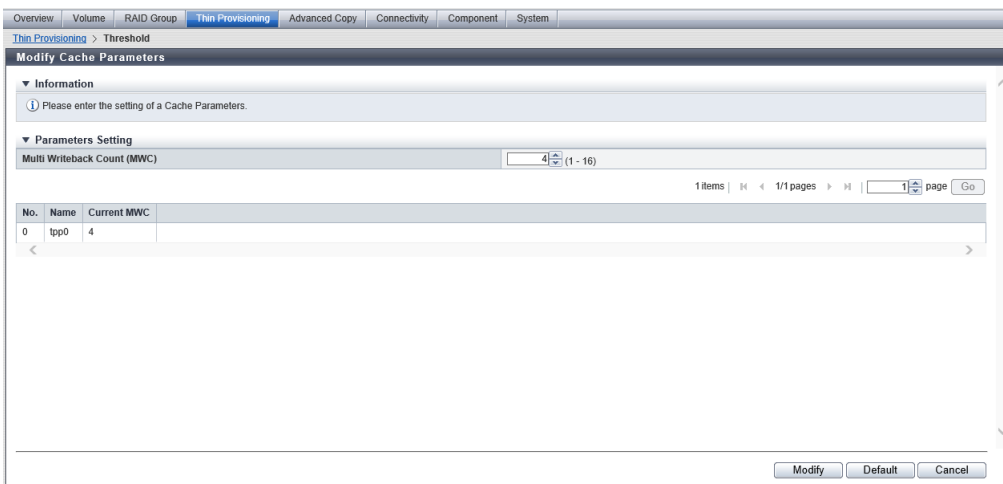
Allowed Input for MWC When the Stripe Depth Value is Tuned (TPP)

RAID level	Drive configuration (*1)	Allowed input for MWC (initial state)			
		When the Stripe Depth is ...			
		128KB	256KB	512KB	1024KB
RAID0	4D	1 - 4 (2)	1 - 2 (2)	1 (fixed)	1 (fixed)
RAID1+0	2D+2M	1 - 8 (4)	1 - 4 (4)	1 - 2 (2)	1 (fixed)
	4D+4M	1 - 4 (2)	1 - 2 (2)	1 (fixed)	1 (fixed)
	8D+8M	1 - 2 (1)	1 (fixed)	1 (fixed)	1 (fixed)
	12D+12M	1 (fixed)	1 (fixed)	1 (fixed)	1 (fixed)
RAID5	3D+1P	1 - 4 (3)	1 - 2 (2)	1 (fixed)	-
	4D+1P	1 - 4 (2)	1 - 2 (2)	1 (fixed)	-
	6D+1P	1 - 2 (2)	1 (fixed)	-	-
	7D+1P	1 - 2 (2)	1 (fixed)	-	-
	8D+1P	1 - 2 (1)	1 (fixed)	-	-
	12D+1P	1 (fixed)	-	-	-

*1 : D: Data drives, M: Mirror drives, P: Parity drives, -: Stripe Depth expansion is not available

■ Display Contents

In this screen, detailed information and cache parameter setting information for the selected TPP are displayed.



Item	Description
No.	The TPP number is displayed.
Name	The TPP name is displayed.

4. Thin Provisioning

Eco-mode Schedule (Thin Provisioning Pool)

Item	Description
Current MWC	The value of the current Multi Writeback Count setting is displayed.

■ Operating Procedures

Procedure ▶▶▶

- 1 Select which TPP to change the cache parameters for (multiple selections can be made) and click [Modify Cache Parameters] in [Action].
- 2 Change the cache parameters and click the [Modify] button.
→ A confirmation screen appears.

Note

- If the [Default] button is clicked before the [Modify] button, the default cache parameters are restored.

- 3 Click the [OK] button.
→ The cache parameter modification starts.
- 4 Click the [Done] button to return to the [Threshold] screen.

Eco-mode Schedule (Thin Provisioning Pool)

- "[■ Overview](#)" (page 400)
- "[■ User Privileges](#)" (page 401)
- "[■ Display Contents](#)" (page 401)
- "[■ Filter Setting](#)" (page 402)

■ Overview

This function displays the set state of the [Eco-mode](#) that is applied for the [Thin Provisioning Pool \(TPP\)](#).

Caution

- When using the Thin Provisioning function, "Enable" the Thin Provisioning. Refer to the [Set Thin Provisioning] function for details.

Note

- TPPs with either or both of Deduplication and Compression enabled are not displayed in the TPP list.
- To check whether the Thin Provisioning function is enabled or disabled, use the [Settings (Thin Provisioning)] function.
- To use the Eco-mode, it is required to create the common Eco-mode setup and Eco-mode schedule. Refer to the [Modify Eco-mode General Setting] function and the [Create Eco-mode Schedule] function for details.
- To assign the Eco-mode schedule to TPPs, use the [Eco-mode Schedule (Thin Provisioning Pool)] function.

4. Thin Provisioning
Eco-mode Schedule (Thin Provisioning Pool)

■ User Privileges

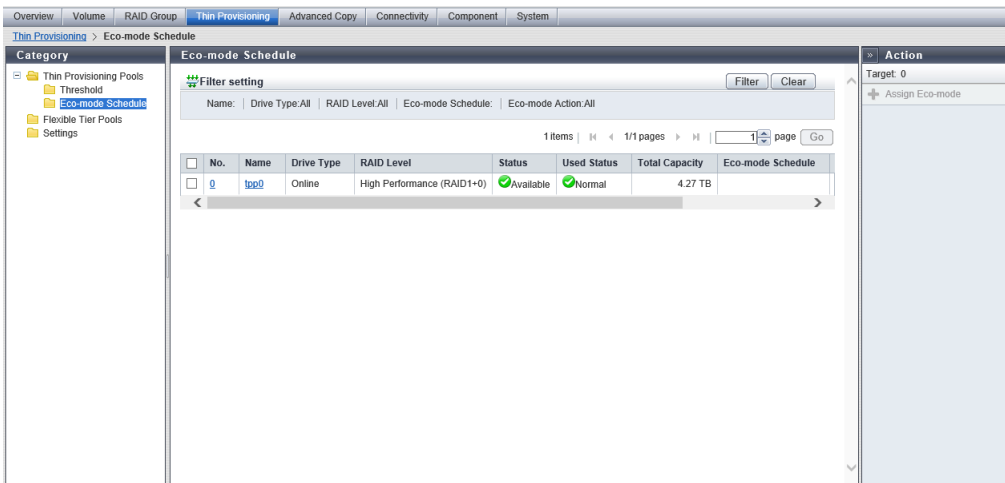
Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	✓
Admin	✓
StorageAdmin	✓
AccountAdmin	
SecurityAdmin	✓
Maintainer	✓

Refer to "'A. User Roles and Policies" (page 1580)" for details on the policies and roles.

■ Display Contents

In this screen, the set state of the Eco-mode that is applied for the TPP is displayed in a list.



TPP List

Item	Description
No.	The TPP number is displayed. Click this item to display the "[Thin Provisioning Pool Detail] Screen ([Basic] Tab)" (page 342).
Name	The TPP name is displayed. Click this item to display the "[Thin Provisioning Pool Detail] Screen ([Basic] Tab)" (page 342).
Drive Type	The type of drive that configures the TPP is displayed. Online Nearline SSD Online SED Nearline SED SSD SED

4. Thin Provisioning

Eco-mode Schedule (Thin Provisioning Pool)

Item	Description
RAID Level	The level of RAID group that configures the TPP is displayed. High Performance (RAID1+0) High Capacity (RAID5) High Reliability (RAID6) High Reliability (RAID6-FR) Mirroring (RAID1) Striping (RAID0)
Status	The TPP status is displayed. Refer to "Thin Provisioning Pool Status" (page 1606) for details.
Used Status	The used status of the TPP or the Data Container Volume is displayed. <ul style="list-style-type: none"> • Normal TPP usage does not exceed the "Attention" threshold. • Attention TPP usage exceeds the "Attention" threshold but does not exceed the "Warning" threshold. Or the Data Container Volume usage is 80 % or larger. • Warning TPP usage exceeds the "Warning" threshold.
Total Capacity	The total capacity of TPP is displayed.
Eco-mode Schedule	The Eco-mode schedule name that is assigned to the TPP is displayed. If the Eco-mode is controlled with FUJITSU ETERNUS SF Storage Management Software, "External" is displayed. When no Eco-mode schedule has been assigned, the field is blank.
Eco-mode Action	The Eco-mode schedule action status is displayed. When no Eco-mode schedule has been assigned, a "-" (hyphen) is displayed. <ul style="list-style-type: none"> • Drive power off The power for the drive is turned off during Eco-mode operation. • Drive motor off The drive motor is stopped during Eco-mode operation. • Drive always on The Eco-mode is disabled and the drive is always on.
Motor Status	The drive motor status is displayed. <ul style="list-style-type: none"> • Active The drive motors are activated. • In the Boot Process The drive motors are starting up. • Idle The drive motors are stopped. • In the Stop Process The drive motors are being stopped. • Power Off The drive power is being turned off.

■ Filter Setting

Function Description

Filter setting is a function used to display a list of only the TPPs satisfying all the specified conditions. No filtering is set by default. The following table shows conditions that can be specified.

4. Thin Provisioning

Eco-mode Schedule (Thin Provisioning Pool)

Item	Description	Setting values
Name	Input the TPP name that is to be displayed. TPPs matching or partially matching the entered name are displayed. When not using the TPP name for filtering, leave this item blank.	TPP name Blank
Drive Type	Select the drive type of the TPP that is to be displayed. When not using the drive type for filtering, select "All".	All Online Nearline SSD Online SED Nearline SED SSD SED
RAID Level	Select the RAID level of the TPP that is to be displayed. When not using the RAID level for filtering, select "All".	All High Performance (RAID1+0) High Capacity (RAID5) High Reliability (RAID6) High Reliability (RAID6-FR) Mirroring (RAID1) Striping (RAID0)
Eco-mode Schedule	Input the Eco-mode schedule name of the TPP that is to be displayed. The TPPs with an Eco-mode schedule that matching or partially matching the entered name are displayed. When not using the Eco-mode schedule for filtering, leave this item blank.	Eco-mode schedule name "External" Blank
Eco-mode Action	Select the Eco-mode action of the TPP that is to be displayed. <ul style="list-style-type: none">• When not using the Eco-mode action for filtering, select "All".• To display TPPs that will have the power cut to the drives during Eco-mode operation, select "Drive power off".• To display TPPs that will have the drive motors stopped during Eco-mode operation, select "Drive motor off".• To display TPPs that are always active by disabling Eco-mode, select "Drive always on".• To display TPPs without Eco-mode schedules, select "-" (hyphen).	All Drive power off Drive motor off Drive always on "-" (hyphen)

Assign Eco-mode Schedule (Thin Provisioning Pool)

- ["■ Overview" \(page 403\)](#)
- ["■ User Privileges" \(page 405\)](#)
- ["■ Settings" \(page 406\)](#)
- ["■ Display Contents" \(page 406\)](#)
- ["■ Operating Procedures" \(page 408\)](#)

■ Overview

This function assigns the Eco-mode schedule to the [Thin Provisioning Pools \(TPPs\)](#) and sets the [Eco-mode](#) action.

There are three Eco-mode actions; "Drive power off", "Drive motor off", and "Drive always on". To enable the Eco-mode, assign the Eco-mode schedule to a TPP and select "Drive power off" or "Drive motor off" as the Eco-mode action. When Eco-mode is enabled, the drives are activated during the scheduled event period. In the time periods outside the scheduled event, the drive status is changed according to the specified Eco-mode actions. Refer to "Drive Status When Eco-mode Action Is Configured" for details.

4. Thin Provisioning
Eco-mode Schedule (Thin Provisioning Pool)

If the RAID group is accessed from the host while the drives are turned off or the drive motors are stopped, the drives are activated and can be accessed within 1 - 5 minutes.

Drive Status When Eco-mode Action Is Configured

Eco-mode Schedule Setting			Eco-mode General Settings		
			Enable		Disable
			Drive power	Drive motor	
Eco-mode Action	Drive power off	During scheduled event term	Drive power is on	Drive motor is activated	Drive power is on or the drive motor runs regardless of the schedule.
		Times other than scheduled event term (*1)	Drive power is off	Drive motor is stopped	
	Drive motor off	During scheduled event term	Drive power is on	Drive motor is activated	
		Times other than scheduled event term (*1)	Drive power is on	Drive motor is stopped	
	Drive always on		Drive power is on	Drive motor is always activated	
	Eco-mode schedule is not assigned			Drive power is on	
Drives not registered in the TPPs			Drive power is on	Drive motors are always stopped	

*1 : If the TPP is accessed, the drives are activated and can be accessed within 1 - 5 minutes.

Caution

- When using Eco-mode, make sure to set the date/time correctly. If the time/date of the storage system is wrong, processes used for stopping and starting the drive motor cannot be performed per the Eco-mode schedule.
- When "External" (drive motor management by FUJITSU ETERNUS SF Storage Management Software) is selected, it can be changed to the Eco-mode schedule. But when the Eco-mode schedule is selected, it cannot be changed to "External".
- If any of the following conditions occur during the Eco-mode scheduled time, the drive will be started even when the drive motor is inactive. The Eco-mode schedule is re-enabled when the conditions listed have finished. (*1)
 - The RAID group status in the TPP is not "✔Available"
 - Functions that change the TPP or the volume configuration is being performed
 - Rebuild or copyback is being performed in the RAID groups that configure the target TPP
 - Formatting is being performed in the TPP
 - Formatting is being performed in the volumes registered in the TPP
 - RAID migration is being performed in the volumes registered in the TPP
 - Advanced Copy is being performed in the volume registered in the TPP (copy session status is not "Suspend" or the phase is not "Tracking")
 - NAS system volumes exist in the TPP
 - During maintenance
 - Disk diagnosis or RAID group diagnosis (diagnosing the RAID groups that configure the TPP) is being performed, or G-List is being exported
 - A module error related to the access paths of the controller modules and drives is detected
- If the server OS or software periodically accesses the storage system, the drive motor may not stop even when the Eco-mode is enabled. (*1)

*1: This does not only affect the motor stoppage, but includes the cutting of the drives power as well.

Note

- Before applying Eco-mode for TPPs, use the [Modify Eco-mode General Setting] function to enable the Eco-mode setting for the storage system.
- Set the Eco-mode schedule using the [Create Eco-mode Schedule] function.
- When the Eco-mode is set to TPP, the same Eco-mode schedule is set for all the RAID groups configuring the TPP.

■ User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	✔
StorageAdmin	✔
AccountAdmin	
SecurityAdmin	

4. Thin Provisioning

Eco-mode Schedule (Thin Provisioning Pool)

Default role	Availability of executions
Maintainer	✓

Refer to ["A. User Roles and Policies" \(page 1580\)](#) for details on the policies and roles.

■ Settings

In this screen, set the Eco-mode for TPPs.

Eco-mode Schedule Settings

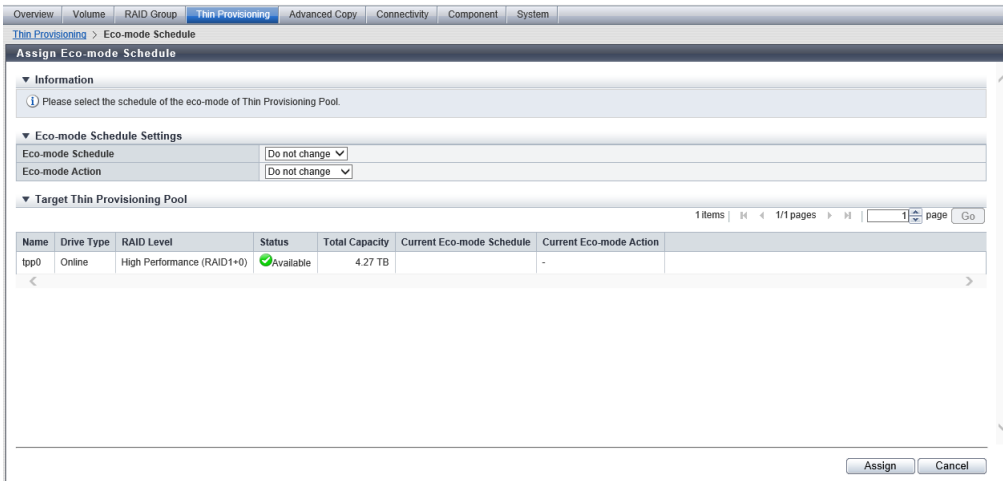
Item	Description	Setting values
Eco-mode Schedule	<p>Select the Eco-mode schedule that is to be assigned to the TPP.</p> <ul style="list-style-type: none"> Do not change Do not change the current assignment. Disable Disable the Eco-mode. Eco-mode schedule name Assign the selected Eco-mode schedule. <p>Caution</p> <ul style="list-style-type: none"> Eco-mode is not available for the following TPPs: <ul style="list-style-type: none"> No volumes are created Configured by SSDs or SSD SEDs Deduplication, Compression, or both Deduplication and Compression are enabled 	<p>Do not change</p> <p>Disable</p> <p>Eco-mode schedule name</p>
Eco-mode Action	<p>Select the Eco-mode action.</p> <p>The setting for this item becomes available if "Do not change" or "Eco-mode schedule name" is selected for "Eco-mode Schedule".</p> <ul style="list-style-type: none"> Do not change Does not change the Eco-mode action (only the Eco-mode schedule can be changed). Drive power off Enables the Eco-mode action and turns off the drives power during time periods outside the specified schedule. Drive motor off Enables the Eco-mode action and stops the drives motors during time periods outside the specified schedule. Drive always on Disables the Eco-mode action and the drive operates continuously regardless of the specified schedule. <p>Caution</p> <ul style="list-style-type: none"> Eco-mode schedule can be assigned for TPPs where ODX Buffer volumes are registered, but Eco-mode is not used. 	<p>Do not change</p> <p>Drive power off</p> <p>Drive motor off</p> <p>Drive always on</p>

■ Display Contents

The detailed information of the selected TPP is displayed.

4. Thin Provisioning

Eco-mode Schedule (Thin Provisioning Pool)



Target Thin Provisioning Pool

Item	Description
Name	The TPP name is displayed.
Drive Type	The type of drive that configures the TPP is displayed. Online Nearline Online SED Nearline SED
RAID Level	The level of RAID group that configures the TPP is displayed. High Performance (RAID1+0) High Capacity (RAID5) High Reliability (RAID6) High Reliability (RAID6-FR) Mirroring (RAID1) Striping (RAID0)
Status	The TPP status is displayed. Refer to "Thin Provisioning Pool Status" (page 1606) for details.
Total Capacity	The total capacity of TPP is displayed.
Current Eco-mode Schedule	The assignment status of the Eco-mode schedule for the TPP is displayed. <ul style="list-style-type: none"> When an Eco-mode schedule has been assigned, "Eco-mode schedule name" is displayed. If the Eco-mode is controlled with FUJITSU ETERNUS SF Storage Management Software, "External" is displayed. When no Eco-mode schedule is assigned, the field is blank.
Current Eco-mode Action	The Eco-mode action status for the TPP is displayed. When no Eco-mode schedule has been assigned, a "-" (hyphen) is displayed. <ul style="list-style-type: none"> Drive power off The power for the drive is turned off during Eco-mode operation. Drive motor off The drive motor is stopped during Eco-mode operation. Drive always on Eco-mode is disabled and the drive is always on.

■ Operating Procedures

Procedure ▶▶▶

- 1 Select the TPP to assign the Eco-mode schedule (multiple selections can be made) to and click [Assign Eco-mode] in [Action].

Note

- By selecting multiple TPPs as the Eco-mode targets, the same Eco-mode schedule can be specified for all the selected TPPs.

- 2 Select the Eco-mode schedule that is to be assigned, select the Eco-mode action, and then click the [Assign] button.
→ A confirmation screen appears.
 - 3 Click the [OK] button.
→ Assigning of the Eco-mode schedule starts.
 - 4 Click the [Done] button to return to the [Eco-mode Schedule] screen.
-



Flexible Tier Pool (Basic Information)

- "[■ Overview](#)" (page 408)
- "[■ User Privileges](#)" (page 409)
- "[■ Display Contents](#)" (page 410)

■ Overview

This function displays the [Flexible Tier Pool \(FTRP\)](#) list.

Caution

- The ETERNUS DX60 S5 does not support this function.
- To use the Flexible Tier function (Automated Storage Tiering), the following operations are required:
 - Select "Enable" for the Thin Provisioning function. Refer to the [Set Thin Provisioning] function for details.
 - To use Automated Storage Tiering with multiple layers, register the Optimization option license for ETERNUS SF Storage Cruiser.
 - Use ETERNUS SF Storage Cruiser to perform the following procedure.
 - Enable the Automated Storage Tiering feature.
 - Create FTRPs, FTSPs, and FTVs.
- When "⚠Attention" or "🚫Warning" is displayed in the "Used Status" field for the FTRP list, the used capacity of the relevant FTRP has exceeded the threshold. Immediately add drives and use ETERNUS SF Storage Cruiser to expand the capacity of the appropriate FTSP (for which expansion is determined to be necessary based upon the performance and used capacity).
- If the target FTRP does not exist when displaying the details screen, a message, "⚠Target is Not Found." is displayed.
- To format a Flexible Tier Pool, use ETERNUS SF Storage Cruiser. The "Maintenance Operation" policy is required to execute the process from Web GUI.

Note

- This function displays the basic FTRP information, the list of FTSPs which belong to the FTRP, the list of RAID groups which configure the FTSP, and the list of FTVs which have been registered to the FTRP.
- To check whether the Thin Provisioning function is enabled or disabled, use the [Settings (Thin Provisioning)] function.

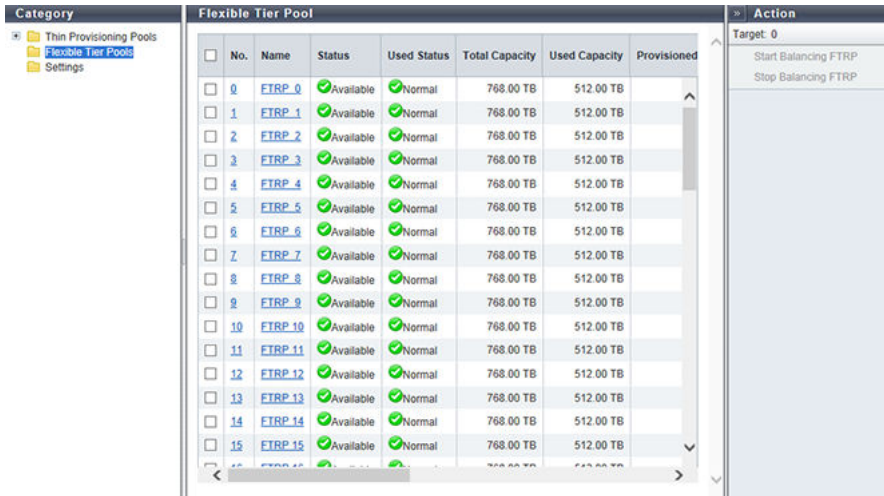
■ User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	✓
Admin	✓
StorageAdmin	✓
AccountAdmin	
SecurityAdmin	✓
Maintainer	✓

Refer to ""A. User Roles and Policies" (page 1580)" for details on the policies and roles.

■ Display Contents



FTRP List

The list of FTRPs created in the storage system is displayed.

Item	Description
No.	The FTRP number is displayed. Click this item to display the "[Flexible Tier Pool Detail] Screen ([Basic] Tab)" (page 411).
Name	The FTRP name is displayed. Click this item to display the "[Flexible Tier Pool Detail] Screen ([Basic] Tab)" (page 411).
Status	The FTRP status is displayed. Refer to "'Thin Provisioning Pool Status' (page 1606)" for details.
Used Status	The used status of the FTRP is displayed. <ul style="list-style-type: none"> • Normal FTRP usage does not exceed the "Attention" threshold. • Attention FTRP usage exceeds the "Attention" threshold but does not exceed the "Warning" threshold. • Warning FTRP usage exceeds the "Warning" threshold.
Total Capacity	The total capacity of the FTRP is displayed.
Used Capacity	The used capacity of the FTRP is displayed. "Used Capacity" indicates the total for the physically allocated capacities of the FTVs in the FTRP.
Provisioned Capacity	The total logical capacity of FTVs in the FTRP is displayed.
Provisioned Rate	The ratio of the total logical capacity (*1) of FTVs in the FTRP to the total capacity of the FTRP is displayed. *1: The provisioned rate is calculated with the total logical capacity where the chunk size is taken into consideration.
Warning	The "Warning" threshold (5 to 99 %) of the FTRP is displayed.
Attention	The "Attention" threshold (5 to 80 %) of the FTRP is displayed. When the attention threshold is omitted, "0 %" is displayed.

4. Thin Provisioning
Flexible Tier Pool (Basic Information)

Item	Description	
Encryption	<p>The FTRP encryption status is displayed.</p> <ul style="list-style-type: none"> • CM The FTRP that is encrypted by CM • "-" (hyphen) The FTRP that is not encrypted 	
Chunk Size	<p>The chunk size of the FTRP is displayed.</p> <p>If the chunk size information cannot be obtained, a "-" (hyphen) is displayed.</p> <p>21 MB 42 MB 84 MB 168 MB 336 MB</p>	
Shrinking	<p>The shrinking status is displayed.</p> <p>Shrinking is a function that deletes specific RAID groups in the FTRP to reduce the physical capacity of the FTRP.</p> <p>If the shrinking is not being performed, a "-" (hyphen) is displayed.</p> <ul style="list-style-type: none"> • Executing The FTRP capacity is being reduced. • Error Reducing the FTRP capacity failed. 	
Balancing Level	<p>The balancing level of the FTRP is displayed.</p> <p>If multiple FTSPs exist in the FTRP, the lowest balancing level among the FTSPs is displayed. A "-" (hyphen) is displayed when the balancing level cannot be obtained due to the FTRP status (*1) or when the physically allocated capacity cannot be checked due to the storage system status.</p> <p>*1: The status of the FTRP is not "Available", "Partially Ready", or "Exposed"</p> <ul style="list-style-type: none"> • High The physically allocated capacity among the RAID groups in the FTSP is equalized • Middle The physically allocated capacity among the RAID groups in the FTSP is slightly unequal • Low The physically allocated capacity among the RAID groups in the FTSP is significantly unequal 	
Balancing Process	Status	<p>The status of the FTRP balancing is displayed.</p> <ul style="list-style-type: none"> • Active All of the FTVs in the FTRP are either reserved or operating normally • Error An FTV in error status exists in the FTRP <p>When FTRP balancing is not being performed, a "-" (hyphen) is displayed.</p>
	Error Code	<p>The error code (hexadecimal) of FTRP balancing is displayed when an error occurs.</p> <p>A "-" (hyphen) is displayed in the following conditions:</p> <ul style="list-style-type: none"> • When FTRP balancing is not being performed on the volumes • When no errors are occurring

[Flexible Tier Pool Detail] Screen ([Basic] Tab)




Click the [No.] or [Name] link in the FTRP list to display the corresponding FTRP information. Click each tab to check the basic information, the list of FTSPs which configure the corresponding FTRP, and the list of volumes registered in the FTRP.

4. Thin Provisioning Flexible Tier Pool (Basic Information)




For details of the basic information, refer to "[Flexible Tier Pool Information](#)" (page 412)". For details of the FTSP list, refer to the "[\[Flexible Tier Pool Detail\] Screen \(\[Flexible Tier Sub Pool\] Tab\)](#)" (page 414). For details of the volume list, refer to the "[\[Flexible Tier Pool Detail\] Screen \(\[Volume\] Tab\)](#)" (page 415).

Flexible Tier Pool Information

In this screen, the basic information of the relevant FTRP can be checked.

Item	Description
Status	The FTRP status is displayed. Refer to " Thin Provisioning Pool Status " (page 1606)" for details.
Used Status	The used status of the FTRP is displayed.  Normal  Attention  Warning
Total Capacity	The total capacity of the FTRP is displayed. In addition, the total capacity is displayed in units of MB enclosed with parentheses.
Used Capacity	The used capacity of the FTRP is displayed. "Used Capacity" indicates the total for the physically allocated capacities of the FTVs in the FTRP. In addition, the used capacity is displayed in units of MB enclosed with parentheses.
Used Rate	The usage rate of the FTRP is displayed. Used Rate = Used Capacity ÷ Total Capacity
Provisioned Capacity	The total logical capacity of FTVs in the FTRP is displayed. In addition, the total logical capacity is displayed in units of MB enclosed with parentheses.
Provisioned Rate	The ratio of the total logical capacity (*1) of FTVs in the FTRP to the total capacity of the FTRP is displayed. *1 : The provisioned rate is calculated with the total logical capacity where the chunk size is taken into consideration.
Warning	The FTRP physical capacity "xxx", which is converted based on the FTRP warning threshold, and the threshold (yy%) are displayed.
Attention	The FTRP physical capacity "xxx", which is converted based on the FTRP attention threshold, and the threshold (yy%) are displayed. When the attention threshold is omitted, a "-" (hyphen) is displayed.
Encryption	The encryption status of the FTRP is displayed. CM "-" (hyphen)
Chunk Size	The chunk size of the FTRP is displayed. If the chunk size information cannot be obtained, a "-" (hyphen) is displayed. 21 MB 42 MB 84 MB 168 MB 336 MB
Shrinking	The shrinking status is displayed. Shrinking is a function that deletes specific RAID groups in the FTRP to reduce the physical capacity of the FTRP. If the shrinking is not being performed, a "-" (hyphen) is displayed. Executing Error

4. Thin Provisioning
Flexible Tier Pool (Basic Information)

Item	Description	
Process	A process that is being performed for the FTRP is displayed. If no process is being performed, a "-" (hyphen) is displayed.	
Progress	The progress of a process that is being performed is displayed with a bar and a rate (0 to 100 %). To display the latest progress, refresh the screen. If no process is being performed, a "-" (hyphen) is displayed.	
Estimated Time Left	<p>The estimated remaining time before formatting is complete is displayed. To display the latest estimated remaining time, refresh the screen. This item is not displayed when the process is other than "Formatting".</p> <ul style="list-style-type: none"> • Calculating The storage system is calculating the estimated remaining time. • 30 days or more The estimated remaining time is 30 days or more. • x days y h z min. The estimated remaining time is more than one minute and less than 30 days. When the estimated remaining time is less than one day, the "days" value is omitted. When the estimated remaining time is less than one hour, the "days" and "h" values are omitted. • Less than 1 min. The estimated remaining time is less than one minute. <div style="background-color: #fff9c4; padding: 10px; margin-top: 10px;"> <p>Caution</p> <ul style="list-style-type: none"> • The estimated time that is left may increase or decrease depending on the I/O load when this parameter is used. </div>	
Remaining Size	The remaining size of the unformatted volume is displayed. To display the latest size, refresh the screen. This item is not displayed when the process is other than "Formatting".	
Balancing Level	<p>The balancing level of the FTRP is displayed.</p> <p>If multiple FTSPs exist in the FTRP, the lowest balancing level among the FTSPs is displayed. A "-" (hyphen) is displayed when the balancing level cannot be obtained due to the FTRP status (*1) or when the physically allocated capacity cannot be checked due to the storage system status.</p> <p>High Middle Low</p> <p>*1: The status of the FTRP is not  Available",  Partially Readyng", or  Exposed"</p>	
Balancing Process	Status	<p>The status of the FTRP balancing is displayed.</p> <p>When FTRP balancing is not being performed, a "-" (hyphen) is displayed.</p> <p>Active Error</p>
	Progress	<p>The lowest progress rate (0 to 100 %) among the FTV balancing sessions that are being performed in the FTRP is displayed.</p> <p>When FTRP balancing is not being performed, a "-" (hyphen) is displayed.</p>
	Error Code	<p>The error code (hexadecimal) of FTRP balancing is displayed when an error occurs.</p> <p>A "-" (hyphen) is displayed in the following conditions:</p> <ul style="list-style-type: none"> • When FTRP balancing is not being performed on the volumes • When no errors are occurring

[Flexible Tier Pool Detail] Screen ([Flexible Tier Sub Pool] Tab)

Flexible Tier Pool Information

The list of Flexible Tier Sub Pools (FTSPs) in the relevant FTRP is displayed.

Item	Description
No.	The FTSP number is displayed. Click this item to display the "[Flexible Tier Sub Pool Detail] Screen ([Basic] Tab)" (page 415).
Name	The FTSP name is displayed. Click this item to display the "[Flexible Tier Sub Pool Detail] Screen ([Basic] Tab)" (page 415).
Status	The FTSP status is displayed. Refer to "'Thin Provisioning Pool Status' (page 1606)" for details.
Drive Type	The type of drive that configures the FTSP is displayed. Online Nearline SSD Online SED Nearline SED SSD SED
RAID Level	The level of RAID group that configures the FTSP is displayed. High Performance (RAID1+0) High Capacity (RAID5) High Reliability (RAID6) High Reliability (RAID6-FR) Mirroring (RAID1) Striping (RAID0)
Total Capacity	The total capacity of the FTSP is displayed.
Used Capacity	The used capacity of the FTSP is displayed. "Used Capacity" indicates the total for the physically allocated capacities of the FTVs in the FTSP.
Balancing Level	The balancing level of the FTSP is displayed. A "-" (hyphen) is displayed when the balancing level cannot be obtained due to the FTRP status (*1) or when the physically allocated capacity cannot be checked due to the storage system status. *1: The status of the FTRP is not "Available", "Partially Ready", or "Exposed" <ul style="list-style-type: none"> • High The physically allocated capacity among the RAID groups is equalized • Middle The physically allocated capacity among the RAID groups is slightly unequal • Low The physically allocated capacity among the RAID groups is significantly unequal
Shrinking	The shrinking status for FTSP is displayed. Shrinking is a function that deletes specific RAID groups in the FTRP to reduce the physical capacity of the FTRP. If the shrinking is not being performed, a "-" (hyphen) is displayed. <ul style="list-style-type: none"> • Executing The FTRP capacity is being reduced. • Error Reducing the FTRP capacity failed.

[Flexible Tier Pool Detail] Screen ([Volume] Tab)

Flexible Tier Pool Information

In this screen, volumes that are registered in the relevant FTRP can be checked. When no volumes are registered in the FTRP, only the item name is displayed.

Item	Description
No.	The volume number is displayed.
Name	The volume name is displayed.
Status	The volume status is displayed. Refer to "Volume Status" (page 1604) for details.
Type	The volume type is displayed. This volume list displays only the volumes whose type is "FTV".
Usage	The usage of the volume is displayed. <ul style="list-style-type: none"> Block The volumes that are used for the SAN. System The system volumes. Veeam The volumes that are used for Veeam Storage Integration.
FTSP Priority	The FTSP number to which a volume is assigned on a priority basis in the FTRP is displayed. When the setting is omitted, a "-" (hyphen) is displayed.
Allocation	The allocation method for the volume is displayed. <ul style="list-style-type: none"> Thin Physical area is allocated to the target area of the volume when a write I/O is received. Thick Physical area is allocated to the whole area of the volume when volumes are created.
Capacity	The volume capacity is displayed.
Used Capacity	The used capacity (physically allocated capacity) of volume is displayed.
Used Rate	The volume utilization (0 to 100 %) is displayed. Used Rate = Used Capacity ÷ Capacity
Threshold	The threshold (0 to 100 %) for monitoring the volume utilization is displayed. If the "Used Rate" value exceeds the "Threshold", a Host Sense Key Code Qualifier is notified.

[Flexible Tier Sub Pool Detail] Screen ([Basic] Tab)

Click the [No.] link or the [Name] link in the [Flexible Tier Pool Detail] ("Flexible Tier Sub Pool" tab) screen to display the detailed information for the relevant FTSP. Click each tab to display the basic information and the list of RAID groups that configure the corresponding FTSP. For details of the basic information, refer to ["Flexible Tier Sub Pool Detail" \(page 415\)](#). For details of the RAID group list, refer to ["\[Flexible Tier Sub Pool Detail\] Screen \(\[RAID Group\] Tab\)" \(page 416\)](#).

Flexible Tier Sub Pool Detail

In this screen, the basic information of the relevant FTSP can be checked.

Item	Description
Status	The FTSP status is displayed. Refer to "Thin Provisioning Pool Status" (page 1606) for details.

4. Thin Provisioning
Flexible Tier Pool (Basic Information)

Item	Description
Drive Type	The type of drive that configures the FTSP is displayed. Online Nearline SSD Online SED Nearline SED SSD SED
RAID Level	The level of RAID group that configures the FTSP is displayed. High Performance (RAID1+0) High Capacity (RAID5) High Reliability (RAID6) High Reliability (RAID6-FR) Mirroring (RAID1) Striping (RAID0)
Total Capacity	The total capacity of the FTSP is displayed. In addition, the total capacity is displayed in units of MB enclosed with parentheses.
Used Capacity	The used capacity of the FTSP is displayed. "Used Capacity" indicates the total for the physically allocated capacities of the FTVs in the FTSP. In addition, the used capacity is displayed in units of MB enclosed with parentheses.
Shrinking	The shrinking status for FTSP is displayed. Shrinking is a function that deletes specific RAID groups in the FTRP to reduce the physical capacity of the FTRP. If the shrinking is not being performed, a "-" (hyphen) is displayed. Executing Error

[Flexible Tier Sub Pool Detail] Screen ([RAID Group] Tab)

Flexible Tier Sub Pool Detail

In this screen, a list of the RAID groups that configure the relevant FTSP is displayed.

Item	Description
No.	The group number of the RAID group that belongs to the FTSP is displayed. Click this item to display the " [RAID Group Detail] Screen ([Basic] Tab) " (page 417).
Name	The RAID group name is displayed. Click this item to display the " [RAID Group Detail] Screen ([Basic] Tab) " (page 417).
Status	The RAID group status is displayed. Refer to " [RAID Group Status] " (page 1605)" for details.
RAID Level	The RAID level is displayed. High Performance (RAID1+0) High Capacity (RAID5) High Reliability (RAID6) High Reliability (RAID6-FR) Mirroring (RAID1) Striping (RAID0)
Total Capacity	The total capacity of the RAID groups is displayed.
Used Capacity	The used capacity of the RAID groups is displayed. "Used Capacity" indicates the total for the physically allocated capacities of the FTVs in the RAID group.

4. Thin Provisioning
Flexible Tier Pool (Basic Information)

Item	Description
Deleting	<p>The RAID group deletion status is displayed.</p> <p>If a RAID group deletion process is not being performed, a "-" (hyphen) is displayed.</p> <ul style="list-style-type: none"> • Executing A RAID group deletion process is being performed or a data migration related to the deletion process is being performed. • Error Deletion of the RAID group failed.

[RAID Group Detail] Screen ([Basic] Tab)

Click the [No.] link or the [Name] link in the [Flexible Tier Sub Pool Detail] ("RAID Group" tab) screen to display the information for the relevant RAID group. Click each tab to display the basic information and the list of drives that configure the corresponding RAID group.

For details of the basic information, refer to "[RAID Group Detail](#)" (page 417)". For the drive list, refer to "[\[RAID Group Detail\] Screen \(\[Drives\] Tab\)](#)" (page 419).

RAID Group Detail

In this screen, the basic information of the relevant RAID group can be checked.

Item	Description
Status	<p>The RAID group status is displayed.</p> <p>Refer to "RAID Group Status" (page 1605)" for details.</p>
RAID Level	<p>The RAID level is displayed.</p> <p>High Performance (RAID1+0) High Capacity (RAID5) High Reliability (RAID6) High Reliability (RAID6-FR) Mirroring (RAID1) Striping (RAID0)</p>
Fast Recovery Configuration	<p>The drive configuration in the Fast Recovery RAID group (*1) is displayed.</p> <p>This item is displayed only when the RAID level is "RAID6-FR".</p> <p>(4D+2P)x2+1HS (6D+2P)x2+1HS (8D+2P)x3+1HS (4D+2P)x5+1HS D: Data drives P: Parity drives HS: Hot Spares</p> <p>*1: "RAID6-FR" groups that configure FTSPs are called "Fast Recovery RAID groups".</p>
Total Capacity	<p>The total capacity of the RAID groups is displayed.</p> <p>In addition, the total capacity is displayed in units of MB enclosed with parentheses.</p>
Used Capacity	<p>The used capacity of the RAID groups is displayed.</p> <p>"Used Capacity" indicates the total for the physically allocated capacities of the FTVs in the RAID group.</p> <p>In addition, the used capacity is displayed in units of MB enclosed with parentheses.</p>

4. Thin Provisioning
Flexible Tier Pool (Basic Information)

Item	Description
Controlling CM	<p>The Controlling CM of the RAID group is displayed.</p> <p>For the ETERNUS DX900 S5 or the ETERNUS DX8900 S4 CE#x CM#y</p> <p>For the other models CM#y</p> <p>x: CE number y: CM number</p>
Eco-mode Schedule	<p>The Eco-mode schedule name that is assigned to the RAID group is displayed.</p> <p>If the Eco-mode is controlled with FUJITSU ETERNUS SF Storage Management Software, "External" is displayed.</p> <p>When no Eco-mode schedule has been assigned, the field is blank.</p>
Eco-mode Action	<p>The Eco-mode schedule action status is displayed.</p> <p>When no Eco-mode schedule has been assigned, a "-" (hyphen) is displayed.</p> <ul style="list-style-type: none"> • Drive power off The power for the drive is turned off during Eco-mode operation. • Drive motor off The drive motor is stopped during Eco-mode operation. • Drive always on The Eco-mode is disabled and the drive is always on.
Motor Status	<p>The drive motor status is displayed.</p> <ul style="list-style-type: none"> • Active The drive motors are activated. • In the Boot Process The drive motors are starting up. • Idle The drive motors are stopped. • In the Stop Process The drive motors are being stopped. • Power Off The drive power is being turned off.
Fast Recovery Drive	<p>When the hot spare area in the Fast Recovery RAID group is used (*1), the location information for the data recovery source drive is displayed. If Fast Recovery (*2) is not used, the field is blank.</p> <p>This item is displayed only when the RAID level is "RAID6-FR".</p> <p>For the ETERNUS DX900 S5 or the ETERNUS DX8900 S4 CE#x Slot#y DE#zz Slot#y</p> <p>x: CE number y: Slot number zz: DE number</p> <p>*1 : Between when a high-speed rebuild is started and when copyback from a hot spare area to a replaced normal drive is completed.</p> <p>*2 : High-speed rebuilding when one drive fails in the Fast Recovery RAID group.</p>
Process	<p>A process that is being performed for the FTRP is displayed. If no process is being performed, a "-" (hyphen) is displayed.</p>
Progress	<p>The progress of a process that is being performed is displayed with a bar and a rate (0 to 100 %). To display the latest progress, refresh the screen. If no process is being performed, a "-" (hyphen) is displayed.</p>

4. Thin Provisioning
Flexible Tier Pool (Basic Information)

Item	Description
Stripe Depth	The Stripe Depth (*1) of the RAID group is displayed. A "-" (hyphen) is displayed when the RAID level is "RAID1". 64 KB 128 KB 256 KB 512 KB 1024 KB *1: This is the number of logical blocks assigned to one drive per stripe when a volume is striped to configuring drives of a RAID group. Normally, it is 64KB.
Deleting	The RAID group deletion status is displayed. If a RAID group deletion process is not being performed, a "-" (hyphen) is displayed. Executing Error
Data Access Failed During Redundancy Loss	The state when access to the data in the RAID group has failed is displayed. If data access fails when the RAID group redundancy is lost, "Yes" is displayed. For states other than the above, a "-" (hyphen) is displayed.

[RAID Group Detail] Screen ([Drives] Tab)

In this screen, a list of the drives that configure the relevant RAID group is displayed.

Item	Description
Enclosure	The number of the enclosure where the drive is installed is displayed. CE : Controller Enclosure (2.5" and 3.5") DE : Drive Enclosure (2.5", 3.5", and 3.5" high density DEs) CE#x DE#yy x: CE number yy: DE number
Slot No.	The number of the slot where the drive is installed is displayed. 2.5" CE/DE: 0 - 23 3.5" CE/DE: 0 - 11 3.5" high density DE: 0 - 59
Status	The drive status is displayed. Refer to "Drive Status" (page 1607) for details.

4. Thin Provisioning Flexible Tier Pool (Basic Information)

Item	Description
Drive Type	<p>The drive type displayed for this item is a combination of the following.</p> <ul style="list-style-type: none"> • Drive size <ul style="list-style-type: none"> - For 2.5-inch drives: 2.5" - For 3.5-inch drives: 3.5" • Drive type <ul style="list-style-type: none"> - For SAS disks: Online - For Nearline SAS disks: Nearline - For SSDs, the following items are displayed depending on the SSD type. <ul style="list-style-type: none"> • For SSD-Hs (12 Gbit/s): SSD-H (*1) • For SSD-Ms (12 Gbit/s): SSD-M (*1) • For SSD-Ls (12 Gbit/s): SSD-L (*1) <p>Note that "SED" is also displayed for self encrypting drives and "AF" is also displayed for Advanced Format compliant drives.</p> <p>*1: The displayed item varies depending on the interface speed (bandwidth) or the capacity of the reserved space. Unless otherwise specified, "SSD-H", "SSD-M", and "SSD-L" are collectively referred to as "SSD". In addition, there may be cases when "SSD SED" is used as the collective term for self encrypting SSD-Hs, SSD-Ms, and SSD-Ls.</p>
Capacity	The capacity of the drive is displayed.
Speed	<p>The drive speed is displayed.</p> <p>For SSD or SSD SED, a "-" (hyphen) is displayed.</p> <p>15000 rpm 10000 rpm 7200 rpm</p>
Usage	<p>The usage of the drive is displayed.</p> <p>Data Global Hot Spare</p>
Data Access Failed	<p>The state when access to the data in the drive has failed is displayed.</p> <p>If data access fails when the RAID group redundancy is lost, "Yes" is displayed.</p> <p>For states other than the above, a "-" (hyphen) is displayed.</p>

Format Flexible Tier Pool (All Area)

- ["■ Overview" \(page 420\)](#)
- ["■ User Privileges" \(page 421\)](#)
- ["■ Operating Procedures" \(page 422\)](#)

■ Overview

This function formats all of the areas in the [Flexible Tier Pool \(FTRP\)](#).

Caution

- When formatting all areas in an FTRP, data stored in the [FTVs](#) in the FTRP will be deleted. Format FTV to use them again when data in FTV is deleted.
- An FTRP cannot be formatted if data migration with the Flexible Tier function is being performed on one of its FTVs. Start FTRP formatting after the data migration is complete.
- An error will stop the [RAID migration](#) when an FTRP, in which the currently migrating FTV belongs, is formatted. Stop the RAID migration session or wait until the RAID migration session is complete, and then format the FTRP.
- When an FTRP that is being balanced is formatted, an error occurs and the FTRP balancing session is stopped. Stop the FTRP balancing session or wait until the FTRP balancing session is complete, and then format the FTRP.
- This function cannot be used under the following conditions:
 - No [FTSPs](#) are registered in the FTRP
 - No FTRPs can be formatted
 - Shrinking is being performed in the FTRP
 - The FTRP includes a volume that is used for the Storage Cluster function
 - The FTRP includes a volume that is used for the Virtual Volume function
- If the error message "An internal resource is insufficient." appears after FTRPs are formatted, a format of FTRPs may have failed. Check the "Status" of the formatted FTRPs in the [Flexible Tier Pool] screen. Refer to the [Flexible Tier Pool (Basic Information)] function for details. FTRPs in the "🟡Readying" or "🟡Partially Readying" state have not been formatted. Perform either of the following procedures according to the status.
 - For the "🟡Readying" state, wait until the current formatting process is completed and then use this function to reformat the relevant FTRPs.
 - For the "🟡Partially Readying" state, wait until the current formatting process is completed and then use the [Format Flexible Tier Pool (Unformatted Area)] function to reformat the relevant FTRPs.

Note

- FTRPs with the status of "🟢Available", "🟡Partially Readying", "🟡Readying" or "🔴Exposed" can be formatted.
- Progress of formatting ("Progress", "Estimated Time Left", and "Remaining Size") can be checked in the [Flexible Tier Pool (Basic Information)] function. Click the FTRP name to display the basic information.
- To format FTVs, use the [Format Volume] function.
- When an FTRP is created using the ETERNUS SF Storage Cruiser, the FTRP is formatted automatically. In this case, it is not necessary to format the FTRP by using this function.

■ User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	
StorageAdmin	

4. Thin Provisioning Flexible Tier Pool (Basic Information)

Default role	Availability of executions
AccountAdmin	
SecurityAdmin	
Maintainer	✓

Refer to "[A. User Roles and Policies](#)" (page 1580) for details on the policies and roles.

■ Operating Procedures

Format all of the areas in an FTRP.

Procedure ▶▶▶

- 1 Select the FTRP that is to be formatted (multiple selections can be made) and click [Format All Area] in [Action].
→ A confirmation screen appears.

Caution

- When formatting all areas in an FTRP, data stored in the FTVs in the FTRP will be deleted.
- An error will stop the RAID migration when an FTRP, in which the currently migrating FTV belongs, is formatted.
- When an FTRP that is being balanced is formatted, an error occurs and the FTRP balancing session is stopped.

- 2 Click the [OK] button.
→ Formatting of all area in the Flexible Tier Pool starts.

Caution

- If data migration by the Flexible Tier function is being performed, an error screen appears.

- 3 Click the [Done] button to return to the [Flexible Tier Pool] screen.

Caution

- To use an FTV in the FTRP again after formatted with "All Area" selected for the mode, format the FTV.



Format Flexible Tier Pool (Unformatted Area)

- "[Overview](#)" (page 422)
- "[User Privileges](#)" (page 423)
- "[Operating Procedures](#)" (page 423)

■ Overview

This function formats unformatted areas in the [Flexible Tier Pool \(FTRP\)](#).

Caution

- This function cannot be used under the following conditions:
 - No FTSPs are registered in the FTRP
 - No FTRPs can be formatted
 - The status of the FTRPs that are to be formatted is "Available"
 - Shrinking is being performed in the FTRP
 - The FTRP includes a volume that is used for the Storage Cluster function
 - The FTRP includes a volume that is used for the Virtual Volume function
- If the error message "An internal resource is insufficient." appears after FTRPs are formatted, a format of FTRPs may have failed. Check the "Status" of the formatted FTRPs in the [Flexible Tier Pool] screen. Refer to the [Flexible Tier Pool (Basic Information)] function for details. FTRPs in the "Readying" or "Partially Readying" state have not been formatted. Perform either of the following procedures according to the status.
 - For the "Readying" state, wait until the current formatting process is completed and then use the [Format Flexible Tier Pool (All Area)] function to reformat the relevant FTRPs.
 - For the "Partially Readying" state, wait until the current formatting process is completed and then use this function to reformat the relevant FTRPs.

Note

- FTRPs with the status of "Partially Readying" or "Readying" can be formatted. Even if formatting is performed, the data that is stored in the FTVs of the target FTRP is not deleted. The "Unformatted area" is a new area that is added to a FTRP by the capacity expansion function.
- This function is only used when an error occurs during FTRP capacity expansion with ETERNUS SF Storage Cruiser and the expanded area cannot be formatted. When FTRP capacity is successfully expanded, the FTRP is automatically formatted. In this case, it is not necessary to format the FTRP by using this function.
- Progress of formatting ("Progress", "Estimated Time Left", and "Remaining Size") can be checked in the [Flexible Tier Pool (Basic Information)] function. Click the FTRP name to display the basic information.

■ User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	
StorageAdmin	
AccountAdmin	
SecurityAdmin	
Maintainer	✓

Refer to "'A. User Roles and Policies" (page 1580)" for details on the policies and roles.

■ Operating Procedures

Format unformatted areas in an FTRP.

Procedure ▶▶▶

- 1 Select the FTRP that is to be formatted (multiple selections can be made) and click [Format Unformatted Area] in [Action].
→ A confirmation screen appears.
 - 2 Click the [OK] button.
→ Formatting of unformatted area in the Flexible Tier Pool starts.
 - 3 Click the [Done] button to return to the [Flexible Tier Pool] screen.
-



Start Balancing Flexible Tier Pool

- ["■ Overview" \(page 424\)](#)
- ["■ User Privileges" \(page 426\)](#)
- ["■ Operating Procedures" \(page 426\)](#)

■ Overview

This function starts [Flexible Tier Pool \(FTRP\)](#) balancing sessions.

The FTRP balancing function equalizes unevenly allocated physical area in the [Flexible Tier Sub Pools \(FTSPs\)](#) that configure an FTRP. By using this function, the physical allocated areas are reallocated equally among the RAID groups in the FTSPs. The I/O access to the [FTV](#) is distributed almost equally to the RAID groups in the FTSP.

Requirements for an FTRP to be Balanced

- The status is "✔Available", "⚠Partially Ready", or "⚠Exposed"
- Balancing of the selected FTRP is not being performed
- Free space, which can be used for balancing, exists in the FTSPs in the target FTRP

Caution

- Before balancing the FTRP, make sure that "Used Capacity" for all the FTSPs in the target FTRP is less than 50% of "Total Capacity". If this requirement is not satisfied and the capacity runs out, the FTRP balancing may not be complete.
"Used Capacity" and "Total Capacity" for FTSP can be checked from the [Flexible Tier Pool Detail] screen ("Flexible Tier Sub Pool" tab). Refer to the [Flexible Tier Pool (Basic Information)] function for details.
- Even after the FTRP balancing session is performed, the physical allocation between the FTVs and the FTSPs does not change.
- The FTRP balancing function extracts up to 32 balanceable FTVs (*1) that have a low balancing level from the selected FTRP and performs balancing sessions in the FTSPs. Note that FTVs are not extracted as balancing targets in certain conditions. For example, FTVs with a high balancing level, FTVs that are undergoing RAID migration, or FTVs that are undergoing capacity optimization.

*1: Up to 32 sessions, which include FTV balancing sessions, TPV balancing sessions, and RAID migration sessions, can be performed at the same time. An FTRP balancing session is performed in each FTRP. Note that the number of FTV balancing sessions that are performed at the same time cannot be specified.
- Balancing of FTVs in the following conditions is not available:
 - FTVs which capacity is 20 GB or less
 - FTVs which used capacity is 10 GB or lessThe FTV capacity can be checked in the [Flexible Tier Pool Detail (Volume)] screen. Refer to the [Flexible Tier Pool (Basic Information)] function for details.
- FTRP balancing cannot be started in the following conditions:
 - The Thin Provisioning function is disabled
 - The Automated Storage Tiering feature is disabled.
 - The maximum number of volumes are already registered in the storage system
 - The total number of TPV balancing sessions, RAID migration sessions, and Non-disruptive Storage Migration sessions that are running in the storage system is 32
 - The total capacity of TPV balancing sessions, RAID migration sessions, and Non-disruptive Storage Migration sessions that are running in the storage system is 128 TB
 - The RAID group diagnosis is being performed in the storage system
 - The disk diagnosis is being performed in the storage system
 - The capacity optimization is being performed for all of the balancing target FTVs in the FTRP
 - ODX is being performed for all of the balancing target FTVs in the FTRP
- When FTRP balancing is performed, the used FTRP capacity may temporarily exceed the threshold. If the used capacity exceeds the threshold, "⚠Attention" or "⚠Warning" is displayed in the "Used Status" field for the FTRP. The usage of the FTRPs is displayed in the [Flexible Tier Pool] screen. Refer to the [Flexible Tier Pool (Basic Information)] function for details.

Note

- FTRP balancing can be performed during the work I/O.
- The balancing levels of FTRPs and FTSPs, and the progress of the FTRP balancing sessions can be checked. Refer to the [Flexible Tier Pool (Basic Information)] function for details.
- The progress of a balancing FTV can be checked in the [Volume Detail] screen. Refer to the [Volume (Basic Information)] function for details.

■ User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	✓
StorageAdmin	✓
AccountAdmin	
SecurityAdmin	
Maintainer	✓

Refer to "[A. User Roles and Policies](#)" (page 1580) for details on the policies and roles.

■ Operating Procedures

Procedure ▶▶▶

- 1 Select the FTRP for which balancing is to be started and click [Start Balancing FTRP] in [Action].
→ A confirmation screen appears.
- 2 Click the [OK] button.
→ FTRP balancing starts.
- 3 Click the [Done] button to return to the [Flexible Tier Pool] screen.



Stop Balancing Flexible Tier Pool

- "[■ Overview](#)" (page 426)
- "[■ User Privileges](#)" (page 427)
- "[■ Operating Procedures](#)" (page 427)

■ Overview

This function stops [Flexible Tier Pool \(FTRP\)](#) balancing sessions.

Caution

- This function cannot be used when no FTRPs are undergoing balancing or when no FTRP balancing that has stopped due to an error exists.
- This function cannot be used when the specified FTRP balancing is already complete.

Note

- If FTRP balancing has stopped, the following conditions apply.
 - All of the balancing sessions that are currently being performed (*1) for the FTVs registered in the target FTRP are stopped. Even when balancing sessions are being stopped, FTVs that are not being balanced can be accessed normally.
 - Note that completed balancing processes for the FTVs in the target FTRP (*1) cannot be stopped (the physical allocation after the balancing process cannot be changed). FTVs that are balanced can be accessed normally.
- *1: When an FTRP balancing session is started, FTV balancing starts in the FTSPs. Refer to the [Start Balancing Flexible Tier Pool] function for details.

■ User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	✓
StorageAdmin	✓
AccountAdmin	
SecurityAdmin	
Maintainer	✓

Refer to "'A. User Roles and Policies" (page 1580)" for details on the policies and roles.

■ Operating Procedures

Procedure ▶▶▶

- 1 Select the FTRP for which balancing is to be stopped and click [Stop Balancing FTRP] in [Action].
→ A confirmation screen appears.
- 2 Click the [OK] button.
→ FTRP balancing stops.
- 3 Click the [Done] button to return to the [Flexible Tier Pool] screen.



Settings (Thin Provisioning)

- "■ Overview" (page 427)
- "■ User Privileges" (page 428)
- "■ Display Contents" (page 428)

■ Overview

This function displays information on the [Thin Provisioning](#) function settings.

4. Thin Provisioning Settings (Thin Provisioning)

Note

- The parameters that are described below can be changed. Refer to the [Set Thin Provisioning] function for details.
 - Whether to enable or disable the Thin Provisioning function
 - Maximum Pool Capacity

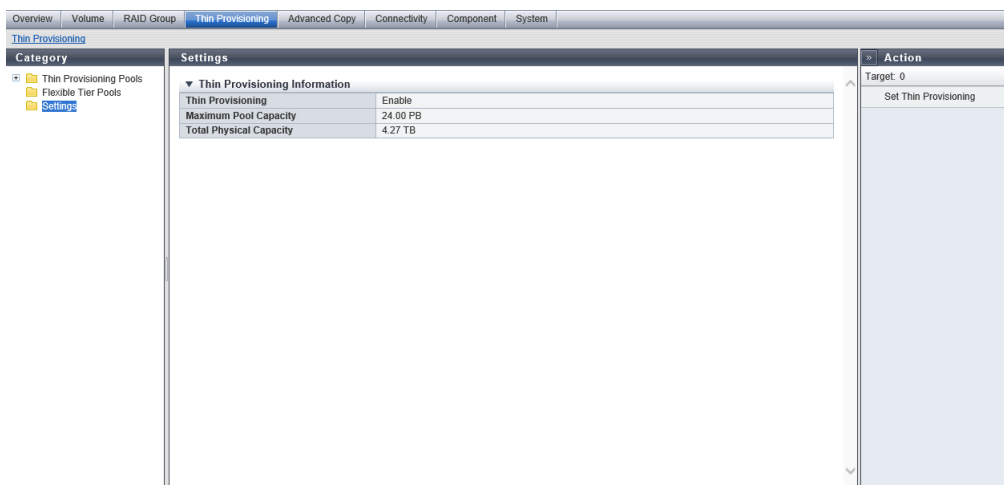
■ User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	✓
StorageAdmin	✓
AccountAdmin	
SecurityAdmin	
Maintainer	✓

Refer to "'A. User Roles and Policies" (page 1580)" for details on the policies and roles.

■ Display Contents



Thin Provisioning Information

Item	Description
Thin Provisioning	Whether the Thin Provisioning function is enabled or disabled is displayed.

4. Thin Provisioning Settings (Thin Provisioning)

Item	Description
Maximum Pool Capacity	<p>The maximum pool capacity that is specified for the storage system is displayed.</p> <p>The maximum pool capacity is the maximum total capacity for TPPs and FTRPs that can be created in the storage system. The chunk size for creating TPPs or FTRPs varies depending on the maximum pool capacity. Refer to ""The Maximum Number of Pools, Maximum Pool Capacity, and Determined Chunk Size for Each Model" (page 349)" for details.</p> <p>This item is displayed only when the Thin Provisioning function for the storage system is enabled.</p> <div style="background-color: #fff9c4; padding: 10px;"><p>Caution</p><ul style="list-style-type: none">• The actual available capacity is limited if the maximum physical capacity of the drives that can be installed is smaller than the maximum pool capacity. For example, when using an ETERNUS DX8900 S4 that is configured only with 900 GB drives, the actual capacity that can be used is approximately 3.6 PB even if the maximum pool capacity is "8.00 PB".</div>
Total Physical Capacity	<p>The total physical capacity of the TPPs in the storage system is displayed.</p> <p>This item is displayed only when the Thin Provisioning function for the storage system is enabled.</p>

Set Thin Provisioning

- ["■ Overview" \(page 429\)](#)
- ["■ User Privileges" \(page 432\)](#)
- ["■ Settings" \(page 432\)](#)
- ["■ Operating Procedures" \(page 433\)](#)

■ Overview

This function enables or disables the use of the [Thin Provisioning](#) function and sets the maximum pool capacity that can be created in the storage system. The maximum pool capacity is the maximum total capacity for [TPPs](#) and [FTRPs](#) that can be created in the storage system. The [chunk size](#) is determined by the specified maximum pool capacity.

For the maximum pool capacity and determined chunk size for each model, refer to [""The Maximum Number of Pools, Maximum Pool Capacity, and Determined Chunk Size for Each Model" \(page 349\)"](#).

Caution

- Note that the Thin Provisioning function is not provided for the ETERNUS DX60 S5/DX100 S5/DX200 S5 1CM model. In addition, the "Thin Provisioning" navigation is not displayed for these models.
- If the following conditions are all satisfied, the Thin Provisioning function can be enabled.
 - "GS License" has not been registered in the storage system
 - Drives are registered in the system area (Refer to ["Installed Drives for Each Maximum Pool Capacity" \(page 431\)](#) for details)
- The Thin Provisioning function cannot be disabled in the following conditions.
 - TPPs exist in the storage system
 - "TPV balancing" is selected for the Thin Provisioning allocation mode
 - The Automated Storage Tiering feature is enabled (*1)
 - *1: Enabling or disabling the Automated Storage Tiering feature is performed by using ETERNUS SF Storage Cruiser.
- Cache memory is not only used for the Thin Provisioning function (*1), but also used for copy tables, [REC Buffers](#), the Storage Cluster function (*2), the Non-disruptive Storage Migration function, and the Extreme Cache function. Note that an REC Buffer with the maximum capacity for each model cannot always be created depending on the following conditions.
 - Memory capacity in the storage system
 - Copy table size
 - REC Buffer size
 - Total TFOV capacity (*2)
 - License registration for the Non-disruptive Storage Migration function
 - Extreme Cache setting (enabled) and Extreme Cache capacity
 - *1: The shared area in the cache memory is used for the following conditions.
 - The maximum pool capacity has been expanded to "1.5 PB" or larger
 - The total TFOV capacity (*2) has been expanded from the default capacityRefer to the descriptions about "Storage Cluster" in the [System] screen for the default capacity of the TFOV for each model.
 - *2: The total TFOV capacity indicates the total capacity of the volumes that are used for the Storage Cluster function in a storage system.
- If the Virtual Volume function is enabled, the current state (enabled or disabled) of the Thin Provisioning function cannot be changed. To check whether the Virtual Volume function is enabled or disabled, use the [System] screen. Refer to the [System (Basic Information)] function for details.
- The FTRP capacity that can be used as Virtual Volumes (VVOLs) is different from the maximum pool capacity. Refer to ["The Maximum FTRP Capacity that Can Be Used as VVOLs" \(page 431\)](#) for details.
- If the maximum pool capacity is set to "4 PB" or larger, the cache mode is temporarily changed to the "Write Through" mode. The workload I/O performance of the entire storage system is lowered when the cache mode is transitioning to "Write Through Mode". Therefore, it is recommended to set a maximum pool capacity of 4 PB or larger when the work I/O is low.

4. Thin Provisioning Settings (Thin Provisioning)

Note

- If "Disable" is selected for the Thin Provisioning function, make sure to change the Thin Provisioning allocation mode from "TPV balancing" to the default "TPP balancing" setting. Refer to the [Setup Subsystem Parameters] function for details.

Installed Drives for Each Maximum Pool Capacity

The following drives must be installed for each maximum pool capacity. There are no requirements for drive type, capacity, and speed.

Model	Maximum pool capacity	Number of installed drives	Installed drive location	
			Enclosures	Slot location
ETERNUS DX60 S5 ETERNUS DX100 S5 ETERNUS DX200 S5	- (*1)	2	CE#0	Slot#0 and Slot#1
ETERNUS DX500 S5	- (*1)	2	CE#0	Slot#0 and Slot#1
ETERNUS DX600 S5	Up to 1 PB	2	CE#0	Slot#0 and Slot#1
	1.5 PB or larger	4	CE#0	Slot#0 to Slot#3
ETERNUS DX900 S5 ETERNUS DX8900 S4	Up to 1 PB	2	CE#0	Slot#0 and Slot#1
	2 PB	4	CE#0	Slot#0 to Slot#3
	4 PB	8	CE#0	Slot#0 to Slot#3
			DE#04	Slot#0 to Slot#3
8 PB or larger	16	CE#0	Slot#0 to Slot#7	
		DE#04	Slot#0 to Slot#7	
ETERNUS AF150 S3 ETERNUS AF250 S3	- (*1)	2	CE#0	Slot#0 and Slot#1
ETERNUS AF650 S3	Up to 1 PB	2	CE#0	Slot#0 and Slot#1
	1.5 PB or larger	4	CE#0	Slot#0 to Slot#3

*1: The required number of drives is fixed regardless of the maximum Thin Provisioning pool capacity.

The Maximum FTRP Capacity that Can Be Used as VVOLS

Model	The maximum FTRP capacity that can be used as VVOLS
ETERNUS DX100 S5 ETERNUS DX200 S5	256 TB
ETERNUS DX500 S5	384 TB
ETERNUS DX600 S5	1024 TB
ETERNUS DX900 S5	2 PB
ETERNUS DX8900 S4	2 PB
ETERNUS AF150 S3/AF250 S3	256 TB
ETERNUS AF650 S3	1024 TB

Caution

- The actual available capacity that can be used as a VVOL is limited depending on whichever is smaller, the maximum FTRP capacity or the maximum pool capacity. For example, if the ETERNUS DX8900 S4 is used and the maximum pool capacity is "512 TB", the actual capacity that can be used for VVOLs is 512 TB even if the maximum FTRP capacity that can be used for VVOLs is "2 PB".

User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	✓
StorageAdmin	
AccountAdmin	
SecurityAdmin	
Maintainer	✓

Refer to ["A. User Roles and Policies" \(page 1580\)](#) for details on the policies and roles.

Settings

Thin Provisioning Settings

Item	Description	Setting values
Thin Provisioning	Select whether to "Enable" or "Disable" the Thin Provisioning function.	Enable Disable Default <ul style="list-style-type: none"> • When the Unified Storage License is installed at the factory Enable • When the Unified Storage License is not installed at the factory Disable
Maximum Pool Capacity	Select the maximum pool capacity that is specified for the storage system. The maximum pool capacity can be expanded gradually according to the used pool capacity. Because the maximum pool capacity is not fixed, memory can be more effectively used. Note that if the chunk size is changed depending on the expanded "Maximum Pool Capacity", a calculation different from the existing method is used to obtain the pool capacity that can be created. This item is only available when "Thin Provisioning" is enabled. Note that a capacity that is smaller than the current capacity cannot be selected.	ETERNUS DX60 S5: 64 TB (Default) 128 TB 2 PB ETERNUS DX100 S5: 128 TB (Default) 256 TB 4 PB ETERNUS DX200 S5: 256 TB (Default) 384 TB

4. Thin Provisioning
Settings (Thin Provisioning)

Item	Description	Setting values															
	<p>Caution</p> <ul style="list-style-type: none"> The actual available capacity is limited if the maximum physical capacity of the drives that can be installed is smaller than the maximum pool capacity. For example, when using an ETERNUS DX8900 S4 that is configured only with 900 GB drives, the actual capacity that can be used is approximately 3.6 PB even if the maximum pool capacity is "8.00 PB". If the chunk size is changed due to the expansion of the maximum pool capacity and the maximum pool capacity has already been used up before the expansion, new pools cannot be created. For example, if the current maximum pool capacity in the ETERNUS DX8900 S4 is "8 PB" or "128 PB", the capacity that can be used to create new pools is calculated with the following formula. <table border="1"> <thead> <tr> <th>Current maximum pool capacity (Chunk size a (*1)) [A]</th> <th>Used pool capacity (Chunk size b (*2)) [B]</th> <th>Capacity that can be used to create new pools [C]</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td rowspan="2">8 PB (21 MB)</td> <td>1 PB (21 MB)</td> <td>7 PB</td> <td rowspan="4">The capacity that can be used to create new pools [C] is calculated with the following formula. $[C] = [A] - [B] \times (\text{Chunk size a} / \text{Chunk size b})$</td> </tr> <tr> <td>8 PB (21 MB)</td> <td>0 PB ↑ New pools cannot be created</td> </tr> <tr> <td rowspan="2">128 PB (336 MB)</td> <td>1 PB (21 MB)</td> <td>112 PB</td> </tr> <tr> <td>8 PB (21 MB)</td> <td>0 PB ↑ New pools cannot be created</td> </tr> </tbody> </table> <p>*1 : This indicates the chunk size that is determined according to the "Maximum Pool Capacity" that is to be set with this function. Refer to ""The Maximum Number of Pools, Maximum Pool Capacity, and Determined Chunk Size for Each Model" (page 349)" for details.</p> <p>*2 : This indicates the chunk size that is determined by the "Maximum Pool Capacity" that had been specified in the storage system when TPPs were created. The chunk size can be checked on the [Thin Provisioning Pool] screen. Refer to the [Thin Provisioning Pool (Basic Information)] function for details.</p> <p>Note</p> <ul style="list-style-type: none"> To reduce the maximum pool capacity, disable "Thin Provisioning". After performing this action, restart this function to enable "Thin Provisioning", and then set a new "Maximum Pool Capacity". 	Current maximum pool capacity (Chunk size a (*1)) [A]	Used pool capacity (Chunk size b (*2)) [B]	Capacity that can be used to create new pools [C]	Description	8 PB (21 MB)	1 PB (21 MB)	7 PB	The capacity that can be used to create new pools [C] is calculated with the following formula. $[C] = [A] - [B] \times (\text{Chunk size a} / \text{Chunk size b})$	8 PB (21 MB)	0 PB ↑ New pools cannot be created	128 PB (336 MB)	1 PB (21 MB)	112 PB	8 PB (21 MB)	0 PB ↑ New pools cannot be created	<p>6 PB</p> <p>ETERNUS DX500 S5: 384 TB (Default) 512 TB 1 PB 16 PB</p> <p>ETERNUS DX600 S5: 512 TB (Default) 1 PB 1.5 PB 24 PB</p> <p>ETERNUS DX900 S5 or ETERNUS DX8900 S4: 512 TB (Default) 1 PB 2 PB 4 PB 8 PB 128 PB</p> <p>ETERNUS AF150 S3: 128 TB (Default) 256 TB 4 PB</p> <p>ETERNUS AF250 S3: 256 TB (Default) 384 TB 6 PB</p> <p>ETERNUS AF650 S3: 512 TB (Default) 1 PB 1.5 PB 24 PB</p>
Current maximum pool capacity (Chunk size a (*1)) [A]	Used pool capacity (Chunk size b (*2)) [B]	Capacity that can be used to create new pools [C]	Description														
8 PB (21 MB)	1 PB (21 MB)	7 PB	The capacity that can be used to create new pools [C] is calculated with the following formula. $[C] = [A] - [B] \times (\text{Chunk size a} / \text{Chunk size b})$														
	8 PB (21 MB)	0 PB ↑ New pools cannot be created															
128 PB (336 MB)	1 PB (21 MB)	112 PB															
	8 PB (21 MB)	0 PB ↑ New pools cannot be created															

■ Operating Procedures

Procedure ▶▶▶

- 1 Click [Set Thin Provisioning] in [Action].

4. Thin Provisioning Settings (Thin Provisioning)

- 2 Select whether to enable or disable the Thin Provisioning function, specify the maximum pool capacity, and then click the [Set] button.
→ A confirmation screen appears.

Caution

- If the Virtual Volume function is being used and the chunk size is changed as a result of a maximum pool capacity expansion, a warning message related to the Virtual Volume function appears.

- 3 Click the [OK] button.
→ The Thin Provisioning setting starts.
- 4 Click the [Done] button to return to the [Settings] screen.



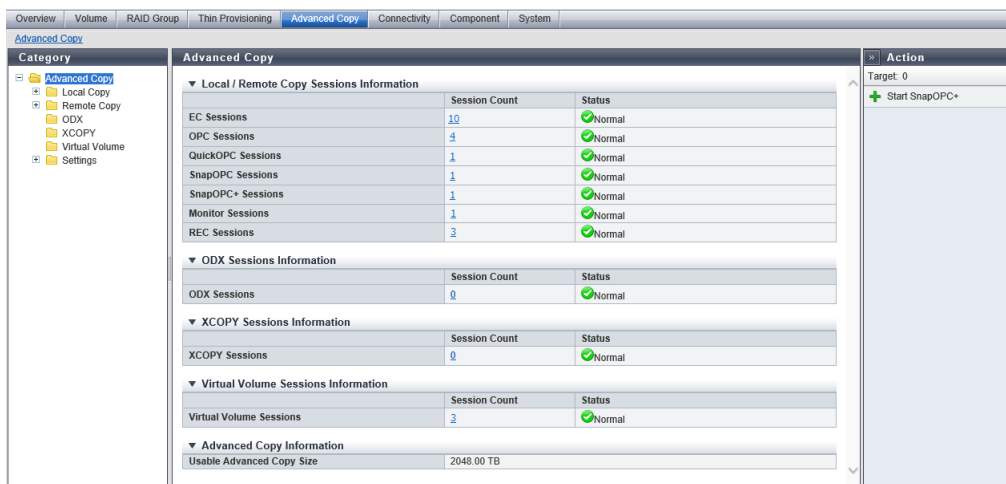
5. Advanced Copy

- ["■ Overview" \(page 435\)](#)
- ["■ Display Function List" \(page 435\)](#)
- ["■ Action List" \(page 436\)](#)

■ Overview

Advanced Copy is a function to create copies at a fast rate using only the storage system instead of the CPU of the server.

■ Display Function List



Category	Function	Description
Advanced Copy	"Advanced Copy" (page 437)	The number of Advanced Copy sessions and available copy capacity are displayed.
Local Copy	"Advanced Copy (All Sessions)" (page 444)	The copy session information, which manages the Advanced Copy operation status, is displayed.
EC		
OPC		
QuickOPC		
SnapOPC		
SnapOPC+		
Monitor		
Remote Copy		
REC		
ODX		
XCOPY		
Settings	"Settings (Advanced Copy)" (page 464)	The operation environment of each Advanced Copy function is displayed.

5. Advanced Copy

Category	Function	Description
Snap Data Pool	" Snap Data Pool " (page 491)	The usage status of the Snap Data Pool (SDP) is displayed.
Copy Path	" Copy Path " (page 496)	The copy path status, which is used to perform REC, is displayed.
REC Buffer	" REC Buffer " (page 549)	The REC Buffer status, which is used to perform REC Consistency, is displayed.
REC Disk Buffer	" REC Disk Buffer " (page 564)	The REC Disk Buffer status, which is used to perform REC Consistency, is displayed.

■ Action List

Action	Function	Description
Advanced Copy		
Start SnapOPC+	" Start SnapOPC+ " (page 440)	Execute SnapOPC+.
Local Copy		
Stop Session	" Stop Copy Session " (page 463)	Stop the selected copy session in progress.
Settings		
Register License	" Register Advanced Copy License " (page 466)	Register an Advanced Copy license.
Delete License	" Delete Advanced Copy License " (page 468)	Delete an Advanced Copy license.
Register Veeam License	" Register Veeam Storage Integration License " (page 470)	Register the Veeam Storage Integration License.
Delete Veeam License	" Delete Veeam Storage Integration License " (page 471)	Delete the Veeam Storage Integration License.
Modify EC/OPC Priority	" Modify EC/OPC Priority " (page 473)	Change the EC/OPC priority.
Modify Copy Table Size	" Modify Copy Table Size " (page 475)	Change the management table size which is required for the Advanced Copy operation.
Enable ODX	" Enable ODX " (page 482)	Enable the ODX (*1) function. *1 : Offloaded Data Transfer
Disable ODX	" Disable ODX " (page 484)	Disable the ODX function.
Create ODX Buffer Volume	" Create ODX Buffer Volume " (page 484)	Create a dedicated volume for the ODX function.
Snap Data Pool		
Modify Copy Parameters	" Modify Copy Parameters " (page 493)	Change the Snap Data Pool management threshold.
Copy Path		

5. Advanced Copy

Advanced Copy

Action	Function	Description
Set Copy Path	"Set Copy Path" (page 501)	Configure the REC path.
Delete All Copy Path	"Delete All Copy Path" (page 535)	Delete all the REC paths that are configured in the storage system.
Export All Copy Path	"Export All Copy Path" (page 537)	Export all the REC path information that are configured in the storage system.
Export Storage Information	"Export Storage Information" (page 538)	Export the REC device information in the storage system.
Get Round Trip Time	"Measure Round Trip Time" (page 539)	Measure the round trip time of the copy path.
Modify REC Multiplicity	"Modify REC Multiplicity" (page 541)	Change the REC Multiplicity setting of each copy path.
Set REC Bandwidth Limit	"Set REC Bandwidth Limit" (page 544)	Set the REC Bandwidth Limit for the Remote Copy path.
Set REC Line Speed	"Set REC Line Speed" (page 547)	Set the line speed when the local and remote storage systems are connected with a remote connection.
REC Buffer		
Modify REC Buffer	"Modify REC Buffer" (page 552)	Specify the detailed information of the selected REC Buffer.
Assign REC Disk Buffer	"Assign REC Disk Buffer" (page 558)	Assign an REC Disk Buffer to an REC Buffer.
REC Disk Buffer		
Create REC Disk Buffer	"Create REC Disk Buffer" (page 569)	Create a new REC Disk Buffer.
Delete REC Disk Buffer	"Delete REC Disk Buffer" (page 575)	Delete an REC Disk Buffer.
Format REC Disk Buffer	"Format REC Disk Buffer" (page 576)	Format an REC Disk Buffer.

Advanced Copy

- ["■ Overview" \(page 437\)](#)
- ["■ User Privileges" \(page 438\)](#)
- ["■ Display Contents" \(page 438\)](#)

■ Overview

This function displays the number of Advanced Copy [sessions](#) and available copy capacity.

Note

- To display the Local / Remote Copy Sessions Information and Advanced Copy Information, register the Advanced Copy license. Note that the Remote Copy Sessions Information and Remote Copy related categories (copy path, REC Buffer, and REC Disk Buffer) are displayed only when using a model that supports REC.
- In the Unified Storage environment, the following items are displayed even if the Advanced Copy function license is not registered.
 - Local Copy Sessions Information (SnapOPC+ Session)
 - Advanced Copy Information (Usable Advanced Copy Size for SnapOPC+)
- Registering an Advanced Copy license is not required to display the [ODX](#) session information, the [XCOPY](#) session information, or the Virtual Volume session information.

■ User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	✓
Admin	✓
StorageAdmin	✓
AccountAdmin	
SecurityAdmin	✓
Maintainer	✓

Refer to "A. User Roles and Policies" (page 1580) for details on the policies and roles.

■ Display Contents

The number of sessions for each copy type, their status, and the available Advanced Copy capacity are displayed.

The screenshot shows the 'Advanced Copy' section of a web GUI. On the left is a navigation tree with categories like Local Copy, Remote Copy, ODX, XCOPY, Virtual Volume, and Settings. The main area displays session information for different copy types, organized into expandable sections:

- Local / Remote Copy Sessions Information:** A table with columns for Session Count and Status.

Session Type	Session Count	Status
EC Sessions	10	Normal
OPC Sessions	4	Normal
QuickOPC Sessions	1	Normal
SnapOPC Sessions	1	Normal
SnapOPC+ Sessions	1	Normal
Monitor Sessions	1	Normal
REC Sessions	2	Normal
- ODX Sessions Information:**

Session Type	Session Count	Status
ODX Sessions	0	Normal
- XCOPY Sessions Information:**

Session Type	Session Count	Status
XCOPY Sessions	0	Normal
- Virtual Volume Sessions Information:**

Session Type	Session Count	Status
Virtual Volume Sessions	2	Normal
- Advanced Copy Information:**

Usable Advanced Copy Size	2048.00 TB
---------------------------	------------

On the right side, there is an 'Action' panel with a 'Target: 0' and a '+ Start SnapOPC+' button.

Local / Remote Copy Sessions Information

Item	Description
Session Count	<p>The number of Advanced Copy sessions that are currently running is displayed for each type (EC, OPC, QuickOPC, SnapOPC, SnapOPC+, Monitor, and REC).</p> <p>The "Session Count" is a total of copy sessions in all the statuses including "🟢Reserved".</p> <p>Click the [Session Count] link to display the list of sessions for each type.</p> <p>Total number of all sessions</p> <p>ETERNUS DX60 S5: 0 - 1024</p> <p>ETERNUS DX100 S5: 0 - 2048</p> <p>ETERNUS DX200 S5: 0 - 4096</p> <p>ETERNUS DX500 S5/DX600 S5: 0 - 8192</p> <p>ETERNUS DX900 S5: 0 - 32768</p> <p>ETERNUS DX8100 S4: 0 - 4096</p> <p>ETERNUS DX8900 S4: 0 - 32768</p> <p>ETERNUS AF150 S3: 0 - 2048</p> <p>ETERNUS AF250 S3: 0 - 4096</p> <p>ETERNUS AF650 S3: 0 - 8192</p>
Status	<p>The status for each Advanced Copy session is displayed.</p> <ul style="list-style-type: none"> • 🟢Normal All sessions are in the normal state. • 🚫Error At least one session is not in the normal state.

ODX Sessions Information



Item	Description
Session Count	<p>The number of ODX sessions that are currently running is displayed.</p> <p>The "Session Count" is a total of copy sessions in all the statuses including "🟢Reserved".</p> <p>Click the [Session Count] link to display the list of sessions.</p> <p>Total number of all sessions</p> <p>0 - 4096</p>
Status	<p>The ODX session status is displayed.</p> <ul style="list-style-type: none"> • 🟢Normal All sessions are in the normal state. • 🚫Error At least one session is not in the normal state.

XCOPY Sessions Information

Item	Description
Session Count	<p>The number of XCOPY sessions that are currently running is displayed.</p> <p>The "Session Count" is a total of copy sessions in all the statuses including "🟢Reserved".</p> <p>Click the [Session Count] link to display the list of sessions.</p> <p>Total number of all sessions</p> <p>0 - 4096</p>

5. Advanced Copy




Advanced Copy

Item	Description
Status	<p>The XCOPY session status is displayed.</p> <ul style="list-style-type: none">•  Normal All sessions are in the normal state.•  Error At least one session is not in the normal state.

Virtual Volume Sessions Information

Caution

- For the ETERNUS DX60 S5 and the ETERNUS DX8100 S4, this session information is not displayed.

Item	Description
Session Count	<p>The number of Virtual Volume sessions that are currently running is displayed.</p> <p>The "Session Count" is a total of copy sessions in all the statuses including  "Reserved".</p> <p>Click the [Session Count] link to display the list of sessions.</p> <p>Total number of all sessions</p> <p>ETERNUS DX100 S5: 0 - 4096</p> <p>ETERNUS DX200 S5: 0 - 8192</p> <p>ETERNUS DX500 S5/DX600 S5: 0 - 16384</p> <p>ETERNUS DX900 S5: 0 - 65535</p> <p>ETERNUS DX8900 S4: 0 - 65535</p> <p>ETERNUS AF150 S3/AF250 S3: 0 - 1536</p> <p>ETERNUS AF650 S3: 0 - 16384</p>
Status	<p>The Virtual Volume session status is displayed.</p> <ul style="list-style-type: none">•  Normal All sessions are in the normal state.•  Error At least one session is not in the normal state.

Advanced Copy Information

Item	Description
Usable Advanced Copy Size	<p>The Advanced Copy capacity that can be added is displayed.</p> <p>The smallest capacity among the usable Advanced Copy sizes calculated from the unused copy table size and copy ratio for each type is displayed.</p>

Start SnapOPC+

- ["■ Overview" \(page 441\)](#)
- ["■ User Privileges" \(page 442\)](#)
- ["■ Settings" \(page 442\)](#)
- ["■ Operating Procedures" \(page 443\)](#)

■ Overview

This function is used to select the copy source volume and copy destination volume, and start a new [SnapOPC+](#) copy session.

The Maximum Number of Sessions and the Maximum Number of Generations for Each Model

Model	The maximum number of sessions (per storage system)	The maximum number of generations (*1)
ETERNUS DX60 S5	1024	512
ETERNUS DX100 S5	2048	
ETERNUS DX200 S5	4096	
ETERNUS DX500 S5	8192	
ETERNUS DX600 S5		
ETERNUS DX900 S5	32768	
ETERNUS DX8100 S4	4096	
ETERNUS DX8900 S4	32768	
ETERNUS AF150 S3	2048	
ETERNUS AF250 S3	4096	
ETERNUS AF650 S3	8192	

*1: The maximum number of generations for a SnapOPC+ from a single copy source volume.

Preparing Copy Destination Volumes

To use SnapOPC+, the same number of volumes as there are generations is required for the copy destination. Create any of the following volumes types in advance.

- [SDV](#) ([SDPVs](#) must be created as expansion areas)
- [TPV](#)
- [FTV](#)

If the volume type of the copy destination is SDV, SDVs must be used for all generations. If the volume type of the copy destination is TPV or FTV, a mixture of TPVs and FTVs is available. Use TPV or FTV for each generation.

To create SDVs, SDPVs, or TPVs, use the [Create Volume] function. To create FTVs, use ETERNUS SF Storage Cruiser.

Caution

- Registering the license for the Advanced Copy function is required to start a SnapOPC+ session.
- Only SnapOPC+ [copy sessions](#) that are performed in units of volumes can be created using Web GUI. To create [EC](#), [OPC](#), [QuickOPC](#), [SnapOPC](#), SnapOPC+ sessions using range selection, and [REC](#) sessions, use copy management software.
- ODX Buffer volumes and [Data Container Volumes](#) cannot be specified as the copy source.
- [External Volumes](#) (or volumes whose "Usage" is "Migration") cannot be specified as the copy source or copy destination.

■ User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	✓
StorageAdmin	✓
AccountAdmin	
SecurityAdmin	
Maintainer	✓

Refer to "[A. User Roles and Policies](#)" (page 1580) for details on the policies and roles.

■ Settings

New Copy Session

Item	Description	Setting values
Type	Select the new copy session type.	SOPC+ (Default)

SnapOPC+ Session Setting

Item	Description	Setting values
Source Volume	Click the [Browse...] button to display the [Select Source Volume] screen. Select the copy source volume in the [Select Volume] screen.	Copy source volume name
Destination Volume	Click the [Browse...] button to display the [Select Source Volume] screen. Select the copy destination volume in the [Select Volume] screen.	Copy destination volume name

[Select Source Volume] Screen / [Select Destination Volume] Screen

In the [Select Source Volume] screen, a list of volumes of "Standard", "WSV", "TPV", and "FTV" types is displayed.

In the [Select Destination Volume] screen, a list of volumes of "SDV", "TPV", and "FTV" types is displayed. The radio buttons are displayed for the volumes that can be used for the copy source or destination.

Item	Description
Radio buttons to select a volume	Select (turn on) the radio button for the volume to be used for the copy source or destination.
No.	The volume number is displayed.
Name	The volume name is displayed.
Status	The volume status is displayed. During initialization of the copy destination SDV, "✓ Available (Initializing)" is displayed. Refer to " Volume Status " (page 1604) for details.

5. Advanced Copy

Advanced Copy

Item	Description
Type	<p>The volume type is displayed.</p> <p>Copy source:</p> <ul style="list-style-type: none"> Standard WSV TPV FTV <p>Copy destination:</p> <ul style="list-style-type: none"> SDV TPV FTV
Usage	<p>The usage of the volume is displayed in the copy source volume list.</p> <ul style="list-style-type: none"> • Block The volumes that are used for the SAN. • Block/Dedupe&Comp The volumes that have both the Deduplication and Compression functions enabled. • Block/Dedupe The volumes that have the Deduplication function enabled. • Block/Comp The volumes that have the Compression function enabled. • File The volumes that are used for the NAS. This function only displays NAS backup volumes. <div style="background-color: #f0f0f0; padding: 10px; margin-top: 10px;"> <p>Note</p> <ul style="list-style-type: none"> • Volumes whose usage is "System", "Migration", or "Veeam" are not displayed in the copy source volume list. • Volumes whose usage is "Migration" or "Veeam" are not displayed in the copy destination volume list. </div>
Capacity	The volume capacity is displayed.

Function Button

Button	Description
[Browse...]	Displays the [Select Source Volume] or [Select Destination Volume] to select copy source volume or copy destination volume.

■ Operating Procedures

Procedure ▶▶▶

- 1 Click [Start SnapOPC+] in [Action].
- 2 Click the [Browse...] button for the copy source volume.
- 3 Select the copy source volume to be used, and click the [OK] button.
→ The display returns to the initial screen.

Note

- In a Unified Storage environment, volumes that are used for the SAN and backup volumes that are used for the NAS are displayed in the copy source volume list.

- 4 Click the [Browse...] button for the copy destination volume.
- 5 Select the copy destination volume to be used, and click the [OK] button.
→ The display returns to the initial screen.
- 6 Check the displayed contents, and click the [Start] button.
→ A confirmation screen appears.
- 7 Click the [OK] button.
→ The SnapOPC+ session starts.

Caution

- An error screen appears in the following conditions:
 - The SnapOPC+ started in the copy source volume exceeds the maximum number of generations per volume
 - The SnapOPC+ started in the copy source volume exceeds the maximum number of copy sessions for the entire storage system

- 8 Click the [Done] button to return to the [Advanced Copy] screen.



Advanced Copy (All Sessions)

- ["■ Overview" \(page 444\)](#)
- ["■ User Privileges" \(page 445\)](#)
- Display Contents
 - Local Copy ([Session List](#), [Filter Setting](#))
 - Remote Copy ([Session List](#), [Filter Setting](#))
 - ODX ([Session List](#), [Filter Setting](#))
 - XCOPY ([Session List](#), [Filter Setting](#))
 - Virtual Volume ([Session List](#), [Filter Setting](#))
 - Session Property ([Local Copy](#), [Remote Copy](#), [ODX](#), [XCOPY](#), [VVOL](#))
 - ["Error Code" \(page 462\)](#)

■ Overview

The copy session status is displayed.

The following session types are available: [EC](#), [OPC](#), [QuickOPC](#), [SnapOPC](#), [SnapOPC+](#), [Monitor](#), [REC](#), [ODX](#), [XCOPY](#), and Virtual Volume.

Note

- Local / Remote Copy Sessions Information is displayed only when the Advanced Copy function license has been registered. Remote copy session information is displayed only for models that support REC.
- When a storage system is used in a Unified Storage environment, the SnapOPC+ session list and SnapOPC+ session details are displayed even if the Advanced Copy function license has not been registered.

5. Advanced Copy
Advanced Copy (All Sessions)

■ User Privileges

Availability of Executions in the Default Role

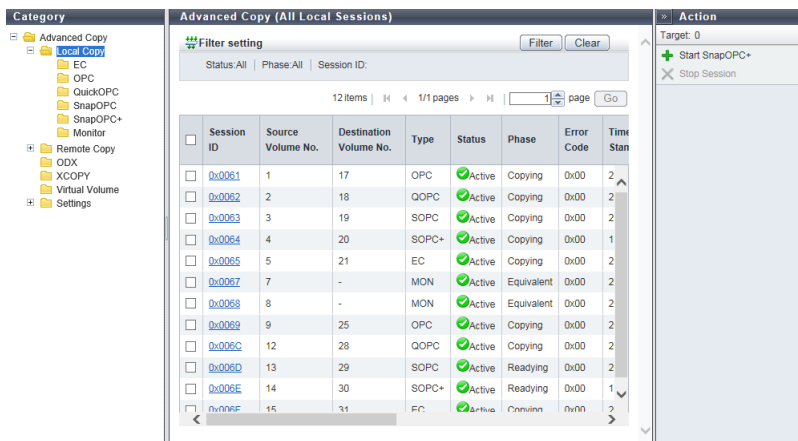
Default role	Availability of executions
Monitor	✓
Admin	✓
StorageAdmin	✓
AccountAdmin	
SecurityAdmin	✓
Maintainer	✓

Refer to "[A. User Roles and Policies](#)" (page 1580) for details on the policies and roles.

■ Display Contents

The copy session status is displayed.

Displayed content varies depending on the selected copy session type. Refer to the description of "[Local Copy](#)" (page 445), "[Remote Copy](#)" (page 449), "[ODX](#)" (page 452), "[XCOPY](#)" (page 454), or "[Virtual Volume](#)" (page 455).











Local Copy

The local copy (EC, OPC, QuickOPC, SnapOPC, SnapOPC+, Monitor) session status is displayed.

Item	Description
Session ID	The session ID (hexadecimal) is displayed. Click this item to display the " [Session Property] (Local Copy) Screen " (page 457).
Source Volume No.	The copy source volume number is displayed. When the copy status is "✓Reserved", a "-" (hyphen) is displayed.
Destination Volume No.	The copy destination volume number is displayed. When the copy status is "✓Reserved" or when the copy session type is "MON", a "-" (hyphen) is displayed.

5. Advanced Copy

Advanced Copy (All Sessions)

Item	Description
Type	<p>The copy session type is displayed using an abbreviation.</p> <p>This item is displayed when [Local Copy] is clicked in the Category.</p> <ul style="list-style-type: none"> • For Equivalent Copy sessions, EC is displayed • For One Point Copy sessions, OPC is displayed • For QuickOPC sessions, QOPC is displayed • For SnapOPC sessions, SOPC is displayed • For SnapOPC+ sessions, SOPC+ is displayed • For Monitor sessions, MON is displayed
Generation	<p>The generation and total number of generations (up to 512 generations) of the copy session are displayed.</p> <p>This item is displayed when [SnapOPC+] is clicked in the Category.</p>
Status	<p>The copy session status is displayed.</p> <ul style="list-style-type: none"> •  Active Operating normally •  Reserved Session ID reserved •  Suspend Suspended by an instruction from the host The copy session type is "EC" •  Error Suspend Copy canceled due to an error •  Unknown A status other than the ones listed above
Merging	<p>When the data merge process for a snapshot is being performed, "Yes" is displayed. If not, "No" is displayed.</p> <p>The "merge process" targets deleted data of a specific generation (except the oldest generation) and copies the difference in data to the previous generation.</p> <p>When the copy status is  Reserved", a "-" (hyphen) is displayed.</p> <p>This item is displayed only when the copy session type is "SOPC+".</p>
Phase	<p>The copy session phase is displayed.</p> <p>When the copy status is  Reserved", a "-" (hyphen) is displayed.</p> <ul style="list-style-type: none"> • Copying For OPC, EC, SnapOPC, and SnapOPC+: Copying For QuickOPC: Copying the updated areas after recording of updated areas is stopped For Monitor: Recording the updated areas • Equivalent Maintaining of the equivalent status of the copy source and copy destination, that are duplicated after the copy, has been completed • Tracking Recording only the updated area after copy is complete • Tracking & Copying Recording the area updated during copy processing and after copy starts • Readyng Preparing to start multiple copies by Concurrent OPC
Error Code	<p>The error code is displayed when an error occurs.</p> <p>When the copy status is  Reserved", a "-" (hyphen) is displayed.</p> <p>Refer to ""Error Code" (page 462)" for details.</p>

5. Advanced Copy
Advanced Copy (All Sessions)

Item	Description																								
Time Stamp	<p>The time when backup is complete and the time when an error occurred (YYYY-MM-DD hh:mm:ss) are displayed. The time stamp is updated in the following conditions:</p> <ul style="list-style-type: none"> For OPC, SnapOPC, and SnapOPC+ The time stamp is updated when a copy starts and when an error occurs. For QuickOPC The time stamp is updated when a copy starts, when a copy restarts, and when an error occurs. For EC The time stamp is updated when suspend is performed and when an error occurs. <p>The following information is displayed for "Time Stamp".</p> <table border="1"> <thead> <tr> <th>Type</th> <th>Status</th> <th>Time Stamp</th> </tr> </thead> <tbody> <tr> <td>Any copy type</td> <td>✔Reserved</td> <td>A "-" (hyphen) is displayed.</td> </tr> <tr> <td>OPC</td> <td>✔Active</td> <td>The backup time when the copy started is displayed.</td> </tr> <tr> <td>QuickOPC</td> <td rowspan="3">✘Error Suspend</td> <td rowspan="3">The time when an error occurred is displayed.</td> </tr> <tr> <td>SnapOPC</td> </tr> <tr> <td>SnapOPC+</td> </tr> <tr> <td rowspan="3">EC</td> <td>✔Active</td> <td>If the copy session is not suspended yet, "0" is displayed for all of the display items. When suspend is requested and "Status" is "✔Active", the backup time of the previous suspend that was requested is displayed.</td> </tr> <tr> <td>✔Suspend</td> <td>The backup time when the copy was suspended is displayed.</td> </tr> <tr> <td>✘Error Suspend</td> <td>The time when an error occurred is displayed.</td> </tr> <tr> <td>Monitor</td> <td>✔Active</td> <td>"0" is displayed for all of the display items.</td> </tr> </tbody> </table>	Type	Status	Time Stamp	Any copy type	✔Reserved	A "-" (hyphen) is displayed.	OPC	✔Active	The backup time when the copy started is displayed.	QuickOPC	✘Error Suspend	The time when an error occurred is displayed.	SnapOPC	SnapOPC+	EC	✔Active	If the copy session is not suspended yet, "0" is displayed for all of the display items. When suspend is requested and "Status" is "✔Active", the backup time of the previous suspend that was requested is displayed.	✔Suspend	The backup time when the copy was suspended is displayed.	✘Error Suspend	The time when an error occurred is displayed.	Monitor	✔Active	"0" is displayed for all of the display items.
Type	Status	Time Stamp																							
Any copy type	✔Reserved	A "-" (hyphen) is displayed.																							
OPC	✔Active	The backup time when the copy started is displayed.																							
QuickOPC	✘Error Suspend	The time when an error occurred is displayed.																							
SnapOPC																									
SnapOPC+																									
EC	✔Active	If the copy session is not suspended yet, "0" is displayed for all of the display items. When suspend is requested and "Status" is "✔Active", the backup time of the previous suspend that was requested is displayed.																							
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	✘Error Suspend	The time when an error occurred is displayed.																							
Monitor	✔Active	"0" is displayed for all of the display items.																							
Elapsed Time	<p>The elapsed time after a session has started is displayed.</p> <p>When the copy status is "✔Reserved", a "-" (hyphen) is displayed.</p> <p>Refer to "Display example of "Elapsed Time" (page 448)" for details.</p>																								
Copied Data Size	<p>The data size of copy that has been completed is displayed.</p> <p>When the copy status is "✔Reserved", a "-" (hyphen) is displayed.</p> <p>When the copy type is "SOPC" or "SOPC+", only the original data (or previous data) before update in the copy target area is copied.</p> <p>When the copy type is "MON", the updated data in the area for monitoring updates is copied. This copy type performs a pseudo copy to measure the updated amount of data.</p>																								
Total Data Size	<p>The data size of the copy target area is displayed.</p> <p>When the copy status is "✔Reserved", a "-" (hyphen) is displayed.</p> <p>When the copy type is "MON", the data size of the area for monitoring updates is displayed.</p>																								
Modified Data Size	<p>The differential data size when QuickOPC is executed is displayed.</p> <p>This item is displayed when [QuickOPC] is clicked in the Category.</p> <p>The modified data size is updated in the "Tracking & Copying" and "Tracking" phases.</p> <p>When recopy starts, the modified data size is once changed to "0" and then the differential data size from the time when recopy started is displayed. When tracking stops, the modified data size is changed to "0".</p> <p>When the copy status is "✔Reserved", a "-" (hyphen) is displayed.</p>																								
SDP No.	<p>The SDP number, which is used when the copy destination SDV capacity is insufficient, is displayed.</p> <p>This item is displayed when [SnapOPC] or [SnapOPC+] is clicked in the Category.</p> <p>When the copy status is "✔Reserved" or when the copy destination is not an SDP, a "-" (hyphen) is displayed.</p>																								

5. Advanced Copy

Advanced Copy (All Sessions)

Item	Description
SDP Used Capacity	<p>The used capacity of SDP area is displayed.</p> <p>This item is displayed when [SnapOPC] or [SnapOPC+] is clicked in the Category.</p> <p>When the copy status is "✔Reserved" or when the copy destination is not an SDP, a "-" (hyphen) is displayed.</p>
Resolution	<p>The copy session resolution is displayed.</p> <p>When the copy status is "✔Reserved", a "-" (hyphen) is displayed.</p> <p>×1 ×2 ×4 ×8 ×16 ×32 ×64</p>
Requestor	<p>The information of the client that started the copy session is displayed.</p> <p>When the copy status is "✔Reserved", a "-" (hyphen) is displayed.</p> <ul style="list-style-type: none"> • SCSI Copy session requested by the copy management software (via SCSI). • LAN Copy session requested by the copy management software (via LAN). • GUI Copy session requested by Web GUI. • CLI Copy session requested by the CLI command. • SMI-S Copy session requested by SMI-S. • LAN (Veeam) Copy session requested by the server that has the Veeam Storage Integration plug-in. • REST Copy session requested by RESTful API. • Unknown Other than the above clients.
License	<p>The registration status of the Advanced Copy license, when the copy session has been started, is displayed.</p> <ul style="list-style-type: none"> • Regular The copy session is started with a full license or a free license (for the ETERNUS DX60 S5/DX100 S5/DX200 S5 and the ETERNUS AF150 S3/AF250 S3). • Trial License The copy session is started with a trial license. Copy sessions that use a trial license are deleted automatically after the expiration of the trial license.

Display example of "Elapsed Time"

One day or longer: 1 day 1 hour 32 min 35 sec

Less than a day: 1 hour 32 min 35 sec

Less than an hour: 32 min 35 sec

Less than a minute: 35 sec

■ Filter Setting

Function Description

Filter setting is a function used to display a list of only the copy sessions meeting all the specified conditions.

No filtering is set by default. The following table shows conditions that can be specified. Displayed content varies depending on the selected copy session type.










Item	Description	Setting values
Status	Select the copy session status that is to be displayed. When not using the status for filtering, select "All" (all copy sessions of the selected type).	All Active Suspend Halt Error Suspend Reserved Unknown
Phase	Select the copy session phase to be displayed. When not using the phase for filtering, select "All" (all copy sessions of the selected type).	All Copying Equivalent Tracking Tracking & Copying Readying "- " (hyphen)
Session ID	Input the session ID of the copy session that is to be displayed. When not using the session ID for filtering, leave this item blank.	4-digit hexadecimal Blank

Remote Copy

The details of the Remote Copy (REC) session are displayed.

Item	Description
Session ID	The session ID (hexadecimal) is displayed. Click this item to display the " [Session Property] (Remote Copy) Screen " (page 458).
Source Volume No.	The copy source volume number is displayed. When the copy status is "✔Reserved", a "- " (hyphen) is displayed.
Destination Volume No.	The copy destination volume number is displayed. When the copy status is "✔Reserved", a "- " (hyphen) is displayed.
Remote Session ID	The session ID (hexadecimal) for the remote storage system is displayed.
Type	The copy session type is displayed using an abbreviation. REC

5. Advanced Copy
Advanced Copy (All Sessions)

Item	Description
Status	<p>The copy session status is displayed.</p> <ul style="list-style-type: none"> •  Active Operating normally •  Reserved Session ID reserved •  Suspend Suspended by an instruction from the host •  Halt Remote copy disabled due to an error •  Error Suspend Copy canceled due to an error •  Unknown A status other than the ones listed above
Phase	<p>The copy session phase is displayed.</p> <p>When the copy status is "Reserved", a "-" (hyphen) is displayed.</p> <ul style="list-style-type: none"> • Copying Copying • Equivalent Maintaining of the equivalent status of the copy source and copy destination, that are duplicated after the copy, has been completed
Error Code	<p>The error code is displayed when an error occurs.</p> <p>When the copy status is "Reserved", a "-" (hyphen) is displayed.</p> <p>Refer to ""Error Code" (page 462)" for details.</p>
Direction	<p>The copy direction of the applicable session is displayed.</p> <p>When the copy status is "Reserved", a "-" (hyphen) is displayed.</p> <ul style="list-style-type: none"> • From Local/To Remote Session from the local storage system (copy source) to the remote storage system (copy destination) • From Remote/To Local Session from the remote storage system (copy source) to the local storage system (copy destination)

5. Advanced Copy
Advanced Copy (All Sessions)

Item	Description												
Time Stamp	<p>The time when backup is complete and the time when an error occurred (YYYY-MM-DD hh:mm:ss) are displayed.</p> <p>The time stamp is updated for suspend processes, when an error occurs, and when the status is changed.</p> <p>The following information is displayed for "Time Stamp".</p> <table border="1"> <thead> <tr> <th>Status</th> <th>Time Stamp</th> </tr> </thead> <tbody> <tr> <td>✔Reserved</td> <td>A "-" (hyphen) is displayed.</td> </tr> <tr> <td>✔Active</td> <td>If the copy session is not suspended yet, "0" is displayed for all of the display items. When suspend is requested and "Status" is "✔Active", the backup time of the previous suspend that was requested is displayed.</td> </tr> <tr> <td>✔Suspend</td> <td>The backup time when the copy was suspended is displayed.</td> </tr> <tr> <td>✘Error Suspend</td> <td>The time when an error occurred is displayed.</td> </tr> <tr> <td>✘Halt</td> <td>The time when an error occurred is displayed. When the status is changed from "✘Halt" to "✔Active" or when the copy session is forcibly suspended, the time stamp information is cleared and "0" is displayed for all of the display items.</td> </tr> </tbody> </table>	Status	Time Stamp	✔Reserved	A "-" (hyphen) is displayed.	✔Active	If the copy session is not suspended yet, "0" is displayed for all of the display items. When suspend is requested and "Status" is "✔Active", the backup time of the previous suspend that was requested is displayed.	✔Suspend	The backup time when the copy was suspended is displayed.	✘Error Suspend	The time when an error occurred is displayed.	✘Halt	The time when an error occurred is displayed. When the status is changed from "✘Halt" to "✔Active" or when the copy session is forcibly suspended, the time stamp information is cleared and "0" is displayed for all of the display items.
Status	Time Stamp												
✔Reserved	A "-" (hyphen) is displayed.												
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✔Suspend	The backup time when the copy was suspended is displayed.												
✘Error Suspend	The time when an error occurred is displayed.												
✘Halt	The time when an error occurred is displayed. When the status is changed from "✘Halt" to "✔Active" or when the copy session is forcibly suspended, the time stamp information is cleared and "0" is displayed for all of the display items.												
Elapsed Time	<p>The elapsed time after a session has started is displayed.</p> <p>When the copy status is "✔Reserved", a "-" (hyphen) is displayed.</p> <p>Refer to ""Display example of "Elapsed Time""" (page 448)" for details.</p>												
Copied Data Size	<p>The size of a copy that has been completed is displayed.</p> <p>When the copy status is "✔Reserved", a "-" (hyphen) is displayed.</p>												
Total Data Size	<p>The total copy size is displayed.</p> <p>When the copy status is "✔Reserved", a "-" (hyphen) is displayed.</p>												
Resolution	<p>The copy session resolution is displayed.</p> <p>When the copy status is "✔Reserved", a "-" (hyphen) is displayed.</p> <p>×1 ×2 ×4 ×8 ×16 ×32 ×64</p>												
Requestor	<p>The information of the client that started the copy session is displayed.</p> <p>When the copy status is "✔Reserved", a "-" (hyphen) is displayed.</p> <ul style="list-style-type: none"> • SCSI Copy session requested by the copy management software (via SCSI). • LAN Copy session requested by the copy management software (via LAN). • SMI-S Copy session requested by SMI-S. • REST Copy session requested by RESTful API. • Unknown Other than the above clients. 												

5. Advanced Copy

Advanced Copy (All Sessions)

Item	Description
License	<p>The registration status of the Advanced Copy license, when the copy session has been started, is displayed. If the license information for the connection target storage system cannot be obtained due to a copy path error, "Unknown" is displayed.</p> <ul style="list-style-type: none"> • Regular The copy session is started with a full license. • Trial License The copy session is started with a trial license. Copy sessions that use a trial license are deleted automatically after the expiration of the trial license.
Remote Box ID	The remote Box ID is displayed.

■ Filter Setting

Function Description

Filter setting is a function used to display a list of the copy sessions only which satisfy all the specified conditions.

No filtering is set by default. The following table shows conditions that can be specified.

Item	Description	Setting values
Status	Select the copy session status that is to be displayed. When not using the status for filtering, select "All" (all copy sessions of the selected type).	All Active Suspend Halt Error Suspend Reserved Unknown
Phase	Select the copy session phase to be displayed. When not using the phase for filtering, select "All" (all copy sessions of the selected type).	All Copying Equivalent "-" (hyphen)
Session ID	Input the session ID of the copy session that is to be displayed. When not using the session ID for filtering, leave this item blank.	4-digit hexadecimal Blank
Remote Box ID	Input the remote Box ID of the copy session that is to be displayed. Copy sessions matching or partially matching the entered remote Box ID are displayed. When not using the remote BOX ID for filtering, leave this item blank.	Blank Up to 40 alphabetic characters (upper case), numerals, spaces, and "#" (hash key characters)

ODX

The ODX session status is displayed.

ODX sessions are created when the ODX function is used for a server with Windows Server 2012 or later.

Item	Description
Session ID	The session ID (hexadecimal) is displayed. Click this item to display the " [Session Property] (ODX) Screen " (page 461).
Source Volume No.	The copy source volume number is displayed. When the copy status is "🟢Reserved", a "-" (hyphen) is displayed.
Destination Volume No.	The copy destination volume number is displayed. When the copy status is "🟢Reserved", a "-" (hyphen) is displayed.

5. Advanced Copy
Advanced Copy (All Sessions)

Item	Description								
Status	<p>The copy session status is displayed.</p> <ul style="list-style-type: none"> ✔ Active Operating normally ✔ Reserved Session ID reserved ✘ Error Suspend Copy canceled due to an error ❓ Unknown A status other than the ones listed above 								
Error Code	<p>The error code is displayed when an error occurs.</p> <p>When the copy status is "✔ Reserved", a "-" (hyphen) is displayed.</p> <p>Refer to ""Error Code" (page 462)" for details.</p>								
Time Stamp	<p>The time when backup is complete and the time when an error occurred (YYYY-MM-DD hh:mm:ss) are displayed.</p> <p>The time stamp is updated when a copy starts and when an error occurs.</p> <p>The following information is displayed for "Time Stamp".</p> <table border="1"> <thead> <tr> <th>Status</th> <th>Time Stamp</th> </tr> </thead> <tbody> <tr> <td>✔ Reserved</td> <td>A "-" (hyphen) is displayed.</td> </tr> <tr> <td>✔ Active</td> <td>The backup time when the copy started is displayed.</td> </tr> <tr> <td>✘ Error Suspend</td> <td>The time when an error occurred is displayed.</td> </tr> </tbody> </table>	Status	Time Stamp	✔ Reserved	A "-" (hyphen) is displayed.	✔ Active	The backup time when the copy started is displayed.	✘ Error Suspend	The time when an error occurred is displayed.
Status	Time Stamp								
✔ Reserved	A "-" (hyphen) is displayed.								
✔ Active	The backup time when the copy started is displayed.								
✘ Error Suspend	The time when an error occurred is displayed.								
Elapsed Time	<p>The elapsed time after a session has started is displayed.</p> <p>When the copy status is "✔ Reserved", a "-" (hyphen) is displayed.</p> <p>Refer to ""Display example of "Elapsed Time" (page 448)" for details.</p>								
Copied Data Size	<p>The size of a copy that has been completed is displayed.</p> <p>When the copy status is "✔ Reserved", a "-" (hyphen) is displayed.</p>								
Total Data Size	<p>The total copy size is displayed.</p> <p>When the copy status is "✔ Reserved", a "-" (hyphen) is displayed.</p>								

■ Filter Setting

Function Description

Filter setting is a function used to display a list of the copy sessions only which satisfy all the specified conditions.

No filtering is set by default. The following table shows conditions that can be specified.

Item	Description	Setting values
Status	<p>Select the copy session status that is to be displayed.</p> <p>When not using the status for filtering, select "All" (all copy sessions of the selected type).</p>	<p>All</p> <p>Active</p> <p>Suspend</p> <p>Halt</p> <p>Error Suspend</p> <p>Reserved</p> <p>Unknown</p>

5. Advanced Copy
Advanced Copy (All Sessions)

Item	Description	Setting values
Session ID	Input the session ID of the copy session that is to be displayed. When not using the session ID for filtering, leave this item blank.	4-digit hexadecimal Blank

XCOPY

The XCOPY session status is displayed.

An XCOPY (Extended Copy) session is created when the Full Copy function of vStorage APIs for Array Integration (VMware VAAI) is used.

Item	Description								
Session ID	The session ID (hexadecimal) is displayed. Click this item to display the "[Session Property] (XCOPY) Screen" (page 461).								
Source Volume No.	The copy source volume number is displayed. When the copy status is Reserved, a "-" (hyphen) is displayed.								
Destination Volume No.	The copy destination volume number is displayed. When the copy status is Reserved, a "-" (hyphen) is displayed.								
Status	The copy session status is displayed. <ul style="list-style-type: none"> Active Operating normally Reserved Session ID reserved Error Suspend Copy canceled due to an error Unknown A status other than the ones listed above 								
Error Code	The error code is displayed when an error occurs. When the copy status is Reserved, a "-" (hyphen) is displayed. Refer to "'Error Code' (page 462)" for details.								
Time Stamp	The time when backup is complete and the time when an error occurred (YYYY-MM-DD hh:mm:ss) are displayed. The time stamp is updated when a copy starts and when an error occurs. The following information is displayed for "Time Stamp". <table border="1"> <thead> <tr> <th>Status</th> <th>Time Stamp</th> </tr> </thead> <tbody> <tr> <td> Reserved</td> <td>A "-" (hyphen) is displayed.</td> </tr> <tr> <td> Active</td> <td>The backup time when the copy started is displayed.</td> </tr> <tr> <td> Error Suspend</td> <td>The time when an error occurred is displayed.</td> </tr> </tbody> </table>	Status	Time Stamp	Reserved	A "-" (hyphen) is displayed.	Active	The backup time when the copy started is displayed.	Error Suspend	The time when an error occurred is displayed.
Status	Time Stamp								
Reserved	A "-" (hyphen) is displayed.								
Active	The backup time when the copy started is displayed.								
Error Suspend	The time when an error occurred is displayed.								
Elapsed Time	The elapsed time after a session has started is displayed. When the copy status is Reserved, a "-" (hyphen) is displayed. Refer to "'Display example of 'Elapsed Time'' (page 448)" for details.								
Copied Data Size	The size of a copy that has been completed is displayed. When the copy status is Reserved, a "-" (hyphen) is displayed.								

5. Advanced Copy

Advanced Copy (All Sessions)

Item	Description
Total Data Size	The total copy size is displayed. When the copy status is "✔Reserved", a "-" (hyphen) is displayed.

■ Filter Setting

Function Description

Filter setting is a function used to display a list of the copy sessions only which satisfy all the specified conditions.

No filtering is set by default. The following table shows conditions that can be specified.

Item	Description	Setting values
Status	Select the copy session status that is to be displayed. When not using the status for filtering, select "All" (all copy sessions of the selected type).	All Active Suspend Halt Error Suspend Reserved Unknown
Session ID	Input the session ID of the copy session that is to be displayed. When not using the session ID for filtering, leave this item blank.	4-digit hexadecimal Blank

Virtual Volume

The Virtual Volume (hereinafter referred to as "VVOL") session status is displayed. VVOL sessions are created by VMware vSphere 6.

Caution

- The ETERNUS DX60 S5 and the ETERNUS DX8100 S4 do not support the Virtual Volume function.

Item	Description
Session ID	The session ID (hexadecimal) is displayed. Click this item to display the "[Session Property] (VVOL) Screen" (page 462).
Source Volume No.	The copy source volume number is displayed. When the copy status is "✔Reserved", a "-" (hyphen) is displayed.
Destination Volume No.	The copy destination volume number is displayed. When the copy status is "✔Reserved", a "-" (hyphen) is displayed.

5. Advanced Copy
Advanced Copy (All Sessions)

Item	Description								
Type	<p>The session type is displayed.</p> <ul style="list-style-type: none"> • Snapshot VVOLs are being copied with the Copy-on-Write method (equivalent to SnapOPC+). Write I/O for the snapshot destination VVOL is not allowed. • Fastclone VVOLs are being copied with the Copy-on-Write method (equivalent to SnapOPC). Write I/O for the copy destination VVOL is allowed. Restoration is not allowed. • Clone VVOLs are being copied with the Background copy method (equivalent to OPC). • Revert Data is being restored from the snapshot destination VVOL to the snapshot source VVOL. • CopyDiffs Comparison result (the difference of a data) between two VVOLs during a snapshot session is being copied to the third VVOL. 								
Status	<p>The copy session status is displayed.</p> <ul style="list-style-type: none"> • Active Operating normally • Reserved Session ID reserved • Error Suspend Copy canceled due to an error • Unknown A status other than the ones listed above 								
Merging	<p>When the data merge process for a snapshot is being performed, "Yes" is displayed. If not, "No" is displayed. The "merge process" targets deleted data of a specific generation (except the oldest generation) and copies the difference in data to the previous generation.</p> <p>When the session type is not "Snapshot" or when the copy status is " Reserved", a "-" (hyphen) is displayed.</p>								
Generation	<p>The generation and total number of generations of the snapshot session are displayed.</p> <p>When the session type is not "Snapshot" or when the copy status is " Reserved", a "-" (hyphen) is displayed.</p>								
Error Code	<p>The error code is displayed when an error occurs.</p> <p>When the copy status is " Reserved", a "-" (hyphen) is displayed.</p> <p>Refer to "Error Code" (page 462) for details.</p>								
Time Stamp	<p>The time when backup is complete and the time when an error occurred (YYYY-MM-DD hh:mm:ss) are displayed.</p> <p>The time stamp is updated when a copy starts and when an error occurs.</p> <p>The following information is displayed for "Time Stamp".</p> <table border="1"> <thead> <tr> <th>Status</th> <th>Time Stamp</th> </tr> </thead> <tbody> <tr> <td> Reserved</td> <td>A "-" (hyphen) is displayed.</td> </tr> <tr> <td> Active</td> <td>The backup time when the copy started is displayed.</td> </tr> <tr> <td> Error Suspend</td> <td>The time when an error occurred is displayed.</td> </tr> </tbody> </table>	Status	Time Stamp	Reserved	A "-" (hyphen) is displayed.	Active	The backup time when the copy started is displayed.	Error Suspend	The time when an error occurred is displayed.
Status	Time Stamp								
Reserved	A "-" (hyphen) is displayed.								
Active	The backup time when the copy started is displayed.								
Error Suspend	The time when an error occurred is displayed.								
Elapsed Time	<p>The elapsed time after a session has started is displayed.</p> <p>When the copy status is " Reserved", a "-" (hyphen) is displayed.</p> <p>Refer to "Display example of "Elapsed Time" (page 448) for details.</p>								

5. Advanced Copy
Advanced Copy (All Sessions)

Item	Description
Copied Data Size	The size of a copy that has been completed is displayed. When the copy status is "✔Reserved", a "-" (hyphen) is displayed.
Total Data Size	The total copy size is displayed. When the copy status is "✔Reserved", a "-" (hyphen) is displayed.
Destination FTRP No.	The FTRP No. to which the copy destination FTV belongs is displayed. When the session type is not "Snapshot" or "Fastclone", or when the copy status is "✔Reserved", a "-" (hyphen) is displayed.
Used Session Capacity	The used capacity of FTRP area is displayed. When the session type is not "Snapshot" or "Fastclone", or when the copy status is "✔Reserved", a "-" (hyphen) is displayed.

■ Filter Setting

Function Description

Filter setting is a function used to display a list of the copy sessions only which satisfy all the specified conditions.

No filtering is set by default. The following table shows conditions that can be specified.

Item	Description	Setting values
Session ID	Input the session ID of the copy session that is to be displayed. When not using the session ID for filtering, leave this item blank.	4-digit hexadecimal Blank
Type	Select the type of the copy session that is to be displayed. When not using the copy session type for filtering, select "All".	All Snapshot Fastclone Clone Revert CopyDiffs
Status	Select the copy session status that is to be displayed. When not using the copy session status for filtering, select "All".	All Active Suspend Halt Error Suspend Reserved Unknown

[Session Property] (Local Copy) Screen

Displayed content varies depending on the selected copy session type.

[Property] Tab

Refer to the [\[Local Copy\] Screen](#) for the details of items other than the ones described below.

Item	Description
Session ID	The session ID (hexadecimal) selected in the [Local Copy] screen is displayed.
Source Volume Name	The copy source volume name is displayed. When the copy status is "✔Reserved", a "-" (hyphen) is displayed.

5. Advanced Copy

Advanced Copy (All Sessions)

Item	Description
Copy destination volume name	The copy destination volume name is displayed. When the copy status is "✔Reserved" or when the copy session type is "MON", a "-" (hyphen) is displayed.
Copy Range	The copy range of the copy session is displayed. When the copy status is "✔Reserved", a "-" (hyphen) is displayed. <ul style="list-style-type: none"> • Totally Whole volume • Extent Part of a volume
Secondary Access Permission	When the copy session status is "✔Active", accessibility from the host to the copy destination volume is displayed. This item is displayed in EC. When the copy status is "✔Reserved", a "-" (hyphen) is displayed. <ul style="list-style-type: none"> • Read Only at Equivalency When the "Phase" is "Equivalent", read access to the copy destination volume is allowed • No Read/Write No read/write access to the copy destination volume is allowed
Concurrent Suspend Status	When an instruction to collectively and tentatively separate multiple pairs of a copy source volume and a copy destination volume (Concurrent Suspend request) is received in EC session, transition status for "Suspend" is displayed. This item is displayed in EC. When the copy status is "✔Reserved", a "-" (hyphen) is displayed. If the Concurrent Suspend Status cannot be obtained, "Unknown" is displayed. <ul style="list-style-type: none"> • Normal Transition to the "Suspend" state is complete or Concurrent Suspend cannot be performed. • Exec Transition to the "Suspend" state is in progress. • Error Transition to the "Suspend" state failed. • Unknown Other than above status.

[Extent Information] Tab

This item is displayed only when the "Copy Range" is "Extent".

Item	Description
Offset	The array number of extent information is displayed.
Source LBA	The first Logical Block Address (LBA) (16-digit hexadecimal) in the copy source of the copy session within the specified range is displayed.
Destination LBA	The first Logical Block Address (LBA) (16-digit hexadecimal) in the copy destination of the copy session within the specified range is displayed.
Copy Extent Size	The data amount for copy within the specified range is displayed.

[Session Property] (Remote Copy) Screen

[Property] Tab

Refer to the [\[Remote Copy\] Screen](#) for the items other than the ones described below.

5. Advanced Copy

Advanced Copy (All Sessions)

Item	Description
Session ID	The session ID (hexadecimal) selected in the [Remote Copy] screen is displayed.
Source Volume Name	The following information is displayed depending on the Direction. When the copy status is "✔Reserved", a "-" (hyphen) is displayed. <ul style="list-style-type: none"> When the "Direction" is "From Local/To Remote" The copy source volume name is displayed. When the "Direction" is "From Remote/To Local" "Remote Box ID/Copy source volume number" is displayed.
Destination Volume Name	The following information is displayed depending on the Direction. When the copy status is "✔Reserved", a "-" (hyphen) is displayed. <ul style="list-style-type: none"> When the "Direction" is "From Local/To Remote" "Remote Box ID/Copy destination volume number" is displayed. When the "Direction" is "From Remote/To Local" The copy destination volume name is displayed.
Copy Range	The copy range of the copy session is displayed. When the copy status is "✔Reserved", a "-" (hyphen) is displayed. <ul style="list-style-type: none"> Totally Whole volume Extent Part of a volume
Secondary Access Permission	When the copy session status is "✔Active", accessibility from the host to the copy destination volume is displayed. When the copy status is "✔Reserved", a "-" (hyphen) is displayed. <ul style="list-style-type: none"> Read Only at Equivalency When the "Phase" is "Equivalent", read access to the copy destination volume is allowed No Read/Write No read/write access to the copy destination volume is allowed
Sync	The operation mode of the copy session is displayed. When the copy status is "✔Reserved", a "-" (hyphen) is displayed. <ul style="list-style-type: none"> Sync (synchronous) Async (asynchronous)
Transfer Mode	The transfer mode of the copy session is displayed. A "-" (hyphen) is displayed when the copy status is "✔Reserved" or the status of a Sync that is described above is "Sync". <ul style="list-style-type: none"> Stack Mode (Asynchronous Stack mode) Consistency Mode (Asynchronous Consistency mode) Through Mode (Asynchronous Through mode)
Recovery Mode	The recovery mode of the copy session is displayed. When the copy status is "✔Reserved", a "-" (hyphen) is displayed. <ul style="list-style-type: none"> Automatic Recovery In this mode, copy automatically resumes when the copy path is recovered from the error state. Manual Recovery In this mode, copy does not automatically resume when the copy path is recovered from the error state.

5. Advanced Copy
Advanced Copy (All Sessions)

Item	Description
Split Mode	<p>The split mode of the copy session is displayed. This item is available only for sessions in REC synchronous mode.</p> <p>When the copy status is "✔Reserved", a "-" (hyphen) is displayed.</p> <p>When the transfer mode is "Stack Mode" or "Consistency Mode", the field is blank.</p> <ul style="list-style-type: none"> • Automatic In this mode, Write I/O access to the copy source volume is accepted when the copy path is in the error state. • Manual In this mode, Write I/O access to the copy source volume is not accepted when the copy path is in the error state. Specific sense information is sent to the host.
Change Error	<p>The result of changing REC mode ("Transfer Mode", "Recovery Mode", or "Split Mode") and the result of REC reverse operation is displayed.</p> <p>When anything other than "Normal" is displayed, the operation mode may be different between the copy source storage system and the copy destination storage system, or REC reverse operation may disabled due to restriction in other functions.</p> <p>When the copy status is "✔Reserved", a "-" (hyphen) is displayed.</p> <ul style="list-style-type: none"> • Normal REC mode change and REC reverse operation are working normally • Mode Change Error An error was detected while changing the REC mode change • Reverse Error An error was detected while the REC reverse operation was being performed
Concurrent Suspend Status	<p>When an instruction to collectively and tentatively separate multiple pairs of a copy source volume and a copy destination volume (Concurrent Suspend request) is received in REC session, transition status for "Suspend" is displayed.</p> <p>When the copy status is "✔Reserved", a "-" (hyphen) is displayed. If the Concurrent Suspend Status cannot be obtained, "Unknown" is displayed.</p> <ul style="list-style-type: none"> • Normal Transition to the "Suspend" state is complete or Concurrent Suspend cannot be performed. • Exec Transition to the "Suspend" state is in progress. • Error Transition to the "Suspend" state failed. • Unknown Other than above status.
Remain Time	<p>The expected time to complete transition to "Suspend" when a Concurrent Suspend request is received.</p> <p>When the copy session status is "✔Reserved", or when the "Remain Time" cannot be obtained, a "-" (hyphen) is displayed.</p> <p>The display format is the same as "Elapsed Time". Refer to "Display example of 'Elapsed Time'" (page 448) for details.</p>

[Extent Information] Tab

This item is displayed only when the "Copy Range" is "Extent".

Item	Description
Offset	The array number of extent information is displayed.
Source LBA	The first Logical Block Address (LBA) (16-digit hexadecimal) in the copy source of the copy session within the specified range is displayed.
Destination LBA	The first Logical Block Address (LBA) (16-digit hexadecimal) in the copy destination of the copy session within the specified range is displayed.

5. Advanced Copy
Advanced Copy (All Sessions)

Item	Description
Copy Extent Size	The data amount for copy within the specified range is displayed.

[Session Property] (ODX) Screen

[Property] Tab

Refer to the [\[ODX\] Screen](#) for other displayed items described below.

Item	Description
Session ID	The session ID (hexadecimal) selected in the [ODX] screen is displayed.
Source Volume Name	The copy source volume name is displayed. When the copy status is "✔Reserved", a "-" (hyphen) is displayed.
Copy destination volume name	The copy destination volume name is displayed. When the copy status is "✔Reserved", a "-" (hyphen) is displayed.

[Extent Information] Tab

Item	Description
Offset	The array number of extent information is displayed.
Source LBA	The first Logical Block Address (LBA) (16-digit hexadecimal) in the copy source of the copy session within the specified range is displayed.
Destination LBA	The first Logical Block Address (LBA) (16-digit hexadecimal) in the copy destination of the copy session within the specified range is displayed.
Copy Extent Size	The data amount for copy within the specified range is displayed.

[Session Property] (XCOPY) Screen

[Property] Tab

Refer to the [\[XCOPY\] Screen](#) for the details of items other than the ones described below.

Item	Description
Session ID	The session ID (hexadecimal) selected in the [XCOPY] screen is displayed.
Source Volume Name	The copy source volume name is displayed. When the copy status is "✔Reserved", a "-" (hyphen) is displayed.
Copy destination volume name	The copy destination volume name is displayed. When the copy status is "✔Reserved", a "-" (hyphen) is displayed.

[Extent Information] Tab

Item	Description
Offset	The array number of extent information is displayed.
Source LBA	The first Logical Block Address (LBA) (16-digit hexadecimal) in the copy source of the copy session within the specified range is displayed.
Destination LBA	The first Logical Block Address (LBA) (16-digit hexadecimal) in the copy destination of the copy session within the specified range is displayed.

5. Advanced Copy
Advanced Copy (All Sessions)

Item	Description
Copy Extent Size	The data amount for copy within the specified range is displayed.

[Session Property] (VVOL) Screen

[Property] Tab

Refer to the [\[Virtual Volume\] Screen](#) for the details of items other than the ones described below.

Item	Description
Source Volume Name	The copy source volume name is displayed. When the copy status is "✔Reserved", a "-" (hyphen) is displayed.
Copy destination volume name	The copy destination volume name is displayed. When the copy status is "✔Reserved", a "-" (hyphen) is displayed.
Destination FTRP Name	The FTRP name to which the copy destination FTV belongs is displayed. When the copy status is "✔Reserved", a "-" (hyphen) is displayed. This item is not displayed when the copy session type is other than "Snapshot" or "Fastclone".

Error Code

The error codes for copy sessions are described below.

Error code	Description
0x10 - 0x1F	An error that is caused by a copy source volume occurs. Some copy source volumes cannot be accessed because a failure has occurred in a component (e.g. drives and drive enclosures).
0x20 - 0x2F	An error that is caused by a copy destination volume occurs. Some copy destination volumes cannot be accessed because a failure has occurred in a component (e.g. drives and drive enclosures).
0x30 - 0x3F	An error that is caused by a copy path occurs. The error location (Suspected Spot) is displayed in the "Detail Information" field on the [Copy Path] screen. Refer to the [Copy Path] function for details.
0xB1	This copy session stopped due to an error that has occurred in the cascade source session while the cascade copy was being specified.
0xB2	This copy session stopped due to a synchronization error of the Storage Cluster continuous copy session.
0xBA	A bad sector is detected.
0xBB	SDV/SDP capacity is insufficient.
0xBD	Overload status is detected in a copy destination volume or a copy destination storage system.
0xBE	A line has failed. Data is stored in the REC Buffer. This error is displayed only when the "Type" is "REC".
0xBF	A line has failed. Data is stored in the REC Disk Buffer. This error is displayed only when the "Type" is "REC".
Other than above	An error other than the ones listed above occurs.

Stop Copy Session

- ["■ Overview" \(page 463\)](#)
- ["■ User Privileges" \(page 463\)](#)
- ["■ Operating Procedures" \(page 463\)](#)

■ Overview

This function stops the selected copy session.

This function is used when a session cannot be stopped due to a host error or other causes.

This function can stop the following copy sessions.

- Advanced Copy sessions (EC, OPC, QuickOPC, SnapOPC, SnapOPC+, Monitor, and REC)
- ODX sessions
- XCOPY sessions
- Virtual Volume sessions

Caution

- If one [SnapOPC+](#) session is stopped, all the sessions started earlier than that session are also stopped.
- If one [SnapOPC+](#) session is stopped, an error occurs in all of the Restore OPC sessions that started earlier than the stopped session and these sessions are also stopped.
- If a [SnapOPC](#) or [SnapOPC+](#) session is stopped during a Restore OPC session, an error occurs in the Restore OPC session and the session is stopped.
- Before stopping snapshot sessions or Fastclone sessions for the Virtual Volume, all the Virtual Volume sessions and Advanced Copy sessions that are specified for copy destination volumes of the target session must be deleted.

■ User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	✓
StorageAdmin	✓
AccountAdmin	
SecurityAdmin	
Maintainer	✓

Refer to ["A. User Roles and Policies" \(page 1580\)](#) for details on the policies and roles.

■ Operating Procedures

Procedure ▶▶▶

- 1 Select the copy session that is to be stopped (multiple selections can be made) and click [Stop Session] in [Action].
→ A confirmation screen appears.

- 2 Click the [OK] button.
→ The selected copy session is stopped.
- 3 Click the [Done] button to return to the [Advanced Copy] screen.



Settings (Advanced Copy)

- "[■ Overview](#)" (page 464)
- "[■ User Privileges](#)" (page 464)
- "[■ Display Contents](#)" (page 464)

■ Overview

This function displays the current Advanced Copy license registration status and the [Advanced Copy](#) set state.

Note

- When the trial license is registered, the registration date and the expiration date can be checked.
- Registering an Advanced Copy license and setting a copy table size are not required when using [ODX](#) or [XCOPY](#), or when using copy functions with Virtual Volumes (VVOLs).

■ User Privileges

Availability of Executions in the Default Role

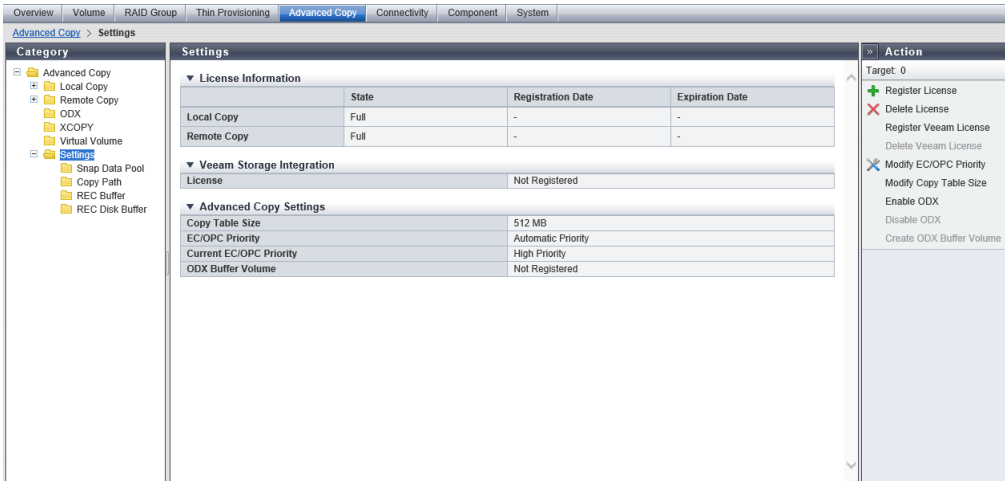
Default role	Availability of executions
Monitor	✓
Admin	✓
StorageAdmin	✓
AccountAdmin	
SecurityAdmin	✓
Maintainer	✓

Refer to "["A. User Roles and Policies" \(page 1580\)](#)" for details on the policies and roles.

■ Display Contents

This function displays the current Advanced Copy license (local copy and remote copy) registration status and the Advanced Copy set state.

5. Advanced Copy Settings (Advanced Copy)



License Information

Item	Description
State	<p>The registration status of the Advanced Copy license for the local copy and remote copy is displayed. "Remote Copy" is displayed only for models that support REC.</p> <ul style="list-style-type: none"> • Not Registered No license is registered. • Free The free license is registered. Up to eight local copy sessions can be created as an Advanced Copy. This item is displayed for the local copy functions of an ETERNUS DX60 S5/DX100 S5/DX200 S5 and an ETERNUS AF150 S3/AF250 S3. • Trial Expiration The trial license is expired. The Advanced Copy function is not available. • Trial A trial license is registered. All of the Advanced Copy functions can be used for a limited time. • Full A paid license is registered. All of the Advanced Copy functions can be used. <p>Note</p> <ul style="list-style-type: none"> • If the trial license expires, the license registration status returns to the state prior to the registration of the trial license.
Registration Date	<p>The date (YYYY-MM-DD hh:mm:ss) when the trial license was registered is displayed.</p> <p>A "-" (hyphen) is displayed in the following conditions:</p> <ul style="list-style-type: none"> • A trial license has never been registered • A full license or a free license is registered
Expiration Date	<p>The expiration date (YYYY-MM-DD hh:mm:ss) for the trial license is displayed.</p> <p>A "-" (hyphen) is displayed in the following conditions:</p> <ul style="list-style-type: none"> • A trial license has never been registered • A full license or a free license is registered

5. Advanced Copy Settings (Advanced Copy)

Veeam Storage Integration

Item	Description
License	<p>The registration status of the Veeam Storage Integration License is displayed as "Not Registered" or "Registered". This item is displayed only when all of the following conditions are satisfied.</p> <ul style="list-style-type: none">• An Advanced Copy License (Full) for the local copy is registered• The storage system model supports Veeam Storage Integration (other than the ETERNUS DX8100 S4)

Advanced Copy Settings

Item	Description
Copy Table Size	<p>A copy table size is displayed.</p> <p>This item is displayed when the Advanced Copy function license has been registered or when the Unified Storage function is enabled.</p>
EC/OPC Priority	<p>The EC/OPC priority status is displayed.</p> <p>This item is displayed when the Advanced Copy function license or the Storage Cluster function license (*1) has been registered.</p> <p>*1: The Storage Cluster function license must be registered using ETERNUS SF Storage Cruiser.</p> <ul style="list-style-type: none">• Automatic Priority This mode changes the EC/OPC priority automatically in response to the operating load status.• High Priority This mode operates by making maximum use of internal resources.• Middle Priority This mode operates slightly slower than the High Priority mode.• Low Priority This mode reduces the effect on host access.• Very Low Priority This mode operates slower than the Low Priority mode.
Current EC/OPC Priority	<p>The current EC/OPC priority is displayed.</p> <p>This item is displayed when the Advanced Copy function license or the Storage Cluster function license has been registered.</p> <p>Automatic Priority High Priority Middle Priority Low Priority Very Low Priority</p>
ODX Buffer Volume	<p>The registration status of the ODX Buffer volume is displayed.</p>

Register Advanced Copy License

- ["■ Overview" \(page 467\)](#)
- ["■ User Privileges" \(page 467\)](#)
- ["■ Settings" \(page 467\)](#)
- ["■ Operating Procedures" \(page 468\)](#)

■ Overview

This function registers the Advanced Copy license for [EC](#), [OPC](#), [QuickOPC](#), [SnapOPC](#), [SnapOPC+](#), and [REC](#).

When this registration is completed successfully, the customer can use the Advanced Copy functions.

Caution

- An Advanced Copy license cannot be registered if the CM status is not normal.

Note

- When using ETERNUS SF AdvancedCopy Manager or ETERNUS SF Express, refer to the documents that are supplied with ETERNUS SF AdvancedCopy Manager or ETERNUS SF Express.
- The registration status of the Advanced Copy license can be checked. Refer to the [Settings (Advanced Copy)] function for details.
- Registering an Advanced Copy license is not required when using the copy functions such as [ODX](#) or [XCOPY](#), or when using copy functions with Virtual Volumes (VVOLs).

■ User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	✓
StorageAdmin	
AccountAdmin	
SecurityAdmin	
Maintainer	✓

Refer to "[A. User Roles and Policies](#)" (page 1580) for details on the policies and roles.

■ Settings

License Settings

Item	Description	Setting values
Registration Method	Select either "Use License Key" or "Use Free License" as the registration method. To register a full license, select "Use License Key". To register a free license, select "Use Free License". "Use Free License" can only be selected when an Advanced Copy license has not been registered in the storage system. This item is displayed for the ETERNUS DX60 S5/DX100 S5/DX200 S5 and the ETERNUS AF150 S3/AF250 S3.	Use License Key Use Free License
License Key	Enter the Advanced Copy license key. For the ETERNUS DX60 S5/DX100 S5/DX200 S5 and the ETERNUS AF150 S3/AF250 S3, a license key can only be entered when "Use License Key" is selected for "Registration Method".	16 capital letters and numeric characters

■ Operating Procedures

Procedure ▶▶▶

- 1 Click [Register License] in [Action].
- 2 Select a registration method, input a license key, and click the [Register] button.
→ A confirmation screen appears.

Caution

- Only when registering a full license, the license key entry is required.
- If the entered license key does not satisfy the input conditions, an error screen appears.

- 3 Click the [OK] button.
→ The Advanced Copy license registration is executed.
 - 4 Click the [Done] button to return to the [Settings] screen.
-



Delete Advanced Copy License

- ["■ Overview" \(page 468\)](#)
- ["■ User Privileges" \(page 469\)](#)
- ["■ Operating Procedures" \(page 470\)](#)

■ Overview

This function deletes all of the Advanced Copy licenses registered in the storage system.

Caution

- Do not delete the Advanced Copy license when the Storage Cluster function is being used.
- An Advanced Copy license cannot be deleted in the following conditions:
 - The **CM** status is not normal
 - A port with the RA mode or CA/RA mode exists
 - **SDVs** or **SDPVs** are registered
 - A volume with Advanced Copy protected exists
 - An Advanced Copy session (except for an ODX session, an XCOPY session, or a Virtual Volume session) exists
 - An Advanced Copy table size has been configured
 - An Advanced Copy path has been configured
 - An **REC Buffer** has been configured
 - An **REC Disk Buffer** has been created
 - The Veeam Storage Integration License has been registered
- If the Storage Cluster function is enabled but is not being used, the Advanced Copy license can be deleted under the following conditions.
 - An Advanced Copy path has been configured
 - A port with the RA mode or CA/RA mode exists
- If the Unified Storage is enabled, the Advanced Copy license can also be deleted under the following conditions.
 - A SnapOPC+ session for the snapshot function exists
 - SDVs are registered (snapshot destination SDVs only)
- Rebooting the storage system is required after deleting an Advanced Copy license.

Note

- To check whether the Storage Cluster function is enabled or disabled, use the [System] screen. Refer to the [System] function for details.

■ **User Privileges**

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	✓
StorageAdmin	
AccountAdmin	
SecurityAdmin	
Maintainer	✓

Refer to "A. User Roles and Policies" (page 1580) for details on the policies and roles.

■ Operating Procedures

Procedure ▶▶▶

- 1 Click [Delete License] in [Action].
→ A confirmation screen appears.
- 2 Click the [OK] button.
→ Deletion of an Advanced Copy license is executed.
- 3 Click the [Done] button to return to the [Settings] screen.

Caution

- Rebooting the storage system is required after deleting an Advanced Copy license.



Register Veeam Storage Integration License

- "[■ Overview](#)" (page 470)
- "[■ User Privileges](#)" (page 470)
- "[■ Settings](#)" (page 471)
- "[■ Operating Procedures](#)" (page 471)

■ Overview

This function registers the Veeam Storage Integration License.
Registration of this license enables the use of [Veeam Storage Integration](#).

Caution

- The ETERNUS DX8100 S4 does not support this function.
- The Advanced Copy License (Full) must be registered in advance to register this license.
- When the maximum number of volumes already exists in the storage system, this license cannot be registered.

Note

- For the conditions required to use Veeam Storage Integration, refer to "Design Guide".
- For the configuration procedure when installing Veeam Storage Integration, refer to "Configuration Guide (Basic)" and "ETERNUS CLI User's Guide".
- The registration status of this license can be checked in the [Settings] screen. Refer to the [Settings (Advanced Copy)] function for details.

■ User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	✓
StorageAdmin	

5. Advanced Copy
Settings (Advanced Copy)

Default role	Availability of executions
AccountAdmin	
SecurityAdmin	
Maintainer	✓

Refer to "[A. User Roles and Policies](#)" (page 1580) for details on the policies and roles.

■ Settings

License Settings

Item	Description	Setting values
License Key	Enter the license key for Veeam Storage Integration.	16 capital letters and numeric characters

■ Operating Procedures

Procedure ▶▶▶

1 Click [Register Veeam License] in [Action].

Caution

- If a Veeam Storage Integration License is already registered, [Register Veeam License] cannot be clicked.

2 Input the license key, and click the [Register] button.

→ A confirmation screen appears.

Caution

- An error screen appears in the following conditions:
 - The license key is not entered
 - The license key does not satisfy the input conditions

3 Click the [OK] button.

→ The Veeam Storage Integration License registration starts.

4 Click the [Done] button to return to the [Settings] screen.



Delete Veeam Storage Integration License

- "[Overview](#)" (page 471)
- "[User Privileges](#)" (page 472)
- "[Operating Procedures](#)" (page 472)

■ Overview

This function deletes the Veeam Storage Integration License registered in the storage system.

Note

- The registration status of this license can be checked in the [Settings] screen. Refer to the [Settings (Advanced Copy)] function for details.
- Perform the following procedure to delete the Veeam Storage Integration License.

Procedure ▶▶▶

- 1** Delete the relevant storage system from the server node where the [Veeam Storage Integration](#) is running.
- 2** Extract all the LUN groups used for Veeam Storage Integration. Refer to the [LUN Group Detailed Information] screen to check whether the LUN group is used for Veeam Storage Integration. Refer to the [LUN Group] function under the [Connectivity] navigation for details.
- 3** Change the setting for all the LUN groups extracted in Step 2 so that they are not used for Veeam Storage Integration. Refer to the "set lun-group" CLI command for details.
- 4** Check that there are no LUN groups that are being used for Veeam Storage Integration. Refer to the [LUN Group Detailed Information] screen for all the LUN groups extracted in Step 2.
- 5** Delete all Veeam Snapshot Volumes (or volumes whose "Usage" is "Veeam", "Dedupe&Comp/Veeam", "Dedupe/Veeam", or "Comp/Veeam") registered in the storage system from the [Volume] screen. Refer to the [Delete Volume] function for details.
- 6** Use this function to delete the Veeam Storage Integration License.



■ **User Privileges**

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	✓
StorageAdmin	
AccountAdmin	
SecurityAdmin	
Maintainer	✓

Refer to "[A. User Roles and Policies](#)" (page 1580) for details on the policies and roles.

■ **Operating Procedures**

Procedure ▶▶▶

- 1** Click [Delete Veeam License] in [Action].
→ A confirmation screen appears.

Caution

- If the Veeam Storage Integration License is already deleted, [Delete Veeam License] cannot be clicked.

- 2 Click the [OK] button.
→ The Veeam Storage Integration License deletion starts.
- 3 Click the [Done] button to return to the [Settings] screen.



Modify EC/OPC Priority

- ["■ Overview" \(page 473\)](#)
- ["■ User Privileges" \(page 473\)](#)
- ["■ Settings" \(page 474\)](#)
- ["■ Operating Procedures" \(page 475\)](#)

■ Overview

This function sets the copy speed when using [EC](#) and [OPC](#).

The EC/OPC speed is usually set in consideration of the host's I/O load and copy processing load. The set EC/OPC speed is applied not only for the next sessions, but also for existing sessions.

Caution

- Registering the Advanced Copy function license or the Storage Cluster function license (*1) is required to use this function.

*1: The Storage Cluster function license must be registered using ETERNUS SF Storage Cruiser.

Note

- EC includes EC, [REC](#), and RAID migration.
If the conditions below are all satisfied, REC is operated with "EC/OPC Priority" which is specified by this function. For all other cases, REC is operated with "Multiplicity" and "Priority Level" which are specified by the [Modify REC Multiplicity] function.
 - When the connection method is "Direct"
 - When the priority level is "Automatic"To set the connection type, use the [Set Copy Path] function.
To set the priority level, use the [Modify REC Multiplicity] function.
- OPC includes OPC, [QuickOPC](#), [SnapOPC](#), and [SnapOPC+](#).
- When "Automatic Priority" is selected for the EC/OPC priority, the current priority level can be checked. Refer to the [Settings (Advanced Copy)] function for details.

■ User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	✓

5. Advanced Copy
Settings (Advanced Copy)

Default role	Availability of executions
StorageAdmin	✓
AccountAdmin	
SecurityAdmin	
Maintainer	✓

Refer to "[A. User Roles and Policies](#)" (page 1580) for details on the policies and roles.

■ Settings

Select the EC/OPC priority from the following five step modes.

EC/OPC Priority

Item	Description	Setting values
EC/OPC Priority	<p>Select the EC/OPC priority.</p> <ul style="list-style-type: none"> • Automatic Priority This mode changes the EC/OPC priority automatically in response to the operating load status. • High Priority This mode operates by making maximum use of internal resources. This mode greatly affects host access performance, thus should not be used during normal operation. Use when the operation load is low. • Middle Priority This mode operates slightly slower than the High Priority mode. Select this mode when performance is greatly affected by the High Priority mode, but the copy speed is too slow with the Low Priority mode. • Low Priority This mode reduces the effect on host access. Select this mode when using EC and/or OPC during operation. • Very Low Priority This mode operates slower than the Low Priority mode. Select this mode when performance is affected (such as when the performance of host response is reduced) by the Automatic Priority or Low Priority mode. 	Automatic Priority High Priority Middle Priority Low Priority Very Low Priority

Advanced Setting

In this screen, specify the copy schedule mode.

5. Advanced Copy
Settings (Advanced Copy)

Item	Description	Setting values
Copy Schedule Mode	<p>Select the schedule mode for EC, OPC, and QuickOPC. It is not necessary to change the default value (Session Balancing) for normal use.</p> <p>Setting the schedule mode for SnapOPC and SnapOPC+ is not required.</p> <p>Use the [Modify REC Multiplicity] function to specify the REC schedule mode.</p> <ul style="list-style-type: none"> • Session Balancing Copy sessions are scheduled evenly to each Controlling CM for a copy source RAID group (a RAID group to which the copy source volume belongs). • Destination RAID Group Balancing Only one copy session can be performed for each copy destination RAID group. This method prevents unequal loading on a specific RAID group. This may improve the copy performance when a copy destination RAID group is configured by Nearline disks or when "High Priority" is set for EC/OPC. <p>Caution</p> <ul style="list-style-type: none"> • Copy performance is not improved by selecting "Destination RAID Group Balancing" in the following conditions: <ul style="list-style-type: none"> - When the type of the copy destination volume is not "Standard" - When the copy destination volume "Standard" and concatenated 	Session Balancing (Default) Destination RAID Group Balancing

■ Operating Procedures

Set the EC/OPC priority.

Procedure ▶▶▶

- 1 Click [Modify EC/OPC Priority] in [Action].
- 2 Specify the parameters, and click the [Set] button.
→ A confirmation screen appears.

Note

- Click [Advanced Setting] to specify the copy schedule mode.

- 3 Click the [OK] button.
→ The selected EC/OPC priority is set.
- 4 Click the [Done] button to return to the [Settings] screen.

Modify Copy Table Size

- "■ Overview" (page 475)
- "■ User Privileges" (page 477)
- "■ Settings" (page 477)
- "■ Operating Procedures" (page 480)

■ Overview

This function sets the copy table size, which is used by the firmware for the storage system, on the CM cache memory. The copy table is used as an area that manages the progress of the copy when Advanced Copy sessions or Veeam sessions are used.

Caution

- A license must be registered for the Advanced Copy function or the Unified Storage environment is required to use this function.
 - When the copy table size is equal to 0 MB, copy functions cannot be used. For the ETERNUS DX500 S5/DX600 S5/DX900 S5, the ETERNUS DX8100 S4/DX8900 S4, and the ETERNUS AF650 S3, the copy table size is set to the default value of 0 MB at the factory. Modify the copy table size before using the copy function.
 - Make sure to stop the [copy session](#) before reducing the copy table size. To check the copy session, use the [Advanced Copy] function.
 - Cache memory is not only used for copy tables, but also used for [REC Buffers](#), the Thin Provisioning function (*1), the Storage Cluster function (*1), the Non-disruptive Storage Migration function, and the Extreme Cache function. Note that a copy table with the maximum capacity for each model cannot always be created depending on the following conditions.
 - Memory capacity in the storage system
 - REC Buffer size
 - Maximum pool capacity
 - Total TFOV capacity (*2)
 - License registration for the Non-disruptive Storage Migration function
 - Extreme Cache setting (enabled) and Extreme Cache capacity
- *1 : The shared area in the cache memory is used for the following conditions.
- The maximum pool capacity is expanded to "1.5 PB" or larger
 - The total TFOV capacity (*2) has been expanded from the default capacity
- Refer to the descriptions about "Storage Cluster" in the [System] screen for the default capacity of the TFOV for each model.
- *2 : The total TFOV capacity indicates the total capacity of the volumes that are used for the Storage Cluster function in a storage system.
- If the copy table size is insufficient, an error occurs in the copy session. Make sure to specify the "Table Size Threshold" value to monitor the usage of the copy table in advance. The storage system reports the notification using the method specified with the [Setup Event Notification] function. When reporting, select the notification method in advance.
 - Set the resolution as small as possible. When a large value is specified, the performance may be reduced. When unsure about whether the copy target area might be increased in future use, specify the maximum resolution.
 - The same resolution must be used by both the copy source and copy destination storage systems for REC. If the resolution settings for the copy source and copy destination storage systems are different, REC cannot be performed. Note that the copy table sizes do not need to be the same. If different recommended resolutions are calculated for the copy source and copy destination storage systems, use whichever resolution is greater for both storage systems. If the resolution is changed, recalculate the copy table size setting for the storage system with the new resolution.

Note

- Changes to the resolution setting are applied from the next session. For a copy session that is currently being performed, data is copied with the resolution that was specified when the session was started. Restore OPC operates with the same resolution as the target session. Restore OPC for copy sessions that have been running even before the resolution is changed operates with the same resolution as the copy sessions that are running. To change the resolution of a copy session that is currently being performed, cancel the copy session and start again.
- When the table size or the table size threshold is changed, the new value is applied immediately.
- The current copy table size can be checked. Refer to the [Settings (Advanced Copy)] function for details.
- The copy table size does not need to be set for the following functions.
 - [ODX](#)
 - [XCOPY](#)
 - Storage Cluster
 - Copy using Virtual Volumes (VVOLs)

■ User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	✓
StorageAdmin	✓
AccountAdmin	
SecurityAdmin	
Maintainer	✓

Refer to "[A. User Roles and Policies](#)" (page 1580) for details on the policies and roles.

■ Settings

In this screen, set the Advanced Copy table size. To estimate the recommended value for the Advanced Copy table size based on copy capacity and number of sessions, click the "[\[Calculation of recommended values\]](#)" (page 478) button.

Advanced Copy Table Size Setting

Item	Description	Setting values
Resolution	Select the resolution for the copy table.	×1 (*1) ×2 ×4 ×8 ×16 (*2) ×32 ×64 *1 : Default value (for the ETERNUS DX500 S5/DX600 S5/ DX900 S5, the ETERNUS DX8100 S4/DX8900 S4, and the ETERNUS AF650 S3) *2 : Default value (for the ETERNUS DX60 S5/DX100 S5/ DX200 S5 and the ETERNUS AF150 S3/AF250 S3)
Table Size	Select the copy table size. The copy table size can be set up to the maximum size that is calculated from the installed memory capacity and the usable cache memory capacity in the storage system (excluding the currently used capacity such as assigned size to the REC Buffers). <div style="background-color: #fff9c4; padding: 5px;"> <p>Caution</p> <ul style="list-style-type: none"> In the ETERNUS DX100 S5, a total size of 512 MB of memory is reserved for the copy table and REC Buffer. If an REC Buffer is created, 256 MB (REC Buffer size, 128 MB x 2) of the total memory size is used. Therefore, the maximum table size is 256 MB. Note that an REC Buffer cannot be created if the copy table size is larger than 264 MB. </div>	The maximum copy table size for each model is as follows: ETERNUS DX60 S5: 0 - 128 MB (integral multiple of 8), 128 MB (Default) ETERNUS DX100 S5/DX200 S5: 0 - 512 MB (integral multiple of 8), 128 MB (Default) ETERNUS DX500 S5: 0 (Default) - 1024 MB (integral multiple of 8) ETERNUS DX600 S5: 0 (Default) - 4096 MB (integral multiple of 8) ETERNUS DX900 S5: 0 (Default) - 12288 MB (integral multiple of 8) ETERNUS DX8100 S4: 0 (Default) - 1024 MB (integral multiple of 8) ETERNUS DX8900 S4: 0 (Default) - 12288 MB (integral multiple of 8) ETERNUS AF150 S3/AF250 S3: 0 - 512 MB (integral multiple of 8), 128 MB (Default) ETERNUS AF650 S3: 0 (Default) - 4096 MB (integral multiple of 8)
Table Size Threshold	Specify the threshold for monitoring the used capacity of the copy table.	1 - 100 % 80 % (Default)

[Calculation of recommended values]

To calculate "Resolution" and "Table Size", enter "Total Copy Capacity" and the number of "Sessions" and click the [Calculation] button.

When using OPC, QuickOPC, SnapOPC, or SnapOPC+, specify "Total Copy Capacity" and "Sessions" for "Restore OPC is used".

5. Advanced Copy Settings (Advanced Copy)

Item	Description	Setting values
Total Copy Capacity (Restore OPC is not used)	Input the total copy capacity (*1) when Restore OPC is not used (unit: GB). The applicable Advanced Copy types are as follows: <ul style="list-style-type: none"> • EC • REC • OPC, QuickOPC, SnapOPC, and SnapOPC+ without using Restore OPC 	Numeric characters [GB] (decimal)
Total Copy Capacity (Restore OPC is used)	Input the total copy capacity (*1) for using Restore OPC (unit: GB). The applicable Advanced Copy types are as follows: <ul style="list-style-type: none"> • OPC, QuickOPC, SnapOPC, and SnapOPC+ using Restore OPC 	Numeric characters [GB] (decimal)
Sessions (Restore OPC is not used)	Input the total number of sessions (*1) for not using Restore OPC. The applicable Advanced Copy types are as follows: <ul style="list-style-type: none"> • EC • REC • OPC, QuickOPC, SnapOPC, and SnapOPC+ without using Restore OPC 	ETERNUS DX60 S5: 0 - 1024 ETERNUS DX100 S5: 0 - 2048 ETERNUS DX200 S5: 0 - 4096 ETERNUS DX500 S5/DX600 S5: 0 - 8192 ETERNUS DX900 S5: 0 - 32768 ETERNUS DX8100 S4: 0 - 4096 ETERNUS DX8900 S4: 0 - 32768
Sessions (Restore OPC is used)	Input the total number of sessions (*1) for using Restore OPC. The applicable Advanced Copy types are as follows: <ul style="list-style-type: none"> • OPC, QuickOPC, SnapOPC, and SnapOPC+ using Restore OPC 	ETERNUS AF150 S3: 0 - 2048 ETERNUS AF250 S3: 0 - 4096 ETERNUS AF650 S3: 0 - 8192 Blank (Default)

*1: For "Total Copy Capacity" and "Sessions", input the respective total values.

Example 1: When executing 10 GB OPC (Restore OPC is used) with 20 sessions and 5 GB QuickOPC (Restore OPC is used) with 10 sessions

Copy Capacity (Restore OPC is used)

= Copy Capacity for OPC (10 GB × 20 sessions) + Copy Capacity for QuickOPC (5 GB × 10 sessions)
= 200 GB + 50 GB = 250 GB

Sessions (Restore OPC is used)

= The number of OPC sessions (20 sessions) + The number of QuickOPC sessions (10 sessions)
= 30 sessions

Example 2: When executing 10 GB OPC (Restore OPC is not used) with 20 sessions and 5 GB QuickOPC (Restore OPC is used) with 10 sessions

Copy Capacity (Restore OPC is not used)

= Copy Capacity for OPC (10 GB × 20 sessions) = 200 GB

Sessions (Restore OPC is not used)

= The number of OPC sessions (20 sessions) = 20 sessions

Copy Capacity (Restore OPC is used)

= Copy Capacity for QuickOPC (5 GB × 10 sessions) = 50 GB

Sessions (Restore OPC is used)

= The number of QuickOPC sessions (10 sessions) = 10 sessions

Advanced Copy Table Size Recommended Values

In this dialog box, calculated resolution and table size are displayed.

5. Advanced Copy
Settings (Advanced Copy)

Item	Description
Resolution	The calculated resolution is displayed. ×1 ×2 ×4 ×8 ×16 ×32 ×64
Table Size	The calculated Advanced Copy table size is displayed. ETERNUS DX60 S5: 0 - 128 MB ETERNUS DX100 S5/DX200 S5: 0 - 512 MB ETERNUS DX500 S5: 0 - 1024 MB ETERNUS DX600 S5: 0 - 4096 MB ETERNUS DX900 S5: 0 - 12288 MB ETERNUS DX8100 S4: 0 - 1024 MB ETERNUS DX8900 S4: 0 - 12288 MB ETERNUS AF150 S3/AF250 S3: 0 - 512 MB ETERNUS AF650 S3: 0 - 4096 MB

Function Button

Button	Description
[Calculation of recommended values]	Automatically calculates "Resolution" and "Table Size". By clicking this button, the "Calculation of recommended values" dialog box is displayed.
[Calculation]	Automatically calculates "Resolution" and "Table Size" from the entered values.

■ **Operating Procedures**

Manually Setting the Copy Table Size

Procedure ▶▶▶

- 1 Click [Modify Copy Table Size] in [Action].
- 2 Specify the parameters, and click the [Set] button.
→ A confirmation screen appears.

Note

- Refer to "[How to Calculate the Copy Table Size]" (page 481) for calculation methods of copy table size.

- 3 Click the [OK] button.
→ Copy table size setting starts.
- 4 Click the [Done] button to return to the [Settings] screen.



Automatically Setting the Copy Table Size

Procedure ▶▶▶

- 1 Click [Modify Copy Table Size] in [Action].
- 2 Click the [Calculation of recommended values] button.
→ The [Calculation of recommended values] dialog box appears.
- 3 Enter the necessary information and click the [Calculation] button.
→ "Resolution" and "Table Size" are automatically calculated.

Note

- The calculated values are "Resolution" and "Table Size". It is assumed that almost 100 % of the copy table size is used.
- When [Calculation of recommended values] is used, the calculation of "Resolution" and "Table Size" makes allowances for a slight increase of the copy capacity. This is why the calculated values are higher than values obtained using the ""[How to Calculate the Copy Table Size]" (page 481)".

- 4 Click the [OK] button.
→ The calculated values are reflected to "Resolution" and "Table Size" in the "Advanced Copy Table Size Setting" field.
- 5 Select the table size threshold and click the [Set] button.
→ A confirmation screen appears.
- 6 Click the [OK] button.
→ Copy table size setting starts.
- 7 Click the [Done] button to return to the [Settings] screen.



[How to Calculate the Copy Table Size]

A dedicated memory area is required for Advanced Copy management and is allocated as a table size. The table size and resolution settings are determined by the copy capacity and the number of sessions (volumes) that will be run simultaneously.

$$\text{(Table size (S)) [MB]} = (S1) + (S2)$$

S1: Refers to the table size (MB) for EC/REC and for OPC/QuickOPC/SnapOPC/SnapOPC+ without OPC Restoration

S2: Refers to the table size (MB) for OPC/QuickOPC/SnapOPC/SnapOPC+ with OPC Restoration

- Round the derived value up to the next multiple of 8 to obtain the correct setting for the copy table size.
- A copy table of the appropriate size (as derived above) is created in each CM.
- If the total table size value (S) exceeds the maximum size allowed, adjust the resolution (M) to make the size of table less than or equal to the maximum value. Set the resolution (M) as small as possible.

Caution

- The same resolution (M) must be used by both the copy source and copy destination storage systems for REC. If the resolution (M) settings for the copy source and copy destination storage systems are different, REC cannot be performed. Note that the copy table sizes (S) do not need to be the same. If different recommended resolutions (M) are calculated for the copy source and copy destination storage systems, use whichever resolution (M) is greater for both storage systems. If the resolution (M) is changed, recalculate the copy table size (S) setting for the storage system with the new resolution.

Note

- The calculated values are "Resolution" and "Table Size". It is assumed that almost 100 % of the copy table size is used.
- Allowance should be made for possible increases in the copy capacity.
- If the resolution is changed when a copy session exists, calculate the copy table size with the previous resolution for the copy session that is being executed. For copy sessions that are created after the resolution has been changed, calculate the copy table size with the new value.

The Table Size for EC/REC and for OPC/QuickOPC/SnapOPC/SnapOPC+ without OPC Restoration (S1)

M: Resolution (The same value is used in the storage system. Set "x1" if possible.)

C1: The total copy capacity (GB) for EC/REC, and OPC/QuickOPC/SnapOPC/SnapOPC+ without OPC Restoration (*1)

N1: The number of sessions for EC/REC, and OPC/QuickOPC/SnapOPC/SnapOPC+ without OPC Restoration

$$S1 [MB] = ((2 \times C1 \div M) + N1) \times 8 [KB] \div 1024 \text{ (Round up decimal point)}$$

The Table Size for OPC/QuickOPC/SnapOPC/SnapOPC+ with OPC Restoration (S2)

M: Resolution (The same value is used in the storage system. Set "x1" if possible.)

C2: The total copy capacity (GB) for OPC/QuickOPC/SnapOPC/SnapOPC+ with OPC Restoration (*1)

N2: The number of sessions for OPC/QuickOPC/SnapOPC/SnapOPC+ with OPC Restoration

$$S2 [MB] = ((2 \times C2 \div M) + N2) \times 2 \times 8 [KB] \div 1024 \text{ (Round up decimal point)}$$

*1 : For EC, OPC, QuickOPC, SnapOPC, SnapOPC+, and REC copy sources, the copy capacity is the total capacity of all volumes (slices or partitions) in the storage system that are defined as copy sources. For REC copy destinations, the copy capacity is the total capacity of all the volumes (slices or partitions) in the storage system that are defined as copy destinations.

If the storage system is used for both the "EC, OPC, QuickOPC, SnapOPC, SnapOPC+ or REC copy source" and the "REC copy destination", the copy capacity is the total capacity of both.

For multi-copy sessions, the copy capacity is the total capacity of multi-copy source volumes (slices or partitions), multiplied by the number of multi-copy destinations for each copy source. The copy capacity for generation management by SnapOPC+ sessions is the total capacity of copy source volumes (slices or partitions) multiplied by the number of generations in the copy destination volumes for each copy source.

Enable ODX

- ["■ Overview" \(page 483\)](#)
- ["■ User Privileges" \(page 483\)](#)
- ["■ Operating Procedures" \(page 483\)](#)

■ Overview

This function enables the [ODX](#) function.

Caution

- To start using the ODX function, the server must recognize that ODX is enabled in the storage system. After enabling ODX with this function, reboot the server.
- ODX requires a dedicated volume (ODX Buffer volume) to save data before updating. An ODX Buffer volume can be created after ODX is enabled. Refer to the [Create ODX Buffer Volume] function for details.
- The storage system does not support an Advanced Copy when the copy destination is a volume that is being used by the ODX function.
- The ODX function only supports copying within the same storage system. Copying to other storage systems is not supported.

Note

- ODX does not require the registration of an Advanced Copy license and copy table size settings.

■ User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	✓
StorageAdmin	✓
AccountAdmin	
SecurityAdmin	
Maintainer	✓

Refer to "[A. User Roles and Policies](#)" (page 1580) for details on the policies and roles.

■ Operating Procedures

Procedure ▶▶▶

- 1 Click [Enable ODX] in [Action].
→ A confirmation screen appears.

Caution

- [Enable ODX] cannot be clicked if ODX is already enabled.

- 2 Click the [OK] button.
→ Enabling of ODX starts.
- 3 Click the [Done] button to return to the [Settings] screen.



Disable ODX

- ["■ Overview" \(page 484\)](#)
- ["■ User Privileges" \(page 484\)](#)
- ["■ Operating Procedures" \(page 484\)](#)

■ Overview

This function disables the [ODX](#) function.

Caution

- To stop using the ODX function, the server must recognize that ODX is disabled in the storage system. After disabling ODX with this function, reboot the server.
- The ODX function cannot be disabled when an ODX Buffer volume exists in the storage system. Delete the ODX Buffer volume in advance. Refer to the [\[Delete Volume\]](#) function for details.

■ User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	✓
StorageAdmin	✓
AccountAdmin	
SecurityAdmin	
Maintainer	✓

Refer to ["A. User Roles and Policies" \(page 1580\)](#) for details on the policies and roles.

■ Operating Procedures

Procedure ▶▶▶

- 1 Click [\[Disable ODX\]](#) in [\[Action\]](#).
→ A confirmation screen appears.

Caution

- [\[Disable ODX\]](#) cannot be clicked if ODX is already disabled.

- 2 Click the [\[OK\]](#) button.
→ Disabling of ODX starts.
- 3 Click the [\[Done\]](#) button to return to the [\[Settings\]](#) screen.



Create ODX Buffer Volume

- ["■ Overview" \(page 485\)](#)
- ["■ User Privileges" \(page 486\)](#)

- ["■ Settings" \(page 486\)](#)
- ["■ Operating Procedures" \(page 490\)](#)

■ Overview

This function creates a dedicated volume for the [ODX](#) function.

ODX is a function that offloads the load from data copying and migration to the storage system. ODX copies data at the time when a copy request is received. If a Write command is issued for the copy source data, this function backs up the previous data in the area that is to be overwritten. An ODX Buffer volume is used to store the backup data at this time.

The ODX function is for "Windows Server 2012" and later.

ODX Buffer Volume Specification

- One ODX Buffer volume can be created in the storage system.
- The type of the ODX Buffer volume is "[Standard](#)", "[TPV](#)", or "[FTV](#)".
- The capacity of an ODX Buffer volume is 1 GB - 1 TB.

Caution

- An ODX Buffer volume can be created when the ODX function is enabled.
- The ODX Buffer volume must be created with the ODX function.
- If the Thin Provisioning function is enabled, a "TPV" type ODX Buffer volume can be created.
- When creating an "FTV" type ODX Buffer volume, use CLI. Web GUI cannot be used to create an "FTV" type ODX Buffer volume.
- When the [encryption mode](#) is disabled, an ODX Buffer volume encrypted by CM cannot be created. Note that when SEDs are not installed in the storage system, an ODX Buffer volume encrypted by [SEDs](#) cannot be created.
- If the maximum number of volumes is already registered in the storage system, an ODX Buffer volume cannot be created. For the maximum number of volumes for the storage system, refer to the [Create Volume] function.
- If the maximum capacity for TPVs or FTVs is already registered in the storage system, a "TPV" type ODX Buffer volume cannot be created. For the maximum capacity, refer to the [Settings (Thin Provisioning)] function for details. The maximum capacity is the same as the maximum pool capacity.

Note

- Only one ODX Buffer volume can be created in the storage system. Use the [Settings] screen to check whether an ODX Buffer volume is already created. Refer to the [Settings (Advanced Copy)] function for details.
- An existing ODX Buffer volume can be checked by using the "Forbid Advanced Copy" field in the [Volume] screen. Refer to the [Volume (Basic Information)] function for details.
- Even when the ODX Buffer volume capacity is insufficient, no error occurs in an ODX session that is already started. Windows Server suspends the use of ODX, and starts a normal copy process that uses Read and Write processes.
- Monitoring the usage of an ODX Buffer volume is available. If insufficient capacity is detected, the storage system sends a notification. Refer to the [Setup Event Notification] function for details. If the ODX Buffer volume capacity is frequently insufficient, the benefit of using the ODX function is lost. Expand the ODX Buffer volume capacity as required. Refer to the [Expand Volume], [Start RAID Migration], or [Expand Thin Provisioning Volume] function for details.
- An ODX Buffer volume can be deleted by using the same procedure as "Standard" and "TPV" type volumes if the ODX function is not used. Refer to the [Delete Volume] function for details. To delete an "FTV" type ODX Buffer volume, use CLI.
- The volume capacity that is required for an ODX Buffer volume varies depending on the server system configuration and the applications that are being used. When using the ODX function for normal file copying or file migration with Microsoft Windows Server, creating a 10 GB ODX Buffer volume is recommended.
- An ODX Buffer volume can be created by using the maximum free space that is available in a RAID group. Specifying a "Capacity" value is not required. "Standard" type volumes can be created using the maximum free space.

■ **User Privileges**

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	✓
StorageAdmin	✓
AccountAdmin	
SecurityAdmin	
Maintainer	✓

Refer to "[A. User Roles and Policies](#)" (page 1580) for details on the policies and roles.

■ **Settings**

In this screen, specify the details of the ODX Buffer volume that is to be created.

ODX Buffer Volume

Item	Description	Setting values
Name	<p>Input the ODX Buffer volume name.</p> <p>An existing volume name cannot be specified. Volume names starting with "\$SYSVOL", "\$VVOL_META", or "\$DATA_CNTNR" cannot be used.</p>	<p>Up to 32 alphanumeric characters, symbols (except "," (comma) and "?"), and spaces</p>
Capacity	<p>Specify the ODX Buffer volume capacity and select the unit of capacity.</p> <p>Up to a 15-digit number including the "." (decimal point) can be input. Note that when "MB" is selected, the specified value is rounded down to the nearest whole number. When "GB" or "TB" is selected, the specified value is converted to "MB" and rounded down to the nearest whole number.</p> <div style="background-color: #fff9c4; padding: 5px; margin: 5px 0;"> <p>Caution</p> <ul style="list-style-type: none"> If "Use all Largest Free Space" is selected, inputting the capacity is not required. The specified value and unit are not used. </div> <div style="background-color: #e0e0e0; padding: 5px; margin: 5px 0;"> <p>Note</p> <ul style="list-style-type: none"> If the same capacity is entered in the same format (digits and units (GB/TB)) as the "Largest Free Space", all of the largest free space is used. To add the capacity without adjustments, input the capacity in units of MB. The number of entered characters includes the "." (decimal point) and the "0" before the decimal point. (Example) 0.1234567890123 (15 characters) </div>	<p>1 GB - 1 TB (numeric characters) Unit: GB (Default)/TB</p>
Type	<p>Select the ODX Buffer volume type.</p> <p>If a Thin Provisioning function is disabled, "Standard" is displayed in this field.</p> <ul style="list-style-type: none"> Standard Volumes that are created in RAID groups. Thin Provisioning Volume Volumes that are created in Thin Provisioning Pools. <div style="background-color: #e0e0e0; padding: 5px; margin: 5px 0;"> <p>Note</p> <ul style="list-style-type: none"> If a Thin Provisioning function is disabled, "Thin Provisioning Volume" is not displayed in this field. There are three types of ODX Buffer volumes: "Standard", "TPV", and "FTV". This is independent of the copy source volume type or the copy destination volume type. Select the copy type according to your environment. <ul style="list-style-type: none"> When creating an ODX Buffer volume in a RAID group, select "Standard" for the volume type. When creating an ODX Buffer volume in a TPP, select "Thin Provisioning Volume" for the volume type. When creating an ODX Buffer volume in an FTRP, use CLI. </div>	<p>Standard Thin Provisioning Volume</p>

5. Advanced Copy
Settings (Advanced Copy)

Item	Description	Setting values
Use all Largest Free Space	<p>Select the "Enable" checkbox to create an ODX Buffer volume with the largest available free space in the RAID group. This checkbox can be selected or cleared only when "Type" is "Standard".</p> <p>If the "Enable" checkbox is selected, an ODX Buffer volume with the maximum capacity is created with the available space displayed in the "Largest Free Space" field for the selected RAID group.</p> <p>Caution</p> <ul style="list-style-type: none"> • When the "Enable" checkbox is selected, the input capacity and the selected unit are disabled. • An ODX Buffer volume cannot be created if the "Largest Free Space" is less than 1 GB or larger than 1 TB. • The capacity for the created ODX Buffer volume is not displayed. Use the [Volume] screen to check the volume capacity after volume creation is complete. 	"Enable" checkbox Selected Cleared
Encryption by CM	<p>Select the encryption status of the ODX Buffer volume.</p> <p>This item is not displayed in the following conditions.</p> <ul style="list-style-type: none"> • Encryption mode is disabled • The ETERNUS DX60 S5 is being used • On Create a volume that is encrypted by CM. • Off Create a volume that is not encrypted by CM. <p>Caution</p> <ul style="list-style-type: none"> • When "Thin Provisioning Volume" is selected for "Type", selecting on or off for this item is not available. • When "On" is selected, a RAID group that is configured with SEDs cannot be selected. When creating an ODX Buffer volume in a RAID group that is configured with SEDs, select "Off". 	On Off
Allocation	<p>Select the allocation mode for the ODX Buffer volume.</p> <p>This item is available only when the ODX Buffer volume is "Thin Provisioning Volume".</p> <ul style="list-style-type: none"> • Thin Physical area is allocated to the target area of the volume when a write I/O is received. • Thick Physical area is allocated to the whole area of the volume when volumes are created. 	Thin Thick

Target RAID Group/Thin Provisioning Pool

In this screen, select the RAID group or the TPP in which the ODX Buffer volume is created.

When "Type" is "Standard"

Item	Description
Radio buttons to select a RAID group	<p>Select the RAID group in which the ODX Buffer volume is created.</p> <div style="background-color: #fff9c4; padding: 10px;"> <p>Caution</p> <ul style="list-style-type: none"> • When "Encryption by CM" is "On", a RAID group that is configured with SEDs cannot be selected. • RAID groups in the following conditions are not displayed in the target RAID group list: <ul style="list-style-type: none"> - RAID groups that are registered in TPPs - RAID groups that are registered in FTRPs - RAID groups that are registered as REC Disk Buffers - RAID groups that are registered as Extreme Cache Pools - RAID groups in which 128 volumes are already created - RAID groups for which "Usage" is "Temporary" - RAID groups for which "Largest Free Space" is less than 1 GB - External RAID Groups </div>
RAID Group Name	The RAID group name is displayed.
Drive Type	<p>The type of drive that configures the RAID group is displayed.</p> <p>Online Nearline SSD Online SED Nearline SED SSD SED</p>
RAID Level	<p>The RAID level is displayed.</p> <p>High Performance (RAID1+0) High Capacity (RAID5) High Reliability (RAID6) High Reliability (RAID6-FR) Reliability (RAID5+0) Mirroring (RAID1) Striping (RAID0)</p>
Number of Drives	The number of drives that configure the RAID group is displayed.
Total Capacity	The total capacity of the RAID groups is displayed.
Total Free Space	<p>The total capacity of free space in the RAID group is displayed.</p> <p>"Free space" means an area in the RAID group where no volume is created, and dispersed areas which became free by creating and deleting a volume.</p>
Largest Free Space	The maximum capacity of free space in the RAID group is displayed.

When "Type" is "Thin Provisioning Volume"

Item	Description
Radio buttons to select a TPP	<p>Select the TPP in which the ODX Buffer volume is created.</p> <div style="background-color: #fff9c4; padding: 10px;"> <p>Caution</p> <ul style="list-style-type: none"> • FTRPs and FTSPs are not displayed in the target Thin Provisioning Pool list. </div>

5. Advanced Copy
Settings (Advanced Copy)

Item	Description
Thin Provisioning Pool Name	The Thin Provisioning Pool name is displayed.
Drive Type	The type of drive that configures the TPP is displayed. Online Nearline SSD Online SED Nearline SED SSD SED
RAID Level	The RAID level is displayed. High Performance (RAID1+0) High Capacity (RAID5) High Reliability (RAID6) High Reliability (RAID6-FR) Mirroring (RAID1) Striping (RAID0)
Total Capacity	The total capacity of the TPPs is displayed.
Total Free Space	The total capacity of free space in the TPP is displayed. "Free space" means an area in the TPP where no volume is allocated, and dispersed areas which became free by creating and deleting a volume.
Encryption	The TPP encryption status is displayed. <ul style="list-style-type: none"> • CM Encryption by CM • "-" (hyphen) The TPP is not encrypted. • SED Encryption by SED

■ Operating Procedures

Procedure ▶▶▶

- 1 Click [Create ODX Buffer Volume] in [Action].
- 2 Specify the detailed information of the ODX Buffer volume and select the RAID group or TPP in which the ODX Buffer volume is to be created. Click the [Create] button.

Note

- When using the maximum free space in the RAID group to create an ODX Buffer volume without specifying the capacity, select the "Enable" checkbox for "Use all Largest Free Space". A "Standard" type volume can be created using the maximum free space.

→ A confirmation screen appears.

Caution

- An error screen appears in the following conditions:
 - The "Name" is not entered
 - The "Name" does not satisfy the input conditions
 - The "Enable" checkbox for "Use all Largest Free Space" is cleared and "Capacity" is not entered
 - The "Enable" checkbox for "Use all Largest Free Space" is selected and the capacity of the created ODX Buffer volume is less than 1 GB
 - The "Enable" checkbox for "Use all Largest Free Space" is selected and the capacity of the created ODX Buffer volume is larger than the maximum capacity
 - The "Capacity" does not satisfy the input conditions
 - The maximum number of volumes that can be created is exceeded
 - Free space in the RAID group or TPP is insufficient
 - LDE is being performed in the RAID group to which the ODX Buffer volume belongs
 - When the allocation mode is "Thick" and the free space in the TPP is insufficient

3 Click the [OK] button.
→ ODX Buffer volume creation starts.

4 Click the [Done] button to return to the [Settings] screen.

Caution

- If the "Provisioned Capacity" (or the total logical capacity) of the volumes that exist within the TPP exceeds the total capacity of the TPP (or if the "Provisioned Rate" (or the capacity rate) exceeds "100 %") when ODX Buffer volumes (TPVs) are created, a warning message appears in the result screen. Check the TPP used state and add drives to expand the TPP capacity as required. Check the [Thin Provisioning Pool Detail] screen for "Provisioned Rate". Refer to the [Thin Provisioning Pool (Basic Information)] function for details.



Snap Data Pool

- ["■ Overview" \(page 491\)](#)
- ["■ User Privileges" \(page 492\)](#)
- ["■ Display Contents" \(page 492\)](#)

■ Overview

This function displays the usage of [SDP](#).

Caution

- The ETERNUS DX8100 S4 does not support this function.

Note

- This function is displayed only when the Advanced Copy function license has been registered or when the Unified Storage function is enabled.
- Because the ETERNUS DX60 S5 does not support the encryption function, display items that follow "Total Capacity" are displayed without the "Encrypted/Unencrypted" table heading.

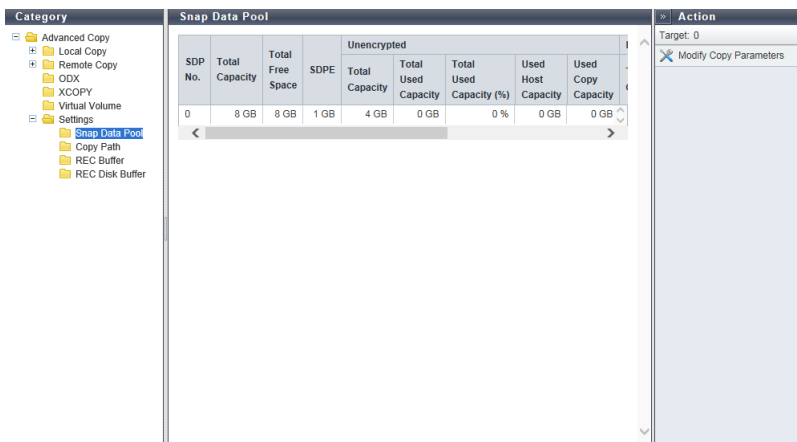
User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	✓
Admin	✓
StorageAdmin	✓
AccountAdmin	
SecurityAdmin	✓
Maintainer	✓

Refer to ["A. User Roles and Policies" \(page 1580\)](#) for details on the policies and roles.

Display Contents



Item	Description
SDP No.	The SDP number is displayed. 0 (fixed)
Total Capacity	The total capacity of the SDP is displayed.
Total Free Space	The total free capacity of the SDP is displayed.
SDPE	Snap Data Pool Element (SDPE), the allocation unit for SDV, is displayed. 1GB 2GB 4GB

5. Advanced Copy Snap Data Pool

Item		Description
Unencrypted	Total Capacity	The total capacity of unencrypted SDP is displayed.
	Total Used Capacity	The used capacity of unencrypted SDP is displayed.
	Total Used Capacity (%)	The usage rate of unencrypted SDP is displayed.
	Used Host Capacity	The total capacity of the SDPE that is allocated for an unencrypted SDV where a capacity shortage caused by data writing from the host has occurred is displayed.
	Used Copy Capacity	The total capacity of the SDPE that is allocated for an unencrypted SDV where a capacity shortage caused by SnapOPC or SnapOPC+ has occurred is displayed.
Encrypted	Total Capacity	The total capacity of encrypted SDP is displayed.
	Total Used Capacity	The used capacity of encrypted SDP is displayed.
	Total Used Capacity (%)	The usage rate of encrypted SDP is displayed.
	Used Host Capacity	The total capacity of the SDPE that is allocated for an encrypted SDV where a capacity shortage caused by data writing from the host has occurred is displayed.
	Used Copy Capacity	The total capacity of the SDPE that is allocated for an encrypted SDV where a capacity shortage caused by SnapOPC or SnapOPC+ has occurred is displayed.

Modify Copy Parameters

- ["■ Overview" \(page 493\)](#)
- ["■ User Privileges" \(page 495\)](#)
- ["■ Settings" \(page 495\)](#)
- ["■ Operating Procedures" \(page 495\)](#)

■ Overview

This function specifies the threshold for the [SDP](#) usage ratio and sets an [SDPE](#).

If the SDP capacity is insufficient during a [SnapOPC+](#) session, an error occurs and the relevant copy session and all the copy sessions that started earlier than the relevant session are stopped. This function is used to change the threshold and the SDPE.

Caution

- The ETERNUS DX8100 S4 does not support this function.
- A license must be registered for the Advanced Copy function or the Unified Storage environment is required to use this function.

Note

- Threshold setting for the **SDP**
 - Automatically notifying the user when the SDP usage ratio exceeds the threshold can be set. To notify events, specify the notification method in advance. Refer to the [Setup Event Notification] function for details.
 - If the threshold for multiple policies is exceeded at the same time, the storage system notifies of the highest policy level.
 - Notification of the shortage of SDP capacity is sent only once for each policy level. Even if the threshold is exceeded again within the 24 hours from the first notification, the storage system does not report that effect. After 24 hours has passed, the device sends a notification again.
- **SDPE** settings
 - The current capacities of the SDPEs and the SDP can be checked. Refer to the [Snap Data Pool] function for details.
 - The maximum SDP capacity is determined by the SDPE. The maximum SDP capacity for each SDPE is described below.
Note that the maximum SDP capacity varies depending on the maximum physical capacity of the drives in the storage system.

The Maximum SDP Capacity for Each SDPE

Model	SDPE	The maximum SDP capacity
ETERNUS DX60 S5/DX100 S5/DX200 S5	1 GB	32 TB
	2 GB	64 TB
	4 GB	128 TB
ETERNUS DX500 S5/DX600 S5	1 GB	64 TB
	2 GB	128 TB
	4 GB	256 TB
ETERNUS DX900 S5 ETERNUS DX8900 S4	1 GB	128 TB
	2 GB	256 TB
	4 GB	512 TB
ETERNUS AF150 S3/AF250 S3	1 GB	32 TB
	2 GB	64 TB
	4 GB	128 TB
ETERNUS AF650 S3	1 GB	64 TB
	2 GB	128 TB
	4 GB	256 TB

- When an SDPE is changed during operation, the changed value is applied to the SDPEs for the SDPVs that are created. Note that values of the SDPEs for SDPVs that are already created and being used do not change. Determining the SDPEs before starting operations and not changing the SDPEs once operations start are recommended.

■ **User Privileges**

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	✓
StorageAdmin	✓
AccountAdmin	
SecurityAdmin	
Maintainer	✓

Refer to "A. User Roles and Policies" (page 1580) for details on the policies and roles.

■ **Settings**

Specify the threshold for each policy level of the SDP.

Policy of Snap Data Pool

Item	Description	Setting values
Policy Level 1 (Informational) Threshold	If the usage of SDP exceeds the specified threshold, the storage system notifies that effect as the Policy Level 1 (Informational).	Numeric characters 1 - 97 % 50 % (Default)
Policy Level 2 (Warning) Threshold	If the usage of SDP exceeds the specified threshold, the storage system notifies that effect as the Policy Level 2 (Warning).	Numeric characters 2 - 98 % 70 % (Default)
Policy Level 3 (Error) Threshold	If the usage of SDP exceeds the specified threshold, the storage system notifies that effect as the Policy Level 3 (Error).	Numeric characters 3 - 99 % 99 % (Default)

SDPE Setting

Item	Description	Setting values
SDPE	Select the SDPE.	1 GB (Default) 2 GB 4 GB

■ **Operating Procedures**

Select the threshold for SDP usage ratio and SDPE.

Procedure ▶▶▶

- 1 Click [Modify Copy Parameters] in [Action].
- 2 Specify the parameters, and click the [Modify] button.
→ A confirmation screen appears.

Caution

- If the magnitude relation is not "Threshold for a policy level 1" < "Threshold for policy level 2" < "Threshold for policy level 3", an error screen appears.

- 3 Click the [OK] button.
→ The specified copy parameters are registered.
- 4 Click the [Done] button to return to the [Snap Data Pool] screen.



Copy Path

- ["■ Overview" \(page 496\)](#)
- ["■ User Privileges" \(page 496\)](#)
- ["■ Display Contents" \(page 497\)](#)

■ Overview

This function displays the REC path status between the local and remote storage systems. In this screen, check whether the copy path created with the [Set Copy Path] function is operating properly. Select the target remote storage system. (Up to 16 storage systems can be registered.) The following items are displayed.

- Storage System Information
- Advanced Copy Path Status

Caution

- The ETERNUS DX60 S5 does not support this function.
- After executing the [Set Copy Path] function, make sure to check the copy path status with this function.

Note

- This function is displayed only when the Advanced Copy function license or the Storage Cluster function license (*1) has been registered, and when using a storage system model that supports REC.
*1: The Storage Cluster function license must be registered using ETERNUS SF Storage Cruiser.
- The "Priority Level" and the "Multiplicity" settings can be specified for each remote Box ID. Refer to the [Modify REC Multiplicity] function for details.
- When the connection type is "Remote", "Line Speed" can be specified for each remote Box ID. Refer to the [Set REC Line Speed] function for details.

■ User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	✓
Admin	✓

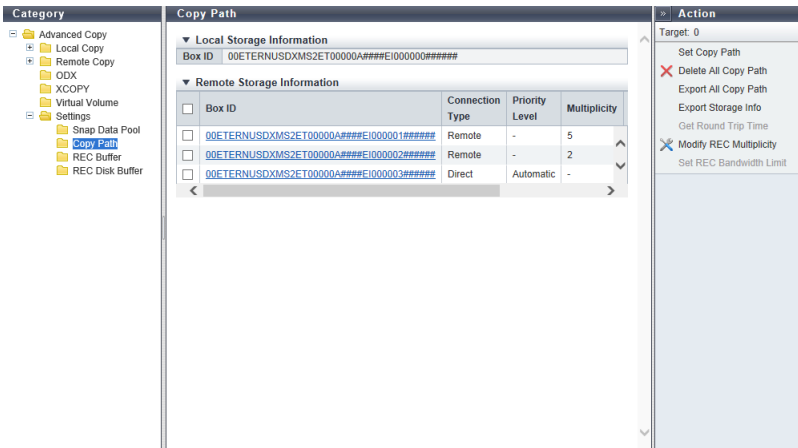
5. Advanced Copy
Copy Path

Default role	Availability of executions
StorageAdmin	✓
AccountAdmin	
SecurityAdmin	✓
Maintainer	✓

Refer to "A. User Roles and Policies" (page 1580) for details on the policies and roles.

■ Display Contents

A list of remote storage systems that are registered in the storage system is displayed.



Local Storage Information

The local storage system information is displayed.

Item	Description
Box ID	The Box ID of the local storage system is displayed.

Remote Storage Information

The remote storage system information is displayed.

Item	Description
Box ID	The Box ID of the remote storage system that has a path to the local storage system is displayed. Click this item to display the "[Copy Path Property] Screen" (page 498).
Connection Type	The type of connection to the remote storage system that has a path to the local storage system is displayed. Direct Remote

5. Advanced Copy
Copy Path

Item	Description
Priority Level	<p>When a remote storage system that has a path to the local storage system is connected by direct connection, the priority level is displayed.</p> <p>When the "Connection Type" is "Remote", a "-" (hyphen) is displayed.</p> <ul style="list-style-type: none"> • Automatic REC is performed using the priority level (Automatic Priority/High Priority/Middle Priority/Low Priority/Very Low Priority) that is specified with the [Modify EC/OPC Priority] function. • 1 - 8 REC is performed with the displayed priority level. "1" corresponds to "Very Low Priority", and "8" corresponds to "High Priority" for the [Modify EC/OPC Priority] function.
Multiplicity	<p>When a remote storage system that has a path to the local storage system is connected by remote connection, the multiplicity is displayed.</p> <p>When the "Connection Type" is "Direct", a "-" (hyphen) is displayed.</p> <ul style="list-style-type: none"> • Automatic REC is performed with the recommended multiplicity that is calculated by the [Measure Round Trip Time] result. • 1 - 1024 REC is performed with the multiplicity that is manually specified with the [Modify REC Multiplicity] function.
Recommended Multiplicity	<p>When a remote storage system that has a path to the local storage system is connected by remote connection, the recommended multiplicity is displayed.</p> <p>When the "Connection Type" is "Direct", a "-" (hyphen) is displayed.</p> <ul style="list-style-type: none"> • 1 - 1024 The recommended multiplicity that is calculated by the [Measure Round Trip Time] result. • *** The round trip time is not measured by the [Measure Round Trip Time] function.
Line Speed	<p>When a remote storage system that has a path to the local storage system is connected by remote connection, the line speed (1 to 65535 Mbit/s) is displayed.</p> <p>When the "Connection Type" is "Direct", a "-" (hyphen) is displayed.</p>

[Copy Path Property] Screen

The copy path details between the local and remote storage systems are displayed.

Storage System Information

The information for the storage system is displayed.



Item	Description
Local Storage Box ID	The Box ID of the local storage system is displayed.
Remote Storage Box ID	The Box ID of the selected remote storage system is displayed.
Connection Type	<p>The connection type between the local storage system and the selected remote storage system is displayed.</p> <p>Direct Remote</p>

5. Advanced Copy Copy Path

Item	Description
Priority Level	<p>When the local storage system and the selected remote storage system are connected by direct connection, the priority level is displayed.</p> <p>When the "Connection Type" is "Remote", a "-" (hyphen) is displayed.</p> <ul style="list-style-type: none"> • Automatic REC is performed using the priority level (Automatic Priority/High Priority/Middle Priority/Low Priority/Very Low Priority) that is specified with the [Modify EC/OPC Priority] function. • 1 - 8 REC is performed with the displayed priority level. "1" corresponds to "Very Low Priority", and "8" corresponds to "High Priority" for the [Modify EC/OPC Priority] function.
Multiplicity	<p>When the local storage system and the selected remote storage system are connected by remote connection, the multiplicity is displayed.</p> <p>When the "Connection Type" is "Direct", a "-" (hyphen) is displayed.</p> <ul style="list-style-type: none"> • Automatic REC is performed with the recommended multiplicity that is calculated by the [Measure Round Trip Time] result. • 1 - 1024 REC is performed with the multiplicity that is manually specified with the [Modify REC Multiplicity] function.
Recommended Multiplicity	<p>When the local storage system and the selected remote storage system are connected by remote connection, the recommended multiplicity is displayed.</p> <p>When the "Connection Type" is "Direct", a "-" (hyphen) is displayed.</p> <ul style="list-style-type: none"> • 1 - 1024 The recommended multiplicity that is calculated by the [Measure Round Trip Time] result. • *** The round trip time is not measured by the [Measure Round Trip Time] function.
Line Speed	<p>When the local storage system and the selected remote storage system are connected by remote connection, the line speed (1 to 65535 Mbit/s) is displayed.</p> <p>When the "Connection Type" is "Direct", a "-" (hyphen) is displayed.</p>

Advanced Copy Path Status

Detailed information of copy path is displayed.

Item	Description
Local Port	<p>The port information of the local storage system is displayed.</p> <p>For the ETERNUS DX900 S5 or the ETERNUS DX8900 S4 CE#x CM#y CA#z Port#w</p> <p>For the other models CM#y CA#z Port#w</p> <p>x: CE number y: CM number z: CA number w: Port number</p>
Status	<p>The port path status between the local and remote storage systems is displayed with an icon and a character string.</p> <ul style="list-style-type: none"> •  Normal: The copy path is in normal status. •  Error: The copy path is in error status.

5. Advanced Copy Copy Path

Item	Description
Remote Port WWN / iSCSI Name	The port WWN or iSCSI name of the remote storage system is displayed.
IP Version	When the port type is iSCSI, the IP version for the iSCSI port of the copy path is displayed. A "-" (hyphen) is displayed when the port type is FC. IPv4 IPv6 (Link Local) IPv6 (Connect IP)
IP Address	When the port type is iSCSI, the IP address for the destination port of the copy path is displayed. The display format varies according to the IP version. A "-" (hyphen) is displayed when the port type is FC. For IPv4 address xxx.xxx.xxx.xxx xxx: 0 - 255 (decimal) For IPv6 address xxxx:xxxx:xxxx:xxxx:xxxx:xxxx:xxxx:xxxx xxxx: 0 - ffff (hexadecimal, "a" - "f" are lowercase letters) Refer to "IPv6 Address Notation" (page 659) for details.
Bandwidth Limit	The bandwidth limit for sending data from the local storage system to the path is displayed. Unlimited 1 - 65535 [Mbit/s]
Detail Information	Detailed information about the copy path is displayed. If an error occurs in the copy path, the error details or location is displayed using the following abbreviations. If there are multiple error locations, multiple abbreviations are displayed. <ul style="list-style-type: none"> • Connectable The copy path is in normal status. • Path Unstable The copy path between the local storage system and remote storage system is in unstable status. For example, link-down repeatedly occurs in a certain period of time or communication fails. • Bitmap Resolution Mismatched The resolution settings are different between the local and remote storage systems. • Suspected Spot (D) The copy path settings may be invalid. • Suspected Spot (N) The error is suspected to have occurred in the remote storage system. • Suspected Spot (T) The error is suspected to have occurred in the FC-RA port or iSCSI-RA port in the remote storage system. • Suspected Spot (C) The error is suspected to have occurred in the cable. • Suspected Spot (O) The error is suspected to have occurred in the adapter other than the local storage system and the remote storage system. • Suspected Spot (S) The error is suspected to have occurred in the switch or the switch settings. • Suspected Spot (I) The error is suspected to have occurred in the FC-RA port or iSCSI-RA port on the local storage system. • Suspected Spot (M) The error is suspected to have occurred in the memory.

Set Copy Path

- ["■ Overview" \(page 501\)](#)
- ["■ User Privileges" \(page 504\)](#)
- ["■ Settings" \(page 504\)](#)
- ["■ Operating Procedures" \(page 529\)](#)

■ Overview

This function sets copy path information between the storage systems required for performing [REC](#) using the wizard screen.

Copy path information indicates the path (copy path and the storage system where the copy path is set) used for performing REC.

Not only copy path information of the local storage system but also the information between remote storage systems can be created.

Storage Systems That Can Be Used as Remote Storage Systems

- ETERNUS DX100 S5/DX200 S5
- ETERNUS DX500 S5/DX600 S5/DX900 S5
- ETERNUS DX8100 S4/DX8900 S4
- ETERNUS DX100 S4/DX200 S4
- ETERNUS DX500 S4/DX600 S4
- ETERNUS DX100 S3/DX200 S3
- ETERNUS DX500 S3/DX600 S3
- ETERNUS DX8100 S3/DX8700 S3/DX8900 S3
- ETERNUS AF150 S3/AF250 S3
- ETERNUS AF650 S3
- ETERNUS AF250 S2
- ETERNUS AF650 S2
- ETERNUS AF250
- ETERNUS AF650
- ETERNUS DX200F
- ETERNUS DX90 S2
- ETERNUS DX410 S2/DX440 S2
- ETERNUS DX8100 S2/DX8700 S2
- ETERNUS DX90
- ETERNUS DX410/DX440/DX8100/DX8400/DX8700
- ETERNUS4000/ETERNUS8000
- ETERNUS6000

The Maximum Number of Remote Storage Systems, Paths, and Ports

- Up to 16 remote storage systems can be connected from one storage system.
- Up to 8 copy paths can be created between a pair of storage systems.
- Up to 32 destination ports (FC-RA) can be connected from one port.

- Up to 16 destination ports (iSCSI-RA) can be connected from one port.

In the [Set Copy Path] function, the storage system that is used to create copy paths is referred to as "local storage system" and the storage system that is connected to is referred to as a "remote storage system".

The [Set Copy Path] function provides the following functions:

Procedure ▶▶▶

- 1 Register Storage System Information
- 2 Create Copy Path
- 3 Apply Copy Path
- 4 Save
- 5 Set Bandwidth Limit
- 6 Measure Round Trip Time



Caution

- Registering the Advanced Copy function license or the Storage Cluster function license (*1) is required to use this function.
- Creating copy paths in the ETERNUS DX100 S4/DX100 S3 is only available when the local storage system (the storage system where copy paths are created) is purchased outside Japan.
- To create copy path information between different generations of storage systems (such as ETERNUS DX600 S5 and ETERNUS DX200 S4), be sure to create the information on the newer model of storage system (ETERNUS DX600 S5 in the above example). The copy path creating function on an older model may not have a function to add the storage system information for newer models or the created path information file cannot be applied to newer models.
- To create copy path information between the ETERNUS DX8000 S4 series and the ETERNUS DX S5 series, create the information on the ETERNUS DX S5 series.
- If the created path information and the path information in the storage system do not match and some of the copy paths to the storage system are not selected to be applied, the actual path information after the application does not correspond to the contents of the backed up path information file. Refer to ""[Specification for Applying Result](#)" (page 523)" for details. Note that the backup path file corresponds to the downloaded path information file that is saved in the setting PC.
- Furthermore, note the following points for modifying the copy path information.
 - When adding a new copy path in the storage system where copy paths already exist, create path information files for all the copy paths including the existing paths.
 - If the Box ID is changed after the copy path is set, REC will no longer run. After creating the copy path information with the new Box ID, apply the new copy path information to all the storage systems that have copy paths to the storage system for which the Box ID was changed.
 - Modifying copy path information in use may stop or otherwise affect operations. Confirm that REC is not in use before modifying the information. To check whether REC is in use, refer to the copy session list of Remote Copy.
- An REC between ETERNUS DX S5 series or ETERNUS AF S3 series and the following models is not supported (*2).
 - ETERNUS DX410 S2/DX440 S2/DX8100 S2/DX8700 S2/DX90 S2
 - ETERNUS DX90
 - ETERNUS DX410/DX440/DX8100/DX8400/DX8700
 - ETERNUS4000/ETERNUS8000
 - ETERNUS6000

*1 : The Storage Cluster function license must be registered using ETERNUS SF Storage Cruiser.

*2 : These are the storage systems other than ETERNUS DX60 S5.

Note

- Only copy path information files created/saved with this function can be loaded with this function.
- The storage system information file that can be loaded by using this function is the file that can be obtained and downloaded from "[Storage Systems That Can Be Used as Remote Storage Systems](#)" (page 501)".
- Use the [Delete All Copy Path] function to delete the copy path information in the local storage system. The copy path information of the local storage system is initialized.
- The round trip time can be measured only between the local storage system and a remote storage system that has a physical path to the local storage system. When a copy path is created between remote storage systems, apply a copy path information file to the applicable storage system before measuring the round trip time.
- The round trip time can be measured only when the connection type is "Remote".
- To change the measured round trip time, use the [Measure Round Trip Time] function.
- To change the line speed, use the [Set REC Line Speed] function. The line speed can be set only when the "Connection Type" is "Remote".

■ **User Privileges**

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	✓
StorageAdmin	✓
AccountAdmin	
SecurityAdmin	
Maintainer	✓

Refer to "[A. User Roles and Policies](#)" (page 1580)" for details on the policies and roles.

■ **Settings**

In this screen, create a copy path using the wizard.

[Start] Screen

Operation Mode Selection

Item	Description	Setting values
Operation Mode	Select the operation mode. <ul style="list-style-type: none"> • Create Copy Path Create copy paths and then apply the information to the storage systems. • Apply Copy Path Apply the existing copy path information files to the storage systems. 	Create Copy Path Apply Copy Path

[Base Information Selection] Screen

Base Information Selection

Item	Description	Setting values
Base Information	<p>Specify whether to use existing information or which information to use for registration of storage system information.</p> <ul style="list-style-type: none"> • Backup Path File The copy path information file previously applied is used. • Path File The copy path information file that is saved in the setting PC is used. • Not use Copy path is newly created. 	Backup Path File Path File Not use

[Copy Path Information File Selection] (for Creation) Screen

Copy Path Information File Selection

Item	Description	Setting values
Copy path information file	<p>Input the location where the copy path information file is stored.</p> <p>Click the [Browse...] button to specify the storage location.</p>	Path to the location where the copy path information file is stored

[Check Registered Storage System Information] Screen

Registered Storage System List

Item	Description
Checkbox to select a storage system	<p>Select the storage system to create a copy path.</p> <p>A list of the storage system information specified in the copy path information file previously applied or stored in the storage system is displayed.</p> <div style="background-color: #fff9c4; padding: 10px; margin-top: 10px;"> <p>Caution</p> <ul style="list-style-type: none"> • Copy paths cannot be created when the same storage system is set for the local storage system and the remote storage system. • Copy paths cannot be created between the following storage systems. <ul style="list-style-type: none"> - ETERNUS DX S5 series or ETERNUS AF S3 series and the following models (*1): <ul style="list-style-type: none"> • ETERNUS DX410 S2/DX440 S2/DX8100 S2/DX8700 S2/DX90 S2 • ETERNUS DX90 • ETERNUS DX410/DX440/DX8100/DX8400/DX8700 • ETERNUS4000/ETERNUS8000 • ETERNUS6000 - ETERNUS DX S4/S3 series and ETERNUS6000 - ETERNUS AF series and ETERNUS6000 - ETERNUS DX90 and ETERNUS DX410/DX440/DX8100/DX8400/DX8700 - ETERNUS DX90 and ETERNUS4000/ETERNUS8000 <p>*1: These are the storage systems other than ETERNUS DX60 S5.</p> </div>
Box ID	The Box ID of the storage system is displayed.

[Storage System Configuration Settings] Screen

Storage System Configuration Settings

Item	Description	Setting values
Box ID	<p>The Box ID of one of the following storage systems that is used to create the copy path is displayed.</p> <ul style="list-style-type: none">• Storage systems that are selected from the existing copy path information files in the [Check Registered Storage System Information] screen• Storage systems that are added by registering a file from the [Storage System Information File Selection] screen• Storage systems that are added by manual entry in the [Storage System Information Setting] screen	
Port	<p>The location information of the port is displayed. The displayed contents and the number of displayed ports vary depending on the storage system type.</p> <p>Refer to "Displayed Contents for "Port" and Number of Displayed Ports" (page 508) for details.</p>	

5. Advanced Copy
Copy Path

Item	Description	Setting values
Port Type	<p>Specify the port type.</p> <p>The displayed contents vary depending on the storage system type.</p> <p>When the target port is not used, select "-" (hyphen).</p> <div style="background-color: #fff9c4; padding: 10px; margin-top: 10px;"> <p>Caution</p> <ul style="list-style-type: none"> • Regardless of whether a copy path is applied or not, select RA or CA/RA when a RA port or a CA/RA port exists in the storage system. • Different types of interfaces (FC, iSCSI 1Gbit/s, or iSCSI 10Gbit/s) cannot exist together on the same copy path (the path between the local storage system and the remote storage system). • Copy path information files cannot be applied to the storage system when the port mode of the port that is specified in the copy path information does not match the port mode of the adapter installed in the storage system to which the copy path information file is to be applied. Modify the copy path information or switch the port mode on the storage system in advance using the [Modify Port Mode] function. • Copy path information files cannot be applied to the storage system when the port type (FC or iSCSI) that is specified in the copy path information does not match the port type of the adapter installed in the storage system to which the copy path information file is to be applied. Applying copy path information is not available under the following conditions: <ul style="list-style-type: none"> - If the port type is FC, the WWN in the copy path information differs from that of the adapter in the target storage system - If the port type is iSCSI, the IP address and the iSCSI Name in the copy path information differ from those of the adapter in the target storage system </div>	

5. Advanced Copy
Copy Path

Item	Description	Setting values
Check to use as RA	<p>Select all of the RA or CA/RA type ports. The port number is displayed at right side of the checkbox.</p> <p>When "iSCSI RA (for older storage system connection)", "iSCSI-RA 1-Port", or "iSCSI-RA 2-Port" is selected in the "Port Type" field, all ports are automatically selected.</p> <p>This item is displayed when the model is other than ETERNUS6000.</p> <div style="background-color: #fff9c4; padding: 5px;"> <p>Caution</p> <ul style="list-style-type: none"> Regardless of whether a copy path is applied or not, select all of the RA ports or CA/RA ports. </div>	<p>#x</p> <p>x: Port number (0 - 3)</p> <p>When "FC 1-Port" is selected as the port type: #0 (#1, #2 and #3 cannot be selected.)</p> <p>When "FC 2-Port" is selected as the port type: #0, #1 (#2 and #3 cannot be selected.)</p> <p>When "FC 4-Port" is selected as the port type: #0, #1, #2, #3</p> <p>When "iSCSI 1-Port" is selected as the port type: #0 (#1 cannot be selected.)</p> <p>When "iSCSI 2-Port" is selected as the port type: #0, #1</p> <p>When "iSCSI-RA" is selected as the port type: #0, #1 (All ports are selected.)</p> <p>When "iSCSI-RA 1-Port" is selected as the port type: #0 (#0 is selected.)</p> <p>When "iSCSI-RA 2-Port" is selected as the port type: #0, #1 (All ports are selected.)</p> <p>Not selected</p>
Port No.	<p>This item is displayed only when the model is an ETERNUS6000.</p> <p>The port number is displayed.</p> <p>Port#x</p> <p>x: Port number (0 - 3)</p>	
Initiator / Target Setting	<p>This item is displayed only when the model is an ETERNUS6000.</p> <p>Select the usage for a port which requires the copy path to be set as RA.</p> <p>When "FC 2-Port" is selected as the port type: The [Initiator/Target Setting] for #2 and #3 will not be updated in the storage system.</p> <p>When "-" (hyphen) is selected as the port type: The [Initiator/Target Setting] for #0, #1, #2, and #3 will not be updated in the storage system.</p> <ul style="list-style-type: none"> Initiator: this is a dedicated port for sending. Target: this is a dedicated port for downloading. 	<p>Initiator</p> <p>Target</p>

Displayed Contents for "Port" and Number of Displayed Ports

Model	Display contents	Number of displayed ports
ETERNUS DX100 S5/DX100 S4/ DX100 S3	CM#y CA#z	Up to 4 (number of CMs: 2, number of CAs per CM: 2)
ETERNUS DX200 S5/DX200 S4/ DX200 S3	CM#y CA#z	Up to 4 (number of CMs: 2, number of CAs per CM: 2)
ETERNUS DX500 S5/DX500 S4/ DX500 S3	CM#y CA#z	Up to 4 (number of CMs: 2, number of CAs per CM: 2)
ETERNUS DX600 S5/DX600 S4/ DX600 S3	CM#y CA#z	Up to 8 (number of CMs: 2, number of CAs per CM: 4)
ETERNUS DX900 S5	CE#x CM#y CA#z	Up to 16 (number of CEs: 2, number of CMs per CE: 2, number of CAs per CM: 4)

5. Advanced Copy
Copy Path

Model	Display contents	Number of displayed ports
ETERNUS DX8100 S4/DX8100 S3	CM#y CA#z	Up to 4 (number of CMs: 2, number of CAs per CM: 2)
ETERNUS DX8700 S3	CE#x CM#y CA#z	Up to 32 (number of CEs: 4, number of CMs per CE: 2, number of CAs per CM: 4)
ETERNUS DX8900 S4/DX8900 S3	CE#x CM#y CA#z	Up to 96 (number of CEs: 12, number of CMs per CE: 2, number of CAs per CM: 4)
ETERNUS AF150 S3/AF250 S3/ AF250 S2/AF250	CM#y CA#z	Up to 4 (number of CMs: 2, number of CAs per CM: 2)
ETERNUS AF650 S3/AF650 S2/ AF650	CM#y CA#z	Up to 8 (number of CMs: 2, number of CAs per CM: 4)
ETERNUS DX200F	CM#y CA#z	4 (number of CMs: 2, number of CAs per CM: 2)
ETERNUS DX90 S2	CM#y CA#z	4 (number of CMs: 2, number of CAs per CM: 2)
ETERNUS DX410 S2	CM#y CA#z	Up to 4 (number of CMs: 2, number of CAs per CM: 2)
ETERNUS DX440 S2	CM#y CA#z	Up to 8 (number of CMs: 2, number of CAs per CM: 4)
ETERNUS DX8100 S2	CM#y CA#z	Up to 8 (number of CMs: 2, number of CAs per CM: 4)
ETERNUS DX8700 S2	CM#y CA#z	Up to 32 (number of CMs: 8, number of CAs per CM: 4)
ETERNUS DX90	CM#y	2 (number of CMs: 2)
ETERNUS DX410/DX440/DX8100/ DX8400/DX8700	CM#y CA#z	Up to 32 (number of CMs: 8, number of CAs per CM: 4)
ETERNUS4000/ETERNUS8000	CM#y CA#z	Up to 32 (number of CMs: 8, number of CAs per CM: 4)
ETERNUS6000	RT#v CA#z	Up to 16 (number of RTs: 4, CAs per RT: 4)

x: CE number
y: CM number
z: CA number
v: RT number

Port Type Setting Values

Model	Setting values
ETERNUS DX200 S5	FC 2-Port FC 4-Port iSCSI 2-Port "-" (hyphen)
ETERNUS DX100 S5/DX100 S4/DX100 S3 and ETERNUS DX200 S4/DX200 S3	FC 2-Port iSCSI 2-Port "-" (hyphen)
ETERNUS DX500 S5/DX600 S5, ETERNUS DX500 S4/DX600 S4, and ETERNUS DX500 S3/DX600 S3	FC 2-Port FC 4-Port iSCSI 2-Port iSCSI RA (for older storage system connection) "-" (hyphen)
ETERNUS DX900 S5, ETERNUS DX8100 S4/DX8900 S4, and ETERNUS DX8100 S3/DX8700 S3/DX8900 S3	FC 2-Port FC 4-Port iSCSI 2-Port iSCSI RA (for older storage system connection) "-" (hyphen)
ETERNUS AF250 S3	FC 2-Port FC 4-Port

5. Advanced Copy
Copy Path

Model	Setting values
	iSCSI 2-Port "- " (hyphen)
ETERNUS AF150 S3, ETERNUS AF250 S2, and ETERNUS AF250	FC 2-Port iSCSI 2-Port "- " (hyphen)
ETERNUS AF650 S3, ETERNUS AF650 S2, and ETERNUS AF650	FC 2-Port FC 4-Port iSCSI 2-Port iSCSI RA (for older storage system connection) "- " (hyphen)
ETERNUS DX200F	FC 2-Port iSCSI 2-Port "- " (hyphen)
ETERNUS DX90 S2	FC 1-Port FC 2-Port iSCSI 1-Port iSCSI 2-Port "- " (hyphen)
ETERNUS DX410 S2/DX440 S2 and ETERNUS DX8100 S2/DX8700 S2	FC 1-Port FC 2-Port FC 4-Port iSCSI 1-Port iSCSI 2-Port iSCSI RA (for older storage system connection) "- " (hyphen)
ETERNUS DX90	FC 4-Port "- " (hyphen)
ETERNUS DX410/DX440/DX8100/DX8400/DX8700 and ETERNUS4000/ ETERNUS8000	FC 1-Port FC 2-Port FC 4-Port iSCSI-RA 1-Port iSCSI-RA 2-Port "- " (hyphen)
ETERNUS6000	FC 2-Port FC 4-Port "- " (hyphen)

[Port Settings] Screen

Port Settings

Item	Description	Setting values
Port	<p>The location information of the port is displayed.</p> <p>For the ETERNUS DX900 S5, the ETERNUS DX8900 S4, and the ETERNUS DX8700 S3/DX8900 S3 CE#x CM#y CA#z Port#w</p> <p>For the other models CM#y CA#z Port#w</p> <p>x: CE number y: CM number z: CA number w: Port number</p>	
Port Type	<p>The type of the target port is displayed.</p> <p>FC 1-Port FC 2-Port FC 4-Port iSCSI 1-Port iSCSI 2-Port iSCSI RA (for older storage system connection) iSCSI-RA 1-Port iSCSI-RA 2-Port</p>	
IP Version	<p>Select the IP version of the iSCSI port.</p> <p>If the copy path is already specified for the port when the copy path information file is being loaded, the IP version that is set for the port is selected as the default value. For other ports, "IPv4" is set as the default value.</p> <p>This item is displayed only when the port type is "iSCSI 1-Port" or "iSCSI 2-Port".</p> <div style="background-color: #fff9c4; padding: 10px; margin-top: 10px;"> <p>Caution</p> <ul style="list-style-type: none"> For a single iSCSI port, one of the following IP versions can be used; IPv4, IPv6 (Link Local), or IPv6 (Connect IP). A copy path can be created between iSCSI ports that are the same IP version. </div>	<p>IPv4 IPv6 (Link Local) IPv6 (Connect IP)</p>
IP Address	<p>Input the IP address of the iSCSI port.</p> <p>This item is displayed when the port type is "iSCSI" (*1).</p> <p>This item is required when one of the following conditions applies: If not specified, the field is blank.</p> <ul style="list-style-type: none"> When "iSCSI RA" (for older storage system connection), "iSCSI-RA 1-Port", or "iSCSI-RA 2-Port" is selected for "Port Type" When "IP Version" is "IPv4" 	<p>Numeric characters First text box: "1" - "255" Other text boxes: "0" - "255" Blank</p>

5. Advanced Copy Copy Path

Item	Description	Setting values
IPv6 Link Local Address	<p>Input the IPv6 link local address of the iSCSI port.</p> <p>This item is required when "IP Version" is "IPv6 (Link Local)". If not specified, the field is blank.</p> <p>Refer to "Available IPv6 Address" (page 1221) for details. When the current setting is displayed, the IPv6 address is displayed as an abbreviation.</p> <p>This item is displayed only when the port type is "iSCSI 1-Port" or "iSCSI 2-Port".</p>	<p>fe80::xxxx:xxxx:xxxx:xxxx</p> <p>xxxx: 0 - ffff (FFFF) (hexadecimal, alphanumeric characters)</p> <p>Refer to "IPv6 Address Notation" (page 1220) for details.</p> <p>Blank</p>
IPv6 Connect IP Address	<p>Input the IPv6 connect IP address of the iSCSI port.</p> <p>This item is required when the IP version is "IPv6 (Connect IP)". If not specified, the field is blank.</p> <p>"Global address", "unique local address", or "6to4 address" can be input for the IPv6 address. Refer to "Available IPv6 Address" (page 1221) for details. When the current setting is displayed, the IPv6 address is displayed as an abbreviation.</p> <p>This item is displayed only when the port type is "iSCSI 1-Port" or "iSCSI 2-Port".</p>	<p>xxxx:xxxx:xxxx:xxxx:xxxx:xxxx:xxxx:xxxx</p> <p>xxxx: 0 - ffff (FFFF) (hexadecimal, alphanumeric characters)</p> <p>Refer to "IPv6 Address Notation" (page 1220) for details.</p> <p>Blank</p>
iSCSI Name	<p>Input the iSCSI Name of the iSCSI port.</p> <p>This item is required when the port type is "iSCSI" (*1). If not specified, the field is blank.</p> <p>Specify a unique iSCSI Name in the same storage system.</p>	<p>4 - 223 alphanumeric characters and symbols ('-', '!', ':')</p> <p>The name starts with "iqn." or "eui."</p> <p>Blank</p>
Alias Name	<p>Input the Alias name of the iSCSI port. (Can be omitted)</p> <p>This item is displayed when the port type is "iSCSI" (*1). If not specified, the field is blank.</p>	<p>Up to 31 alphanumeric characters and symbols ('-', '!', ':', '+', '@', '_', '=', '/', '[', ']', '!', '~')</p> <p>Blank</p>
User Name	<p>Input the user name to access the iSCSI port. (Can be omitted)</p> <p>This item is displayed when the port type is "iSCSI" (*1). If not specified, the field is blank.</p> <p>Make sure to set the user name and password together.</p>	<p>Up to 255 alphanumeric characters and symbols</p> <p>Blank</p>
Password	<p>Input the password to access the iSCSI port. (Can be omitted)</p> <p>This item is displayed when the port type is "iSCSI" (*1). If not specified, the field is blank.</p> <p>Make sure to set the user name and password together.</p> <p>The entry is displayed with "*" or similar characters.</p>	<p>12 - 100 alphanumeric characters and symbols</p> <p>Blank</p>
WWN	<p>Input the WWN for the FC port.</p> <p>A unique WWN in the storage system is required.</p> <p>This item is displayed when the port type is "FC" (*2). The following value is displayed as the default setting:</p> <ul style="list-style-type: none"> When the "Storage System Information File" or "Path Information File" has been read, the FC port WWNs that were specified in each file are displayed. When the storage system information is manually specified, the FC port WWNs that were created from the WWN of the storage system are displayed. <div style="background-color: #e0e0e0; padding: 5px; margin-top: 10px;"> <p>Note</p> <ul style="list-style-type: none"> For screens in which FC port WWNs are displayed, refer to "Display screen of the FC port WWNs" (page 517). </div>	<p>Hexadecimal numbers (0 - 9, A - F, a - f)</p> <p>16 digits (using "F (f)" or "0" in entire 16 digits is not allowed)</p>

*1 : When the port type is "iSCSI 1-Port", "iSCSI 2-Port", "iSCSI RA (for older storage system connection)", "iSCSI-RA 1-Port", or "iSCSI-RA 2-Port".

*2 : When the port type is "FC 1-Port", "FC 2-Port" or "FC 4-Port".

[Storage System Information File Selection] Screen

Registered Storage System List

Item	Description
Box ID	<p>The Box ID of one of the following storage systems to create a copy path is displayed.</p> <ul style="list-style-type: none"> Storage systems that are selected from the existing copy path information files in the [Check Registered Storage System Information] screen Storage systems that are added by registering a file from the [Storage System Information File Selection] screen Storage systems that are added by manual entry in the [Storage System Information Setting] screen

Operation Method Selection

Item	Description	Setting values
Operation Method	<p>Select whether to continue the storage system registration.</p> <p>When selecting "Registration from file", specify a file in the "Storage System Information File Selection" field.</p> <p>When 128 storage systems are already registered, "Registration from file" cannot be selected.</p>	<p>Finish of registration by file reading</p> <p>Registration from file</p>

Storage System Information File Selection

Item	Description	Setting values
Storage System Information File	<p>Input the location where the storage system information file is stored.</p> <p>Click the [Browse...] button to specify the storage location.</p>	<p>Path to the location where the storage system information file is stored</p>

[Storage System Information Setting] Screen

Registered Storage System List

Item	Description
Box ID	<p>The Box ID of one of the following storage systems to create a copy path is displayed.</p> <ul style="list-style-type: none"> Storage systems that are selected from the existing copy path information files in the [Check Registered Storage System Information] screen Storage systems that are added by registering a file from the [Storage System Information File Selection] screen Storage systems that are added by manual entry in the [Storage System Information Setting] screen

Operation Method Selection

Item	Description	Setting values
Operation Method	<p>Select whether to continue the storage system registration.</p> <p>When selecting "Registration by manual operation", specify parameters in the "Storage System Information Setting" field.</p> <p>When 128 storage systems are already registered, "Registration by manual operation" cannot be selected.</p>	<p>Finish of registration by manual operation</p> <p>Registration by manual operation</p>

Storage System Information Setting

Item	Description	Setting values
Storage System Type	Select the storage system type that is to be registered.	ETERNUS DX900 S5 ETERNUS DX500 S5/DX600 S5/AF650 S3 ETERNUS DX100 S5/DX200 S5/AF150 S3/AF250 S3 ETERNUS DX8900 S4 ETERNUS DX8100 S4 ETERNUS DX500 S4/DX600 S4/AF650 S2 ETERNUS DX100 S4/DX200 S4/AF250 S2 ETERNUS DX8700 S3/DX8900 S3 ETERNUS DX8100 S3 ETERNUS DX500 S3/DX600 S3/AF650 ETERNUS DX100 S3/DX200 S3/DX200F/AF250 ETERNUS DX8700 S2 ETERNUS DX8100 S2 ETERNUS DX410 S2/DX440 S2 ETERNUS DX90 S2 ETERNUS DX90 ETERNUS DX410/DX440/DX8100/DX8400/DX8700 ETERNUS4000/ETERNUS8000 MODEL400/600/800/1200/2200 ETERNUS4000/ETERNUS8000 MODEL300/500/700/900/1100/2100 ETERNUS6000
Box ID	Input the Box ID of the storage system that is to be registered. Box ID that is already registered in the storage system cannot be specified.	Alphabetic characters (upper case), numerals, blanks, and "#" (hash key characters) 40 characters (fixed)

5. Advanced Copy
Copy Path

Item	Description	Setting values
WWN	<p>Input the WWN of the storage system that is to be registered. A WWN that is already registered in the storage system cannot be specified.</p> <p>Note</p> <ul style="list-style-type: none"> • For the ETERNUS DX S3 series (*1) and higher models, the ETERNUS AF series, or the ETERNUS DX200F, the storage system WWN is displayed in the [System] screen. Refer to the [System (Basic Information)] function for details. • *1: ETERNUS DX S5 series or ETERNUS DX S4/S3 series • For older models, the storage system WWN is created from the FC port WWN. Refer to ""How to obtain the storage system WWNs" (page 516)" for details. • For screens in which FC port WWNs are displayed, refer to ""Display screen of the FC port WWNs" (page 517)". Note that the same storage system WWN is obtained from any FC port in the storage system. • If only an iSCSI interface is installed in the storage system, a storage system WWN cannot be created. In this case, use the [Export Storage Information] function in older models to create the storage system information file. Use the obtained file to register the storage system information with the [Set Copy Path] function. 	<p>Hexadecimal numbers (0 - 9, A - F, a - f) 16 digits (using "F (f)" or "0" in entire 16 digits is not allowed)</p>

5. Advanced Copy
Copy Path

How to obtain the storage system WWNs

Create the storage system WWN from a FC port WWN

- For the ETERNUS DX8100 S2/ETERNUS DX8700 S2,
the ETERNUS DX410 S2/DX440 S2,
the ETERNUS DX90 S2,
or the ETERNUS DX90

Convert the FC port WWN to bit format and change the bit7 - 0 values to "0".

(Example 1) When the FC port WWN is "500000E0D4445884", the storage system WWN is "500000E0D4445800".

The underlined value indicates bit7 - 0 in the following example:

Byte position	0	1	2	3	4	5	6	7
bit position	63 --- 56	55 --- 48	47 --- 40	39 --- 32	31 --- 24	23 --- 16	15 --- 8	7 --- 0
FC port WWN (bit format)	500000E0D4445884 (0101 0000 0000 0000 0000 0000 1110 0000 1101 0100 0100 0100 0101 1000 <u>1000 0100</u>)							
Storage system WWN (bit format)	500000E0D4445800 (0101 0000 0000 0000 0000 0000 1110 0000 1101 0100 0100 0100 0101 1000 <u>0000 0000</u>)							

- For the ETERNUS DX410/DX440/DX8100/DX8400/DX8700,
the ETERNUS4000/ETERNUS8000 model 400/600/800/1200/2200,
the ETERNUS4000/ETERNUS8000 model 300/500/700/900/1100/2100,
or the ETERNUS6000

Convert the FC port WWN to bit format and change the bit60 - 48 values to "0".

(Example 2) When the FC port WWN is "2040000B5D6A0000", the storage system WWN is "2000000B5D6A0000".

The underlined value indicates bit60 - 48 in the following example:

Byte position	0	1	2	3	4	5	6	7
bit position	63 --- 56	55 --- 48	47 --- 40	39 --- 32	31 --- 24	23 --- 16	15 --- 8	7 --- 0
FC port WWN (bit format)	2040000B5D6A0000 (00 <u>10 0000 0100 0000</u> 0000 0000 0000 1011 0101 1101 0110 1010 0000 0000 0000 0000)							
Storage system WWN (bit format)	2000000B5D6A0000 (00 <u>10 0000 0000 0000</u> 0000 0000 0000 1011 0101 1101 0110 1010 0000 0000 0000 0000)							

5. Advanced Copy Copy Path

Display screen of the FC port WWNs

The FC port WWNs are displayed in the following screens:

- For the ETERNUS DX S5 series
For the ETERNUS DX S4/S3 series
For the ETERNUS AF series and the ETERNUS DX200F
→ Port information (FC) of the [Channel Adapter Detail] screen
- For the ETERNUS DX90 S2
For the ETERNUS DX410 S2/DX440 S2
For the ETERNUS DX8100 S2/DX8700 S2
→ Port information (FC) of the [Channel Adapter Detail] screen
- For the ETERNUS DX90
→ Port status (FC) of the [Storage System Status] screen
- For the ETERNUS DX410/DX440
For the ETERNUS DX8100/DX8400/DX8700
For the ETERNUS4000/ETERNUS8000
→ CA Detailed Information screen (FC) of the [Storage System Status] screen
- For the ETERNUS6000
→ WWN list (FC) of the [Storage System Status] screen

[Check Registered Storage System Information] Screen



Registered Storage System List

Item	Description
Box ID	The Box IDs of the storage systems to create a copy path are displayed. Two or more storage systems are required when creating a copy path.

[Copy Path Creation Storage System Selection] Screen

Storage System Connection List

A list of combinations of registered storage systems that can be connected is displayed.

Item	Description
Path	When a copy path is set between storage systems, the following icons are displayed. <ul style="list-style-type: none"> •  A copy path is set. •  The following errors occur in the specified copy path. <ul style="list-style-type: none"> - More than 16 remote storage systems are connected. - More than 32 copy paths (16 copy paths for iSCSI-RA) are set for a port.
Local Storage System Box ID	The Box ID for the local storage system is displayed. In the [Set Copy Path] function, the storage system that is used to create copy paths is referred to as "local storage system" and the storage system that is connected to is referred to as a "remote storage system". There is no copy direction between the "local storage system" and the "remote storage system". Both storage systems can be used as the copy source storage system.
Remote Storage System Box ID	The Box ID for the remote storage system is displayed. Click this item to display the "[Copy Path Setting] Dialog Box" (page 518).

[Copy Path Setting] Dialog Box

Set Copy Path

Item	Description
Local Storage System Box ID	The Box ID for the local storage system is displayed.
Remote Storage System Box ID	The Box ID for the remote storage system is displayed.

Line Setting

Item	Description	Setting values
Connection Type	<p>Select the connection type between the local and remote storage systems.</p> <ul style="list-style-type: none"> Remote Connecting the local and remote storage systems via a line. Direct Connecting the local and remote storage systems without a line. Even in connection via a switch, select "Direct" when not using a line. 	Remote Direct
Line Speed	<p>Specify the line speed (1 to 65535 (Mbit/s)) for connection with the remote storage system. This item can be set when the "Connection Type" is "Remote". Refer to ""Setting Example of Line Speed" (page 518)" for details.</p> <div style="background-color: #fff9c4; padding: 5px;"> <p>Caution</p> <ul style="list-style-type: none"> To change the line speed, create a copy path with a new line speed by using this function, and apply the created copy path to the related storage systems. </div>	Up to 5-digit decimal number 1 - 65535 (Mbit/s)

Setting Example of Line Speed

For the "Line Speed" field, specify the WAN bandwidth (a total of multiple lines, if used) that can be actually used for REC. For some cases such as using the bandwidth control device, the WAN bandwidth that can be used for REC is designated. In this case, specify the designated value. To control WAN bandwidth, using the bandwidth control device is required.

When using a carrier equipment with the compression function, specify the bandwidth (a total of multiple lines, if used) that can be used after compression. In the ETERNUS storage systems, data compression is unavailable. To compress data, using a carrier equipment with the compression function is required.

(Example 1): When the bandwidth control device is not used

Line bandwidth (*2): 200 Mbit/s (All available for REC)

The number of lines (*3): 4 (200 Mbit/s for all)

Line speed = 200 (Mbit/s) × 4 = 800 (Mbit/s)

(Example 2): When the bandwidth control device is used

Line bandwidth with bandwidth limit (*2): 100 Mbit/s (100 Mbit/s out of 200 Mbit/s line bandwidth is available for REC)

The number of lines (*3): 2 (100 Mbit/s for all)

Line speed = 100 (Mbit/s) × 2 = 200 (Mbit/s)

(Example 3): When the line device has no compression function

Line bandwidth (*2): 200 Mbit/s (All available for REC)

The number of lines (*3): 2 (200 Mbit/s for all)

Compression ratio: 0 (%) (No compression)

Line speed = 200 (Mbit/s) × 2 ÷ (1 - 0 (%)) = 400 (Mbit/s)

(Example 4): When the line device has the compression function

5. Advanced Copy Copy Path

Line bandwidth (*2): 200 Mbit/s (All available for REC)
 The number of lines (*3): 2 (200 Mbit/s for all)
 Compression ratio: 20 (%) (20% for all)
 Line speed = 200 (Mbit/s) × 2 ÷ (1 - 20 (%)) = 500 (Mbit/s)

*2 : The line bandwidth that the user has signed up to be used for REC

*3 : The number of lines that the user has signed up to be used for REC

Path Settings

Item	Description
CE	<p>The CE number is displayed.</p> <p>Local storage system: Displayed in the vertical lines.</p> <p>Remote storage system: Displayed in the horizontal lines.</p> <p>This item is displayed for models in which multiple CEs can be installed, such as the ETERNUS DX8900 S4.</p> <p>CE#x x: CE number</p>
CM	<p>The CM number is displayed.</p> <p>Local storage system: Displayed in the vertical lines.</p> <p>Remote storage system: Displayed in the horizontal lines.</p> <p>This item is displayed when the model is not an ETERNUS6000.</p> <p>CM#x x: CM number</p>
RT	<p>The RT number is displayed.</p> <p>Local storage system: Displayed in the vertical lines.</p> <p>Remote storage system: Displayed in the horizontal lines.</p> <p>This item is displayed only when the model is ETERNUS6000.</p> <p>RT#x x: RT number</p>
CA	<p>The CA number and the port type are displayed.</p> <p>Local storage system: Displayed in the vertical lines.</p> <p>Remote storage system: Displayed in the horizontal lines.</p> <p>This item is not displayed when the model is ETERNUS DX90.</p> <p>CA#x (y) x: CA number y: Port type FC iSCSI</p>
Port	<p>The port number (0 to 3) in the CM or CA is displayed.</p> <p>Local storage system: Displayed in the vertical lines.</p> <p>Remote storage system: Displayed in the horizontal lines.</p> <p>If "Port Type" is "iSCSI 1-Port", "iSCSI 2-Port", "iSCSI RA (for older storage system connection)", "iSCSI-RA 1-Port", or "iSCSI-RA 2-Port", the IP version is displayed after or under the port number.</p> <p>(v4): IPv4 address (v6L): IPv6 link local address (v6C): IPv6 connect IP address (-): The target port is not used</p> <p>When using the ETERNUS6000, the usage of the port is displayed after or under the port number.</p> <p>(I): Initiator (A dedicated port for sending) (T): Target (A dedicated port for downloading) (-): The target port is not used</p>

5. Advanced Copy Copy Path

Item	Description
Line	Select the checkbox for the combination of storage systems to apply the copy path.
Setting	<p>Clear the checkbox for the combination of storage systems to delete the copy path.</p> <p>Up to eight copy paths can be selected.</p> <p>Checkboxes are displayed only for the combinations meeting all the following conditions (combinations to which a copy path can be set):</p> <ul style="list-style-type: none">• The same port type (FC, iSCSI, or iSCSI-RA) is used for both the local storage system and remote storage system.• The same IP version (v4, v6L, or v6C) is specified for the iSCSI ports that are used for both the local and remote storage systems.• The port type is RA or CA/RA.• For the ETERNUS6000, the local storage system and the remote storage system have different port usages (Initiator/Target).

[Download File] Screen

Export Copy Path Information

Item	Description
Save	When the copy path information file already exists, the [✓] icon is displayed.

5. Advanced Copy Copy Path

Item	Description
Model	<p>The target models for outputting the copy path information file are displayed.</p> <p>Only the models in the path information that is created by this function are displayed in the following model units.</p> <ul style="list-style-type: none"> • ETERNUS DX S5 series, AF S3 series • ETERNUS DX8000 S4 series • ETERNUS DX S4/S3 series, AF series (excluding the AF S3 series), ETERNUS DX200F (Target: V10L40 and later) • ETERNUS DX S3 series, ETERNUS DX200F (Target : earlier than V10L40) • ETERNUS DX90 S2 ETERNUS DX400 S2 series ETERNUS DX8000 S2 series • ETERNUS DX90 • ETERNUS DX400 series ETERNUS DX8000 series • ETERNUS4000 ETERNUS8000 • ETERNUS6000 <div style="background-color: #fff9c4; padding: 10px; margin-top: 10px;"> <p>Caution</p> <ul style="list-style-type: none"> • If all the controller firmware versions for the ETERNUS DX S3 series in the copy path information file are "V10L40 and later", save the copy path information file of "ETERNUS DX S4/S3 series, AF series, ETERNUS DX200F (Target : V10L40 and later)". If all the controller firmware versions for the ETERNUS DX S3 series in the copy path information file are "earlier than V10L40", save the copy path information file of "ETERNUS DX S3 series, ETERNUS DX200F (Target : earlier than V10L40)". If the controller firmware versions in the copy path information file are both "V10L40 and later" and "earlier than V10L40", save both the copy path information files of "ETERNUS DX S4/S3 series, AF series, ETERNUS DX200F (Target : V10L40 and later)" and "ETERNUS DX S3 series, ETERNUS DX200F (Target : earlier than V10L40)". <p>For the storage systems with the controller firmware versions V10L40 and later, the copy path information file that is saved in the "ETERNUS DX S4/S3 series, AF series, ETERNUS DX200F (Target : V10L40 and later)" format must be applied. Similarly, for the storage systems with the controller firmware versions earlier than V10L40, the copy path information file that is saved in the "ETERNUS DX S3 series, ETERNUS DX200F (Target : earlier than V10L40)" format must be applied.</p> <ul style="list-style-type: none"> • To edit the copy path information file for the ETERNUS DX S3 series using this function, use the copy path information file that was saved in the "ETERNUS DX S4/S3 series, AF series, ETERNUS DX200F (Target : V10L40 and later)" format. Note that this function cannot edit the copy path information file that is saved in "ETERNUS DX S3 series, ETERNUS DX200F (Target : earlier than V10L40)". </div> <div style="background-color: #e0e0e0; padding: 10px; margin-top: 10px;"> <p>Note</p> <ul style="list-style-type: none"> • If the local storage system is an ETERNUS DX S4/S3 series, the following information is displayed even if there is no copy path information for the ETERNUS DX S4 series or the ETERNUS DX S3 series. <ul style="list-style-type: none"> - ETERNUS DX S4/S3 series, AF series, ETERNUS DX200F (Target : V10L40 and later) - ETERNUS DX S3 series, ETERNUS DX200F (Target : earlier than V10L40) • If the local storage system is an ETERNUS DX8000 S4 series, "ETERNUS DX8000 S4 series" is displayed even if there is no copy path information for the relevant storage system. • If the local storage system is an ETERNUS DX S5 series or ETERNUS AF S3 series, "ETERNUS DX S5 series, ETERNUS AF S3 series" is displayed even if there is no relevant storage system. </div>

5. Advanced Copy Copy Path

Item	Description
Box ID	The Box IDs for output target models are displayed. <ul style="list-style-type: none">• For the ETERNUS DX S5/S4/S3 series, the ETERNUS AF series, the ETERNUS DX90 S2, the ETERNUS DX400 S2 series, and the ETERNUS DX8000 S2 series, the Box IDs are displayed in the same line. Note that if no path information exists for the ETERNUS DX S5/S4/S3 series and the ETERNUS AF series, a blank is displayed as the Box ID.• For the other models, a single Box ID is displayed in one line.

[Copy Path Information File Selection] (for Applying) Screen

Copy Path Information File Selection

Item	Description
Copy Path Information File	Input the location where the copy path information file is stored. Click the [Browse...] button to specify the storage location.

[Storage System Connection List] Screen

Local Storage System Information

Item	Description
Box ID	The Box ID for the local storage system is displayed.

Remote Storage System Information

Item	Description
Checkbox to select a Box ID	Select the checkbox of the path information that is to be applied to the storage system. This checkbox is only displayed when the path information that is created by this function does not match the path information that is already applied. The Box ID in the path information that is created by using this function is selected by default.

5. Advanced Copy Copy Path

Item	Description
Result of applying	<p>The results of comparing the path information that is created by using this function and the path information that is already applied to the storage system are displayed.</p> <p>When the checkbox for selecting a Box ID is selected, the path information after applying the created path information to the storage system is displayed.</p> <p>When the checkbox for selecting a Box ID is cleared, the path information before applying the created path information to the storage system is displayed.</p> <ul style="list-style-type: none"> • When the path setting is not to be changed, "Do not Change" is displayed • When the path is to be added, "Add" is displayed • When the path is not to be added, "Do not Add" is displayed • When the path setting is to be changed, "Change" is displayed • When the path is to be deleted, "Delete" is displayed <p>Refer to "Specification for Applying Result" (page 523)" and "Display Example of an Applying Result and an Actual Applying Result" (page 524)" for details. When applying the copy path information file to the storage system, the paths with the "Add", "Change", and "Delete" states are updated.</p> <div style="background-color: #fff9c4; padding: 10px; margin: 10px 0;"> <p>Caution</p> <ul style="list-style-type: none"> • If the created path information and the path information in the storage system do not match and some of the copy paths to the storage system are not selected to be applied (clear the Box ID checkbox), the actual path information after the application does not correspond to the backed up path information file. Refer to "Specification for Applying Result" (page 523)" for details. </div> <div style="background-color: #e0e0e0; padding: 10px; margin: 10px 0;"> <p>Note</p> <ul style="list-style-type: none"> • Even when "Result of applying" is "Delete" for the path, the applying result is changed to "Do not Change" when the checkbox for selecting the Box ID is cleared. If the created path information is applied under this condition, the relevant path is not deleted. The path information is merged in the storage system. • When "Result of applying" is "Do not Change" for a path, the checkbox for selecting a Box ID is selected. In this case, the checkbox cannot be cleared. </div>
Box ID	<p>The Box ID for the remote storage system is displayed.</p> <p>A link is displayed for the Box ID of the created copy path information. Click this item to display the "[Check Copy Path Information Setting] Dialog Box" (page 526).</p>

Specification for Applying Result

Comparison result (*1)		Display item in the "Result of applying" field		
		Status of the checkbox for selecting a Box ID		
		Selected (Apply the information)	Cleared (Do not apply the information)	Default
The Box ID information exists in both storage systems	The path information is the same	Do not Change	Do not Change	Do not Change
	The path information is different	Change	Do not Change (*2)	Change
The Box ID exists only in the created path information		Add	Do not Add	Add
The Box ID information exists only in the path information in the storage system		Delete	Do not Change (*2)	Do not Change

*1 : The comparison result between "created path information" and "path information in the storage system" is displayed.

5. Advanced Copy Copy Path

*2 : If the path information file is applied to the storage system under this condition, the contents of the path information in the storage system and the backup path file do not match.

Display Example of an Applying Result and an Actual Applying Result

(Example 1) When applying the created path information to the storage system (all of the checkboxes for selecting the Box IDs are selected)	
Created path information	Path for storage system 1 Storage system 4 -- (Path c) -- Storage system 1 -- (Path b) -- Storage system 3
Path information in the storage system	Path for storage system 1 Storage system 2 -- (Path a) -- Storage system 1 -- (Path b) -- Storage system 3
Checkbox to select a Box ID	Storage system 2: Selected Storage system 3: Selected (because there are no differences between "created path information" and "path information in the storage system", the checkbox is selected and cannot be changed.) Storage system 4: Selected
Result of applying	How the path information in the storage system is to be changed after applying the created path information is displayed. Path a: Delete Path b: Do not Change Path c: Add
Path information in the storage system (Actual result of applying)	Path in the storage system 1 Storage system 4 -- (Path c) -- Storage system 1 (path b) -- Storage system 3 All the path information ("path information in the storage system", "backed up path information", and "downloaded path information") are the same.
Backed up path information (*1)	Path for storage system 1 Storage system 4 -- (Path c) -- Storage system 1 -- (Path b) -- Storage system 3
Downloaded path information (*2)	Path for storage system 1 Storage system 4 -- (Path c) -- Storage system 1 -- (Path b) -- Storage system 3
(Example 2) When applying the created path information to the storage system (the checkbox for selecting Box ID is cleared)	
Created path information	Path for storage system 1 Storage system 4 -- (Path c) -- Storage system 1 -- (Path b) -- Storage system 3
Path information in the storage system	Path for storage system 1 Storage system 2 -- (Path a) -- Storage system 1 -- (Path b) -- Storage system 3
Checkbox to select a Box ID	Storage system 2: Cleared Storage system 3: Selected (because there are no differences between "created path information" and "path information in the storage system", the checkbox is selected and cannot be changed.) Storage system 4: Cleared
Result of applying	How the path information in the storage system is to be changed after applying the created path information is displayed. Path a: Do not Change Path b: Do not Change Path c: Do not Add
Path information in the storage system (Actual result of applying)	Path in the storage system 1 Storage system 2 -- (Path a) -- Storage system 1 -- (Path b) -- Storage system 3 The copy path information in the storage system is not changed after the copy path information file is applied.

5. Advanced Copy
Copy Path

(Example 2) When applying the created path information to the storage system (the checkbox for selecting Box ID is cleared)	
Backed up path information (*1)	<p>Path for storage system 1 Storage system 1 -- (Path b) -- Storage system 3</p> <p>In the backed up path information, only the part of the "created path information" that is applied to the storage system is saved. Note that this information does not match "path information in the storage system".</p>
Downloaded path information (*2)	<p>Path for storage system 1 Storage system 1 -- (Path b) -- Storage system 3</p> <p>The downloaded path information is the same as the backed up path information.</p>

(Example 3) When applying the created path information to the storage system (the checkboxes for selecting the Box IDs are selected or cleared)	
Created path information	<p>Path for storage system 1 Storage system 4 -- (Path c) -- Storage system 1 == (Path b) == Storage system 3 (increase the number of ports for Path b)</p>
Path information in the storage system	<p>Path for storage system 1 Storage system 2 -- (Path a) -- Storage system 1 -- (Path b) -- Storage system 3</p>
Checkbox to select a Box ID	<p>Storage system 2: Cleared Storage system 3: Selected Storage system 4: Selected</p>
Result of applying	<p>How the path information in the storage system is to be changed after applying the created path information is displayed.</p> <p>Path a: Do not Change Path b: Change Path c: Add</p>
Path information in the storage system (Actual result of applying)	<p>Path for storage system 1 Storage system 4 -- (Path c) -- Storage system 1 == (Path b) == Storage system 3 (Path a) Storage system 2</p> <p>Path a between storage systems 1 and 2 is merged in the path information that is applied in the storage system.</p>
Backed up path information (*1)	<p>Path for storage system 1 Storage system 4 -- (Path c) -- Storage system 1 == (Path b) == Storage system 3</p> <p>Some parts of the backed up path information that is applied in the storage system (in this example, all of "created path information") are saved. The merged parts (the Path a between storage systems 1 and 2) are not backed up. In this case, the backed up path information does not match "path information in the storage system".</p>
Downloaded path information (*2)	<p>Path for storage system 1 Storage system 4 -- (Path c) -- Storage system 1 == (Path b) == Storage system 3</p> <p>The downloaded path information is the same as the backed up path information.</p>

*1 : When the copy path information file is applied to the storage system, a backup path file is created. The backup path file can be downloaded by using the [Export All Copy Path] function.

*2 : The copy path information file that is saved in the setting PC by clicking the [Save] button in this function.

[Check Copy Path Information Setting] Dialog Box


Copy Path Information

Item	Description
Local Storage System Box ID	The Box ID for the local storage system is displayed.
Remote Storage System Box ID	The Box ID for the remote storage system is displayed.
Connection Type	The connection type for the remote storage system is displayed.
Line Speed	The line speed (1 to 65535 (Mbit/s)) for the local storage system and the remote storage system is displayed. A "-" (hyphen) is displayed when the connection type is "Direct".

Line Setting

Item	Description
CE	<p>The CE number is displayed.</p> <p>Local storage system: Displayed in the vertical lines.</p> <p>Remote storage system: Displayed in the horizontal lines.</p> <p>This item is displayed for models in which multiple CEs can be installed, such as the ETERNUS DX8900 S4.</p> <p>CE#x x: CE number</p>
CM	<p>The CM number is displayed.</p> <p>Local storage system: Displayed in the vertical lines.</p> <p>Remote storage system: Displayed in the horizontal lines.</p> <p>This item is displayed when the model is not an ETERNUS6000.</p> <p>CM#x x: CM number</p>
RT	<p>The RT number is displayed.</p> <p>Local storage system: Displayed in the vertical lines.</p> <p>Remote storage system: Displayed in the horizontal lines.</p> <p>This item is displayed only when the model is ETERNUS6000.</p> <p>RT#x x: RT number</p>
CA	<p>The CA number and the port type are displayed.</p> <p>Local storage system: Displayed in the vertical lines.</p> <p>Remote storage system: Displayed in the horizontal lines.</p> <p>This item is not displayed when the model is ETERNUS DX90.</p> <p>CA#x (y) x: CA number y: Port type FC iSCSI</p>

5. Advanced Copy Copy Path

Item	Description
Port	<p>The port number (0 to 3) in the CM or CA is displayed.</p> <p>Local storage system: Displayed in the vertical lines.</p> <p>Remote storage system: Displayed in the horizontal lines.</p> <p>If "Port Type" is "iSCSI 1-Port", "iSCSI 2-Port", "iSCSI RA (for older storage system connection)", "iSCSI-RA 1-Port", or "iSCSI-RA 2-Port", the IP version is displayed after or under the port number.</p> <p>(v4): IPv4 address (v6L): IPv6 link local address (v6C): IPv6 connect IP address (-): The target port is not used</p> <p>When using the ETERNUS6000, the usage of the port is displayed after or under the port number.</p> <p>(I): Initiator (A dedicated port for sending) (T): Target (A dedicated port for downloading) (-): The target port is not used</p>
Line Setting	The  icon is displayed for the copy path that is set between the RA ports.

[Set Bandwidth Limit] Screen

Remote Storage System Information

Item	Description
Box ID	The Box ID for the remote storage system is displayed.
Bandwidth Limit	<p>The bandwidth limit between the local and the remote storage systems is displayed.</p> <p>If the same bandwidth limit is specified for all of the ports, one bandwidth limit value is displayed. If different bandwidth limit settings are applied to each port, multiple bandwidth limit values are displayed.</p> <p>Click the [Bandwidth Limit] link to display the [Set REC Bandwidth Limit] screen.</p> <p>Unlimited 1 - 65535 (Mbit/s)</p>
Connection Type	<p>The connection type for the remote storage system is displayed.</p> <p>Direct Remote</p>
Line Speed	The line speed (1 to 65535 (Mbit/s)) for the local storage system and the remote storage system is displayed. A "-" (hyphen) is displayed when the connection type is "Direct".

[Set REC Bandwidth Limit] Screen

Storage System Information

Item	Description
Local Storage Box ID	The Box ID of the local storage system is displayed.
Remote Storage Box ID	The Box ID for the remote storage system is displayed.
Line Speed	<p>When a remote storage system that has a path to the local storage system is connected by remote connection, the line speed (1 to 65535 (Mbit/s)) is displayed.</p> <p>When the "Connection Type" is "Direct", a "-" (hyphen) is displayed.</p>

Bandwidth Limit Settings

Item	Description	Setting values
Setting Mode	Select a bandwidth setting mode.	Set the same Bandwidth Limit for all paths Set the Bandwidth Limit for each path
Bandwidth Limit	When "Set the same Bandwidth Limit for all paths" is selected for the setting mode, enter the bandwidth limit. When "0" is entered, the bandwidth limit is "Unlimited". When "Set the Bandwidth Limit for each path" is selected for the setting mode, the field is blank. Set the bandwidth limit for each path in the "Advanced Copy Path" field.	0 - 65535 (Mbit/s) Blank

Advanced Copy Path

Item	Description	Setting values
Local Port	The location information of a CA port in the local storage system is displayed. For the ETERNUS DX900 S5, the ETERNUS DX8900 S4, and the ETERNUS DX8700 S3/DX8900 S3 CE#x CM#y CA#z Port#w For the other models CM#y CA#z Port#w x: CE number y: CM number z: CA number w: Port number	
Remote Port WWN / iSCSI Name	The destination port is displayed. For the FC port, WWN is displayed. For the iSCSI port, iSCSI name is displayed.	
IP Address	When the port type is iSCSI, the IP address for the destination port of the copy path is displayed. The display format varies according to the IP version. A "-" (hyphen) is displayed when the port type is FC. For IPv4 address xxx.xxx.xxx.xxx xxx: 0 - 255 (decimal) For IPv6 address xxxx:xxxx:xxxx:xxxx:xxxx:xxxx:xxxx:xxxx xxxx: 0 - ffff (FFFF) (hexadecimal, alphanumeric characters) Refer to "IPv6 Address Notation" (page 659) for details.	
Bandwidth Limit	Enter the bandwidth limit for each path. When "0" is entered, the bandwidth limit is "Unlimited".	0 (Default) - 65535 (Mbit/s)

[Measure Round Trip Time] Screen

Remote Storage System Information

Item	Description
Checkbox to select the measuring target	Select the checkbox of the remote storage system to measure the round trip time. This checkbox is only displayed for the remote storage system of which connection type is "Remote".
Box ID	The Box ID for the remote storage system is displayed.
Round Trip Time	The round trip time between the local and the remote storage systems is displayed. A "-" (hyphen) is displayed when the connection type is "Direct". When the round trip time is not measured or not specified, "Not measured" is displayed.
Connection Type	The connection type for the remote storage system is displayed. Direct Remote

[Measure Round Trip Time Result] Screen

Remote Storage System Information

Item	Description
(Target)	The [✓] icon is displayed for a remote storage system where the round trip time measurement is complete.
Box ID	The Box ID for the remote storage system is displayed.
Round Trip Time	The round trip time measurement result between the local storage system and the remote storage system is displayed. A "-" (hyphen) is displayed when the connection type is "Direct". <ul style="list-style-type: none"> When the round trip time is "0", "Not measured" is displayed. If the round trip time cannot be measured due to an error, "Error" is displayed (in red characters).
Connection Type	The connection type for the remote storage system is displayed. Direct Remote

Function Button

Button	Description
[Browse...]	Click this button to display the screen for selecting the information file to be imported to the storage system.
[Save]	Click this button to display the dialog box for saving the copy path information file.

■ Operating Procedures

Operation Mode Selection

Select the operation mode.

Procedure ▶▶▶

- 1 Click [Set Copy Path] in [Action].
→ The "[Start] Screen" (page 504) appears.

- 2 Select the operation mode and click the [Next >>] button.
Displayed screen varies depending on the selected operation mode.
 - When "Create Copy Path" is selected
 - The "[Base Information Selection] Screen" (page 505) appears. Proceed to ""Register Storage System Information" (page 530)".
 - When "Apply Copy Path" is selected
 - The "[Copy Path Information File Selection] (for Applying) Screen" (page 522) appears. Proceed to ""Select Copy Path Information" (page 532)".



Register Storage System Information

Register information of the storage system to create a copy path.

Procedure ▶▶▶

- 1 Select a storage system information registration method and click the [Next >>] button.
The displayed screen varies depending on the selected method.
 - When "Backup Path File" is selected
 - The "[Check Registered Storage System Information] Screen" (page 505) appears. Proceed to Step 3.
 - When "Path File" is selected
 - The "[Copy Path Information File Selection] (for Creation) Screen" (page 505) appears. Proceed to Step 2.
 - When "Not use" is selected
 - The "[Storage System Information File Selection] Screen" (page 513) appears. Proceed to Step 7.
- 2 Specify the storage location of the copy path information file that is to be used and click the [Next >>] button.
→ The "[Check Registered Storage System Information] Screen" (page 505) appears.
- 3 Select a storage system to register the information (multiple selections can be made) and click the [Next >>] button.
→ A confirmation screen appears.
- 4 Click the [OK] button.
→ The "[Storage System Configuration Settings] Screen" (page 506) appears.

Note

- When no storage system to register the information is selected, the "[Storage System Information File Selection] Screen" (page 513) appears. Proceed to Step 7.

- 5 Perform the RA port and CA-RA port settings and click the [Next >>] button.
→ The "[Port Settings] Screen" (page 511) appears.

Caution

- Regardless whether a copy path is applied or not, set all of the RA ports or CA/RA ports.

- 6** Perform the port settings and click the [Next >>] button.
The displayed screen varies depending on the port settings.
 - When a storage system for which port setting is not complete exists
→ The "[Storage System Configuration Settings] Screen" (page 506) appears again. Proceed to Step 5.
 - When port setting is complete for all the selected storage systems
→ The "[Storage System Information File Selection] Screen" (page 513) appears. Proceed to Step 7.
- 7** Select whether to use the storage system information file and click the [Next >>] button.
The displayed screen varies depending on the selected operation method.
 - When "Finish of registration by file reading" is selected
→ The "[Storage System Information Setting] Screen" (page 513) appears. Proceed to Step 8.
 - When "Registration from file" is selected
→ The "[Storage System Configuration Settings] Screen" (page 506) appears. Proceed to Step 5.
- 8** Register the storage system information. Select whether to continue the storage system information registration and click the [Next >>] button.
The displayed screen varies depending on the selected operation method.
 - When "Registration by manual operation" is selected
→ The "[Storage System Configuration Settings] Screen" (page 506) appears. Proceed to Step 5.
 - When "Finish of registration by manual operation" is selected
→ The "[Check Registered Storage System Information] Screen" (page 517) appears. Proceed to Step 9.
- 9** Check the storage system information and click the [Next >>] button.
→ The "[Copy Path Creation Storage System Selection] Screen" (page 517) appears. Proceed to ""Create Copy Path" (page 531)".



Create Copy Path

In this screen, create the copy path. Specify the Box ID of the storage system to create the copy path, and then set the line information between the storage systems.

Procedure ▶▶▶

- 1** Click the [Remote Storage System Box ID] link to create a copy path.
→ The "[Copy Path Setting] Dialog Box" (page 518) appears.
- 2** Specify the copy path and click the [OK] button.
→ The "[Copy Path Creation Storage System Selection] Screen" (page 517) appears.
- 3** Repeat Step 1 and Step 2 the same number of times as the number of storage systems to set copy paths.
- 4** When setting a copy path is complete for all the storage systems, click the [Next >>] button.
→ The "[Storage System Connection List] Screen" (page 522) appears. Proceed to ""Apply Copy Path" (page 532)".

Caution

- An error screen appears in the following conditions:
 - The number of remote storage systems exceeds the maximum
 - The number of paths per port exceeds the maximum

Note

- Click the [Box ID] link in the "[Storage System Connection List] Screen" (page 522) to display the "[Check Copy Path Information Setting] Dialog Box" (page 526). Confirm the path information that is to be applied to the storage system.
- If a path with the normal state exists, the [Skip] button is displayed. Click the button to display the "[Download File] Screen" (page 520). Proceed to ""Save" (page 533)".



Select Copy Path Information

Select the copy path information file that is to be used.

Note

- This setting is required only when "Apply Copy Path" is selected for ""Operation Mode Selection" (page 529)".

Procedure ▶▶▶

- 1 Specify the storage location of the copy path information file that is to be used and click the [Next >>] button.
→ The "[Storage System Connection List] Screen" (page 522) appears. Proceed to ""Apply Copy Path" (page 532)".

Note

- Click the [Box ID] link in the "[Storage System Connection List] Screen" (page 522) to display the "[Check Copy Path Information Setting] Dialog Box" (page 526). Confirm the path information that is to be applied to the storage system.



Apply Copy Path

In this screen, apply the copy path information.

Procedure ▶▶▶

- 1 Confirm that the copy path has been set between the storage systems and click the [Next >>] button.
→ A confirmation screen appears.

Note

- When no paths that can be applied to the storage system exist, the "[Download File] Screen" (page 520) appears. Proceed to ""Save" (page 533)".

- 2 Click the [OK] button.
→ Application of the copy path information starts. After application is complete, the [Result of applying] screen appears.

Caution

- If one of the following information does not match the local storage system configuration and the configuration in the copy path information file, the cause of the error is displayed in the [Result of applying] screen.
 - Port mode (when the local storage system is "CA" and the copy path information file is "RA")
 - Port type (FC, iSCSI, and iSCSI RA)
 - When the port type is "FC", the WWN information
 - When the port type is "iSCSI" or "iSCSI RA", the IP address information
 - When the port type is "iSCSI" or "iSCSI RA", the iSCSI Name information

- 3 Check the message and click the [Next >>] button.
Displayed screen varies depending on the operation mode that is selected in "[Start] Screen" (page 504).
 - When "Create Copy Path" is selected
→ The "[Download File] Screen" (page 520) appears. Proceed to ""Save" (page 533)".
 - When "Apply Copy Path" is selected
 - When application of the copy path information file succeeds
→ The "[Set Bandwidth Limit] Screen" (page 527) appears. Proceed to ""Set Bandwidth Limit" (page 534)".
 - When application of the copy path information file fails
→ The [End Confirmation] screen appears. Click the [OK] button to display the [Finish Display] screen. Proceed to ""Finish" (page 535)".



Save

In this screen, save the copy path information that is created in the ""Create Copy Path" (page 531)" screen.

Note

- The saved copy path information file can be applied to other storage systems.
- Click the [Save] button for each model and save the copy path information file.

Procedure ▶▶▶

- 1 Click the [Save] button.
→ A dialog box to download the file appears.
- 2 Save the copy path information for each model.
The default file name depends on the model as follows.
 - For the ETERNUS DX S5 series and the ETERNUS AF S3 series
The default file name is "RecPath_serial number for the storage system_YYYY-MM-DD_hh-mm-ss_copy path information file number (*1).bin". (YYYY-MM-DD_hh-mm-ss: the date and time when the save screen (Step 1) is displayed.)

- For the ETERNUS DX8000 S4 series:
The default file name is "RecPathConvT_serial number for the storage system_YYYY-MM-DD_hh-mm-ss_copy path information file number (*1).bin". (YYYY-MM-DD_hh-mm-ss: the date and time when the save screen (Step 1) is displayed.)
- For the ETERNUS DX S4/S3 series, AF series, and the ETERNUS DX200F (Target: V10L40 and later)
The default file name is "RecPathConvT_serial number for the storage system_YYYY-MM-DD_hh-mm-ss_copy path information file number (*1).bin". (YYYY-MM-DD_hh-mm-ss: the date and time when the save screen (Step 1) is displayed.)
- For the ETERNUS DX S3 series and the ETERNUS DX200F (Target: earlier than V10L40)
The default file name is "RecPathConvTV10L30_serial number for the storage system_YYYY-MM-DD_hh-mm-ss_copy path information file number (*1).bin". (YYYY-MM-DD_hh-mm-ss: the date and time when the save screen (Step 1) is displayed.)
- For the other models
The default file name is "RecPathConvT_serial number for the storage system_YYYY-MM-DD_hh-mm-ss_copy path information file number (*1).bin". (YYYY-MM-DD_hh-mm-ss: the date and time when the save screen (Step 1) is displayed.)

*1: Copy path information file numbers are assigned in ascending order according to the [Save] button on the screen. For example, "1" is assigned for the path information file, which is downloaded by clicking the first button in the list.

- 3** Save the copy path information files for all of the models and click the [Next >>] button.
→ If the created path information has already been applied, the "[Set Bandwidth Limit] Screen" (page 527) appears. Proceed to "[Set Bandwidth Limit]" (page 534)".

Caution

- If the [Finish] button is clicked, the created copy path information file is deleted even when the copy path information files for some of the models are not saved. Make sure to save all of the copy path information files.

Note

- When the created copy path information has not been applied or when the [Finish] button is clicked, the [End Confirmation] screen appears. Click the [OK] button to display the [Finish Display] screen. Proceed to "[Finish]" (page 535)".



Set Bandwidth Limit

In this screen, set the bandwidth limit between the local and the remote storage systems.

Note

- If the bandwidth limit setting is not required, click the [Next >>] button. The "[Measure Round Trip Time] Screen" (page 529) appears. Proceed to "[Measure Round Trip Time]" (page 535)".

Procedure ▶▶▶

- 1** Select the remote storage system to set the bandwidth limit, and click the [Bandwidth Limit] link.
→ The "[Set REC Bandwidth Limit] Screen" (page 527) appears.
- 2** Set the detailed bandwidth limit information, and click the [Set] button.
→ A confirmation screen appears.
- 3** Click the [OK] button.
→ The REC bandwidth limit setting starts.

- 4 Click the [Done] button to return to the [Set Bandwidth Limit] screen.
- 5 Click the [Next >>] button to display the "[Measure Round Trip Time] Screen" (page 529). Proceed to ""Measure Round Trip Time" (page 535)".



Measure Round Trip Time

In this screen, measure the round trip time between the local and the remote storage systems.

Caution

- Round trip times must be measured from a static state without sending data through the line.
- Before measuring the round trip time, set a physical line properly between the storage systems. When a line has an error, the round trip time cannot be measured correctly.
- Round trip times must be set for copy source and copy destination storage systems. Refer to the [Measure Round Trip Time] function for details.
- It takes a maximum of 160 seconds to measure the round trip time.

Procedure ▶▶▶

- 1 Select a remote storage system to measure the round trip time (multiple selections can be made) and click the [Next >>] button.
→ A confirmation screen appears.

Note

- If there are no remote storage systems that can measure the round trip time or when the connection type for all of the copy paths is "Direct", the [Finish Display] screen appears. Proceed to ""Finish" (page 535)".

- 2 Click the [OK] button.
→ Measurement of the round trip time starts. After measurement is complete, the "[Measure Round Trip Time Result] Screen" (page 529) appears.
- 3 Check the measured round trip time, and click the [Next >>] button.
→ A confirmation screen appears.
- 4 Click the [OK] button.
→ Setting of the round trip time starts. After completing the settings, the [Finish Display] screen appears. Proceed to ""Finish" (page 535)".



Finish

Procedure ▶▶▶

- 1 Click the [Done] button to return to the [Copy Path] screen.



Delete All Copy Path

- "■ Overview" (page 536)
- "■ User Privileges" (page 536)

- "[Operating Procedures](#)" (page 536)

■ Overview

This function deletes all of the copy path information registered in the storage system.

Caution

- Registering the Advanced Copy function license or the Storage Cluster function license (*1) is required to use this function.
*1: The Storage Cluster function license must be registered using ETERNUS SF Storage Cruiser.
- If an **REC** path, which is being used in an REC, was deleted, it may affect operations, such as the REC being stopped. Confirm that REC is not in use before modifying the information. To check if the REC is active, use the [Advanced Copy] screen. Refer to the [Advanced Copy (Basic Information)] function for details.
- When deleting copy paths that are allocated with REC Buffers, make sure to delete the relevant REC Buffers and REC Disk Buffers.
- This function deletes all of the REC paths configured in the storage system. To delete some of the REC paths, use the [Set Copy Path] function.

Note

- Note that the bandwidth limit for the path is also deleted when the copy path has been deleted.

■ User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	✓
StorageAdmin	✓
AccountAdmin	
SecurityAdmin	
Maintainer	✓

Refer to "[A. User Roles and Policies](#)" (page 1580) for details on the policies and roles.

■ Operating Procedures

Procedure ▶▶▶

- 1 Click [Delete All Copy Path] in [Action].
→ A confirmation screen appears.
- 2 Click the [OK] button.
→ Deletion of all the copy paths starts.
- 3 Click the [Done] button to return to the [Copy Path] screen.



Export All Copy Path

- ["■ Overview" \(page 537\)](#)
- ["■ User Privileges" \(page 537\)](#)
- ["■ Operating Procedures" \(page 537\)](#)

■ Overview

This function exports the copy path information registered in the storage system, and saves the information in a file.

The saved file can be used as path information when creating or changing a copy path, so that manual registration of the path information will not be required.

Caution

- Registering the Advanced Copy function license or the Storage Cluster function license (*1) is required to use this function.
*1: The Storage Cluster function license must be registered using ETERNUS SF Storage Cruiser.
- The bandwidth limit value for a copy path cannot be exported.

■ User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	✓
StorageAdmin	✓
AccountAdmin	
SecurityAdmin	
Maintainer	✓

Refer to ["A. User Roles and Policies" \(page 1580\)](#) for details on the policies and roles.

■ Operating Procedures

Procedure ▶▶▶

- 1 Click [Export All Copy Path] in [Action].
- 2 Click the [Export] button.
→ The copy path information, which has been registered in the storage system, is exported.
After the copy path information export has been finished, a screen to execute downloading the file is displayed.
- 3 Click the [Download] button.
→ A dialog box to download the file appears.

Caution

- The [Download] button cannot be clicked if the copy path information is not registered in the storage system.

- 4 Save the copy path information file.
The default file name is "RecPath_serial number for the storage system_YYYY-MM-DD_hh-mm-ss.bin".
(YYYY-MM-DD_hh-mm-ss: the date and time when the download screen (Step 3) is displayed.)
- 5 Click the [Close] button to return to the [Copy Path] screen.



Export Storage Information

- ["■ Overview" \(page 538\)](#)
- ["■ User Privileges" \(page 538\)](#)
- ["■ Operating Procedures" \(page 538\)](#)

■ Overview

This function exports the storage system information (installation information of the RA port or the CA/RA port) and saves it in a file.

The saved file can be used as storage system information when creating a copy path, so that manual registration of the storage system information will not be required.

Caution

- Registering the Advanced Copy function license or the Storage Cluster function license (*1) is required to use this function.

*1: The Storage Cluster function license must be registered using ETERNUS SF Storage Cruiser.
- The bandwidth limit value for a copy path cannot be exported.

■ User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	✓
StorageAdmin	✓
AccountAdmin	
SecurityAdmin	
Maintainer	✓

Refer to ["A. User Roles and Policies" \(page 1580\)](#) for details on the policies and roles.

■ Operating Procedures

Procedure ▶▶▶

- 1 Click [Export Storage Info] in [Action].
- 2 Click the [Export] button.
→ The storage system information, which has been registered in the storage system, is exported.
After the storage system information export has been finished, a screen to execute downloading the file is displayed.

Caution

- The [Export] button cannot be clicked if no RA ports or CA/RA ports are installed in the storage system.

- 3 Click the [Download] button.
→ A dialog box to download the file appears.
- 4 Save the storage system information file.
The default file name is "RecRAInfo_serial number for the storage system_YYYY-MM-DD_hh-mm-ss.bin".
(YYYY-MM-DD_hh-mm-ss: the date and time when the download screen (Step 3) is displayed.)
- 5 Click the [Close] button to return to the [Copy Path] screen.



Measure Round Trip Time

- ["■ Overview" \(page 539\)](#)
- ["■ User Privileges" \(page 540\)](#)
- ["■ Display Contents" \(page 540\)](#)
- ["■ Settings" \(page 540\)](#)
- ["■ Operating Procedures" \(page 541\)](#)

■ Overview

This function measures the round trip time between the local and the remote storage systems. "Round trip time" is the time taken to make a communication between two storage systems. Only one remote storage system can be measured at a time.

Caution

- Registering the Advanced Copy function license or the Storage Cluster function license (*1) is required to use this function.
*1: The Storage Cluster function license must be registered using ETERNUS SF Storage Cruiser.
- Round trip time can be measured only when the connection type is "Remote". Round trip time cannot be measured when the connection type is "Direct".
- Round trip times must be set for copy source and copy destination storage systems. Measure the round trip time after applying the copy path information to both the copy source and copy destination storage systems, and then set the results (measured value).
- Round trip times must be measured from a static state without sending data through the line. For example, if REC sessions exist between storage systems, set the REC session status to "✔ Suspend" before measuring.
- Make sure that the physical line is correctly configured between storage systems before measuring. When a line has an error, the round trip time cannot be measured correctly.
- If the path between storage systems is changed, measure the round trip time again.
- It takes a maximum of 160 seconds to measure the round trip time.

User Privileges

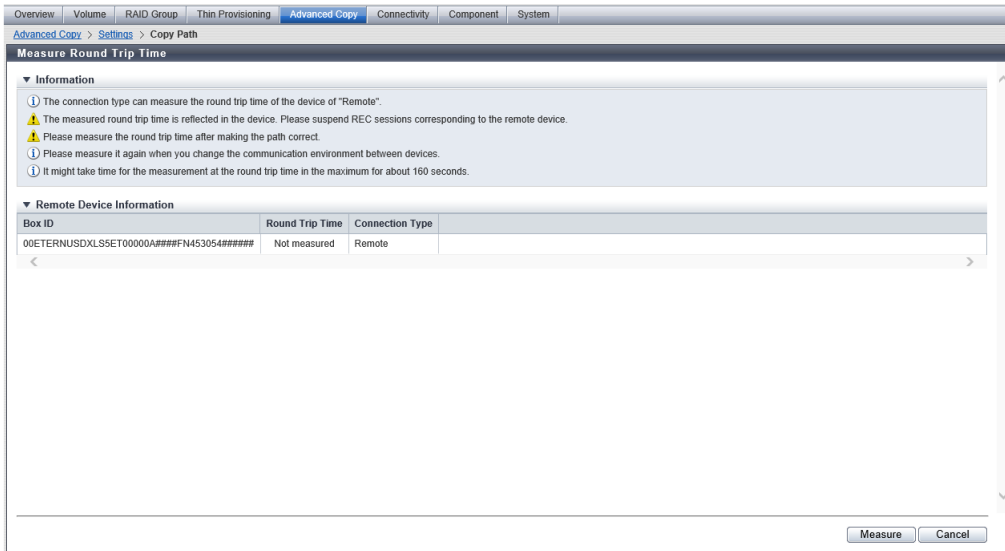
Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	✓
StorageAdmin	✓
AccountAdmin	
SecurityAdmin	
Maintainer	✓

Refer to "A. User Roles and Policies" (page 1580) for details on the policies and roles.

Display Contents

The information of the remote storage systems that are currently connected is displayed.



Remote Storage System Information

Item	Description
Box ID	The Box ID for the remote storage system is displayed.
Round Trip Time	The round trip time of the remote storage system is displayed. <ul style="list-style-type: none"> • If the round trip time has already been measured, the current round trip time is displayed. • If the round trip time has never been measured before, "Not measured" is displayed.
Connection Type	The connection type between the local and the remote storage systems is displayed. Remote

Settings

The round trip time measurement result is displayed.

Item	Description	Setting values
Box ID	The Box ID for the remote storage system is displayed.	
Round Trip Time	The round trip time (1 to 65535) measurement result between the local and the remote storage systems is displayed. If a measurement error has occurred, the field is blank. The value can be changed. The following describes the recommended round trip time. Asynchronous copy: within 100 msec. Synchronous copy: within 50 msec.	Numeric characters between 1 - 65535 (decimal) Unit: msec.
Connection Type	The connection type between the local and the remote storage systems is displayed. Remote	

■ Operating Procedures

Procedure ▶▶▶

- 1 Select the remote storage system that is connected by remote connection to measure the round trip time, and click [Get Round Trip Time] in [Action].
- 2 Click the [Measure] button.
→ Measurement of the round trip time starts.
- 3 Change the "Round Trip Time (msec)" value if necessary, and click the [Modify] button.
→ A confirmation screen appears.

Caution

- If the round trip time has not been entered, the [Modify] button cannot be clicked.
- If the entered round trip time does not satisfy the input conditions, an error screen appears.

- 4 Click the [OK] button.
→ The round trip time measurement result is updated in the storage system.
- 5 Click the [Done] button to return to the [Copy Path] screen.



Modify REC Multiplicity

- "■ Overview" (page 541)
- "■ User Privileges" (page 542)
- "■ Settings" (page 542)
- "■ Operating Procedures" (page 544)

■ Overview

This function specifies multiplicity or priority level when performing REC.
It is not necessary to change the default value (Automatic) for normal use. This function can adjust the copy performance to give priority to REC over work I/O or to reduce the affect on work I/O.

When the Local Storage System and the Remote Storage System are Connected by Remote Connection

- If "Automatic" is selected for the specification mode, REC is performed with the recommended multiplicity that is calculated by the obtained round trip time.
If the round trip time is not measured, "****" is displayed in the "Recommended Multiplicity" field. To display the recommended multiplicity, use the [Get Round Trip Time] function.
- If "Manual" is selected for the specification mode, REC will be performed with the specified multiplicity.

When the Local Storage System and the Remote Storage System are Connected by Direct Connection

- When the priority level is "Automatic", REC is performed using the priority level that is specified with the [Modify EC/OPC Priority] function.
- When the priority level is from "1" to "8", REC is performed using the specified priority level.

Caution

- Registering the Advanced Copy function license or the Storage Cluster function license (*1) is required to use this function.

*1: The Storage Cluster function license must be registered using ETERNUS SF Storage Cruiser.
- If "****" is displayed in the "Recommended Multiplicity" field of the Remote Box ID List, and "Automatic" has been selected for the specification mode, REC will not be performed with the appropriate multiplicity. To select "Automatic", measure the round trip time in advance. Refer to the [Measure Round Trip Time] function for details.
- If the path between local and remote storage systems has been changed, measure the round trip time and set the multiplicity again.

■ **User Privileges**

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	✓
StorageAdmin	✓
AccountAdmin	
SecurityAdmin	
Maintainer	✓

Refer to ""A. User Roles and Policies" (page 1580)" for details on the policies and roles.

■ **Settings**

In this screen, specify the REC Multiplicity.

Remote Box ID List

Item	Description	Setting values
Remote Box ID	The Box ID for the remote storage system is displayed.	

5. Advanced Copy
Copy Path

Item	Description	Setting values
Connection Type	The type of connection to the remote storage system that has a path to the local storage system is displayed. Direct Remote	
Priority Level	When the "Connection Type" is "Direct", select the priority level. When the "Connection Type" is "Remote", a "-" (hyphen) is displayed. <ul style="list-style-type: none"> Automatic REC is performed using the priority level (Automatic Priority/High Priority/Middle Priority/Low Priority/Very Low Priority) that is specified with the [Modify EC/OPC Priority] function. 1 - 8 Specify from "1" to "8" for the REC priority level. "1" corresponds to "Very Low Priority", and "8" corresponds to "High Priority" for the [Modify EC/OPC Priority] function. 	Automatic 1 (corresponds to "Very Low Priority") 2 (corresponds to "Low Priority") 3 4 5 6 7 8 (corresponds to "High Priority") -" (hyphen)
Specification Mode	When the "Connection Type" is "Remote", select the specification mode for multiplicity. When the "Connection Type" is "Direct", a "-" (hyphen) is displayed.	Automatic Manual -" (hyphen)
Multiplicity	When the "Connection Type" is "Remote" and "Manual" is selected for the specification mode, specify multiplicity (1 to 1024). When "Automatic" is selected, a "-" (hyphen) is displayed. When the "Connection Type" is "Direct", a "-" (hyphen) is displayed. 1 (Default) - 1024 -" (hyphen)	
Present multiplicity	The current multiplicity setting (1 to 1024) is displayed. When the specification mode is "Automatic", "Automatic" is displayed. When the "Connection Type" is "Direct", a "-" (hyphen) is displayed.	
Recommended Multiplicity	The recommended multiplicity (1 to 1024) is displayed. If the round trip time is not measured, "***" is displayed in the "Recommended Multiplicity" field. When the "Connection Type" is "Direct", a "-" (hyphen) is displayed.	

Advanced Setting

In this screen, specify the copy schedule mode for each remote storage system.

Item	Description	Setting values
Remote Box ID	The Box ID for the remote storage system is displayed.	

5. Advanced Copy
Copy Path

Item	Description	Setting values
Copy Schedule Mode	<p>Select the REC copy schedule mode for each remote storage system. It is not necessary to change the default value (Session Balancing) for normal use.</p> <ul style="list-style-type: none"> • Session Balancing Copy sessions are scheduled evenly to each Controlling CM for a copy source RAID group (a RAID group to which the copy source volume belongs). • Destination RAID Group Balancing Only one copy session can be performed for each copy destination RAID group. This method prevents unequal loading on a specific RAID group. This may improve the copy performance when the copy source storage system and the copy destination storage system are connected by direct connection and the copy destination RAID group is configured by Nearline disks. <p>Caution</p> <ul style="list-style-type: none"> • Copy performance is not improved by selecting "Destination RAID Group Balancing" in the following conditions: <ul style="list-style-type: none"> - When the type of the copy destination volume is not "Standard" - When the copy destination volume "Standard" and concatenated • Specify the same copy schedule mode for copy source and copy destination storage systems. If different modes are specified, the copy performance may not improve as expected. 	Session Balancing (Default) Destination RAID Group Balancing

■ Operating Procedures

Procedure ▶▶▶

- 1 Click the [Modify REC Multiplicity] in [Action].
- 2 Specify the parameters, and click the [Set] button.
→ A confirmation screen appears.

Caution

- When "Manual" is selected for "Specification Mode" and numeric characters exceed the allowed range (from 1 to 1024), an error screen appears.

Note

- Click [Advanced Setting] to specify the copy schedule mode.

- 3 Click the [OK] button.
→ The REC multiplicity settings starts.
- 4 Click the [Done] button to return to the [Copy Path] screen.



Set REC Bandwidth Limit

- "■ Overview" (page 545)
- "■ User Privileges" (page 545)
- "■ Display Contents" (page 546)
- "■ Settings" (page 546)

- ["■ Operating Procedures" \(page 547\)](#)

■ Overview

This function sets the bandwidth limit for the copy path.

Caution

- Registering the Advanced Copy function license or the Storage Cluster function license (*1) is required to use this function.

*1: The Storage Cluster function license must be registered using ETERNUS SF Storage Cruiser.

Note

- This function enables the Initiator (copy source) to limit the bandwidth for sending data in the copy path. The bandwidth limit can be set for each path.
- The bandwidth limit setting is not included in the copy path information. Therefore, a bandwidth limit setting for the unchanged path remains even when a copy path was created after the copy path information had been changed.
- Note that the bandwidth limit for the path is also deleted when the copy path has been deleted.

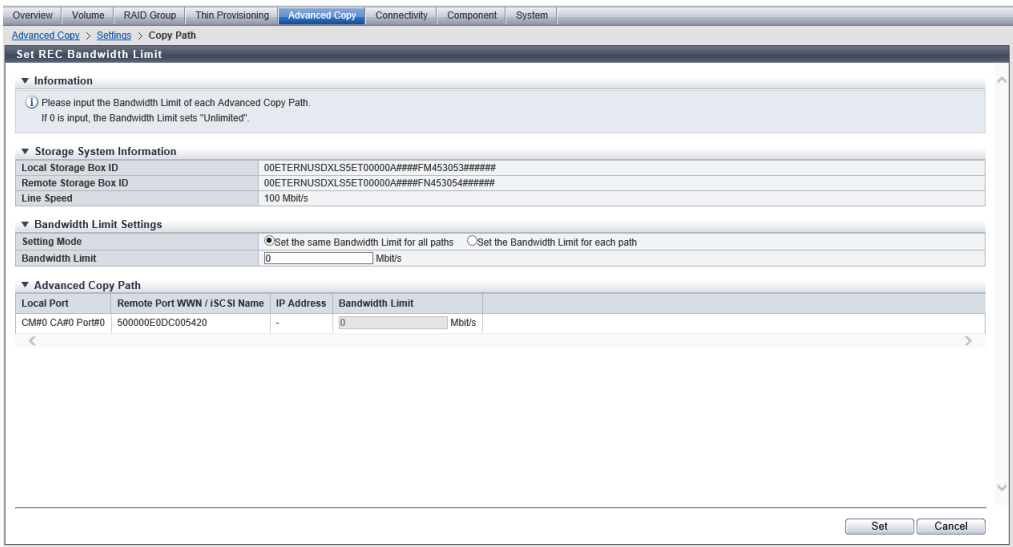
■ User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	✓
StorageAdmin	✓
AccountAdmin	
SecurityAdmin	
Maintainer	✓

Refer to ["A. User Roles and Policies" \(page 1580\)](#) for details on the policies and roles.

■ Display Contents



Storage System Information

Item	Description
Local Storage Box ID	The Box ID of the local storage system is displayed.
Remote Storage Box ID	The Box ID for the remote storage system is displayed.
Line Speed	When a remote storage system that has a path to the local storage system is connected by remote connection, the line speed (1 to 65535 (Mbit/s)) is displayed. When the "Connection Type" is "Direct", a "-" (hyphen) is displayed.

■ Settings

Bandwidth Limit Settings

Item	Description	Setting values
Setting Mode	Select a bandwidth setting mode. <ul style="list-style-type: none"> Set the same Bandwidth Limit for all paths Specify the same bandwidth limit for all the paths. Set the Bandwidth Limit for each path Specify the bandwidth limit for each path. 	Set the same Bandwidth Limit for all paths Set the Bandwidth Limit for each path
Bandwidth Limit	When "Set the same Bandwidth Limit for all paths" is selected for the setting mode, enter the bandwidth limit. When "0" is entered, the bandwidth limit is "Unlimited". When "Set the Bandwidth Limit for each path" is selected for the setting mode, the field is blank. Set the bandwidth limit for each path in the "Advanced Copy Path" field.	0 (Default) - 65535[Mbit/s] Blank

Advanced Copy Path

Item	Description	Setting values
Local Port	The location information of a CA port in the local storage system is displayed. For the ETERNUS DX900 S5 or the ETERNUS DX8900 S4 CE#x CM#y CA#z Port#w For the other models CM#y CA#z Port#w x: CE number y: CM number z: CA number w: Port number	
Remote Port WWN / iSCSI Name	The destination port is displayed. For the FC port, WWN is displayed. For the iSCSI port, iSCSI name is displayed.	
IP Address	When the port type is iSCSI, the IP address for the destination port of the copy path is displayed. The display format varies according to the IP version. A "-" (hyphen) is displayed when the port type is FC. For IPv4 address xxx.xxx.xxx.xxx xxx: 0 - 255 (decimal) For IPv6 address xxxx:xxxx:xxxx:xxxx:xxxx:xxxx:xxxx:xxxx xxxx: 0 - ffff (FFFF) (hexadecimal, alphanumeric characters) Refer to "IPv6 Address Notation" (page 659) for details.	
Bandwidth Limit	Enter the bandwidth limit for each path. When "0" is entered, the bandwidth limit is "Unlimited".	0 (Default) - 65535[Mbit/s]

■ Operating Procedures

Procedure ▶▶▶

- 1 Select the remote storage system to set the bandwidth limit, and click [Set REC Bandwidth Limit] in [Action].
- 2 Set the detailed bandwidth limit information, and click the [Set] button.
→ A confirmation screen appears.
- 3 Click the [OK] button.
→ The REC bandwidth limit setting starts.
- 4 Click the [Done] button to return to the [Copy Path] screen.



Set REC Line Speed

- ["■ Overview" \(page 548\)](#)
- ["■ User Privileges" \(page 548\)](#)
- ["■ Settings" \(page 548\)](#)
- ["■ Operating Procedures" \(page 548\)](#)

■ Overview

This function sets the line speed when the local and remote storage systems are connected with a remote connection.

This function is used to change the line speed after the copy path setting is completed.

Caution

- Registering the Advanced Copy function license or the Storage Cluster function license (*1) is required to use this function.
*1: The Storage Cluster function license must be registered using ETERNUS SF Storage Cruiser.
- This setting value provides the WAN bandwidth that can be used by REC as information. Note that this value is not for controlling the WAN bandwidth for REC. To control the WAN bandwidth that is used by REC, refer to ""Set REC Bandwidth Limit" (page 544)" for details.
- This setting is available only for a local storage system used as a copy source of REC. If the REC session can be reversed, set the same value for the copy destination storage system of REC.

■ User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	✓
StorageAdmin	✓
AccountAdmin	
SecurityAdmin	
Maintainer	✓

Refer to ""A. User Roles and Policies" (page 1580)" for details on the policies and roles.

■ Settings

Remote Storage System

Item	Description	Setting values
Box ID	The Box ID of the remote storage system that has a path to the local storage system is displayed.	
Line Speed	Specify the line speed for connection with the remote storage system. Refer to ""Setting Example of Line Speed" (page 518)" for details.	1 - 65535 (Mbit/s)

■ Operating Procedures

Procedure ▶▶▶

- 1 Select a remote storage system (multiple selections can be made) to specify the line speed and click [Set REC Line Speed] in [Action].

Caution

- [Set REC Line Speed] cannot be clicked if the selected remote storage system is connected directly to the local storage system.

- 2 Specify the line speed, and click the [Set] button.
→ A confirmation screen appears.
- 3 Click the [OK] button.
→ The line speed configuration is started.
- 4 Click the [Done] button to return to the [Copy Path] screen.



REC Buffer

- ["■ Overview" \(page 549\)](#)
- ["■ User Privileges" \(page 549\)](#)
- ["■ Display Contents" \(page 549\)](#)

■ Overview

This function displays the **REC Buffer** status when performing **REC** in the "asynchronous consistency mode".

Note

- This function is displayed only when the Advanced Copy function license has been registered and a storage system model that supports REC is used.

■ User Privileges

Availability of Executions in the Default Role

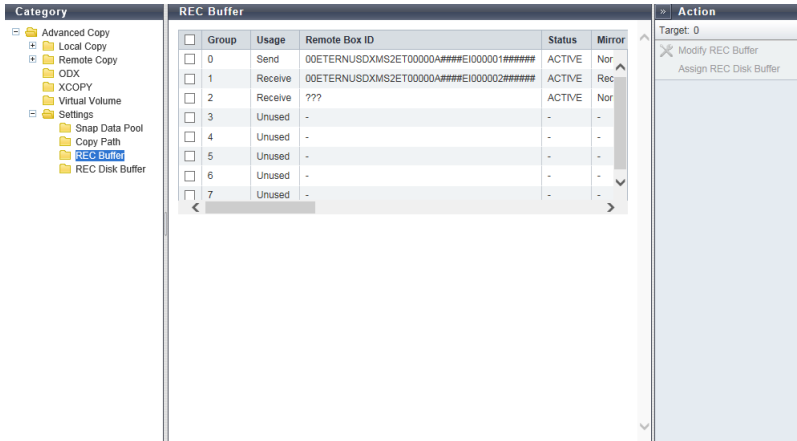
Default role	Availability of executions
Monitor	✓
Admin	✓
StorageAdmin	✓
AccountAdmin	
SecurityAdmin	✓
Maintainer	✓

Refer to ["A. User Roles and Policies" \(page 1580\)](#) for details on the policies and roles.

■ Display Contents

The REC Buffer status is displayed on a list.

5. Advanced Copy
REC Buffer



REC Buffer

Item	Description
Group	<p>The management group number of the REC Buffer is displayed.</p> <p>ETERNUS DX100 S5: 0 ETERNUS DX200 S5: 0 - 3 ETERNUS DX500 S5/DX600 S5/DX900 S5: 0 - 7 ETERNUS DX8100 S4/DX8900 S4: 0 - 7 ETERNUS AF150 S3: 0 ETERNUS AF250 S3: 0 - 3 ETERNUS AF650 S3: 0 - 7</p>
Usage	<p>The REC Buffer usage is displayed.</p> <p>Unused Send Receive</p>
Remote Box ID	<p>The Box ID for the remote storage system is displayed.</p> <p>If the copy path information is deleted after the REC Buffer creation, "???" is displayed. Note that REC Buffers with "???" cannot be used. Delete any REC Buffers with this status. Refer to the [Modify REC Buffer] function for details.</p> <p>A "-" (hyphen) is displayed when the usage is "Unused".</p>
Status	<p>The REC Buffer status is displayed.</p> <ul style="list-style-type: none"> ACTIVE The REC Buffer is available for data transfer. INACTIVE The REC Buffer is not available for data transfer.
Mirror Status	<p>The mirror status (redundant status) of the REC Buffer is displayed.</p> <p>A "-" (hyphen) is displayed when the usage is "Unused".</p> <p>The REC Buffer is duplicated with 2CMs to prevent copied data from being lost if the storage system fails or while maintenance operations are being performed.</p> <ul style="list-style-type: none"> Normal The REC Buffer is redundant. Recovering The REC Buffer has lost redundancy.

5. Advanced Copy
REC Buffer

Item	Description
Size	<p>The REC Buffer size is displayed.</p> <p>A "-" (hyphen) is displayed when the usage is "Unused".</p> <p>ETERNUS DX100 S5: 128 MB</p> <p>ETERNUS DX200 S5: 128 MB, 256 MB, 512 MB</p> <p>ETERNUS DX500 S5/DX600 S5/DX900 S5: 128 MB, 256 MB, 512 MB, 1024 MB, 2048 MB</p> <p>ETERNUS DX8100 S4/DX8900 S4: 128 MB, 256 MB, 512 MB, 1024 MB, 2048 MB</p> <p>ETERNUS AF150 S3: 128 MB</p> <p>ETERNUS AF250 S3: 128 MB, 256 MB, 512 MB</p> <p>ETERNUS AF650 S3: 128 MB, 256 MB, 512 MB, 1024 MB, 2048 MB</p>
Forwarding Interval	<p>The data transfer interval is displayed.</p> <p>A "-" (hyphen) is displayed when the usage is "Unused".</p> <p>1 sec., 2 sec., 4 sec., 8 sec., 15 sec., 30 sec., 45 sec., 60 sec., 75 sec., 90 sec., 105 sec., 120 sec.</p>
Monitoring Time	<p>The monitoring time, before transition to the "Halt" state for a copy session when an REC Buffer shortage occurs, is displayed. When the monitoring time is "0 min.", the storage system is not being monitored.</p> <p>A "-" (hyphen) is displayed when the usage is "Unused".</p> <p>0 min., 1 min., 2 min., 3 min., 4 min., 5 min., 6 min., 7 min., 8 min., 9 min., 10 min., 11 min., 12 min., 13 min., 14 min., 15 min.</p>
HALT Wait Timer	<p>The maximum non-responding time is displayed. During the non-response time, the host I/O response is stopped to give priority to performing REC Buffer transfers in a high-load state.</p> <p>A "-" (hyphen) is displayed when the usage is "Unused".</p> <p>0 sec., 5 sec., 10 sec., 15 sec.</p>
I/O Priority Mode	<p>Whether the "I/O Priority Mode" is enabled or disabled is displayed.</p> <p>A "-" (hyphen) is displayed when the usage is "Unused".</p> <p>"I/O Priority Mode" reduces the effect on host I/O when an initial copy for starting, restarting, or recovering the copy function is performed.</p> <p>This item is available when logged in using a user account with the "Advanced Copy Management" policy.</p>
Immediate HALT Mode	<p>Whether the "Immediate HALT Mode" is enabled or disabled is displayed.</p> <p>A "-" (hyphen) is displayed when the usage is "Unused".</p> <p>"Immediate HALT Mode" reduces the effect on host I/O because of the insufficient of REC Buffer when "HALT Wait Timer" is set to "0 sec.".</p> <p>This item is available when logged in using a user account with the "Advanced Copy Management" policy.</p>
High Bandwidth Mode	<p>Whether the "High Bandwidth Mode" is enabled or disabled is displayed.</p> <p>A "-" (hyphen) is displayed when the usage is "Unused".</p> <p>"High Bandwidth Mode" reduces the number of communications by transferring control data required for buffer transfers with as little time as possible to improve the transfer speed for long distance communication.</p> <p>This item is available when logged in using a user account with the "Advanced Copy Management" policy.</p>

5. Advanced Copy REC Buffer

Item	Description
REC Disk Buffer Status	<p>When the REC Buffer usage is "Send", the status of the REC Disk Buffers that are assigned to the REC Buffer is displayed.</p> <p>A "-" (hyphen) is displayed when the REC Disk Buffer is not allocated or the usage is "Receive" or "Unused".</p> <ul style="list-style-type: none"> • Active All of the REC Disk Buffers are available. • Rebuilding Rebuild/copyback is being performed in some of the REC Disk Buffers. • Formatting Formatting is being performed in some of the REC Disk Buffers. • Not Supported The copy destination storage system for REC does not support the REC Disk Buffers. • Not Mirrored Some of the REC Disk Buffers have lost redundancy due to disk failure. • Error Some of the REC Disk Buffers cannot be used (due to RAID group failure or RAID group blockage). <p>If the "REC Disk Buffer Status" is "Formatting", "Not Supported", or "Error", all of the other REC Disk Buffers that belong to the same REC Buffer cannot be used.</p>
REC Disk Buffer Total Capacity	<p>When the usage is "Send", the total capacity of the REC Disk Buffer, which is assigned to the REC Buffer, is displayed.</p> <p>A "-" (hyphen) is displayed when the REC Disk Buffer is not allocated or the usage is "Receive" or "Unused".</p>
Total Storage Data Size	<p>When the REC Buffer usage is "Send", the size of the data in the REC Disk Buffer that is assigned to the REC Buffer is displayed.</p> <p>A "-" (hyphen) is displayed when the REC Disk Buffer is not allocated or the usage is "Receive" or "Unused".</p>
Free Disk Buffer Size	<p>When the REC Buffer usage is "Send", the unused capacity of the REC Disk Buffers that are assigned to the REC Buffer are displayed.</p> <p>A "-" (hyphen) is displayed when the REC Disk Buffer is not allocated or the usage is "Receive" or "Unused".</p>

Modify REC Buffer

- ["■ Overview" \(page 552\)](#)
- ["■ User Privileges" \(page 554\)](#)
- ["■ Settings" \(page 554\)](#)
- ["■ Operating Procedures" \(page 557\)](#)

■ Overview

This function sets parameters of the [REC Buffer](#) for copying data via the [REC](#) in [Consistency mode](#).

REC Buffer Specifications for Each Model

Model	Total size of all of the REC Buffers (per CM)	The maximum number of REC Buffers	The maximum size of a single REC Buffer
ETERNUS DX100 S5	128 MB	1	128 MB
ETERNUS DX200 S5	512 MB	4	512 MB
ETERNUS DX500 S5/DX600 S5/DX900 S5 ETERNUS DX8100 S4/DX8900 S4	8192 MB	8	2048 MB
ETERNUS AF150 S3	128 MB	1	128 MB

5. Advanced Copy REC Buffer

Model	Total size of all of the REC Buffers (per CM)	The maximum number of REC Buffers	The maximum size of a single REC Buffer
ETERNUS AF250 S3	512 MB	4	512 MB
ETERNUS AF650 S3	8192 MB	8	2048 MB

Caution

- Registering the license for the Advanced Copy function is required to set the REC Buffer.
 - This function can only be used when the local storage system (the storage system that creates REC Buffers) supports REC.
 - Perform REC Buffer settings in both the REC copy source and destination storage systems.
 - When changing REC Buffers, suspend the sessions using the target REC Buffers.
 - When deleting REC Buffers, stop the sessions using the target REC Buffers.
 - This function cannot be used when the remote storage system and/or copy path have not been configured.
 - Cache memory is not only used for REC Buffers, but also used for copy tables, the Thin Provisioning function (*1), the Storage Cluster function (*1), the Non-disruptive Storage Migration function, and the Extreme Cache function. Note that an REC Buffer with the maximum capacity for each model cannot always be created depending on the following conditions.
 - Memory capacity in the storage system
 - Copy table size
 - Maximum pool capacity
 - Total TFOV capacity (*2)
 - License registration for the Non-disruptive Storage Migration function
 - Extreme Cache setting (enabled) and Extreme Cache capacity
- *1 : The shared area in the cache memory is used for the following conditions.
- The maximum pool capacity is expanded to "1.5 PB" or larger
 - The total TFOV capacity (*2) has been expanded from the default capacity
Refer to the descriptions about "Storage Cluster" in the [System] screen for the default capacity of the TFOV for each model.
- *2 : The total TFOV capacity indicates the total capacity of the volumes that are used for the Storage Cluster function in a storage system.
- Because REC Buffers are duplicated between the CMs, the actual memory capacity is twice as large as the selected REC Buffer capacity.

Note

- Take REC reverse operation into consideration and specify the same values for the REC Buffers ("Forwarding Interval", "Monitoring Time", "HALT Wait Timer", "I/O Priority Mode", "Immediate HALT Mode", and "High Bandwidth Mode") in the copy source storage system and the copy destination storage system.
- When performing bidirectional data transfer, settings for "Send" and "Receive" REC Buffers in the storage system are required.
- If the usage of the REC Buffer to which the REC Disk Buffer has already been assigned is changed to "Unused", the REC Disk Buffer assignment will be cleared (the REC Disk Buffer itself will not be deleted).

■ User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	✓
StorageAdmin	✓
AccountAdmin	
SecurityAdmin	
Maintainer	✓

Refer to "[A. User Roles and Policies](#)" (page 1580) for details on the policies and roles.

■ Settings

Specify "Usage", "Remote Box ID", "Size", "Forwarding Interval", "Monitoring Time", and "HALT Wait Timer" for each management group of the REC Buffer obtained from the storage system.

REC Buffer Setting List

Item	Description	Setting values
Group	The management group number of the REC Buffer is displayed.	ETERNUS DX100 S5: 0 ETERNUS DX200 S5: 0 - 3 ETERNUS DX500 S5/DX600 S5/ DX900 S5: 0 - 7 ETERNUS DX8100 S4/DX8900 S4: 0 - 7 ETERNUS AF150 S3: 0 ETERNUS AF250 S3: 0 - 3 ETERNUS AF650 S3: 0 - 7
Usage	Specify the usage of the REC Buffer. When setting the REC Buffer for sending, select "Send". When setting the REC Buffer for receiving, select "Receive". To delete the REC Buffer, select "Unused".	Unused Send Receive
Remote Box ID	Select the Box ID for the remote storage system. If the copy path information is deleted after the REC Buffer creation, "???" is displayed. Note that REC Buffers with "???" cannot be used. Delete any REC Buffers with this status. If "Unused" is selected for the usage, "-" (hyphen) is displayed.	Remote storage system Box ID "-" (hyphen)

5. Advanced Copy
REC Buffer

Item	Description	Setting values
Size	<p>Select the REC Buffer size.</p> <p>If "Unused" is selected for the usage, "-" (hyphen) is displayed.</p> <p>The REC Buffer size can be set up to the maximum size that is calculated from the installed memory capacity and the usable cache memory capacity in the storage system (excluding the currently used capacity such as assigned size to the copy tables).</p> <div style="background-color: #fff9c4; padding: 10px; margin-top: 10px;"> <p>Caution</p> <ul style="list-style-type: none"> In the ETERNUS DX100 S5, a total size of 512 MB of memory is reserved for the copy table and REC Buffer. If an REC Buffer is created, 256 MB (REC Buffer size, 128 MB x 2) of the total memory size is used. Therefore, the maximum table size is 256 MB. Note that an REC Buffer cannot be created if the copy table size is larger than 264 MB. </div>	<p>ETERNUS DX100 S5: 128 MB (Default)</p> <p>ETERNUS DX200 S5: 128 MB (Default) 256 MB 512 MB</p> <p>ETERNUS DX500 S5/DX600 S5/ DX900 S5: 128 MB (Default) 256 MB 512 MB 1024 MB 2048 MB</p> <p>ETERNUS DX8100 S4/DX8900 S4: 128 MB (Default) 256 MB 512 MB 1024 MB 2048 MB</p> <p>ETERNUS AF150 S3: 128 MB (Default)</p> <p>ETERNUS AF250 S3: 128 MB (Default) 256 MB 512 MB</p> <p>ETERNUS AF650 S3: 128 MB (Default) 256 MB 512 MB 1024 MB 2048 MB</p> <p>"-" (hyphen)</p>
Forwarding Interval	<p>Select the data transfer intervals.</p> <p>If "Unused" is selected for the usage, "-" (hyphen) is displayed.</p>	<p>1 sec. (Default) 2 sec. 4 sec. 8 sec. 15 sec. 30 sec. 45 sec. 60 sec. 75 sec. 90 sec. 105 sec. 120 sec. "-" (hyphen)</p>

5. Advanced Copy
REC Buffer

Item	Description	Setting values
Monitoring Time	Specify the monitoring time, before transition to the "⊗Halt" state for a copy session when an REC Buffer shortage occurs. If the REC Buffer is in a high-load state for the specified monitoring time, the copy session is automatically changed to "⊗Halt" state. When "0 min." is specified in this field, REC Buffer shortage monitoring is not performed. If "Unused" is selected for the usage, "-" (hyphen) is displayed.	0 min. 1 min. 2 min. 3 min. 4 min. 5 min. (Default) 6 min. 7 min. 8 min. 9 min. 10 min. 11 min. 12 min. 13 min. 14 min. 15 min. "-" (hyphen)
HALT Wait Timer	Specify the maximum non-response time. During a non-response time, the host I/O response is stopped to give priority to data transfers from the REC Buffer in a high-load state (or when the used capacity of the REC Buffer is 100%). If the non-response time exceeds the specified value, response to host I/O is restarted. However, the data transfer is stopped. The copy session is changed to the "⊗Halt" state. If a response delay to the host I/O is not allowed, such as when the host is VMware, specify "0 sec." for this parameter. If "Unused" is selected for the usage, "-" (hyphen) is displayed.	0 sec. 5 sec. 10 sec. 15 sec. (Default) "-" (hyphen)

Advanced Setting

"I/O Priority Mode", "Immediate HALT Mode", and "High Bandwidth Mode" can only be set when setting a copy operation or host I/O tuning for each REC Buffer.

Item	Description	Setting values
Group	The management group number of the REC Buffer is displayed.	ETERNUS DX100 S5: 0 ETERNUS DX200 S5: 0 - 3 ETERNUS DX500 S5/ DX600 S5/DX900 S5: 0 - 7 ETERNUS DX8100 S4/ DX8900 S4: 0 - 7 ETERNUS AF150 S3: 0 ETERNUS AF250 S3: 0 - 3 ETERNUS AF650 S3: 0 - 7

5. Advanced Copy
REC Buffer

Item	Description	Setting values
I/O Priority Mode	<p>Select either "Enable" or "Disable" for the "I/O Priority Mode" of the REC Buffer. It is not necessary to change the default value ("Enable") for normal use. If "Unused" is selected for the usage, "-" (hyphen) is displayed. "I/O Priority Mode" reduces the effect on host I/O when an initial copy for starting, restarting, or recovering the copy function is performed.</p> <p>Caution</p> <ul style="list-style-type: none"> • This mode should only be used by users who want to maintain host I/O performance as much as possible during REC. • If "Enable" is selected and host I/O with a high load continues, it may take an extended period of time for the data to reach an equivalent state. Reduce throughput by as much as possible to avoid exceeding the line bandwidth of REC during initial copying. 	<p>Enable Disable "-" (hyphen)</p>
Immediate HALT Mode	<p>Select either "Enable" or "Disable" for the "Immediate HALT Mode" of the REC Buffer. It is not necessary to change the default value ("Enable") for normal use. If "Unused" is selected for the usage, "-" (hyphen) is displayed. "Immediate HALT Mode" reduces the effect on host I/O because of the insufficient of REC Buffer when "HALT Wait Timer" is set to "0 sec.". Enable this item when the response to host I/O is reduced even if "0 sec." is selected for the "HALT Wait Timer".</p> <p>Caution</p> <ul style="list-style-type: none"> • This mode should only be used by users who want to maintain host I/O performance as much as possible during REC. • Items that are set for this mode are only applied when "0 sec." is selected for "HALT Wait Timer". • When "Enable" is selected, the storage system changes the sessions using the target REC Buffers to "🛑Halt" if the capacity of an REC Buffer is insufficient. If this occurs, the initial copy starts every time when recovering from the "🛑Halt" state and the time required for the order of data transfers cannot be guaranteed, resulting in this process taking an extended period of time. 	<p>Enable Disable "-" (hyphen)</p>
High Bandwidth Mode	<p>Select either "Enable" or "Disable" for the "High Bandwidth Mode" of the REC Buffer. It is not necessary to change the default value ("Enable") for normal use. If "Unused" is selected for the usage, "-" (hyphen) is displayed. "High Bandwidth Mode" reduces the number of communications by transferring control data required for buffer transfers with as little time as possible to improve the transfer speed for long distance communication.</p>	<p>Enable Disable "-" (hyphen)</p>

■ Operating Procedures

Adding or Changing an REC Buffer

Procedure ▶▶▶

- 1 Select the target REC Buffer that is to be added or changed (multiple selections can be made), and click the [Modify REC Buffer] in [Action].
- 2 Change the REC Buffer configurations, and click the [Set] button.
→ A confirmation screen appears.

Caution

- An error screen appears in the following conditions:
 - The total size of REC Buffers is larger than the maximum capacity for each model
 - The same remote Box ID has been selected both for "Send" and for "Receive" as its usage
 - The usage of an REC Buffer is "Send" or "Receive", and its path to the remote Box ID has been deleted
 - An REC Buffer, which has already been deleted ("???" is displayed in the "Remote Box ID" field), still exists
 - The usage of an REC Buffer to which an REC Disk Buffer has already been assigned is changed to "Receive"
 - The setting contents of the REC Buffer has not been changed

Note

- To change the remote Box ID, first delete the corresponding group. Then, click [Modify REC Buffer] again to specify a new remote Box ID and other information in the corresponding group.
- To change "I/O Priority Mode", "Immediate HALT Mode", or "High Bandwidth Mode", click "Advanced Setting".

- 3** Click the [OK] button.
→ The REC Buffer modification starts.
- 4** Click the [Done] button to return to the [REC Buffer] screen.



Deleting an REC Buffer

Procedure ▶▶▶

- 1** Select the target REC Buffers to be deleted (multiple selections can be made), and click the [Modify REC Buffer] in [Action].
- 2** Select "Unused" for the usage of the REC Buffer and then click the [Set] button.
→ A confirmation screen appears.
- 3** Click the [OK] button.
→ Deletion of an REC Buffer starts.
- 4** Click the [Done] button to return to the [REC Buffer] screen.



Assign REC Disk Buffer

- ["■ Overview" \(page 559\)](#)
- ["■ User Privileges" \(page 560\)](#)
- ["■ Display Contents" \(page 560\)](#)
- ["■ Settings" \(page 562\)](#)
- ["■ Operating Procedures" \(page 563\)](#)

■ Overview

This function assigns an [REC Disk Buffer](#) to an [REC Buffer](#). This function also deletes the assignment of the REC Disk Buffers.

Requirements for REC Buffers to Assign REC Disk Buffers

- The usage of the REC Buffer must be "Send"
 - The number of REC Disk Buffers that are to be assigned to a single REC Buffer must be one of the following numbers.
 - For the ETERNUS DX100 S5/DX200 S5: One or two (but less than or equal to the number of CMs that are installed)
 - For the ETERNUS DX500 S5/DX600 S5: One or two
 - For the ETERNUS DX900 S5: One, two, or four (but less than or equal to the number of CMs that are installed)
 - For the ETERNUS DX8900 S4: One, two, four, or six (but less than or equal to the number of CMs that are installed)
 - For the ETERNUS AF150 S3/AF250 S3: One or two
 - For the ETERNUS AF650 S3: One or two
 - Requirements to assign multiple REC Disk Buffers to a single REC Buffer
 - The drive type ([Online/Nearline/SSD/Online SED/Nearline SED/SSD SED](#)) must be the same (*1)
 - The assigned REC Disk Buffers have the same number of drives (two, four, or eight)
 - The assigned REC Disk Buffers have the same encryption status ("CM", "-", or "SED")
 - Recommended conditions for assigning multiple REC Disk Buffers to a single REC Buffer
 - The assigned REC Disk Buffers have the same Stripe Depth (*2)
 - The assigned REC Disk Buffers have the same capacity (*3)
 - The SSD type ([SSD-H/SSD-M/SSD-L/SSD-H SED/SSD-M SED/SSD-L SED](#)) must be the same
- *1 : Only assigning either "Online" or "Nearline" REC Disk Buffers is recommended. Also, only assigning either an "Online SED" or a "Nearline SED" REC Disk Buffers is recommended. This is because the available capacity and the access performance may be reduced when these REC Disk Buffers are assigned in the same REC Buffer.
- *2 : If the Stripe Depth is different for the used REC Disk Buffers, access performance of the REC Disk Buffer may be affected.
- *3 : When using REC Disk Buffers of different capacities, the smallest becomes the standard, and all other REC Disk Buffers are regarded as having the same capacity as the smallest REC Disk Buffer. In this case, the remaining REC Disk Buffer space will NOT be used.

Caution

- This function can only be used when the local storage system (the storage system that assigns REC Disk Buffers) supports REC.
- A single REC Disk Buffer cannot be assigned to multiple REC Buffers.
- When an REC that uses an REC Buffer is being performed, make sure to suspend the relevant REC session in advance.

5. Advanced Copy
REC Buffer

Note

- When assigning REC Disk Buffers to REC Buffers, an REC Disk Buffer must be created in advance. Refer to the [Create REC Disk Buffer] function for details.
- The Stripe Depth for REC Disk Buffers can be checked from the [REC Disk Buffer Detail] screen. Refer to the [REC Disk Buffer] function for details.

■ User Privileges

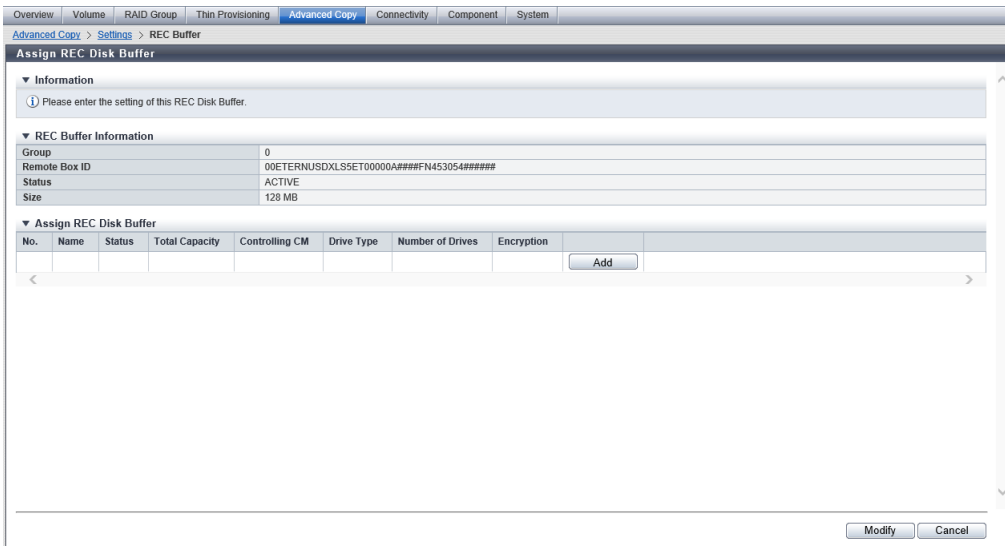
Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	✓
StorageAdmin	✓
AccountAdmin	
SecurityAdmin	
Maintainer	✓

Refer to "'A. User Roles and Policies" (page 1580)" for details on the policies and roles.

■ Display Contents

The selected REC Buffer and the REC Disk Buffers, which will be/are assigned to the REC Buffer, are displayed.



REC Buffer Information

Item	Description
Group	The management group number of the REC Buffer to which the REC Disk Buffer is to be assigned is displayed. ETERNUS DX100 S5: 0 ETERNUS DX200 S5: 0 - 3 ETERNUS DX500 S5/DX600 S5/DX900 S5: 0 - 7 ETERNUS DX8100 S4/DX8900 S4: 0 - 7 ETERNUS AF150 S3: 0 ETERNUS AF250 S3: 0 - 3 ETERNUS AF650 S3: 0 - 7
Remote Box ID	The remote storage system Box ID of the REC Buffer to which the REC Disk Buffer is to be assigned is displayed. If the remote storage system path information has been deleted, "???" is displayed.
Status	The status of the REC Buffer to which the REC Disk Buffer is to be assigned is displayed. <ul style="list-style-type: none"> • ACTIVE The REC Buffer is available for data transfer. • INACTIVE The REC Buffer is not available for data transfer.
Size	The capacity of the REC Buffer to which the REC Disk Buffer is to be assigned is displayed. ETERNUS DX100 S5: 128 MB ETERNUS DX200 S5: 128 MB, 256 MB, 512 MB ETERNUS DX500 S5/DX600 S5/DX900 S5: 128 MB, 256 MB, 512 MB, 1024 MB, 2048 MB ETERNUS DX8100 S4/DX8900 S4: 128 MB, 256 MB, 512 MB, 1024 MB, 2048 MB ETERNUS AF150 S3: 128 MB ETERNUS AF250 S3: 128 MB, 256 MB, 512 MB ETERNUS AF650 S3: 128 MB, 256 MB, 512 MB, 1024 MB, 2048 MB

Assign REC Disk Buffer

Item	Description
No.	The RAID group number of the REC Disk Buffer is displayed.
Name	The RAID group name of the REC Disk Buffer is displayed.
Status	The RAID group status of the REC Disk Buffer is displayed. Refer to ""RAID Group Status" (page 1605)" for details.
Total Capacity	The total capacity of the REC Disk Buffer is displayed.
Controlling CM	The Controlling CM of the RAID group which have been registered as the REC Disk Buffer is displayed. For the ETERNUS DX900 S5 or the ETERNUS DX8900 S4 CE#x CM#y For the other models CM#y x: CE number y: CM number

5. Advanced Copy REC Buffer

Item	Description
Drive Type	<p>The drive type of the REC Disk Buffer is displayed.</p> <p>If multiple drive types are used in the REC Disk Buffer, the drive type is displayed as described below.</p> <ul style="list-style-type: none"> • If only "Online" type drives are used or if both "Online" and "Nearline" type drives are used, "Online" is displayed. • If only "Online SED" type drives are used or if both "Online SED" and "Nearline SED" type drives are used, "Online SED" is displayed. • If a single SSD type (SSD-H/SSD-M/SSD-L) is used or if multiple SSD types (SSD-H/SSD-M/SSD-L) are used, "SSD" is displayed. • If a single SSD type (SSD-H SED/SSD-M SED/SSD-L SED) is used or if multiple SSD types (SSD-H SED/SSD-M SED/SSD-L SED) are used, "SSD SED" is displayed.
Number of Drives	<p>The number of drives, which configure the REC Disk Buffer, is displayed.</p> <p>2 4 8</p>
Encryption	<p>The encryption status of the REC Disk Buffer is displayed.</p> <p>CM: Encryption by CM "-" (hyphen): Unencryption SED: Encryption by SED</p>

Function Button

Button	Description
[Add]	<p>Assigns an additional REC Disk Buffer.</p> <p>The [Add] button is available when the number of assigned REC Disk Buffers is one of the following numbers and the REC Disk Buffers that are to be assigned satisfy the required conditions.</p> <p>ETERNUS DX100 S5/DX200 S5, ETERNUS DX500 S5/DX600 S5, and ETERNUS AF150 S3/AF250 S3/AF650 S3: 0 or 1 (less than the number of installed CMs)</p> <p>ETERNUS DX900 S5: 0 - 3 (less than the number of installed CMs)</p> <p>ETERNUS DX8900 S4: 0 - 5 (less than the number of installed CMs)</p>
[Delete]	<p>Deletes the assignment of the specified REC Disk Buffers.</p> <p>If no REC Disk Buffer is assigned, the [Delete] button is not displayed.</p>

■ Settings

In this screen, select the REC Disk Buffer that is to be assigned to the REC Buffer.

[Select REC Disk Buffer] Screen

Select REC Disk Buffer

For other items that are not described in this section, refer to [""Assign REC Disk Buffer" \(page 561\)""](#).

Item	Description
Checkbox to select an REC Disk Buffer	<p>Select the checkbox for the REC Disk Buffer that is to be assigned to the REC Buffer. For details on the requirements for REC Disk Buffer selection, refer to "Requirements for REC Buffers to Assign REC Disk Buffers" (page 559).</p> <div style="background-color: #f0f0f0; padding: 10px;"> <p>Note</p> <ul style="list-style-type: none"> • A list of the REC Disk Buffers that satisfy the following conditions for being assigned to REC Buffers is displayed. <ul style="list-style-type: none"> - For the first REC Disk Buffer that is assigned to the REC Buffer <ul style="list-style-type: none"> • REC Disk Buffers that are not assigned to any REC Buffers - For REC Disk Buffers that are to be assigned to an REC Buffer to which other REC Disk Buffer has already been assigned <ul style="list-style-type: none"> • REC Disk Buffers that are not assigned to any REC Buffers • REC Disk Buffers that correspond to the already assigned REC Disk Buffer and that satisfy all of the following conditions: <ul style="list-style-type: none"> - Drive capacities greater than or equal to the smallest capacity - The drive type (Online/Nearline/SSD/Online SED/Nearline SED/SSD SED) is the same Note that the storage system recognizes "Online" and "Nearline" as the same drive type. Also note that the storage system recognizes "Online SED" and "Nearline SED" as the same drive type. - The number of drives (two, four, or eight) is the same - The encryption status ("CM", "-", or "SED") is the same </div>

■ Operating Procedures

Assigning an additional REC Disk Buffer

In this screen, assign an additional REC Disk Buffer.

Procedure ▶▶▶

- 1 Select the REC Buffer, to which the REC Disk Buffer is to be assigned, and click [Assign REC Disk Buffer] in [Action].
- 2 Click the [Add] button.
→ The [Select REC Disk Buffer] screen appears.
- 3 Select the checkbox for the additional REC Disk Buffer (multiple selections can be made) that is to be assigned, and click the [OK] button.
→ The selected REC Disk Buffer is added.

Caution

- When assigning multiple REC Disk Buffers to an REC Buffer, select ones with the same capacity.
- An error screen appears in the following conditions:
 - No REC Disk Buffers, which satisfy the assignment requirements, are registered to the storage system
 - The number of REC Disk Buffers, which are assigned to an REC Buffer, exceeds the maximum number which the storage system model supports
 - The selected REC Disk Buffer does not satisfy the assignment requirements

Note

- To delete the assignment of the REC Disk Buffer, click the [Delete] button for the target REC Disk Buffer (RAID group).

- 4 When the REC Disk Buffer assignment has been completed, click the [Modify] button.
→ A confirmation screen appears.
- 5 Click the [OK] button.
→ The REC Disk Buffer assignment starts.
- 6 Click the [Done] button to return to the [REC Buffer] screen.



Deleting an REC Disk Buffer assignment

In this screen, delete the assignment of the REC Disk Buffers from the REC Buffer.

Procedure ▶▶▶

- 1 Select the REC Buffer to delete the assignment of the REC Disk Buffer, and click [Assign REC Disk Buffer] in [Action].
- 2 To delete the assignment of the REC Disk Buffer, click the [Delete] button for the target REC Disk Buffer (RAID group).
→ The selected REC Disk Buffer is deleted from the list.
- 3 Click the [Modify] button.
→ A confirmation screen appears.
- 4 Click the [OK] button.
→ Deletion of an REC Disk Buffer starts.
- 5 Click the [Done] button to return to the [REC Buffer] screen.



REC Disk Buffer

- ["■ Overview" \(page 564\)](#)
- ["■ User Privileges" \(page 565\)](#)
- ["■ Display Contents" \(page 565\)](#)
- ["■ Filter Setting" \(page 568\)](#)

■ Overview

This function displays the existing [REC Disk Buffers](#) in the storage system.

Caution

- Drives are not monitored for bad sectors when the drives configure the REC Disk Buffer.

Note

- This function is displayed only when the Advanced Copy function license has been registered and a storage system model that supports REC is used.

■ User Privileges

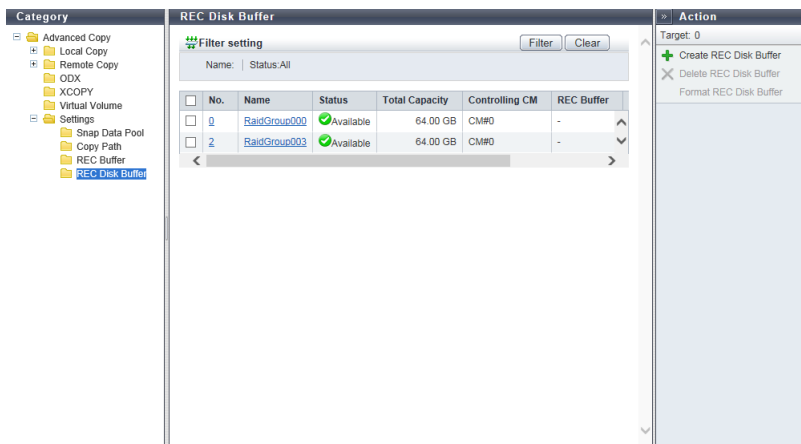
Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	✓
Admin	✓
StorageAdmin	✓
AccountAdmin	
SecurityAdmin	✓
Maintainer	✓

Refer to "'A. User Roles and Policies" (page 1580)" for details on the policies and roles.

■ Display Contents

The REC Disk Buffer status is displayed on a list.



REC Disk Buffer List

Item	Description
No.	The RAID group number of the REC Disk Buffer is displayed. Click this item to display the "[REC Disk Buffer Detail] Screen" (page 566).
Name	The REC Disk Buffer name is displayed. Click this item to display the "[REC Disk Buffer Detail] Screen" (page 566).
Status	The REC Disk Buffer status is displayed. Refer to "'RAID Group Status" (page 1605)" for details.
Total Capacity	The total capacity of the REC Disk Buffer is displayed.
Controlling CM	The Controlling CM of the REC Disk Buffer is displayed. For the ETERNUS DX900 S5 or the ETERNUS DX8900 S4 CE#x CM#y For the other models CM#y x: CE number y: CM number

5. Advanced Copy REC Disk Buffer

Item	Description
REC Buffer	<p>The management group number of the REC Buffer to which the REC Disk Buffer is assigned is displayed. A "-" (hyphen) is displayed for an REC Disk Buffer that is not assigned to any REC Buffers.</p> <p>ETERNUS DX100 S5: 0 ETERNUS DX200 S5: 0 - 3 ETERNUS DX500 S5/DX600 S5/DX900 S5: 0 - 7 ETERNUS DX8100 S4/DX8900 S4: 0 - 7 ETERNUS AF150 S3: 0 ETERNUS AF250 S3: 0 - 3 ETERNUS AF650 S3: 0 - 7</p>
Encryption	<p>The encryption status of the REC Disk Buffer is displayed.</p> <ul style="list-style-type: none"> • CM: Encryption by CM • "-" (hyphen): Unencryption • SED: Encryption by SED
Process	<p>A process that is being performed for the REC Disk Buffer is displayed. If no process is being performed, a "-" (hyphen) is displayed.</p> <ul style="list-style-type: none"> • Recovering Rebuild, copyback, redundant copy, or recovery of the RAID group is being performed. • Formatting Formatting is being performed.

[REC Disk Buffer Detail] Screen

[Basic] Tab

Detailed information of the RAID group to be used as an REC Disk Buffer is displayed. The RAID group number and the RAID group name of the REC Disk Buffer are displayed.

REC Disk Buffer Information

Item	Description
Status	<p>The RAID group status is displayed.</p> <p>Refer to "RAID Group Status" (page 1605) for details.</p>
Total Capacity	<p>The total capacity of the RAID groups is displayed.</p>
Controlling CM	<p>The Controlling CM of the RAID group is displayed.</p> <p>For the ETERNUS DX900 S5 or the ETERNUS DX8900 S4 CE#x CM#y For the other models CM#y x: CE number y: CM number</p>
REC Buffer	<p>The management group number of the REC Buffer to which the REC Disk Buffer is assigned is displayed. A "-" (hyphen) is displayed for an REC Disk Buffer that is not assigned to any REC Buffers.</p> <p>ETERNUS DX100 S5: 0 ETERNUS DX200 S5: 0 - 3 ETERNUS DX500 S5/DX600 S5/DX900 S5: 0 - 7 ETERNUS DX8100 S4/DX8900 S4: 0 - 7 ETERNUS AF150 S3: 0 ETERNUS AF250 S3: 0 - 3 ETERNUS AF650 S3: 0 - 7</p>

5. Advanced Copy
REC Disk Buffer

Item	Description
Encryption	The encryption status of the REC Disk Buffer is displayed. CM: Encryption by CM "- (hyphen): Unencryption SED: Encryption by SED
Process	A process that is being performed for the REC Disk Buffer is displayed. If no process is being performed, a "- (hyphen) is displayed. Recovering Formatting
Progress	The progress (0 to 100 %) of a process that is being performed is displayed.
Stripe Depth	The Stripe Depth (*1) of the RAID group is displayed. 64 KB 128 KB 256 KB 512 KB 1024 KB *1: This is the number of logical blocks assigned to one drive per stripe when a volume is striped to configuring drives of a RAID group. Normally, it is 64KB.

[Drives] Tab

Drives configuring the REC Disk Buffer are displayed.
The RAID group number and the RAID group name of the REC Disk Buffer are displayed.

REC Disk Buffer Information

Item	Description
Enclosure	The enclosure where the drive is installed is displayed. CE: Controller Enclosure (2.5" and 3.5") DE: Drive Enclosure (2.5", 3.5", and 3.5" high density DEs) CE#x DE#yy x: CE number yy: DE number
Slot No.	The slot number of the enclosure where the drive is installed is displayed. 2.5" CE/DE: 0 - 23 3.5" CE/DE: 0 - 11 3.5" high density DE: 0 - 59
Status	The drive status is displayed. Refer to "" Drive Status " (page 1607)" for details.

5. Advanced Copy
REC Disk Buffer

Item	Description
Drive Type	<p>The drive type displayed for this item is a combination of the following.</p> <ul style="list-style-type: none"> • Drive size <ul style="list-style-type: none"> - For 2.5-inch drives: 2.5" - For 3.5-inch drives: 3.5" • Drive type <ul style="list-style-type: none"> - For SAS disks: Online - For Nearline SAS disks: Nearline - For SSDs, the following items are displayed depending on the SSD type. <ul style="list-style-type: none"> • For SSD-Hs (12 Gbit/s): SSD-H (*1) • For SSD-Ms (12 Gbit/s): SSD-M (*1) • For SSD-Ls (12 Gbit/s): SSD-L (*1) <p>Note that "SED" is also displayed for self encrypting drives and "AF" is also displayed for Advanced Format compliant drives.</p> <p>*1: The displayed item varies depending on the interface speed (bandwidth) or the capacity of the reserved space. Unless otherwise specified, "SSD-H", "SSD-M", and "SSD-L" are collectively referred to as "SSD". In addition, there may be cases when "SSD SED" is used as the collective term for self encrypting SSD-Hs, SSD-Ms, and SSD-Ls.</p>
Capacity	<p>The capacity of the drive is displayed.</p> <div style="background-color: #fff9c4; padding: 10px; border: 1px solid #ccc;"> <p>Caution</p> <ul style="list-style-type: none"> • The displayed drive capacity may differ from the product's actual capacity. For example, the drive capacity of a "1.92 TB SSD" is displayed as "2.00 TB" and the capacity of an "18 TB Nearline SAS disk" is displayed as "17.9 TB". </div>
Speed	<p>The drive speed is displayed.</p> <p>For SSD or SSD SED, a "-" (hyphen) is displayed.</p> <p>15000 rpm 10000 rpm 7200 rpm</p>
Usage	<p>The usage of the drive is displayed.</p> <p>Data Global Hot Spare</p>

■ Filter Setting

Function Description

Filter setting is a function used to display a list of only the REC Disk Buffers satisfying all the specified conditions.

No filtering is set by default. The following table shows conditions that can be specified.

Item	Description	Setting values
Name	<p>Input the REC Disk Buffer name that is to be displayed.</p> <p>REC Disk Buffer names matching or partially matching the entered name are displayed.</p> <p>When not using the REC Disk Buffer name for filtering, leave this item blank.</p>	<p>REC Disk Buffer name</p> <p>Blank</p>
Status	<p>Select the REC Disk Buffer status to be displayed.</p> <p>When not using the REC Disk Buffer status for filtering, select "All".</p>	<p>All</p> <p>Refer to ""RAID Group Status" (page 1605)".</p>

Create REC Disk Buffer

- ["■ Overview" \(page 569\)](#)
- ["■ User Privileges" \(page 570\)](#)
- ["■ Settings" \(page 570\)](#)
- ["■ Operating Procedures" \(page 575\)](#)

■ Overview

This function creates an REC Disk Buffer.

When using the REC Consistency mode, REC Buffer shortage may occur due to errors (such as an unstable line). Note that the copy session will be in the "⊘Halt" state if the REC Buffer shortage extends for a certain period of time. The REC Disk Buffer is used for temporarily saving copy data to avoid these situations.

Caution

- Registering the license for the Advanced Copy function is required to create an REC Disk Buffer.
- This function can only be used when the local storage system (the storage system that creates REC Disk Buffers) supports REC.
- When the [encryption mode](#) is disabled, an REC Disk Buffer encrypted by CM cannot be created.
- In the following conditions, REC Disk Buffers cannot be created:
 - When multiple types of drives are combined in a single REC Disk Buffer
Refer to the ["Drive Combinations That Can Configure an REC Disk Buffer" \(page 569\)](#) for details.
 - When resources for creating an REC Disk Buffer (such as the number of RAID groups and volumes) are insufficient
(When the maximum number of RAID groups or volumes already exists in the storage system, REC Disk Buffers cannot be created.)

Note

- When the REC Disk Buffer creation process has been completed, the REC Disk Buffer is formatted automatically.
- When assigning multiple REC Disk Buffers to an REC Buffer, each REC Buffer has different conditions. Refer to the [Assign REC Disk Buffer] function for details.

Drive Combinations That Can Configure an REC Disk Buffer

	Online	Nearline	SSD	Online SED	Nearline SED	SSD SED
Online	OK	OK (but not recommended)	NG	NG	NG	NG
Nearline	OK (but not recommended)	OK	NG	NG	NG	NG
SSD	NG	NG	OK	NG	NG	NG
Online SED	NG	NG	NG	OK	OK (but not recommended)	NG
Nearline SED	NG	NG	NG	OK (but not recommended)	OK	NG
SSD SED	NG	NG	NG	NG	NG	OK

OK: REC Disk Buffers can be created OK (but not recommended): REC Disk Buffers can be created, but not a recommended configuration NG: REC Disk Buffers cannot be created

■ User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	✓
StorageAdmin	✓
AccountAdmin	
SecurityAdmin	
Maintainer	✓

Refer to "[A. User Roles and Policies](#)" (page 1580) for details on the policies and roles.

■ Settings

This function creates a new RAID group to be used as an REC Disk Buffer.

New RAID Group

Item	Description	Setting values
Name	Input a RAID group name to be created. An existing RAID group name cannot be used.	Up to 16 alphanumeric characters, symbols (except ",", (comma), "?", and "%" (used as the first character)), and spaces

Manual Setting

Select the drives configuring the REC Disk Buffer.

Item	Description	Setting values
Controlling CM	Specify the Controlling CM of the RAID group to be created. "Automatic" and the normal CM number ("CE#x CM#y" or "CM#y") that is installed are displayed as options. Select "Automatic" for normal operations. When "Automatic" is selected, the Controlling CM that is to be allocated is determined by the RAID group number. Refer to " Automatic Controlling CM Setting " (page 281) for details.	For the ETERNUS DX900 S5 or the ETERNUS DX8900 S4 Automatic CE#x CM#y For the other models Automatic CM#y x: CE number y: CM number
RAID Group Capacity	The RAID group capacity is displayed. If RAID groups cannot be configured with the selected drives, a "-" (hyphen) is displayed.	

5. Advanced Copy
REC Disk Buffer

Item	Description	Setting values
Encryption by CM	<p>Select the RAID group encryption status with the radio button.</p> <p>If RAID groups cannot be configured with the selected drives, a "-" (hyphen) is displayed.</p> <ul style="list-style-type: none"> To use a CM to perform encryption, select "On". To perform encryption without using a CM, select "Off". <p>When the encryption mode is disabled, "On" cannot be selected.</p> <p>When "On" is specified for "Encryption by CM", select Online, Nearline, or SSD type drives.</p>	<p>On</p> <p>Off</p>

Advanced Setting

Stripe Depth should be set only when advanced tuning needs to be performed for each RAID group configuring the REC Disk Buffer.

Item	Description	Setting values
Stripe Depth	<p>Select the Stripe Depth of the RAID group that is to be created. It is not necessary to change the default value (64KB) for normal use.</p> <p>The Stripe Depth of the RAID groups configuring the REC Disk Buffer, which has already been created, cannot be changed.</p> <p>When two drives are selected, Stripe Depth is 64 KB.</p> <div style="background-color: #f0f0f0; padding: 5px; margin-top: 10px;"> <p>Note</p> <ul style="list-style-type: none"> Specifying a large value for Stripe Depth may enhance the random access performance to the corresponding RAID group. </div>	<p>64 KB (Default)</p> <p>128 KB</p> <p>256 KB</p> <p>512 KB</p> <p>1024 KB</p>

Drive Selection

Drives can be selected from the list or the installation image. To switch between the list and the installation image, click the tab.

Requirements for selecting drives

- The conditions of the RAID group to be used as an REC Disk Buffer are shown below.
 - The number of member drives is two, four, or eight
(The RAID level for the REC Disk Buffer is RAID1, RAID1+0(2+2), or RAID1+0(4+4).)
 - Do not combine different drive types ([Online/Nearline/SSD/Online SED/Nearline SED/SSD SED](#))
(Although "Online" type drives and "Nearline" type drives can be used in the same REC Disk Buffer, using only "Online" type drives or using only "Nearline" type drives is recommended. Also, "Online SED" type drives and "Nearline SED" type drives can be used in the same REC Disk Buffer, but using only "Online SED" type drives or using only "Nearline SED" type drives is recommended. This is because the available capacity and the access performance may be reduced when these drives are used in the same REC Disk Buffer.)
 - The drive size must be smaller than 6 TB (except SSDs and SSD SEDs)
- The recommended drive configuration of the RAID group is shown as follows:
 - Select drives with the same capacity. If drives of different capacities exist in a RAID group, the smallest becomes the standard, and all other drives are regarded as the same capacity as the smallest drive. In this case, the remaining drive space is not used.
 - Select drives with the same speed. If drives of different speeds exist in a RAID group, access performance of the RAID group may be affected.
 - Select the same SSD type ([SSD-H/SSD-M/SSD-L/SSD-H SED/SSD-M SED/SSD-L SED](#)).
 - If the host connection environment does not support Advanced Format (AF), select non-AF-compliant drives (*1). If AF-compliant drives (*2) are selected, a data format conversion occurs and the drive access performance is reduced. When the host to be connected supports AF, both AF-compliant and non-AF-compliant drives can be selected.
 - *1 : Drives (such as 2.5" Online and 2.5" Nearline) where "AF" is not displayed for the type.
 - *2 : Drives (such as 2.5" Online AF and 2.5" Nearline AF) where "AF" is displayed for the type.
- There are conditions for the ETERNUS DX8900 S4 drive layout. Refer to ["Conditions for the ETERNUS DX8900 S4 Drive Layout" \(page 574\)](#) for details. Note that these conditions are not applied to other models.

[Tabular] Tab

Click the [Tabular] tab to select drives from the list. Only unused drives are displayed on the list. There are conditions for the ETERNUS DX8900 S4 drive layout. Refer to ["Conditions for the ETERNUS DX8900 S4 Drive Layout" \(page 574\)](#) for details.


Item	Description
Checkbox to select drives	Select the checkbox for the drive that is to be used. When selecting drives, refer to "Requirements for selecting drives" (page 572) .
Enclosure	The enclosure where the drive is installed is displayed. CE : Controller Enclosure (2.5" and 3.5") DE : Drive Enclosure (2.5", 3.5", and 3.5" high density DEs) CE#x DE#yy x: CE number yy: DE number
Slot No.	The slot number of the enclosure, where the drive is installed, is displayed. 2.5" CE/DE: 0 - 23 3.5" CE/DE: 0 - 11 3.5" high density DE: 0 - 59

5. Advanced Copy
REC Disk Buffer

Item	Description
Drive Type	<p>The drive type displayed for this item is a combination of the following.</p> <ul style="list-style-type: none"> • Drive size <ul style="list-style-type: none"> - For 2.5-inch drives: 2.5" - For 3.5-inch drives: 3.5" • Drive type <ul style="list-style-type: none"> - For SAS disks: Online - For Nearline SAS disks: Nearline - For SSDs, the following items are displayed depending on the SSD type. <ul style="list-style-type: none"> • For SSD-Hs (12 Gbit/s): SSD-H (*1) • For SSD-Ms (12 Gbit/s): SSD-M (*1) • For SSD-Ls (12 Gbit/s): SSD-L (*1) <p>Note that "SED" is also displayed for self encrypting drives and "AF" is also displayed for Advanced Format compliant drives.</p> <p>*1: The displayed item varies depending on the interface speed (bandwidth) or the capacity of the reserved space. Unless otherwise specified, "SSD-H", "SSD-M", and "SSD-L" are collectively referred to as "SSD". In addition, there may be cases when "SSD SED" is used as the collective term for self encrypting SSD-Hs, SSD-Ms, and SSD-Ls.</p>
Capacity	<p>The capacity of the drive is displayed.</p> <div style="background-color: #fff9c4; padding: 10px; border: 1px solid #ccc;"> <p>Caution</p> <ul style="list-style-type: none"> • The displayed drive capacity may differ from the product's actual capacity. For example, the drive capacity of a "1.92 TB SSD" is displayed as "2.00 TB" and the capacity of an "18 TB Nearline SAS disk" is displayed as "17.9 TB". </div>
Speed	<p>The drive speed is displayed.</p> <p>For SSD or SSD SED, a "-" (hyphen) is displayed.</p> <p>15000 rpm 10000 rpm 7200 rpm</p>

[Graphic] Tab

Click the [Graphic] tab to select drives from the drive installation image. The installation images of all the drives installed in the storage system are displayed. Checkboxes are displayed for unused drives. There are conditions for the ETERNUS DX8900 S4 drive layout. Refer to ["Conditions for the ETERNUS DX8900 S4 Drive Layout" \(page 574\)](#) for details.

Item	Description	Setting values
DE selection list box	Select the DE group. Options are displayed in the list box when at least one CE or DE in the DE group is installed in the storage system. Refer to "DE selection list box" (page 273) for details on the options and DE groups for each model.	DE#0x DE#1x DE#2x DE#3x DE#4x DE#5x DE#6x DE#7x DE#8x DE#9x DE#Ax DE#Bx
DE	Only the CEs or the DEs in the selected DE group that are installed in the storage system are displayed. CE CE#x DE#yy x: CE number yy: DE number	
Checkbox to select drives	Select the checkbox for the drive that is to be used. Checkboxes are displayed for unused drives. For 2.5" CEs or 2.5" DEs, drives are displayed from left to right in ascending order of the slot number. For 3.5" CEs, 3.5" DEs, or 3.5" high density DEs, drives are displayed from bottom left to top right in ascending order of the slot number. Placing the mouse pointer on the  icon displays the detailed information of the drive. When selecting drives, refer to "Requirements for selecting drives" (page 572) .	

Conditions for the ETERNUS DX8900 S4 Drive Layout

The drive layout to configure RAID groups must satisfy the conditions described below. RAID groups cannot be created if the required conditions are not satisfied.

RAID level	Drive layout conditions	
RAID1+0	Required	Allocate mirroring pair drives to different DEs.
	Recommended	Allocate striping drives to DEs under as many CEs as possible. Allocate striping drives to as many SAS cascades (*1) as possible.
RAID1	Required	Allocate mirroring pair drives to different DEs.
	Recommended	Allocate pair drives under different CEs as possible. Allocate pair drives under different SAS cascades (*1) as possible.

*1: "SAS cascade" for the ETERNUS DX8900 S4 refers to DEs that are attached to one drive interface port. The DEs that are allocated to the same SAS cascade configuration are as follows:

- DE#x1, DE#x2, and DE#x3 that are connected to CE#x/DI Port#0 (x:0 - B)
 - DE#x4, DE#x5, DE#x6, and DE#x7 that are connected to CE#x/DI Port#1 (x:0 - B)
 - DE#x8, DE#x9, DE#xA, and DE#xB that are connected to CE#x/DI Port#2 (x:0 - B)
 - DE#xC, DE#xD, DE#xE, and DE#xF that are connected to CE#x/DI Port#3 (x:0 - B)
- (Example) DE#01, DE#02, and DE#03 that are connected to CE#0/DI Port#0 are on the same SAS cascade.

■ Operating Procedures

Procedure ▶▶▶

- 1 Click [Create REC Disk Buffer] in [Action].
- 2 Specify the REC Disk Buffer detailed information, and click the [Create] button.
→ A confirmation screen appears.

Caution

- An error screen appears in the following conditions:
 - The "Name" is not entered
 - The RAID group name specified in the "Name" field does not satisfy the input conditions
 - The selected drives do not satisfy the input conditions
 - The selected drives do not satisfy the required layout conditions
(Refer to ""[Conditions for the ETERNUS DX8900 S4 Drive Layout](#)" (page 574)" for details.)

- 3 Click the [OK] button.
→ Creation of an REC Disk Buffer starts.
- 4 Click the [Done] button to return to the [REC Disk Buffer] screen.



Delete REC Disk Buffer

- "[■ Overview](#)" (page 575)
- "[■ User Privileges](#)" (page 575)
- "[■ Operating Procedures](#)" (page 576)

■ Overview

This function deletes an [REC Disk Buffer](#).

■ User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	✓
StorageAdmin	✓
AccountAdmin	
SecurityAdmin	
Maintainer	✓

Refer to "[A. User Roles and Policies](#)" (page 1580) for details on the policies and roles.

■ Operating Procedures

Procedure ▶▶▶

- 1 Select the REC Disk Buffer that is to be deleted (multiple selections can be made) and click [Delete REC Disk Buffer] in [Action].
→ A confirmation screen appears.

Caution

- [Delete REC Disk Buffer] cannot be clicked if the selected REC Disk Buffers are assigned to the [REC Buffer](#).

- 2 Click the [OK] button.
→ Deletion of an REC Disk Buffer starts.
- 3 Click the [Done] button to return to the [REC Disk Buffer] screen.

Format REC Disk Buffer

- "[■ Overview](#)" (page 576)
- "[■ User Privileges](#)" (page 576)
- "[■ Operating Procedures](#)" (page 577)

■ Overview

This function formats an [REC Disk Buffer](#).

Caution

- If an in-use REC Disk Buffer is formatted, the data stored in the REC Disk Buffer will be deleted.

Note

- The newly created REC Disk Buffer will be formatted automatically. In this case, it is not necessary to format the REC Disk Buffer by using this function.

■ User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	✓
StorageAdmin	✓
AccountAdmin	
SecurityAdmin	
Maintainer	✓

Refer to "[A. User Roles and Policies](#)" (page 1580) for details on the policies and roles.

■ Operating Procedures

Procedure ▶▶▶

- 1 Select the REC Disk Buffers that are to be formatted (multiple selections can be made), and click [Format REC Disk Buffer] in [Action].
→ A confirmation screen appears.

Caution

- [Format REC Disk Buffer] cannot be clicked if the selected REC Disk Buffer is not in the "✔ Available" or "✔ Ready" state.

- 2 Click the [OK] button.
→ Formatting of an REC Disk Buffer starts.
- 3 Click the [Done] button to return to the [REC Disk Buffer] screen.



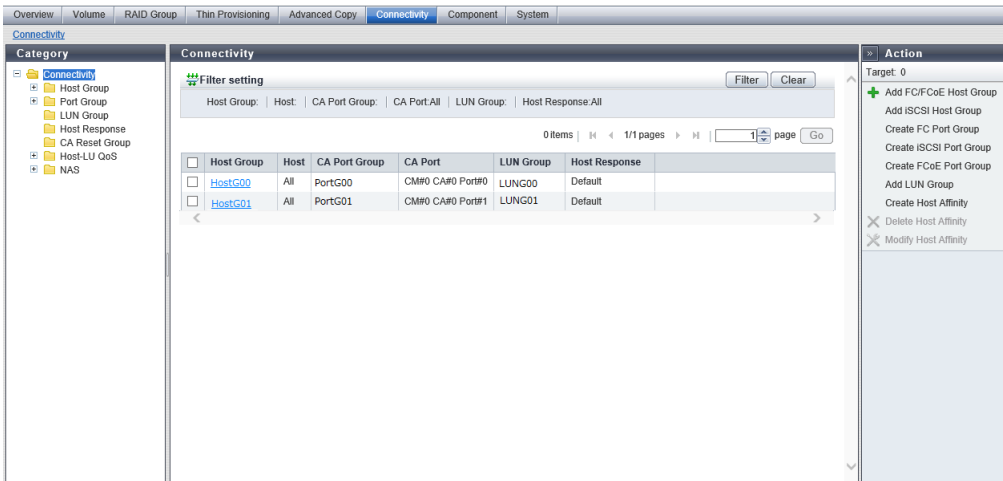
6. Connectivity

- "■ Overview" (page 578)
- "■ Display Function List" (page 578)
- "■ Action List" (page 579)

■ Overview

This function provides setting functions required for various hosts to recognize prepared volumes.

■ Display Function List



Category	Function	Description
Connectivity	"Connectivity" (page 582)	The current host affinity settings are displayed.
Host Group	"Host Group" (page 608)	The list of the host groups to be connected is displayed.
FC	"FC Host" (page 637)	Information of the hosts that are connected to the storage system is displayed.
iSCSI	"iSCSI Host" (page 657)	Information of the hosts that are connected to the storage system is displayed.
SAS	"SAS Host" (page 682)	Information of the hosts that are connected to the storage system is displayed.
Port Group	"CA Port Group" (page 700)	The list of the CA port groups used for the host interface is displayed.
FC	"FC Port" (page 715)	The port parameter settings used for the host interface are displayed.
iSCSI	"iSCSI Port" (page 738)	The port parameter settings used for the host interface are displayed.
SAS	"SAS Port" (page 771)	The port parameter settings used for the host interface are displayed.
LUN Group	"LUN Group" (page 776)	The list of LUN groups that comprise a unit to enable hosts to recognize volumes is displayed.
Host Response	"Host Response" (page 792)	The host response setting to adjust host access operations is displayed.
CA Reset Group	"CA Reset Group" (page 816)	The list of the registered CA reset groups is displayed.
Host-LU QoS	"Host-LU QoS" (page 820)	The list of the Host-LU QoS is displayed.

6. Connectivity

Category		Function	Description
Host QoS	FC	"Host QoS" (page 842)	The bandwidth limit of the host is displayed.
	iSCSI		
	SAS		
Port QoS	FC	"Port QoS" (page 849)	The bandwidth limit of the port is displayed.
	iSCSI		
	SAS		
LU QoS Group		"LU QoS Group" (page 861)	The list of the LU QoS groups is displayed.
NAS		"NAS" (page 866)	The list of the NAS shared folders is displayed.
NAS Interface		"NAS Interface" (page 891)	The list of the NAS interfaces is displayed.
Environment Settings		"Environment Settings" (page 898)	The setup information for the servers (NAS servers, DNS servers, and authentication servers) is displayed.
Quota Management		"Quota Management" (page 921)	The list of quota setting information is displayed.
Meta Cache Distribution		"Meta Cache Distribution" (page 939)	The setting state of the automatic meta cache distribution and the location of the meta cache are displayed.

■ Action List

Action	Function	Description	
Create Host Affinity	"Create Host Affinity" (page 587)	Create a host affinity to specify association between host groups, port groups, and LUN groups.	
Delete Host Affinity	"Delete Host Affinity" (page 598)	Delete a host affinity.	
Modify Host Affinity	"Modify Host Affinity" (page 599)	Change the host affinity settings.	
Host Group			
Delete Host Group	"Delete Host Group" (page 636)	Delete a host group.	
Modify Host Group	FC	"Modify Host Group (FC)" (page 611)	Change the FC host group settings.
	iSCSI	"Modify Host Group (iSCSI)" (page 619)	Change the iSCSI host group settings.
	SAS	"Modify Host Group (SAS)" (page 628)	Change the SAS host group settings.
FC	Add FC Host Group	"Add FC Host Group" (page 640)	Add FC host groups.
	Add FC Host	"Add FC Host" (page 648)	Add FC hosts.
	Delete FC Host	"Delete FC Host" (page 654)	Delete the FC hosts.
	Modify FC Host	"Modify FC Host" (page 655)	Change the FC host information.
iSCSI	Add iSCSI Host Group	"Add iSCSI Host Group" (page 660)	Add iSCSI host groups.
	Add iSCSI Host	"Add iSCSI Host" (page 670)	Add iSCSI hosts.
	Delete iSCSI Host	"Delete iSCSI Host" (page 678)	Delete the iSCSI hosts.
	Modify iSCSI Host	"Modify iSCSI Host" (page 679)	Change the iSCSI host information.
SAS	Add SAS Host Group	"Add SAS Host Group" (page 685)	Add SAS host groups.
	Add SAS Host	"Add SAS Host" (page 692)	Add SAS hosts.
	Delete SAS Host	"Delete SAS Host" (page 697)	Delete the SAS hosts.
	Modify SAS Host	"Modify SAS Host" (page 698)	Change the SAS host information.

6. Connectivity

Action		Function	Description
Port Group			
Create FC Port Group		"Create FC Port Group" (page 702)	Create FC port groups.
Create iSCSI Port Group		"Create iSCSI Port Group" (page 705)	Create iSCSI port groups.
Create SAS Port Group		"Create SAS Port Group" (page 708)	Create SAS port groups.
Delete Port Group		"Delete CA Port Group" (page 714)	Delete the CA port groups.
Modify Port Group		"Modify CA Port Group" (page 711)	Change the CA port group settings.
FC	Modify FC Port Parameters	"Modify FC Port Parameters" (page 719)	Change the FC port parameters.
	Modify Port Mode	"Modify Port Mode" (page 735)	Change the usage of the port (CA, RA, CA/RA, Initiator).
iSCSI	Modify iSCSI Port Parameters	"Modify iSCSI Port Parameters" (page 743)	Change the iSCSI port parameters.
	Modify Port Mode	"Modify Port Mode" (page 735)	Change the usage of the port (CA, RA, CA/RA).
SAS	Modify SAS Port Parameters	"Modify SAS Port Parameters" (page 774)	Change the SAS port parameters.
LUN Group			
Add LUN Group		"Add LUN Group" (page 779)	Add LUN groups.
Delete LUN Group		"Delete LUN Group" (page 785)	Delete the LUN groups.
Modify LUN Group		"Modify LUN Group" (page 786)	Change the LUN group settings.
Host Response			
Add Host Response		"Add Host Response" (page 797)	Add a host response.
Delete Host Response		"Delete Host Response" (page 806)	Delete a host response.
Modify Host Response		"Modify Host Response" (page 807)	Change the host response settings.
CA Reset Group			
Modify Reset Group		"Modify CA Reset Group" (page 817)	Change a CA reset group.
Host-LU QoS			

6. Connectivity

Action		Function	Description	
Enable QoS		"Enable QoS/Disable QoS" (page 828)	Enable or disable the QoS.	
Disable QoS				
Initialize QoS		"Initialize QoS" (page 830)	Initialize all the QoS settings.	
Set Host-LU QoS		"Set Host-LU QoS" (page 830)	Assign an LU QoS groups to a "Host - CA Port - LUN Group" with host affinity settings.	
Release Host-LU QoS		"Release Host-LU QoS" (page 833)	Release the LU QoS groups that are assigned to a "Host - CA Port - LUN Group" with host affinity settings.	
Start Perfmon		"Start Host-LU QoS Performance Monitoring" (page 834)	Start performance monitoring of Host-LU QoS.	
Stop Perfmon		"Stop Host-LU QoS Performance Monitoring" (page 835)	Stop performance monitoring of Host-LU QoS.	
Set Host QoS Pattern		"Set Host QoS Pattern" (page 836)	Set the QoS patterns of the host.	
Set Port QoS Pattern		"Set Port QoS Pattern" (page 838)	Set the QoS patterns of the port.	
Set LU QoS Pattern		"Set LU QoS Pattern" (page 840)	Set the QoS patterns of the host LUN.	
Host QoS				
	FC	Set FC Host QoS	"Set FC Host QoS" (page 844)	Configure the bandwidth limit (the maximum performance limit) of the FC host.
	iSCSI	Set iSCSI Host QoS	"Set iSCSI Host QoS" (page 846)	Configure the bandwidth limit (the maximum performance limit) of the iSCSI host.
	SAS	Set SAS Host QoS	"Set SAS Host QoS" (page 847)	Configure the bandwidth limit (the maximum performance limit) of the SAS host.
Port QoS				
	FC	Set FC Port QoS	"Set FC Port QoS" (page 856)	Configure the bandwidth limit (the maximum performance limit) of the FC port.
	iSCSI	Set iSCSI Port QoS	"Set iSCSI Port QoS" (page 858)	Configure the bandwidth limit (the maximum performance limit) of the iSCSI port.
	SAS	Set SAS Port QoS	"Set SAS Port QoS" (page 859)	Configure the bandwidth limit (the maximum performance limit) of the SAS port.
LU QoS Group				
	Add LU QoS Group		"Add LU QoS Group" (page 862)	Add LU QoS groups with the bandwidth limit (the maximum performance limit) configured for each Host LUN.
	Delete LU QoS Group		"Delete LU QoS Group" (page 864)	Delete the LU QoS groups.
	Modify LU QoS Group		"Modify LU QoS Group" (page 865)	Change the bandwidth limit (the maximum performance limit) for the Host LUN.
NAS				
	Create Shared Folder		"Create Shared Folder" (page 870)	Create NAS shared folders.

6. Connectivity

Connectivity

Action	Function	Description	
Delete Shared Folder	"Delete Shared Folder" (page 880)	Delete NAS shared folders.	
Modify Shared Folder	"Modify Shared Folder" (page 881)	Change the NAS shared folder settings.	
Clear NAS Data	"Clear NAS Data" (page 890)	Delete all user data and directories in the NAS shared folder.	
NAS Interface			
	Create	"Create NAS Interface" (page 893)	Create NAS interfaces.
	Delete	"Delete NAS Interface" (page 895)	Delete NAS interfaces.
	Modify	"Modify NAS Interface" (page 896)	Change the NAS interface settings.
Environment Settings			
	Change NAS Server Name	"Change NAS Server Name" (page 902)	Change the NAS server name that is registered in the storage system.
	Set DNS Server	"Set DNS Server" (page 903)	Set the NAS Domain Name System (DNS) server.
	Set Authentication Server	"Set Authentication Server" (page 906)	Set the NAS Authentication server.
	Add Local User	"Add Local User" (page 910)	Add local users that are used for the local user authentication.
	Delete Local User	"Delete Local User" (page 913)	Delete the local user.
	Modify Local User	"Modify Local User" (page 914)	Change the password and groups of the local user.
	Add Local Group	"Add Local Group" (page 918)	Add local groups to which the local users belong.
	Delete Local Group	"Delete Local Group" (page 920)	Delete the local group.
Quota Management			
	Add Quota Setting	"Add Quota Setting" (page 926)	Add new quota setting information.
	Delete Quota Setting	"Delete Quota Setting" (page 933)	Delete the quota setting information.
	Modify Quota Setting	"Modify Quota Setting" (page 933)	Change the quota setting information.
Meta Cache Distribution			
	Enable Automatic Meta Cache Distribution	"Enable Automatic Meta Cache Distribution" (page 941)	Enable the automatic meta cache distribution.
	Disable Automatic Meta Cache Distribution	"Disable Automatic Meta Cache Distribution" (page 942)	Disable the automatic meta cache distribution.
	Initialize Meta Cache Distribution	"Initialize Meta Cache Distribution" (page 943)	Restore the meta cache to the initial location manually.

Connectivity

- "■ Overview" (page 583)
- "■ User Privileges" (page 583)
- "■ Display Contents" (page 583)
- "■ Filter Setting" (page 586)

■ Overview

The list of the [host affinities](#) is displayed.

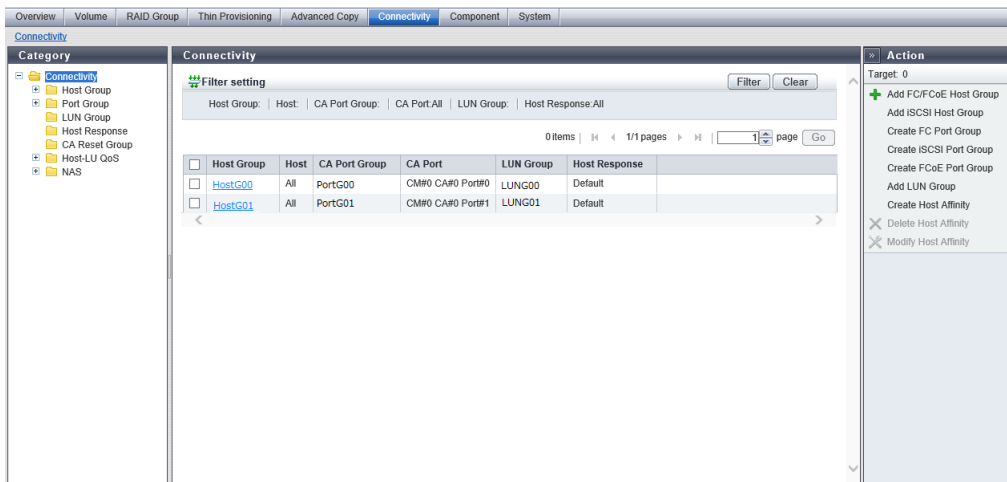
■ User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	✓
Admin	✓
StorageAdmin	✓
AccountAdmin	
SecurityAdmin	✓
Maintainer	✓

Refer to "[A. User Roles and Policies](#)" (page 1580) for details on the policies and roles.

■ Display Contents



Host Affinity List

The registered host affinities in the storage system are displayed.

Item	Description
Host Group	<p>The "Host Group Name" with the host affinity setting is displayed.</p> <p>Instead of specific host groups, if any host can be connected, "All" is displayed.</p> <p>Click the "Host Group Name" or "All" to display the "[Host Affinity Detail] Screen (Host Group - CA Port Group - LUN Group Setting)" (page 585).</p> <p>Regardless of whether the host belongs to a host group, a "-" (hyphen) is displayed if the host affinity setting is specified when selecting a host.</p> <p>Click the "-" (hyphen) to display the "[Host Affinity Detail] Screen (Host - CA Port - LUN Group Setting)" (page 586).</p>

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Item	Description
Host	The "Host Name" with the host affinity setting is displayed. Instead of specific hosts, if any host can be connected, "All" is displayed. When setting the host affinity with the host group specification, the host name that configures the host group is displayed. If "All" has been selected for the host group, "All" is displayed for the host.
CA Port Group	The "CA Port Group Name" with the host affinity setting is displayed. Regardless of whether the CA port belongs to a CA port group, a "-" (hyphen) is displayed if the host affinity setting is specified when selecting a CA port.
CA Port	The location information of the CA port with the host affinity setting is displayed. When setting the host affinity with the CA port group specifications, the location information of the CA port that configures the CA port group is displayed. For the ETERNUS DX900 S5 or the ETERNUS DX8900 S4 CE#x CM#y CA#z Port#w For the other models CM#y CA#z Port#w x: CE number y: CM number z: CA number w: Port number
LUN Group	The "LUN Group Name" with the host affinity setting is displayed. When LUN mapping is configured to a CA port by an application other than Web GUI, a "-" (hyphen) is displayed.
Host Response	One of the following host responses is displayed. <ul style="list-style-type: none"> Host response that is allocated to the host group Host response that is allocated to the host If any hosts can be connected ("All" is displayed in the "Host" field), the host response that was selected when setting the host affinity Default Solaris MPxIO HP-UX AIX AIX VxVM VS850/SVC BS2000 Host responses registered in the storage system
Virtual Volume	When the host affinity is being used by the Virtual Volume function, "Enable" is displayed. When the host affinity is not used for the Virtual Volume function, "Disable" is displayed. This item is only displayed when "Enable" is selected for the Virtual Volume function. <div style="background-color: #fff9c4; padding: 10px; margin-top: 10px;"> <p>Caution</p> <ul style="list-style-type: none"> Host affinities of which the Virtual Volume function is enabled cannot be modified by using Web GUI. </div>

Display Examples of Host Affinities

Display examples of host affinities are shown in the following table.

Example No.	Display contents					
	Host Group	Host	CA Port Group	CA Port	LUN Group	Host Response
Example 1 (*1)	Host_Group_xxx	Host_1 Show...	Port_Group_xxx	CM#0 CA#0 Port#0 Show...	LUN_Group_xxx	Host_Response1
Example 2 (*2)	All	All	Port_Group_yyy	CM#0 CA#1 Port#1	LUN_Group_yyy	Host_Response2

6. Connectivity

Connectivity

Example No.	Display contents					
	Host Group	Host	CA Port Group	CA Port	LUN Group	Host Response
Example 3 (*3)	-	Host_z	-	CM#0 CA#0 Port#0	LUN_Group_zzz	Host_Response3
Example 4 (*4)	-	All	-	CM#1 CA#1 Port#1	LUN_Group_www	Host_Response4
Example 5 (*5)	-	All	-	CM#0 CA#1 Port#1	-	Host_Response5
Example 6 (*6)	Host_Group_xxx	Host_1 Host_2 Host_3 Hide...	Port_Group_xxx	CM#0 CA#0 Port#0 CM#1 CA#0 Port#0 Hide...	LUN_Group_xxx	Host_Response1

*1 : The host affinity setting has been configured in "Host_Group_xxx", "Port_Group_xxx" and "LUN_Group_xxx". Member hosts in "Host_Group_xxx" reference the same LUN group "LUN_Group_xxx". In the host field, the name of the host that configures "Host_Group_xxx" is displayed. In the CA port field, the location information of the CA port that configures "Port_Group_xxx" is displayed.

*2 : Any host can be the target. All member ports in the "Port_Group_yyy" reference the specified LUN group "LUN_Group_yyy". In the CA port field, the location information of the CA port that configures "Port_Group_yyy" is displayed.

*3 : Hosts, CA ports, and LUN groups are allocated without specifying a host group or CA port group.

*4 : CA ports and LUN groups are allocated without specifying a host group or CA port group.

*5 : LUN mapping is configured to CA port "CM#0 CA#1 Port#1" by an application other than Web GUI.

*6 : Display example when the [Show...] link for "Host" or "CA Port" is clicked in Example 1. In the host field, field, the names of all the hosts that configure "Host_Group_xxx" are displayed. In the CA port field, the location information of all the CA ports that configure "Port_Group_xxx" is displayed.

[Host Affinity Detail] Screen (Host Group - CA Port Group - LUN Group Setting)

The detailed information of host affinities is displayed.

Host Group - CA Port Group - LUN Group Setting

Item	Description
Host Group	The selected host group name or "All" is displayed.
CA Port Group	The CA port group, which is associated with the selected host group, is displayed.
LUN Group	The LUN group, which is associated with the selected host group, is displayed.
Veeam Storage Integration	When the LUN group that is associated with the selected host group is being used for Veeam Storage Integration , "Yes" is displayed. When that LUN group is not used for Veeam Storage Integration, a "-" (hyphen) is displayed. This item is displayed only when the Veeam Storage Integration License has been registered.

Host - CA Port Connection

Item	Description
Host	The member host of the selected host group is displayed. If "All" has been selected for the host group, "All" is also displayed for the host.

6. Connectivity

Connectivity

Item	Description
CA Port	The location information of the corresponding host and the CA port with the host affinity setting is displayed. For the ETERNUS DX900 S5 or the ETERNUS DX8900 S4 CE#x CM#y CA#z Port#w For the other models CM#y CA#z Port#w x: CE number y: CM number z: CA number w: Port number

[Host Affinity Detail] Screen (Host - CA Port - LUN Group Setting)

The detailed information of host affinities is displayed.

Host - CA Port - LUN Group Setting

Item	Description
Host	The selected host name or "All" is displayed.
CA Port	The location information of the CA port, which is allocated with the selected host, is displayed. For the ETERNUS DX900 S5 or the ETERNUS DX8900 S4 CE#x CM#y CA#z Port#w For the other models CM#y CA#z Port#w x: CE number y: CM number z: CA number w: Port number
LUN Group	The LUN group that is allocated with the selected host, or a "-" (hyphen) is displayed.
Veeam Storage Integration	When the LUN group that is associated with the selected host is being used for Veeam Storage Integration, "Yes" is displayed. When that LUN group is not used for Veeam Storage Integration, a "-" (hyphen) is displayed. This item is displayed only when the Veeam Storage Integration License has been registered.

■ Filter Setting

Function Description

Filter setting is a function used to display a list of only the host affinities meeting all the specified conditions.

No filtering is set by default. The following table shows conditions that can be specified.

Item	Description	Setting values
Host Group	Input the name of the host group configuring the host affinity that is to be displayed. Host affinities matching or partially matching the entered host group name are displayed. When not using the host group name for filtering, leave this item blank.	Blank Host group name
Host	Input the name of the host configuring the host affinity that is to be displayed. Host affinities matching or partially matching the entered host name are displayed. When not using the host name for filtering, leave this item blank.	Blank Host name

6. Connectivity

Connectivity

Item	Description	Setting values
CA Port Group	Input the name of the CA port group configuring the host affinity that is to be displayed. Host affinities matching or partially matching the entered CA port group name are displayed. When not using the CA port group name for filtering, leave this item blank.	Blank CA port group name
CA Port	Select the location information of the CA port configuring the host affinity that is to be displayed.	All For the ETERNUS DX900 S5 or the ETERNUS DX8900 S4 CE#x CM#y CA#z Port#w For the other models CM#y CA#z Port#w x: CE number, y: CM number, z: CA number, w: Port number
LUN Group	Input the name of the LUN group configuring the host affinity that is to be displayed. Host affinities matching or partially matching the entered LUN group name are displayed. When not using the LUN group name for filtering, leave this item blank.	Blank LUN group name
Host Response	Select the name of the host response for the host affinity that is to be displayed.	All Host response name
Virtual Volume	Select the set state of the Virtual Volume function for the host affinity that is to be displayed. This item is only displayed when "Enable" is selected for the Virtual Volume function.	All Enable Disable

Create Host Affinity

- ["■ Overview" \(page 587\)](#)
- ["■ User Privileges" \(page 588\)](#)
- ["■ Settings" \(page 588\)](#)
- ["■ Operating Procedures" \(page 596\)](#)

■ Overview

This function creates a new host affinity configuration.

The following two methods are available for configuring host affinity depending on the connection target.

- "Host Group - CA Port Group"
- "Host - CA Port"

When host affinity is configured, the volumes that are referenced by hosts or CA ports can be specified. The number of hosts that can be allocated to the CA port using this function is determined based on the total number of hosts described below. Note that the maximum number of hosts is 256 (32 for the ETERNUS DX60 S5).

- The number of member hosts in each host group that is associated with the CA port
- The number of hosts that do not belong to the host group that is associated with the CA port

Caution

- A host can be a member of multiple host groups. In addition, a CA port can be a member of multiple CA port groups. However, only one LUN group can be allocated to host and port combinations when configuring host affinity.

Note

- If a host group has been specified in the "Host Group" field of host affinity, all the member ports of the assigned "CA Port Group" have the affinity mode configured "ON".
- If "All (any hosts)" has been specified in the "Host Group" field of host affinity, all the member ports of the assigned "CA Port Group" have the affinity mode configured "OFF".
- When one CA port is registered in multiple CA port groups, and the affinity setting has been configured on one of the CA port groups including the corresponding port, the affinity setting is configured on all the CA port groups, which include the corresponding port, and also on the member ports.
- CA port groups or CA ports without the host affinity setting can be used for creating a host affinity regardless of whether the affinity mode is enabled (ON) or disabled (OFF).
- To change the settings of the host affinities, use the [Modify Host Affinity] function.
- FC host groups can be used to configure host affinity with CA port groups whose CA type is "FC".

■ **User Privileges**

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	✓
StorageAdmin	✓
AccountAdmin	
SecurityAdmin	
Maintainer	✓

Refer to "[A. User Roles and Policies](#)" (page 1580) for details on the policies and roles.

■ **Settings**

Target Connection Setting

In this screen, select the connection target. The host affinity creation screen that is to be displayed depends on the selected connection target.

6. Connectivity

Connectivity

Item	Description	Setting values
Target Connection	<p>Select the connection target from "Host Group - CA Port Group" or "Host - CA Port".</p> <ul style="list-style-type: none"> Host Group - CA Port Group Specify a "Host Group", a "CA Port Group", and a "LUN Group" to create a host affinity. The "Host Group - CA Port Group - LUN Group Setting" (page 589) field and the "Host - CA Port Connection" (page 589) field are displayed. Host - CA Port Specify a "Host", a "CA Port", and a "LUN Group" to create a host affinity. Only the "Host - CA Port - LUN Group Setting" (page 593) field is displayed. 	<p>Host Group - CA Port Group</p> <p>Host - CA Port</p>

Host Group - CA Port Group - LUN Group Setting

In this screen, specify a "Host Group", a "CA Port Group", and a "LUN Group", and creates a new host affinity.

Item	Description	Setting values
Host Group	<p>Click the [Browse...] button, and select a host group to configure a host affinity on the "[Select Host Group] Screen" (page 589).</p> <p>Select "All" when assigning CA port groups to any host instead of a specific host. If "All" is specified, a host response for the CA port group must be selected. In this case, "All" is displayed in the "All (host response name)" format.</p>	<p>Host group name</p> <p>All (host response name)</p>
CA Port Group	<p>Click the [Browse...] button, and select a CA port group to configure host affinity on the "[Select CA Port Group] Screen" (page 591).</p>	<p>CA port group name</p>
LUN Group	<p>Click the [Browse...] button, and select a LUN group to configure a host affinity on the "[Select LUN Group] Screen" (page 591).</p>	<p>LUN group name</p>

Host - CA Port Connection

If "Host Group" is specified, all of the hosts in the "Host Group" are displayed. If "CA Port Group" is also specified, the paths to all of the member ports for each host are displayed.

Item	Description
Host	<p>All of the member hosts of the specified host group are displayed.</p> <p>If "All" has been selected for "Host Group", "All (host response name)" is displayed.</p>
CA Port	<p>By default, all the location information of member ports for the specified CA port group is displayed.</p> <p>Click the [Edit] button to display the "[Select CA Port] Screen" (page 593). Edit the path between a host and a CA port on the "[Select CA Port] Screen" (page 593). The "CA Port" field is updated after editing.</p> <p>For the ETERNUS DX900 S5 or the ETERNUS DX8900 S4 CE#x CM#y CA#z Port#w</p> <p>For the other models CM#y CA#z Port#w</p> <p>x: CE number y: CM number z: CA number w: Port number</p>

[Select Host Group] Screen

In this screen, select a host group to configure a host affinity.

Target Connection Setting

Item	Description	Setting values
Target Connection	<p>Select the connection target from "Host Group" (specific host group) or "All" (any hosts). The [Select Host Group] screen that is to be displayed depends on the selected item. Refer to "Select Host Group" (page 590) or "Select "All" (page 590) for detailed information on each screen.</p> <p>Note that "All" can be selected only when all of the following conditions are satisfied.</p> <ul style="list-style-type: none"> • LUNs are not specified from LUN#512 onward in the selected LUN group • The selected CA port group is in any of the following conditions. <ul style="list-style-type: none"> - The CA port group is not being used - Member ports in the CA port group do not belong to other CA port groups 	Host Group All

Select Host Group

Item	Description
Radio buttons to select a host group	Select the radio button for the host group to configure a host affinity.
Host Group	The host group name is displayed.
Type	<p>The interface type of the host group is displayed.</p> <p>FC iSCSI SAS</p>
Host Response	<p>The host response which has been assigned to a host group is displayed.</p> <p>Default Solaris MPxIO HP-UX AIX AIX VxVM VS850/SVC BS2000 Host responses registered in the storage system</p>

Select "All"

"All" can be selected only when the required conditions are satisfied.

Item	Description
Radio buttons to select a host response	Select a radio button for the host response that is assigned to any hosts ("All") as the host affinity.
Host Response	<p>The host responses that have been registered in the storage system are displayed.</p> <p>Default Solaris MPxIO HP-UX AIX AIX VxVM VS850/SVC BS2000 Host responses registered in the storage system</p>

[Select CA Port Group] Screen

In this screen, select a CA port group to configure a host affinity.

Item	Description
Radio buttons to select a CA port group	<p>Select the radio button for the CA port group to configure a host affinity.</p> <p>Note</p> <ul style="list-style-type: none"> • If a specific host group has been selected in the "Host Group" field, CA port groups for which the affinity mode is "OFF" are not displayed. • If "All" has been selected in the "Host Group" field, CA port groups with any of the following conditions are not displayed: <ul style="list-style-type: none"> - The affinity mode is "ON" - Member CA ports that are being used in another CA port group - The CA port group is used by another host affinity
CA Port Group	The CA port group name is displayed.
Type	<p>The CA type of a CA port group is displayed.</p> <p>FC</p> <p>iSCSI</p> <p>SAS</p>
Member	<p>The location information of member ports of a CA port group are displayed.</p> <p>For the ETERNUS DX900 S5 or the ETERNUS DX8900 S4 CE#x CM#y CA#z Port#w</p> <p>For the other models CM#y CA#z Port#w</p> <p>x: CE number y: CM number z: CA number w: Port number</p>
Affinity Mode	<p>The affinity mode of a CA port group is displayed.</p> <p>If the affinity mode is neither "ON" nor "OFF", the field is blank.</p>

[Select LUN Group] Screen

In this screen, select a LUN group to configure a host affinity.

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Connectivity

Item	Description																				
Radio buttons to select a LUN group	<p>Select the radio button for the LUN group to configure a host affinity.</p> <p>Caution</p> <ul style="list-style-type: none"> The LUN range that can be referenced from a host depends on the "LUN Addressing" and "LUN Expand Mode (Peripheral Device Addressing)" settings of the host response that is applied to the selected "Host Group" (specific host group), "Host" (specific host), or "All" (any hosts). Refer to "Host Response and Referable Number of LUNs" for details. LUN groups that use LUNs from LUN#256 onward cannot configure the host affinity with a host group or a host for which the referable LUNs is "256 LUN" host response. When "All" is selected for "Host Group" or "Host", the host affinity setting cannot be configured with LUN groups that use LUNs from LUN#256 onward. <table border="1"> <thead> <tr> <th colspan="2">Host response</th> <th colspan="2">The number of LUNs that can be referenced from a host (LUN range)</th> </tr> <tr> <th>LUN Addressing</th> <th>LUN Expand Mode (Peripheral Device Addressing)</th> <th>When "Host Group" or "Host" is selected</th> <th>When "All" is selected</th> </tr> </thead> <tbody> <tr> <td>PRHL</td> <td>Disabled (Default)</td> <td>256 LUN (LUN#0 - LUN#255)</td> <td>256 LUN (LUN#0 - LUN#255)</td> </tr> <tr> <td>PRHL</td> <td>Enabled</td> <td>4096 LUN (LUN#0 - LUN#4095)</td> <td>512 LUN (LUN#0 - LUN#511)</td> </tr> <tr> <td>FLAT</td> <td>Disabled (Default) Enabled</td> <td>4096 LUN (LUN#0 - LUN#4095)</td> <td>512 LUN (LUN#0 - LUN#511)</td> </tr> </tbody> </table> <ul style="list-style-type: none"> If the host response whose "LUN Expand Mode (Peripheral Device Addressing)" is "Enable" or "LUN Addressing" is "Flat space addressing" is used, the maximum number of connectible hosts per CA port is 32 (or four for the ETERNUS DX60 S5). Therefore, make sure to connect 32 or less hosts (or four or less hosts for the ETERNUS DX60 S5) to the target CA port. If the number of connected hosts exceeds the limit, the volume may become inaccessible from any of the hosts assigned to the target CA port. <p>Note</p> <ul style="list-style-type: none"> When "All" is selected for "Host Group" or "Host", the LUN groups in which LUNs are specified from LUN#512 onward are not displayed. LUN groups including volumes that are used for the Storage Cluster function are not displayed. 	Host response		The number of LUNs that can be referenced from a host (LUN range)		LUN Addressing	LUN Expand Mode (Peripheral Device Addressing)	When "Host Group" or "Host" is selected	When "All" is selected	PRHL	Disabled (Default)	256 LUN (LUN#0 - LUN#255)	256 LUN (LUN#0 - LUN#255)	PRHL	Enabled	4096 LUN (LUN#0 - LUN#4095)	512 LUN (LUN#0 - LUN#511)	FLAT	Disabled (Default) Enabled	4096 LUN (LUN#0 - LUN#4095)	512 LUN (LUN#0 - LUN#511)
Host response		The number of LUNs that can be referenced from a host (LUN range)																			
LUN Addressing	LUN Expand Mode (Peripheral Device Addressing)	When "Host Group" or "Host" is selected	When "All" is selected																		
PRHL	Disabled (Default)	256 LUN (LUN#0 - LUN#255)	256 LUN (LUN#0 - LUN#255)																		
PRHL	Enabled	4096 LUN (LUN#0 - LUN#4095)	512 LUN (LUN#0 - LUN#511)																		
FLAT	Disabled (Default) Enabled	4096 LUN (LUN#0 - LUN#4095)	512 LUN (LUN#0 - LUN#511)																		
Name	The LUN group name is displayed.																				
Status	Whether the LUN group is applied ("Active") or not ("Inactive") for other Host Affinity settings is displayed. <ul style="list-style-type: none"> Active The LUN group is applied for other Host Affinity settings. Inactive The LUN group is not applied for other Host Affinity settings. 																				
Number of LUNs	The number of mappings (1 to 4096) in a LUN group is displayed.																				
LUN Overlap	Whether the LUN group includes volumes that are allocated to other LUN groups is displayed. <ul style="list-style-type: none"> Yes At least one volume is allocated to other LUN groups. Blank Volumes in the LUN group are not allocated to other LUN groups. 																				

6. Connectivity

Connectivity

Item	Description
Veeam	If the LUN group is used for Veeam Storage Integration , "Yes" is displayed. If the LUN group is not used for Veeam Storage Integration, a "-" (hyphen) is displayed. This item is displayed only when the Veeam Storage Integration License has been registered.

[Select CA Port] Screen

In this screen, edit the path between the corresponding host and a CA port.

CA Port Group

Item	Description
Name	The CA port group name is displayed.

Item	Description
Checkbox to select a CA port	By default, checkboxes for all the CA ports are selected. To delete the path between a host and a CA port, clear the checkbox.
CA Port	The location information of a CA port is displayed. For the ETERNUS DX900 S5 or the ETERNUS DX8900 S4 CE#x CM#y CA#z Port#w For the other models CM#y CA#z Port#w x: CE number y: CM number z: CA number w: Port number

Host - CA Port - LUN Group Setting

In this screen, specify a "Host", a "CA Port", and a "LUN Group", and creates a new host affinity.

Item	Description
Host	Click the [Browse...] button, and select a host to configure a host affinity on the " [Select Host] Screen " (page 593). Select "All" when assigning CA ports to any host instead of a specific host. If "All" is specified, a host response for the CA port must be selected. In this case, "All" is displayed in the "All (host response name)" format.
CA Port	Click the [Browse...] button, and select a CA port to configure host affinity on the " [Select CA Port] Screen " (page 595).
LUN Group	Click the [Browse...] button, and select a LUN group to configure a host affinity on the " [Select LUN Group] Screen " (page 591).

[Select Host] Screen

In this screen, select a host to configure a host affinity.

Target Connection Setting

Item	Description	Setting values
Target Connection	<p>Select the connection target from "Host" (specific host) or "All" (any hosts). The [Select Host] screen that is to be displayed depends on the selected item. Refer to "Select Host" (page 594) or "Select All" (page 594) for detailed information on each screen.</p> <p>Note that "All" can be selected only when all of the following conditions are satisfied.</p> <ul style="list-style-type: none"> • LUNs are not specified from LUN#512 onward in the selected LUN group • The selected CA port is in any of the following conditions. <ul style="list-style-type: none"> - The CA port is not a member port of CA port groups - The affinity mode of the CA port is not "ON" 	Host All

Select Host

Item	Description
Radio buttons to select a host	<p>Select the radio button for the host to configure a host affinity.</p> <div style="background-color: #f0f0f0; padding: 5px; margin-top: 10px;"> <p>Note</p> <ul style="list-style-type: none"> • Hosts that are set for the host affinity of which the Virtual Volume function is enabled are not displayed. </div>
Host	The host name is displayed.
Type	<p>The host interface type is displayed.</p> <p>FC iSCSI SAS</p>
Host Group	The name of the host group to which the host belongs is displayed. If the host does not belong to a host group, the field is blank.
Host Response	<p>The host response, which has been assigned to a host, is displayed.</p> <p>Default Solaris MPxIO HP-UX AIX AIX VxVM VS850/SVC BS2000 Host responses registered in the storage system</p>

Select "All"

"All" can be selected only when the required conditions are satisfied.

Item	Description
Radio buttons to select a host response	Select a radio button for the host response that is assigned to any hosts ("All") as the host affinity.

6. Connectivity Connectivity

Item	Description
Host Response	<p>The host responses that have been registered in the storage system are displayed.</p> <p>Default Solaris MPxIO HP-UX AIX AIX VxVM VS850/SVC BS2000 Host responses registered in the storage system</p>

[Select CA Port] Screen

In this screen, select a CA port to configure a host affinity.

Item	Description
Radio buttons to select a CA port	<p>Select the radio button for the CA port to configure a host affinity.</p> <div style="background-color: #f0f0f0; padding: 10px;"> <p>Note</p> <ul style="list-style-type: none"> • If a specific host has been selected in the "Host" field, CA ports for which the affinity mode is "OFF" are not displayed. • If "All" has been selected in the "Host" field, CA ports with any of the following conditions are not displayed: <ul style="list-style-type: none"> - The affinity mode is "ON" - The CA port is used in the CA port group - The CA port is used by another host affinity • CA ports that are used for the Storage Cluster function are not displayed. </div>
CA Port	<p>The location information of a CA port is displayed.</p> <p>For the ETERNUS DX900 S5 or the ETERNUS DX8900 S4 CE#x CM#y CA#z Port#w</p> <p>For the other models CM#y CA#z Port#w</p> <p>x: CE number y: CM number z: CA number w: Port number</p>
Type	<p>The CA port type is displayed.</p> <p>FC iSCSI SAS</p>
Affinity Mode	<p>The affinity mode of the CA port is displayed.</p> <p>If the affinity mode is neither "ON" nor "OFF", the field is blank.</p>

Function Button

Item	Description
[Browse...]	Displays a selection screen for a "Host Group", a "Host", a "CA Port Group", a "CA port", or a "LUN Group".
[Edit]	Edits the path between a host and a CA port.

■ Operating Procedures

When "Host Group - CA Port Group" is Selected for "Target Connection"

Create a new host affinity.

Procedure ▶▶▶

- 1 Click [Create Host Affinity] in [Action].
- 2 Click the [Browse...] button for the host group.
→ The [Select Host Group] screen appears.
- 3 Select the connection target.
 - When "Host Group" is selected
Select a host group to configure a host affinity, and click the [OK] button.
→ The display returns to the initial screen.
 - When "All" is selected
Select a host response, and click the [OK] button.
→ The display returns to the initial screen.
- 4 Click the [Browse...] button for the CA port group.
→ The [Select CA Port Group] screen appears.
- 5 Select a CA port group to configure a host affinity, and click the [OK] button.
→ The display returns to the initial screen.
- 6 Click the [Browse...] button for the LUN group.
→ The [Select LUN Group] screen appears.
- 7 Select a LUN group to configure a host affinity, and click the [OK] button.
→ The display returns to the initial screen.
- 8 To edit the path between a host and a CA port, click the [Edit] button for the path to be edited.
→ The [Select CA Port] screen appears.
- 9 Select whether to enable or disable the path between a host and a CA port, and click the [OK] button.
To enable the path between a host and a CA port, select the checkbox of the CA port.
To disable the path between a host and a CA port, clear the checkbox of the CA port.
- 10 Confirm the host affinity setting and the path between the host and the CA port, click the [Create] button.
→ A confirmation screen appears.

Caution

- An error screen appears in the following conditions:
 - The host interface type of the host group and the CA type of the CA port group do not match
 - The number of host affinities exceeds the maximum number per storage system
 - The number of hosts exceeds the maximum number per CA port
 - Some LUNs cannot be referenced from the host

- 11 Click the [OK] button.
→ The host affinity creation starts.
- 12 Click the [Done] button to return to the [Connectivity] screen.



When "Host - CA Port" is selected for "Target Connection"

Create a new host affinity.

Procedure ▶▶▶

- 1 Click [Create Host Affinity] in [Action].
- 2 Click the [Browse...] button for the host.
→ The [Select Host] screen appears.
- 3 Select the connection target.
 - When "Host" is selected
Select a host to configure a host affinity, and click the [OK] button.
→ The display returns to the initial screen.
 - When "All" is selected
Select a host response, and click the [OK] button.
→ The display returns to the initial screen.
- 4 Click the [Browse...] button for the CA port.
→ The [Select CA Port] screen appears.
- 5 Select a CA port to configure a host affinity, and click the [OK] button.
→ The display returns to the initial screen.
- 6 Click the [Browse...] button for the LUN group.
→ The [Select LUN Group] screen appears.
- 7 Select a LUN group to configure a host affinity, and click the [OK] button.
→ The display returns to the initial screen.
- 8 After confirming the host affinity settings, click the [Create] button.
→ A confirmation screen appears.

Caution

- An error screen appears in the following conditions:
 - The host interface type of the host and the CA type of the CA port do not match
 - The number of host affinities exceeds the maximum number per storage system
 - The number of hosts exceeds the maximum number per CA port
 - Some LUNs cannot be referenced from the host

- 9 Click the [OK] button.
→ The host affinity creation starts.
- 10 Click the [Done] button to return to the [Connectivity] screen.



Delete Host Affinity

- ["■ Overview" \(page 598\)](#)
- ["■ User Privileges" \(page 598\)](#)
- ["■ Operating Procedures" \(page 598\)](#)

■ Overview

This function deletes the registered host affinity in the storage system.

When a host affinity is deleted, the paths between "Host group", "CA port group" and "LUN group" or the paths between "Host", "CA Port", "and "LUN Group" are also deleted.

Caution

- When deleting host affinity, make sure to stop access from the host used in the deletion target host affinity setting.
- The following host affinities cannot be deleted. When deleting, use ETERNUS SF Storage Cruiser.
 - The CA port with the host affinity setting is used for the Storage Cluster function
 - The LUN group with the host affinity setting is used for the Storage Cluster function
 - The host with the host affinity setting is used for the Virtual Volume function

■ User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	✓
StorageAdmin	✓
AccountAdmin	
SecurityAdmin	
Maintainer	✓

Refer to ["A. User Roles and Policies" \(page 1580\)](#) for details on the policies and roles.

■ Operating Procedures

In this screen, delete a host affinity.

Procedure ▶▶▶

- 1 Select the host affinity to be deleted (multiple selections can be made) and click [Delete Host Affinity] in [Action].
→ A confirmation screen appears.
- 2 Click the [OK] button.
→ The deletion of the host affinity starts.
- 3 Click the [Done] button to return to the [Connectivity] screen.



Modify Host Affinity

- "[■ Overview](#)" (page 599)
- "[■ User Privileges](#)" (page 600)
- "[■ Display Contents](#)" (page 600)
- "[■ Settings](#)" (page 601)
- "[■ Operating Procedures](#)" (page 606)

■ Overview

This function is used to perform the following operations to the existing host affinities.

- Changing the "CA Port Group" allocation
- Changing the "CA Port" allocation
- Changing the "LUN Group" allocation
- Changing the path between the host and the port in "CA Port Group"
- Changing the "Host Response" allocation (only when "Host Group" or "Host" is "All")

The number of hosts that can be associated with the CA port using this function is determined based on the total number of hosts described below. Note that the maximum number of hosts is 256 (32 for the ETERNUS DX60 S5).

- The number of member hosts in the host group that is associated with the CA port
- The number of hosts that do not belong to the host group that is associated with the CA port

Use each functions for the following each operation.

- Adding or deleting hosts from the host group ([Modify Host Group])
- Adding or deleting member ports from the CA port group ([Modify CA Port Group])
- Adding, changing, or deleting volume allocation from the LUN group ([Modify LUN Group])
- Changing the host response that is specified for the host group ([Modify Host Group])
- Changing the host response that is specified for the host ([Modify FC Host], [Modify iSCSI Host], or [Modify SAS Host])

Caution

- When setting an active host affinity, make sure to stop the access of the host which has been associated with the host affinity to be set. The server must be rebooted after the host response is changed. The host response can be changed only if the host group or host is "All".
- A host can be a member of multiple host groups. In addition, a CA port can be a member of multiple CA port groups. However, only one LUN group can be allocated to host and port combinations when changing host affinity settings.
- The following host affinities cannot be modified by using Web GUI. To change host affinities, use the ETERNUS SF Storage Cruiser.
 - A host affinity that is used for the Storage Cluster function
 - Host affinities of which the Virtual Volume function is enabled

Note

- When one CA port is registered in multiple CA port groups, and the host affinity setting has been configured on one of the CA port groups including the corresponding port, the same affinity mode is applied to all the CA port groups, which include the corresponding port, and also on the member ports.
- CA port groups or CA ports without the host affinity setting can be used for creating a host affinity regardless of whether the affinity mode is enabled (ON) or disabled (OFF).
- When a host is added to a host group with the [Modify Host Group] function, the paths between the added host and all of the CA ports in the associated CA port group are configured.
- When a CA port is added to a CA port group with the [Modify CA Port Group] function, the paths between all of the hosts in the host group and the added CA port are configured.
- FC host groups can be used to configure host affinity with CA port groups whose CA type is "FC".

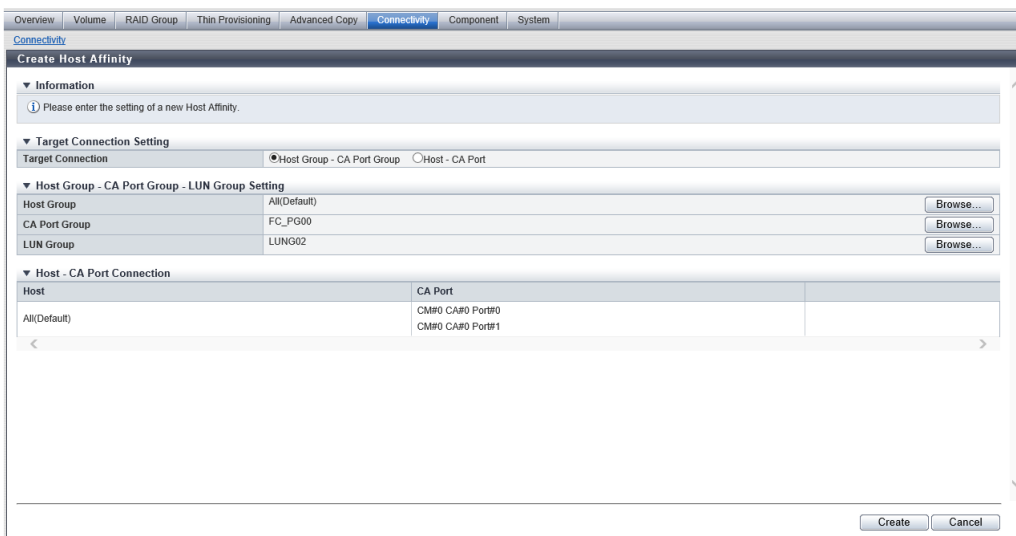
User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	✓
StorageAdmin	✓
AccountAdmin	
SecurityAdmin	
Maintainer	✓

Refer to "[A. User Roles and Policies](#)" (page 1580) for details on the policies and roles.

Display Contents



Target Connection Setting

The connection target selected in the [Connectivity] screen is displayed. The host affinity setting screen that is to be displayed depends on the selected connection target.

Item	Description
Target Connection	<p>The connection target that is to be changed is displayed.</p> <ul style="list-style-type: none"> • Host Group - CA Port Group Specify a "Host Group", a "CA Port Group", and a "LUN Group" to change the host affinity settings. The ""Host Group - CA Port Group - LUN Group Setting" (page 601)" field and the ""Host - CA Port Connection" (page 601)" field are displayed. • Host - CA Port Specify a "Host", a "CA Port", and a "LUN Group" to change the host affinity settings. The ""Host - CA Port - LUN Group Setting" (page 605)" field is displayed.

■ Settings

Host Group - CA Port Group - LUN Group Setting

The "Host Group", the "CA Port Group", and the "LUN Group" for the selected host affinity is displayed. In this screen, specify the "CA Port Group" or the "LUN Group" for the host affinity, and modify the host affinity. Note that when the selected host group is "All (host response name)", the host response settings can be changed with this function.

Item	Description	Setting values
Host Group	The host group for the selected host affinity is displayed. When the selected host group is "All (host response name)", the host response settings can be changed. Click the [Browse...] button, and select a host response on the [Select Host Group] Screen.	
CA Port Group	Click the [Browse...] button, and select a CA port group to configure host affinity on the "[Select CA Port Group] Screen" (page 602).	CA port group name
LUN Group	Click the [Browse...] button, and select a LUN group to configure a host affinity on the "[Select LUN Group] Screen" (page 603).	LUN group name

Host - CA Port Connection

The path between the host and the CA port for the selected host affinity is displayed. Click the [Edit] button and edit the path between the host and the CA port.

Item	Description
Host	The hosts for the selected host affinity are displayed. When configuring a path with any hosts, "All (host response name)" is displayed.

6. Connectivity
Connectivity

Item	Description
CA Port	<p>The location information of the corresponding host and the CA port of which a path has been configured are displayed. Click the [Edit] button to display the "[Select CA Port] Screen" (page 605). Edit the path between a host and a CA port on the "[Select CA Port] Screen" (page 605). The "CA Port" field is updated after editing.</p> <p>For the ETERNUS DX900 S5 or the ETERNUS DX8900 S4 CE#x CM#y CA#z Port#w</p> <p>For the other models CM#y CA#z Port#w</p> <p>x: CE number y: CM number z: CA number w: Port number</p>

[Select Host Group] Screen / [Select Host] Screen

Select a host response to be assigned to any host.

Target Connection Setting

Item	Description
Target Connection	"All" (any hosts) is displayed.

Item	Description
Radio buttons to select a host response	Select the host response that is to be newly assigned by using the radio button.
Host Response	<p>The host responses that have been registered in the storage system are displayed.</p> <p>Default Solaris MPxIO HP-UX AIX AIX VxVM VS850/SVC BS2000 Host responses registered in the storage system</p>

[Select CA Port Group] Screen

In this screen, select a CA port group to configure a host affinity.

Item	Description
Radio buttons to select a CA port group	<p>Select the radio button for the CA port group that is newly used to configure the host affinity.</p> <p>Note</p> <ul style="list-style-type: none"> If a specific host group has been selected for "Host Group", CA port groups with any of the following conditions are not displayed: <ul style="list-style-type: none"> The affinity mode is "OFF" The CA port group is used by another host affinity If "All" has been selected for "Host Group", CA port groups with any of the following conditions are not displayed: <ul style="list-style-type: none"> The CA port group is used by another host affinity Member CA ports that are being used in another CA port group

6. Connectivity

Connectivity

Item	Description
CA Port Group	The CA port group name is displayed.
Type	The CA type of a CA port group is displayed. FC iSCSI SAS
Member	The location information of member ports of a CA port group are displayed. For the ETERNUS DX900 S5 or the ETERNUS DX8900 S4 CE#x CM#y CA#z Port#w For the other models CM#y CA#z Port#w x: CE number y: CM number z: CA number w: Port number
Affinity Mode	The affinity mode of a CA port group is displayed. If the affinity mode is neither "ON" nor "OFF", the field is blank.

[Select LUN Group] Screen

In this screen, select a LUN group to configure a host affinity.

6. Connectivity
Connectivity

Item	Description																								
Radio buttons to select a LUN group	<p>Select the radio button for the LUN group that is newly used to configure a host affinity.</p> <p>Caution</p> <ul style="list-style-type: none"> The range of LUNs that can be referenced from the host depends on the "LUN Addressing" and "LUN Expand Mode (Peripheral Device Addressing)" settings for the following host responses. Refer to "Host Response and Referable Number of LUNs" for details. LUN groups that use LUNs from LUN#256 onward cannot configure the host affinity with a host group or a host for which the referable LUNs is "256 LUN" host response. When "All" is selected for "Host Group" or "Host", the host affinity setting cannot be configured with LUN groups that use LUNs from LUN#256 onward. <table border="1"> <thead> <tr> <th colspan="2">Host response</th> <th colspan="2">The number of LUNs that can be referenced from a host (LUN range)</th> </tr> <tr> <th>LUN Addressing</th> <th>LUN Expand Mode (Peripheral Device Addressing)</th> <th>When "Host Group" or "Host" is selected</th> <th>When "All" is selected</th> </tr> </thead> <tbody> <tr> <td>PRHL</td> <td>Disabled (Default)</td> <td>256 LUN (LUN#0 - LUN#255)</td> <td>256 LUN (LUN#0 - LUN#255)</td> </tr> <tr> <td>PRHL</td> <td>Enabled</td> <td>4096 LUN (LUN#0 - LUN#4095)</td> <td>512 LUN (LUN#0 - LUN#511)</td> </tr> <tr> <td>FLAT</td> <td>Disabled (Default)</td> <td>4096 LUN (LUN#0 - LUN#4095)</td> <td>512 LUN (LUN#0 - LUN#511)</td> </tr> <tr> <td></td> <td>Enabled</td> <td></td> <td></td> </tr> </tbody> </table> <ul style="list-style-type: none"> If the host response whose "LUN Expand Mode (Peripheral Device Addressing)" is "Enable" or "LUN Addressing" is "Flat space addressing" is used, the maximum number of connectible hosts per CA port is 32 (or four for the ETERNUS DX60 S5). Therefore, make sure to connect 32 or less hosts (or four or less hosts for the ETERNUS DX60 S5) to the target CA port. If the number of connected hosts exceeds the limit, the volume may become inaccessible from any of the hosts assigned to the target CA port. <p>Note</p> <ul style="list-style-type: none"> When "All" is selected for "Host Group" or "Host", the LUN groups in which LUNs are specified from LUN#512 onward are not displayed. LUN groups including volumes that are used for the Storage Cluster function are not displayed. 	Host response		The number of LUNs that can be referenced from a host (LUN range)		LUN Addressing	LUN Expand Mode (Peripheral Device Addressing)	When "Host Group" or "Host" is selected	When "All" is selected	PRHL	Disabled (Default)	256 LUN (LUN#0 - LUN#255)	256 LUN (LUN#0 - LUN#255)	PRHL	Enabled	4096 LUN (LUN#0 - LUN#4095)	512 LUN (LUN#0 - LUN#511)	FLAT	Disabled (Default)	4096 LUN (LUN#0 - LUN#4095)	512 LUN (LUN#0 - LUN#511)		Enabled		
Host response		The number of LUNs that can be referenced from a host (LUN range)																							
LUN Addressing	LUN Expand Mode (Peripheral Device Addressing)	When "Host Group" or "Host" is selected	When "All" is selected																						
PRHL	Disabled (Default)	256 LUN (LUN#0 - LUN#255)	256 LUN (LUN#0 - LUN#255)																						
PRHL	Enabled	4096 LUN (LUN#0 - LUN#4095)	512 LUN (LUN#0 - LUN#511)																						
FLAT	Disabled (Default)	4096 LUN (LUN#0 - LUN#4095)	512 LUN (LUN#0 - LUN#511)																						
	Enabled																								
Name	The LUN group name is displayed.																								
Status	<p>Whether the LUN group is "Active" or "Inactive" for other Host Affinity settings is displayed.</p> <ul style="list-style-type: none"> Active The LUN group is applied for other Host Affinity settings. Inactive The LUN group is not applied for other Host Affinity settings. 																								
Number of LUNs	The number of mappings (1 to 4096) in a LUN group is displayed.																								
LUN Overlap	<p>Whether the LUN group includes volumes that are allocated to other LUN groups is displayed.</p> <ul style="list-style-type: none"> Yes At least one volume is allocated to other LUN groups. Blank Volumes in the LUN group are not allocated to other LUN groups. 																								

6. Connectivity

Connectivity

Item	Description
Veeam	If the LUN group is used for Veeam Storage Integration , "Yes" is displayed. If the LUN group is not used for Veeam Storage Integration, a "-" (hyphen) is displayed. This item is displayed only when the Veeam Storage Integration License has been registered.

[Select CA Port] Screen

In this screen, edit the path between the corresponding host and a CA port.

CA Port Group

Item	Description
Name	The CA port group name is displayed.

Item	Description
Checkbox to select a CA port	To configure a path between the corresponding host and a CA port, select the checkbox. To delete the path between a host and a CA port, clear the checkbox.
CA Port	The location information of a CA port is displayed. For the ETERNUS DX900 S5 or the ETERNUS DX8900 S4 CE#x CM#y CA#z Port#w For the other models CM#y CA#z Port#w x: CE number y: CM number z: CA number w: Port number

Host - CA Port - LUN Group Setting

The "Host", the "CA Port", and the "LUN Group" for the selected host affinity is displayed. In this screen, specify the "CA Port" or the "LUN Group" for the host affinity, and modify the host affinity. Note that when the selected host is "All (host response name)", the host response settings can be changed with this function.

Item	Description
Host	The hosts for the selected host affinity are displayed. When the selected host is "All (host response name)", the host response settings can be changed. Click the [Browse...] button, and select a host response on the [Select Host] Screen .
CA Port	Click the [Browse...] button, and select a CA port to configure host affinity on the " [Select CA Port] Screen " (page 605).
LUN Group	Click the [Browse...] button, and select a LUN group to configure a host affinity on the " [Select LUN Group] Screen " (page 603).

[Select CA Port] Screen

In this screen, select a CA port to configure a host affinity.

Item	Description
Radio buttons to select a CA port	<p>Select the radio button for the CA port that is newly used to configure a host affinity.</p> <div style="background-color: #f0f0f0; padding: 10px;"> <p>Note</p> <ul style="list-style-type: none"> • If a specific host group has been selected for "Host", CA ports with any of the following conditions are not displayed: <ul style="list-style-type: none"> - The affinity mode is "OFF" - The CA port is used by another host affinity • If "All" has been selected for "Host", CA ports with any of the following conditions are not displayed: <ul style="list-style-type: none"> - The CA port is used by another host affinity - The CA port is used in the CA port group • CA ports that are used for the Storage Cluster function are not displayed. </div>
CA Port	<p>The location information of a CA port is displayed.</p> <p>For the ETERNUS DX900 S5 or the ETERNUS DX8900 S4 CE#x CM#y CA#z Port#w</p> <p>For the other models CM#y CA#z Port#w</p> <p>x: CE number y: CM number z: CA number w: Port number</p>
Type	<p>The CA port type is displayed.</p> <p>FC iSCSI SAS</p>
Affinity Mode	<p>The affinity mode of the CA port is displayed.</p> <p>If the affinity mode is neither "ON" nor "OFF", the field is blank.</p>

Function Button

Item	Description
[Browse...]	Displays a selection screen for a "Host Group", a "Host", a "CA Port Group", a "CA port", or a "LUN Group".
[Edit]	Edits the path between a host and a CA port.

■ Operating Procedures

When Selecting a Host Affinity for "Host Group - CA Port Group"

In this screen, change the host affinity settings.

Procedure ▶▶▶

- 1 Select the host affinity to be set, and click [Modify Host Affinity] in [Action].
- 2 Check the display contents of the host groups.
The next step that needs to be performed depends on the display contents.
 - When "All (host response name)" is displayed for the host group
 - (1) Click the [Browse...] button.
→ The [Select Host Group] screen appears. Proceed to Step 3.

- When the host group is not "All (host response name)"
→ Proceed to Step 4.
- 3** Select the host response that is to be assigned to any host, and click the [OK] button.
→ The display returns to the initial screen.
 - 4** Click the [Browse...] button for the CA port group.
→ The [Select CA Port Group] screen appears.
 - 5** Select a CA port group to configure a host affinity, and click the [OK] button.
→ The display returns to the initial screen.
 - 6** Click the [Browse...] button for the LUN group.
→ The [Select LUN Group] screen appears.
 - 7** Select a LUN group to configure a host affinity, and click the [OK] button.
→ The display returns to the initial screen.
 - 8** To edit the path between a host and a CA port, click the [Edit] button for the path to be edited.
→ The [Select CA Port] screen appears.
 - 9** Select whether to enable or disable the path between a host and a CA port, and click the [OK] button.
To enable the path between a host and a CA port, select the checkbox of the CA port.
To disable the path between a host and a CA port, clear the checkbox of the CA port.
 - 10** Confirm the modified host affinity setting and the path between the host and the CA port, click the [Modify] button.
→ A confirmation screen appears.
- Caution**

 - An error screen appears in the following conditions:
 - The host interface of the host group and the CA type of the CA port group do not match
 - The number of hosts exceeds the maximum number per CA port
 - Some LUNs cannot be referenced from the host
- 11** Click the [OK] button.
→ The modification of the host affinity starts.
 - 12** Click the [Done] button to return to the [Connectivity] screen.



When Selecting a Host Affinity for "Host - CA Port"

In this screen, change the host affinity settings.

Procedure ▶▶▶

- 1** Select the host affinity to be set, and click [Modify Host Affinity] in [Action].
- 2** Check the display contents of the hosts.
The next step that needs to be performed depends on the display contents.
 - When "All (host response name)" is displayed for the host
 - (1)** Click the [Browse...] button.
→ The [Select Host] screen appears. Proceed to Step 3.

- When the host is not "All (host response name)"
→ Proceed to Step 4.

- 3** Select the host response that is to be assigned to any host, and click the [OK] button.
→ The display returns to the initial screen.
- 4** Click the [Browse...] button for the CA port.
→ The [Select CA Port] screen appears.
- 5** Select a CA port to configure a host affinity, and click the [OK] button.
→ The display returns to the initial screen.
- 6** Click the [Browse...] button for the LUN group.
→ The [Select LUN Group] screen appears.
- 7** Select a LUN group to configure a host affinity, and click the [OK] button.
→ The display returns to the initial screen.
- 8** After confirming the host affinity settings, click the [Modify] button.
→ A confirmation screen appears.

Caution

- An error screen appears in the following conditions:
 - The host interface type of the host group and the CA type of the CA port group do not match
 - The number of hosts exceeds the maximum number per CA port
 - Some LUNs cannot be referenced from the host

- 9** Click the [OK] button.
→ The modification of the host affinity starts.
- 10** Click the [Done] button to return to the [Connectivity] screen.



Host Group

- ["■ Overview" \(page 608\)](#)
- ["■ User Privileges" \(page 608\)](#)
- ["■ Display Contents" \(page 609\)](#)
- ["■ Filter Setting" \(page 610\)](#)

■ Overview

The list of the host groups is displayed.
A host group is a group of hosts (HBAs) that are allowed to access the volume (LUN group).

■ User Privileges

Availability of Executions in the Default Role

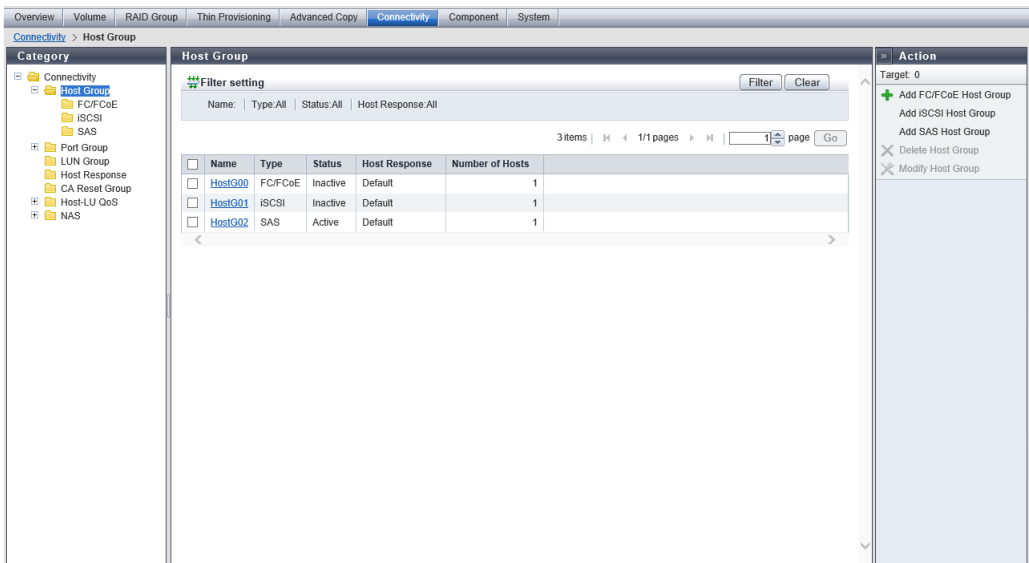
Default role	Availability of executions
Monitor	✓

6. Connectivity
Host Group

Default role	Availability of executions
Admin	✓
StorageAdmin	✓
AccountAdmin	
SecurityAdmin	✓
Maintainer	✓

Refer to "A. User Roles and Policies" (page 1580) for details on the policies and roles.

■ Display Contents



Host Group List

The registered host groups in the storage system are displayed.

Item	Description
Name	The host group name is displayed. Click this item to display the "[Host Group Detailed Information] Screen" (page 610).
Type	The interface type of the host registered in the host group is displayed. FC iSCSI SAS
Status	Whether the host group is "Active" or "Inactive" in the host affinity setting is displayed. <ul style="list-style-type: none"> Active The host group is used for the host affinity settings. Inactive The host group is not used for the host affinity settings.

6. Connectivity

Host Group

Item	Description
Host Response	The host response, which has been assigned to a host group, is displayed. Default Solaris MPxIO HP-UX AIX AIX VxVM VS850/SVC BS2000 Host responses registered in the storage system
Number of Hosts	The number of hosts (1 to 8), which have been registered in the host group, is displayed.

[Host Group Detailed Information] Screen

The detailed host group information is displayed.

Host Group Information

Item	Description
Name	The host group name is displayed.
Host Response	The host response, which has been assigned to a host group, is displayed. Default Solaris MPxIO HP-UX AIX AIX VxVM VS850/SVC BS2000 Host responses registered in the storage system
Status	Whether the host group is "Active" or "Inactive" in the host affinity setting is displayed.
Number of Hosts	The number of hosts (1 to 8), which have been registered in the host group, is displayed.

The number of hosts, which have been registered in the corresponding host group, is displayed.

Item	Description
Name	The host name is displayed.
WWN	When the host interface type is "FC", the WWN of the host is displayed.
iSCSI Name	When the host interface type is "iSCSI", the iSCSI name of the host is displayed.
SAS Address	When the host interface type is "SAS", the SAS address of the host is displayed.
Other Host Group	The other host group names to which the host belongs are displayed. If the host belongs to only one host group, the field is blank.

■ Filter Setting

Function Description

Filter setting is a function used to display a list of only the host groups meeting all the specified conditions.

No filtering is set by default. The following table shows conditions that can be specified.

Item	Description	Setting values
Name	Input the name for the host group that is to be displayed. Host groups matching or partially matching the entered name are displayed. When not using the name for filtering, leave this item blank.	Blank Host group name
Type	Select the interface type of the host group that is to be displayed.	All FC iSCSI SAS
Status	Select the set state of the host affinity for the host group that is to be displayed.	All Active Inactive
Host Response	Select the name of the host response that is assigned to the host group that is to be displayed.	All Default Solaris MPxIO HP-UX AIX AIX VxVM VS850/SVC BS2000 Host responses registered in the storage system

Modify Host Group (FC)

- ["■ Overview" \(page 611\)](#)
- ["■ User Privileges" \(page 613\)](#)
- ["■ Settings" \(page 613\)](#)
- ["■ Filter Setting" \(page 615\)](#)
- ["■ Operating Procedures" \(page 617\)](#)

■ Overview

This function performs the following modifications to the existing FC host group.

- Changing the "Host Group Name" settings
- Changing the "Host Response" allocation
- Changing the "Host" settings (including addition and deletion of member hosts in a host group)

Hosts can be added to host groups which the host affinity setting has been already configured, or deleted from host groups.

If a host is added, the host affinity setting is automatically configured to the host, as a host group member.

If a host is deleted, the host affinity setting is cleared from the corresponding host.

The Number of Hosts That Can Be Registered

Model	Number of hosts (HBAs) (*1) (per storage system)	Number of hosts (HBAs) (per CA port)	Number of hosts (HBAs) (per host group)
ETERNUS DX60 S5	128	32	8
ETERNUS DX100 S5 ETERNUS DX200 S5	1024	256	
ETERNUS DX500 S5 ETERNUS DX600 S5	4096		
ETERNUS DX8100 S4	1024		
ETERNUS DX900 S5 ETERNUS DX8900 S4	8192	64	
ETERNUS AF150 S3 ETERNUS AF250 S3	1024		
ETERNUS AF650 S3	4096		

*1 : Total of all hosts, regardless of the interface type.

Caution

- To perform the following operations, stop the host access that is associated with host affinity.
 - Changing the "Host Response" allocation
The server must be rebooted after the host response allocation is changed. Refer to [""Requirements for Changing Parameters" \(page 808\)"](#) for details.
 - Deleting "Host" from the host group
- To perform the following operations, stopping the host access that is associated with host affinity is not required.
 - Changing the "Host Group Name" settings
 - Adding "Host" to the host group
- Registration of the host is necessary to create a host group. It is not possible to delete all hosts from a host group.
- Hosts that are registered from Web GUI with this function belong to any host group.
- A host can be a member of multiple host groups. However, only one LUN group can be allocated to host and port combinations when configuring host affinity.
- Refer to "Configuration Guide -Server Connection-" for each OS type to assign an appropriate host response to the host group. A host response has a recommended pattern which has been prepared for each OS type. Refer to [""Recommended Patterns of Host Responses" \(page 798\)"](#) for details. If an appropriate host response is not configured to the host group, the path may not be switched correctly or the volume may not be recognized correctly.
- The host response that is specified for a host group is applied to all the member hosts in the target group. When a host belongs to multiple host groups, the same host response must be applied for all the groups to which the target host belongs. When a host that already belongs to an existing host group is added to another host group, the host response of the target host is changed to the host response of the host group to which the target host is added. The host response of the existing host group to which the target host belongs is also changed. Refer to [""Example of Changing the Host Response When Adding a Host to an Existing Host Group" \(page 616\)"](#) for details.
- When changing the host response for the host group, the host responses of the other host groups to which the target host belongs are also changed.

Note

- When a host was added to a host group, of which the host affinity setting has been configured, paths between all the ports with the host affinity setting and the added host will be configured. To modify the path between a host and a port, use the [Modify Host Affinity] function.
- When a host in the host group for which the host affinity settings are already configured is deleted, the path from the host to the port is also deleted.
- To change the host name or WWN, use the [Modify FC Host] function.
- To create a new host group and register hosts, use the [Add FC Host Group] function.

■ **User Privileges**

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	✓
StorageAdmin	✓
AccountAdmin	
SecurityAdmin	
Maintainer	✓

Refer to "[A. User Roles and Policies](#)" (page 1580) for details on the policies and roles.

■ **Settings**

Host Group Setting

Item	Description	Setting values
Host Group Name	Specify the host group name. When this function starts, the name of the target host group is displayed. An existing host group name cannot be used. (Host group names cannot overlap with any other host group names, irrespective of the interface types.)	Up to 16 alphanumeric characters, symbols (except ",", (comma) and "?"), and spaces
Host Response	Select a host response that is to be assigned to a host group. When this function starts, the host response that is assigned to the target host group is displayed. A list of host responses that are created in the storage system is displayed. <div style="background-color: #fff9c4; padding: 10px; border: 1px solid #ccc;"> <p>Caution</p> <ul style="list-style-type: none"> • Before changing a host response, check the LUN set state. If LUNs that are LUN#256 or higher are used, the referable LUN setting cannot be changed to a "256 LUN" host response. Refer to "Host Response and Referable Number of LUNs" for details. • When hosts are to be added in an existing host group and the relevant host already belongs to another host group, the host response setting is also changed for that host group too. If a LUN group belongs to a host affinity setting for another host group and this LUN group uses LUNs from LUN#256 onward, the referable LUN setting cannot be changed to a "256 LUN" host response. </div>	Default Solaris MPxIO HP-UX AIX AIX VxVM VS850/SVC BS2000 Host responses registered in the storage system

6. Connectivity
Host Group

Item	Description	Setting values
Number of Hosts	<p>The number of member hosts in the host group is displayed.</p> <p>The number of member hosts is determined by the total number of hosts selected from the host list and the manually specified hosts.</p> <p>For the ETERNUS DX900 S5 or the ETERNUS DX8900 S4 1 - 64</p> <p>For the other models 1 - 8</p>	

The following two methods are available for adding or deleting hosts from an existing FC host group.

- ["Selecting the Target Hosts that Are to Be Added or Deleted from the List" \(page 614\)](#)
- ["Manually Specifying the Target Hosts that Are to Be Added" \(page 615\)](#)

Selecting the Target Hosts that Are to Be Added or Deleted from the List

This screen is displayed when the [Registered And Now Connected] tab is clicked.

Add an FC host to a host group from the host list. Or delete an FC host from the host group. After an FC host has been added to a host group, the FC host is named automatically. Refer to ["Naming Conventions for Adding or Renaming Hosts" \(page 616\)](#) for details.

Item	Description
Checkbox to select a host	<p>The checkbox of the FC host (member host), which has been registered in the host group, is selected.</p> <p>Select the FC host checkbox to be added in a host group. Clear the FC host checkbox to be deleted from a host group.</p> <div style="background-color: #fff9c4; padding: 10px; margin: 10px 0;"> <p>Caution</p> <ul style="list-style-type: none"> • If the total for the number of hosts added from the host list and the manually specified hosts exceeds the maximum number of hosts, FC hosts cannot be registered. </div> <div style="background-color: #e0e0e0; padding: 10px; margin: 10px 0;"> <p>Note</p> <ul style="list-style-type: none"> • FC hosts whose port mode is "CA" or "CA/RA", and satisfy any of the following conditions are displayed in the host list. <ul style="list-style-type: none"> - FC hosts that are registered in the target host group - FC hosts that are connected to the FC port, but not registered in any host group - FC hosts that are connected to the FC port and already registered in other host groups - FC hosts that are not connected to the FC port, but already registered in other host groups • FC hosts that are set for the host affinity of which the Virtual Volume function is enabled are not displayed. </div>
WWN	The FC host WWN is displayed.
Ports	<p>The CA port, which is connected to the FC host, is displayed.</p> <p>For the ETERNUS DX900 S5 or the ETERNUS DX8900 S4 CE#x CM#y CA#z Port#w</p> <p>For the other models CM#y CA#z Port#w</p> <p>x: CE number y: CM number z: CA number w: Port number</p>

6. Connectivity

Host Group

Item	Description
Name	The FC host name of the member host is displayed. Even if an FC host is not a member host, if it has already been registered in the storage system, the FC host name is displayed. If a connected FC host is not registered in the storage system, the field is blank.
Other Host Group	The other host group names to which the FC host belongs are displayed. When an FC host is registered by a method other than Web GUI (e.g. CLI), a "-" (hyphen) is displayed. If a connected FC host is not registered in the storage system, the field is blank.
Host Response	The host response of the FC host is displayed. If a connected FC host is not registered in the storage system, the field is blank. Default Solaris MPxIO HP-UX AIX AIX VxVM VS850/SVC BS2000 Host responses registered in the storage system

■ Filter Setting

Function Description

Filter setting is a function used to display a list of only the FC hosts meeting all the specified conditions. No filtering is set by default. The following table shows conditions that can be specified.

Item	Description	Setting values
WWN	Input the WWN for the FC host that is to be displayed. FC hosts matching or partially matching the entered WWN are displayed. When not using the WWN for filtering, leave this item blank.	WWN Blank
Other Host Group	Input the name of the other host group to which the FC host that is to be displayed belongs. "Other Host Group" indicates the host groups to which the FC host belongs other than the one that is selected when this function is started. FC hosts which belong to any host groups matching or partially matching the entered name are displayed. When not using the host group name for filtering, leave this item blank.	Host group name Blank
Host Response	Select the host response that is assigned to the FC host that is to be displayed. Any FC hosts that are allocated to the selected host response are displayed. When not using the host response for filtering, select "All".	All Default Solaris MPxIO HP-UX AIX AIX VxVM VS850/SVC BS2000 Host responses registered in the storage system

Manually Specifying the Target Hosts that Are to Be Added

This screen is displayed when the [Manual Input] tab is clicked.

To add a new host that is not connected to the FC port, directly enter the WWN of the FC host. After the host has been added to a host group, the host is named automatically. Refer to ["Naming Conventions for Adding or Renaming Hosts" \(page 616\)](#) for details.

Item	Description	Setting values
WWN	Input the WWN for the FC host.	Hexadecimal numbers (0 - 9, A - F, a - f) 16 digits (using "F (f)" or "0" in entire 16 digits is not allowed)

Function Button

Button	Description
[Rediscover]	Reacquire the FC hosts that are connected to the FC port. The [Rediscover] button is displayed in the [Registered And Now Connected] screen. Clicking the [Rediscover] button updates the FC host list.
[Add]	Adds a FC host to a host group by manual entry. The [Add] button is displayed in the [Manual Input] screen. If the maximum number of hosts has already been registered, the [Add] button cannot be clicked.
[Delete]	Deletes a FC host from the target host group. The [Delete] button is displayed in the [Manual Input] screen. If no FC host has been added, the [Delete] button is not displayed.

Naming Conventions for Adding or Renaming Hosts

- A name is automatically specified to the added host with the "host group name" and a suffix number "_x" (serial numbers starting with the smallest unused number).
(Example) Host group: HOST_Group_001 (14 characters) the smallest unused number = 2 → Host name: HOST_Group_001_2, HOST_Group_001_3, etc.
- When the host name including the suffix number "_x" has more than 16 characters, the excess number of characters is deleted from the "host group name", starting with the last character and a suffix number "~x" will be added. Then, the name will contain only 16 characters.
(Example) Host group: HOST_Group_ABCDE (16 characters) the smallest unused number = 2 → Host name: HOST_Group_ABC~2, HOST_Group_ABC~3, etc.
- When a host name including the suffix number already exists, the suffix number is increased by one (+1). The suffix number is increased by one (+1) until no host names overlap.
- The hosts, which were selected on the [Registered And Now Connected] screen, are named, and then the hosts, which were specified on the [Manual Input] screen, are named next.
- The name of the existing member host will not be changed.

Example of Changing the Host Response When Adding a Host to an Existing Host Group

When "Host-3" is added to the existing host group "Host_G3" (host response: HR_1)

- Configuration before the host is added

Host group (Host response)	Member host	Host response that is allocated to the host
Host_G1 (Default)	Host-1	Default
	Host-2	Default
Host_G2 (Default)	Host-2	Default
	Host-3	Default

Host group (Host response)	Member host	Host response that is allocated to the host
Host_G3 (HR_1)	Host-4	HR_1

- Configuration after the host is added
The same host response is applied to Host_G1, Host_G2, and Host_G3.

Host group (Host response)	Member host	Host response that is allocated to the host
Host_G1 (HR_1)	Host-1	HR_1
	Host-2	HR_1
Host_G2 (HR_1)	Host-2	HR_1
	Host-3	HR_1
Host_G3 (HR_1)	Host-3	HR_1
	Host-4	HR_1

- Details
The details on how the host response that is applied to the host is changed are as follows.

Procedure ▶▶▶

- 1 The host response for Host-3 is changed from "Default" to "HR_1" (the host response for Host_G3).
- 2 Since the host response for Host-3 is changed, the host response for Host_G2 to which Host-3 belongs is also changed from "Default" to "HR_1".
(The host response for Host_2, which is the member host of Host_G2, is changed from "Default" to "HR_1".)
- 3 Since the host response for Host-2 is changed, the host response for Host_G1 to which Host-2 belongs is also changed from "Default" to "HR_1".
(The host response for Host_1, which is the member host of Host_G1, is changed from "Default" to "HR_1".)



■ **Operating Procedures**

Change the FC port group settings.

Procedure ▶▶▶

- 1 Select the FC host group that is to be changed, and click [Modify Host Group] in [Action].
- 2 Enter a new host group name, or re-select a host response to be assigned to the host group.
- 3 Add or delete a host in a host group in the following procedures.
 - Selecting the registration or deletion target host from the list
 - (1) Click the [Registered And Now Connected] tab.
 - (2) Add or delete hosts and click the [Modify] button.
Select the corresponding host checkbox in the FC host list, to add a host.
Clear the corresponding host checkbox in the FC host list, to delete a host.
→ A confirmation screen appears.

Caution

- If the WWN is not displayed when clicking the [Rediscover] button, make sure that there is no error in the connection environment, such as the connection between the host and the switch, and the CA port settings of the storage system. If there is no error in the connection environment, contact the Support Department, or specify the WWN manually.
- An error screen appears in the following conditions:
 - The "Host Group Name" is not entered
 - The "Host Group Name" does not satisfy the input conditions
 - The "Host Group Name" overlaps with an existing host group name (Host group names cannot overlap with any other host group names, irrespective of the interface types.)
 - Some LUNs cannot be referenced from the host
 - No hosts are registered in the host group
 - The total number of hosts has exceeded the maximum number for the storage system

- Manually specifying the target hosts that are to be added

(1) Click the [Manual Input] tab.

(2) Click the [Add] button.

→ The [Add FC Host] screen appears.

(3) Manually specify the WWN of the host to be added, and click the [OK] button.

→ Returns to the [Manual Input] screen.

Caution

- An error screen appears in the following conditions:
 - The "WWN" is not entered
 - The "WWN" does not satisfy the input conditions

(4) Repeat Step b and c when adding multiple WWNs.

(5) After adding or deleting the host is complete, click the [Modify] button.

→ A confirmation screen appears.

Caution

- An error screen appears in the following conditions:
 - The "Host Group Name" is not entered
 - The "Host Group Name" does not satisfy the input conditions
 - The "Host Group Name" overlaps with an existing host group name (Host group names cannot overlap with any other host group names, irrespective of the interface types.)
 - The multiple FC hosts with the same WWNs have been registered
 - Some LUNs cannot be referenced from the host
 - No hosts are registered in the host group
 - The total number of hosts has exceeded the maximum number for the storage system

- 4 Click the [OK] button.
→ Modification of the FC host group starts.
- 5 Click the [Done] button to return to the [Host Group] screen.



Modify Host Group (iSCSI)

- ["■ Overview" \(page 619\)](#)
- ["■ User Privileges" \(page 621\)](#)
- ["■ Settings" \(page 621\)](#)
- ["■ Filter Setting" \(page 624\)](#)
- ["■ Operating Procedures" \(page 626\)](#)

■ Overview

This function performs the following modifications to the existing iSCSI host group.

- Changing the "Host Group Name" settings
- Changing the "Host Response" allocation
- Changing the "Host" settings (including addition and deletion of member hosts in a host group)

Hosts can be added to host groups which the host affinity setting has been already configured, or deleted from host groups.

If a host is added, the host affinity setting is automatically configured to the host, as a host group member.

If a host is deleted, the host affinity setting is cleared from the corresponding host.

The Number of Hosts That Can Be Registered

Model	Number of hosts (HBAs) (*1) (per storage system)	Number of hosts (HBAs) (per CA port)	Number of hosts (HBAs) (per host group)
ETERNUS DX60 S5	128	32	8
ETERNUS DX100 S5	1024	256	
ETERNUS DX200 S5			
ETERNUS DX500 S5	4096		
ETERNUS DX600 S5			
ETERNUS DX8100 S4	1024		
ETERNUS DX900 S5	8192	64	
ETERNUS DX8900 S4			
ETERNUS AF150 S3	1024		8
ETERNUS AF250 S3			
ETERNUS AF650 S3	4096		

*1: Total of all hosts, regardless of the interface type.

Caution

- To perform the following operations, stop the host access that is associated with host affinity.
 - Changing the "Host Response" allocation
The server must be rebooted after the host response allocation is changed. Refer to [""Requirements for Changing Parameters" \(page 808\)"](#) for details.
 - Deleting "Host" from the host group
- To perform the following operations, stopping the host access that is associated with host affinity is not required.
 - Changing the "Host Group Name" settings
 - Adding "Host" to the host group
- Registration of the host is necessary to create a host group. It is not possible to delete all hosts from a host group.
- Hosts that are registered from Web GUI with this function belong to any host group.
- A host can be a member of multiple host groups. However, only one LUN group can be allocated to host and port combinations when configuring host affinity.
- Refer to "Configuration Guide -Server Connection-" for each OS type to assign an appropriate host response to the host group. A host response has a recommended pattern which has been prepared for each OS type. Refer to [""Recommended Patterns of Host Responses" \(page 798\)"](#) for details. If an appropriate host response is not configured to the host group, the path may not be switched correctly or the volume may not be recognized correctly.
- The host response that is specified for a host group is applied to all the member hosts in the target group. When a host belongs to multiple host groups, the same host response must be applied for all the groups to which the target host belongs. When a host that already belongs to an existing host group is added to another host group, the host response of the target host is changed to the host response of the host group to which the target host is added. The host response of the existing host group to which the target host belongs is also changed. Refer to [""Example of Changing the Host Response When Adding a Host to an Existing Host Group" \(page 616\)"](#) for details.
- When changing the host response for the host group, the host responses of the other host groups to which the target host belongs are also changed.
- Unlike Web GUI, CLI can register two iSCSI hosts that have the same iSCSI name by setting an IP address for one of these iSCSI hosts and by not setting an IP address for the other iSCSI host. However, if iSCSI hosts are registered in the storage system in this way, iSCSI host settings cannot be changed using Web GUI. Avoid this configuration when using Web GUI and CLI together. If both iSCSI hosts already exist, use CLI to specify an IP address for the iSCSI host without the IP address.

Note

- When a host was added to a host group, of which the host affinity setting has been configured, paths between all the ports with the host affinity setting and the added host will be configured. To modify the path between a host and a port, use the [Modify Host Affinity] function.
- When a host in the host group for which the host affinity settings are already configured is deleted, the path from the host to the port is also deleted.
- To change the iSCSI host information, use the [Modify iSCSI Host] function.
- To create a new host group and register hosts, use the [Add iSCSI Host Group] function.

■ User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	✓
StorageAdmin	✓
AccountAdmin	
SecurityAdmin	
Maintainer	✓

Refer to "[A. User Roles and Policies](#)" (page 1580) for details on the policies and roles.

■ Settings

Host Group Setting

Item	Description	Setting values
Host Group Name	Specify the host group name. When this function starts, the name of the target host group is displayed. An existing host group name cannot be used. (Host group names cannot overlap with any other host group names, irrespective of the interface types.)	Up to 16 alphanumeric characters, symbols (except ",", (comma) and "?"), and spaces
Host Response	Select a host response that is to be assigned to a host group. When this function starts, the host response that is assigned to the target host group is displayed. A list of host responses that are created in the storage system is displayed. Caution <ul style="list-style-type: none"> • Before changing a host response, check the LUN set state. If LUNs that are LUN#256 or higher are used, the referable LUN setting cannot be changed to a "256 LUN" host response. Refer to "Host Response and Referable Number of LUNs" for details. • When hosts are to be added in an existing host group and the relevant host already belongs to another host group, the host response setting is also changed for that host group too. If a LUN group belongs to a host affinity setting for another host group and this LUN group uses LUNs from LUN#256 onward, the referable LUN setting cannot be changed to a "256 LUN" host response. 	Default Solaris MPxIO HP-UX AIX AIX VxVM VS850/SVC BS2000 Host responses registered in the storage system
Number of Hosts	The number of member hosts in the host group is displayed. The number of member hosts is determined by the total number of hosts selected from the host list and the manually specified hosts. For the ETERNUS DX900 S5 or the ETERNUS DX8900 S4 1 - 64 For the other models 1 - 8	

The following two methods are available for adding or deleting hosts from an existing iSCSI host group.

- "[Selecting the Target Hosts that Are to Be Added or Deleted from the List](#)" (page 622)

- ["Manually Specifying the Target Hosts that Are to Be Added" \(page 625\)](#)

Selecting the Target Hosts that Are to Be Added or Deleted from the List

This screen is displayed when the [Registered And Now Connected] tab is clicked.

Add an iSCSI host to a host group from the host list. Or delete an iSCSI host from the host group. After an iSCSI host has been added to a host group, the iSCSI host is named automatically. Refer to ["Naming Conventions for Adding or Renaming Hosts" \(page 616\)](#) for details.

Item	Description	Setting values
Checkbox to select an iSCSI host	<p>The checkbox of the iSCSI host (member host), which has been registered in the host group, is selected.</p> <p>Select the iSCSI host checkbox to be added in a host group. Clear the iSCSI host checkbox to be deleted from a host group.</p> <div style="background-color: #fff9c4; padding: 10px; margin: 10px 0;"> <p>Caution</p> <ul style="list-style-type: none"> • If the total for the number of hosts selected from the host list and the manually specified hosts exceeds the maximum number of hosts, iSCSI hosts cannot be added. • The following items can be specified only for the iSCSI hosts that are selected by checkboxes; "IP Version", "IP Address", "Alias Name", "CHAP User ID", "Change CHAP Password", "CHAP Password", and "Confirm CHAP Password". </div> <div style="background-color: #e0e0e0; padding: 10px; margin: 10px 0;"> <p>Note</p> <ul style="list-style-type: none"> • iSCSI hosts whose port mode is "CA" or "CA/RA", and satisfy any of the following conditions are displayed in the host list. <ul style="list-style-type: none"> - iSCSI hosts that are registered in the target host group - iSCSI hosts that are connected to the iSCSI port, but not registered in any host group (*1) - iSCSI hosts that are connected to the iSCSI port and already registered in other host groups - iSCSI hosts that are not connected to the iSCSI port, but already registered in other host groups <p>*1 : A host that is not registered in the storage system indicates that a host with the same parameters (iSCSI name, IP version, and Alias name) as the target host is not registered. However, the host is regarded as unregistered host when a host with the same iSCSI name, IP version, Alias name, but with a different IP address is already registered. The obtained "iSCSI Name", "IP Version", "IP Address", and "Alias Name" are displayed.</p> <ul style="list-style-type: none"> • iSCSI hosts that are set for the host affinity of which the Virtual Volume function is enabled are not displayed. </div>	
iSCSI Name	The iSCSI name of the iSCSI host is displayed.	

6. Connectivity
Host Group

Item	Description	Setting values
IP Version	<p>The IP version of the iSCSI host is displayed. To change the IP version, select "IPv4" or "IPv6".</p> <p>Caution</p> <ul style="list-style-type: none"> To register an iSCSI host without using an IP address, perform IP version selection as follows: <ul style="list-style-type: none"> Select "IPv4" when the IP address format of the iSCSI host is IPv4 (when using an IPv4 host). Select "IPv6" when the IP address format of the iSCSI host is IPv6 (when using an IPv6 host). If the IP address format of the iSCSI host cannot be checked (when either an IPv4 host or an IPv6 host is used), register two hosts. Select "IPv4" for one host, and select "IPv6" for the other host. Specify the same iSCSI name, CHAP user ID, and CHAP password for each host. 	<p>IPv4</p> <p>IPv6</p>
IP Address	<p>IP address of the member host is displayed.</p> <p>To add an iSCSI host to a host group, select the checkbox of the iSCSI host to be added, and enter the IP address.</p> <p>There are two methods to specify an IP address; "IPv4" and "IPv6".</p> <p>The IP address must be specified with the selected IP version (IPv4 or IPv6). The following IPv6 addresses can be used; "link local address", "global address", "unique local address", or "6to4 address". Refer to "Available IPv6 Address" (page 1221) for details. When the current setting is displayed, the IPv6 address is displayed as an abbreviation. It is not necessary to specify this item if IP address is not used.</p>	<p>For IPv4 address</p> <p>xxx.xxx.xxx.xxx</p> <p>xxx: 1 - 255 for the top field (decimal)</p> <p>xxx: 0 - 255 for other fields (decimal)</p> <p>For IPv6 address</p> <p>xxxx:xxxx:xxxx:xxxx:xxxx:xxxx:xxxx:xxxx</p> <p>xxxx: 0 - ffff (FFFF) (hexadecimal, alphanumeric characters)</p> <p>Refer to "IPv6 Address Notation" (page 1220) for details.</p>
Name	<p>The iSCSI host name of the member host is displayed.</p> <p>Even if an iSCSI host is not a member host, if it has already been registered in the storage system, the iSCSI host name is displayed.</p> <p>If a connected iSCSI host is not registered in the storage system, the field is blank.</p>	
Alias Name	<p>The Alias name of the member host is displayed.</p> <p>To add an iSCSI host to a host group, select the checkbox of the iSCSI host to be added, and enter the Alias name.</p> <p>If the iSCSI host has already been registered in the storage system, the Alias name is displayed.</p> <p>It is not necessary to specify this item if Alias name is not used.</p> <p>An existing Alias name cannot be specified.</p>	<p>Alias name</p> <p>Up to 31 alphanumeric characters, symbols (except "," (comma) and "?"), and spaces</p>
CHAP User ID	<p>Specify the user ID for the CHAP Authentication.</p> <p>If the iSCSI host has already been registered in the host group, the CHAP User ID is displayed. To change this item, select the checkbox for the iSCSI host and then specify the CHAP User ID.</p> <p>It is not necessary to specify this item if the CHAP Authentication is not used.</p> <p>Configure a user ID and a password as a pair.</p>	<p>User ID</p> <p>Up to 255 alphanumeric characters, symbols (except "," (comma) and "?"), and spaces</p>
Change CHAP Password	<p>To register or edit the CHAP Authentication password, select the checkbox.</p> <p>This item is available only when the checkbox for the iSCSI host is selected.</p>	<p>Checkbox</p> <p>Selected</p> <p>Cleared</p>

6. Connectivity

Host Group

Item	Description	Setting values
CHAP Password	<p>Specify the password for the CHAP Authentication.</p> <p>If the iSCSI host is already registered in the host group and CHAP Authentication is used, the password is displayed with "*" (asterisks). To change this item, select the checkbox for the iSCSI host and the checkbox for "Change CHAP Password", and then specify the password.</p> <p>It is not necessary to specify this item if the CHAP Authentication is not used.</p> <p>Configure a user ID and a password as a pair.</p>	<p>Password</p> <p>12 - 100 alphanumeric characters, symbols (except ",", (comma) and "?"), and spaces</p>
Confirm CHAP Password	<p>Input the CHAP password again for confirmation.</p> <p>If the iSCSI host is already registered in the host group and CHAP Authentication is used, the password is displayed with "*" (asterisks). To change this item, select the checkbox for the iSCSI host and the checkbox for "Change CHAP Password", and then input the password again.</p> <p>It is not necessary to specify this item if the CHAP Authentication is not used.</p>	<p>Password</p> <p>12 - 100 alphanumeric characters, symbols (except ",", (comma) and "?"), and spaces</p>
Ports	<p>The CA port, which is connected to the iSCSI host, is displayed.</p> <p>For the ETERNUS DX900 S5 or the ETERNUS DX8900 S4 CE#x CM#y CA#z Port#w</p> <p>For the other models CM#y CA#z Port#w</p> <p>x: CE number y: CM number z: CA number w: Port number</p>	
Other Host Group	<p>The other host group names to which the iSCSI host belongs are displayed.</p> <p>When an iSCSI host is registered by a method other than Web GUI (e.g. CLI), a "-" (hyphen) is displayed.</p> <p>If a connected iSCSI host is not registered in the storage system, the field is blank.</p>	
Host Response	<p>The host response of the iSCSI host is displayed.</p> <p>If a connected iSCSI host is not registered in the storage system, the field is blank.</p> <p>Default</p> <p>Solaris MPxIO</p> <p>HP-UX</p> <p>AIX</p> <p>AIX VxVM</p> <p>VS850/SVC</p> <p>BS2000</p> <p>Host responses registered in the storage system</p>	

■ Filter Setting

Function Description

Filter setting is a function used to display a list of only the iSCSI hosts meeting all the specified conditions.

No filtering is set by default. The following table shows conditions that can be specified.

6. Connectivity

Host Group

Item	Description	Setting values
iSCSI Name	Input the iSCSI name of the iSCSI host that is to be displayed. iSCSI hosts matching or partially matching the entered iSCSI name are displayed. When not using the iSCSI name for filtering, leave this item blank.	iSCSI name Blank
Other Host Group	Input the name of the other host group to which the iSCSI host that is to be displayed belongs. iSCSI hosts which belong to any host groups matching or partially matching the entered name are displayed. When not using the host group name for filtering, leave this item blank.	Host group name Blank
Host Response	Select the host response of the iSCSI host that is to be displayed. Any iSCSI hosts that are allocated to the selected host response are displayed. When not using the host response for filtering, select "All".	All Default Solaris MPxIO HP-UX AIX AIX VxVM VS850/SVC BS2000 Host responses registered in the storage system

Manually Specifying the Target Hosts that Are to Be Added

This screen is displayed when the [Manual Input] tab is clicked.

To add a new iSCSI host that is not connected to the iSCSI port, directly enter the iSCSI host information. After the iSCSI host has been added to a host group, the iSCSI host is named automatically. Refer to ["Naming Conventions for Adding or Renaming Hosts" \(page 616\)](#) for details.

Item	Description	Setting values
iSCSI Name	Input the iSCSI name of the iSCSI host (required). An iSCSI name that has already been registered in the storage system cannot be used.	iSCSI name 4 - 223 alphanumeric characters and symbols "-" (hyphen), "." (period), and ":" (colon) The name starts with "iqn." or "eui."
IP Version	Refer to the description in "Selecting the Target Hosts that Are to Be Added or Deleted from the List" (page 622) for details.	Refer to "Selecting the Target Hosts that Are to Be Added or Deleted from the List" (page 622) for setting values.
IP Address		
Alias Name		
CHAP User ID		
CHAP Password		
Confirm CHAP Password		

Function Button

Button	Description
[Rediscover]	Reacquire the iSCSI hosts that are connected to the iSCSI port. The [Rediscover] button is displayed in the [Registered And Now Connected] screen. Click the [Rediscover] button to update the iSCSI host list.
[Add]	Adds an iSCSI host to a host group by manual entry. The [Add] button is displayed in the [Manual Input] screen. If the maximum number of hosts has already been registered, the [Add] button cannot be clicked.

Button	Description
[Delete]	Deletes an iSCSI host from the target host group. The [Delete] button is displayed in the [Manual Input] screen. If no iSCSI host has been added, the [Delete] button is not displayed.

■ Operating Procedures

In this screen, change the iSCSI host group settings.

Procedure ▶▶▶

- 1 Select the iSCSI host group that is to be changed, and click [Modify Host Group] in [Action].
- 2 Enter a new host group name, or re-select a host response to be assigned to the host group.
- 3 Add or delete a host in a host group in the following procedures.
 - Selecting the registration or deletion target host from the list
 - (1) Click the [Registered And Now Connected] tab.
 - (2) Add or delete a host, and input the iSCSI host information (such as the IP Address and Alias Name) for the added host, and click the [Modify] button.
Select the corresponding host checkbox in the iSCSI host list, to add a host.
Clear the corresponding host checkbox in the iSCSI host list, to delete a host.
→ A confirmation screen appears.

Caution

- If the iSNS server has not been configured in the [Modify iSCSI Port Parameters] function, the iSCSI host cannot be automatically acquired.
- The following restrictions in the environment that is described below apply for the automatic acquirement of host information (*1) even when the iSNS server is specified.
 - *1: "iSCSI Name", "IP Version", "IP Address", and "Alias Name"
 - When one of the following OSs is used and there are multiple hosts that have the same iSCSI name but different IP addresses, only the information of one host can be acquired.
 - Windows Server 2012
 - Windows Server 2012 R2
 - Windows Server 2016
 - Windows Server 2019
 - Oracle Solaris 10
 - When the host OS is Oracle Solaris 11, "IP Version" and "IP Address" cannot be acquired.
- If the iSCSI host information is not displayed when clicking the [Rediscover] button, make sure that there is no error in the connection environment, such as the connection between the host and the switch, and the CA port settings of the storage system. If there is no error in the connection environment, contact the Support Department or manually specify the iSCSI host information.
- An error screen appears in the following conditions:
 - The "Host Group Name" is not entered
 - The "Host Group Name" does not satisfy the input conditions

- The "Host Group Name" overlaps with an existing host group name (Host group names cannot overlap with any other host group names, irrespective of the interface types.)
- The "IP Address" does not satisfy the input conditions
- When the "IP Address" is specified and an iSCSI host with the same combination of "iSCSI Name" and "IP Address" is already registered
- When the "IP Address" is not specified and an iSCSI host with the same combination of "iSCSI Name" and "IP Version" is already registered
- The "Alias Name" does not satisfy the input conditions
- The "Alias Name" overlaps the existing Alias name
- The "CHAP User ID" does not satisfy the input conditions
- The "CHAP Password" does not satisfy the input conditions
- The "Confirm CHAP Password" does not satisfy the input conditions
- The "CHAP Password" and the "Confirm CHAP Password" do not match
- Either of the "CHAP User ID" or the "CHAP Password" has been specified
- Some LUNs cannot be referenced from the host
- No hosts are registered in the host group
- The total number of hosts has exceeded the maximum number for the storage system

- Manually specifying the target hosts that are to be added

- (1) Click the [Manual Input] tab.
- (2) Click the [Add] button.
→ The [Add iSCSI Host] screen appears.
- (3) Specify the iSCSI host information of the host to be added, and click the [OK] button.
→ Returns to the [Manual Input] screen.

Caution

- An error screen appears in the following conditions:
 - The "iSCSI Name" is not entered
 - The "iSCSI Name" does not satisfy the input conditions
 - The "IP Address" does not satisfy the input conditions
 - The "Alias Name" does not satisfy the input conditions
 - The "CHAP User ID" does not satisfy the input conditions
 - The "CHAP Password" does not satisfy the input conditions
 - The "Confirm CHAP Password" does not satisfy the input conditions
 - The "CHAP Password" and the "Confirm CHAP Password" do not match
 - Either of the "CHAP User ID" or the "CHAP Password" has been specified

- (4) Repeat Step b and c when adding multiple iSCSI hosts.
- (5) After adding or deleting the host is complete, click the [Modify] button.
→ A confirmation screen appears.

Caution

- An error screen appears in the following conditions:
 - The "Host Group Name" is not entered
 - The "Host Group Name" does not satisfy the input conditions
 - The "Host Group Name" overlaps with an existing host group name (Host group names cannot overlap with any other host group names, irrespective of the interface types.)
 - The same iSCSI name is specified for multiple iSCSI hosts
 - When the "IP Address" is specified and an iSCSI host with the same combination of "iSCSI Name" and "IP Address" is already registered
 - When the "IP Address" is not specified and an iSCSI host with the same combination of "iSCSI Name" and "IP Version" is already registered
 - The "Alias Name" overlaps the existing Alias name
 - Some LUNs cannot be referenced from the host
 - No hosts are registered in the host group
 - The total number of hosts has exceeded the maximum number for the storage system

- 4 Click the [OK] button.
→ Modification of the iSCSI host group starts.
- 5 Click the [Done] button to return to the [Host Group] screen.



Modify Host Group (SAS)

- ["■ Overview" \(page 628\)](#)
- ["■ User Privileges" \(page 630\)](#)
- ["■ Settings" \(page 630\)](#)
- ["■ Filter Setting" \(page 632\)](#)
- ["■ Operating Procedures" \(page 634\)](#)

■ Overview

This function performs the following modifications to the existing SAS host group.

- Changing the "Host Group Name" settings
- Changing the "Host Response" allocation
- Changing the "Host" settings (including addition and deletion of member hosts in a host group)

Hosts can be added to host groups which the host affinity setting has been already configured, or deleted from host groups.

If a host is added, the host affinity setting is automatically configured to the host, as a host group member.

If a host is deleted, the host affinity setting is cleared from the corresponding host.

The Number of Hosts That Can Be Registered

Model	Number of hosts (HBAs) (*1) (per storage system)	Number of hosts (HBAs) (per CA port)	Number of hosts (HBAs) (per host group)
ETERNUS DX60 S5	128	32	8
ETERNUS DX100 S5	1024	256	
ETERNUS DX200 S5			

*1 : Total of all hosts, regardless of the interface type.

Caution

- To perform the following operations, stop the host access that is associated with host affinity.
 - Changing the "Host Response" allocation
The server must be rebooted after the host response allocation is changed. Refer to [""Requirements for Changing Parameters" \(page 808\)"](#) for details.
 - Deleting "Host" from the host group
- To perform the following operations, stopping the host access that is associated with host affinity is not required.
 - Changing the "Host Group Name" settings
 - Adding "Host" to the host group
- Registration of the host is necessary to create a host group. It is not possible to delete all hosts from a host group.
- Hosts that are registered from Web GUI with this function belong to any host group.
- A host can be a member of multiple host groups. However, only one LUN group can be allocated to a combination of host and port when configuring host affinity.
- Refer to "Configuration Guide -Server Connection-" for each OS type to assign an appropriate host response to the host group. A host response has a recommended pattern which has been prepared for each OS type. Refer to [""Recommended Patterns of Host Responses" \(page 798\)"](#) for details. If an appropriate host response is not configured to the host group, the path may not be switched correctly or the volume may not be recognized correctly.
- The host response that is specified for a host group is applied to all the member hosts in the target group. When a host belongs to multiple host groups, the same host response must be applied for all the groups to which the target host belongs. When a host that already belongs to an existing host group is added to another host group, the host response of the target host is changed to the host response of the host group to which the target host is added. The host response of the existing host group to which the target host belongs is also changed. Refer to [""Example of Changing the Host Response When Adding a Host to an Existing Host Group" \(page 633\)"](#) for details.
- When changing the host response for the host group, the host responses of the other host groups to which the target host belongs are also changed.

Note

- When a host was added to a host group, of which the host affinity setting has been configured, paths between all the ports with the host affinity setting and the added host will be configured. To modify the path between a host and a port, use the [Modify Host Affinity] function.
- When a host in the host group for which the host affinity settings are already configured is deleted, the path from the host to the port is also deleted.
- To change the host name or the SAS address, use the [Modify SAS Host] function.
- To create a new host group and register hosts, use the [Add SAS Host Group] function.

■ **User Privileges**

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	✓
StorageAdmin	✓
AccountAdmin	
SecurityAdmin	
Maintainer	✓

Refer to "[A. User Roles and Policies](#)" (page 1580) for details on the policies and roles.

■ **Settings**

Host Group Setting

In this screen, change the SAS host group settings.

There are two methods to modify a host. One method is "[Selecting a Host that is to be Added or Deleted from the Displayed Host List by Clicking the \[Registered And Now Connected\] Tab](#)" (page 631).

The other method is "[Inputting the SAS Address of the Host Manually by Clicking the \[Manual Input\] Tab](#)" (page 632).

Item	Description	Setting values
Host Group Name	Specify the host group name. An existing host group name cannot be used. (Host group names cannot overlap with any other host group names, irrespective of the interface types.)	Up to 16 alphanumeric characters, symbols (except ",", (comma) and "?"), and spaces

6. Connectivity
Host Group

Item	Description	Setting values
Host Response	<p>Select a host response that is to be assigned to a host group. A list of host responses that are created in the storage system is displayed.</p> <p>Caution</p> <ul style="list-style-type: none"> • Before changing a host response, check the LUN set state. If LUNs that are LUN#256 or higher are used, the referable LUN setting cannot be changed to a "256 LUN" host response. Refer to "Host Response and Referable Number of LUNs" for details. • When hosts are to be added in an existing host group and the relevant host already belongs to another host group, the host response setting is also changed for that host group too. If a LUN group belongs to a host affinity setting for another host group and this LUN group uses LUNs from LUN#256 onward, the referable LUN setting cannot be changed to a "256 LUN" host response. 	<p>Default Solaris MPxIO HP-UX AIX AIX VxVM VS850/SVC BS2000 Host responses registered in the storage system</p>
Number of Hosts	<p>The number of member hosts (1 to 8) in the host group is displayed. The number of member hosts is determined by the total number of member hosts that were selected from the host list on the [Registered And Now Connected] screen and specified on the [Manual Input] screen.</p>	

Selecting a Host that is to be Added or Deleted from the Displayed Host List by Clicking the [Registered And Now Connected] Tab

All of the SAS hosts that are connected to SAS and are registered or not registered in a host group but can be recognized by the storage system (the SAS hosts are connected to the storage system or are already registered in the storage system) are displayed. In this screen, add or delete a member host in a host group. After the host has been added to a host group, the host is named automatically. Refer to "[Naming Conventions for Adding or Renaming Hosts](#)" (page 633) for details.

Item	Description
Checkbox to select a SAS host	<p>The checkbox of the SAS host (member host), which has been registered in the host group, is selected. Select the SAS host checkbox to be added in a host group. Clear the SAS host checkbox to be deleted from a host group.</p>
SAS Address	<p>The SAS address of the SAS host is displayed.</p>
Port	<p>The CA port, which is connected to the SAS host, is displayed. CM#x CA#y Port#z x: CM number y: CA number z: Port number</p>
Name	<p>The SAS host name of the member host is displayed. Even if a SAS host is not a member host, if it has already been registered in the storage system, the SAS host name is displayed. If a connected SAS host is not registered in the storage system, the field is blank.</p>
Other Host Group	<p>The other host group name to which the SAS host belongs is displayed. When a SAS host is registered by a method other than Web GUI (e.g. CLI), a "-" (hyphen) is displayed. If a connected SAS host is not registered in the storage system, the field is blank.</p>

6. Connectivity
Host Group

Item	Description
Host Response	The host response of the SAS host is displayed. If a connected SAS host is not registered in the storage system, the field is blank. Default Solaris MPxIO HP-UX AIX AIX VxVM VS850/SVC BS2000 Host responses registered in the storage system

■ Filter Setting

Function Description

Filter setting is a function used to display a list of only the SAS hosts meeting all the specified conditions. No filtering is set by default. The following table shows conditions that can be specified.

Item	Description	Setting values
SAS Address	Input the SAS address that is to be displayed. SAS hosts matching or partially matching the entered SAS address are displayed. When not using the SAS address for filtering, leave this item blank.	SAS address Blank
Other Host Group	Input the other host group names that are to be displayed. SAS hosts which belong to any host groups that match or partially match the entered name are displayed. When not using the host group name for filtering, leave this item blank.	Host group name Blank
Host Response	Select the host response that is to be displayed. Any SAS hosts that are allocated to the selected host response are displayed. When not using the host response for filtering, select "All".	All Default Solaris MPxIO HP-UX AIX AIX VxVM VS850/SVC BS2000 Host responses registered in the storage system

Inputting the SAS Address of the Host Manually by Clicking the [Manual Input] Tab

Click the [Add] button to display the screen to add a SAS address. Directly input the SAS address for the SAS host to be added in a host group. After the host has been added to a host group, the host is named automatically. Refer to ["Naming Conventions for Adding or Renaming Hosts" \(page 633\)](#) for details.

Item	Description	Setting values
SAS Address	Specify the SAS address of the SAS host. A SAS address that has already been registered in the storage system cannot be used.	Hexadecimal numbers (0 - 9, A - F, a - f) 16 digits (using "F (f)" or "0" in entire 16 digits is not allowed) Blank

Function Button

Button	Description
[Rediscover]	Updates the SAS host list which can be recognized by the storage system. The [Rediscover] button is displayed in the [Registered And Now Connected] screen. Clicking the [Rediscover] button updates the SAS host list.
[Add]	Adds a SAS host to a host group by manual entry. The [Add] button is displayed in the [Manual Input] screen. If the maximum number of hosts has already been registered, the [Add] button cannot be clicked.
[Delete]	Delete a SAS host from the target host group. The [Delete] button is displayed in the [Manual Input] screen. If no SAS host has been added, the [Delete] button is not displayed.

Naming Conventions for Adding or Renaming Hosts

- A name is automatically specified to the added host with the "host group name" and a suffix number "_x" (serial numbers starting with the smallest unused number).
(Example) Host group: HOST_Group_001 (14 characters) the smallest unused number = 2 → Host name: HOST_Group_001_2, HOST_Group_001_3, etc.
- When the host name including the suffix number "_x" has more than 16 characters, the excess number of characters is deleted from the "host group name", starting with the last character and a suffix number "~x" will be added. Then, the name will contain only 16 characters.
(Example) Host group: HOST_Group_ABCED (16 characters) the smallest unused number = 2 → Host name: HOST_Group_ABC~2, HOST_Group_ABC~3, etc.
- When a host name including the suffix number already exists, the suffix number is increased by one (+1). The suffix number is increased by one (+1) until no host names overlap.
- The hosts, which were selected on the [Registered And Now Connected] screen, are named, and then the hosts, which were specified on the [Manual Input] screen, are named next.
- The name of the existing member host will not be changed.

Example of Changing the Host Response When Adding a Host to an Existing Host Group

Host group (Host response)	Member host	Host response that is allocated to the host
Host_G1 (Default)	Host-1	Default
	Host-2	Default
Host_G2 (Default)	Host-2	Default
	Host-3	Default
Host_G3 (HR_1)	Host-4	HR_1

If "Host-3" is added to an existing host group named "Host_G3" (the host response is HR_1) as shown in the above example, the host response is changed as follows:

Procedure ▶▶▶

- 1 The host response for Host-3 is changed from "Default" to "HR_1" (the host response for Host_G3).
- 2 Since the host response for Host-3 is changed, the host response for Host_G2 to which Host-3 belongs is also changed from "Default" to "HR_1".
(The host response for Host_2, which is the member host of Host_G2, is changed from "Default" to "HR_1".)

- 3** Since the host response for Host-2 is changed, the host response for Host_G1 to which Host-2 belongs is also changed from "Default" to "HR_1".
(The host response for Host_1, which is the member host of Host_G1, is changed from "Default" to "HR_1".)



The following table shows the host response after new hosts are added.

Host group (Host response)	Member host	Host response that is allocated to the host
Host_G1 (HR_1)	Host-1	HR_1
	Host-2	HR_1
Host_G2 (HR_1)	Host-2	HR_1
	Host-3	HR_1
Host_G3 (HR_1)	Host-3	HR_1
	Host-4	HR_1

■ Operating Procedures

In this screen, change the SAS host group settings.

Procedure ▶▶▶

- 1** Select the SAS host group that is to be changed, and click [Modify Host Group] in [Action].
- 2** Enter a new host group name, or re-select a host response to be assigned to the host group.
- 3** Add or delete a host in a host group in the following procedures.
 - Selecting the registration or deletion target host from the list
 - (1)** Click the [Registered And Now Connected] tab.
 - (2)** Add or delete hosts and click the [Modify] button.
Select the corresponding host checkbox in the SAS host list, to add a host.
Clear the corresponding host checkbox in the SAS host list, to delete a host.
→ A confirmation screen appears.

Caution

- If the SAS address is not displayed when clicking the [Rediscover] button, make sure that there is no error in the connection environment, such as the connection between the host and the switch, and the CA port settings of the storage system. If there is no error in the connection environment, contact the Support Department, or specify the SAS address manually.
- An error screen appears in the following conditions:
 - The "Host Group Name" is not entered
 - The "Host Group Name" does not satisfy the input conditions
 - The "Host Group Name" overlaps with an existing host group name (Host group names cannot overlap with any other host group names, irrespective of the interface types.)
 - Some LUNs cannot be referenced from the host
 - Nine or more hosts are registered in the host group or no hosts are registered in the host group
 - The total number of hosts has exceeded the maximum number for the storage system

- Manually specifying the target hosts that are to be added

(1) Click the [Manual Input] tab.

(2) Click the [Add] button.

→ The [Add SAS Host] screen appears.

(3) Manually specify the SAS address of the host to be added, and click the [OK] button.

→ Returns to the [Manual Input] screen.

Caution

- An error screen appears in the following conditions:
 - The "SAS Address" is not entered
 - The "SAS Address" does not satisfy the input conditions

(4) Repeat Step b and c when registering multiple SAS addresses.

(5) After adding or deleting the host is complete, click the [Modify] button.

→ A confirmation screen appears.

Caution

- An error screen appears in the following conditions:
 - The "Host Group Name" is not entered
 - The "Host Group Name" does not satisfy the input conditions
 - The "Host Group Name" overlaps with an existing host group name (Host group names cannot overlap with any other host group names, irrespective of the interface types.)
 - Multiple registration of the same SAS address has been attempted.
 - Some LUNs cannot be referenced from the host
 - Nine or more hosts are registered in the host group or no hosts are registered in the host group
 - The total number of hosts has exceeded the maximum number for the storage system

- 4 Click the [OK] button.
→ Modification of the SAS host group starts.
- 5 Click the [Done] button to return to the [Host Group] screen.



Delete Host Group

- ["■ Overview" \(page 636\)](#)
- ["■ User Privileges" \(page 636\)](#)
- ["■ Operating Procedures" \(page 637\)](#)

■ Overview

This function deletes host groups.

Note

- When this function is executed, the hosts registered in only the deletion target host group are deleted.

■ User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	✓
StorageAdmin	✓
AccountAdmin	
SecurityAdmin	
Maintainer	✓

Refer to ["A. User Roles and Policies" \(page 1580\)](#) for details on the policies and roles.

■ Operating Procedures

In this screen, delete the host groups.

Procedure ▶▶▶

- 1 Select the host group to be deleted (multiple selections can be made) and click [Delete Host Group] in [Action].
→ A confirmation screen appears.

Caution

- [Delete Host Group] cannot be clicked if a host group that is set with host affinity (the status is "Active") is selected.

- 2 Click the [OK] button.
→ Deletion of the host group starts.
- 3 Click the [Done] button to return to the [Host Group] screen.



FC Host

- "[■ Overview](#)" (page 637)
- "[■ User Privileges](#)" (page 637)
- "[■ Display Contents](#)" (page 638)
- "[■ Filter Setting](#)" (page 639)

■ Overview

This function displays the registered FC hosts in the storage system.

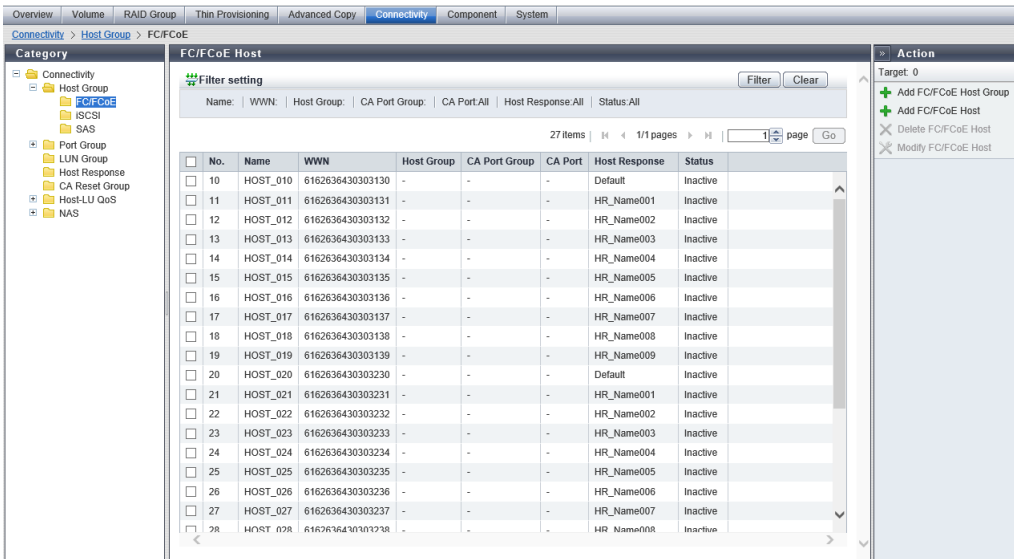
■ User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	✓
Admin	✓
StorageAdmin	✓
AccountAdmin	
SecurityAdmin	✓
Maintainer	✓

Refer to "["A. User Roles and Policies" \(page 1580\)](#)" for details on the policies and roles.

■ Display Contents



The registered FC hosts in the storage system are displayed.

Item	Description
No.	The FC host number is displayed.
Name	The FC host name is displayed.
WWN	The FC host WWN is displayed.
Host Group	The name of the host group to which the FC host belongs is displayed. If the FC host does not belong to a host group, a "-" (hyphen) is displayed.
CA Port Group	The name of the CA port group that has the host affinity setting with the FC host is displayed. If no CA port group with the host affinity setting exists, a "-" (hyphen) is displayed.
CA Port	The location information of the CA port that has the host affinity setting with the FC host is displayed. If no CA port with the host affinity setting exists, a "-" (hyphen) is displayed. For the ETERNUS DX900 S5 or the ETERNUS DX8900 S4 CE#x CM#y CA#z Port#w For the other models CM#y CA#z Port#w x: CE number y: CM number z: CA number w: Port number
Host Response	The host response that is assigned to the FC host or to the host group of the FC host is displayed. Default Solaris MPxIO HP-UX AIX AIX VxVM VS850/SVC BS2000 Host responses registered in the storage system

6. Connectivity

Host Group

Item	Description
Status	<p>Whether the FC host is "Active" or "Inactive" for the host affinity setting is displayed.</p> <ul style="list-style-type: none"> • Active The FC host is used for the host affinity setting. • Inactive The FC host is not used for the host affinity setting.

■ Filter Setting

Function Description

Filter setting is a function used to display a list of only the FC hosts meeting all the specified conditions. No filtering is set by default. The following table shows conditions that can be specified.

Item	Description	Setting values
Name	<p>Input the name for the FC host that is to be displayed.</p> <p>FC hosts matching or partially matching the entered name are displayed.</p> <p>When not using the name for filtering, leave this item blank.</p>	<p>Blank</p> <p>FC host name</p>
WWN	<p>Input the WWN for the FC host that is to be displayed.</p> <p>FC hosts matching or partially matching the entered WWN are displayed.</p> <p>When not using the WWN for filtering, leave this item blank.</p>	<p>Blank</p> <p>WWN</p>
Host Group	<p>Input the name of the host group to which the FC host that is to be displayed belongs.</p> <p>FC hosts matching or partially matching the entered host group name are displayed.</p> <p>When not using the host group for filtering, leave this item blank.</p>	<p>Blank</p> <p>Host group name</p>
CA Port Group	<p>Input the name of the CA port group that has the host affinity setting with the FC host that is to be displayed.</p> <p>FC hosts matching or partially matching the entered CA port group name are displayed.</p> <p>When not using the CA port group for filtering, leave this item blank.</p>	<p>Blank</p> <p>CA port group name</p>
CA Port	<p>Select the CA port that has the host affinity setting with the FC host that is to be displayed.</p>	<p>All</p> <p>For the ETERNUS DX900 S5 or the ETERNUS DX8900 S4 CE#x CM#y CA#z Port#w</p> <p>For the other models CM#y CA#z Port#w</p> <p>x: CE number y: CM number z: CA number w: Port number</p>
Host Response	<p>Select the name of the host response that is assigned to the FC host that is to be displayed.</p>	<p>All</p> <p>Default</p> <p>Solaris MPxIO</p> <p>HP-UX</p> <p>AIX</p> <p>AIX VxVM</p> <p>VS850/SVC</p> <p>BS2000</p> <p>Host responses registered in the storage system</p>

6. Connectivity

Host Group

Item	Description	Setting values
Status	Select the set state of the host affinity for the FC host that is to be displayed.	All Active Inactive

Add FC Host Group

- ["■ Overview" \(page 640\)](#)
- ["■ User Privileges" \(page 641\)](#)
- ["■ Settings" \(page 642\)](#)
- ["■ Filter Setting" \(page 644\)](#)
- ["■ Operating Procedures" \(page 646\)](#)

■ Overview

This function creates a new FC host group and registers which hosts are members of this group. A host group is a group of hosts (HBAs) that are allowed to access the volume (LUN group). The Host Affinity is specified for each host group.

The Number of Host Groups and Hosts That Can Be Registered

Model	Number of host groups (*1) (per storage system)	Number of hosts (HBAs) (*2) (per storage system)	Number of hosts (HBAs) (per CA port)	Number of hosts (HBAs) (per host group)
ETERNUS DX60 S5	512	128	32	8
ETERNUS DX100 S5		1024		
ETERNUS DX200 S5		4096		
ETERNUS DX500 S5		1024		
ETERNUS DX600 S5				
ETERNUS DX8100 S4		1024		
ETERNUS DX900 S5	1536	8192		64
ETERNUS DX8900 S4				
ETERNUS AF150 S3	512	1024		8
ETERNUS AF250 S3				
ETERNUS AF650 S3		4096		

*1 : Total of all host groups, regardless of the interface type.

*2 : Total of all hosts, regardless of the interface type.

Caution

- Registration of the host is necessary to create a host group. If this function is used to register a host to the storage system from Web GUI, a new host group is also created.
- A host can be a member of multiple host groups. However, only one LUN group can be allocated to a combination of host and port when configuring host affinity.
- Refer to "Configuration Guide -Server Connection-" for each OS type to assign an appropriate host response to the created host group. A host response has a recommended pattern which has been prepared for each OS type. Refer to "[Recommended Patterns of Host Responses](#)" (page 798)" for details. If an appropriate host response is not configured to the host group, the path may not be switched correctly or the volume may not be recognized correctly.
- The host response that is specified for a host group is applied to all the member hosts in the target group. When a host belongs to multiple host groups, the same host response must be applied for all the groups to which the target host belongs. When a host that already belongs to an existing host group is added to a newly created host group, the host response of the new host group is applied to the host. The host response of the existing host group to which the target host belongs is also changed. Refer to "[Example of Changing the Host Response When Adding a Host](#)" (page 646)" for details.
- When creating the host group that is used for the Non-disruptive Storage Migration function, allocate the same host response as the host group that accesses the migration source volume in the external storage system.

Note

- To perform the following operations, use the [Modify Host Group (FC)] function.
 - Changing the host group settings
 - Adding a host to an existing host group
- To change the host name or WWN, use the [Modify FC Host] function.

■ **User Privileges**

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	✓
StorageAdmin	✓
AccountAdmin	
SecurityAdmin	
Maintainer	✓

Refer to "[A. User Roles and Policies](#)" (page 1580)" for details on the policies and roles.

■ Settings

Host Group Setting

Item	Description	Setting values
Host Group Name	Specify the host group name. An existing host group name cannot be used. (Host group names cannot overlap with any other host group names, irrespective of the interface types.)	Up to 16 alphanumeric characters, symbols (except ",", (comma) and "?"), and spaces
Host Response	Select a host response that is to be assigned to a host group. A list of host responses that are created in the storage system is displayed. <div style="background-color: #fff9c4; padding: 10px; border: 1px solid #ccc;"> <p>Caution</p> <ul style="list-style-type: none"> The LUNs that can be referenced from the host are determined by the "LUN Addressing" settings and the "LUN Expand Mode (Peripheral Device Addressing)" settings for the host response. When a host that has the host affinity setting is added to a new host group, check the LUN set state. If a LUN that is LUN#256 onward is used for the host, the relevant host cannot be added to a host group with "256 LUN" for the host response. Refer to "Host Response and Referable Number of LUNs" for details. </div>	Default Solaris MPxIO HP-UX AIX AIX VxVM VS850/SVC BS2000 Host responses registered in the storage system
Number of Hosts	The number of member hosts in the host group is displayed. The number of member hosts is determined by the total number of hosts selected from the host list and the manually specified hosts. For the ETERNUS DX900 S5 or the ETERNUS DX8900 S4 0 - 64 For the other models 0 - 8	

Host Response and Referable Number of LUNs (Available: ✓)

Item		Recommended Patterns of Host Responses							Example of host responses in the storage system		
		Default	Solaris MPxIO	HP-UX	AIX	AIX VxVM	VS850/SVC	BS2000	HR1	HR2	HR3
Host Response	LUN Addressing (*1)	PRHL	PRHL	FLAT	FLAT	FLAT	PRHL	PRHL	PRHL	PRHL	FLAT
	LUN Expand Mode (Peripheral Device Addressing) (*2)	Disabled (Default)	Disabled (Default)	Disabled (Default)	Disabled (Default)	Disabled (Default)	Disabled (Default)	Enabled	Disabled (Default)	Enabled	Disabled (Default)
Referable number of LUNs		256 LUNs	256 LUNs	4096 LUNs	4096 LUNs	4096 LUNs	256 LUNs	4096 LUNs	256 LUNs	4096 LUNs	4096 LUNs

6. Connectivity
Host Group

Item		Recommended Patterns of Host Responses							Example of host responses in the storage system		
		Default	Solaris MPxIO	HP-UX	AIX	AIX VxVM	VS850/S VC	BS2000	HR1	HR2	HR3
LUN settings for LUN groups with host affinity settings	LUN#0 - LUN#255	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	LUN#0 - LUN#4095			✓	✓	✓		✓		✓	✓

- *1 : "PRHL" indicates "Peripheral device addressing (Default)" and "FLAT" indicates "Flat space addressing".
- *2 : Some restrictions are applied for environments to use "LUN Expand Mode (Peripheral Device Addressing)". Refer to "Setting the Host Responses" in "Configuration Guide -Server Connection-" (*3) for details.
- *3 : Configuration Guide -Server Connection- Fibre Channel/ ETERNUS AF series, ETERNUS DX200F All-Flash Arrays, ETERNUS DX S5/S4/S3 series Hybrid Storage Systems Settings

Caution

- If the referable number of LUN is "256 LUN", 256 LUNs (LUN#0 - LUN#255) can be referenced (LUN#256 - LUN#4095 cannot be referenced).
- If the referable number of LUN is "4096 LUN", 4096 LUNs (LUN#0 - LUN#4095) can be referenced.

The following two methods are available to register a host.

- ["Selecting the Registration Target Host from the List" \(page 643\)](#)
- ["Manually Specifying the Registration Target Host" \(page 645\)](#)

Selecting the Registration Target Host from the List

This screen is displayed when the [Now Connected] tab is clicked. Select an FC host to be registered in a host group from the host list. After registration, the FC host is named automatically. Refer to ["Naming Conventions for Adding Hosts" \(page 645\)](#) for details.

Item	Description
Checkbox to select a host	<p>Select the FC host checkbox to be registered in a host group.</p> <div style="background-color: #fff9c4; padding: 10px; margin-top: 10px;"> <p>Caution</p> <ul style="list-style-type: none"> • If the total for the number of hosts selected from the host list and the manually specified hosts exceeds the maximum number of hosts, FC hosts cannot be registered. </div> <div style="background-color: #e0e0e0; padding: 10px; margin-top: 10px;"> <p>Note</p> <ul style="list-style-type: none"> • FC hosts whose port mode is "CA" or "CA/RA", and satisfy any of the following conditions are displayed in the host list. <ul style="list-style-type: none"> - FC hosts that are connected to the FC port, but not registered in any host group - FC hosts that are connected to the FC port and already registered in other host groups - FC hosts that are not connected to the FC port, but already registered in other host groups • FC hosts that are set for the host affinity of which the Virtual Volume function is enabled are not displayed. </div>
WWN	The FC host WWN is displayed.

6. Connectivity

Host Group

Item	Description
Ports	The CA port, which is connected to the FC host, is displayed. For the ETERNUS DX900 S5 or the ETERNUS DX8900 S4 CE#x CM#y CA#z Port#w For the other models CM#y CA#z Port#w x: CE number y: CM number z: CA number w: Port number
Name	If the FC host has already been registered in the storage system, the FC host name is displayed. If a connected FC host is not registered in the storage system, the field is blank.
Host Group	The name of the host group to which the FC host belongs is displayed. When an FC host is registered by a method other than Web GUI (e.g. CLI), a "-" (hyphen) is displayed. If a connected FC host is not registered in the storage system, the field is blank.
Host Response	For the FC host that has already been registered in the storage system, the currently assigned host response is displayed. If a connected FC host is not registered in the storage system, the field is blank. Default Solaris MPxIO HP-UX AIX AIX VxVM VS850/SVC BS2000 Host responses registered in the storage system

■ Filter Setting

Function Description

Filter setting is a function used to display a list of only the FC hosts meeting all the specified conditions. No filtering is set by default. The following table shows conditions that can be specified.

Item	Description	Setting values
WWN	Input the WWN for the FC host that is to be displayed. FC hosts matching or partially matching the entered WWN are displayed. When not using the WWN for filtering, leave this item blank.	WWN Blank
Host Group	Input the host group name of the FC host that is to be displayed. FC hosts which belong to any host groups matching or partially matching the entered name are displayed. When not using the host group name for filtering, leave this item blank.	Host group name Blank

6. Connectivity

Host Group

Item	Description	Setting values
Host Response	Select the host response of the FC host that is to be displayed. Any FC hosts that are allocated to the selected host response are displayed. When not using the host response for filtering, select "All".	All Default Solaris MPxIO HP-UX AIX AIX VxVM VS850/SVC BS2000 Host responses registered in the storage system

Manually Specifying the Registration Target Host

This screen is displayed when the [Manual Input] tab is clicked.
To register a new host that is not connected to the FC port, directly enter the WWN of the FC host. After registration, the host is named automatically. Refer to ["Naming Conventions for Adding Hosts" \(page 645\)](#) for details.

Item	Description	Setting values
WWN	Input the WWN for the FC host.	Hexadecimal numbers (0 - 9, A - F, a - f) 16 digits (using "F (f)" or "0" in entire 16 digits is not allowed)

Function Button

Button	Description
[Rediscover]	Reacquire the FC hosts that are connected to the FC port or the ones already registered in the storage system. The [Rediscover] button is displayed in the [Now Connected] screen. Clicking the [Rediscover] button updates the FC host list.
[Add]	Adds a FC host to a host group by manual entry. The [Add] button is displayed in the [Manual Input] screen. If the maximum number of hosts has already been registered, the [Add] button cannot be clicked.
[Delete]	Deletes a FC host from the target host group. The [Delete] button is displayed in the [Manual Input] screen. If no FC host has been added, the [Delete] button is not displayed.

Naming Conventions for Adding Hosts

- A name is automatically added to a host with the "host group name" and a suffix number "_x" (serial numbers starting with "0").
(Example) Host group: HOST_Group_001 (14 characters)→ Host name: HOST_Group_001_0, HOST_Group_001_1, etc.
- When the host name including the suffix number "_x" has more than 16 characters, the excess number of characters is deleted from the "host group name", starting with the last character and a suffix number "~x" will be added. Then, the name will contain only 16 characters.
(Example) Host group: HOST_Group_ABCDE (16 characters)→ Host name: HOST_Group_ABC~0, HOST_Group_ABC~1, etc.
- When a host name including the suffix number already exists, the suffix number is increased by one (+1). The suffix number is increased by one (+1) until no host names overlap.
- The hosts, which were selected on the [Now Connected] screen, are named, and then the hosts, which were specified on the [Manual Input] screen, are named next.

- The name of the existing member host will not be changed.

Example of Changing the Host Response When Adding a Host

When a new host group "Host_G3" (host response: HR_1) is created and "Host-3" and "Host-4" are added

- Configuration before the host is added

Host group (Host response)	Member host	Host response that is allocated to the host
Host_G1 (Default)	Host-1	Default
	Host-2	Default
Host_G2 (Default)	Host-2	Default
	Host-3	Default

- Configuration after the host is added
The same host response is applied to Host_G1, Host_G2, and Host_G3.

Host group (Host response)	Member host	Host response that is allocated to the host
Host_G1 (HR_1)	Host-1	HR_1
	Host-2	HR_1
Host_G2 (HR_1)	Host-2	HR_1
	Host-3	HR_1
Host_G3 (HR_1)	Host-3	HR_1
	Host-4	HR_1

- Details
The details on how the host response that is applied to the host is changed are as follows.

Procedure ▶▶▶

- 1 The host response for Host-3 is changed from "Default" to "HR_1" (the host response for Host_G3).
- 2 Since the host response for Host-3 is changed, the host response for Host_G2 to which Host-3 belongs is also changed from "Default" to "HR_1". (The host response for Host_2, which is the member host of Host_G2, is changed from "Default" to "HR_1".)
- 3 Since the host response for Host-2 is changed, the host response for Host_G1 to which Host-2 belongs is also changed from "Default" to "HR_1". (The host response for Host_1, which is the member host of Host_G1, is changed from "Default" to "HR_1".)



■ **Operating Procedures**

In this screen, create a FC host group and registers the host to be a member.

Procedure ▶▶▶

- 1 Click [Add FC Host Group] in [Action].

2 Enter a host group name to be created, and select a host response to be assigned to the host group.

3 Add a host in the host group in the following procedures.

- Selecting the registration target host from the list

(1) Click the [Now Connected] tab.

(2) Select a host that is to be registered from the FC host list, and click the [Add] button.
→ A confirmation screen appears.

Caution

- If the WWN is not displayed when clicking the [Rediscover] button, make sure that there is no error in the connection environment, such as the connection between the host and the switch, and the CA port settings of the storage system. If there is no error in the connection environment, contact the Support Department, or specify the WWN manually.
- An error screen appears in the following conditions:
 - The "Host Group Name" is not entered
 - The "Host Group Name" does not satisfy the input conditions
 - The "Host Group Name" overlaps with an existing host group name (Host group names cannot overlap with any other host group names, irrespective of the interface types.)
 - No hosts are registered in the host group
 - The total number of host groups has exceeded the maximum number for the storage system
 - The total number of hosts has exceeded the maximum number for the storage system
 - A host that has a LUN that cannot be referenced is added

- Manually specifying the registration target host

(1) Click the [Manual Input] tab.

(2) Click the [Add] button.
→ The [Add FC Host] screen appears.

(3) Manually specify the WWN of the host to be registered, and click the [OK] button.
→ Returns to the [Manual Input] screen.

Caution

- An error screen appears in the following conditions:
 - The "WWN" is not entered
 - The "WWN" does not satisfy the input conditions

(4) Repeat Step b and c when registering multiple WWNs.

(5) After registering the host is complete, click the [Add] button.
→ A confirmation screen appears.

Caution

- An error screen appears in the following conditions:
 - The "Host Group Name" is not entered
 - The "Host Group Name" does not satisfy the input conditions
 - The "Host Group Name" overlaps with an existing host group name (Host group names cannot overlap with any other host group names, irrespective of the interface types.)
 - The multiple FC hosts with the same WWNs have been registered
 - No hosts are registered in the host group
 - The total number of host groups has exceeded the maximum number for the storage system
 - The total number of hosts has exceeded the maximum number for the storage system
 - A host that has a LUN that cannot be referenced is added

- 4 Click the [OK] button.
→ Registration of the FC host group starts.
- 5 Click the [Done] button to return to the [Host Group] screen.

Note

- Click the [Continue] button to continue registering FC host groups.



Add FC Host

- ["■ Overview" \(page 648\)](#)
- ["■ User Privileges" \(page 649\)](#)
- ["■ Settings" \(page 649\)](#)
- ["■ Filter Setting" \(page 651\)](#)
- ["■ Operating Procedures" \(page 652\)](#)

■ Overview

This function registers a new FC host (HBA).

The following list shows the maximum number of hosts (*1) that can be registered for each storage system model.

- ETERNUS DX60 S5: 128
- ETERNUS DX100 S5/DX200 S5: 1024
- ETERNUS DX500 S5/DX600 S5: 4096
- ETERNUS DX8100 S4: 1024
- ETERNUS DX900 S5 or ETERNUS DX8900 S4: 8192
- ETERNUS AF150 S3/AF250 S3: 1024
- ETERNUS AF650 S3: 4096

*1: Total of all hosts, regardless of the interface type.

Caution

- This action item is only displayed when the "Use "Add Host"" checkbox is selected for the "Function to Add Host" field in "Web GUI Settings". This checkbox is not selected (this function is not displayed) by default. Refer to the [Setup Subsystem Parameters] function for details.
- Note that this function does not create a host group. The storage system also has a function that creates new host groups to register hosts as their members. Refer to the [Add FC Host Group] function for details.
- Hosts that are registered with this function can belong to host groups. However, only one LUN group can be allocated to a combination of host and port when configuring host affinity.
- Refer to "Configuration Guide -Server Connection-" for each OS type to assign an appropriate host response to the host that is to be registered. A host response has a recommended pattern which has been prepared for each OS type. Refer to ""Recommended Patterns of Host Responses" (page 798)" for details. If an appropriate host response is not configured to the host, the path may not be switched correctly or the volume may not be recognized correctly.

Note

- To change the FC host information, use the [Modify FC Host] function.
- The host affinity setting can be specified for each FC host. Refer to the [Create Host Affinity] function for details.

■ **User Privileges**

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	✓
StorageAdmin	✓
AccountAdmin	
SecurityAdmin	
Maintainer	✓

Refer to ""A. User Roles and Policies" (page 1580)" for details on the policies and roles.

■ **Settings**

Host Setting

In this screen, register the FC hosts.

6. Connectivity
Host Group

Item	Description
Number of Hosts	<p>The number of hosts that are to be registered is displayed.</p> <p>The number of hosts to be registered is determined by the total for the number of hosts selected from the host list and the number of manually specified hosts.</p> <p>For the ETERNUS DX60 S5 0 - 128</p> <p>For the ETERNUS DX100 S5/DX200 S5 0 - 1024</p> <p>For the ETERNUS DX500 S5/DX600 S5 0 - 4096</p> <p>For the ETERNUS DX8100 S4 0 - 1024</p> <p>For the ETERNUS DX900 S5 or the ETERNUS DX8900 S4 0 - 8192</p> <p>For the ETERNUS AF150 S3/AF250 S3 0 - 1024</p> <p>For the ETERNUS AF650 S3 0 - 4096</p>

The following two methods are available to register a host.

- ["Selecting the Registration Target Host from the List" \(page 650\)](#)
- ["Manually Specifying the Registration Target Host" \(page 651\)](#)

Selecting the Registration Target Host from the List

This screen is displayed when the [Now Connected] tab is clicked. Select the hosts that are to be registered in the storage system and specify the FC host information.

Item	Description	Setting values
Checkbox to select a host	<p>Select the checkbox of the FC host that is to be registered in the storage system. The host name and host response can only be specified for the selected FC host.</p> <div style="background-color: #fff9c4; padding: 5px; margin: 5px 0;"> <p>Caution</p> <ul style="list-style-type: none"> • If the total for the number of hosts selected from the host list and the manually specified hosts exceeds the maximum number of hosts, FC hosts cannot be registered. </div> <div style="background-color: #e0e0e0; padding: 5px; margin: 5px 0;"> <p>Note</p> <ul style="list-style-type: none"> • In the host list, the FC hosts that are connected to the FC-CA port or the FC-CA/RA port and are not registered in the storage system are displayed. • The "Name" and "Host Response" can only be specified for the FC hosts that are selected by checkboxes. </div>	
Name	<p>Input the name of the FC host.</p> <p>An existing host name cannot be specified.</p>	Up to 16 alphanumeric characters, symbols (except ",", (comma) and "?"), and spaces
WWN	The FC host WWN is displayed.	WWN

6. Connectivity

Host Group

Item	Description	Setting values
Host Response	Select a host response to be assigned to an FC host. A list of host responses that are created in the storage system is displayed.	Default Solaris MPxIO HP-UX AIX AIX VxVM VS850/SVC BS2000 Host responses registered in the storage system
Ports	The location information of the CA port, which is connected to the FC host, is displayed. For the ETERNUS DX900 S5 or the ETERNUS DX8900 S4 CE#x CM#y CA#z Port#w For the other models CM#y CA#z Port#w x: CE number y: CM number z: CA number w: Port number	

■ Filter Setting

Function Description

Filter setting is a function used to display a list of only the FC hosts meeting all the specified conditions. No filtering is set by default. The following table shows conditions that can be specified.

Item	Description	Setting values
WWN	Input the WWN for the FC host that is to be displayed. FC hosts matching or partially matching the entered WWN are displayed. When not using the WWN for filtering, leave this item blank.	WWN Blank

Manually Specifying the Registration Target Host

This screen is displayed when the [Manual Input] tab is clicked. To register a new FC host that is not connected to the FC-CA port or the FC-CA/RA port, directly enter the FC host information.

[Add FC Host] Screen

Item	Description	Setting values
Name	Input the name of the FC host. An existing host name cannot be specified.	Up to 16 alphanumeric characters, symbols (except ",", (comma) and "?"), and spaces
WWN	Input the WWN for the FC host.	Hexadecimal numbers (0 - 9, A - F, a - f) 16 digits (using "F (f)" or "0" in entire 16 digits is not allowed)

Item	Description	Setting values
Host Response	Select a host response to be assigned to an FC host. A list of host responses that are created in the storage system is displayed.	Default Solaris MPxIO HP-UX AIX AIX VxVM VS850/SVC BS2000 Host responses registered in the storage system

Function Button

Button	Description
[Rediscover]	Reacquire the FC hosts that are connected to the FC-CA port or the FC-CA/RA port. The [Rediscover] button is displayed in the [Now Connected] screen. Clicking the [Rediscover] button updates the FC host list. The [Rediscover] button clears the checkboxes for the selected FC hosts. Note that any FC host information that is specified in the [Manual Input] screen is retained.
[Add]	Adds FC host information by manual entry. The [Add] button is displayed in the [Manual Input] screen. If the maximum number of hosts has already been registered, the [Add] button cannot be clicked.
[Delete]	Deletes the selected FC host information. The [Delete] button is displayed in the [Manual Input] screen. If no FC host has been added, the [Delete] button is not displayed.

■ Operating Procedures

In this screen, register the FC hosts in the storage system.

Procedure ▶▶▶

- 1 Click [Add FC Host] in [Action].
- 2 Add a host in the storage system in the following procedures.
 - Selecting the registration target host from the list
 - (1) Click the [Now Connected] tab.
 - (2) Select the host that is to be registered from the FC host list, input the FC host information, and click the [Add] button.
→ A confirmation screen appears.

Caution

- If the WWN is not displayed when clicking the [Rediscover] button, make sure that there is no error in the connection environment, such as the connection between the host and the switch, and the CA port settings of the storage system. If there is no error in the connection environment, contact the Support Department, or specify the WWN manually.
- An error screen appears in the following conditions:
 - The "Name" is not entered
 - The "Name" does not satisfy the input conditions
 - The "Name" is already used for the registration target host or the same "Name" is already used in the storage system
 - The number of hosts that are to be registered is "0"
 - The number of registered hosts has exceeded the maximum number for the storage system

- Manually specifying the registration target host

(1) Click the [Manual Input] tab.

(2) Click the [Add] button.

→ The [Add FC Host] screen appears.

(3) Specify the host information of the FC host that is to be registered, and click the [OK] button.

→ Returns to the [Manual Input] screen.

Caution

- An error screen appears in the following conditions:
 - The "Name" is not entered
 - The "Name" does not satisfy the input conditions
 - The "Name" is already being used by the registration target host
 - The "WWN" is not entered
 - The "WWN" does not satisfy the input conditions
 - The "WWN" is already being used by the registration target host

(4) Repeat Step b and c when registering multiple FC hosts.

(5) After registering the FC host is complete, click the [Add] button.

→ A confirmation screen appears.

Caution

- An error screen appears in the following conditions:
 - The same "Name" has already been registered in the storage system
 - The same "WWN" has already been registered in the storage system
 - The number of hosts that are to be registered is "0"
 - The number of registered hosts has exceeded the maximum number for the storage system

3 Click the [OK] button.

→ Registration of the FC host starts.

4 Click the [Done] button to return to the screen when starting this function in Step 1.

Note

- Click the [Continue] button to continue registering FC hosts.



Delete FC Host

- "[Overview](#)" (page 654)
- "[User Privileges](#)" (page 654)
- "[Operating Procedures](#)" (page 654)

■ Overview

In this screen, delete the FC hosts.

When an FC host belongs to a host group, the FC host can be deleted, irrespective of its host affinity settings.

Caution

- It is not possible to delete all hosts from a host group.

Note

- When a host in the host group where the host affinity settings are already configured is deleted, the LUN mapping is released from the deleted host.

■ User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	✓
StorageAdmin	✓
AccountAdmin	
SecurityAdmin	
Maintainer	✓

Refer to "[A. User Roles and Policies](#)" (page 1580) for details on the policies and roles.

■ Operating Procedures

In this screen, delete the FC hosts.

Procedure ▶▶▶

- 1 Select the FC host that is to be deleted (multiple selections can be made) and click [Delete FC Host] in [Action].
→ A confirmation screen appears.

Caution

- [Delete FC Host] cannot be clicked if all of the following conditions are satisfied.
 - FC hosts do not belong to a host group
 - Host affinity is set for the FC host

- 2 Click the [OK] button.
→ Deletion of the FC host starts.
- 3 Click the [Done] button to return to the [FC Host] screen.



Modify FC Host

- "[■ Overview](#)" (page 655)
- "[■ User Privileges](#)" (page 655)
- "[■ Settings](#)" (page 656)
- "[■ Operating Procedures](#)" (page 656)

■ Overview

This function changes the FC host information. The following host information can be changed.

- Name
- WWN
- Host response allocation (only for FC hosts that are not registered in a host group)

Caution

- When no FC hosts are registered, this function cannot be used.
- When changing the WWN or the host response of an FC host that is currently being used, make sure to stop access to that FC host. The server must be rebooted after the host response is changed.

Note

- When the FC host is registered in a host group, use the [Modify Host Group] function to change the host response. Refer to the [Modify Host Group (FC)] function for details.

■ User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	✓
StorageAdmin	✓
AccountAdmin	
SecurityAdmin	
Maintainer	✓

Refer to "["A. User Roles and Policies" \(page 1580\)](#)" for details on the policies and roles.

■ Settings

FC Host Setting

In this screen, change the FC host information.

Item	Description	Setting values
Name	Specify a new FC host name. An existing host name cannot be used. (Host names cannot overlap with any other host names, irrespective of the interface types.)	Up to 16 alphanumeric characters, symbols (except ",", (comma) and "?"), and spaces
WWN	Specify a new WWN. The registered WWN cannot be used.	Hexadecimal numbers (0 - 9, A - F, a - f) 16 digits (using "F (f)" or "0" in entire 16 digits is not allowed)
Host Response	Select a new host response that is to be assigned to the FC host. A list of host responses that are created in the storage system is displayed. This item is available only when an FC host is not registered in the host group. <div style="background-color: #fff9c4; padding: 5px;"> <p>Caution</p> <ul style="list-style-type: none"> • Before changing a host response, check the LUN set state. If LUNs that are LUN#256 or higher are used, the referable LUN setting cannot be changed to a "256 LUN" host response. Refer to "Host Response and Referable Number of LUNs" for details. </div>	Default Solaris MPxIO HP-UX AIX AIX VxVM VS850/SVC BS2000 Host responses registered in the storage system

■ Operating Procedures

In this screen, change the FC host information.

Procedure ▶▶▶

- 1 Select the FC host to change the host information for, and click [Modify FC Host] in [Action].
- 2 Input new host information and click the [Modify] button.
→ A confirmation screen appears.

Caution

- An error screen appears in the following conditions:
 - The "Name" is not entered
 - The "Name" does not satisfy the input conditions
 - The "Name" already exists
 - The "WWN" is not entered
 - The "WWN" does not satisfy the input conditions
 - The same "WWN" is already registered in the storage system
 - There are some LUNs that cannot be referenced from the FC host because the "Host Response" setting has been changed (only for FC hosts that are not registered in a host group)

- 3 Click the [OK] button.
→ Changing of the FC host information starts.

4 Click the [Done] button to return to the [FC Host] screen.



iSCSI Host

- "■ Overview" (page 657)
- "■ User Privileges" (page 657)
- "■ Display Contents" (page 657)
- "■ Filter Setting" (page 659)

■ Overview

This function displays the registered iSCSI hosts in the storage system.

■ User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	✓
Admin	✓
StorageAdmin	✓
AccountAdmin	
SecurityAdmin	✓
Maintainer	✓

Refer to "A. User Roles and Policies" (page 1580) for details on the policies and roles.

■ Display Contents

The screenshot shows the 'iSCSI Host' management page. On the left is a 'Category' tree with 'Connectivity' expanded to 'Host Group' and 'iSCSI' selected. The main area displays a table of 10 registered iSCSI hosts. Above the table is a 'Filter setting' section with fields for Name, Host Group, CA Port Group, CA Port, Host Response, Status, IP Version, and IP Address. The table has columns for No., Name, iSCSI Name, Host Group, CA Port Group, and CA Port. The right sidebar shows an 'Action' menu with options: Add iSCSI Host Group, Add iSCSI Host, Delete iSCSI Host, and Modify iSCSI Host.

No.	Name	iSCSI Name	Host Group	CA Port Group	CA Port
0	ISCSI-HOST_000	iqn.2000-09.com.fujitsu.storage-system.d41.0000000000000000	HostGroup_0001		CM#0 CA#1 Port# Show...
1	ISCSI-HOST_001	iqn.2000-09.com.fujitsu.storage-system.d41.0000000000000001	HostGroup_0004		CM#0
2	ISCSI-HOST_002	iqn.2000-09.com.fujitsu.storage-system.d41.0000000000000002	HostGroup_0007		CM#0
3	ISCSI-HOST_003	iqn.2000-09.com.fujitsu.storage-system.d41.0000000000000003	HostGroup_0001		CM#0
4	ISCSI-HOST_004	iqn.2000-09.com.fujitsu.storage-system.d41.0000000000000004	-	-	-
5	ISCSI-HOST_005	iqn.2000-09.com.fujitsu.storage-system.d41.0000000000000005	-	-	-
6	ISCSI-HOST_006	iqn.2000-09.com.fujitsu.storage-system.d41.0000000000000006	-	-	-
7	ISCSI-HOST_007	iqn.2000-09.com.fujitsu.storage-system.d41.0000000000000007	-	-	-
8	ISCSI-HOST_008	iqn.2000-09.com.fujitsu.storage-system.d41.0000000000000008	-	-	-
9	ISCSI-HOST_009	iqn.2000-09.com.fujitsu.storage-system.d41.0000000000000009	-	-	-

Registered iSCSI Host List

The registered iSCSI hosts in the storage system are displayed.

6. Connectivity

Host Group

Item	Description
No.	The iSCSI host number is displayed.
Name	The iSCSI host name is displayed.
iSCSI Name	The iSCSI name of the iSCSI host is displayed.
Host Group	The name of the host group to which the iSCSI host belongs is displayed. If the iSCSI host does not belong to a host group, a "-" (hyphen) is displayed.
CA Port Group	The name of the CA port group that has the host affinity setting with the iSCSI host is displayed. If no CA port group with the host affinity setting exists, a "-" (hyphen) is displayed.
CA Port	The location information of the CA port that has the host affinity setting with the iSCSI host is displayed. If no CA port with the host affinity setting exists, a "-" (hyphen) is displayed. For the ETERNUS DX900 S5 or the ETERNUS DX8900 S4 CE#x CM#y CA#z Port#w For the other models CM#y CA#z Port#w x: CE number y: CM number z: CA number w: Port number
Host Response	The host response that is assigned to the iSCSI host or to the host group of the iSCSI host is displayed. Default Solaris MPxIO HP-UX AIX AIX VxVM VS850/SVC BS2000 Host responses registered in the storage system
Status	Whether the iSCSI host is used "Active" or not used "Inactive" for the host affinity setting is displayed. <ul style="list-style-type: none"> • Active The iSCSI host is used for the host affinity setting. • Inactive The iSCSI host is not used for the host affinity setting.
IP Version	The IP version when the IP address was registered for the iSCSI host is displayed. IPv4 IPv6
IP Address	The IP address of the iSCSI host is displayed. Note that the IPv6 address is displayed as an abbreviation. If the IP address is not specified, the field is blank. For IPv4 address xxx.xxx.xxx.xxx xxx: 0 - 255 (decimal) For IPv6 address xxxx:xxxx:xxxx:xxxx:xxxx:xxxx:xxxx:xxxx xxxx: 0 - ffff (hexadecimal, "a" - "f" are lowercase letters) Refer to "IPv6 Address Notation" (page 659) for details. Blank
Alias Name	The iSCSI host Alias name is displayed. If the Alias name is not specified, the field is blank.
CHAP User ID	The CHAP user name of the iSCSI host is displayed. If the CHAP user ID is not specified, the field is blank.

IPv6 Address Notation

Since the IPv6 address is 128-bit and extremely long, this address is displayed using "xxxx", which describes 16-bit in hexadecimals as being one block that is separated by colons (":").

xxxx:xxxx:xxxx:xxxx:xxxx:xxxx:xxxx:xxxx

- The current setting is displayed with 0 - ffff (hexadecimal, "a" - "f" are lowercase letters)
- Up to 128-bit
- The first 64-bit (prefix) of the link local address is fixed to "fe80::"

The following three abbreviation methods are available for IPv6 addresses:

(1) Omission of the first "0" of a block that follows consecutive zeros.

[Example] 2001:1000:0120:0000:0000:0123:0000:0000

↓

2001:1000:120:0000:0000:123:0000:0000

(2) Replacement of "0000" blocks with "0".

[Example] 2001:1000:120:0000:0000:123:0000:0000

↓

2001:1000:120:0:0:123:0:0

(3) Replacement of a block with consecutive zeros by "::" is performed only once.

[Example] 2001:1000:120:0:0:123:0:0

↓

2001:1000:120::123:0:0 is OK

2001:1000:120::123:: is not allowed (Replacement of a block with consecutive zeros by "::" is allowed only once.)

■ Filter Setting

Function Description

Filter setting is a function used to display a list of only the iSCSI hosts meeting all the specified conditions.

No filtering is set by default. The following table shows conditions that can be specified.

Item	Description	Setting values
Name	Input the name for the iSCSI host that is to be displayed. iSCSI hosts matching or partially matching the entered name are displayed. When not using the name for filtering, leave this item blank.	Blank iSCSI host name
iSCSI Name	Input the iSCSI name of the iSCSI host that is to be displayed. iSCSI hosts matching or partially matching the entered iSCSI name are displayed. When not using the iSCSI name for filtering, leave this item blank.	Blank iSCSI name
Host Group	Input the name of the host group to which the iSCSI host that is to be displayed belongs. iSCSI hosts matching or partially matching the entered host group name are displayed. When not using the host group for filtering, leave this item blank.	Blank Host group name
CA Port Group	Input the name of the CA port group that has the host affinity setting with the iSCSI host that is to be displayed. iSCSI hosts matching or partially matching the entered CA port group name are displayed. When not using the CA port group for filtering, leave this item blank.	Blank CA port group name

6. Connectivity

Host Group

Item	Description	Setting values
CA Port	Select the CA port that has the host affinity setting with the iSCSI host that is to be displayed.	All For the ETERNUS DX900 S5 or the ETERNUS DX8900 S4 CE#x CM#y CA#z Port#w For the other models CM#y CA#z Port#w x: CE number y: CM number z: CA number w: Port number
Host Response	Select the name of the host response that is assigned to the iSCSI host that is to be displayed.	All Default Solaris MPxIO HP-UX AIX AIX VxVM VS850/SVC BS2000 Host responses registered in the storage system
Status	Select the set state of the host affinity for the iSCSI host that is to be displayed.	All Active Inactive
IP Version	Select the IP version for the iSCSI host that is to be displayed.	All IPv4 IPv6
IP Address	Input the IP address for the iSCSI host that is to be displayed. The iSCSI hosts that matching the beginning of the entered IP address are displayed. When not using the IP address for filtering, leave this item blank.	Blank IPv4 address IPv6 address
Alias Name	Input the Alias name of the iSCSI host that is to be displayed. iSCSI hosts matching or partially matching the entered Alias name are displayed. When not using the Alias name for filtering, leave this item blank.	Blank Alias name

Add iSCSI Host Group

- ["■ Overview" \(page 660\)](#)
- ["■ User Privileges" \(page 662\)](#)
- ["■ Settings" \(page 662\)](#)
- ["■ Filter Setting" \(page 666\)](#)
- ["■ Operating Procedures" \(page 667\)](#)

■ Overview

This function creates a new iSCSI host group and registers which hosts are members of this group. A host group is a group of hosts (HBAs) that are allowed to access the volume (LUN group). The Host Affinity is specified for each host group.

The Number of Host Groups and Hosts That Can Be Registered

Model	Number of host groups (*1) (per storage system)	Number of hosts (HBAs) (*2) (per storage system)	Number of hosts (HBAs) (per CA port)	Number of hosts (HBAs) (per host group)
ETERNUS DX60 S5	512	128	32	8
ETERNUS DX100 S5		1024		
ETERNUS DX200 S5		4096		
ETERNUS DX500 S5				
ETERNUS DX600 S5		1024		
ETERNUS DX8100 S4	1536	8192	64	
ETERNUS DX900 S5	ETERNUS DX8900 S4			
ETERNUS AF150 S3	512	1024	8	
ETERNUS AF250 S3		4096		
ETERNUS AF650 S3				

*1 : Total of all host groups, regardless of the interface type.

*2 : Total of all hosts, regardless of the interface type.

Caution

- Registration of the host is necessary to create a host group. If this function is used to register a host to the storage system from Web GUI, a new host group is also created.
- A host can be a member of multiple host groups. However, only one LUN group can be allocated to a combination of host and port when configuring host affinity.
- Refer to "Configuration Guide -Server Connection-" for each OS type to assign an appropriate host response to the created host group. A host response has a recommended pattern which has been prepared for each OS type. Refer to "[Recommended Patterns of Host Responses](#)" (page 798)" for details. If an appropriate host response is not configured to the host group, the path may not be switched correctly or the volume may not be recognized correctly.
- The host response that is specified for a host group is applied to all the member hosts in the target group. When a host belongs to multiple host groups, the same host response must be applied for all the groups to which the target host belongs. When a host that already belongs to an existing host group is added to a newly created host group, the host response of the new host group is applied to the host. The host response of the existing host group to which the target host belongs is also changed. Refer to "[Example of Changing the Host Response When Adding a Host](#)" (page 646)" for details.
- Unlike Web GUI, CLI can register two iSCSI hosts that have the same iSCSI name by setting an IP address for one of these iSCSI hosts and by not setting an IP address for the other iSCSI host. However, if iSCSI hosts are registered in the storage system in this way, iSCSI hosts cannot be added using Web GUI. Avoid this configuration when using Web GUI and CLI together. If both iSCSI hosts already exist, use CLI to specify an IP address for the iSCSI host without the IP address.
- When creating the host group that is used for the Non-disruptive Storage Migration function, allocate the same host response as the host group that accesses the migration source volume in the external storage system.

Note

- To perform the following operations, use the [Modify Host Group (iSCSI)] function.
 - Changing the host group settings
 - Adding a host to an existing host group
- To change the iSCSI host information, use the [Modify iSCSI Host] function.

■ **User Privileges**

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	✓
StorageAdmin	✓
AccountAdmin	
SecurityAdmin	
Maintainer	✓

Refer to "[A. User Roles and Policies](#)" (page 1580) for details on the policies and roles.

■ **Settings**

Host Group Setting

Item	Description	Setting values
Host Group Name	Specify the host group name. An existing host group name cannot be used. (Host group names cannot overlap with any other host group names, irrespective of the interface types.)	Up to 16 alphanumeric characters, symbols (except ",", (comma) and "?"), and spaces
Host Response	Select a host response that is to be assigned to a host group. A list of host responses that are created in the storage system is displayed. <div style="background-color: #fff9c4; padding: 5px;"> <p>Caution</p> <ul style="list-style-type: none"> • The LUNs that can be referenced from the host are determined by the "LUN Addressing" settings and the "LUN Expand Mode (Peripheral Device Addressing)" settings for the host response. When a host that has the host affinity setting is added to a new host group, check the LUN set state. If a LUN that is LUN#256 onward is used for the host, the relevant host cannot be added to a host group with "256 LUN" for the host response. Refer to "Host Response and Referable Number of LUNs" for details. </div>	Default Solaris MPxIO HP-UX AIX AIX VxVM VS850/SVC BS2000 Host responses registered in the storage system

6. Connectivity

Host Group

Item	Description	Setting values
Number of Hosts	<p>The number of member hosts in the host group is displayed.</p> <p>The number of member hosts is determined by the total number of hosts selected from the host list and the manually specified hosts.</p> <p>For the ETERNUS DX900 S5 or the ETERNUS DX8900 S4 0 - 64</p> <p>For the other models 0 - 8</p>	

The following two methods are available to register a host.

- ["Selecting the Registration Target Host from the List" \(page 663\)](#)
- ["Manually Specifying the Registration Target Host" \(page 666\)](#)

Selecting the Registration Target Host from the List

This screen is displayed when the [Now Connected] tab is clicked.

Select an iSCSI host to be registered in a host group, and enter the IP address and the Alias name. After registration, the iSCSI host is named automatically. Refer to ["Naming Conventions for Adding Hosts" \(page 645\)](#) for details.

6. Connectivity
Host Group

Item	Description	Setting values
Checkbox to select a host	<p>Select the iSCSI host checkbox to be registered in a host group.</p> <p>Caution</p> <ul style="list-style-type: none"> • If the total for the number of hosts selected from the host list and the manually specified hosts exceeds the maximum number of hosts, iSCSI hosts cannot be registered. • The following items can be specified only for the iSCSI hosts that are selected by checkboxes; "IP Version", "IP Address", "Alias Name", "CHAP User ID", "Change CHAP Password", "CHAP Password", and "Confirm CHAP Password". <p>Note</p> <ul style="list-style-type: none"> • iSCSI hosts whose port mode is "CA" or "CA/RA", and satisfy any of the following conditions are displayed in the host list. <ul style="list-style-type: none"> - iSCSI hosts that are connected to the iSCSI port, but not registered in any host group (*1) - iSCSI hosts that are connected to the iSCSI port and already registered in other host groups - iSCSI hosts that are not connected to the iSCSI port, but already registered in other host groups • *1: A host that is not registered in the storage system indicates that a host with the same parameters (iSCSI name, IP version, and Alias name) as the target host is not registered. However, the host is regarded as unregistered host when a host with the same iSCSI name, IP version, Alias name, but with a different IP address is already registered. The obtained "iSCSI Name", "IP Version", "IP Address", and "Alias Name" are displayed. • iSCSI hosts that are set for the host affinity of which the Virtual Volume function is enabled are not displayed. 	
iSCSI Name	The iSCSI name of the iSCSI host is displayed.	
IP Version	<p>Select the IP version of the iSCSI host.</p> <p>Caution</p> <ul style="list-style-type: none"> • To register an iSCSI host without using an IP address, perform IP version selection as follows: <ul style="list-style-type: none"> - Select "IPv4" when the IP address format of the iSCSI host is IPv4 (when using an IPv4 host). - Select "IPv6" when the IP address format of the iSCSI host is IPv6 (when using an IPv6 host). - If the IP address format of the iSCSI host cannot be checked (when either an IPv4 host or an IPv6 host is used), register two hosts. Select "IPv4" for one host, and select "IPv6" for the other host. Specify the same iSCSI name, CHAP user ID, and CHAP password for each host. 	IPv4 IPv6

6. Connectivity
Host Group

Item	Description	Setting values
IP Address	<p>Specify the IP address of the iSCSI host.</p> <p>There are two methods to specify an IP address; "IPv4" and "IPv6". The IP address must be specified with the selected IP version (IPv4 or IPv6). The following IPv6 addresses can be used; "link local address", "global address", "unique local address", or "6to4 address". Refer to "Available IPv6 Address" (page 1221) for details. When the current setting is displayed, the IPv6 address is displayed as an abbreviation.</p> <p>It is not necessary to specify this item if IP address is not used.</p>	<p>For IPv4 address xxx.xxx.xxx.xxx xxx: 1 - 255 for the top field (decimal) xxx: 0 - 255 for other fields (decimal)</p> <p>For IPv6 address xxxx:xxxx:xxxx:xxxx:xxxx:xxxx:xxxx:xxxx xxxx: 0 - ffff (FFFF) (hexadecimal, alphanumeric characters)</p> <p>Refer to "IPv6 Address Notation" (page 1220) for details.</p> <p>Blank</p>
Name	<p>If the iSCSI host has already been registered in the storage system, the iSCSI host name is displayed.</p> <p>If a connected iSCSI host is not registered in the storage system, the field is blank.</p>	
Alias Name	<p>Specify the Alias name of the iSCSI host.</p> <p>If the iSCSI host has already been registered in the storage system, the Alias name is displayed.</p> <p>It is not necessary to specify this item if Alias name is not used.</p> <p>An existing Alias name cannot be specified.</p>	<p>Up to 31 alphanumeric characters, symbols (except "," (comma) and "?"), and spaces</p> <p>Blank</p>
CHAP User ID	<p>Specify the user ID for the CHAP Authentication.</p> <p>If the iSCSI host has already been registered in the storage system, the user ID is displayed.</p> <p>It is not necessary to specify this item if the CHAP Authentication is not used.</p> <p>Configure a user ID and a password as a pair.</p>	<p>Up to 255 alphanumeric characters, symbols (except "," (comma) and "?"), and spaces</p> <p>Blank</p>
Change CHAP Password	<p>To register the CHAP Authentication password, select the checkbox.</p>	<p>Checkbox</p> <p>Selected</p> <p>Cleared</p>
CHAP Password	<p>Specify the password for the CHAP Authentication.</p> <p>It is not necessary to specify this item if the CHAP Authentication is not used.</p> <p>Configure a user ID and a password as a pair.</p> <p>A new password can only be specified when the "Change CHAP Password" checkbox is selected.</p>	<p>12 - 100 alphanumeric characters, symbols (except "," (comma) and "?"), and spaces</p> <p>Blank</p>
Confirm CHAP Password	<p>Input the CHAP password again for confirmation.</p> <p>A new password can only be specified when the "Change CHAP Password" checkbox is selected.</p>	<p>12 - 100 alphanumeric characters, symbols (except "," (comma) and "?"), and spaces</p> <p>Blank</p>
Ports	<p>The CA port, which is connected to the iSCSI host, is displayed.</p> <p>For the ETERNUS DX900 S5 or the ETERNUS DX8900 S4 CE#x CM#y CA#z Port#w</p> <p>For the other models CM#y CA#z Port#w</p> <p>x: CE number y: CM number z: CA number w: Port number</p>	

6. Connectivity

Host Group

Item	Description	Setting values
Host Group	The name of the host group to which the iSCSI host belongs is displayed. When an iSCSI host is registered by a method other than Web GUI (e.g. CLI), a "-" (hyphen) is displayed. If a connected iSCSI host is not registered in the storage system, the field is blank.	
Host Response	The host response of the iSCSI host is displayed. If a connected iSCSI host is not registered in the storage system, the field is blank. Default Solaris MPxIO HP-UX AIX AIX VxVM VS850/SVC BS2000 Host responses registered in the storage system	

■ Filter Setting

Function Description

Filter setting is a function used to display a list of only the iSCSI hosts meeting all the specified conditions.

No filtering is set by default. The following table shows conditions that can be specified.

Item	Description	Setting values
iSCSI Name	Input the iSCSI name of the iSCSI host that is to be displayed. iSCSI hosts matching or partially matching the entered iSCSI name are displayed. When not using the iSCSI name for filtering, leave this item blank.	iSCSI name Blank
Host Group	Input the host group name of the iSCSI host that is to be displayed. iSCSI hosts which belong to any host groups matching or partially matching the entered name are displayed. When not using the host group name for filtering, leave this item blank.	Host group name Blank
Host Response	Select the host response of the iSCSI host that is to be displayed. Any iSCSI hosts that are allocated to the selected host response are displayed. When not using the host response for filtering, select "All".	All Default Solaris MPxIO HP-UX AIX AIX VxVM VS850/SVC BS2000 Host responses registered in the storage system

Manually Specifying the Registration Target Host

This screen is displayed when the [Manual Input] tab is clicked.

To register a new host that is not connected to the iSCSI port, directly enter the iSCSI host information. After registration, the host is named automatically. Refer to "[Naming Conventions for Adding Hosts](#)" (page 645)" for details.

Item	Description	Setting values
iSCSI Name	Input the iSCSI name of the iSCSI host (required). An iSCSI name that has already been registered in the storage system cannot be used.	4 - 223 alphanumeric characters and symbols "-" (hyphen), "." (period), and ":" (colon) The name starts with "iqn." or "eui."
IP Version	Refer to the description in "Selecting the Registration Target Host from the List" (page 663) for details.	Refer to "Selecting the Registration Target Host from the List" (page 663) for setting values.
IP Address		
Alias Name		
CHAP User ID		
CHAP Password		
Confirm CHAP Password		

Function Button

Button	Description
[Rediscover]	Reacquire the iSCSI hosts that are connected to the iSCSI port or the ones already registered in the storage system. The [Rediscover] button is displayed in the [Now Connected] screen. Click the [Rediscover] button to update the iSCSI host list.
[Add]	Adds an iSCSI host to a host group by manual entry. The [Add] button is displayed in the [Manual Input] screen. If the maximum number of hosts has already been registered, the [Add] button cannot be clicked.
[Delete]	Deletes an iSCSI host from the target host group. The [Delete] button is displayed in the [Manual Input] screen. If no iSCSI host has been added, the [Delete] button is not displayed.

■ Operating Procedures

In this screen, create an iSCSI host group and registers the host that is to be a member.

Procedure ▶▶▶

- 1 Click [Add iSCSI Host Group] in [Action].
- 2 Enter a host group name to be created, and select a host response to be assigned to the host group.
- 3 Add a host in the host group in the following procedures.
 - Selecting the registration target host from the list
 - (1) Click the [Now Connected] tab.
 - (2) Select the host that is to be registered from the iSCSI host list, input the iSCSI host information (such as the IP address and Alias name), and click the [Add] button.
→ A confirmation screen appears.

Caution

- If the iSNS server has not been configured in the [Modify iSCSI Port Parameters] function, the iSCSI host cannot be automatically acquired.

- The following restrictions in the environment that is described below apply for the automatic acquirement of host information (*1) even when the iSNS server is specified.
 - *1 : "iSCSI Name", "IP Version", "IP Address", and "Alias Name"
 - When one of the following OSs is used and there are multiple hosts that have the same iSCSI name but different IP addresses, only the information of one host can be acquired.
 - Windows Server 2012
 - Windows Server 2012 R2
 - Windows Server 2016
 - Windows Server 2019
 - Oracle Solaris 10
 - When the host OS is Oracle Solaris 11, "IP Version" and "IP Address" cannot be acquired.
- If the iSCSI host information is not displayed when clicking the [Rediscover] button, make sure that there is no error in the connection environment, such as the connection between the host and the switch, and the CA port settings of the storage system. If there is no error in the connection environment, contact the Support Department or manually specify the iSCSI host information.
- An error screen appears in the following conditions:
 - The "Host Group Name" is not entered
 - The "Host Group Name" does not satisfy the input conditions
 - The "Host Group Name" overlaps with an existing host group name (Host group names cannot overlap with any other host group names, irrespective of the interface types.)
 - The "IP Address" does not satisfy the input conditions
 - When the "IP Address" is specified and an iSCSI host with the same combination of "iSCSI Name" and "IP Address" is already registered
 - When the "IP Address" is not specified and an iSCSI host with the same combination of "iSCSI Name" and "IP Version" is already registered
 - The "Alias Name" does not satisfy the input conditions
 - The "Alias Name" overlaps the existing Alias name
 - The "CHAP User ID" does not satisfy the input conditions
 - The "CHAP Password" does not satisfy the input conditions
 - The "Confirm CHAP Password" does not satisfy the input conditions
 - The "CHAP Password" and the "Confirm CHAP Password" do not match
 - Either of the "CHAP User ID" or the "CHAP Password" has been specified
 - No hosts are registered in the host group
 - The total number of host groups has exceeded the maximum number for the storage system
 - The total number of hosts has exceeded the maximum number for the storage system
 - A host that has a LUN that cannot be referenced is added

- Manually specifying the registration target host

- (1) Click the [Manual Input] tab.
- (2) Click the [Add] button.
→ The [Add iSCSI Host] screen appears.
- (3) Specify the iSCSI host information of the host to be registered, and click the [OK] button.
→ Returns to the [Manual Input] screen.

Caution

- An error screen appears in the following conditions:
 - The "iSCSI Name" is not entered
 - The "iSCSI Name" does not satisfy the input conditions
 - The "IP Address" does not satisfy the input conditions
 - The "Alias Name" does not satisfy the input conditions
 - The "CHAP User ID" does not satisfy the input conditions
 - The "CHAP Password" does not satisfy the input conditions
 - The "Confirm CHAP Password" does not satisfy the input conditions
 - The "CHAP Password" and the "Confirm CHAP Password" do not match
 - Either of the "CHAP User ID" or the "CHAP Password" has been specified

- (4) Repeat Step b and c when registering multiple iSCSI hosts.
- (5) After registering the host is complete, click the [Add] button.
→ A confirmation screen appears.

Caution

- An error screen appears in the following conditions:
 - The "Host Group Name" is not entered
 - The "Host Group Name" does not satisfy the input conditions
 - The "Host Group Name" overlaps with an existing host group name
(Host group names cannot overlap with any other host group names, irrespective of the interface types.)
 - When the "IP Address" is specified and an iSCSI host with the same combination of "iSCSI Name" and "IP Address" is already registered
 - When the "IP Address" is not specified and an iSCSI host with the same combination of "iSCSI Name" and "IP Version" is already registered
 - The same iSCSI name is specified for multiple iSCSI hosts
 - The "Alias Name" overlaps the existing Alias name
 - No hosts are registered in the host group
 - The total number of host groups has exceeded the maximum number for the storage system
 - The total number of hosts has exceeded the maximum number for the storage system
 - A host that has a LUN that cannot be referenced is added

- 4 Click the [OK] button.
→ Registration of the iSCSI host group starts.

- 5 Click the [Done] button to return to the [Host Group] screen.

Note

- Click the [Continue] button to continue registering iSCSI host groups.

Add iSCSI Host

- ["■ Overview" \(page 670\)](#)
- ["■ User Privileges" \(page 671\)](#)
- ["■ Settings" \(page 671\)](#)
- ["■ Filter Setting" \(page 674\)](#)
- ["■ Operating Procedures" \(page 675\)](#)

■ Overview

This function registers a new iSCSI host (HBA).

The following list shows the maximum number of hosts (*1) that can be registered for each storage system model.

- ETERNUS DX60 S5: 128
- ETERNUS DX100 S5/DX200 S5: 1024
- ETERNUS DX500 S5/DX600 S5: 4096
- ETERNUS DX8100 S4: 1024
- ETERNUS DX900 S5 or ETERNUS DX8900 S4: 8192
- ETERNUS AF150 S3/AF250 S3: 1024
- ETERNUS AF650 S3: 4096

*1: Total of all hosts, regardless of the interface type.

Caution

- This action item is only displayed when the "Use "Add Host"" checkbox is selected for the "Function to Add Host" field in "Web GUI Settings". This checkbox is not selected (this function is not displayed) by default. Refer to the [Setup Subsystem Parameters] function for details.
- Note that this function does not create a host group. The storage system also has a function that creates new host groups to register hosts as their members. Refer to the [Add iSCSI Host Group] function for details.
- Hosts that are registered with this function can belong to host groups. However, only one LUN group can be allocated to a combination of host and port when configuring host affinity.
- Refer to "Configuration Guide -Server Connection-" for each OS type to assign an appropriate host response to the host that is to be registered. A host response has a recommended pattern which has been prepared for each OS type. Refer to ["Recommended Patterns of Host Responses" \(page 798\)](#) for details. If an appropriate host response is not configured to the host, the path may not be switched correctly or the volume may not be recognized correctly.
- Unlike Web GUI, CLI can register two iSCSI hosts that have the same iSCSI name by setting an IP address for one of these iSCSI hosts and by not setting an IP address for the other iSCSI host. However, if iSCSI hosts are registered in the storage system in this way, iSCSI hosts cannot be added using Web GUI. Avoid this configuration when using Web GUI and CLI together. If both iSCSI hosts already exist, use CLI to specify an IP address for the iSCSI host without the IP address.

Note

- To change the iSCSI host information, use the [Modify iSCSI Host] function.
- The host affinity setting can be specified for each iSCSI host. Refer to the [Create Host Affinity] function for details.

User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	✓
StorageAdmin	✓
AccountAdmin	
SecurityAdmin	
Maintainer	✓

Refer to "[A. User Roles and Policies](#)" (page 1580)" for details on the policies and roles.

Settings

Host Setting

In this screen, register the iSCSI hosts.

Item	Description
Number of Hosts	<p>The number of hosts that are to be registered is displayed.</p> <p>The number of hosts to be registered is determined by the total for the number of hosts selected from the host list and the number of manually specified hosts.</p> <p>For the ETERNUS DX60 S5 0 - 128</p> <p>For the ETERNUS DX100 S5/DX200 S5 0 - 1024</p> <p>For the ETERNUS DX500 S5/DX600 S5 0 - 4096</p> <p>For the ETERNUS DX8100 S4 0 - 1024</p> <p>For the ETERNUS DX900 S5 or the ETERNUS DX8900 S4 0 - 8192</p> <p>For the ETERNUS AF150 S3/AF250 S3 0 - 1024</p> <p>For the ETERNUS AF650 S3 0 - 4096</p>

The following two methods are available to register a host.

- "[Selecting the Registration Target Host from the List](#)" (page 672)
- "[Manually Specifying the Registration Target Host](#)" (page 674)

Selecting the Registration Target Host from the List

This screen is displayed when the [Now Connected] tab is clicked. Select the hosts that are to be registered in the storage system and specify the iSCSI host information.

Item	Description	Setting values
Checkbox to select a host	<p>Select the checkbox of the iSCSI host that is to be registered in the storage system.</p> <p>Caution</p> <ul style="list-style-type: none"> If the total for the number of hosts selected from the host list and the manually specified hosts exceeds the maximum number of hosts, iSCSI hosts cannot be registered. <p>Note</p> <ul style="list-style-type: none"> In the host list, the iSCSI hosts that are connected to the iSCSI-CA port or the iSCSI-CA/RA port and are not registered in the storage system are displayed (*1). *1 : A host that is not registered in the storage system indicates that a host with the same parameters (iSCSI name, IP version, and Alias name) as the target host is not registered. However, the host is regarded as an unregistered host when its parameters (iSCSI name, IP version, Alias name) are the same but it has a different IP address. The obtained "iSCSI Name" and "Port" are displayed in the screen. The following items can be specified only for the iSCSI hosts that are selected by checkboxes; "Name", "Host Response", "IP Version", "IP Address", "Alias Name", "CHAP User ID", "CHAP Password", and "Confirm CHAP Password". 	
Name	<p>Specify the iSCSI host name.</p> <p>An existing host name cannot be specified.</p>	Up to 16 alphanumeric characters, symbols (except "," (comma) and "?"), and spaces
iSCSI Name	The iSCSI name of the iSCSI host is displayed.	
Host Response	<p>Select a host response to be assigned to an iSCSI host.</p> <p>A list of host responses that are created in the storage system is displayed.</p>	<p>Default</p> <p>Solaris MPxIO</p> <p>HP-UX</p> <p>AIX</p> <p>AIX VxVM</p> <p>VS850/SVC</p> <p>BS2000</p> <p>Host responses registered in the storage system</p>

6. Connectivity
Host Group

Item	Description	Setting values
IP Version	<p>Select the IP version of the iSCSI host.</p> <p>Caution</p> <ul style="list-style-type: none"> To register an iSCSI host without using an IP address, perform IP version selection as follows: <ul style="list-style-type: none"> Select "IPv4" when the IP address format of the iSCSI host is IPv4 (when using an IPv4 host). Select "IPv6" when the IP address format of the iSCSI host is IPv6 (when using an IPv6 host). If the IP address format of the iSCSI host cannot be checked (when either an IPv4 host or an IPv6 host is used), register two hosts. Select "IPv4" for one host, and select "IPv6" for the other host. Specify the same iSCSI name, CHAP user ID, and CHAP password for each host. 	<p>IPv4</p> <p>IPv6</p>
IP Address	<p>Specify the IP address of the iSCSI host.</p> <p>There are two methods to specify an IP address; "IPv4" and "IPv6". The IP address must be specified with the selected IP version (IPv4 or IPv6). The following IPv6 addresses can be used; "link local address", "global address", "unique local address", or "6to4 address". Refer to "Available IPv6 Address" (page 1221) for details. When the current setting is displayed, the IPv6 address is displayed as an abbreviation.</p> <p>It is not necessary to specify this item if IP address is not used.</p>	<p>For IPv4 address</p> <p>xxx.xxx.xxx.xxx</p> <p>xxx: 1 - 255 for the top field (decimal)</p> <p>xxx: 0 - 255 for other fields (decimal)</p> <p>For IPv6 address</p> <p>xxxx:xxxx:xxxx:xxxx:xxxx:xxxx:xxxx:xxxx</p> <p>xxxx: 0 - ffff (FFFF) (hexadecimal, alphanumeric characters)</p> <p>Refer to "IPv6 Address Notation" (page 1220) for details.</p> <p>Blank</p>
Alias Name	<p>Specify the Alias name of the iSCSI host.</p> <p>It is not necessary to specify this item if Alias name is not used.</p> <p>An existing Alias name cannot be specified.</p>	<p>Up to 31 alphanumeric characters, symbols (except "," (comma) and "?"), and spaces</p> <p>Blank</p>
CHAP User ID	<p>Specify the user ID for the CHAP Authentication.</p> <p>It is not necessary to specify this item if the CHAP Authentication is not used.</p> <p>Configure a user ID and a password as a pair.</p>	<p>Up to 255 alphanumeric characters, symbols (except "," (comma) and "?"), and spaces</p> <p>Blank</p>
CHAP Password	<p>Specify the password for the CHAP Authentication.</p> <p>It is not necessary to specify this item if the CHAP Authentication is not used.</p> <p>Configure a user ID and a password as a pair.</p>	<p>12 - 100 alphanumeric characters, symbols (except "," (comma) and "?"), and spaces</p> <p>Blank</p>
Confirm CHAP Password	<p>Input the CHAP password again for confirmation.</p>	<p>12 - 100 alphanumeric characters, symbols (except "," (comma) and "?"), and spaces</p> <p>Blank</p>

6. Connectivity
Host Group

Item	Description	Setting values
Ports	<p>The location information of the CA port, which is connected to the iSCSI host, is displayed.</p> <p>For the ETERNUS DX900 S5 or the ETERNUS DX8900 S4 CE#x CM#y CA#z Port#w</p> <p>For the other models CM#y CA#z Port#w</p> <p>x: CE number y: CM number z: CA number w: Port number</p>	

■ Filter Setting

Function Description

Filter setting is a function used to display a list of only the iSCSI hosts meeting all the specified conditions.

No filtering is set by default. The following table shows conditions that can be specified.

Item	Description	Setting values
iSCSI Name	<p>Input the iSCSI name of the iSCSI host that is to be displayed.</p> <p>iSCSI hosts matching or partially matching the entered iSCSI name are displayed.</p> <p>When not using the iSCSI name for filtering, leave this item blank.</p>	<p>iSCSI name</p> <p>Blank</p>

Manually Specifying the Registration Target Host

This screen is displayed when the [Manual Input] tab is clicked. To register a new iSCSI host that is not connected to the iSCSI-CA port or the iSCSI-CA/RA port, directly enter the iSCSI host information.

[Add iSCSI Host] Screen

Item	Description	Setting values
Name	Refer to the description in ""Selecting the Registration Target Host from the List" (page 672)" for details.	Refer to ""Selecting the Registration Target Host from the List" (page 672)" for setting values.
iSCSI Name	<p>Input the iSCSI name of the iSCSI host (required).</p> <p>An iSCSI name that has already been registered in the storage system cannot be used.</p>	<p>4 - 223 alphanumeric characters and symbols "-" (hyphen), "." (period), and ":" (colon)</p> <p>The name starts with "iqn." or "eui."</p>
Host Response	Refer to the description in ""Selecting the Registration Target Host from the List" (page 672)" for details.	Refer to ""Selecting the Registration Target Host from the List" (page 672)" for setting values.
IP Version		
IP Address		
Alias Name		
CHAP User ID		
CHAP Password		
Confirm CHAP Password		

Function Button

Button	Description
[Rediscover]	Reacquire the iSCSI hosts that are connected to the iSCSI-CA port or the iSCSI-CA/RA port. The [Rediscover] button is displayed in the [Now Connected] screen. Click the [Rediscover] button to update the iSCSI host list. The [Rediscover] button clears the checkboxes for the selected iSCSI hosts. Note that any iSCSI host information that is specified in the [Manual Input] screen is retained.
[Add]	Adds iSCSI host information by manual entry. The [Add] button is displayed in the [Manual Input] screen. If the maximum number of hosts has already been registered, the [Add] button cannot be clicked.
[Delete]	Deletes the selected iSCSI host information. The [Delete] button is displayed in the [Manual Input] screen. If no iSCSI host has been added, the [Delete] button is not displayed.

■ Operating Procedures

In this screen, register the iSCSI hosts in the storage system.

Procedure ▶▶▶

- 1 Click [Add iSCSI Host] in [Action].
- 2 Add a host in the storage system in the following procedures.
 - Selecting the registration target host from the list
 - (1) Click the [Now Connected] tab.
 - (2) Select the host that is to be registered from the iSCSI host list, input the iSCSI host information, and click the [Add] button.
→ A confirmation screen appears.

Caution

- If the iSNS server has not been configured in the [Modify iSCSI Port Parameters] function, the iSCSI host cannot be automatically acquired.
- The following restrictions in the environment that is described below apply for the automatic acquirement of host information (*1) even when the iSNS server is specified.
 - *1: "iSCSI Name", "IP Version", "IP Address", and "Alias Name"
 - When one of the following OSs is used and there are multiple hosts that have the same iSCSI name but different IP addresses, only the information of one host can be acquired.
 - Windows Server 2012
 - Windows Server 2012 R2
 - Windows Server 2016
 - Windows Server 2019
 - Oracle Solaris 10
 - When the host OS is Oracle Solaris 11, "IP Version" and "IP Address" cannot be acquired.
- An error screen appears in the following conditions:
 - The "Name" is not entered
 - The "Name" does not satisfy the input conditions
 - The "Name" is already used for the registration target host or the same "Name" is already used in the storage system
 - The "IP Address" does not satisfy the input conditions
 - If the "IP Address" is entered, an iSCSI host with the same combination of "iSCSI Name" and "IP Address" is already registered
 - If the "IP Address" is not entered, an iSCSI host with the same combination of "iSCSI Name" and "IP Version" is already registered
 - The "Alias Name" does not satisfy the input conditions
 - The "Alias Name" is already used for the registration target host or the same "Alias Name" is already used in the storage system
 - The "CHAP User ID" does not satisfy the input conditions
 - The "CHAP Password" does not satisfy the input conditions
 - The "CHAP Password" and the "Confirm CHAP Password" do not match
 - Either of the "CHAP User ID" or the "CHAP Password" has been specified
 - The number of hosts that are to be registered is "0"
 - The number of registered hosts has exceeded the maximum number for the storage system

- Manually specifying the registration target host
 - (1) Click the [Manual Input] tab.
 - (2) Click the [Add] button.
 - The [Add iSCSI Host] screen appears.

- (3) Specify the host information of the iSCSI host that is to be registered, and click the [OK] button.
→ Returns to the [Manual Input] screen.

Caution

- An error screen appears in the following conditions:
 - The "Name" is not entered
 - The "Name" does not satisfy the input conditions
 - The "Name" is already used for the registration target host
 - The "iSCSI Name" is not entered
 - The "iSCSI Name" does not satisfy the input conditions
 - The "iSCSI Name" is already used for the registration target host
 - The "IP Address" does not satisfy the input conditions
 - The "Alias Name" does not satisfy the input conditions
 - The "Alias Name" is already used for the registration target host
 - The "CHAP User ID" does not satisfy the input conditions
 - The "CHAP Password" does not satisfy the input conditions
 - The "CHAP Password" and the "Confirm CHAP Password" do not match
 - Either of the "CHAP User ID" or the "CHAP Password" has been specified

- (4) Repeat Step b and c when registering multiple iSCSI hosts.
- (5) After registering the iSCSI host is complete, click the [Add] button.
→ A confirmation screen appears.

Caution

- An error screen appears in the following conditions:
 - The same "Name" has already been registered in the storage system
 - The same "iSCSI Name" has already been registered in the storage system
 - If the "IP Address" is entered, an iSCSI host with the same combination of "iSCSI Name" and "IP Address" is already registered
 - If the "IP Address" is not entered, an iSCSI host with the same combination of "iSCSI Name" and "IP Version" is already registered
 - The same "Alias Name" has already been registered in the storage system
 - The number of hosts that are to be registered is "0"
 - The number of registered hosts has exceeded the maximum number for the storage system

- 3 Click the [OK] button.
→ Registration of the iSCSI host starts.
- 4 Click the [Done] button to return to the screen when starting this function in Step 1.

Note

- Click the [Continue] button to continue registering iSCSI hosts.



Delete iSCSI Host

- ["■ Overview" \(page 678\)](#)
- ["■ User Privileges" \(page 678\)](#)
- ["■ Operating Procedures" \(page 678\)](#)

■ Overview

This function deletes iSCSI hosts.

When an iSCSI host belongs to a host group, the iSCSI host can be deleted, irrespective of its host affinity settings.

Caution

- It is not possible to delete all hosts from a host group.

Note

- When a host in the host group where the host affinity settings are already configured is deleted, the LUN mapping is released from the deleted host.

■ User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	✓
StorageAdmin	✓
AccountAdmin	
SecurityAdmin	
Maintainer	✓

Refer to ["A. User Roles and Policies" \(page 1580\)](#) for details on the policies and roles.

■ Operating Procedures

In this screen, delete the iSCSI hosts.

Procedure ▶▶▶

- 1 Select the iSCSI host to be deleted (multiple selections can be made) and click [Delete iSCSI Host] in [Action].
→ A confirmation screen appears.

Caution

- [Delete iSCSI Host] cannot be clicked if all of the following conditions are satisfied.
 - iSCSI hosts do not belong to a host group
 - Host affinity is set for the iSCSI host

- 2 Click the [OK] button.
→ Deletion of the iSCSI host starts.

- 3 Click the [Done] button to return to the [iSCSI Host] screen.



Modify iSCSI Host

- "[■ Overview](#)" (page 679)
- "[■ User Privileges](#)" (page 679)
- "[■ Settings](#)" (page 680)
- "[■ Operating Procedures](#)" (page 681)

■ Overview

This function changes the iSCSI host information. The following host information can be changed.

- Name
- iSCSI name
- IP version
- IP address
- Alias name
- CHAP User ID
- CHAP Password
- Host response allocation (only for iSCSI hosts that are not registered in a host group)

Caution

- When no iSCSI hosts are registered, this function cannot be used.
- When changing the information or the host response of an iSCSI host that is currently being used, make sure to stop access to that iSCSI host. The server must be rebooted after the host response is changed.

Note

- When the iSCSI host is registered in a host group, use the [Modify Host Group] function to change the host response. Refer to the [Modify Host Group (iSCSI)] function for details.

■ User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	✓
StorageAdmin	✓
AccountAdmin	
SecurityAdmin	
Maintainer	✓

Refer to "[A. User Roles and Policies](#)" (page 1580)" for details on the policies and roles.

■ Settings

iSCSI Host Setting

In this screen, change the iSCSI host information.

Item	Description	Setting values
Name	Specify a new iSCSI host name. An existing host name cannot be used. (Host names cannot overlap with any other host names, irrespective of the interface types.)	Up to 16 alphanumeric characters, symbols (except "," (comma) and "?"), and spaces
iSCSI Name	Specify an iSCSI name of the iSCSI host. An iSCSI name that has already been registered in the storage system cannot be used.	iSCSI Name 4 - 223 alphanumeric characters and symbols "-" (hyphen), "." (period), and ":" (colon) The name starts with "iqn." or "eui."
Host Response	Select a new host response that is to be assigned to the iSCSI host. A list of host responses that are created in the storage system is displayed. This item is available only when an iSCSI host is not registered in the host group. Caution <ul style="list-style-type: none"> Before changing a host response, check the LUN set state. If LUNs that are LUN#256 or higher are used, the referable LUN setting cannot be changed to a "256 LUN" host response. Refer to "Host Response and Referable Number of LUNs" for details. 	Default Solaris MPxIO HP-UX AIX AIX VxVM VS850/SVC BS2000 Host responses registered in the storage system
IP Version	Select the IP version of the iSCSI host.	IPv4 IPv6
IP Address	Specify the IP address of the iSCSI host. There are two methods to specify an IP address; "IPv4" and "IPv6". The IP address must be specified with the selected IP version (IPv4 or IPv6). The following IPv6 addresses can be used; "link local address", "global address", "unique local address", or "6to4 address". Refer to " Available IPv6 Address " (page 1221) for details. When the current setting is displayed, the IPv6 address is displayed as an abbreviation. It is not necessary to specify this item if IP address is not used.	For IPv4 address xxx.xxx.xxx.xxx xxx: 1 - 255 for the top field (decimal) xxx: 0 - 255 for other fields (decimal) For IPv6 address xxxx:xxxx:xxxx:xxxx:xxxx:xxxx:xxxx:xxxx xxxx: 0 - ffff (FFFF) (hexadecimal, alphanumeric characters) Refer to " IPv6 Address Notation " (page 1220) for details.
Alias Name	Specify the Alias name of the iSCSI host. It is not necessary to specify this item if Alias name is not used. An existing Alias name cannot be specified.	Alias name Up to 31 alphanumeric characters, symbols (except "," (comma) and "?"), and spaces
CHAP User ID	Specify the user ID for the CHAP Authentication. It is not necessary to specify this item if the CHAP Authentication is not used. Configure a user ID and a password as a pair.	User ID Up to 255 alphanumeric characters, symbols (except "," (comma) and "?"), and spaces

6. Connectivity

Host Group

Item	Description	Setting values
Change CHAP Password	To change the CHAP Authentication password, select the checkbox. Only when the "CHAP User ID" is registered, the field is available.	Checkbox Selected Cleared
CHAP Password	Specify the password for the CHAP Authentication. It is not necessary to specify this item if the CHAP Authentication is not used. Configure a user ID and a password as a pair. Only when the "Change CHAP Password" checkbox is selected, the field is available.	Password 12 - 100 alphanumeric characters, symbols (except "," (comma) and "?"), and spaces
Confirm CHAP Password	Input the CHAP password again for confirmation. Only when the "Change CHAP Password" checkbox is selected, the field is available.	Password 12 - 100 alphanumeric characters, symbols (except "," (comma) and "?"), and spaces

■ Operating Procedures

In this screen, change the iSCSI host information.

Procedure ▶▶▶

- 1 Select the iSCSI host to changed the host information for, and click [Modify iSCSI Host] in [Action].
- 2 Input new iSCSI host information and click the [Modify] button.
→ A confirmation screen appears.

Caution

- An error screen appears in the following conditions:
 - The "Name" is not entered
 - The "Name" does not satisfy the input conditions
 - The "Name" already exists
 - The "iSCSI Name" is not entered
 - The "iSCSI Name" does not satisfy the input conditions
 - The "IP Address" does not satisfy the input conditions
 - An iSCSI host with the same "IP Address", "iSCSI Name", and "IP Version" is already configured
 - An iSCSI host with the same "iSCSI Name" and "IP Version" but without the "IP Address" setting is already configured
 - The "Alias Name" does not satisfy the input conditions
 - The "Alias Name" overlaps the existing Alias name
 - The "CHAP User ID" does not satisfy the input conditions
 - The "CHAP Password" does not satisfy the input conditions
 - The "Confirm CHAP Password" does not satisfy the input conditions
 - Either of the "CHAP User ID" or the "CHAP Password" has been specified
 - The "CHAP Password" and the "Confirm CHAP Password" do not match
 - There are some LUNs that cannot be referenced from the iSCSI host because the "Host Response" setting has been changed (only for iSCSI hosts that are not registered in a host group)

- 3 Click the [OK] button.
→ Changing of the iSCSI host information starts.
- 4 Click the [Done] button to return to the [iSCSI Host] screen.



SAS Host

- ["■ Overview" \(page 682\)](#)
- ["■ User Privileges" \(page 682\)](#)
- ["SAS Host List" \(page 683\)](#)
- ["■ Filter Setting" \(page 684\)](#)

■ Overview

The registered SAS hosts in the storage system are displayed.

■ User Privileges

Availability of Executions in the Default Role

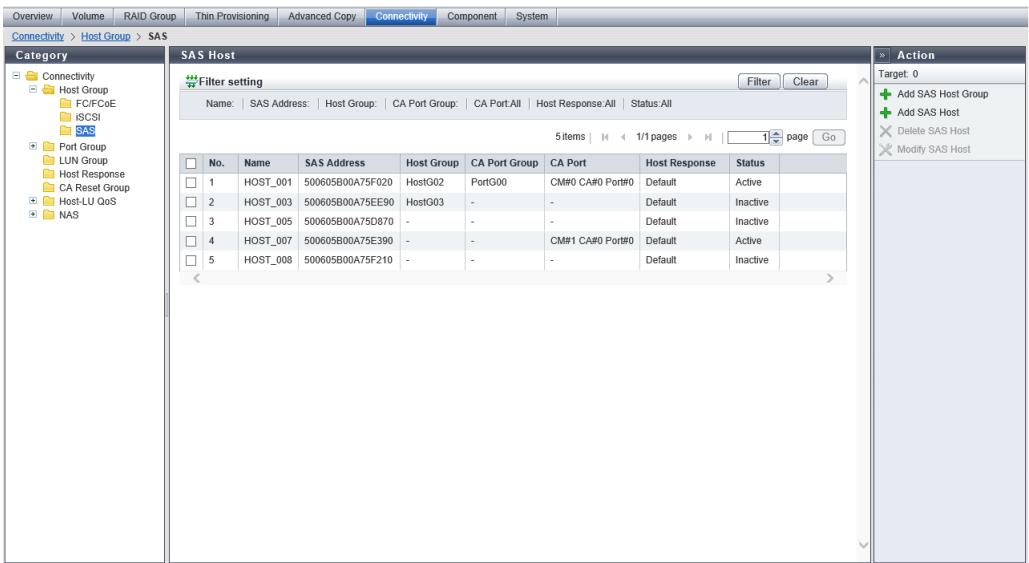
Default role	Availability of executions
Monitor	✓

6. Connectivity
Host Group

Default role	Availability of executions
Admin	✓
StorageAdmin	✓
AccountAdmin	
SecurityAdmin	✓
Maintainer	✓

Refer to "A. User Roles and Policies" (page 1580) for details on the policies and roles.

■ Display Contents



SAS Host List

The registered SAS hosts in the storage system are displayed.

Caution

- The SAS host is supported in the ETERNUS DX60 S5/DX100 S5/DX200 S5.

Item	Description
No.	The SAS host number is displayed.
Name	The SAS host name is displayed.
SAS Address	The SAS address of the SAS host is displayed.
Host Group	The name of the host group to which the SAS host belongs is displayed. If the SAS host does not belong to a host group, a "-" (hyphen) is displayed.
CA Port Group	The name of the CA port group that has the host affinity setting with the SAS host is displayed. If no CA port group with the host affinity setting exists, a "-" (hyphen) is displayed.

6. Connectivity

Host Group

Item	Description
CA Port	The location information of the CA port that has the host affinity setting with the SAS host is displayed. If no CA port with the host affinity setting exists, a "-" (hyphen) is displayed. CM#x CA#y Port#z x: CM number y: CA number z: Port number
Host Response	The host response that is assigned to the SAS host or to the host group of the SAS host is displayed. Default Solaris MPxIO HP-UX AIX AIX VxVM VS850/SVC BS2000 Host responses registered in the storage system
Status	Whether the SAS host is used ("Active") or not used ("Inactive") for the host affinity setting is displayed. The host affinity setting specifies the path between each host and port. <ul style="list-style-type: none"> • Active The SAS host is used for the host affinity setting. The LUN group can be accessed from the SAS host. • Inactive The SAS host is not used for the host affinity setting.

■ Filter Setting

Function Description

Filter setting is a function used to display a list of only the SAS hosts meeting all the specified conditions. No filtering is set by default. The following table shows conditions that can be specified.

Item	Description	Setting values
Name	Input the name for the SAS host that is to be displayed. SAS hosts matching or partially matching the entered name are displayed. When not using the name for filtering, leave this item blank.	Blank SAS host name
SAS Address	Input the SAS address for the SAS host that is to be displayed. SAS hosts matching or partially matching the entered SAS address are displayed. When not using the SAS address for filtering, leave this item blank.	Blank SAS address
Host Group	Input the name of the host group to which the SAS host that is to be displayed belongs. SAS hosts matching or partially matching the entered host group name are displayed. When not using the host group for filtering, leave this item blank.	Blank Host group name
CA Port Group	Input the name of the CA port group that has the host affinity setting with the SAS host that is to be displayed. SAS hosts matching or partially matching the entered CA port group name are displayed. When not using the CA port group for filtering, leave this item blank.	Blank CA port group name

6. Connectivity

Host Group

Item	Description	Setting values
CA Port	Select the CA port that has the host affinity setting with the SAS host that is to be displayed.	All CM#x CA#y Port#z x: CM number y: CA number z: Port number
Host Response	Select the name of the host response that is assigned to the SAS host that is to be displayed.	All Default Solaris MPxIO HP-UX AIX AIX VxVM VS850/SVC BS2000 Host responses registered in the storage system
Status	Select the set state of the host affinity for the SAS host that is to be displayed.	All Active Inactive

Add SAS Host Group

- ["■ Overview" \(page 685\)](#)
- ["■ User Privileges" \(page 686\)](#)
- ["■ Settings" \(page 686\)](#)
- ["■ Filter Setting" \(page 688\)](#)
- ["■ Operating Procedures" \(page 690\)](#)

■ Overview

This function creates a new SAS host group and registers which hosts are members of this group. A host group is a group of hosts (HBAs) that are allowed to access the volume (LUN group). The Host Affinity is specified for each host group.

The Number of Host Groups and Hosts That Can Be Registered

Model	Number of host groups (*1) (per storage system)	Number of hosts (HBAs) (*2) (per storage system)	Number of hosts (HBAs) (per CA port)	Number of hosts (HBAs) (per host group)
ETERNUS DX60 S5	512	128	32	8
ETERNUS DX100 S5		1024	256	
ETERNUS DX200 S5				

*1 : Total of all host groups, regardless of the interface type.

*2 : Total of all hosts, regardless of the interface type.

Caution

- This function is supported in the ETERNUS DX60 S5/DX100 S5/DX200 S5.
- Registration of the host is necessary to create a host group. If this function is used to register a host to the storage system from Web GUI, a new host group is also created.
- A host can be a member of multiple host groups. However, only one LUN group can be allocated to a combination of host and port when configuring host affinity.
- Refer to "Configuration Guide -Server Connection-" for each OS type to assign an appropriate host response to the created host group. A host response has a recommended pattern which has been prepared for each OS type. Refer to "[Recommended Patterns of Host Responses](#)" (page 798)" for details. If an appropriate host response is not configured to the host group, the path may not be switched correctly or the volume may not be recognized correctly.
- The host response that is specified for a host group is applied to all the member hosts in the target group. When a host belongs to multiple host groups, the same host response must be applied for all the groups to which the target host belongs. When a host that already belongs to an existing host group is added to a newly created host group, the host response of the new host group is applied to the host. The host response of the existing host group to which the target host belongs is also changed. Refer to "[Example of Changing the Host Response When Adding a Host](#)" (page 689)" for details.
- When creating the host group that is used for the Non-disruptive Storage Migration function, allocate the same host response as the host group that accesses the migration source volume in the external storage system.

Note

- To perform the following operations, use the [Modify Host Group (SAS)] function.
 - Changing the host group settings
 - Adding a host to an existing host group
- To change the host name or the SAS address, use the [Modify SAS Host] function.

■ **User Privileges**

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	✓
StorageAdmin	✓
AccountAdmin	
SecurityAdmin	
Maintainer	✓

Refer to "[A. User Roles and Policies](#)" (page 1580)" for details on the policies and roles.

■ **Settings**

Host Group Setting

In this screen, input the SAS host group information, and register the host in the host group that is to be created.

6. Connectivity
Host Group

There are two methods to register a host. One method is ["Selecting a Host from the Displayed Host List by Clicking the \[Now Connected\] Tab" \(page 687\)](#).
The other method is ["Inputting the SAS Address Manually by Clicking the \[Manual Input\] Tab" \(page 688\)](#).

Item	Description	Setting values
Host Group Name	Specify the host group name. An existing host group name cannot be used. (Host group names cannot overlap with any other host group names, irrespective of the interface types.)	Up to 16 alphanumeric characters, symbols (except ",", (comma) and "?"), and spaces
Host Response	Select a host response that is to be assigned to a host group. A list of host responses that are created in the storage system is displayed. <div style="background-color: #fff9c4; padding: 5px;"> <p>Caution</p> <ul style="list-style-type: none"> The LUNs that can be referenced from the host are determined by the "LUN Addressing" settings and the "LUN Expand Mode (Peripheral Device Addressing)" settings for the host response. When a host that has the host affinity setting is added to a new host group, check the LUN set state. If a LUN that is LUN#256 onward is used for the host, the relevant host cannot be added to a host group with "256 LUN" for the host response. Refer to "Host Response and Referable Number of LUNs" for details. </div>	Default Solaris MPxIO HP-UX AIX AIX VxVM VS850/SVC BS2000 Host responses registered in the storage system
Number of Hosts	The number of member hosts (0 (default) to 8) in the host group is displayed. The number of member hosts is determined by the total number of member hosts that were selected from the host list on the [Now Connected] screen and specified on the [Manual Input] screen.	

Selecting a Host from the Displayed Host List by Clicking the [Now Connected] Tab

All of the SAS hosts that are connected to SAS and are not registered in a host group but can be recognized by the storage system (the SAS hosts are connected to the storage system or are already registered in the storage system) are displayed. Select a SAS host to be registered in a host group. After registration, the host is named automatically. Refer to ["Naming Conventions for Adding Hosts" \(page 689\)](#) for details.

Item	Description
Checkbox to select a host	Select the SAS host checkbox to be registered in a host group.
SAS Address	The SAS address of the SAS host is displayed.
Port	The CA port, which is connected to the SAS host, is displayed. CM#x CA#y Port#z x: CM number y: CA number z: Port number
Name	If the SAS host has already been registered in the storage system, the SAS host name is displayed. If a connected SAS host is not registered in the storage system, the field is blank.
Host Group	The name of the host group to which the SAS host belongs is displayed. When a SAS host is registered by a method other than Web GUI (e.g. CLI), a "-" (hyphen) is displayed. If a connected SAS host is not registered in the storage system, the field is blank.

6. Connectivity

Host Group

Item	Description
Host Response	<p>For the SAS host that has already been registered in the storage system, the currently assigned host response is displayed.</p> <p>If a connected SAS host is not registered in the storage system, the field is blank.</p> <p>Default</p> <p>Solaris MPxIO</p> <p>HP-UX</p> <p>AIX</p> <p>AIX VxVM</p> <p>VS850/SVC</p> <p>BS2000</p> <p>Host responses registered in the storage system</p>

■ Filter Setting

Function Description

Filter setting is a function used to display a list of only the SAS hosts meeting all the specified conditions. No filtering is set by default. The following table shows conditions that can be specified.

Item	Description	Setting values
SAS Address	<p>Input the SAS address that is to be displayed.</p> <p>SAS hosts matching or partially matching the entered SAS address are displayed.</p> <p>When not using the SAS address for filtering, leave this item blank.</p>	<p>SAS address</p> <p>Blank</p>
Host Group	<p>Input the host group name that is to be displayed.</p> <p>SAS hosts which belong to any host groups that match or partially match the entered name are displayed.</p> <p>When not using the host group name for filtering, leave this item blank.</p>	<p>Host group name</p> <p>Blank</p>
Host Response	<p>Select the host response that is to be displayed.</p> <p>Any SAS hosts that are allocated to the selected host response are displayed.</p> <p>When not using the host response for filtering, select "All".</p>	<p>All</p> <p>Default</p> <p>Solaris MPxIO</p> <p>HP-UX</p> <p>AIX</p> <p>AIX VxVM</p> <p>VS850/SVC</p> <p>BS2000</p> <p>Host responses registered in the storage system</p>

Inputting the SAS Address Manually by Clicking the [Manual Input] Tab

Click the [Add] button to display the screen to add a SAS address. Directly input the SAS address for the SAS host to be registered in a host group. After registration, the host is named automatically. Refer to ["Naming Conventions for Adding Hosts" \(page 689\)](#) for details.

Item	Description	Setting values
SAS Address	Specify the SAS address of the SAS host.	<p>Hexadecimal numbers (0 - 9, A - F, a - f)</p> <p>16 digits (using "F (f)" or "0" in entire 16 digits is not allowed)</p> <p>Blank</p>

Function Button

Button	Description
[Rediscover]	Updates the SAS host list which can be recognized by the storage system. The [Rediscover] button is displayed in the [Now Connected] screen. Clicking the [Rediscover] button updates the SAS host list.
[Add]	Adds a SAS host to a host group by manual entry. The [Add] button is displayed in the [Manual Input] screen. If the maximum number of hosts has already been registered, the [Add] button cannot be clicked.
[Delete]	Deletes a SAS host from the target host group. The [Delete] button is displayed in the [Manual Input] screen. If no SAS host has been added, the [Delete] button is not displayed.

Naming Conventions for Adding Hosts

- A name is automatically added to a host with the "host group name" and a suffix number "_x" (serial numbers starting with "0").
(Example) Host group: HOST_Group_001 (14 characters)→ Host name: HOST_Group_001_0, HOST_Group_001_1, etc.
- When the host name including the suffix number "_x" has more than 16 characters, the excess number of characters is deleted from the "host group name", starting with the last character and a suffix number "~x" will be added. Then, the name will contain only 16 characters.
(Example) Host group: HOST_Group_ABCDE (16 characters)→ Host name: HOST_Group_ABC~0, HOST_Group_ABC~1, etc.
- When a host name including the suffix number already exists, the suffix number is increased by one (+1). The suffix number is increased by one (+1) until no host names overlap.
- The hosts, which were selected on the [Now Connected] screen, are named, and then the hosts, which were specified on the [Manual Input] screen, are named next.
- The name of the existing member host will not be changed.

Example of Changing the Host Response When Adding a Host

Host group (Host response)	Member host	Host response that is allocated to the host
Host_G1 (Default)	Host-1	Default
	Host-2	Default
Host_G2 (Default)	Host-2	Default
	Host-3	Default

When a new host group "Host_G3" (host response: HR_1) is created and "Host-3" and "Host-4" are added, the host response is changed as follows:

Procedure ▶▶▶

- 1 The host response for Host-3 is changed from "Default" to "HR_1" (the host response for Host_G3).
- 2 Since the host response for Host-3 is changed, the host response for Host_G2 to which Host-3 belongs is also changed from "Default" to "HR_1".
(The host response for Host_2, which is the member host of Host_G2, is changed from "Default" to "HR_1".)

- 3 Since the host response for Host-2 is changed, the host response for Host_G1 to which Host-2 belongs is also changed from "Default" to "HR_1".
(The host response for Host_1, which is the member host of Host_G1, is changed from "Default" to "HR_1".)



The following table shows the host response after new hosts are added.

Host group (Host response)	Member host	Host response that is allocated to the host
Host_G1 (HR_1)	Host-1	HR_1
	Host-2	HR_1
Host_G2 (HR_1)	Host-2	HR_1
	Host-3	HR_1
Host_G3 (HR_1)	Host-3	HR_1
	Host-4	HR_1

■ Operating Procedures

In this screen, create a SAS host group and register the host to be a member.

Procedure ▶▶▶

- 1 Click [Add SAS Host Group] in [Action].
- 2 Enter a host group name to be created, and select a host response to be assigned to the host group.
- 3 Add a host in the host group in the following procedures.
 - Selecting the registration target host from the list
 - (1) Click the [Now Connected] tab.
 - (2) Select a host that is to be registered from the SAS host list, and click the [Add] button.
→ A confirmation screen appears.

Caution

- If the SAS address is not displayed when clicking the [Rediscover] button, make sure that there is no error in the connection environment, such as the connection between the host and the switch, and the CA port settings of the storage system. If there is no error in the connection environment, contact the Support Department, or specify the SAS address manually.
- An error screen appears in the following conditions:
 - The "Host Group Name" is not entered
 - The "Host Group Name" does not satisfy the input conditions
 - The "Host Group Name" overlaps with an existing host group name (Host group names cannot overlap with any other host group names, irrespective of the interface types.)
 - Nine or more hosts are registered in the host group or no hosts are registered in the host group
 - The total number of host groups has exceeded the maximum number for the storage system
 - The total number of hosts has exceeded the maximum number for the storage system
 - A host that has a LUN that cannot be referenced is added

- Manually specifying the registration target host

(1) Click the [Manual Input] tab.

(2) Click the [Add] button.

→ The [Add SAS Host] screen appears.

(3) Manually specify the SAS address of the host to be registered, and click the [OK] button.

→ Returns to the [Manual Input] screen.

Caution

- An error screen appears in the following conditions:
 - The "SAS Address" is not entered
 - The "SAS Address" does not satisfy the input conditions

(4) Repeat Step b and c when registering multiple SAS addresses.

(5) After registering the host is complete, click the [Add] button.

→ A confirmation screen appears.

Caution

- An error screen appears in the following conditions:
 - The "Host Group Name" is not entered
 - The "Host Group Name" does not satisfy the input conditions
 - The "Host Group Name" overlaps with an existing host group name (Host group names cannot overlap with any other host group names, irrespective of the interface types.)
 - The multiple SAS hosts with the same SAS addresses have been registered
 - Nine or more hosts are registered in the host group or no hosts are registered in the host group
 - The total number of host groups has exceeded the maximum number for the storage system
 - The total number of hosts has exceeded the maximum number for the storage system
 - A host that has a LUN that cannot be referenced is added

- 4 Click the [OK] button.
→ Registration of the SAS host group starts.
- 5 Click the [Done] button to return to the [Host Group] screen.

Note

- Click the [Continue] button to continue registering SAS host groups.



Add SAS Host

- ["■ Overview" \(page 692\)](#)
- ["■ User Privileges" \(page 693\)](#)
- ["■ Settings" \(page 693\)](#)
- ["■ Filter Setting" \(page 694\)](#)
- ["■ Operating Procedures" \(page 695\)](#)

■ Overview

This function registers a new SAS host (HBA).

The total number of all the interface type hosts that can be registered in the storage system is 1024 (128 for the ETERNUS DX60 S5).

Caution

- This function is supported in the ETERNUS DX60 S5/DX100 S5/DX200 S5.
- This action item is only displayed when the "Use "Add Host"" checkbox is selected for the "Function to Add Host" field in "Web GUI Settings". This checkbox is not selected (this function is not displayed) by default. Refer to the [Setup Subsystem Parameters] function for details.
- Note that this function does not create a host group. The storage system also has a function that creates new host groups to register hosts as their members. Refer to the [Add SAS Host Group] function for details.
- Hosts that are registered with this function can belong to host groups. However, only one LUN group can be allocated to a combination of host and port when configuring host affinity.
- Refer to "Configuration Guide -Server Connection-" for each OS type to assign an appropriate host response to the host that is to be registered. A host response has a recommended pattern which has been prepared for each OS type. Refer to ""Recommended Patterns of Host Responses" (page 798)" for details. If an appropriate host response is not configured to the host, the path may not be switched correctly or the volume may not be recognized correctly.

Note

- To change the SAS host information, use the [Modify SAS Host] function.
- The host affinity setting can be specified for each SAS host. Refer to the [Create Host Affinity] function for details.

■ **User Privileges**

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	✓
StorageAdmin	✓
AccountAdmin	
SecurityAdmin	
Maintainer	✓

Refer to "A. User Roles and Policies" (page 1580) for details on the policies and roles.

■ **Settings**

Host Setting

In this screen, register the SAS hosts.

There are two methods to register a host. One method is "Selecting a Host from the Displayed Host List by Clicking the [Now Connected] Tab" (page 694).

The other method is "Inputting the Host Information Manually by Clicking the [Manual Input] Tab" (page 695).

Item	Description
Number of Hosts	<p>The number of hosts that are to be registered is displayed.</p> <p>The number of hosts is determined by the total number of hosts that were selected from the host list on the [Now Connected] screen and the number of hosts that were specified on the [Manual Input] screen.</p> <p>For the ETERNUS DX60 S5: 0 - 128</p> <p>For the other models: 0 - 1024</p>

Selecting a Host from the Displayed Host List by Clicking the [Now Connected] Tab

All of the unregistered hosts that are connected to SAS and that can be recognized by the storage system are displayed. Select the hosts that are to be registered in the storage system and specify the SAS host information.

Item	Description	Setting values
Checkbox to select a host	Select the checkbox of the SAS host that is to be registered in the storage system. The host name and host response can only be specified for the selected SAS host.	
Name	<p>Input the name of the SAS host.</p> <p>An existing host name cannot be specified.</p>	Up to 16 alphanumeric characters, symbols (except ",", (comma) and "?"), and spaces
SAS Address	The SAS address of the SAS host is displayed.	
Host Response	<p>Select a host response to be assigned to a SAS host.</p> <p>A list of host responses that are created in the storage system is displayed.</p>	<p>Default</p> <p>Solaris MPxIO</p> <p>HP-UX</p> <p>AIX</p> <p>AIX VxVM</p> <p>VS850/SVC</p> <p>BS2000</p> <p>Host responses registered in the storage system</p>
Ports	<p>The location information of the CA port, which is connected to the SAS host, is displayed.</p> <p>CM#x CA#y Port#z</p> <p>x: CM number</p> <p>y: CA number</p> <p>z: Port number</p>	

■ Filter Setting

Function Description

Filter setting is a function used to display a list of only the SAS hosts meeting all the specified conditions. No filtering is set by default. The following table shows conditions that can be specified.

Item	Description	Setting values
SAS Address	<p>Input the SAS address for the SAS host that is to be displayed.</p> <p>SAS hosts matching or partially matching the entered SAS address are displayed.</p> <p>When not using the SAS address for filtering, leave this item blank.</p>	<p>SAS address</p> <p>Blank</p>

Inputting the Host Information Manually by Clicking the [Manual Input] Tab

Click the [Add] button at the bottom of the SAS host list to display the [Add SAS Host] screen. Directly input the SAS host information that is to be added in the storage system.

[Add SAS Host] Screen

Item	Description	Setting values
Name	Specify the SAS host name. An existing host name cannot be specified.	Up to 16 alphanumeric characters, symbols (except ",", (comma) and "?"), and spaces
SAS Address	Specify the SAS address of the SAS host. The registered SAS address cannot be used.	Hexadecimal numbers (0 - 9, A - F, a - f) 16 digits (using "F (f)" or "0" in entire 16 digits is not allowed)
Host Response	Select a host response to be assigned to a SAS host. A list of host responses that are created in the storage system is displayed.	Default Solaris MPxIO HP-UX AIX AIX VxVM VS850/SVC BS2000 Host responses registered in the storage system

Function Button

Button	Description
[Rediscover]	Updates the SAS host list which can be recognized by the storage system. The [Rediscover] button is displayed in the [Now Connected] screen. Clicking the [Rediscover] button updates the SAS host list. The [Rediscover] button clears the checkboxes for the selected SAS hosts. Note that any SAS host information that is specified in the [Manual Input] screen is retained.
[Add]	Adds SAS host information by manual entry. The [Add] button is displayed in the [Manual Input] screen. If the maximum number of hosts has already been registered, the [Add] button cannot be clicked.
[Delete]	Deletes the selected SAS host information. The [Delete] button is displayed in the [Manual Input] screen. If no SAS host has been added, the [Delete] button is not displayed.

■ Operating Procedures

In this screen, register the SAS hosts in the storage system.

Procedure ▶▶▶

- 1 Click [Add SAS Host] in [Action].
- 2 Add a host in the storage system in the following procedures.
 - Selecting the registration target host from the list
 - (1) Click the [Now Connected] tab.
 - (2) Select the host that is to be registered from the SAS host list, input the SAS host information, and click the [Add] button.
→ A confirmation screen appears.

Caution

- An error screen appears in the following conditions:
 - The "Name" is not entered
 - The "Name" does not satisfy the input conditions
 - The "Name" is already used for the registration target host or the same "Name" is already used in the storage system
 - The number of hosts that are to be registered is "0"
 - The number of registered hosts has exceeded the maximum number for the storage system

- Manually specifying the registration target host

(1) Click the [Manual Input] tab.

(2) Click the [Add] button.

→ The [Add SAS Host] screen appears.

(3) Specify the host information of the SAS host that is to be registered, and click the [OK] button.

→ Returns to the [Manual Input] screen.

Caution

- An error screen appears in the following conditions:
 - The "Name" is not entered
 - The "Name" does not satisfy the input conditions
 - The "Name" is already used for the registration target host
 - The "SAS Address" is not entered
 - The "SAS Address" does not satisfy the input conditions
 - The "SAS Address" is already used for the registration target host

(4) Repeat Step b and c when registering multiple SAS hosts.

(5) After registering the SAS host is complete, click the [Add] button.

→ A confirmation screen appears.

Caution

- An error screen appears in the following conditions:
 - The same "Name" has already been registered in the storage system
 - The same "SAS Address" has already been registered in the storage system
 - The number of hosts that are to be registered is "0"
 - The number of registered hosts has exceeded the maximum number for the storage system

3 Click the [OK] button.

→ Registration of the SAS host starts.

4 Click the [Done] button to return to the screen when starting this function in Step 1.

Note

- Click the [Continue] button to continue registering SAS hosts.



Delete SAS Host

- "[Overview](#)" (page 697)
- "[User Privileges](#)" (page 697)
- "[Operating Procedures](#)" (page 697)

■ Overview

This function deletes SAS hosts.

When a SAS host belongs to a host group, the SAS host can be deleted, irrespective of its host affinity settings.

Caution

- It is not possible to delete all hosts from a host group.
- When a SAS host does not belong to a host group, the SAS host, for which host affinity settings have been configured, cannot be deleted.

Note

- When a host in the host group for which the host affinity settings are already configured is deleted, the path from the host to the port is also deleted.

■ User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	✓
StorageAdmin	✓
AccountAdmin	
SecurityAdmin	
Maintainer	✓

Refer to "[A. User Roles and Policies](#)" (page 1580) for details on the policies and roles.

■ Operating Procedures

In this screen, delete the SAS hosts.

Procedure ▶▶▶

- 1 Select the SAS host to be deleted (multiple selections can be made) and click [Delete SAS Host] in [Action].
→ A confirmation screen appears.

Caution

- An error screen appears in the following conditions:
 - The SAS host that to be deleted is the last host, which belongs to a host group
 - The SAS host that is to be deleted does not belong to a host group and the host affinity setting has been configured for the target SAS host

- 2 Click the [OK] button.
→ Deletion of the SAS host starts.
- 3 Click the [Done] button to return to the [SAS Host] screen.



Modify SAS Host

- ["■ Overview" \(page 698\)](#)
- ["■ User Privileges" \(page 698\)](#)
- ["■ Settings" \(page 699\)](#)
- ["■ Operating Procedures" \(page 699\)](#)

■ Overview

This function changes the SAS host information.

Caution

- When no SAS hosts are registered, the [Modify SAS Host] function cannot be used.
- When changing the SAS address or the host response of a SAS host that is currently being used, make sure to stop access to that SAS host. The server must be rebooted after the host response is changed.

Note

- This function can change the following SAS host information; "Name" and "SAS address". When the SAS host is not registered in a host group, the "Host Response" setting can also be changed.
- When the SAS host is registered in a host group, use the [Modify Host Group] function to change the host response. Refer to the [Modify Host Group (SAS)] function for details.

■ User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	✓
StorageAdmin	✓
AccountAdmin	
SecurityAdmin	
Maintainer	✓

Refer to ["A. User Roles and Policies" \(page 1580\)](#) for details on the policies and roles.

■ Settings

SAS Host Setting

In this screen, change the SAS host information.

Item	Description	Setting values
Name	Specify a new SAS host name. An existing host name cannot be used. (Host names cannot overlap with any other host names, irrespective of the interface types.)	Up to 16 alphanumeric characters, symbols (except "," (comma) and "?"), and spaces
SAS Address	Specify a new SAS address. The registered SAS address cannot be used.	Hexadecimal numbers (0 - 9, A - F, a - f) 16 digits (using "F (f)" or "0" in entire 16 digits is not allowed)
Host Response	Select a new host response that is to be assigned to the SAS host. A list of host responses that are created in the storage system is displayed. This item is available only when a SAS host is not registered in the host group. Caution <ul style="list-style-type: none"> Before changing a host response, check the LUN set state. If LUNs that are LUN#256 or higher are used, the referable LUN setting cannot be changed to a "256 LUN" host response. Refer to "Host Response and Referable Number of LUNs" for details. 	Default Solaris MPxIO HP-UX AIX AIX VxVM VS850/SVC BS2000 Host responses registered in the storage system

■ Operating Procedures

In this screen, change the SAS host information.

Procedure ▶▶▶

- 1 Select the SAS host to change the host information for, and click [Modify SAS Host] in [Action].
- 2 Input new host information and click the [Modify] button.
→ A confirmation screen appears.

Caution

- An error screen appears in the following conditions:
 - The "Name" is not entered
 - The "Name" does not satisfy the input conditions
 - The "Name" already exists
 - The "SAS Address" is not entered
 - The "SAS Address" does not satisfy the input conditions
 - The same "SAS Address" is already registered in the storage system
 - There are some LUNs that cannot be referenced from the SAS host because the "Host Response" setting has been changed (only for SAS hosts that are not registered in a host group)

- 3 Click the [OK] button.
→ Changing of the SAS host information starts.

4 Click the [Done] button to return to the [SAS Host] screen.



CA Port Group

- ["■ Overview"](#) (page 700)
- ["■ User Privileges"](#) (page 700)
- ["■ Display Contents"](#) (page 700)
- ["■ Filter Setting"](#) (page 701)

■ Overview

The list of CA port groups is displayed.

A CA port group is a group of host interface ports that is allowed to access the volume (LUN group).

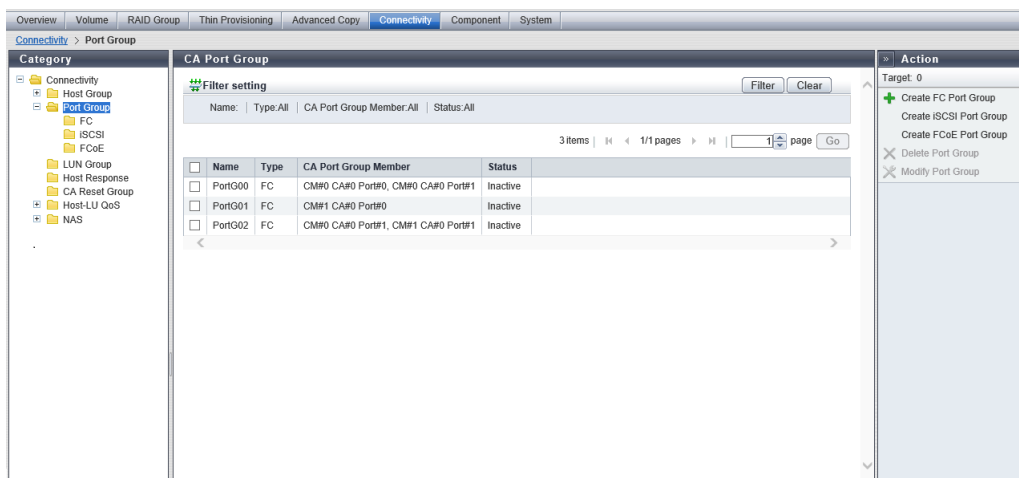
■ User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	✓
Admin	✓
StorageAdmin	✓
AccountAdmin	
SecurityAdmin	✓
Maintainer	✓

Refer to ["A. User Roles and Policies"](#) (page 1580) for details on the policies and roles.

■ Display Contents



CA Port Group List

The list of CA port groups that are created in the storage system is displayed.

6. Connectivity

CA Port Group

Item	Description
Name	The CA port group name is displayed.
Type	The CA type of a CA port group is displayed. FC iSCSI SAS
CA Port Group Member	The location information of the port, which is a CA port group member, is displayed. For the ETERNUS DX900 S5 or the ETERNUS DX8900 S4 CE#x CM#y CA#z Port#w For the other models CM#y CA#z Port#w x: CE number y: CM number z: CA number w: Port number
Status	Whether the CA port group is "Active" or "Inactive" in the host affinity setting is displayed. <ul style="list-style-type: none"> Active The CA port group is used for the host affinity settings. Inactive The CA port group is not used for the host affinity settings.

■ Filter Setting

Function Description

Filter setting is a function used to display a list of only the CA port groups meeting all the specified conditions.

No filtering is set by default. The following table shows conditions that can be specified.

Item	Description	Setting values
Name	Input the name of the CA port group that is to be displayed. CA port groups matching or partially matching the entered name are displayed. When not using the name for filtering, leave this item blank.	Blank CA port group name
Type	Select the type of the CA port group that is to be displayed.	All FC iSCSI SAS
CA Port Group Member	Select the location information of the member port for the CA port group that is to be displayed.	All Location information of the port For the ETERNUS DX900 S5 or the ETERNUS DX8900 S4 CE#x CM#y CA#z Port#w For the other models CM#y CA#z Port#w x: CE number y: CM number z: CA number w: Port number

Item	Description	Setting values
Status	Select the set state of the host affinity for the CA port group that is to be displayed.	All Active Inactive

Create FC Port Group

- ["■ Overview" \(page 702\)](#)
- ["■ User Privileges" \(page 703\)](#)
- ["■ Settings" \(page 703\)](#)
- ["■ Operating Procedures" \(page 704\)](#)

■ Overview

This function creates a new FC port group, and registers the port to be a member.

A port group is a group of host interface ports that is allowed to access the volume (LUN group). The Host Affinity is specified for each port group.

- Regardless of the CA type, the maximum number of port groups per storage system is 128 (384 for the ETERNUS DX900 S5 or the ETERNUS DX8900 S4).
- The maximum number of ports per port group is 8.
- A port can be a member of multiple port groups.

Caution

- Registration of the port is necessary to create a port group. A port group cannot be created if the port that is to be a member has not been registered from Web GUI.
- Only ports with "CA" or "CA/RA" as the port mode can be added to a port group. Ports with other port modes cannot be added to a port group.
- Ports that are used for the Storage Cluster function cannot be registered in the port group.
- A port in the affinity mode enabled (On) and a port in the affinity mode disabled (Off) cannot exist together in a port group.
 - The affinity mode (On/Off) of a port group is decided when the host affinity setting has been configured on the corresponding port group. All of the member ports in a port group have the same affinity mode.
 - The affinity mode (On/Off) of a port group is not changed until the host affinity setting has been released from the corresponding port group.
 - When one port is registered in multiple port groups, and the affinity setting has been configured on one of the port groups including the corresponding port, the affinity setting is configured on all the port groups, which include the corresponding port, and also on the member ports.
 - Ports without the host affinity setting can be members of a port group, regardless of whether the affinity mode for the group is enabled (On) or disabled (Off).

Note

- To perform the following operations, use the [Modify CA Port Group] function.
 - Changing the port group settings
 - Adding a port to an existing port group
- To change the port mode from "RA" or "Initiator" to "CA" or "CA/RA", use the [Modify Port Mode] function.

■ **User Privileges**

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	✓
StorageAdmin	✓
AccountAdmin	
SecurityAdmin	
Maintainer	✓

Refer to "A. User Roles and Policies" (page 1580) for details on the policies and roles.

■ **Settings**

CA Port Group Setting

In this screen, input the FC port group information, and register the port in the port group that is to be created.

Item	Description	Setting values
Name	Specify the port group name. An existing port group name cannot be used. (Port group names cannot overlap with any other port group names, irrespective of the CA types.)	Up to 16 alphanumeric characters, symbols (except ",", (comma) and "?"), and spaces
Type	The CA type of the port group is displayed. FC	
Number of CA Port Group Members	The number of member ports (0 to 8) in the CA port group is displayed. The number of member ports in the port list is updated every time the checkbox has been selected or cleared on the port list.	

Select Ports

In this screen, select a FC port to be registered in a FC port group. The selectable FC ports are displayed on the port list.

Item	Description
Checkbox to select a port	<p>Select the checkbox of the FC port to be registered in a FC port group.</p> <div style="background-color: #fff9c4; padding: 10px;"> <p>Caution</p> <ul style="list-style-type: none"> • When a port in the affinity mode enabled (On) is selected, ports in the affinity mode disabled (Off) cannot be selected. • When a port in the affinity mode disable (Off) is selected, ports in the affinity mode enable (On) cannot be selected. • Up to eight ports can be selected. </div>
Port	<p>The location information of the FC port is displayed.</p> <p>For the ETERNUS DX900 S5 or the ETERNUS DX8900 S4 CE#x CM#y CA#z Port#w</p> <p>For the other models CM#y CA#z Port#w</p> <p>x: CE number y: CM number z: CA number w: Port number</p> <div style="background-color: #e0e0e0; padding: 10px;"> <p>Note</p> <ul style="list-style-type: none"> • FC ports that satisfy all of the following conditions are displayed. <ul style="list-style-type: none"> - Ports which port mode are "CA" or "CA/RA" - Not used for the Storage Cluster function </div>
Affinity	<p>The affinity status of the FC port is displayed.</p> <ul style="list-style-type: none"> • If the affinity mode is enabled (On) for the port and the host affinity setting is configured for the port, "On" is displayed. • If the affinity mode is disabled (Off) for the port and the host affinity setting is configured for the port, "Off" is displayed. • When a port is not registered in the port group or a port belongs to port groups without host affinity settings, the field is blank.

■ Operating Procedures

In this screen, create a FC port group, and register the port to be a member.

Procedure ▶▶▶

- 1 Click [Create FC Port Group] in [Action].
- 2 Specify the name of the port group that is to be created, select all the ports that are to be registered in the port group, and click the [Create] button.
→ A confirmation screen appears.

Caution

- An error screen appears in the following conditions:
 - The "Name" is not entered
 - The "Name" does not satisfy the input conditions
 - The "Name" overlaps with an existing port group name
 - The total number of port groups has exceeded the maximum number for the storage system
 - No ports are registered in the port group
 - Ports with the affinity mode enabled (On) and disabled (Off) exist together

- 3** Click the [OK] button.
→ Registration of the FC port group starts.
- 4** Click the [Done] button to return to the [CA Port Group] screen.



Create iSCSI Port Group

- ["■ Overview" \(page 705\)](#)
- ["■ User Privileges" \(page 706\)](#)
- ["■ Settings" \(page 706\)](#)
- ["■ Operating Procedures" \(page 707\)](#)

■ Overview

This function creates a new iSCSI port group, and registers the port to be a member.

A port group is a group of host interface ports that is allowed to access the volume (LUN group). The Host Affinity is specified for each port group.

- Regardless of the CA type, the maximum number of port groups per storage system is 128 (384 for the ETERNUS DX900 S5 or the ETERNUS DX8900 S4).
- The maximum number of ports per port group is 8.
- A port can be a member of multiple port groups.

Caution

- Registration of the port is necessary to create a port group. A port group cannot be created if the port that is to be a member has not been registered from Web GUI.
- Only ports with "CA" or "CA/RA" as the port mode can be added to a port group. Ports with "RA" as the port mode cannot be added to a port group.
- A port in the affinity mode enabled (On) and a port in the affinity mode disabled (Off) cannot exist together in a port group.
 - The affinity mode (On/Off) of a port group is decided when the host affinity setting has been configured on the corresponding port group. All of the member ports in a port group have the same affinity mode.
 - The affinity mode (On/Off) of a port group is not changed until the host affinity setting has been released from the corresponding port group.
 - When one port is registered in multiple port groups, and the affinity setting has been configured on one of the port groups including the corresponding port, the affinity setting is configured on all the port groups, which include the corresponding port, and also on the member ports.
 - Ports without the host affinity setting can be members of a port group, regardless of whether the affinity mode for the group is enabled (On) or disabled (Off).

Note

- To perform the following operations, use the [Modify CA Port Group] function.
 - Changing the port group settings
 - Adding a port to an existing port group
- To change the port mode from "RA" to "CA" or "CA/RA", use the [Modify Port Mode] function.

■ **User Privileges**

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	✓
StorageAdmin	✓
AccountAdmin	
SecurityAdmin	
Maintainer	✓

Refer to "[A. User Roles and Policies](#)" (page 1580) for details on the policies and roles.

■ **Settings**

CA Port Group Setting

In this screen, input the iSCSI port group information, and register the port in the port group that is to be created.

Item	Description	Setting values
Name	Specify the port group name. An existing port group name cannot be used. (Port group names cannot overlap with any other port group names, irrespective of the CA types.)	Up to 16 alphanumeric characters, symbols (except ",", (comma) and "?"), and spaces
Type	The CA type of the port group is displayed. iSCSI	
Number of CA Port Group Members	The number of member ports (0 to 8) in the CA port group is displayed. The number of member ports in the port list is updated every time the checkbox has been selected or cleared on the port list.	

Select Ports

In this screen, select an iSCSI port to be registered in an iSCSI port group. The selectable iSCSI ports are displayed on the port list.

Item	Description
Checkbox to select a port	Select the checkbox of the iSCSI port to be registered in an iSCSI port group. <div style="background-color: #fff9c4; padding: 10px; border: 1px solid #ccc;"> <p>Caution</p> <ul style="list-style-type: none"> • When a port in the affinity mode enabled (On) is selected, ports in the affinity mode disabled (Off) cannot be selected. • When a port in the affinity mode disable (Off) is selected, ports in the affinity mode enable (On) cannot be selected. • Up to eight ports can be selected. </div>
Port	The location information of the iSCSI port is displayed. For the ETERNUS DX900 S5 or the ETERNUS DX8900 S4 CE#x CM#y CA#z Port#w For the other models CM#y CA#z Port#w x: CE number y: CM number z: CA number w: Port number
Affinity	The affinity status of the iSCSI port is displayed. <ul style="list-style-type: none"> • If the affinity mode is enabled (On) for the port and the host affinity setting is configured for the port, "On" is displayed. • If the affinity mode is disabled (Off) for the port and the host affinity setting is configured for the port, "Off" is displayed. • When a port is not registered in the port group or a port belongs to port groups without host affinity settings, the field is blank.

■ Operating Procedures

In this screen, create an iSCSI port group, and register the port to be a member.

Procedure ▶▶▶

- 1 Click [Create iSCSI Port Group] in [Action].

- 2 Specify the name of the port group that is to be created, select all the ports that are to be registered in the port group, and click the [Create] button.
→ A confirmation screen appears.

Caution

- An error screen appears in the following conditions:
 - The "Name" is not entered
 - The "Name" does not satisfy the input conditions
 - The "Name" overlaps with an existing port group name
 - The total number of port groups has exceeded the maximum number for the storage system
 - No ports are registered in the port group
 - Ports with the affinity mode enabled (On) and disabled (Off) exist together

- 3 Click the [OK] button.
→ Registration of the iSCSI port group starts.
- 4 Click the [Done] button to return to the [CA Port Group] screen.



Create SAS Port Group

- ["■ Overview" \(page 708\)](#)
- ["■ User Privileges" \(page 709\)](#)
- ["■ Settings" \(page 709\)](#)
- ["■ Operating Procedures" \(page 710\)](#)

■ Overview

This function creates a new SAS port group, and registers the port to be a member.

A port group is a group of host interface ports that is allowed to access the volume (LUN group). The Host Affinity is specified for each port group.

- The maximum number of port groups per storage system is 128, irrespective of the CA types.
- The maximum number of ports per port group is 8.
- A port can be a member of multiple port groups.

Caution

- This function is supported in the ETERNUS DX60 S5/DX100 S5/DX200 S5.
- Registration of the port is necessary to create a port group. A port group cannot be created if the port that is to be a member has not been registered from GUI.
- A port in the affinity mode enabled (On) and a port in the affinity mode disabled (Off) cannot exist together in a port group.
 - The affinity mode (On/Off) of a port group is decided when the host affinity setting has been configured on the corresponding port group. All of the member ports in a port group have the same affinity mode.
 - The affinity mode (On/Off) of a port group is not changed until the host affinity setting has been released from the corresponding port group.
 - When one port is registered in multiple port groups, and the affinity setting has been configured on one of the port groups including the corresponding port, the affinity setting is configured on all the port groups, which include the corresponding port, and also on the member ports.
 - Ports without the host affinity setting can be members of a port group, regardless of whether the affinity mode for the group is enabled (On) or disabled (Off).

Note

- To perform the following operations, use the [Modify CA Port Group] function.
 - Changing the port group settings
 - Adding a port to an existing port group

■ **User Privileges**

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	✓
StorageAdmin	✓
AccountAdmin	
SecurityAdmin	
Maintainer	✓

Refer to "[A. User Roles and Policies](#)" (page 1580) for details on the policies and roles.

■ **Settings**

CA Port Group Setting

In this screen, input the SAS port group information, and register the port in the port group to be created.

Item	Description	Setting values
Name	Specify the port group name. An existing port group name cannot be used. (Port group names cannot overlap with any other port group names, irrespective of the CA types.)	Up to 16 alphanumeric characters, symbols (except ",", (comma) and "?"), and spaces
Type	The CA type of the port group is displayed. SAS	
Number of CA Port Group Members	The number of member ports (0 (default) to 8) in the CA port group is displayed. The number of member ports in the port list is updated every time the checkbox has been selected or cleared on the port list.	

Select Ports

In this screen, select a SAS port to be registered in an SAS port group. The selectable SAS ports are displayed on the port list.

Item	Description
Checkbox to select a port	Select the checkbox of the SAS port to be registered in a SAS port group. <div style="background-color: #fff9c4; padding: 10px; border: 1px solid #ccc;"> <p>Caution</p> <ul style="list-style-type: none"> • When a port in the affinity mode enabled (On) is selected, ports in the affinity mode disabled (Off) cannot be selected. • When a port in the affinity mode disable (Off) is selected, ports in the affinity mode enable (On) cannot be selected. • Up to eight ports can be selected. </div>
Port	The location information of the SAS port is displayed. CM#x CA#y Port#z x: CM number y: CA number z: Port number
Affinity	The affinity status of the SAS port is displayed. <ul style="list-style-type: none"> • If the affinity mode is enabled (On) for the port and the host affinity setting is configured for the port, "On" is displayed. • If the affinity mode is disabled (Off) for the port and the host affinity setting is configured for the port, "Off" is displayed. • When a port is not registered in the port group or a port belongs to port groups without host affinity settings, the field is blank.

■ Operating Procedures

In this screen, create a SAS port group, and register the port to be a member.

Procedure ▶▶▶

- 1 Click [Create SAS Port Group] in [Action].
- 2 Specify the name of the port group that is to be created, select all the ports that are to be registered in the port group, and click the [Create] button.
→ A confirmation screen appears.

Caution

- An error screen appears in the following conditions:
 - The "Name" is not entered
 - The "Name" does not satisfy the input conditions
 - The "Name" overlaps with an existing port group name
 - The total number of port groups has exceeded the maximum number for the storage system
 - Nine or more ports are registered in the port group or no ports are registered in the port group
 - Ports with the affinity mode enabled (On) and disabled (Off) exist together

- 3 Click the [OK] button.
→ Registration of the SAS port group starts.
- 4 Click the [Done] button to return to the [CA Port Group] screen.



Modify CA Port Group

- ["■ Overview" \(page 711\)](#)
- ["■ User Privileges" \(page 712\)](#)
- ["■ Settings" \(page 713\)](#)
- ["■ Operating Procedures" \(page 714\)](#)

■ Overview

This function performs the following modifications to the existing CA port group.

- Changing the CA port group name
- Adding and deleting member ports in a CA port group

Ports can be added to CA port groups which the host affinity setting has been already configured, or deleted from CA port groups.

If a port is added, a host affinity is set automatically to the relevant port as a member of the CA port group.

If a port has been deleted, the host affinity setting is cleared from the corresponding port.

- Regardless of the CA type, the maximum number of CA port groups per storage system is 128 (384 for the ETERNUS DX900 S5 or the ETERNUS DX8900 S4).
- The maximum number of ports per CA port group is 8.
- Ports with the same CA type as the member ports of the CA port group can be added.
- A port can be a member of multiple CA port groups.

Caution

- Registration of the port is necessary to create a CA port group. Not all of the ports can be deleted from a CA port group.
- Only ports with "CA" or "CA/RA" as the port mode can be added to a CA port group. Ports with other port modes cannot be added to a CA port group.
- Ports that are used for the Storage Cluster function cannot be added to the port group.
- A port in the affinity mode enabled (On) and a port in the affinity mode disabled (Off) cannot exist together in a CA port group.
 - The affinity mode (On/Off) of a CA port group is decided when the host affinity setting has been configured on the corresponding CA port group. All of the member ports in a CA port group have the same affinity mode.
 - The affinity mode (On/Off) of a CA port group cannot be changed until the host affinity setting is cleared from the corresponding CA port group.
 - When one port is registered in multiple CA port groups, and the affinity setting has been configured on one of the CA port groups including the corresponding port, the affinity setting is configured on all the CA port groups, which include the corresponding port, and also on the member ports.
 - Ports without the host affinity setting can be members of a CA port group, regardless of whether the affinity mode for the group is enabled (On) or disabled (Off).

Note

- Host access does not need to be stopped when adding or deleting ports from the CA port group where the host affinity setting has been configured.
- When a port was added to a CA port group, of which the host affinity setting has been configured, paths between all the hosts with the host affinity setting and the added port will be configured. To modify the path between a host and a port, use the [Modify Host Affinity] function.
- When a port in the CA port group for which the host affinity settings are already configured is deleted, the path from the host to the port is also deleted.
- When creating a new CA port group and registering a port in the CA port group, use the [Create FC Port Group] function, the [Create iSCSI Port Group] function, or the [Create SAS Port Group] function depending on the CA port type.
- To change the port mode to "CA" or "CA/RA", use the [Modify Port Mode] function.

■ **User Privileges**

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	✓
StorageAdmin	✓
AccountAdmin	
SecurityAdmin	
Maintainer	✓

Refer to "A. User Roles and Policies" (page 1580) for details on the policies and roles.

■ Settings

CA Port Group Setting

In this screen, set the CA port groups.

Item	Description	Setting values
Name	Specify the CA port group name. An existing CA port group name cannot be used. (Port group names cannot overlap with any other port group names, irrespective of the CA types.)	Up to 16 alphanumeric characters, symbols (except ",", (comma) and "?"), and spaces
Type	The CA type of a CA port group is displayed. FC iSCSI SAS	
Number of CA Port Group Members	The number of member ports (0 to 8) in the CA port group is displayed. The number of member ports in the port list is updated every time the checkbox has been selected or cleared on the port list.	

Select Ports

In this screen, add a port to a CA port group. Or delete a port from a CA port group. The selectable ports are displayed on the port list.

Item	Description
Checkbox to select a port	Select the checkbox of the port that is to be added to the CA port group. Clear the checkbox of the port that is to be deleted from the CA port group. The checkbox of the port, which has been registered in the CA port group, is selected. <div style="background-color: #fff9c4; padding: 10px;"> <p>Caution</p> <ul style="list-style-type: none"> • If the CA port group's affinity mode is "On" (the affinity mode of all the selected ports is "On"), the port, of which affinity mode is "Off", cannot be selected. • If the CA port group's affinity mode is "Off" (the affinity mode of all the selected ports is "Off"), the port, of which affinity mode is "On", cannot be selected. • Up to eight ports can be selected. </div>
Port	The location information of the port is displayed. For the ETERNUS DX900 S5 or the ETERNUS DX8900 S4 CE#x CM#y CA#z Port#w For the other models CM#y CA#z Port#w x: CE number y: CM number z: CA number w: Port number <div style="background-color: #e0e0e0; padding: 10px;"> <p>Note</p> <ul style="list-style-type: none"> • Only the ports whose CA type is the same as the selected CA port group (FC/iSCSI/SAS) are displayed. </div>

Item	Description
Affinity	The affinity status of the port is displayed. <ul style="list-style-type: none">• On The affinity mode of the port is enabled (On), and the host affinity setting has been configured.• Off The affinity mode of the port is disabled (Off), and the host affinity setting has been configured.• Blank The port is not registered in a CA port group. Or all of the CA port groups, to which the port belongs, have not had the affinity setting applied.

■ Operating Procedures

In this screen, change the CA port group settings.

Procedure ▶▶▶

- 1 Select the CA port group that is to be changed, and click [Modify Port Group] in [Action].
- 2 Specify the new name of the CA port group, add a port to the CA port group (select the checkbox), or delete a port from the CA port group (clear the checkbox), and click the [Modify] button.
→ A confirmation screen appears.

Caution

- An error screen appears in the following conditions:
 - The "Name" is not entered
 - The "Name" does not satisfy the input conditions
 - The "Name" overlaps with an existing CA port group name
 - No ports are registered in the CA port group

- 3 Click the [OK] button.
→ Changing of the CA port group settings starts.
- 4 Click the [Done] button to return to the [CA Port Group] screen.



Delete CA Port Group

- ["■ Overview" \(page 714\)](#)
- ["■ User Privileges" \(page 715\)](#)
- ["■ Operating Procedures" \(page 715\)](#)

■ Overview

This function deletes the CA port groups.

Caution

- CA port groups that are being used for the host affinity settings (or the CA port groups whose status is "Active" in the CA port group list) cannot be deleted.

■ User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	✓
StorageAdmin	✓
AccountAdmin	
SecurityAdmin	
Maintainer	✓

Refer to "A. User Roles and Policies" (page 1580) for details on the policies and roles.

■ Operating Procedures

In this screen, delete the CA port groups.

Procedure ▶▶▶

- 1 Select the CA port group that is to be deleted (multiple selections can be made) and click [Delete Port Group] in [Action].
→ A confirmation screen appears.
- 2 Click the [OK] button.
→ Deletion of the CA port group starts.
- 3 Click the [Done] button to return to the [CA Port Group] screen.



FC Port

- "■ Overview" (page 715)
- "■ User Privileges" (page 715)
- "■ Display Contents" (page 716)
- "■ Filter Setting" (page 718)

■ Overview

This function displays a list of the FC port parameters that are registered in the storage system.

■ User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	✓
Admin	✓
StorageAdmin	✓
AccountAdmin	

6. Connectivity CA Port Group

Default role	Availability of executions
SecurityAdmin	✓
Maintainer	✓

Refer to ["A. User Roles and Policies" \(page 1580\)](#) for details on the policies and roles.

■ Display Contents

The screenshot shows the 'FC Port' configuration page in the ETERNUS Web GUI. The page includes a navigation menu on the left, a filter setting section at the top, and a table of FC ports. The table has the following columns: Port, Type, SFP Type, Status, Port Mode, Connection, Loop ID, Transfer Rate, and FC Frame Size. The table contains four rows of data, all with a status of 'Normal'.

Port	Type	SFP Type	Status	Port Mode	Connection	Loop ID	Transfer Rate	FC Frame Size
CM#0 CA#0 Port#0	16G FC	16G SFP+(MMF)	Normal	CA	Fabric	-	Auto-negotiation	2048 bytes
CM#0 CA#0 Port#1	16G FC	16G SFP+(MMF)	Normal	Initiator	FC-AL	Ascending	Auto-negotiation	2048 bytes
CM#1 CA#0 Port#0	16G FC	16G SFP+(MMF)	Normal	CA	Fabric	-	Auto-negotiation	2048 bytes
CM#1 CA#0 Port#1	16G FC	16G SFP+(MMF)	Normal	Initiator	FC-AL	Ascending	Auto-negotiation	2048 bytes

FC Port List

Parameters of the FC ports that are registered in the storage system are displayed.

Item	Description
Port	<p>The location information of the target port is displayed.</p> <p>For the ETERNUS DX900 S5 or the ETERNUS DX8900 S4 CE#x CM#y CA#z Port#w</p> <p>For the other models CM#y CA#z Port#w</p> <p>x: CE number y: CM number z: CA number w: Port number</p>
Type	<p>The CA type of the target port is displayed.</p> <p>8G FC 16G FC 32G FC</p>

6. Connectivity
CA Port Group

Item	Description
SFP Type	<p>The SFP type of the target port is displayed. If an SFP is not installed, "Unmount" is displayed.</p> <ul style="list-style-type: none"> • SFP+(MMF) An SFP (8G SFP+) that is installed in an 8 Gbit/s (maximum) FC port. • 16G SFP+(SMF) An SFP (16G LongWave) that is installed in a 16 Gbit/s (maximum) FC port. • 16G SFP+(MMF) An SFP (16G SFP+) that is installed in a 16 Gbit/s (maximum) FC port. • 32G SFP+(MMF) An SFP (32G SFP+) that is installed in a 32 Gbit/s (maximum) FC port. • Unknown Other than the above SFPs.
Status	<p>The status of the target port is displayed. Refer to "Component Status" (page 1607) for details.</p>
Port Mode	<p>The mode of the target port is displayed.</p> <p>CA RA CA/RA Initiator</p>
Connection	<p>The connection type of the target port is displayed.</p> <ul style="list-style-type: none"> • Fabric A connection type that enables simultaneous communication among multiple nodes through a Fibre Channel switch. This connection type can also be used for a direct connection when "Transfer Rate" is "16 Gbit/s" or more. • FC-AL A connection type that connects multiple nodes in a loop.
Loop ID	<p>If the connection type of the target port is "FC-AL", the Loop ID (0x00 to 0x7D) is displayed. "Loop ID" is an identification number of a node in a loop. When "Manual" is selected for "Set Loop ID", 0x00 - 0x7D is displayed. When "Set Loop ID" is "Automatic", "Ascending" or "Descending" is displayed. A "-" (hyphen) is displayed when the connection type of the target port is "Fabric".</p>
Transfer Rate	<p>The transfer rate of the target port is displayed.</p> <p>Auto-negotiation 4 Gbit/s 8 Gbit/s 16 Gbit/s 32 Gbit/s</p>
FC Frame Size	<p>The FC frame size of the target port is displayed. "FC Frame Size" specifies the length of the communication information.</p> <p>512 bytes 1024 bytes 2048 bytes</p>
Reset Scope	<p>The reset scope of the target port is displayed. Reset scope is the range where the command reset request from the server is performed, when the target port is connected to multiple servers.</p> <ul style="list-style-type: none"> • I_T_L (I: Initiator, T: Target, L: LUN) Reset (cancel) the command request from the server that sent the command reset request. • T_L (T: Target, L: LUN) Reset (cancel) the command request from all of the servers that are connected to the port. <p>A "-" (hyphen) is displayed when the port mode is "RA" or "Initiator".</p>

6. Connectivity

CA Port Group

Item	Description
Release Reservation if Chip is Reset	Whether the function to release the reservation status of the volume when the target port (chip) is reset is enabled or disabled is displayed. A "-" (hyphen) is displayed when the port mode is "RA" or "Initiator".
REC Line No.	The REC line number (0 to 127) of the target port is displayed. The REC line number is used to switch the communication path when a line fails. A "-" (hyphen) is displayed when the port mode is "CA" or "Initiator". This item is displayed only when the Advanced Copy license has been registered.
REC Transfer Mode	Whether the REC synchronous transfer mode, the REC asynchronous stack mode, the REC asynchronous consistency mode, or the REC asynchronous through mode is enabled or disabled for the target port is displayed. A "-" (hyphen) is displayed when the port mode is "CA" or "Initiator". This item is displayed only when the Advanced Copy license has been registered. <ul style="list-style-type: none"> • Sync When the REC synchronous transfer mode is enabled, the target port can be used as an REC synchronous transfer mode path. • Async Stack When the REC asynchronous stack mode is enabled, the target port can be used as an REC asynchronous stack mode path. • Async Consistency When the REC asynchronous consistency mode is enabled, the target port can be used as an REC asynchronous consistency mode path. • Async Through When the REC asynchronous through mode is enabled, the target port can be used as an REC asynchronous through mode path.
TFO Transfer Mode	Whether the TFO transfer mode is enabled or disabled for the target port is displayed. A "-" (hyphen) is displayed when the port mode is "CA" or "Initiator". This item is only displayed when "Enable" is selected for the Storage Cluster function.
TFO WWN Mode	When the target port is being used by the Storage Cluster function, "Custom" is displayed if WWN has been changed, and "Default" is displayed if no changes have been made. A "-" (hyphen) is displayed when the port mode is "RA", "CA/RA", or "Initiator". This item is only displayed when "Enable" is selected for the Storage Cluster function.
TFO Port	When the target port is being used by the Storage Cluster function, "Used" is displayed, and "Unused" is displayed when the target port is not used. This item is only displayed when "Enable" is selected for the Storage Cluster function.
Host Group	The name of the host group that has the host affinity setting with the target port is displayed. If no host group with the host affinity setting exists, a "-" (hyphen) is displayed.
Port Group	The name of the port group to which the target port belongs is displayed. If the target port does not belong to a port group, a "-" (hyphen) is displayed.
WWN	WWNs of all FC hosts that have the host affinity setting with the target port are displayed. If the host affinity setting is not configured, the field is blank.

■ Filter Setting

Function Description

Filter setting is a function used to display a list of only the FC ports meeting all the specified conditions. No filtering is set by default. The following table shows conditions that can be specified.

Item	Description	Setting values
Port	Select the location information of the port that is to be displayed.	All For the ETERNUS DX900 S5 or the ETERNUS DX8900 S4 CE#x CM#y CA#z Port#w For the other models CM#y CA#z Port#w x: CE number y: CM number z: CA number w: Port number
Type	Select the CA type of the port that is to be displayed.	All 8G FC 16G FC 32G FC
Status	Select the status of the port that is to be displayed.	All Refer to ""Component Status" (page 1607) ".
Host Group	Input the name of the host group that has the host affinity setting with the port that is to be displayed. Ports matching or partially matching the entered host group name are displayed. When not using the host group name for filtering, leave this item blank.	Blank Host group name
Port Group	Input the name of the port group to which the port that is to be displayed belongs. Ports matching or partially matching the entered port group name are displayed. When not using the port group name for filtering, leave this item blank.	Blank Port group name
WWN	Input the WWN of the FC host that has the host affinity setting with the port that is to be displayed. Ports matching or partially matching the entered WWN are displayed. When not using the WWN for filtering, leave this item blank.	Blank WWN

Modify FC Port Parameters

- ["■ Overview" \(page 719\)](#)
- ["■ User Privileges" \(page 720\)](#)
- ["■ Settings" \(page 720\)](#)
- ["■ Operating Procedures" \(page 734\)](#)

■ Overview

This function sets the parameters for the FC host interface port that connects between the storage system and the host, or connects between the storage systems for REC or Storage Migration.

Caution

- When changing port parameters during operation, stop access from the server that is allocated to the target port. Host access does not need to be stopped to change the port parameters of newly added CA ports.
- Port parameters cannot be changed for FC-Initiator ports that have online Storage Migration paths or offline Storage Migration paths.

Note

- There are four types of port modes for FC ports: CA, RA, CA/RA, and Initiator. CA is used for connections, RA is used for REC, CA/RA is used for both applications, and Initiator is used for Storage Migration. To change the port mode, use the [Modify Port Mode] function. The default value is "CA".
- For more details on FC-CA parameter settings, refer to "Configuration Guide -Server Connection-" for each OS type.
- When changing the port parameters for FC-Initiator port, delete the path group specified in the target port. Refer to the [Delete Storage Migration Path] function for details about how to delete the Storage Migration path.

■ User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	✓
StorageAdmin	✓
AccountAdmin	
SecurityAdmin	
Maintainer	✓

Refer to "[A. User Roles and Policies](#)" (page 1580)" for details on the policies and roles.

■ Settings

Modify FC Port Parameters

In this screen, specify the port connection information (FC port parameters) to connect a host, to perform REC, or to perform Storage Migration.

The settings of the FC port parameters vary depending on the configurations listed below.

- "[When the Port Mode is "CA"](#)" (page 721)
- "[When the Port Mode is "RA" or "CA/RA"](#)" (page 724)
- "[When the Port Mode is "Initiator"](#)" (page 729)

Copy FC Port Parameters

Select multiple FC ports, and then set and copy the FC port parameters. Refer to "[Copying FC Port Parameters](#)" (page 731)" for details.

When the Port Mode is "CA"

Item	Description	Setting values
Port	Select the target port. The selectable port locations are displayed as options.	For the ETERNUS DX900 S5 or the ETERNUS DX8900 S4 CE#x CM#y CA#z Port#w For the other models CM#y CA#z Port#w x: CE number y: CM number z: CA number w: Port number
Type	The type of the target port is displayed. 8G FC 16G FC 32G FC	
SFP Type	The SFP type of the target port is displayed. If an SFP is not installed, "Unmount" is displayed. <ul style="list-style-type: none"> • SFP+(MMF) An SFP (8G SFP+) that is installed in an 8 Gbit/s (maximum) FC port. • 16G SFP+(SMF) An SFP (16G LongWave) that is installed in a 16 Gbit/s (maximum) FC port. • 16G SFP+(MMF) An SFP (16G SFP+) that is installed in a 16 Gbit/s (maximum) FC port. • 32G SFP+(MMF) An SFP (32G SFP+) that is installed in a 32 Gbit/s (maximum) FC port. • Unknown Other than the above SFPs. 	
Port Mode	The port mode of the target port is displayed. FC-CA	

6. Connectivity
CA Port Group

Item	Description	Setting values	
Connection	<p>Select the connection topology for the target port from the "Fabric" or "FC-AL". When "FC-AL" is selected, it is necessary to assign a Loop ID to the port.</p> <ul style="list-style-type: none"> • Fabric A connection type that enables simultaneous communication among multiple nodes through a Fibre Channel switch. • FC-AL A connection type that connects multiple nodes in a loop. <p>Caution</p> <ul style="list-style-type: none"> • Select "FC-AL" for a direct connection when "Transfer Rate" is "4 Gbit/s" or "8 Gbit/s". Note that there may be cases when "Fabric" must be selected depending on the Fibre Channel card of the connection destination. Refer to "Setting the To-Server Connection Type (Setting the FC Port Parameters)" in "Configuration Guide -Server Connection-" (*1) for details. • *1 : Configuration Guide -Server Connection- Fibre Channel/ ETERNUS AF series, ETERNUS DX200F All-Flash Arrays, ETERNUS DX S5/S4/S3 series Hybrid Storage Systems Settings • Select "Fabric" for a direct connection when "Transfer Rate" is "16 Gbit/s" or more. Some destination Fibre Channel cards may require Fibre Channel switches. For details, refer to the Fibre Channel card specifications. 	Fabric FC-AL	
Set Loop ID	<p>When the connection type is "FC-AL", select "Manual" or "Automatic" as the specification method for the Loop ID. "Loop ID" is an identification number of a node in a loop.</p>	Manual Automatic	
Loop ID	Manual	<p>When "Set Loop ID" is "Manual", input the Loop ID. The Loop ID must have a value that is different from the values of all the ports.</p>	0x0 (Default) - 0x7D
	Automatic	<p>When "Set Loop ID" is "Automatic", select "Ascending" or "Descending".</p>	Ascending Descending

6. Connectivity
CA Port Group

Item	Description	Setting values																								
Transfer Rate	<p>Select the transfer rate for the target port. The available transfer rate varies according to the FC type, the SFP type, and the connection topology.</p> <table border="1"> <thead> <tr> <th>Type</th> <th>SFP Type</th> <th>Connection</th> <th>Transfer Rate</th> </tr> </thead> <tbody> <tr> <td rowspan="2">32G FC</td> <td rowspan="2">32G SFP+(MMF)</td> <td>Fabric</td> <td>Auto-negotiation 8 Gbit/s 16 Gbit/s 32 Gbit/s</td> </tr> <tr> <td>FC-AL</td> <td>Auto-negotiation 8 Gbit/s</td> </tr> <tr> <td rowspan="2">16G FC</td> <td rowspan="2">16G SFP+(SMF) 16G SFP+(MMF)</td> <td>Fabric</td> <td>Auto-negotiation 4 Gbit/s 8 Gbit/s 16 Gbit/s</td> </tr> <tr> <td>FC-AL</td> <td>Auto-negotiation 4 Gbit/s 8 Gbit/s</td> </tr> <tr> <td>8G FC</td> <td>SFP+(MMF)</td> <td>Fabric</td> <td>Auto-negotiation</td> </tr> <tr> <td rowspan="2">Other</td> <td rowspan="2">Unknown Unmount</td> <td>FC-AL</td> <td>4 Gbit/s 8 Gbit/s</td> </tr> </tbody> </table> <p>Caution</p> <ul style="list-style-type: none"> "Auto-negotiation" is selected for the transfer rate when the transfer rate is "16 Gbit/s" or "32 Gbit/s" and the connection type is changed from "Fabric" to "FC-AL". 	Type	SFP Type	Connection	Transfer Rate	32G FC	32G SFP+(MMF)	Fabric	Auto-negotiation 8 Gbit/s 16 Gbit/s 32 Gbit/s	FC-AL	Auto-negotiation 8 Gbit/s	16G FC	16G SFP+(SMF) 16G SFP+(MMF)	Fabric	Auto-negotiation 4 Gbit/s 8 Gbit/s 16 Gbit/s	FC-AL	Auto-negotiation 4 Gbit/s 8 Gbit/s	8G FC	SFP+(MMF)	Fabric	Auto-negotiation	Other	Unknown Unmount	FC-AL	4 Gbit/s 8 Gbit/s	Auto-negotiation 4 Gbit/s 8 Gbit/s 16 Gbit/s 32 Gbit/s
Type	SFP Type	Connection	Transfer Rate																							
32G FC	32G SFP+(MMF)	Fabric	Auto-negotiation 8 Gbit/s 16 Gbit/s 32 Gbit/s																							
		FC-AL	Auto-negotiation 8 Gbit/s																							
16G FC	16G SFP+(SMF) 16G SFP+(MMF)	Fabric	Auto-negotiation 4 Gbit/s 8 Gbit/s 16 Gbit/s																							
		FC-AL	Auto-negotiation 4 Gbit/s 8 Gbit/s																							
8G FC	SFP+(MMF)	Fabric	Auto-negotiation																							
Other	Unknown Unmount	FC-AL	4 Gbit/s 8 Gbit/s																							
		Frame Size	<p>Select the frame size of the target port.</p> <p>"Frame Size" specifies the length of the communication information.</p>	512 bytes 1024 bytes 2048 bytes (Default)																						
Reset Scope	<p>Specify the reset scope of the target port.</p> <p>Reset scope is the range where the command reset request from the server is performed, when the target port is connected to multiple servers.</p> <ul style="list-style-type: none"> I_T_L (I: Initiator, T: Target, L: LUN) Reset (cancel) the command request from the server that sent the command reset request. T_L (T: Target, L: LUN) Reset (cancel) the command request from all of the servers that are connected to the port. 	I_T_L T_L																								
Release Reservation if Chip is Reset	<p>Select whether to "Enable" or "Disable" the function to release the reserved status of the volume when the target port (chip) is reset.</p>	Enable Disable																								

When the Port Mode is "RA" or "CA/RA"

Item	Description	Setting values
Port	Select the target port. The selectable port locations are displayed as options.	For the ETERNUS DX900 S5 or the ETERNUS DX8900 S4 CE#x CM#y CA#z Port#w For the other models CM#y CA#z Port#w x: CE number y: CM number z: CA number w: Port number
Type	The type of the target port is displayed. 8G FC 16G FC 32G FC	
SFP Type	The SFP type of the target port is displayed. If an SFP is not installed, "Unmount" is displayed. <ul style="list-style-type: none"> • SFP+(MMF) An SFP (8G SFP+) that is installed in an 8 Gbit/s (maximum) FC port. • 16G SFP+(SMF) An SFP (16G LongWave) that is installed in a 16 Gbit/s (maximum) FC port. • 16G SFP+(MMF) An SFP (16G SFP+) that is installed in a 16 Gbit/s (maximum) FC port. • 32G SFP+(MMF) An SFP (32G SFP+) that is installed in a 32 Gbit/s (maximum) FC port. • Unknown Other than the above SFPs. 	
Port Mode	The port mode of the target port is displayed. FC-RA FC-CA/RA	

6. Connectivity
CA Port Group

Item	Description	Setting values	
Connection	<p>Select the connection topology for the target port from the "Fabric" or "FC-AL". When "FC-AL" is selected, it is necessary to assign a Loop ID to the port.</p> <ul style="list-style-type: none"> • Fabric A connection type that enables simultaneous communication among multiple nodes through a Fibre Channel switch. • FC-AL A connection type that connects multiple nodes in a loop. <div style="background-color: #fff9c4; padding: 10px; margin-top: 10px;"> <p>Caution</p> <ul style="list-style-type: none"> • Select "FC-AL" for a direct connection when "Transfer Rate" is "4 Gbit/s" or "8 Gbit/s". Note that there may be cases when "Fabric" must be selected depending on the Fibre Channel card of the connection destination. Refer to "Setting the To-Server Connection Type (Setting the FC Port Parameters)" in "Configuration Guide -Server Connection-" (*1) for details. <p>*1 : Configuration Guide -Server Connection- Fibre Channel/ ETERNUS AF series, ETERNUS DX200F All-Flash Arrays, ETERNUS DX S5/S4/S3 series Hybrid Storage Systems Settings</p> <ul style="list-style-type: none"> • Select "Fabric" for a direct connection when "Transfer Rate" is "16 Gbit/s" or more. </div>	Fabric FC-AL	
Set Loop ID	<p>When the connection type is "FC-AL", select "Manual" or "Automatic" as the specification method for the Loop ID. "Loop ID" is an identification number of a node in a loop.</p>	Manual Automatic	
Loop ID	Manual	<p>When "Set Loop ID" is "Manual", input the Loop ID. The Loop ID must have a value that is different from the values of all the ports.</p>	0x0 (Default) - 0x7D
	Automatic	<p>When "Set Loop ID" is "Automatic", select "Ascending" or "Descending".</p>	Ascending Descending

6. Connectivity
CA Port Group

Item	Description	Setting values																								
Transfer Rate	<p>Select the transfer rate for the target port. The available transfer rate varies according to the FC type, the SFP type, and the connection topology.</p> <table border="1"> <thead> <tr> <th>Type</th> <th>SFP Type</th> <th>Connection</th> <th>Transfer Rate</th> </tr> </thead> <tbody> <tr> <td rowspan="2">32G FC</td> <td rowspan="2">32G SFP+(MMF)</td> <td>Fabric</td> <td>Auto-negotiation 8 Gbit/s 16 Gbit/s 32 Gbit/s</td> </tr> <tr> <td>FC-AL</td> <td>Auto-negotiation 8 Gbit/s</td> </tr> <tr> <td rowspan="2">16G FC</td> <td rowspan="2">16G SFP+(SMF) 16G SFP+(MMF)</td> <td>Fabric</td> <td>Auto-negotiation 4 Gbit/s 8 Gbit/s 16 Gbit/s</td> </tr> <tr> <td>FC-AL</td> <td>Auto-negotiation 4 Gbit/s 8 Gbit/s</td> </tr> <tr> <td>8G FC</td> <td>SFP+(MMF)</td> <td>Fabric</td> <td>Auto-negotiation</td> </tr> <tr> <td rowspan="2">Other</td> <td rowspan="2">Unknown Unmount</td> <td>FC-AL</td> <td>4 Gbit/s 8 Gbit/s</td> </tr> </tbody> </table> <div style="background-color: #fff9c4; padding: 10px; margin-top: 10px;"> <p>Caution</p> <ul style="list-style-type: none"> "Auto-negotiation" is selected for the transfer rate when the transfer rate is "16 Gbit/s" or "32 Gbit/s" and the connection type is changed from "Fabric" to "FC-AL". </div>	Type	SFP Type	Connection	Transfer Rate	32G FC	32G SFP+(MMF)	Fabric	Auto-negotiation 8 Gbit/s 16 Gbit/s 32 Gbit/s	FC-AL	Auto-negotiation 8 Gbit/s	16G FC	16G SFP+(SMF) 16G SFP+(MMF)	Fabric	Auto-negotiation 4 Gbit/s 8 Gbit/s 16 Gbit/s	FC-AL	Auto-negotiation 4 Gbit/s 8 Gbit/s	8G FC	SFP+(MMF)	Fabric	Auto-negotiation	Other	Unknown Unmount	FC-AL	4 Gbit/s 8 Gbit/s	Auto-negotiation 4 Gbit/s 8 Gbit/s 16 Gbit/s 32 Gbit/s
Type	SFP Type	Connection	Transfer Rate																							
32G FC	32G SFP+(MMF)	Fabric	Auto-negotiation 8 Gbit/s 16 Gbit/s 32 Gbit/s																							
		FC-AL	Auto-negotiation 8 Gbit/s																							
16G FC	16G SFP+(SMF) 16G SFP+(MMF)	Fabric	Auto-negotiation 4 Gbit/s 8 Gbit/s 16 Gbit/s																							
		FC-AL	Auto-negotiation 4 Gbit/s 8 Gbit/s																							
8G FC	SFP+(MMF)	Fabric	Auto-negotiation																							
Other	Unknown Unmount	FC-AL	4 Gbit/s 8 Gbit/s																							
		Frame Size	<p>Select the frame size of the target port.</p> <p>"Frame Size" specifies the length of the communication information.</p>	512 bytes 1024 bytes 2048 bytes (Default)																						
Reset Scope	<p>Specify the reset scope of the target port.</p> <p>Reset scope is the range where the command reset request from the server is performed, when the target port is connected to multiple servers.</p> <p>This item is displayed only when the port mode is "FC-CA/RA".</p> <ul style="list-style-type: none"> I_T_L (I: Initiator, T: Target, L: LUN) Reset (cancel) the command request from the server that sent the command reset request. T_L (T: Target, L: LUN) Reset (cancel) the command request from all of the servers that are connected to the port. 	I_T_L T_L																								
Release Reservation if Chip is Reset	<p>Select whether to "Enable" or "Disable" the function to release the reserved status of the volume when the target port (chip) is reset.</p> <p>This item is displayed only when the port mode is "FC-CA/RA".</p>	Enable Disable																								

6. Connectivity
CA Port Group

Item	Description	Setting values
REC Line No.	<p>Select the REC line number of the target port.</p> <p>The REC line number is used to switch the communication path when a line fails. The REC line number is used to recognize failed lines. Set different REC line numbers for each physical communication path. When lines are in normal status, an REC can be performed regardless of the REC line number (specifying the same REC line numbers is allowed) in the same way as conventional REC operations. Note that no priority applies to REC line numbers.</p> <p>This item is displayed only when the Advanced Copy license has been registered.</p> <p>Caution</p> <ul style="list-style-type: none">• When a line fails, the communication path is switched according to the REC line number of the copy source storage system. For normal operation, set the same REC line number for the copy source and the copy destination storage systems to recover data.• If the port mode is changed from "CA/RA" or "RA" to the other mode, the REC line number returns to the default value ("0"). When the port mode is changed from "CA/RA" to "RA" or changed from "RA" to "CA/RA", the current REC line number setting is retained. Refer to the [Modify Port Mode] function for details.	0 (Default) - 127

Item	Description	Setting values
REC Transfer Mode	<p>Select which REC transfer mode is enabled or disabled for the target port.</p> <ul style="list-style-type: none"> • Sync (synchronous transfer mode) • Async Stack (asynchronous stack mode) • Async Consistency (asynchronous consistency mode) • Async Through (asynchronous through mode) <p>When "Enable" is selected, an REC is performed in the selected transfer mode for the target port.</p> <p>When "Disable" is selected, an REC is not performed in the selected transfer mode for the target port.</p> <p>For example, specify different ports for Consistency and Stack to perform data transfers without any interference. The current setting is retained even when an REC path is changed. When "Enable" is selected for all of the REC transfer modes, a conventional REC is performed.</p> <p>This item is displayed only when the Advanced Copy license has been registered.</p> <div style="background-color: #fff9c4; padding: 10px; margin-top: 10px;"> <p>Caution</p> <ul style="list-style-type: none"> • The REC transfer mode can be changed without suspending a copy session even when an REC is being performed in the target port. The changed settings are applied immediately to the storage system. • If specific REC transfer modes for all the RA ports and the CA/RA ports are disabled, a copy session with a disabled REC transfer mode fails because the REC paths for all the RA ports and the CA/RA ports are regarded as being blocked. When the REC transfer mode for a copy session that is being performed is disabled, this copy session is halted. • When "Async Consistency" is disabled for all the RA ports and the CA/RA ports, the REC buffer status changes to "INACTIVE". • For normal operations, set the same REC transfer mode for the copy source and the copy destination storage systems to recover data. When the REC transfer mode is specified for a copy source storage system, the specified REC transfer mode is performed even if one of the following storage systems is used as a copy destination. <ul style="list-style-type: none"> - Older models (ETERNUS S3 series, ETERNUS AF series, or ETERNUS DX8100 S2/DX8700 S2) - Storage systems without the "REC Transfer Mode" setting • If the port mode is changed from "CA/RA" or "RA" to the other mode, the REC transfer mode returns to the default value ("Enable"). When the port mode is changed from "CA/RA" to "RA" or changed from "RA" to "CA/RA", the current REC transfer mode setting is retained. Refer to the [Modify Port Mode] function for details. </div>	<p>Enable</p> <p>Disable</p>

When the Port Mode is "Initiator"

Item	Description	Setting values
Port	<p>Select the target port.</p> <p>The selectable port locations are displayed as options.</p>	<p>For the ETERNUS DX900 S5 or the ETERNUS DX8900 S4 CE#x CM#y CA#z Port#w</p> <p>For the other models CM#y CA#z Port#w</p> <p>x: CE number y: CM number z: CA number w: Port number</p>
Type	<p>The type of the target port is displayed.</p> <p>8G FC 16G FC 32G FC</p>	
SFP Type	<p>The SFP type of the target port is displayed. If an SFP is not installed, "Unmount" is displayed.</p> <ul style="list-style-type: none"> • SFP+(MMF) An SFP (8G SFP+) that is installed in an 8 Gbit/s (maximum) FC port. • 16G SFP+(SMF) An SFP (16G LongWave) that is installed in a 16 Gbit/s (maximum) FC port. • 16G SFP+(MMF) An SFP (16G SFP+) that is installed in a 16 Gbit/s (maximum) FC port. • 32G SFP+(MMF) An SFP (32G SFP+) that is installed in a 32 Gbit/s (maximum) FC port. • Unknown Other than the above SFPs. 	
Port Mode	<p>The port mode of the target port is displayed.</p> <p>FC-Initiator</p>	
Connection	<p>Select the connection topology for the target port from the "Fabric" or "FC-AL". When "FC-AL" is selected, it is necessary to assign a Loop ID to the port.</p> <ul style="list-style-type: none"> • Fabric A connection type that enables simultaneous communication among multiple nodes through a Fibre Channel switch. • FC-AL A connection type that connects multiple nodes in a loop. <div style="background-color: #fff9c4; padding: 5px; margin-top: 10px;"> <p>Caution</p> <ul style="list-style-type: none"> • Select "FC-AL" for a direct connection when "Transfer Rate" is "4 Gbit/s" or "8 Gbit/s". • Select "Fabric" for a direct connection when "Transfer Rate" is "16 Gbit/s" or more. </div>	<p>Fabric FC-AL</p>

6. Connectivity
CA Port Group

Item	Description	Setting values																								
Set Loop ID	When the connection type is "FC-AL", select "Manual" or "Automatic" as the specification method for the Loop ID. "Loop ID" is an identification number of a node in a loop.	Manual Automatic																								
Loop ID	Manual When "Set Loop ID" is "Manual", input the Loop ID. The Loop ID must have a value that is different from the values of all the ports.	0x0 (Default) - 0x7D																								
	Automatic When "Set Loop ID" is "Automatic", select "Ascending" or "Descending".	Ascending Descending																								
Transfer Rate	Select the transfer rate for the target port. The available transfer rate varies according to the FC type, the SFP type, and the connection topology. <table border="1"> <thead> <tr> <th>Type</th> <th>SFP Type</th> <th>Connection</th> <th>Transfer Rate</th> </tr> </thead> <tbody> <tr> <td rowspan="2">32G FC</td> <td rowspan="2">32G SFP+(MMF)</td> <td>Fabric</td> <td>Auto-negotiation 8 Gbit/s 16 Gbit/s 32 Gbit/s</td> </tr> <tr> <td>FC-AL</td> <td>Auto-negotiation 8 Gbit/s</td> </tr> <tr> <td rowspan="2">16G FC</td> <td rowspan="2">16G SFP+(SMF) 16G SFP+(MMF)</td> <td>Fabric</td> <td>Auto-negotiation 4 Gbit/s 8 Gbit/s 16 Gbit/s</td> </tr> <tr> <td>FC-AL</td> <td>Auto-negotiation 4 Gbit/s 8 Gbit/s</td> </tr> <tr> <td>8G FC</td> <td>SFP+(MMF)</td> <td>Fabric</td> <td>Auto-negotiation</td> </tr> <tr> <td rowspan="2">Other</td> <td rowspan="2">Unknown Unmount</td> <td>FC-AL</td> <td>4 Gbit/s 8 Gbit/s</td> </tr> </tbody> </table> <div style="background-color: #fff9c4; padding: 5px;"> <p>Caution</p> <ul style="list-style-type: none"> "Auto-negotiation" is selected for the transfer rate when the transfer rate is "16 Gbit/s" or "32 Gbit/s" and the connection type is changed from "Fabric" to "FC-AL". </div>	Type	SFP Type	Connection	Transfer Rate	32G FC	32G SFP+(MMF)	Fabric	Auto-negotiation 8 Gbit/s 16 Gbit/s 32 Gbit/s	FC-AL	Auto-negotiation 8 Gbit/s	16G FC	16G SFP+(SMF) 16G SFP+(MMF)	Fabric	Auto-negotiation 4 Gbit/s 8 Gbit/s 16 Gbit/s	FC-AL	Auto-negotiation 4 Gbit/s 8 Gbit/s	8G FC	SFP+(MMF)	Fabric	Auto-negotiation	Other	Unknown Unmount	FC-AL	4 Gbit/s 8 Gbit/s	Auto-negotiation 4 Gbit/s 8 Gbit/s 16 Gbit/s 32 Gbit/s
Type	SFP Type	Connection	Transfer Rate																							
32G FC	32G SFP+(MMF)	Fabric	Auto-negotiation 8 Gbit/s 16 Gbit/s 32 Gbit/s																							
		FC-AL	Auto-negotiation 8 Gbit/s																							
16G FC	16G SFP+(SMF) 16G SFP+(MMF)	Fabric	Auto-negotiation 4 Gbit/s 8 Gbit/s 16 Gbit/s																							
		FC-AL	Auto-negotiation 4 Gbit/s 8 Gbit/s																							
8G FC	SFP+(MMF)	Fabric	Auto-negotiation																							
Other	Unknown Unmount	FC-AL	4 Gbit/s 8 Gbit/s																							
		Frame Size	Select the frame size of the target port. "Frame Size" specifies the length of the communication information.	512 bytes 1024 bytes 2048 bytes (Default)																						

Item	Description	Setting values
WWN (Port Name)	<p>When the offline storage migration is performed, the storage system (destination device) is regarded as a host connecting to the migration source device. Specify the World Wide Port Name (WWPN) for the host that was connected to the FC-CA port of the migration source device.</p> <p>The default "WWN (Port Name)" is displayed with parentheses on the right side of the [Default] button. Click the [Default] button to set the default value.</p> <p>Caution</p> <ul style="list-style-type: none"> Specifying the WWPN of the host is only required when the host affinity setting is configured between the host and a migration source FC-CA port. If LUN mapping is configured for a migration source FC-CA port, the default value does not need to be changed. If the FC-Initiator port is used for an online storage migration or the Non-disruptive Storage Migration function, the default value does not need to be changed. 	<p>WWPN (16-digit hexadecimal)</p> <p>WWPN of the storage system</p>
WWN (Node Name)	<p>When the offline storage migration is performed, the storage system (destination device) is regarded as a host connecting to the migration source device. Specify the World Wide Node Name (WWNN) for the host that was connected to the FC-CA port of the migration source device.</p> <p>The default "WWN (Node Name)" is displayed with parentheses on the right side of the [Default] button. Click the [Default] button to set the default value.</p> <p>Caution</p> <ul style="list-style-type: none"> Specifying the WWNN of the host is only required when the host affinity setting is configured between the host and a migration source FC-CA port. If LUN mapping is configured for a migration source FC-CA port, the default value does not need to be changed. If the FC-Initiator port is used for an online storage migration or the Non-disruptive Storage Migration function, the default value does not need to be changed. 	<p>WWNN (16-digit hexadecimal)</p> <p>WWNN of the storage system</p>

Copying FC Port Parameters

Specify the FC port parameter for the copy source port and then copy the specified parameters to the target port.

Item	Description	Setting values
Port	<p>Select the copy source port.</p> <p>The selectable port locations are displayed as options.</p>	<p>For the ETERNUS DX900 S5 or the ETERNUS DX8900 S4 CE#x CM#y CA#z Port#w</p> <p>For the other models CM#y CA#z Port#w</p> <p>x: CE number y: CM number z: CA number w: Port number</p>

To set items that are not described above, refer to the following items for each port mode.

- ["When the Port Mode is "CA"" \(page 721\)](#)
- ["When the Port Mode is "RA" or "CA/RA"" \(page 724\)](#)

- ["When the Port Mode is "Initiator"" \(page 729\)](#)

[Copy Settings] Screen

Confirm the parameters of the copy source port and select the copy destination ports.

Source

Item	Description
Port	The location information of the copy source port is displayed. For the ETERNUS DX900 S5 or the ETERNUS DX8900 S4 CE#x CM#y CA#z Port#w For the other models CM#y CA#z Port#w x: CE number y: CM number z: CA number w: Port number
Type	The type of the copy source port is displayed. 8G FC 16G FC 32G FC
SFP Type	The SFP type of the target port is displayed. If an SFP is not installed, "Unmount" is displayed. SFP+(SMF) SFP+(MMF) 16G SFP+(SMF) 16G SFP+(MMF) 32G SFP+(MMF) Unknown Unmount
Port Mode	The port mode of the copy source port is displayed. FC-CA FC-CA/RA FC-RA FC-Initiator
Connection	The copy source port information (connection type, the specification method of the Loop ID, the Loop ID, and the detailed specification method of the Loop ID) is displayed. Fabric Connection FC-AL Connection (Loop ID: Automatic (Ascending)) FC-AL Connection (Loop ID: Automatic (Descending)) FC-AL Connection (Loop ID: Manual (xx)) xx: Loop ID (0x0 - 0x7D)
Transfer Rate	The transfer rate of the copy source port is displayed. Auto-negotiation 4 Gbit/s 8 Gbit/s 16 Gbit/s 32 Gbit/s
Frame Size	The frame size of the copy source port is displayed. 512 bytes 1024 bytes 2048 bytes

6. Connectivity
CA Port Group

Item	Description								
Reset Scope	The reset scope of the copy source port is displayed. This item is displayed only when the port mode is "FC-CA" or "FC-CA/RA". I_T_L T_L								
Release Reservation if Chip is Reset	Whether to release the reservation when a chip reset occurs in the copy source port is displayed. This item is displayed only when the port mode is "FC-CA" or "FC-CA/RA". Enable Disable								
REC Line No.	The REC line number (0 to 127) of the copy source port is displayed. This item is displayed only when the Advanced Copy license has been registered and the port mode is "FC-CA/RA" or "FC-RA".								
REC Transfer Mode	<table border="1"> <tr> <td>Sync</td> <td>The REC transfer mode of the copy source port is displayed.</td> </tr> <tr> <td>Async Stack</td> <td>This item is displayed only when the Advanced Copy license has been registered and the port mode is "FC-CA/RA" or "FC-RA".</td> </tr> <tr> <td>Async Consistency</td> <td> <ul style="list-style-type: none"> • Sync (synchronous transfer mode) </td> </tr> <tr> <td>Async Through</td> <td> <ul style="list-style-type: none"> • Async Stack (asynchronous stack mode) • Async Consistency (asynchronous consistency mode) • Async Through (asynchronous through mode) </td> </tr> </table> Enable Disable	Sync	The REC transfer mode of the copy source port is displayed.	Async Stack	This item is displayed only when the Advanced Copy license has been registered and the port mode is "FC-CA/RA" or "FC-RA".	Async Consistency	<ul style="list-style-type: none"> • Sync (synchronous transfer mode) 	Async Through	<ul style="list-style-type: none"> • Async Stack (asynchronous stack mode) • Async Consistency (asynchronous consistency mode) • Async Through (asynchronous through mode)
Sync	The REC transfer mode of the copy source port is displayed.								
Async Stack	This item is displayed only when the Advanced Copy license has been registered and the port mode is "FC-CA/RA" or "FC-RA".								
Async Consistency	<ul style="list-style-type: none"> • Sync (synchronous transfer mode) 								
Async Through	<ul style="list-style-type: none"> • Async Stack (asynchronous stack mode) • Async Consistency (asynchronous consistency mode) • Async Through (asynchronous through mode) 								
WWN (Port Name)	The World Wide Port Name (WWPN) of the storage system (migration destination storage system) that is connected to the migration source FC-CA port is displayed. This item is displayed only when the port mode is "FC-Initiator".								
WWN (Node Name)	The World Wide Node Name (WWNN) of the storage system (migration destination storage system) that is connected to the migration source FC-CA port is displayed. This item is displayed only when the port mode is "FC-Initiator".								

Destination

Refer to [""Source" \(page 732\)](#) for details on any other items that are not described below.

Item	Description
Checkbox to select copy destination port	Select the checkbox of the copy destination port.

■ Operating Procedures

Setting FC Port Parameters Manually

Procedure ▶▶▶

- 1 Select which FC port to set the parameters for (multiple selections can be made) and click [Configure FC Port] in [Action].

Note

- Multiple selections can be made from FC ports that have the same SFP type and port mode. Note that multiple FC ports can also be selected if the SFP types are one of the following combinations.
 - A mix of "16G SFP+(SMF)" and "16G SFP+(MMF)"
 - A mix of "SFP+(SMF)", "SFP+(MMF)", "Unknown", and "Unmount"
- Multiple ports can be set with the same or with different parameters in a single operation. To set parameters to multiple ports, select the target ports and specify the parameters for each port. After the specification is complete, click the [Modify] button.

- 2 Set the parameters for all of the selected ports and click the [Modify] button.
→ A confirmation screen appears.

Caution

- If the Loop ID is changed while a server is operating, reboot the server immediately. If the server is operated without being rebooted, a warning message may appear or a system failure may occur.
- If the parameters do not satisfy the input conditions, an error screen appears.

- 3 Click the [OK] button.
→ Setting of the FC port parameters starts.
- 4 Click the [Done] button to return to the [FC Port] screen.



Copying FC Port Parameters

Procedure ▶▶▶

- 1 Select the copy source port of parameters and all the copy destination ports, and click [Configure FC Port] in [Action].

Note

- Multiple selections can be made from FC ports that have the same SFP type and port mode. Note that multiple FC ports can also be selected if the SFP types are one of the following combinations.
 - A mix of "16G SFP+(SMF)" and "16G SFP+(MMF)"
 - A mix of "SFP+(SMF)", "SFP+(MMF)", "Unknown", and "Unmount"
- Setting and copying the FC port parameters can be performed with a single operation.

- 2 Set the copy source port parameters and then click the [Copy] button.
→ The [Copy Settings] screen appears.
- 3 Select all of the copy destination ports and then click the [Copy] button.
→ Returns to the [Modify FC Port Parameters] screen.
- 4 Specify the parameter that is not to be copied and click the [Set] button.
→ A confirmation screen appears.

Caution

- The "parameter that is not to be copied" indicates the "Loop ID" setting for "Set Loop ID (Manual)". When the connection type is "FC-AL" and the Loop ID setting is "Manual", specify the "Loop ID" value after copying of the parameters is complete.
- If the Loop ID is changed while a server is operating, reboot the server immediately. If the server is operated without being rebooted, a warning message may appear or a system failure may occur.
- If the parameters do not satisfy the input conditions, an error screen appears.

- 5 Click the [OK] button.
→ Setting of the FC port parameters starts.
- 6 Click the [Done] button to return to the [FC Port] screen.



Modify Port Mode

- ["■ Overview" \(page 735\)](#)
- ["■ User Privileges" \(page 737\)](#)
- ["■ Settings" \(page 737\)](#)
- ["■ Operating Procedures" \(page 738\)](#)

■ Overview

This function changes the port mode of each host interface port among Channel Adapter (CA), Remote Adapter (RA), CA/RA, and Initiator.

The port modes of the FC port and the iSCSI port can be changed.

Switchable Port Mode

Port	Port Mode	Usage
FC Port	CA	CA is used for connecting to the host.
	RA	RA is used for performing REC.
	CA/RA	CA/RA is used for connecting to the host and performing REC.
	Initiator	Initiator is used for performing Storage Migration.
iSCSI Port	CA	CA is used for connecting to the host.
	RA	RA is used for performing REC.
	CA/RA	CA/RA is used for connecting to the host and performing REC.

Caution

- The mapping information or the Advanced Copy path information may be deleted from the currently used port. Refer to "[Retained and Deleted Information When Changing the Port Mode](#)" for details.
 - Before changing this parameter, stop access from the host that is allocated to the target port. Note that the operation can be continued via other normal paths when the multipath configuration is used.
 - If the Advanced Copy path information is to be deleted due to the change of the port mode, perform this function when no sessions exist in the target port.
- When the Multiple VLAN setting is enabled and the port mode for the relevant iSCSI ports are changed from "CA" or "CA/RA" to "RA", all of the specified IP address information is deleted. If this occurs, only the IP address that is specified in the general information remains for the iSCSI port.
- When the Advanced Copy license has been registered or the Storage Cluster function is "Enable", the port mode can be changed to "RA" or "CA/RA".
- Whether the port mode can be changed varies depending on the status of the Storage Cluster function (used/unused). Refer to "[The Storage Cluster Function and Port Mode Modification](#)" for details.
- The port mode cannot be changed in the following conditions:
 - When the port type is "iSCSI RA (for older storage system connection)"
 - When selecting an FC-Initiator port with a Storage Migration path
- If the ETERNUS DX60 S5 is used with iSCSI or SAS host interfaces, this function is not displayed in [Action].

Retained and Deleted Information When Changing the Port Mode (-: N/A)

		Port mode after modification			
		CA	RA	CA/RA	Initiator
Port mode before modification	CA	-	Mapping information is deleted	Mapping information is retained	Mapping information is deleted
	RA	Advanced Copy path information is deleted	-	<ul style="list-style-type: none"> • Advanced Copy path information is retained • REC Line No. is retained • REC Transfer Mode is retained 	Advanced Copy path information is deleted
	CA/RA	<ul style="list-style-type: none"> • Mapping information is retained • Advanced Copy path information is deleted 	<ul style="list-style-type: none"> • Mapping information is deleted • Advanced Copy path information is retained • REC Line No. is retained • REC Transfer Mode is retained 	-	<ul style="list-style-type: none"> • Mapping information is deleted • Advanced Copy path information is deleted

The Storage Cluster Function and Port Mode Modification (The port mode can be changed: ✓)

Port mode before modification	The Storage Cluster's usage of the port		Port mode after modification		
			RA	CA/RA	Initiator
CA	The Storage Cluster function is not used	WWN is not changed	✓	✓	✓
		WWN is changed (*1)	✓		✓
	The Storage Cluster function is used				

*1: The port is being used for the Storage Cluster function, but the port is not used currently.

Note

- If the port mode is changed, the port parameter returns to the default setting. Note that the port parameters are retained if the port mode is changed from "CA" to "CA/RA" or changed from "CA/RA" to "CA".
- When changing the port mode of an FC-Initiator port, delete the path group that is specified for the target port. Refer to the [Delete Storage Migration Path] function for details about how to delete the Storage Migration path.
- To check whether or not the WWN for the target port has been changed, use the [FC Port] screen. Refer to the [Port] function for details.

■ **User Privileges**

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	✓
StorageAdmin	✓
AccountAdmin	
SecurityAdmin	
Maintainer	✓

Refer to "'A. User Roles and Policies" (page 1580)" for details on the policies and roles.

■ **Settings**

Port List

In this screen, change the port mode.

Item	Description	Setting values
Port	The location of the target port is displayed. For the ETERNUS DX900 S5 or the ETERNUS DX8900 S4 CE#x CM#y CA#z Port#w For the other models CM#y CA#z Port#w x: CE number y: CM number z: CA number w: Port number	
Type	The port type is displayed. FC iSCSI	
Port Mode(Now)	The current port mode is displayed. CA RA CA/RA Initiator	
Port Mode(After)	Select the port mode from "CA", "RA", "CA/RA" or "Initiator" to be changed over to. Note <ul style="list-style-type: none"> "Initiator" is displayed only for FC ports. "RA" and "CA/RA" are displayed as options only for the models that support REC. 	CA RA CA/RA Initiator

■ Operating Procedures

In this screen, change the port mode.

Procedure ▶▶▶

- 1 Click [Modify Port Mode] in [Action].
- 2 Select the port mode to be changed over to, and click the [Set] button.
→ A confirmation screen appears.

Caution

- If the specified FC-Initiator port is configured in Storage Migration path, an error screen appears.

- 3 Click the [OK] button.
→ Port mode changeover starts.
- 4 Click the [Done] button to return to the [CA Port] screen.



iSCSI Port

- ["■ Overview" \(page 739\)](#)
- ["■ User Privileges" \(page 739\)](#)

- ["■ Display Contents" \(page 739\)](#)
- ["■ Filter Setting" \(page 742\)](#)

■ Overview

This function displays a list of the iSCSI port parameters that are registered in the storage system.

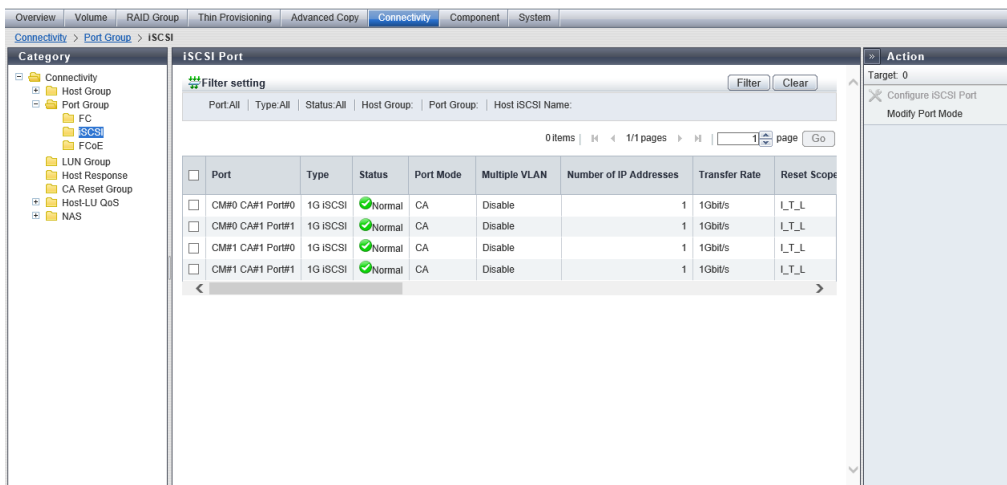
■ User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	✓
Admin	✓
StorageAdmin	✓
AccountAdmin	
SecurityAdmin	✓
Maintainer	✓

Refer to ["A. User Roles and Policies" \(page 1580\)](#) for details on the policies and roles.

■ Display Contents



iSCSI Port List

Parameters of the iSCSI ports that are registered in the storage system are displayed.

6. Connectivity
CA Port Group

Item	Description
Port	<p>The location information of the target port is displayed.</p> <p>For the ETERNUS DX900 S5 or the ETERNUS DX8900 S4 CE#x CM#y CA#z Port#w</p> <p>For the other models CM#y CA#z Port#w</p> <p>x: CE number y: CM number z: CA number w: Port number</p>
Type	<p>The type of the target port is displayed.</p> <ul style="list-style-type: none"> • 1G iSCSI 1Gbit/s iSCSI. The port mode can be changed (CA, RA, or CA/RA). • 10G iSCSI 10Gbit/s iSCSI. The port mode can be changed (CA, RA, or CA/RA). • 10G Base-T iSCSI 10Gbit/s iSCSI. The port mode can be changed (CA, RA, or CA/RA). This port can be installed in the ETERNUS DX60 S5/DX100 S5/DX200 S5 and the ETERNUS AF150 S3/AF250 S3. • iSCSI RA (for older storage system connection) 1Gbit/s iSCSI-RA. This port is used for an REC between the older models (*1). <p>*1: ETERNUS DX400 series, ETERNUS DX8000 series, ETERNUS4000, or ETERNUS8000</p>
Status	<p>The status of the target port is displayed.</p> <p>Refer to "Component Status" (page 1607) for details.</p>
Port Mode	<p>The mode of the target port is displayed.</p> <p>CA RA CA/RA</p>
Multiple VLAN	<p>Whether the Multiple VLAN is enabled or disabled for the target port is displayed.</p> <p>"Multiple VLAN" is a function that enables up to 16 pieces of VLAN information (IP address information) to be registered for each port.</p> <p>A "-" (hyphen) is displayed when the port mode is "RA".</p>
Number of IP Addresses	<p>The number of IP addresses (1 to 16) that are used for the relevant port is displayed.</p> <p>When "Multiple VLAN" is enabled, the number of IP addresses that are registered in the port is displayed. When "Multiple VLAN" is disabled or "-" is displayed in the "Multiple VLAN" field, "1" is displayed.</p>
Transfer Rate	<p>The transfer rate of the target port is displayed. All transfers are full-duplex.</p> <p>Auto-negotiation 1 Gbit/s 10 Gbit/s 100 Mbit/s</p>
Reset Scope	<p>The reset scope of the target port is displayed.</p> <p>Reset scope is the range where the command reset request from the server is performed, when the target port is connected to multiple servers.</p> <p>A "-" (hyphen) is displayed when the port mode is "RA".</p> <ul style="list-style-type: none"> • I_T_L (I: Initiator, T: Target, L: LUN) Reset (cancel) the command request from the server that sent the command reset request. • T_L (T: Target, L: LUN) Reset (cancel) the command request from all of the servers that are connected to the port.

6. Connectivity
CA Port Group

Item	Description
Release Reservation if Chip is Reset	Whether the function to release the reservation status of the volume when the target port (chip) is reset is enabled or disabled is displayed. A "-" (hyphen) is displayed when the port mode is "RA".
iSCSI Name	The iSCSI name of the target port is displayed.
Alias Name	The Alias name of the target port is displayed. If the Alias name is not specified, the field is blank.
Bandwidth Limit	The bandwidth limit (10 Mbit/s to 400 Mbit/s) of the target port is displayed. This item is displayed when the WAN bandwidth that can be used for REC is designated. A "-" (hyphen) is displayed when the type is "1G iSCSI", "10G iSCSI", or "10G Base-T iSCSI".
MTU	The MTU size of the target port is displayed. "Maximum Transmission Unit (MTU)" is the maximum amount of data that can be transmitted at the one time over the communication network. A "-" (hyphen) is displayed when the port mode is "CA". When the port type is "1G iSCSI", "10G iSCSI", or "10G Base-T iSCSI": 576 - 9000 When the port type is "iSCSI RA": 1000 1050 1100 1150 1200 1250 1300 1350 1400 1438
CHAP	When CHAP authentication for the target port is enabled, "ON" is displayed. When it is disabled, "OFF" is displayed. When the port mode is "CA/RA", this status is displayed in the form of "x/y" as follows: x: The CHAP authentication status of the CA port ("ON" or "OFF") y: The CHAP authentication status of the RA port ("ON" or "OFF")
REC Line No.	The REC line number (0 to 127) of the target port is displayed. The REC line number is used to switch the communication path when a line fails. A "-" (hyphen) is displayed when the port mode is "CA". This item is displayed only when the Advanced Copy license has been registered.

Item	Description
REC Transfer Mode	<p>Whether the REC synchronous transfer mode, the REC asynchronous stack mode, the REC asynchronous consistency mode, or the REC asynchronous through mode is enabled or disabled for the target port is displayed.</p> <p>A "-" (hyphen) is displayed when the port mode is "CA".</p> <p>This item is displayed only when the Advanced Copy license has been registered.</p> <ul style="list-style-type: none"> • Sync When the REC synchronous transfer mode is enabled, the target port can be used as an REC synchronous transfer mode path. • Async Stack When the REC asynchronous stack mode is enabled, the target port can be used as an REC asynchronous stack mode path. • Async Consistency When the REC asynchronous consistency mode is enabled, the target port can be used as an REC asynchronous consistency mode path. • Async Through When the REC asynchronous through mode is enabled, the target port can be used as an REC asynchronous through mode path.
TFO Transfer Mode	<p>Whether the TFO transfer mode is enabled or disabled for the target port is displayed.</p> <p>A "-" (hyphen) is displayed when the port mode is "CA".</p> <p>This item is only displayed when "Enable" is selected for the Storage Cluster function.</p>
TFO Port	<p>When the target port is being used by the Storage Cluster function, "Used" is displayed, and "Unused" is displayed when the target port is not used.</p> <p>This item is only displayed when "Enable" is selected for the Storage Cluster function.</p>
Host Group	<p>The name of the host group that has the host affinity setting with the target port is displayed.</p> <p>If no host group with the host affinity setting exists, a "-" (hyphen) is displayed.</p>
Port Group	<p>The name of the port group to which the target port belongs is displayed.</p> <p>If the target port does not belong to a port group, a "-" (hyphen) is displayed.</p>
Host iSCSI Name	<p>iSCSI names of all iSCSI hosts that have the host affinity setting with the target port are displayed.</p> <p>If the host affinity setting is not configured, a "-" (hyphen) is displayed.</p>

■ Filter Setting

Function Description

Filter setting is a function used to display a list of only the iSCSI ports meeting all the specified conditions.

No filtering is set by default. The following table shows conditions that can be specified.

Item	Description	Setting values
Port	Select the location information of the port that is to be displayed.	<p>All</p> <p>For the ETERNUS DX900 S5 or the ETERNUS DX8900 S4 CE#x CM#y CA#z Port#w</p> <p>For the other models CM#y CA#z Port#w</p> <p>x: CE number y: CM number z: CA number w: Port number</p>

Item	Description	Setting values
Type	Select the type of the port that is to be displayed.	All 1G iSCSI 10G iSCSI 10G Base-T iSCSI iSCSI RA (for older storage system connection)
Status	Select the status of the port that is to be displayed.	All Refer to "Component Status" (page 1607) .
Host Group	Input the name of the host group that has the host affinity setting with the port that is to be displayed. Ports matching or partially matching the entered host group name are displayed. When not using the host group name for filtering, leave this item blank.	Blank Host group name
Port Group	Input the name of the port group to which the port that is to be displayed belongs. Ports matching or partially matching the entered port group name are displayed. When not using the port group name for filtering, leave this item blank.	Blank Port group name
Host iSCSI Name	Input the host iSCSI name of the iSCSI host that has the host affinity setting with the port that is to be displayed. Ports matching or partially matching the entered host iSCSI name are displayed. When not using the host iSCSI name for filtering, leave this item blank.	Blank Host iSCSI name

Modify iSCSI Port Parameters

- ["■ Overview" \(page 743\)](#)
- ["■ User Privileges" \(page 744\)](#)
- ["■ Settings" \(page 744\)](#)
- ["■ Operating Procedures" \(page 770\)](#)

■ Overview

This function sets the parameters for the iSCSI host interface port that connects between the storage system and the host, or connects between the storage systems for REC.

Caution

- When changing port parameters during operation, stop access from the server that is allocated to the target port. Host access does not need to be stopped to change the port parameters of newly added CA ports.
- Multiple VLAN can be set for ports with "CA" or "CA/RA" as the port mode. For "CA/RA" ports, up to 15 IP addresses can be used as "CA" type ports.
- When the Multiple VLAN setting is enabled and the port mode for the relevant iSCSI ports are changed from "CA" or "CA/RA" to "RA", all of the added IP address information is deleted. Refer to the [Modify Port Mode] function for details.

Note

- There are three types of port modes for iSCSI ports; CA, RA, and CA/RA. CA is used for connecting to a host, RA is used for REC, and CA/RA is used for both applications. To change the port mode, use the [Modify Port Mode] function. The default value is "CA".
- For more details on iSCSI-CA parameter settings, refer to "Configuration Guide -Server Connection-" for each OS type.
- iSCSI RA (for older storage system connection) is an iSCSI-RA adapter that is used exclusively for an REC between older models (*1).

*1: ETERNUS DX400 series, ETERNUS DX8000 series, ETERNUS4000, or ETERNUS8000

■ **User Privileges**

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	✓
StorageAdmin	✓
AccountAdmin	
SecurityAdmin	
Maintainer	✓

Refer to "[A. User Roles and Policies](#)" (page 1580) for details on the policies and roles.

■ **Settings**

iSCSI Port Parameter Settings

In this screen, specify the port connection information (iSCSI port parameters) to connect a host or to perform REC.

The settings of the iSCSI port parameters vary depending on the configurations listed below.

- When the port type is "1G iSCSI", "10G iSCSI", or "10G Base-T iSCSI" and [the port mode is "CA"](#)
- When the port type is "1G iSCSI", "10G iSCSI", or "10G Base-T iSCSI" and [the port mode is "RA"](#)
- When the port type is "1G iSCSI", "10G iSCSI", or "10G Base-T iSCSI" and [the port mode is "CA/RA"](#)
- When [the type is "iSCSI RA \(for older storage system connection\)"](#)

When the Port Mode is "CA"

When the type is "1G iSCSI", "10G iSCSI", or "10G Base-T iSCSI" and the port mode is "CA", specify the following items:

Select Port

Item	Description	Setting values
Port	Select the target port. The selectable port locations are displayed as options.	For the ETERNUS DX900 S5 or the ETERNUS DX8900 S4 CE#x CM#y CA#z Port#w For the other models CM#y CA#z Port#w x: CE number y: CM number z: CA number w: Port number
Type	The CA type of the target port is displayed. 1G iSCSI 10G iSCSI 10G Base-T iSCSI	
Mode	The port mode of the target port is displayed. iSCSI-CA	

General Information

iSCSI Settings

Item	Description	Setting values
iSCSI Name	Input the iSCSI name of the target port. Click the [Default] button to set the common iSCSI name of the storage system. Caution <ul style="list-style-type: none"> The same iSCSI name cannot be set to multiple iSCSI ports except the device iSCSI name. 	4 - 223 alphanumeric characters and symbols "-" (hyphen), "." (period), and ":" (colon) The name starts with "iqn." or "eui." The unique iSCSI name of each port is set (Default)
Alias Name	Input the alias name of the target port. (can be omitted) While the iSCSI name is a formal nomenclature that specifies the target iSCSI port, an alias name is used as nickname. An alias name that is the same as another port cannot be specified.	Up to 31 alphanumeric characters and symbols "-" (hyphen), "." (period), ":" (colon), "+" (plus), "@" (at sign), "_" (underscore), "=" (equal), "/" (slash), "[" (left square bracket), "]" (right square bracket), "," (comma), "~" (tilde)

TCP/IP Settings

Item	Description	Setting values
IP Version	Select the IP version for the target port. <ul style="list-style-type: none"> IPv4 Specify the IPv4 address. When "IPv4" is selected, input "IP Address" (required), "Subnet Mask" (required), and "Gateway". IPv6 Specify the IPv6 address. When "IPv6" is selected, input "IPv6 Connect IP Address" (required), "IPv6 Global Address", and "IPv6 Gateway". IPv4 / IPv6 Specify both the IPv4 address and the IPv6 address. The input items for IPv4 and IPv6 can be specified. 	IPv4 IPv6 IPv4 / IPv6

6. Connectivity
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Item	Description	Setting values
IP Address	<p>Input the IPv4 address of the target port (required when "IPv4" or "IPv4/IPv6" is selected).</p> <p>Click the [Test Connection (ping)] button to display the "[Send ping] Screen" (page 769). Specify the IP address to check the connection status of the remote storage system and the number of transmissions. Click the [Send] button. When the "ping" command is sent, the settings of the IP address and the connection path for the remote storage system can be checked.</p>	<p>Up to 3 numeric characters</p> <p>First text box: "1" - "255"</p> <p>Other text boxes: "0" - "255"</p> <p>"192.168.xxx.xxx" (Default)</p>
Subnet Mask	<p>Input the subnet mask of the target port (required when "IPv4" or "IPv4/IPv6" is selected).</p>	<p>255.0.0.0 - 255.255.255.252</p> <p>"255.255.255.0" (Default)</p>
Gateway	<p>Input the gateway IPv4 address of the target port.</p>	<p>Up to 3 numeric characters</p> <p>All text boxes: "0" - "255"</p>
IPv6 Link Local Address	<p>Input the IPv6 link local address of the target port (required when "IPv6" or "IPv4/IPv6" is selected).</p> <p>Refer to "'Available IPv6 Address' (page 1221)" for details. When the current setting is displayed, the IPv6 address is displayed as an abbreviation.</p> <p>Click the [Test Connection (ping)] button to display the "[Send ping] Screen" (page 769). Specify the IP address to check the connection status of the remote storage system and the number of transmissions. Click the [Send] button. When the "ping" command is sent, the settings of the IP address and the connection path for the remote storage system can be checked.</p> <p>Click the [Default] button to set the default IPv6 link local address.</p>	<p>fe80::xxxx:xxxx:xxxx:xxxx xxxx: 0 - ffff (FFFF) (hexadecimal, alphanumeric characters)</p> <p>Refer to "'IPv6 Address Notation' (page 1220)" for details.</p> <p>Address that is obtained from the device WWN (Default)</p>
IPv6 Connect IP Address	<p>Input the IPv6 connect IP address of the target port.</p> <p>"Global address", "unique local address", or "6to4 address" can be input for the IPv6 address. Refer to "'Available IPv6 Address' (page 1221)" for details.</p> <p>When the current setting is displayed, the IPv6 address is displayed as an abbreviation.</p> <p>"IPv6 Connect IP Address" corresponds to "IP Address" for IPv4.</p> <p>"IPv6 Connect IP Address" can be directly input or created automatically.</p> <p>Click the [Discovery] button to display the "[Select IPv6 Prefix] Screen" (page 751). Select "IPv6 Prefix" to create an IPv6 connect IP address automatically from the selected IPv6 prefix and the input IPv6 link local address (interface ID). Click the [OK] button to specify the created IPv6 address in the entry field.</p> <p>Click the [Test Connection (ping)] button to display the "[Send ping] Screen" (page 769). Specify the IP address to check the connection status of the remote storage system and the number of transmissions. Click the [Send] button. When the "ping" command is sent, the settings of the IP address and the connection path for the remote storage system can be checked.</p>	<p>xxxx:xxxx:xxxx:xxxx:xxxx: xxxx:xxxx:xxxx xxxx: 0 - ffff (FFFF) (hexadecimal, alphanumeric characters)</p> <p>Refer to "'IPv6 Address Notation' (page 1220)" for details.</p>

6. Connectivity
CA Port Group

Item	Description	Setting values																																
IPv6 Gateway	<p>Input the gateway IPv6 address of the target port.</p> <p>The following IPv6 addresses can be used; "link local address", "global address", "unique local address", or "6to4 address". Refer to "Available IPv6 Address" (page 1221) for details. When the current setting is displayed, the IPv6 address is displayed as an abbreviation.</p> <p>"IPv6 Gateway" can be directly input or created automatically.</p> <p>Click the [Discovery] button to display the "[Select IPv6 Gateway] Screen" (page 752). Select "IPv6 Gateway" and click the [OK] button. The selected IPv6 address is specified in the entry field.</p>	<p>xxxx:xxxx:xxxx:xxxx:xxxx: xxxx:xxxx:xxxx xxxx: 0 - ffff (FFFF) (hexadecimal, alphanumeric characters) Refer to "IPv6 Address Notation" (page 1220) for details.</p>																																
TCP Port No.	<p>Input the TCP port number of the target port.</p> <p>Click the [Default] button to set the default TCP port number.</p>	<p>0 - 28671 3260 (Default)</p>																																
TCP Window Scale	<p>Input the TCP Window Scale of the target port.</p> <p>"TCP Window Scale" is a parameter that is used to specify the TCP window size. When the I/O load is high, the expected performance may not be achieved even if "0" or "1" is specified for TCP Window Scale. Even if "8" or higher is specified, the storage system performs as though "7" is specified for TCP Window Scale.</p> <p>Specify the "TCP Window Scale" in powers of two (when the value is n-th to the power of two, "n" indicates the "TCP Window Scale"). The relationship between the setting value and the TCP Window Scale is as follows:</p> <table border="1"> <thead> <tr> <th>TCP Window Scale</th> <th>TCP Window size</th> </tr> </thead> <tbody> <tr><td>0</td><td>32 KB</td></tr> <tr><td>1</td><td>64 KB</td></tr> <tr><td>2</td><td>128 KB</td></tr> <tr><td>3</td><td>256 KB</td></tr> <tr><td>4</td><td>512 KB</td></tr> <tr><td>5</td><td>1024 KB</td></tr> <tr><td>6</td><td>2048 KB</td></tr> <tr><td>7</td><td>4096 KB</td></tr> <tr><td>8</td><td>8192 KB</td></tr> <tr><td>9</td><td>16384 KB</td></tr> <tr><td>10</td><td>32768 KB</td></tr> <tr><td>11</td><td>65536 KB</td></tr> <tr><td>12</td><td>131072 KB</td></tr> <tr><td>13</td><td>262144 KB</td></tr> <tr><td>14</td><td>524288 KB</td></tr> </tbody> </table>	TCP Window Scale	TCP Window size	0	32 KB	1	64 KB	2	128 KB	3	256 KB	4	512 KB	5	1024 KB	6	2048 KB	7	4096 KB	8	8192 KB	9	16384 KB	10	32768 KB	11	65536 KB	12	131072 KB	13	262144 KB	14	524288 KB	<p>0 - 14 2 (Default)</p>
TCP Window Scale	TCP Window size																																	
0	32 KB																																	
1	64 KB																																	
2	128 KB																																	
3	256 KB																																	
4	512 KB																																	
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11	65536 KB																																	
12	131072 KB																																	
13	262144 KB																																	
14	524288 KB																																	

6. Connectivity
CA Port Group

Item	Description	Setting values
iSNS Server	<p>Select whether to enable the use of an iSNS server with IPv4 or IPv6, or disable the use of an iSNS server for the target port.</p> <p>When "IPv4" or "IPv6" is selected, input the IP address of the iSNS server.</p> <p>Internet Storage Name Service (iSNS) is almost equivalent to Domain Name System (DNS) for the Internet. iSNS server is used to convert the iSCSI name to the IP address on the iSCSI network.</p> <div style="background-color: #fff9c4; padding: 10px; margin-top: 10px;"> <p>Caution</p> <ul style="list-style-type: none"> • When "IP Version" is "IPv4", "IPv4" and "Disable" can be selected. • When "IP Version" is "IPv6", "IPv6" and "Disable" can be selected. • When "IP Version" is "IPv4/IPv6", "IPv4", "IPv6", and "Disable" can be selected. </div>	<p>IPv4</p> <p>IPv6</p> <p>Disable</p>
iSNS Server (IPv4 Address)	<p>When "iSNS Server" is "IPv4", input the IPv4 address for the iSNS server.</p>	<p>xxx.xxx.xxx.xxx</p> <p>xxx: 1 - 255 for the top field (decimal)</p> <p>xxx: 0 - 255 for other fields (decimal)</p>
iSNS Server (IPv6 Address)	<p>When "iSNS Server" is "IPv6", input the IPv6 address for the iSNS server.</p> <p>The following IPv6 addresses can be used; "link local address", "global address", "unique local address", or "6to4 address". Refer to "Available IPv6 Address" (page 1221) for details. When the current setting is displayed, the IPv6 address is displayed as an abbreviation.</p>	<p>xxxx:xxxx:xxxx:xxxx:xxxx:</p> <p>xxxx:xxxx:xxxx</p> <p>xxxx: 0 - ffff (FFFF)</p> <p>(hexadecimal, alphanumeric characters)</p> <p>Refer to "IPv6 Address Notation" (page 1220) for details.</p>
iSNS Server Port No.	<p>When "iSNS Server" for the target port is "IPv4" or "IPv6", input the port number of the iSNS server.</p> <p>Click the [Default] button to set the default iSNS server port number.</p>	<p>0 - 65535</p> <p>3205 (Default)</p>
VLAN ID	<p>Select whether to "Enable" or "Disable" the VLAN ID for the target port.</p> <p>When "Enable" is selected, input the VLAN ID.</p> <div style="background-color: #fff9c4; padding: 10px; margin-top: 10px;"> <p>Caution</p> <ul style="list-style-type: none"> • When specifying the VLAN ID, confirm the VLAN setting values of the LAN switch and the VLAN tagging configuration of the server LAN card. </div>	<p>Enable</p> <p>Disable</p> <p>When "Enable" is selected: 0 (Default) - 4095</p>
Jumbo Frame	<p>Select whether to "Enable" or "Disable" the Jumbo Frame.</p> <p>Select "Enable" when using the Jumbo Frame to transfer data via the target port. When not using the Jumbo Frame, select "Disable".</p> <p>Enabling Jumbo Frame increases the amount of data to be transferred per Frame, making data transfer more efficient.</p> <p>Confirm that the connected device (*1) supports the Jumbo Frame before enabling the Jumbo Frame.</p> <p>*1: When the storage system and server are connected directly, this indicates that the connected device is a server side LAN card (NIC). When the storage system and server are connected via a switch, this indicates that the connected device is a switch.</p>	<p>Enable</p> <p>Disable</p>

Security Settings

Item	Description	Setting values
CHAP	Specify "ON" to use the unidirectional CHAP authentication or bidirectional CHAP authentication for the target port, and specify "OFF" not to use both unidirectional CHAP authentication and bidirectional CHAP authentication. For CHAP authentication, an encrypted password based on a random key that the storage system receives from the host is sent, and connection possibility is judged on the server side.	ON OFF
CHAP User ID	When using the bidirectional CHAP authentication, enter the user ID to access the target port. When using the unidirectional CHAP authentication, it is not necessary to enter a user ID. Make sure to set the user name and password together.	Up to 255 alphanumeric characters, symbols, and spaces
New Password	When using the bidirectional CHAP authentication, enter the password to access the target port. When using the unidirectional CHAP authentication, it is not necessary to enter a password. Make sure to set the user name and password together.	12 - 100 alphanumeric characters, symbols, and spaces
Confirm new Password	Input the same password as that entered in the New Password field.	12 - 100 alphanumeric characters, symbols, and spaces
Header Digest	Select "OFF" not to add the Header Digest of the target port. Select "CRC32C" to add the Header Digest. Header Digest is a check code to be added to the header part of the iSCSI port detailed information. Specify "CRC32C" when the host requests to add the check code. "CRC32C" is the algorithm that is used to create a check code.	OFF CRC32C
Data Digest	Select "OFF" not to add the Data Digest of the target port. Select "CRC32C" to add the Data Digest. Data Digest is a check code to be added to the data area of the iSCSI port detailed information. Specify "CRC32C" when the host requests to add the check code. "CRC32C" is the algorithm that is used to create a check code.	OFF CRC32C

General Settings

Item	Description	Setting values
Transfer Rate	Select the transfer rate for the target port. This item is displayed only when the port type is "10G Base-T iSCSI". <ul style="list-style-type: none"> • Auto-negotiation The transfer rate is automatically selected from "1 Gbit/s" or "10 Gbit/s". • 1 Gbit/s The transfer rate is 1 Gbit/s. • 10 Gbit/s The transfer rate is 10 Gbit/s. 	Auto-negotiation 1 Gbit/s 10 Gbit/s

6. Connectivity
CA Port Group

Item	Description	Setting values
Reset Scope	<p>Specify the reset scope of the target port.</p> <p>Reset scope is the range where the command reset request from the server is performed, when the target port is connected to multiple servers.</p> <ul style="list-style-type: none"> • I_T_L (I: Initiator, T: Target, L: LUN) Reset (cancel) the command request from the server that sent the command reset request. • T_L (T: Target, L: LUN) Reset (cancel) the command request from all of the servers that are connected to the port. 	I_T_L T_L
Release Reservation if Chip is Reset	Select whether to "Enable" or "Disable" the function to release the reserved status of the volume when the target port (chip) is reset.	Enable Disable
CmdSN Count	Change the number of commands that can be accepted from the host to the target port at the same time. It is not necessary to change the setting from "Unlimited" for normal use.	Unlimited (Default) 180 120 80 40 20

Additional IP Address Information

Additional IP Address Settings

Item	Description	Setting values
Multiple VLAN	<p>Select whether to "Enable" or "Disable" the Multiple VLAN settings for the target port.</p> <p>When the Multiple VLAN setting is enabled, multiple IP addresses can be specified for a single iSCSI-CA port. This enables concurrent connection to multiple hosts that belong to different VLANs via a single iSCSI-CA port.</p> <div style="background-color: #fff9c4; padding: 10px; margin-top: 10px;"> <p>Caution</p> <ul style="list-style-type: none"> • If the Multiple VLAN setting is changed to "Disable", all of the added IP address information is deleted. </div>	Enable Disable

When the Multiple VLAN setting is "Enable", multiple IP address information can be specified.

IP Address Settings

Item	Description
No.	<p>The setting number of the IP address is displayed.</p> <p>Click this item to display the "[IP Address Settings] Screen" (page 752). Edit the IP address information for the Multiple VLAN setting in the [IP Address Settings] screen.</p> <p>IP#n n: 1 - 15</p>
VLAN ID	<p>The VLAN ID (0 to 4095) of the IP address is displayed.</p> <p>If the VLAN ID is not specified, a "-" (hyphen) is displayed.</p>

Item	Description
IP Address	<p>The IPv4 address is displayed.</p> <p>If an IP address is not specified (when "IPv6" is selected for the IP version setting in the [IP Address Settings] screen), a "-" (hyphen) is displayed.</p> <p>xxx.xxx.xxx.xxx xxx: 0 - 255 (decimal)</p>
IPv6 Link Local Address	<p>The IPv6 link local address is displayed.</p> <p>Note that the IPv6 address is displayed as an abbreviation.</p> <p>If an IP address is not specified (when "IPv4" is selected for the IP version setting in the [IP Address Settings] screen), a "-" (hyphen) is displayed.</p> <p>fe80::xxx:xxx:xxx:xxx xxx: 0 - ffff (FFFF) (hexadecimal, alphanumeric characters) Refer to ""IPv6 Address Notation" (page 659)" for details.</p>
IPv6 Connect IP Address	<p>The IPv6 connect IP address is displayed.</p> <p>Note that the IPv6 address is displayed as an abbreviation.</p> <p>If an IP address is not specified (when "IPv4" is selected for the IP version setting in the [IP Address Settings] screen), a "-" (hyphen) is displayed.</p> <p>xxxx:xxxx:xxxx:xxxx:xxxx:xxxx:xxxx:xxxx xxx: 0 - ffff (FFFF) (hexadecimal, alphanumeric characters) Refer to ""IPv6 Address Notation" (page 659)" for details.</p>

[Select IPv6 Prefix] Screen

Select IPv6 Prefix

Item	Description	Setting values
IPv6 Prefix	<p>Select the IPv6 prefix.</p> <p>The IPv6 prefix (fixed to 64bit) values that are obtained from the connected router are displayed in the list box (up to five values). If an IPv6 prefix cannot be obtained (such as when the target port is in Link Down status or no routers exist within the link local), "ffff:ffff:ffff:ffff:" is displayed.</p>	<p>Prefix (unabbreviated) The first prefix</p>
IPv6 Connect IP Address	<p>The IPv6 connect IP address that is obtained by the selected IPv6 prefix and the input IPv6 link local address (interface ID) is displayed. Even when an abbreviation for the IPv6 link local address is input, the obtained IPv6 connect IP address is displayed in an unabbreviated format.</p> <p>Note that when an incorrect IPv6 link local address is specified, the IPv6 connect IP address that is obtained from an abbreviation for the IPv6 link local address is displayed without being changed. If an IPv6 prefix cannot be obtained, "ffff:ffff:ffff:ffff:" is displayed.</p> <p>xxxx:xxxx:xxxx:xxxx:xxxx:xxxx:xxxx:xxxx (unabbreviated) xxx: 0 - ffff (FFFF) (hexadecimal, alphanumeric characters) The IPv6 connect IP address that is obtained from the first prefix</p>	

[Select IPv6 Gateway] Screen

Select IPv6 Gateway

Item	Description	Setting values
IPv6 Gateway	Select the IPv6 gateway. The IPv6 gateway values that are obtained from the connected router are displayed in the list box (up to three values). If an IPv6 gateway cannot be obtained (such as when the target port is in Link Down status or no routers exist within the link local), the field is blank.	xxxx:xxxx:xxxx:xxxx:xxxx:xxxx:xxxx:xxxx xxxx: 0 - ffff (FFFF) (hexadecimal, alphanumeric characters) Refer to "IPv6 Address Notation" (page 1220) for details. The first gateway (Default) Blank

[IP Address Settings] Screen

Item	Description	Setting values
No.	The identification number for each IP address is displayed. An identification number is allocated from the smallest unused decimal number in ascending order. IP#n n: 1 - 15	
VLAN ID	Select whether to "Enable" or "Disable" the VLAN ID for IP#n (n: 1 - 15). When "Enable" is selected, input the VLAN ID.	Enable Disable When "Enable" is selected: 0 (Default) - 4095
IP Version	Select the IP version for IP#n (n: 1 - 15). For other descriptions, refer to "When the Port Mode is CA" (TCP/IP Settings) .	IPv4 IPv6 IPv4 / IPv6
IP Address	Input the IPv4 address of IP#n (n: 1 - 15) (required when "IPv4" or "IPv4/IPv6" is selected). For other descriptions, refer to "When the Port Mode is CA" (TCP/IP Settings) .	Up to 3 numeric characters First text box: "1" - "255" Other text boxes: "0" - "255"
Subnet Mask	Input the subnet mask of IP#n (n: 1 - 15) (required when "IPv4" or "IPv4/IPv6" is selected).	255.0.0.0 - 255.255.255.252
Gateway	Input the gateway IPv4 address of IP#n (n: 1 - 15).	Up to 3 numeric characters All text boxes: "0" - "255"
IPv6 Link Local Address	Input the IPv6 link local address of IP#n (n: 1 - 15) (required when "IPv6" or "IPv4/IPv6" is selected). For other descriptions, refer to "When the Port Mode is CA" (TCP/IP Settings) .	fe80::xxxx:xxxx:xxxx:xxxx xxxx: 0 - ffff (FFFF) (hexadecimal, alphanumeric characters) Refer to "IPv6 Address Notation" (page 1220) for details. Address that is obtained from the device WWN (Default)
IPv6 Connect IP Address	Input the IPv6 connect IP address of IP#n (n: 1 - 15). For other descriptions, refer to "When the Port Mode is CA" (TCP/IP Settings) .	xxxx:xxxx:xxxx:xxxx:xxxx:xxxx:xxxx:xxxx xxxx: 0 - ffff (FFFF) (hexadecimal, alphanumeric characters) Refer to "IPv6 Address Notation" (page 1220) for details.

6. Connectivity
CA Port Group

Item	Description	Setting values
IPv6 Gateway	Input the gateway IPv6 address of IP#n (n: 1 - 15). For other descriptions, refer to " When the Port Mode is "CA" (TCP/IP Settings) ".	xxxx:xxxx:xxxx:xxxx:xxxx:xxxx:xxxx:xxxx xxxx: 0 - ffff (FFFF) (hexadecimal, alphanumeric characters) Refer to " "IPv6 Address Notation" (page 1220) " for details.
TCP Port No.	Input the TCP port number of IP#n (n: 1 - 15). Click the [Default] button to set the default TCP port number.	0 - 28671 3260 (Default)
TCP Window Scale	Select the TCP Window Scale of IP#n (n: 1 - 15). For other descriptions, refer to " When the Port Mode is "CA" (TCP/IP Settings) ".	0 - 14 2 (Default)
iSNS Server	Select whether to enable the use of an iSNS server with IPv4 or IPv6, or disable the use of an iSNS server for IP#n (n: 1 - 15). When "IPv4" or "IPv6" is selected, input the IP address of the iSNS server. For other descriptions, refer to " When the Port Mode is "CA" (TCP/IP Settings) ".	IPv4 IPv6 Disable
iSNS Server Port No.	When the iSNS server for the IP#n (n: 1 - 15) is "IPv4" or "IPv6", input the port number of the iSNS server. Click the [Default] button to set the default iSNS server port number.	0 - 65535 3205 (Default)
Jumbo Frame	Select whether to "Enable" or "Disable" the Jumbo Frame for IP#n (n: 1 - 15). For other descriptions, refer to " When the Port Mode is "CA" (TCP/IP Settings) ".	Enable Disable

When the Port Mode is "RA"

When the type is "1G iSCSI", "10G iSCSI", or "10G Base-T iSCSI" and the port mode is "RA", specify the following items:

Select Port

Item	Description	Setting values
Port	Select the target port. The selectable port locations are displayed as options.	For the ETERNUS DX900 S5 or the ETERNUS DX8900 S4 CE#x CM#y CA#z Port#w For the other models CM#y CA#z Port#w x: CE number y: CM number z: CA number w: Port number
Type	The CA type of the target port is displayed. 1G iSCSI 10G iSCSI 10G Base-T iSCSI	
Mode	The port mode of the target port is displayed. iSCSI-RA	

General Information

iSCSI Settings

Item	Description	Setting values
iSCSI Name	<p>Input the iSCSI name of the target port. Click the [Default] button to set the common iSCSI name of the storage system.</p> <div style="background-color: #fff9c4; padding: 5px;"> <p>Caution</p> <ul style="list-style-type: none"> The same iSCSI name cannot be set to multiple iSCSI ports except the device iSCSI name. </div>	<p>4 - 223 alphanumeric characters and symbols "-" (hyphen), "." (period), and ":" (colon) The name starts with "iqn." or "eui." The unique iSCSI name of each port is set (Default)</p>
Alias Name	<p>Input the alias name of the target port. (can be omitted) While the iSCSI name is a formal nomenclature that specifies the target iSCSI port, an alias name is used as nickname. An alias name that is the same as another port cannot be specified.</p>	<p>Up to 31 alphanumeric characters and symbols "-" (hyphen), "." (period), ":" (colon), "+" (plus), "@" (at sign), "_" (underscore), "=" (equal), "/" (slash), "[" (left square bracket), "]" (right square bracket), "," (comma), "~" (tilde)</p>

TCP/IP Settings

Item	Description	Setting values
IP Version	<p>Select the IP version for the target port.</p> <ul style="list-style-type: none"> IPv4 Specify the IPv4 address. When "IPv4" is selected, input "IP Address" (required), "Subnet Mask" (required), and "Gateway". IPv6 Specify the IPv6 address. When "IPv6" is selected, input "IPv6 Connect IP Address" (required), "IPv6 Global Address", and "IPv6 Gateway". IPv4 / IPv6 Specify both the IPv4 address and the IPv6 address. The input items for IPv4 and IPv6 can be specified. 	<p>IPv4 IPv6 IPv4 / IPv6</p>
IP Address	<p>Input the IPv4 address of the target port (required when "IPv4" or "IPv4/IPv6" is selected). Click the [Test Connection (ping)] button to display the "[Send ping] Screen" (page 769). Specify the IP address to check the connection status of the remote storage system and the number of transmissions. Click the [Send] button. When the "ping" command is sent, the settings of the IP address and the connection path for the remote storage system can be checked.</p>	<p>Up to 3 numeric characters First text box: "1" - "255" Other text boxes: "0" - "255" "192.168.xxx.xxx" (Default)</p>
Subnet Mask	<p>Input the subnet mask of the target port (required when "IPv4" or "IPv4/IPv6" is selected).</p>	<p>255.0.0.0 - 255.255.255.252 "255.255.255.0" (Default)</p>
Gateway	<p>Input the gateway IPv4 address of the target port.</p>	<p>Up to 3 numeric characters All text boxes: "0" - "255"</p>

6. Connectivity
CA Port Group

Item	Description	Setting values
IPv6 Link Local Address	<p>Input the IPv6 link local address of the target port (required when "IPv6" or "IPv4/IPv6" is selected). Refer to "Available IPv6 Address" (page 1221) for details. When the current setting is displayed, the IPv6 address is displayed as an abbreviation.</p> <p>Click the [Test Connection (ping)] button to display the "[Send ping] Screen" (page 769). Specify the IP address to check the connection status of the remote storage system and the number of transmissions. Click the [Send] button. When the "ping" command is sent, the settings of the IP address and the connection path for the remote storage system can be checked. Click the [Default] button to set the default IPv6 link local address.</p>	<p>fe80::xxxx:xxxx:xxxx:xxxx xxxx: 0 - ffff (FFFF) (hexadecimal, alphanumeric characters)</p> <p>Refer to "IPv6 Address Notation" (page 1220) for details.</p> <p>Address that is obtained from the device WWN (Default)</p>
IPv6 Connect IP Address	<p>Input the IPv6 connect IP address of the target port. "Global address", "unique local address", or "6to4 address" can be input for the IPv6 address. Refer to "Available IPv6 Address" (page 1221) for details. When the current setting is displayed, the IPv6 address is displayed as an abbreviation.</p> <p>"IPv6 Connect IP Address" corresponds to "IP Address" for IPv4. "IPv6 Connect IP Address" can be directly input or created automatically.</p> <p>Click the [Discovery] button to display the "[Select IPv6 Prefix] Screen" (page 751). Select "IPv6 Prefix" to create an IPv6 connect IP address automatically from the selected IPv6 prefix and the input IPv6 link local address (interface ID). Click the [OK] button to specify the created IPv6 address in the entry field.</p> <p>Click the [Test Connection (ping)] button to display the "[Send ping] Screen" (page 769). Specify the IP address to check the connection status of the remote storage system and the number of transmissions. Click the [Send] button. When the "ping" command is sent, the settings of the IP address and the connection path for the remote storage system can be checked.</p>	<p>xxxx:xxxx:xxxx:xxxx:xxxx:xxxx:xxxx:xxxx xxxx: 0 - ffff (FFFF) (hexadecimal, alphanumeric characters)</p> <p>Refer to "IPv6 Address Notation" (page 1220) for details.</p>
IPv6 Gateway	<p>Input the gateway IPv6 address of the target port. The following IPv6 addresses can be used; "link local address", "global address", "unique local address", or "6to4 address". Refer to "Available IPv6 Address" (page 1221) for details. When the current setting is displayed, the IPv6 address is displayed as an abbreviation.</p> <p>"IPv6 Gateway" can be directly input or created automatically. Click the [Discovery] button to display the "[Select IPv6 Gateway] Screen" (page 752). Select "IPv6 Gateway" and click the [OK] button. The selected IPv6 address is specified in the entry field.</p>	<p>xxxx:xxxx:xxxx:xxxx:xxxx:xxxx:xxxx:xxxx xxxx: 0 - ffff (FFFF) (hexadecimal, alphanumeric characters)</p> <p>Refer to "IPv6 Address Notation" (page 1220) for details.</p>
TCP Port No.	<p>Input the TCP port number of the target port. Click the [Default] button to set the default TCP port number.</p> <div style="background-color: #fff9c4; padding: 10px; border: 1px solid #ccc;"> <p>Caution</p> <ul style="list-style-type: none"> Do not change the TCP port number from 3260 (default value). REC can only be performed when "TCP Port No." is "3260". </div>	<p>0 - 28671 3260 (Default)</p>

6. Connectivity
CA Port Group

Item	Description	Setting values																																
TCP Window Scale	<p>Input the TCP Window Scale of the target port.</p> <p>"TCP Window Scale" is a parameter that is used to specify the TCP window size. When the I/O load is high, the expected performance may not be achieved even if "0" or "1" is specified for TCP Window Scale. Even if "8" or higher is specified, the storage system performs as though "7" is specified for TCP Window Scale. Specify the "TCP Window Scale" in powers of two (when the value is n-th to the power of two, "n" indicates the "TCP Window Scale"). The relationship between the setting value and the TCP Window Scale is as follows:</p> <table border="1"> <thead> <tr> <th>TCP Window Scale</th> <th>TCP Window size</th> </tr> </thead> <tbody> <tr><td>0</td><td>32 KB</td></tr> <tr><td>1</td><td>64 KB</td></tr> <tr><td>2</td><td>128 KB</td></tr> <tr><td>3</td><td>256 KB</td></tr> <tr><td>4</td><td>512 KB</td></tr> <tr><td>5</td><td>1024 KB</td></tr> <tr><td>6</td><td>2048 KB</td></tr> <tr><td>7</td><td>4096 KB</td></tr> <tr><td>8</td><td>8192 KB</td></tr> <tr><td>9</td><td>16384 KB</td></tr> <tr><td>10</td><td>32768 KB</td></tr> <tr><td>11</td><td>65536 KB</td></tr> <tr><td>12</td><td>131072 KB</td></tr> <tr><td>13</td><td>262144 KB</td></tr> <tr><td>14</td><td>524288 KB</td></tr> </tbody> </table>	TCP Window Scale	TCP Window size	0	32 KB	1	64 KB	2	128 KB	3	256 KB	4	512 KB	5	1024 KB	6	2048 KB	7	4096 KB	8	8192 KB	9	16384 KB	10	32768 KB	11	65536 KB	12	131072 KB	13	262144 KB	14	524288 KB	<p>0 - 14</p> <p>2 (Default)</p>
TCP Window Scale	TCP Window size																																	
0	32 KB																																	
1	64 KB																																	
2	128 KB																																	
3	256 KB																																	
4	512 KB																																	
5	1024 KB																																	
6	2048 KB																																	
7	4096 KB																																	
8	8192 KB																																	
9	16384 KB																																	
10	32768 KB																																	
11	65536 KB																																	
12	131072 KB																																	
13	262144 KB																																	
14	524288 KB																																	
VLAN ID	<p>Select whether to "Enable" or "Disable" the VLAN ID for the target port.</p> <p>When "Enable" is selected, input the VLAN ID.</p>	<p>Enable</p> <p>Disable</p> <p>When "Enable" is selected: 0 (Default) - 4095</p>																																
MTU	<p>Specify the MTU size of the target port.</p> <p>"Maximum Transmission Unit (MTU)" is the maximum amount of data that can be transmitted at the one time over the communication network.</p>	<p>When "IP Version" is "IPv4":</p> <p>576 - 9000 bytes</p> <p>When "IP Version" is "IPv6" or "IPv4 / IPv6":</p> <p>1280 - 9000 bytes</p> <p>1300 bytes (Default)</p>																																

Security Settings

Item	Description	Setting values
CHAP	<p>Select "ON" to enable CHAP Authentication for the target port. Select "OFF" to disable CHAP Authentication.</p> <p>For CHAP authentication, an encrypted password based on a random key that the storage system receives from the remote storage system of REC is sent, and connection possibility is judged on the remote storage system of REC.</p>	<p>ON</p> <p>OFF</p>

6. Connectivity
CA Port Group

Item	Description	Setting values
CHAP User ID	When "ON" is selected for "CHAP", enter the user name to access the target port. Make sure to set the user name and password together.	Up to 63 alphanumeric characters, symbols, and spaces
New Password	When "ON" is selected for "CHAP", enter the password to access the target port. Make sure to set the user name and password together.	12 - 32 alphanumeric characters, symbols, and spaces
Confirm new Password	Input the same password as that entered in the New Password field.	12 - 32 alphanumeric characters, symbols, and spaces

REC Settings

Item	Description	Setting values
REC Line No.	<p>Select the REC line number of the target port.</p> <p>The REC line number is used to switch the communication path when a line fails. The REC line number is used to recognize failed lines. Set different REC line numbers for each physical communication path. When lines are in normal status, an REC can be performed regardless of the REC line number (specifying the same REC line numbers is allowed) in the same way as conventional REC operations. Note that no priority applies to REC line numbers.</p> <p>This item is displayed only when the Advanced Copy license has been registered.</p> <div style="background-color: #fff9c4; padding: 10px; margin-top: 10px;"> <p>Caution</p> <ul style="list-style-type: none"> When a line fails, the communication path is switched according to the REC line number of the copy source storage system. For normal operation, set the same REC line number for the copy source and the copy destination storage systems to recover data. If the port mode is changed from "RA" to "CA", the REC line number returns to the default value ("0"). When the port mode is changed from "RA" to "CA/RA", the current REC line number setting is retained. Refer to the [Modify Port Mode] function for details. </div>	0 (Default) - 127

Item	Description	Setting values
REC Transfer Mode	<p>Select which REC transfer mode is enabled or disabled for the target port.</p> <ul style="list-style-type: none"> • Sync (synchronous transfer mode) • Async Stack (asynchronous stack mode) • Async Consistency (asynchronous consistency mode) • Async Through (asynchronous through mode) <p>When "Enable" is selected, an REC is performed in the selected transfer mode for the target port. When "Disable" is selected, an REC is not performed in the selected transfer mode for the target port. For example, specify different ports for Consistency and Stack to perform data transfers without any interference. The current setting is retained even when an REC path is changed. When "Enable" is selected for all of the REC transfer modes, a conventional REC is performed. This item is displayed only when the Advanced Copy license has been registered.</p> <div style="background-color: #fff9c4; padding: 10px;"> <p>Caution</p> <ul style="list-style-type: none"> • The REC transfer mode can be changed without suspending a copy session even when an REC is being performed in the target port. The changed settings are applied immediately to the storage system. • If specific REC transfer modes for all the RA ports and the CA/RA ports are disabled, a copy session with a disabled REC transfer mode fails because the REC paths for all the RA ports and the CA/RA ports are regarded as being blocked. When the REC transfer mode for a copy session that is being performed is disabled, this copy session is halted. • When "Async Consistency" is disabled for all the RA ports and the CA/RA ports, the REC buffer status changes to "INACTIVE". • For normal operations, set the same REC transfer mode for the copy source and the copy destination storage systems to recover data. When the REC transfer mode is specified for a copy source storage system, the specified REC transfer mode is performed even if one of the following storage systems is used as a copy destination. <ul style="list-style-type: none"> - Older models (the ETERNUS S3 series, the ETERNUS AF series, or the ETERNUS DX8100 S2/ DX8700 S2) - Storage systems without the "REC Transfer Mode" setting • If the port mode is changed from "RA" to "CA", the REC transfer mode returns to the default value ("Enable"). When the port mode is changed from "RA" to "CA/RA", the current REC transfer mode setting is retained. Refer to the [Modify Port Mode] function for details. </div>	Enable Disable

When the Port Mode is "CA/RA"

When the type is "1G iSCSI", "10G iSCSI", or "10G Base-T iSCSI" and the port mode is "CA/RA", specify the following items:

Select Port

Item	Description	Setting values
Port	Select the target port. The selectable port locations are displayed as options.	<p>For the ETERNUS DX900 S5 or the ETERNUS DX8900 S4 CE#x CM#y CA#z Port#w</p> <p>For the other models CM#y CA#z Port#w</p> <p>x: CE number y: CM number z: CA number w: Port number</p>

6. Connectivity
CA Port Group

Item	Description	Setting values
Type	The CA type of the target port is displayed. 1G iSCSI 10G iSCSI 10G Base-T iSCSI	
Mode	The port mode of the target port is displayed. iSCSI-CA/RA	

General Information

iSCSI Settings

Item	Description	Setting values
iSCSI Name	Input the iSCSI name of the target port. Click the [Default] button to set the common iSCSI name of the storage system. Caution <ul style="list-style-type: none"> The same iSCSI name cannot be set to multiple iSCSI ports except the device iSCSI name. 	4 - 223 alphanumeric characters and symbols "-" (hyphen), "." (period), and ":" (colon) The name starts with "iqn." or "eui." The unique iSCSI name of each port is set (Default)
Alias Name	Input the alias name of the target port. (can be omitted) While the iSCSI name is a formal nomenclature that specifies the target iSCSI port, an alias name is used as nickname. An alias name that is the same as another port cannot be specified.	Up to 31 alphanumeric characters and symbols "-" (hyphen), "." (period), ":" (colon), "+" (plus), "@" (at sign), "_" (underscore), "=" (equal), "/" (slash), "[" (left square bracket), "]" (right square bracket), "," (comma), "~" (tilde)

TCP/IP Settings

Item	Description	Setting values
IP Version	Select the IP version for the target port. <ul style="list-style-type: none"> IPv4 Specify the IPv4 address. When "IPv4" is selected, input "IP Address" (required), "Subnet Mask" (required), and "Gateway". IPv6 Specify the IPv6 address. When "IPv6" is selected, input "IPv6 Connect IP Address" (required), "IPv6 Global Address", and "IPv6 Gateway". IPv4 / IPv6 Specify both the IPv4 address and the IPv6 address. The input items for IPv4 and IPv6 can be specified. 	IPv4 IPv6 IPv4 / IPv6
IP Address	Input the IPv4 address of the target port (required when "IPv4" or "IPv4/IPv6" is selected). Click the [Test Connection (ping)] button to display the "[Send ping] Screen" (page 769). Specify the IP address to check the connection status of the remote storage system and the number of transmissions. Click the [Send] button. When the "ping" command is sent, the settings of the IP address and the connection path for the remote storage system can be checked.	Up to 3 numeric characters First text box: "1" - "255" Other text boxes: "0" - "255" "192.168.xxx.xxx" (Default)

6. Connectivity
CA Port Group

Item	Description	Setting values
Subnet Mask	Input the subnet mask of the target port (required when "IPv4" or "IPv4/IPv6" is selected).	255.0.0.0 - 255.255.255.252 "255.255.255.0" (Default)
Gateway	Input the gateway IPv4 address of the target port.	Up to 3 numeric characters All text boxes: "0" - "255"
IPv6 Link Local Address	<p>Input the IPv6 link local address of the target port (required when "IPv6" or "IPv4/IPv6" is selected). Refer to "Available IPv6 Address" (page 1221) for details. When the current setting is displayed, the IPv6 address is displayed as an abbreviation.</p> <p>Click the [Test Connection (ping)] button to display the "[Send ping] Screen" (page 769). Specify the IP address to check the connection status of the remote storage system and the number of transmissions. Click the [Send] button. When the "ping" command is sent, the settings of the IP address and the connection path for the remote storage system can be checked. Click the [Default] button to set the default IPv6 link local address.</p>	<p>fe80::xxxx:xxxx:xxxx:xxxx xxxx: 0 - ffff (FFFF) (hexadecimal, alphanumeric characters)</p> <p>Refer to "IPv6 Address Notation" (page 1220) for details.</p> <p>Address that is obtained from the device WWN (Default)</p>
IPv6 Connect IP Address	<p>Input the IPv6 connect IP address of the target port. "Global address", "unique local address", or "6to4 address" can be input for the IPv6 address. Refer to "Available IPv6 Address" (page 1221) for details. When the current setting is displayed, the IPv6 address is displayed as an abbreviation.</p> <p>"IPv6 Connect IP Address" corresponds to "IP Address" for IPv4. "IPv6 Connect IP Address" can be directly input or created automatically.</p> <p>Click the [Discovery] button to display the "[Select IPv6 Prefix] Screen" (page 751). Select "IPv6 Prefix" to create an IPv6 connect IP address automatically from the selected IPv6 prefix and the input IPv6 link local address (interface ID). Click the [OK] button to specify the created IPv6 address in the entry field.</p> <p>Click the [Test Connection (ping)] button to display the "[Send ping] Screen" (page 769). Specify the IP address to check the connection status of the remote storage system and the number of transmissions. Click the [Send] button. When the "ping" command is sent, the settings of the IP address and the connection path for the remote storage system can be checked.</p>	<p>xxxx:xxxx:xxxx:xxxx:xxxx:xxxx:xxxx:xxxx xxxx: 0 - ffff (FFFF) (hexadecimal, alphanumeric characters)</p> <p>Refer to "IPv6 Address Notation" (page 1220) for details.</p>
IPv6 Gateway	<p>Input the gateway IPv6 address of the target port. The following IPv6 addresses can be used; "link local address", "global address", "unique local address", or "6to4 address". Refer to "Available IPv6 Address" (page 1221) for details. When the current setting is displayed, the IPv6 address is displayed as an abbreviation.</p> <p>"IPv6 Gateway" can be directly input or created automatically. Click the [Discovery] button to display the "[Select IPv6 Gateway] Screen" (page 752). Select "IPv6 Gateway" and click the [OK] button. The selected IPv6 address is specified in the entry field.</p>	<p>xxxx:xxxx:xxxx:xxxx:xxxx:xxxx:xxxx:xxxx xxxx: 0 - ffff (FFFF) (hexadecimal, alphanumeric characters)</p> <p>Refer to "IPv6 Address Notation" (page 1220) for details.</p>

6. Connectivity
CA Port Group

Item	Description	Setting values																																
TCP Port No.	<p>Input the TCP port number of the target port. Click the [Default] button to set the default TCP port number.</p> <div style="background-color: #fff9c4; padding: 10px; border: 1px solid #ccc;"> <p>Caution</p> <ul style="list-style-type: none"> Do not change the TCP port number from 3260 (default value). REC can only be performed when "TCP Port No." is "3260". </div>	<p>0 - 28671 3260 (Default)</p>																																
TCP Window Scale	<p>Input the TCP Window Scale of the target port. "TCP Window Scale" is a parameter that is used to specify the TCP window size. When the I/O load is high, the expected performance may not be achieved even if "0" or "1" is specified for TCP Window Scale. Even if "8" or higher is specified, the storage system performs as though "7" is specified for TCP Window Scale. Specify the "TCP Window Scale" in powers of two (when the value is n-th to the power of two, "n" indicates the "TCP Window Scale"). The relationship between the setting value and the TCP Window Scale is as follows:</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>TCP Window Scale</th> <th>TCP Window size</th> </tr> </thead> <tbody> <tr><td>0</td><td>32 KB</td></tr> <tr><td>1</td><td>64 KB</td></tr> <tr><td>2</td><td>128 KB</td></tr> <tr><td>3</td><td>256 KB</td></tr> <tr><td>4</td><td>512 KB</td></tr> <tr><td>5</td><td>1024 KB</td></tr> <tr><td>6</td><td>2048 KB</td></tr> <tr><td>7</td><td>4096 KB</td></tr> <tr><td>8</td><td>8192 KB</td></tr> <tr><td>9</td><td>16384 KB</td></tr> <tr><td>10</td><td>32768 KB</td></tr> <tr><td>11</td><td>65536 KB</td></tr> <tr><td>12</td><td>131072 KB</td></tr> <tr><td>13</td><td>262144 KB</td></tr> <tr><td>14</td><td>524288 KB</td></tr> </tbody> </table>	TCP Window Scale	TCP Window size	0	32 KB	1	64 KB	2	128 KB	3	256 KB	4	512 KB	5	1024 KB	6	2048 KB	7	4096 KB	8	8192 KB	9	16384 KB	10	32768 KB	11	65536 KB	12	131072 KB	13	262144 KB	14	524288 KB	<p>0 - 14 2 (Default)</p>
TCP Window Scale	TCP Window size																																	
0	32 KB																																	
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10	32768 KB																																	
11	65536 KB																																	
12	131072 KB																																	
13	262144 KB																																	
14	524288 KB																																	

6. Connectivity
CA Port Group

Item	Description	Setting values
iSNS Server	<p>Select whether to enable the use of an iSNS server with IPv4 or IPv6, or disable the use of an iSNS server for the target port. When "IPv4" or "IPv6" is selected, input the IP address of the iSNS server.</p> <p>Internet Storage Name Service (iSNS) is almost equivalent to Domain Name System (DNS) for the Internet. iSNS server is used to convert the iSCSI name to the IP address on the iSCSI network.</p> <div style="background-color: #fff9c4; padding: 10px; margin-top: 10px;"> <p>Caution</p> <ul style="list-style-type: none"> • When "IP Version" is "IPv4", "IPv4" and "Disable" can be selected. • When "IP Version" is "IPv6", "IPv6" and "Disable" can be selected. • When "IP Version" is "IPv4/IPv6", "IPv4", "IPv6", and "Disable" can be selected. </div>	<p>IPv4</p> <p>IPv6</p> <p>Disable</p>
iSNS Server (IPv4 Address)	<p>When "iSNS Server" is "IPv4", input the IPv4 address for the iSNS server.</p>	<p>xxx.xxx.xxx.xxx</p> <p>xxx: 1 - 255 for the top field (decimal)</p> <p>xxx: 0 - 255 for other fields (decimal)</p>
iSNS Server (IPv6 Address)	<p>When "iSNS Server" is "IPv6", input the IPv6 address for the iSNS server.</p> <p>The following IPv6 addresses can be used; "link local address", "global address", "unique local address", or "6to4 address". Refer to "Available IPv6 Address" (page 1221) for details. When the current setting is displayed, the IPv6 address is displayed as an abbreviation.</p>	<p>xxxx:xxxx:xxxx:xxxx:xxxx:xxxx:xxxx:xxxx</p> <p>xxxx: 0 - ffff (FFFF) (hexadecimal, alphanumeric characters)</p> <p>Refer to "IPv6 Address Notation" (page 1220) for details.</p>
iSNS Server Port No.	<p>When "iSNS Server" for the target port is "IPv4" or "IPv6", input the port number of the iSNS server.</p> <p>Click the [Default] button to set the default iSNS server port number.</p>	<p>0 - 65535</p> <p>3205 (Default)</p>
VLAN ID	<p>Select whether to "Enable" or "Disable" the VLAN ID for the target port.</p> <p>When "Enable" is selected, input the VLAN ID.</p> <div style="background-color: #fff9c4; padding: 10px; margin-top: 10px;"> <p>Caution</p> <ul style="list-style-type: none"> • When specifying the VLAN ID, confirm the VLAN setting values of the LAN switch and the VLAN tagging configuration of the server LAN card. </div>	<p>Enable</p> <p>Disable</p> <p>When "Enable" is selected: 0 (Default) - 4095</p>
MTU	<p>Specify the MTU size of the target port.</p> <p>"Maximum Transmission Unit (MTU)" is the maximum amount of data that can be transmitted at the one time over the communication network.</p>	<p>When "IP Version" is "IPv4":</p> <p>576 - 9000 bytes</p> <p>When "IP Version" is "IPv6" or "IPv4 / IPv6":</p> <p>1280 - 9000 bytes</p> <p>The default MTU depends on the port status before the port mode is changed.</p>

Security Settings

Item	Description	Setting values
CHAP (CA)	Specify "ON" to use the unidirectional CHAP authentication or bidirectional CHAP authentication for the target CA port, and specify "OFF" not to use both unidirectional CHAP authentication and bidirectional CHAP authentication. For CHAP authentication, an encrypted password based on a random key that the storage system receives from the host is sent, and connection possibility is judged on the server side.	ON OFF
CHAP User ID (CA)	When using the bidirectional CHAP authentication, enter the user ID to access the target CA port. When using the unidirectional CHAP authentication, it is not necessary to enter a user ID. Make sure to set the user name and password together.	Up to 255 alphanumeric characters, symbols, and spaces
New Password (CA)	When using the bidirectional CHAP authentication, enter the password to access the target CA port. When using the unidirectional CHAP authentication, it is not necessary to enter a password. Make sure to set the user name and password together.	12 - 100 alphanumeric characters, symbols, and spaces
Confirm new Password (CA)	Input the same password as that entered in the New Password (CA) field.	12 - 100 alphanumeric characters, symbols, and spaces
CHAP (RA)	Select "ON" to enable CHAP Authentication for the target RA port. Select "OFF" to disable CHAP Authentication. For CHAP authentication, an encrypted password based on a random key that the storage system receives from the remote storage system of REC is sent, and connection possibility is judged on the remote storage system of REC.	ON OFF
CHAP User ID (RA)	When "ON" is selected for "CHAP (RA)", enter the user name to access the target RA port. Make sure to set the user name and password together.	Up to 63 alphanumeric characters, symbols, and spaces
New Password (RA)	When "ON" is selected for "CHAP (RA)", enter the password to access the target RA port. Make sure to set the user name and password together.	12 - 32 alphanumeric characters, symbols, and spaces
Confirm new Password (RA)	Input the same password as that entered in the New Password (RA) field.	12 - 32 alphanumeric characters, symbols, and spaces
Header Digest	Select "OFF" not to add the Header Digest of the target port. Select "CRC32C" to add the Header Digest. Header Digest is a check code to be added to the header part of the iSCSI port detailed information. Specify "CRC32C" when the host requests to add the check code. "CRC32C" is the algorithm that is used to create a check code.	OFF CRC32C
Data Digest	Select "OFF" not to add the Data Digest of the target port. Select "CRC32C" to add the Data Digest. Data Digest is a check code to be added to the data area of the iSCSI port detailed information. Specify "CRC32C" when the host requests to add the check code. "CRC32C" is the algorithm that is used to create a check code.	OFF CRC32C

General Settings

Item	Description	Setting values
Reset Scope	<p>Specify the reset scope of the target port.</p> <p>Reset scope is the range where the command reset request from the server is performed, when the target port is connected to multiple servers.</p> <ul style="list-style-type: none"> • I_T_L (I: Initiator, T: Target, L: LUN) Reset (cancel) the command request from the server that sent the command reset request. • T_L (T: Target, L: LUN) Reset (cancel) the command request from all of the servers that are connected to the port. 	I_T_L T_L
Release Reservation if Chip is Reset	Select whether to "Enable" or "Disable" the function to release the reserved status of the volume when the target port (chip) is reset.	Enable Disable
CmdSN Count	Change the number of commands that can be accepted from the host to the target port at the same time. It is not necessary to change the setting from "Unlimited" for normal use.	Unlimited 180 120 80 40 20

REC Settings

Item	Description	Setting values
REC Line No.	<p>Select the REC line number of the target port.</p> <p>The REC line number is used to switch the communication path when a line fails. The REC line number is used to recognize failed lines. Set different REC line numbers for each physical communication path. When lines are in normal status, an REC can be performed regardless of the REC line number (specifying the same REC line numbers is allowed) in the same way as conventional REC operations. Note that no priority applies to REC line numbers. This item is displayed only when the Advanced Copy license has been registered.</p> <div style="background-color: #fff9c4; padding: 10px; margin-top: 10px;"> <p>Caution</p> <ul style="list-style-type: none"> • When a line fails, the communication path is switched according to the REC line number of the copy source storage system. For normal operation, set the same REC line number for the copy source and the copy destination storage systems to recover data. • If the port mode is changed from "CA/RA" to "CA", the REC line number returns to the default value ("0"). When the port mode is changed from "CA/RA" to "RA", the current REC line number setting is retained. Refer to the [Modify Port Mode] function for details. </div>	0 (Default) - 127

6. Connectivity
CA Port Group

Item	Description	Setting values
REC Transfer Mode	<p>Select which REC transfer mode is enabled or disabled for the target port.</p> <ul style="list-style-type: none"> • Sync (synchronous transfer mode) • Async Stack (asynchronous stack mode) • Async Consistency (asynchronous consistency mode) • Async Through (asynchronous through mode) <p>When "Enable" is selected, an REC is performed in the selected transfer mode for the target port. When "Disable" is selected, an REC is not performed in the selected transfer mode for the target port. For example, specify different ports for Consistency and Stack to perform data transfers without any interference. The current setting is retained even when an REC path is changed. When "Enable" is selected for all of the REC transfer modes, a conventional REC is performed. This item is displayed only when the Advanced Copy license has been registered.</p> <div style="background-color: #fff9c4; padding: 10px;"> <p>Caution</p> <ul style="list-style-type: none"> • The REC transfer mode can be changed without suspending a copy session even when an REC is being performed in the target port. The changed settings are applied immediately to the storage system. • If specific REC transfer modes for all the RA ports and the CA/RA ports are disabled, a copy session with a disabled REC transfer mode fails because the REC paths for all the RA ports and the CA/RA ports are regarded as being blocked. When the REC transfer mode for a copy session that is being performed is disabled, this copy session is halted. • When "Async Consistency" is disabled for all the RA ports and the CA/RA ports, the REC buffer status changes to "INACTIVE". • For normal operations, set the same REC transfer mode for the copy source and the copy destination storage systems to recover data. When the REC transfer mode is specified for a copy source storage system, the specified REC transfer mode is performed even if one of the following storage systems is used as a copy destination. <ul style="list-style-type: none"> - Older models (the ETERNUS S3 series, the ETERNUS AF series, or the ETERNUS DX8100 S2/ DX8700 S2) - Storage systems without the "REC Transfer Mode" setting • If the port mode is changed from "CA/RA" to "CA", the REC transfer mode returns to the default value ("Enable"). When the port mode is changed from "CA/RA" to "RA", the current REC transfer mode setting is retained. Refer to the [Modify Port Mode] function for details. </div>	<p>Enable</p> <p>Disable</p>

Additional IP Address Information

Additional IP Address Settings

Item	Description	Setting values
Multiple VLAN	<p>Select whether to "Enable" or "Disable" the Multiple VLAN settings for the target port.</p> <p>When the Multiple VLAN setting is enabled, multiple IP addresses can be specified for a single iSCSI-CA port. This enables concurrent connection to multiple hosts that belong to different VLANs via a single iSCSI-CA port.</p> <div style="background-color: #fff9c4; padding: 10px;"> <p>Caution</p> <ul style="list-style-type: none"> • If the Multiple VLAN setting is changed to "Disable", all of the added IP address information is deleted. </div>	<p>Enable</p> <p>Disable</p>

When the Multiple VLAN setting is "Enable", multiple IP address information can be specified.

IP Address Settings

Item	Description
No.	The setting number of the IP address is displayed. Click this item to display the "[IP Address Settings] Screen" (page 752). Edit the IP address information for the Multiple VLAN setting in the [IP Address Settings] screen. IP#n n: 1 - 15
VLAN ID	The VLAN ID (0 to 4095) of the IP address is displayed. If the VLAN ID is not specified, a "-" (hyphen) is displayed.
IP Address	The IPv4 address is displayed. If an IP address is not specified (when "IPv4" is selected for the IP version setting in the [IP Address Settings] screen), a "-" (hyphen) is displayed. xxx.xxx.xxx.xxx xxx: 0 - 255 (decimal)
IPv6 Link Local Address	The IPv6 link local address is displayed. Note that the IPv6 address is displayed as an abbreviation. If an IP address is not specified (when "IPv4" is selected for the IP version setting in the [IP Address Settings] screen), a "-" (hyphen) is displayed. fe80::xxx:xxx:xxx:xxx xxx: 0 - ffff (FFFF) (hexadecimal, alphanumeric characters) Refer to "'IPv6 Address Notation' (page 659)" for details.
IPv6 Connect IP Address	The IPv6 connect IP address is displayed. Note that the IPv6 address is displayed as an abbreviation. If an IP address is not specified (when "IPv4" is selected for the IP version setting in the [IP Address Settings] screen), a "-" (hyphen) is displayed. xxxx:xxxx:xxxx:xxxx:xxxx:xxxx:xxxx:xxxx xxxx: 0 - ffff (FFFF) (hexadecimal, alphanumeric characters) Refer to "'IPv6 Address Notation' (page 659)" for details.

When the Type is "iSCSI RA (for Older Storage System Connection)"

When the type is "iSCSI RA (for older storage system connection)", specify the following items:

Select Port

Item	Description	Setting values
Port	Select the target port. The selectable port locations are displayed as options.	For the ETERNUS DX900 S5 or the ETERNUS DX8900 S4 CE#x CM#y CA#z Port#w For the other models CM#y CA#z Port#w x: CE number y: CM number z: CA number w: Port number
Type	The CA type of the target port is displayed. iSCSI RA (for older storage system connection)	

Item	Description	Setting values
Mode	The port mode of the target port is displayed. iSCSI-RA	

General Information

iSCSI Settings

Item	Description	Setting values
Alias Name	Input the alias name of the target port. (can be omitted) While the iSCSI name is a formal nomenclature that specifies the target iSCSI port, an alias name is used as nickname. An alias name that is the same as another port cannot be specified.	Up to 31 alphanumeric characters and symbols "-" (hyphen), "." (period), ":" (colon), "+" (plus), "@" (at sign), "_" (underscore), "=" (equal), "/" (slash), "[" (left square bracket), "]" (right square bracket), "," (comma), "~" (tilde)

TCP/IP Settings

Item	Description	Setting values
IP Address	Input the IPv4 address of the target port (required). Click the [Test Connection (ping)] button to display the "[Send ping] Screen" (page 769). Specify the IP address to check the connection status of the remote storage system and the number of transmissions. Click the [Send] button. When the "ping" command is sent, the settings of the IP address and the connection path for the remote storage system can be checked.	Up to 3 numeric characters First text box: "1" - "255" Other text boxes: "0" - "255" "192.168.xxx.xxx" (Default)
Subnet Mask	Input the subnet mask of the target port (required).	255.0.0.0 - 255.255.255.252 "255.255.255.0" (Default)
Gateway	Input the gateway IP address of the target port.	Up to 3 numeric characters All text boxes: "0" - "255"
MTU	Specify the MTU size of the target port. "Maximum Transmission Unit (MTU)" is the maximum amount of data that can be transmitted at the one time over the communication network.	1000 bytes 1050 bytes 1100 bytes 1150 bytes 1200 bytes 1250 bytes 1300 bytes (Default) 1350 bytes 1400 bytes 1438 bytes

Security Settings

Item	Description	Setting values
CHAP	Select "ON" to enable CHAP Authentication for the target port. Select "OFF" to disable CHAP Authentication. For CHAP authentication, an encrypted password based on a random key that the storage system receives from the remote storage system of REC is sent, and connection possibility is judged on the remote storage system of REC.	ON OFF
CHAP User ID	When "ON" is selected for "CHAP", enter the user name to access the target port. Make sure to set the user name and password together.	Up to 63 alphanumeric characters, symbols, and spaces

6. Connectivity

CA Port Group

Item	Description	Setting values
New Password	When "ON" is selected for "CHAP", enter the password to access the target port. Make sure to set the user name and password together.	12 - 32 alphanumeric characters, symbols, and spaces
Confirm new Password	Input the same password as that entered in the New Password field.	12 - 32 alphanumeric characters, symbols, and spaces

General Settings

Item	Description	Setting values
Transfer Rate	Select the transfer rate for the target port. <ul style="list-style-type: none"> 1 Gbit/s 1 Gbit/s (Full Duplex) 100 Mbit/s 100 Mbit/s (Full Duplex) Auto-negotiation The transfer rate is automatically selected from "100 Mbit/s (Full Duplex)" or "1 Gbit/s (Full Duplex)". 	1 Gbit/s 100 Mbit/s Auto-negotiation
Limit Band Width	Input the bandwidth limit of the target port. "Limit Band Width" is used to limit the amount of data that is transferred via an iSCSI-RA port.	10 - 400 Mbit/s 400 Mbit/s (Default)

REC Settings

Item	Description	Setting values
REC Line No.	Select the REC line number of the target port. The REC line number is used to switch the communication path when a line fails. The REC line number is used to recognize failed lines. Set different REC line numbers for each physical communication path. When lines are in normal status, an REC can be performed regardless of the REC line number (specifying the same REC line numbers is allowed) in the same way as conventional REC operations. Note that no priority applies to REC line numbers. This item is displayed only when the Advanced Copy license has been registered. <div style="background-color: #fff9c4; padding: 10px; margin-top: 10px;"> <p>Caution</p> <ul style="list-style-type: none"> When a line fails, the communication path is switched according to the REC line number of the copy source storage system. </div>	0 (Default) - 127

Item	Description	Setting values
REC Transfer Mode	<p>Select which REC transfer mode is enabled or disabled for the target port.</p> <ul style="list-style-type: none"> • Sync (synchronous transfer mode) • Async Stack (asynchronous stack mode) • Async Consistency (asynchronous consistency mode) • Async Through (asynchronous through mode) <p>When "Enable" is selected, an REC is performed in the selected transfer mode for the target port. When "Disable" is selected, an REC is not performed in the selected transfer mode for the target port. For example, specify different ports for Consistency and Stack to perform data transfers without any interference. The current setting is retained even when an REC path is changed. When "Enable" is selected for all of the REC transfer modes, a conventional REC is performed. This item is displayed only when the Advanced Copy license has been registered.</p> <div style="background-color: #fff9c4; padding: 10px;"> <p>Caution</p> <ul style="list-style-type: none"> • The REC transfer mode can be changed without suspending a copy session even when an REC is being performed in the target port. The changed settings are applied immediately to the storage system. • If specific REC transfer modes for all the RA ports and the CA/RA ports are disabled, a copy session with a disabled REC transfer mode fails because the REC paths for all the RA ports and the CA/RA ports are regarded as being blocked. When the REC transfer mode for a copy session that is being performed is disabled, this copy session is halted. • When "Async Consistency" is disabled for all the RA ports and the CA/RA ports, the REC buffer status changes to "INACTIVE". • The specified REC transfer mode is performed only when the target port is a copy source. </div>	<p>Enable Disable</p>

[Send ping] Screen

Checks the connection status between the target port and the remote storage system.

Item	Description	Setting values
IP Address	<p>Input the IPv4 or IPv6 address of the storage system that is used to check the connection status of the target port.</p> <p>The following IPv6 addresses can be used; "link local address", "global address", "unique local address", or "6to4 address". Refer to "Available IPv6 Address" (page 1221) for details. When the current setting is displayed, the IPv6 address is displayed as an abbreviation.</p>	<p>For IPv4 address xxx.xxx.xxx.xxx xxx: 1 - 255 for the top field (decimal) xxx: 0 - 255 for other fields (decimal) Class must be A, B, or C.</p> <p>For IPv6 address xxxx:xxxx:xxxx:xxxx:xxxx:xxxx:xxxx:xxxx xxxx: 0 - ffff (FFFF) (hexadecimal, alphanumeric characters) Refer to "IPv6 Address Notation" (page 1220) for details.</p>
Send Number	Input the transmission count of the "ping" command.	1 (Default) - 10
Result	<p>Click the [Send] button to display the results of the "ping" commands that are sent.</p> <ul style="list-style-type: none"> • success All were sent successfully. • failed At least one failure occurred. 	<p>success failed</p>

Function Button

Item	Description
[Test Connection (ping)]	Checks the connection status between the target port and the remote storage system.
[Send]	Sends the specified number of ping commands to the IP address of the remote storage system.
[Close]	Closes the [Send ping] screen.
[Default]	Sets the default setting values.
[Discovery]	Obtains the IPv6 address from the connected router. "IPv6 Connect IP Address" and "IPv6 Gateway" can be obtained by using this button.
[Add]	When Multiple VLAN is enabled, add IP addresses. If the maximum number of IP address has already been registered, the [Add] button cannot be clicked.
[Delete]	When Multiple VLAN is enabled, delete any IP addresses in the relevant area. If no IP address has been added, the [Delete] button is not displayed.

■ Operating Procedures

In this screen, specify the iSCSI port parameters.

Procedure ▶▶▶

- 1 Select which iSCSI port to set the parameters for (multiple selections can be made) and click [Configure iSCSI Port] in [Action].

Note

- Multiple "1G iSCSI", "10G iSCSI", or "10G Base-T iSCSI" type iSCSI ports with the same port mode can be selected. Multiple "iSCSI RA (for older storage system connection)" ports can also be selected.
- Multiple ports can be set with the same or with different parameters in a single operation. To set parameters to multiple ports, select the target ports and specify the parameters for each port. After the specification is complete, click the [Modify] button.

- 2 Set the parameters for all of the selected ports and click the [Modify] button.
→ A confirmation screen appears.

Caution

- An error screen appears in the following conditions:
 - Required items ("IP Address" and "Subnet Mask" for IPv4) are not specified
 - Required item ("IPv6 Link Local Address" for IPv6) is not specified
 - Some parameters do not satisfy the input conditions
 - "255.255.255.255" is input for the IP address, the subnet mask, or the gateway
 - The IP address and the network address are the same
 - The IP address and the broadcast address are the same
 - The gateway is set and the IP address and the gateway IP address are the same
 - The gateway is set and the IP Address and the gateway are not in the same subnet
 - The gateway is set and the gateway and the network address are the same
 - The gateway is set and the gateway and the broadcast address are the same

Note

- When the [Discovery] button is clicked for "IPv6 Connect IP Address", the IPv6 connect IP address can be created automatically from the prefix value that is obtained from the router that is connected to the storage system and the input IPv6 link local address.
- When the [Discovery] button is clicked for "IPv6 Gateway", the gateway information can be obtained from the connected router.
- When the port mode is "CA" or "CA/RA" and Multiple VLAN is enabled, click the [Add] button to register up to 15 IP address information for each port.
- To check whether the IP address is allocated correctly and the connection status for the remote storage system, click the [Test Connection (ping)] button for "IP Address", "IPv6 Link Local Address", or "IPv6 Connect IP Address".

- 3** Click the [OK] button.
→ Setting of the iSCSI port parameters starts.
- 4** Click the [Done] button to return to the [iSCSI Port] screen.



Modify Port Mode

Refer to "["Modify Port Mode" \(page 735\)](#)" for details.

SAS Port

- "["Overview" \(page 771\)](#)"
- "["User Privileges" \(page 771\)](#)"
- "["SAS Port List" \(page 772\)](#)"
- "["Filter Setting" \(page 773\)](#)"

■ Overview

This function displays a list of the SAS port parameters that are registered in the storage system for each CA type.

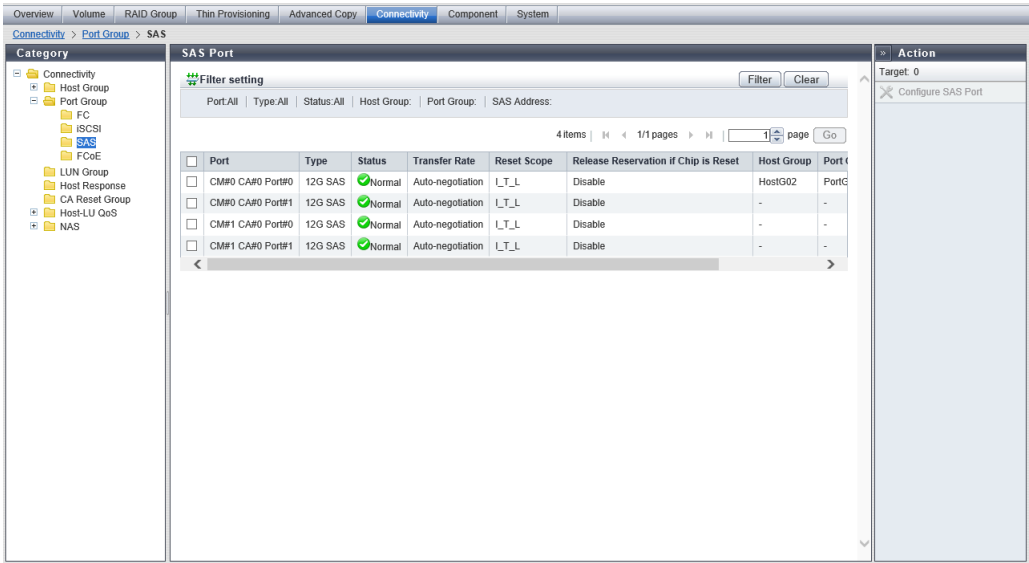
■ User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	✓
Admin	✓
StorageAdmin	✓
AccountAdmin	
SecurityAdmin	✓
Maintainer	✓

Refer to "["A. User Roles and Policies" \(page 1580\)](#)" for details on the policies and roles.

■ Display Contents



SAS Port List

Parameters of the SAS ports that are registered in the storage system are displayed.

Caution

- The SAS port is supported in the ETERNUS DX60 S5/DX100 S5/DX200 S5.

Item	Description
Port	The location information of the target port is displayed. CM#x CA#y Port#z x: CM number y: CA number z: Port number
Type	The CA type of the target port is displayed. Caution <ul style="list-style-type: none"> "6G SAS" is supported in the ETERNUS DX60 S5. "12G SAS" is supported in the ETERNUS DX60 S5/DX100 S5/DX200 S5.
Status	The status of the target port is displayed. Refer to ""Component Status" (page 1607)" for details.
Transfer Rate	The transfer rate of the target port is displayed. Auto-negotiation 1.5 Gbit/s 3 Gbit/s 6 Gbit/s 12 Gbit/s

Item	Description
Reset Scope	<p>The reset scope of the target port is displayed.</p> <p>Reset scope is the range where the command reset request from the server is performed, when the target port is connected to multiple servers.</p> <ul style="list-style-type: none"> • I_T_L (I: Initiator, T: Target, L: LUN) Reset (cancel) the command request from the server that sent the command reset request. • T_L (T: Target, L: LUN) Reset (cancel) the command request from all of the servers that are connected to the port.
Release Reservation if Chip is Reset	Whether the function to release the reservation status of the volume when the target port (chip) is reset is enabled or disabled is displayed.
Host Group	<p>The name of the host group that has the host affinity setting with the target port is displayed.</p> <p>If no host group with the host affinity setting exists, a "-" (hyphen) is displayed.</p>
Port Group	<p>The name of the port group to which the target port belongs is displayed.</p> <p>If the target port does not belong to a port group, a "-" (hyphen) is displayed.</p>
SAS Address	<p>SAS addresses of all SAS hosts that have the host affinity setting with the target port are displayed.</p> <p>If the host affinity setting is not configured, a "-" (hyphen) is displayed.</p>

■ Filter Setting

Function Description

Filter setting is a function used to display a list of only the SAS ports meeting all the specified conditions. No filtering is set by default. The following table shows conditions that can be specified.

Item	Description	Setting values
Port	Select the location information of the port that is to be displayed.	<p>All</p> <p>CM#x CA#y Port#z x: CM number y: CA number z: Port number</p>
Type	Select the type of the port that is to be displayed.	<p>All</p> <p>6G SAS 12G SAS</p>
Status	Select the status of the port that is to be displayed.	<p>All</p> <p>Port status</p>
Host Group	<p>Input the name of the host group that has the host affinity setting with the port that is to be displayed.</p> <p>Ports matching or partially matching the entered host group name are displayed.</p> <p>When not using the host group name for filtering, leave this item blank.</p>	<p>Blank</p> <p>Host group name</p>
Port Group	<p>Input the name of the port group to which the port that is to be displayed belongs.</p> <p>Ports matching or partially matching the entered port group name are displayed.</p> <p>When not using the port group name for filtering, leave this item blank.</p>	<p>Blank</p> <p>Port group name</p>
SAS Address	<p>Input the SAS address of the SAS host that has the host affinity setting with the port that is to be displayed.</p> <p>Ports matching or partially matching the entered SAS address are displayed.</p> <p>When not using the SAS address for filtering, leave this item blank.</p>	<p>Blank</p> <p>SAS address</p>

Modify SAS Port Parameters

- ["■ Overview" \(page 774\)](#)
- ["■ User Privileges" \(page 774\)](#)
- ["■ Settings" \(page 774\)](#)
- ["■ Operating Procedures" \(page 775\)](#)

■ Overview

This function sets the parameters for the SAS host interface port that connects between the storage system and the host.

Caution

- This function is supported in the ETERNUS DX60 S5/DX100 S5/DX200 S5.
- When changing port parameters during operation, stop access from the server that is allocated to the target port. Host access does not need to be stopped to change the port parameters of newly added CA ports.

Note

- For more details on SAS parameter settings, refer to "Configuration Guide -Server Connection-" for each OS type.

■ User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	✓
StorageAdmin	✓
AccountAdmin	
SecurityAdmin	
Maintainer	✓

Refer to ["A. User Roles and Policies" \(page 1580\)](#) for details on the policies and roles.

■ Settings

SAS Port Parameter Settings

In this screen, set the connection information between the SAS port of the storage system and the host (SAS port parameters).

Item	Description	Setting values
Port	Select the target port. The selectable port locations are displayed as options.	CM#x CA#y Port#z x: CM number y: CA number z: Port number

Item	Description	Setting values
Type	<p>The type of the target port is displayed.</p> <p>6G SAS 12G SAS</p> <p>Caution</p> <ul style="list-style-type: none"> • "6G SAS" is supported in the ETERNUS DX60 S5. • "12G SAS" is supported in the ETERNUS DX60 S5/DX100 S5/DX200 S5. 	
Transfer Rate	<p>Select the transfer rate for the target port.</p> <p>The available transfer rate varies according to the SAS type.</p> <ul style="list-style-type: none"> • When the SAS type is "6G SAS" <ul style="list-style-type: none"> - Auto-negotiation - 1.5 Gbit/s - 3 Gbit/s - 6 Gbit/s • When the SAS type is "12G SAS" <ul style="list-style-type: none"> - Auto-negotiation - 3 Gbit/s - 6 Gbit/s - 12 Gbit/s 	<p>Auto-negotiation</p> <p>1.5 Gbit/s</p> <p>3 Gbit/s</p> <p>6 Gbit/s</p> <p>12 Gbit/s</p>
Reset Scope	<p>Specify the reset scope of the target port.</p> <p>Reset scope is the range where the command reset request from the server is performed, when the target port is connected to multiple servers.</p> <ul style="list-style-type: none"> • I_T_L (I: Initiator, T: Target, L: LUN) Reset (cancel) the command request from the server that sent the command reset request. • T_L (T: Target, L: LUN) Reset (cancel) the command request from all of the servers that are connected to the port. 	<p>I_T_L</p> <p>T_L</p>
Release Reservation if Chip is Reset	<p>Select whether to "Enable" or "Disable" the function to release the reserved status of the volume when the target port (chip) is reset.</p>	<p>Enable</p> <p>Disable</p>

■ Operating Procedures

Procedure ▶▶▶

- 1 Select which SAS port to set the parameters for (multiple selections can be made) and click [Configure SAS Port] in [Action].

Note

- Multiple ports can be set with the same or with different parameters in a single operation. To set parameters to multiple ports, select the target ports and specify the parameters for each port. Set the parameters for all of the selected ports and click the [Modify] button.

- 2 Set the parameters for all of the selected ports and click the [Modify] button.
→ A confirmation screen appears.

Caution

- If the parameters do not satisfy the input conditions, an error screen appears.

- 3 Click the [OK] button.
→ Setting of the SAS port parameters starts.
- 4 Click the [Done] button to return to the [SAS Port] screen.



LUN Group

- "[■ Overview](#)" (page 776)
- "[■ User Privileges](#)" (page 776)
- Display Contents ([LUN Group List](#), [LUN Group Details](#))
- Filter Setting ([LUN Group List](#), [LUN Group Details](#))

■ Overview

This function displays the [LUN group](#) list.

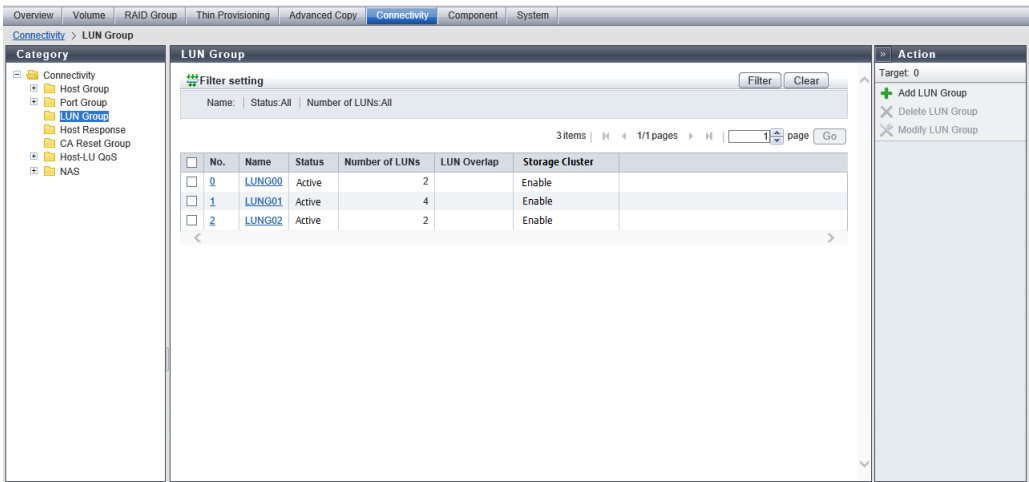
■ User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	✓
Admin	✓
StorageAdmin	✓
AccountAdmin	
SecurityAdmin	✓
Maintainer	✓

Refer to "["A. User Roles and Policies"](#) (page 1580)" for details on the policies and roles.

■ Display Contents



LUN Group List

A list of the LU groups registered in the storage system is displayed.

Item	Description
No.	The LUN group number is displayed. Click the [No.] link to display the "[LUN Group Detailed Information] Screen" (page 778).
Name	The LUN group name is displayed. Click the [Name] link to display the "[LUN Group Detailed Information] Screen" (page 778).
Status	Whether the LUN group is used "Active" or not "Inactive" for the host affinity settings is displayed. <ul style="list-style-type: none"> Active The LUN group is used for the host affinity settings. Inactive The LUN group is not used for the host affinity settings.
Number of LUNs	The number of host LUNs (1 to 4096) to which the volumes are allocated in the LUN group is displayed. Veeam Control Volumes are excluded.
LUN Overlap	If volumes in the LUN group satisfy one or both of the following conditions, "Yes" is displayed. For any other conditions, the field is blank. Veeam Control Volumes are excluded. <ul style="list-style-type: none"> The volumes are allocated to different LUN groups The volumes are included in the mapping information, which is directly allocated to the port without specifying the host group or the CA port group
Storage Cluster	When volumes in the LUN group are used for the Storage Cluster function, "Enable" is displayed. When no volumes are used for the Storage Cluster function, "Disable" is displayed. This item is only displayed when "Enable" is selected for the Storage Cluster function.

■ Filter Setting

Function Description

Filter setting is a function used to display a list of only the LUN groups meeting all the specified conditions.

No filtering is set by default. The following table shows conditions that can be specified.

6. Connectivity

LUN Group

Item	Description	Setting values
Name	Input the name of the LUN group that is to be displayed. LUN groups matching or partially matching the entered name are displayed. When not using the name for filtering, leave this item blank.	LUN group name Blank
Status	Select the LUN group status that is to be displayed. When not using the status for filtering, select "All" (all LUN groups).	All Active Inactive
Number of LUNs	Select the number of LUNs that is to be displayed. Using "512 LUN" as the standard, ">512" or "<=512" can be selected. When not using the number of LUNs for filtering, select "All" (all LUN groups).	All >512 <=512
Storage Cluster	Select the volume status in the LUN group that is to be displayed. When not using the Storage Cluster for filtering, select "All" (all LUN groups). This item is only displayed when "Enable" is selected for the Storage Cluster function. <ul style="list-style-type: none"> Select "Enable" when displaying LUN groups with volumes that are used by the Storage Cluster function. Select "Disable" when displaying LUN groups without volumes that are used by the Storage Cluster function. 	All Enable Disable

[LUN Group Detailed Information] Screen

Click the [No.] link or the [Name] link in the LUN group list to display the detailed information for the corresponding LUN group.

LUN Group

In this screen, the LUN group number, the name, the status, the number of LUNs in the selected LUN group, the existence of LUN overlapping, whether Storage Cluster is enabled or disabled, and whether the LUN group is used for Veeam Storage Integration are displayed.

Item	Description
Veeam Storage Integration	If the LUN group is used for Veeam Storage Integration, "Yes" is displayed. If the LUN group is not used for Veeam Storage Integration, a "-" (hyphen) is displayed. This item is displayed only when the Veeam Storage Integration License has been registered.

Refer to "[LUN Group List](#)" (page 777) for the other items.

Detail Information

Item	Description
Host LUN	The host LUN (0 to 4095) is displayed.
Volume No.	The volume number allocated to the host LUN is displayed.
Name	The volume name allocated to the host LUN is displayed.
Type	The volume type allocated to the host LUN is displayed. Standard WSV TPV FTV SDV
Capacity	The volume capacity allocated to the host LUN is displayed. When the "Type" is "SDV", the logical capacity, which can be accessed from the host, is displayed.

6. Connectivity

LUN Group

Item	Description
LUN Group	<p>If the volume allocated to the host LUN is included in different LUN groups, that LUN group name is displayed. If the host, ports, and LUNs are allocated without specifying a host group or CA port group, the location information of the ports is displayed.</p> <p>When a volume is not allocated to different LUN groups, the field is blank.</p> <p>For the ETERNUS DX900 S5 or the ETERNUS DX8900 S4</p> <p>LUN group name CE#x CM#y CA#z Port#w Blank</p> <p>For the other models</p> <p>LUN group name CM#y CA#z Port#w Blank</p> <p>x: CE number y: CM number z: CA number w: Port number</p>
UID	<p>The volume UID allocated to the host LUN is displayed.</p> <p>The UID is an identifier (storage system name) to specify a volume from the open system server.</p> <p>For Data Container Volumes, a "-" (hyphen) is displayed.</p> <p>32-digit capital letters and numeric characters (hexadecimal)</p>

■ Filter Setting

Function Description

Filter setting is a function used to display a list of only the LUNs meeting all the specified conditions. No filtering is set by default. The following table shows conditions that can be specified.

Item	Description	Setting values
Name	<p>Input the volume name that is to be displayed.</p> <p>Volumes matching or partially matching the entered name are displayed.</p> <p>When not using the name for filtering, leave this item blank.</p>	<p>Volume name</p> <p>Blank</p>
Type	<p>Select the volume type that is to be displayed.</p> <p>When not using the type for filtering, select "All".</p>	<p>All</p> <p>Standard</p> <p>TPV</p> <p>FTV</p> <p>WSV</p> <p>SDV</p> <p>SDPV</p> <p>Temporary</p>

Add LUN Group

- ["■ Overview" \(page 780\)](#)
- ["■ User Privileges" \(page 781\)](#)
- ["■ Settings" \(page 781\)](#)
- ["■ Operating Procedures" \(page 784\)](#)

■ Overview

This function creates a new [LUN group](#), and allocates a volume number in the storage system to the Logical Unit Number (host LUN), which can be referenced by the host.

The following list shows the maximum number of LUN groups that can be created for each model.

- ETERNUS DX60 S5: 128
- ETERNUS DX100 S5/DX200 S5: 1024
- ETERNUS DX500 S5/DX600 S5: 2048
- ETERNUS DX8100 S4: 1024
- ETERNUS DX900 S5 or ETERNUS DX8900 S4: 6144
- ETERNUS AF150 S3/AF250 S3: 1024
- ETERNUS AF650 S3: 2048

Caution

- Only the volumes with "Standard", "WSV", "TPV", "FTV", or "SDV" volume types can be registered in the LUN group.
- Normally a LUN group cannot be created without registering volumes. However, it can be created if it is used for Veeam Storage Integration.
- Up to 4096 LUNs can be created. If the host affinity setting is performed for the host groups or hosts to which the host response setting has been allocated, the number of LUNs that can be referenced by the host vary depending on the host response setting. Refer to "[Host Response and Referable Number of LUNs](#)" for details.
- Note that if a LUN group to which volumes are mapped from LUN#512 onward exists, the maximum number of LUN groups cannot be created. This is because when volumes are mapped for LUN#512 onward, an additional LUN group is created as an internal resource for every 512 LUNs. For example, when volumes are mapped in LUN#0 and LUN#1024, three LUN groups are created (one for LUNs #0 to #511, one for LUNs #512 to #1023, and one for LUNs #1024 to #1535) even though no volumes are mapped between LUN#1 and LUN#1023.
- The following volumes cannot be registered in the LUN group. These volumes are not displayed as selectable volumes.
 - "SDPV" type volumes
 - Volumes with the mirroring reservation attribute (*1)
 - ODX Buffer volumes
 - NAS volumes and NAS system volumes that are used in a Unified Storage environment
 - Volumes that are used for the Storage Cluster function
 - Volumes that are used for the Virtual Volume function (including "\$VVOL_META")
 - [Data Container Volume](#)
 - [Veeam Snapshot Volumes](#)However, if the LUN group is used for Veeam Storage Integration, a Veeam Snapshot Volume is displayed as an option and can be registered in the LUN group.
- If the specified volumes are changed to one of the following conditions before the [Create] button is clicked, LUN groups cannot be registered.
 - Volumes specified for the RAID Migration function
 - Volumes with the mirroring reservation attribute (*1)
 - ODX Buffer volumes

- Volumes where a capacity optimization is being performed

*1: An attribute to be set to a volume being created as the REC copy destination by the Dynamic LUN Mirroring function. The volumes with this attribute may have been left in the storage system due to unsuccessful creation. Volumes that have the mirroring reservation attribute can be checked in the "Forbid Advanced Copy" field on the [Volume] screen. Refer to the [Volume (Basic Information)] function for details.

■ User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	✓
StorageAdmin	✓
AccountAdmin	
SecurityAdmin	
Maintainer	✓

Refer to "[A. User Roles and Policies](#)" (page 1580) for details on the policies and roles.

■ Settings

LUN Group Setting

In this screen, create a LUN group.

Item	Description	Setting values
Name	Specify the LUN group name. An existing LUN group name cannot be specified.	Up to 16 alphanumeric characters, symbols (except ",", (comma) and "?"), and spaces
Number of LUNs	The number of host LUNs (0 to 4096) to which the volumes are allocated is displayed.	
LUN Overlap	If volumes in the LUN group satisfy one or both of the following conditions, "Yes" is displayed. For any other conditions, the field is blank. <ul style="list-style-type: none"> The volumes are allocated to different LUN groups The volumes are included in the mapping information, which is directly allocated to the port without specifying the host group or the CA port group 	
Veeam Storage Integration	If the LUN group is used for Veeam Storage Integration, select the "Yes" checkbox. If the LUN group is not used for Veeam Storage Integration, clear the checkbox. This item is displayed only when the Veeam Storage Integration License has been registered.	Checkbox Selected Cleared (Default)

Define LUN Group

The LUN and volume allocation information in the corresponding LUN group is displayed. Click the [Add] button to display the "[\[Add LUN\] Screen](#)" (page 782).

6. Connectivity

LUN Group

Item	Description
Checkbox to select a volume	Select checkboxes for host LUNs and volume allocation information that are to be deleted from the LUN group.
Host LUN	The host LUN (0 to 4095) is displayed.
Volume No.	The volume number allocated to the host LUN is displayed.
Name	The volume name allocated to the host LUN is displayed.
Type	The volume type allocated to the host LUN is displayed. Standard WSV TPV FTV SDV
Capacity	The volume capacity allocated to the host LUN is displayed. When the "Type" is "SDV", the logical capacity, which can be accessed from the host, is displayed.
LUN Group	If the volume is allocated to different LUN groups, the LUN group name is displayed. If the host, ports, and LUNs are allocated without specifying a host group or port group by an application other than Web GUI, the location information of the ports is displayed. When a volume is not allocated to different LUN groups, the field is blank. For the ETERNUS DX900 S5 or the ETERNUS DX8900 S4 LUN group name CE#x CM#y CA#z Port#w Blank For the other models LUN group name CM#y CA#z Port#w Blank x: CE number y: CM number z: CA number w: Port number
UID	The volume UID allocated to the host LUN is displayed. The UID is an identifier (storage system name) to specify a volume from the open system server. 32-digit capital letters and numeric characters (hexadecimal)

Function Button

Button	Description
[Add]	Adds the host LUN and volume allocation information to the LUN group. If the allocation information has exceeded the maximum number, the [Add] button is not available.
[Delete]	Deletes the specified host LUN and the volume allocation information from the LUN group. If no host LUNs or volume allocation information exists, the [Delete] button cannot be clicked.

[Add LUN] Screen

In this screen, allocate volumes to host LUNs.

LUN Setting

Use the radio button in the "Start Host LUNs" field, to specify the starting volume number, which will be allocated to a host LUN. By clicking the [OK] button, the selected volume numbers are allocated to the number of LUNs to be created, starting from the first LUN.

Item	Description	Setting values
Start Host LUNs	<p>Specify the host LUN from which volume allocation is to be started.</p> <p>Caution</p> <ul style="list-style-type: none"> If the allocation of the host LUN is started from an "External Volume", specify the host LUN that is allocated to the relevant volume in the external storage system. The host LUN for the External Volume is displayed in the [External Drives] screen. Refer to the [External Drives] function for details. For LUN groups whose the "Yes" checkbox of "Veeam Storage Integration" is selected, volumes cannot be allocated to Host LUN#511. 	<p>0 - 4095 (decimal)</p> <p>The smallest number among the available host LUNs (Default)</p>
Number of LUNs	Specify the number of host LUNs to which the volumes are allocated.	1 (Default) - 4096 (decimal)

Select Volume

Item	Description
Radio buttons to select a volume	<p>Select the radio button of the volume number that allocation is to be started from.</p> <p>Note</p> <ul style="list-style-type: none"> If any volumes that cannot be used for allocation exist within the range specified by the LUN number, these volumes are skipped and the next volume is allocated. Volumes that have already been registered in relevant LUN groups (volumes displayed in the "Define LUN Group" field on the [Add LUN Group] screen) are not displayed.
No.	The volume number is displayed.
Name	The volume name is displayed.
Type	<p>The volume type is displayed.</p> <p>Standard WSV TPV FTV SDV</p>
Capacity	<p>The volume capacity is displayed.</p> <p>When the "Type" is "SDV", the logical capacity, which can be accessed from the host, is displayed.</p>

Item	Description
LUN Group	<p>If the volume is allocated to different LUN groups, the LUN group name is displayed. If the host, ports, and LUNs are allocated without specifying a host group or port group by an application other than Web GUI, the location information of the ports is displayed. When a volume is not allocated to different LUN groups, the field is blank.</p> <p>For the ETERNUS DX900 S5 or the ETERNUS DX8900 S4 LUN group name CE#x CM#y CA#z Port#w Blank</p> <p>For the other models LUN group name CM#y CA#z Port#w Blank</p> <p>x: CE number y: CM number z: CA number w: Port number</p>
UID	<p>The volume UID is displayed. A "-" (hyphen) is displayed for the Data Container Volume. 32-digit capital letters and numeric characters (hexadecimal)</p> <div style="background-color: #f0f0f0; padding: 10px; margin-top: 10px;"> <p>Note</p> <ul style="list-style-type: none"> • For External Volumes that inherit the External LU Information, the UID of the External Volumes is displayed. If External Volumes do not inherit the information, the UID that is assigned by the storage system is displayed. • If the External LU Information is deleted, the UID that is assigned by the storage system is displayed. Refer to the [Delete External LU Information] function for details. </div>

■ Operating Procedures

In this screen, create a LUN group.

Procedure ▶▶▶

- 1 Click [Add LUN Group] in [Action].
- 2 Specify the LUN group name.
- 3 Click the [Add] button.
→ The [Add LUN] screen is displayed.

Note

- To delete the allocation information between LUNs and volumes from the LUN group, select the checkbox for allocation information to delete and click the [Delete] button.

- 4 Specify the LUN and the number of LUNs for volume allocation, select the volume numbers to start the allocation to the corresponding LUNs from, and then click the [OK] button.
→ Returns to the [Add LUN Group] screen.

Caution

- An error screen appears in the following conditions:
 - The LUN volume, which is specified in "Start Host LUNs", has already been allocated to a different LUN
 - The necessary number of LUNs, which have been specified in "Number of LUNs", cannot be allocated to the LUN volumes

- 5 Repeat Step 3 and Step 4 to set multiple allocation information between the LUNs and the volumes.
- 6 Check the LUN and the volume allocation information to be registered in the LUN group, and then click the [Create] button.
→ A confirmation screen appears.

Caution

- An error screen appears in the following conditions:
 - The "Name" is not entered
 - The "Name" does not satisfy the input conditions
 - The "Name" overlaps with an existing LUN group name
 - The total number of LUN groups has reached the maximum number of LUN groups for each model
 - The data merge process of a SnapOPC+ session is being performed for the specified volume

- 7 Click the [OK] button.
→ Adding LUN group starts.
- 8 Click the [Done] button to return to the [LUN Group] screen.



Delete LUN Group

- ["■ Overview" \(page 785\)](#)
- ["■ User Privileges" \(page 786\)](#)
- ["■ Operating Procedures" \(page 786\)](#)

■ Overview

This function deletes the [LUN groups](#).

Caution

- The following LUN groups cannot be deleted:
 - The LUN group is used for the host affinity settings
 - The LUN group includes a volume that is used for the Storage Cluster function

■ User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	✓
StorageAdmin	✓
AccountAdmin	
SecurityAdmin	
Maintainer	✓

Refer to "A. User Roles and Policies" (page 1580) for details on the policies and roles.

■ Operating Procedures

Delete the LUN groups.

Procedure ▶▶▶

- 1 Select the LUN group that is to be deleted (multiple selections can be made), and click [Delete LUN Group] in [Action].
→ A confirmation screen appears.
- 2 Click the [OK] button.
→ The LUN group deletion starts.
- 3 Click the [Done] button to return to the [LUN Group] screen.



Modify LUN Group

- "■ Overview" (page 786)
- "■ User Privileges" (page 787)
- "■ Settings" (page 787)
- "■ Operating Procedures" (page 791)

■ Overview

This function modifies [LUN groups](#).

Caution

- When changing or deleting the volume allocation in a running LUN group, stop access from the associated host.
- When adding LUNs or volume allocation to a running LUN group, stopping access from the associated host is not necessary.
- Only the volumes with "Standard", "WSV", "TPV", "FTV", or "SDV" volume types can be registered in the LUN group.
- To change a LUN group with the host affinity setting, the number of LUNs that can be referenced by the host depends on the host response setting that is allocated to the host group or the host.

Refer to "[Host Response and Referable Number of LUNs](#)" for details. When adding LUNs to a LUN group, check the host response.

- The following volumes cannot be registered in the LUN group. These volumes are not displayed as selectable volumes.
 - "SDPV" type volumes
 - Volumes with the mirroring reservation attribute (*1)
 - ODX Buffer volumes
 - NAS volumes and NAS system volumes that are used in a Unified Storage environment
 - Volumes that are used for the Storage Cluster function
 - Volumes that are used for the Virtual Volume function (including "\$VVOL_META")
 - [Data Container Volume](#)
 - [Veeam Snapshot Volumes](#) (if the LUN group is not used by [Veeam Storage Integration](#))
- If the specified volumes are changed to one of the following conditions before the [Modify] button is clicked, LUN groups cannot be registered.
 - Volumes specified for the RAID Migration function
 - Volumes with the mirroring reservation attribute (*1)
 - ODX Buffer volumes
 - Volumes where a capacity optimization is being performed

*1: An attribute to be set to a volume being created as the REC copy destination by the Dynamic LUN Mirroring function. The volumes with this attribute may have been left in the storage system due to unsuccessful creation. Volumes that have the mirroring reservation attribute can be checked in the "Forbid Advanced Copy" field on the [Volume] screen. Refer to the [Volume (Basic Information)] function for details.

■ User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	✓
StorageAdmin	✓
AccountAdmin	
SecurityAdmin	
Maintainer	✓

Refer to "[A. User Roles and Policies](#)" (page 1580)" for details on the policies and roles.

■ Settings

LUN Group Setting

In this screen, modify a LUN group.

6. Connectivity
LUN Group

Item	Description	Setting values
Name	Modify the LUN group name. An existing LUN group name cannot be specified.	Up to 16 alphanumeric characters, symbols (except ",", (comma) and "?"), and spaces
Number of LUNs	The number of host LUNs (0 to 4096) to which the volumes are allocated is displayed.	
LUN Overlap	If volumes in the LUN group satisfy one or both of the following conditions, "Yes" is displayed. For any other conditions, the field is blank. <ul style="list-style-type: none"> • The volumes are allocated to different LUN groups • The volumes are included in the mapping information, which is directly allocated to the port without specifying the host group or the CA port group 	
Veeam Storage Integration	If the LUN group is used for Veeam Storage Integration, select the "Yes" checkbox. If the LUN group is not used for Veeam Storage Integration, clear the checkbox. This item is displayed only when the Veeam Storage Integration License has been registered.	Checkbox Selected Cleared

Define LUN Group

The LUN and volume allocation information in the corresponding LUN group is displayed. Click the [Add] button to display the "[Add LUN] Screen" (page 789). Click the [Delete] button to delete the specified LUN and the volume allocation information from the LUN group.

Item	Description
Checkbox to select a volume	Select checkboxes for host LUNs and volume allocation information that are to be deleted from the LUN group.
Host LUN	The host LUN (0 to 4095) is displayed.
Volume No.	The volume number allocated to the host LUN is displayed.
Name	The volume name allocated to the host LUN is displayed.
Type	The volume type allocated to the host LUN is displayed. Standard WSV TPV FTV SDV
Capacity	The volume capacity allocated to the host LUN is displayed. When the "Type" is "SDV", the logical capacity, which can be accessed from the host, is displayed.

6. Connectivity

LUN Group

Item	Description
LUN Group	<p>If the volume is allocated to different LUN groups, the LUN group name is displayed. If the host, ports, and LUNs are allocated without specifying a host group or port group by an application other than Web GUI, the location information of the ports is displayed. When a volume is not allocated to different LUN groups, the field is blank.</p> <p>For the ETERNUS DX900 S5 or the ETERNUS DX8900 S4</p> <p>LUN group name CE#x CM#y CA#z Port#w Blank</p> <p>For the other models</p> <p>LUN group name CM#y CA#z Port#w Blank</p> <p>x: CE number y: CM number z: CA number w: Port number</p>
UID	<p>The volume UID allocated to the host LUN is displayed.</p> <p>The UID is an identifier (storage system name) to specify a volume from the open system server.</p> <p>32-digit capital letters and numeric characters (hexadecimal)</p>

Function Button

Button	Description
[Add]	<p>Adds the host LUN and volume allocation information to the LUN group.</p> <p>If the allocation information has exceeded the maximum number, the [Add] button cannot be clicked.</p>
[Delete]	<p>Deletes the specified host LUN and the volume allocation information from the LUN group.</p> <p>If no host LUNs or volume allocation information exists, the [Delete] button cannot be clicked.</p>

[Add LUN] Screen

In this screen, allocate volumes to host LUNs.

LUN Setting

Use the radio button in the "Start Host LUNs" field, to specify the starting volume number, which will be allocated to a host LUN. By clicking the [OK] button, the selected volume numbers are allocated to the number of LUNs to be created, starting from the first LUN.

Item	Description	Setting values
Start Host LUNs	<p>Specify the host LUN from which volume allocation is to be started.</p> <div style="background-color: #fff9c4; padding: 10px; border: 1px solid #ccc;"> <p>Caution</p> <ul style="list-style-type: none"> If the allocation of the host LUN is started from an "External Volume", specify the host LUN that is allocated to the relevant volume in the external storage system. The host LUN for the External Volume is displayed in the [External Drives] screen. Refer to the [External Drives] function for details. For LUN groups whose the "Yes" checkbox of "Veeam Storage Integration" is selected, volumes cannot be allocated to Host LUN#511. </div>	<p>0 - 4095 (decimal)</p> <p>The smallest number among the available host LUNs (Default)</p>

6. Connectivity
LUN Group

Item	Description	Setting values
Number of LUNs	The number of host LUNs to which the volumes are allocated is displayed.	1 (Default) - 4096 (decimal)

Select Volume

Item	Description
Radio buttons to select a volume	<p>Select the radio button of the volume number that allocation is to be started from.</p> <div style="background-color: #f0f0f0; padding: 10px;"> <p>Note</p> <ul style="list-style-type: none"> • If any volumes that cannot be used for allocation exist within the range specified by the LUN number, these volumes are skipped and the next volume is allocated. • Volumes that have already been registered in relevant LUN groups (volumes displayed in the "Define LUN Group" field on the [Modify LUN Group] screen) are not displayed. </div>
No.	The volume number is displayed.
Name	The volume name is displayed.
Type	<p>The volume type is displayed.</p> <p>Standard WSV TPV FTV SDV</p>
Capacity	<p>The volume capacity is displayed.</p> <p>When the "Type" is "SDV", the logical capacity, which can be accessed from the host, is displayed.</p>
LUN Group	<p>If the volume is allocated to different LUN groups, the LUN group name is displayed. If the host, ports, and LUNs are allocated without specifying a host group or port group by an application other than Web GUI, the location information of the ports is displayed. When a volume is not allocated to different LUN groups, the field is blank.</p> <p>For the ETERNUS DX900 S5 or the ETERNUS DX8900 S4 LUN group name CE#x CM#y CA#z Port#w</p> <p>For the other models LUN group name CM#y CA#z Port#w</p> <p>x: CE number y: CM number z: CA number w: Port number</p>
UID	<p>The volume UID is displayed.</p> <p>A "-" (hyphen) is displayed for the Data Container Volume.</p> <p>32-digit capital letters and numeric characters (hexadecimal)</p> <div style="background-color: #f0f0f0; padding: 10px;"> <p>Note</p> <ul style="list-style-type: none"> • For External Volumes that inherit the External LU Information, the UID of the External Volumes is displayed. If External Volumes do not inherit the information, the UID that is assigned by the storage system is displayed. • If the External LU Information is deleted, the UID that is assigned by the storage system is displayed. Refer to the [Delete External LU Information] function for details. </div>

■ Operating Procedures

In this screen, modify a LUN group.

Procedure ▶▶▶

- 1 Select the LUN group that is to be modified and click [Modify LUN Group] in [Action].
- 2 Modify the LUN group name (if required).
- 3 Click the [Add] button.
→ The [Add LUN] screen is displayed.

Note

- To delete the allocation information between LUNs and volumes from the LUN group, select the checkbox for allocation information to delete and click the [Delete] button.
- To change the LUN and the volume allocation information, delete the allocation information to be changed. Restart this function to add a new allocation of LUNs and volumes in the LUN group.

- 4 Specify the LUN and the number of LUNs for volume allocation, select the volume numbers to start the allocation to the corresponding LUNs from, and then click the [OK] button.
→ Returns to the [Modify LUN Group] screen.

Caution

- An error screen appears in the following conditions:
 - The LUN volume, which is specified in "Start Host LUNs", has already been allocated to a different LUN
 - The necessary number of LUNs, which have been specified in "Number of LUNs", cannot be allocated to the LUN volumes

- 5 Repeat Step 3 and Step 4 to set multiple allocation information between the LUNs and the volumes.
- 6 Check the LUN and the volume allocation information to be registered in the LUN group, click the [Modify] button.
→ A confirmation screen appears.

Caution

- An error screen appears in the following conditions:
 - The "Name" is not entered
 - The "Name" does not satisfy the input conditions
 - The "Name" overlaps with an existing LUN group name
 - Some LUNs cannot be referenced from the host
 - The data merge process of a SnapOPC+ session is being performed for the specified volume
 - The "Yes" checkbox of "Veeam Storage Integration" is selected for a LUN group whose host affinity is configured with any host

- 7 Click the [OK] button.
→ Modifying LUN group starts.

- 8 Click the [Done] button to return to the [LUN Group] screen.



Host Response

- "[Host Response Overview](#)" (page 792)
- "[Host Response User Privileges](#)" (page 792)
- "[Host Response Display Contents](#)" (page 792)

Host Response Overview

This function displays the host responses that are registered in the storage system. The host response configures the appropriate operation mode on which the host makes connection. The usual host connection uses a recommended pattern or the default setting which have been arranged in advance in accordance with each OS type. Use the [Add Host Response] function when customizing the host response in accordance with the OS type or the operating environment.

Host Response User Privileges

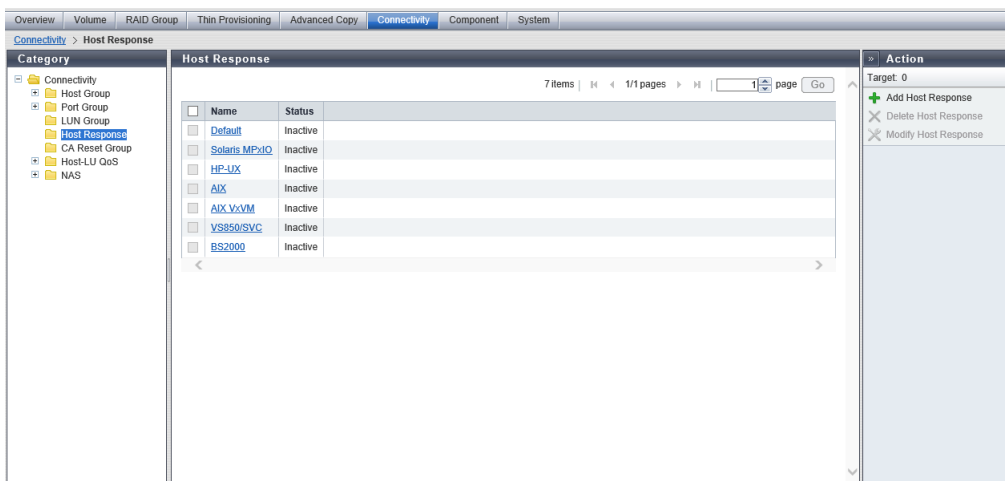
Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	✓
Admin	✓
StorageAdmin	✓
AccountAdmin	
SecurityAdmin	✓
Maintainer	✓

Refer to "[A. User Roles and Policies](#)" (page 1580) for details on the policies and roles.

Host Response Display Contents

In this screen, the list of host responses are displayed.



6. Connectivity

Host Response

Item	Description
Name	All of the host response names that have been registered in the storage system are displayed. Click the host response name to display the "[Host Response Detail] Screen" (page 793). Default Solaris MPxIO HP-UX AIX AIX VxVM VS850/SVC BS2000
Status	The usage of the host response ("Active" or "Inactive") is displayed. <ul style="list-style-type: none">• Active A host response which is being used on host, host group, or host affinity.• Inactive A host response which is not being used on host, host group, or host affinity.

[Host Response Detail] Screen

The setting parameters for registered host responses are displayed.

Host Response Name

Item	Description
Name	The selected host response name is displayed. Default Solaris MPxIO HP-UX AIX AIX VxVM VS850/SVC BS2000

LUN Settings

Item	Description
LUN Addressing	The LUN addressing format is displayed. <ul style="list-style-type: none">• Peripheral device addressing (Default) This mode enables mapping to 256 LUNs.• Flat space addressing This mode enables mapping to 4096 LUNs.

6. Connectivity
Host Response

Item	Description
LUN Expand Mode (Peripheral Device Addressing)	<p>The LUN expand mode of the Peripheral Device Addressing is displayed.</p> <ul style="list-style-type: none"> • Enable Expand the number of LUNs that can be mapped using the Peripheral Device Addressing method to 4096. • Disable (Default) Do not Expand the number of LUNs that can be mapped using the Peripheral Device Addressing method (not changed from 256 maximum). <p>Note</p> <ul style="list-style-type: none"> • This parameter is only available when the LUN addressing setting is "Peripheral device addressing (Default)".

ALUA Settings

Item	Description
Asymmetric / Symmetric Logical Unit Access	<p>The access type from the host to a volume is displayed.</p> <ul style="list-style-type: none"> • ACTIVE-ACTIVE / PREFERRED_PATH There are recommended paths and non-recommended paths for each volume. By using a CA port in the Controlling CM of a RAID group in which the volume belongs for the recommended paths (other ports are regarded as non-recommended paths), data migration between CMs (cross access) can be reduced. • ACTIVE / ACTIVE All of the paths to the volume are regarded as being recommended paths. The multipath driver determines which paths are used. <p>For the ETERNUS DX900 S5 or the ETERNUS DX8900 S4: ACTIVE-ACTIVE / PREFERRED_PATH ACTIVE / ACTIVE (Default)</p> <p>For the other models: ACTIVE-ACTIVE / PREFERRED_PATH (Default) ACTIVE / ACTIVE</p> <p>Caution</p> <ul style="list-style-type: none"> • This item is only available when the TPGS mode is "Enabled (Default)". Note that this parameter is enabled regardless of the TPGS mode setting when the ETERNUS Multipath Driver is used. • For storage systems other than the ETERNUS DX900 S5 or the ETERNUS DX8900 S4, when setting "ACTIVE / ACTIVE", a data migration occurs between CMs and there may be a reduction in performance.
TPGS Mode	<p>The Target Port Group Support (TPGS) mode is displayed.</p> <p>TPGS is a standard that is used to achieve Asymmetric Logical Unit Access (ALUA) for multipath control. By notifying the path status (recommend or non-recommend) of each volume, the selection conditions of paths for multipath control can be determined. If the TPGS mode is "Disabled", the multipath driver determines which paths are used.</p> <p>Enabled (Default) Disabled</p>

6. Connectivity
Host Response

Item	Description
TPG Referrals Mode	<p>The TPG Referrals mode is displayed.</p> <p>The TPG Referrals function determines the priority path for each block when accessing volumes via the ETERNUS Multipath Driver in order to prevent cross access.</p> <p>Enabled Disabled (Default)</p> <div style="background-color: #fff9c4; padding: 10px; border: 1px solid #ccc;"> <p>Caution</p> <ul style="list-style-type: none"> • The TPG Referrals function is performed when "Enabled" is selected and all of the following conditions apply: <ul style="list-style-type: none"> - The ETERNUS Multipath Driver supports the TPG Referrals function - The TPGS mode is "Enabled (Default)" • This parameter is available for Standard, WSV, TPV, FTV, and Standard (LUN Concatenation) type volumes. This mode is effective for WSVs, TPVs, FTVs, and Standard (LUN Concatenation) type volumes when RAID groups are configured with different controlling CMs. </div>

Inquiry Command Settings

Item	Description
Peripheral Device Type (Peripheral Device Addressing)	<p>When the LUN addressing setting is "Peripheral device addressing (Default)", the Peripheral Device type for unconnected LUNs is displayed.</p> <p>No Device Type (3Fh) (Default) Not Supported (7Fh) Not Connected (20h)</p>
Peripheral Device Type (Flat Space Addressing)	<p>When the LUN addressing setting is "Flat space addressing", the Peripheral Device type for LUN0 is displayed.</p> <p>No Device Type (3Fh) (Default) Controller Device (0Ch)</p>
SCSI Version	<p>The version for the SCSI specification that is responded to the host is displayed.</p> <p>Version 6 (Default) Version 5 Version 4 Version 3</p>
NACA	<p>The respond mode for the Normal Auto Contingent Allegiance (NACA) bit is displayed.</p> <ul style="list-style-type: none"> • Enabled The host is responded to with the NACA bit on. • Disabled (Default) The host is responded to with the NACA bit off.
Device ID Type	<p>The format of the volume identification information is displayed.</p> <p>Type3 (Default) Type1 Type1 + Type3</p>
Product ID	<p>The product ID that is responded to the host is displayed.</p> <p>Default Respond as ETERNUS DX S2</p>
Product Revision	<p>Whether to respond with the firmware version as the product revision is displayed.</p> <p>Respond Not Respond (Default)</p>

Test Unit Ready Command Settings

Item	Description
Reservation Conflict Response	<p>Whether the TEST UNIT READY command for the reserved volume is responded to with the RESERVATION CONFLICT status is displayed.</p> <ul style="list-style-type: none"> • GOOD (Default) The TEST UNIT READY command is executed. If the target volume is in the normal state, responds with the GOOD status. • RESERVATION CONFLICT The TEST UNIT READY command is responded to with the RESERVATION CONFLICT status.

Sense Settings

Item	Description
Notify Change of Volume Mapping	<p>Whether sense is reported to the host when volumes are added to LUN groups set with host affinity is displayed.</p> <ul style="list-style-type: none"> • Enabled (Default) Sense is notified. • Disabled Sense is not notified.
Notify Change of Volume Expansion	<p>Whether sense is reported to the host when the volume capacity is changed is displayed.</p> <ul style="list-style-type: none"> • Enabled (Default) Sense is notified. • Disabled Sense is not notified.
Notify Vendor Unique Sense	<p>Whether asynchronous sense is reported to the host when an event such as a module disconnection occurs in the storage system is displayed.</p> <ul style="list-style-type: none"> • Enabled Sense is notified. • Disabled (Default) Sense is not notified.
Sense Data Conversion	<p>Whether or not unconverted sense data is sent to the host is displayed.</p> <ul style="list-style-type: none"> • No Conversion (Default) Sense data is sent to the host without any conversion. • Customize Customized sense data is sent to the host.
Sense Data Conversion	<p>From SK/ASC/ASCQ</p>
	<p>To SK/ASC/ASCQ</p>
	<p>When sense data is converted, the sense data conversion pattern is displayed. "From SK/ASC/ASCQ" and "To SK/ASC/ASCQ" values are displayed in pairs. The sense data that matches the "From SK/ASC/ASCQ" value is changed to the "To SK/ASC/ASCQ" value. For non-conversion target items, "*" is displayed.</p> <ul style="list-style-type: none"> • Sense Key (SK): SK indicates sense keys included in the sense data. • Additional Sense Code (ASC): ASC indicates sense codes included in the sense data. • Additional Sense Code Qualifier (ASCQ): ASCQ indicates additional sense code qualifiers included in the sense data.

Mode Sense Command Settings

Item	Description
Reservation Conflict Response (Write Exclusive)	The response status when the "Mode Sense" command to the volume is received while the relevant volume is reserved with "Write Exclusive" by the host is displayed. "Write Exclusive" is a reservation type. Refer to the [Reservation] function for details. GOOD RESERVATION CONFLICT (Default)

Other Settings

Item	Description
Command Monitor Time	The time before the command timed out is displayed. If a timeout occurs, the relevant command ends abnormally with a specific sense code. <ul style="list-style-type: none"> • Default (25sec.) A timeout occurs after 25 seconds. • Customize A timeout occurs after the specified value (10 - 255 seconds).
Load Balance Response Status	The response status of the load balancing function is displayed. CHECK CONDITION / UNIT ATTENTION (Default) BUSY TASK SET FULL <div style="background-color: #fff9c4; padding: 5px;"> <p>Caution</p> <ul style="list-style-type: none"> • This item is only available when "Enable" is selected for "Load Balance" in the subsystem parameter. </div>
iSCSI Discovery Reply Mode	The response mode for iSCSI Discovery requests is displayed. <ul style="list-style-type: none"> • All - Reply All Ports (Default) Replies to the host with the information for all the iSCSI ports (iSCSI names and IP addresses). • Port - Reply Target Port Only Replies to the host with only the information for the specified iSCSI ports (iSCSI names and IP addresses).
iSCSI Reservation Range	The reservation management range for iSCSI connection is displayed. <ul style="list-style-type: none"> • Storage System (Default) The reservation status of volumes is managed for each storage system. • CA Port The reservation status of volumes is managed for each CA port.

Add Host Response

- ["■ Overview" \(page 797\)](#)
- ["■ User Privileges" \(page 798\)](#)
- ["■ Settings" \(page 798\)](#)
- ["■ Operating Procedures" \(page 806\)](#)

■ Overview

The host response setting can be customized. This function creates a new host response. Up to 256 host responses, which include the recommended patterns, can be created for each storage system.

For more details on setting the host response parameters, refer to "Configuration Guide -Server Connection-" for each OS type.

Caution

- If an appropriate host response is not configured to the host affinity, the path may not be switched correctly or the volume may not be recognized correctly.
- When customizing the host response, make sure to understand the setting parameters and create the host response with careful attention.
- When Asymmetric Logical Unit Access (ALUA) is set for the volume, ALUA is given priority over the "Asymmetric / Symmetric Logical Unit Access" setting that is specified in this function. Refer to "ALUA" in the [Performance (Host I/O)] function for details.

Note

- A host response has a recommended pattern which has been prepared for each OS type. Refer to "[Recommended Patterns of Host Responses](#)" (page 798) for details. Select "Default" in other host connection environments.
- Assign a host response when adding or changing a host group. Refer to the [Add FC Host Group] function, the [Add iSCSI Host Group] function, the [Add SAS Host Group] function, or the [Modify Host Group] function for details.
- Assign a host response when adding or changing a host. Refer to the [Add FC Host] function, the [Add iSCSI Host] function, the [Add SAS Host] function, the [Modify FC Host] function, the [Modify iSCSI Host] function, or the [Modify SAS Host] function for details.
- Assign a host response to the CA port when "All" is specified with host affinity for the host group or the host. Refer to the [Create Host Affinity] function or the [Modify Host Affinity] function for details.
- To change a host response, use the [Modify Host Response] function.

■ **User Privileges**

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	✓
StorageAdmin	✓
AccountAdmin	
SecurityAdmin	
Maintainer	✓

Refer to "[A. User Roles and Policies](#)" (page 1580) for details on the policies and roles.

■ **Settings**

Recommended Patterns of Host Responses

Host response name	Connection environment
Solaris MPxIO	Set this parameter to connect to an Oracle Solaris host and to use the OS standard Multipath Driver (MPxIO).

6. Connectivity
Host Response

Host response name	Connection environment
HP-UX	Set this parameter to connect to an HP-UX host.
AIX	Set this parameter to connect to an AIX host.
AIX VxVM	Set this parameter to connect to an AIX host and to use Veritas Volume Manager (VxVM).
VS850/SVC	Set this parameter to connect to an ETERNUS VS850 Virtualization Storage or an IBM SAN Volume Controller (SVC).
BS2000	Set this parameter to connect to a BS2000 host.
Default	Set this parameter for any host connection environments that are not listed above.

Default Values for Recommended Patterns of Host Responses

Host response	Host response name						
	Default	Solaris MPxIO	HP-UX	AIX	AIX VxVM	VS850/SVC	BS2000
LUN Settings							
LUN Addressing (*1)	PRHL (Default)		FLAT			PRHL (Default)	
LUN Expand Mode (Peripheral Device Addressing)	Disabled (Default)						Enabled
ALUA Settings							
Asymmetric / Symmetric Logical Unit Access	For the ETERNUS DX900 S5 or the ETERNUS DX8900 S4: ACTIVE / ACTIVE (Default) For the other models: ACTIVE-ACTIVE / PREFERRED_PATH (Default)						ACTIVE / ACTIVE
TPGS Mode	Enabled (Default)						
TPG Referrals Mode	Disabled (Default)						
Inquiry Command Settings							
Peripheral Device Type (*2) (Peripheral Device Addressing)	No Device Type (3Fh) (Default)				Not Connected (20h)	No Device Type (3Fh) (Default)	
Peripheral Device Type (*3) (Flat Space Addressing)	No Device Type (3Fh) (Default)	Controller Device (0Ch)	No Device Type (3Fh) (Default)				
SCSI Version	Version 6 (Default)						
NACA	Disabled (Default)			Enabled		Disabled (Default)	
Device ID Type	Type3 (Default)				Type1	Type1 + Type3	
Product ID	Default						
Product Revision	Not Respond (Default)						

6. Connectivity
Host Response

Host response	Host response name						
	Default	Solaris MPxIO	HP-UX	AIX	AIX VxVM	VS850/SVC	BS2000
Test Unit Ready Command Settings							
Reservation Conflict Response	GOOD (Default)	RESERVATION CONFLICT	GOOD (Default)	RESERVATION CONFLICT	GOOD (Default)	RESERVATION CONFLICT	
Sense Settings							
Notify Change of Volume Mapping	Enabled (Default)						
Notify Change of Volume Expansion	Enabled (Default)						
Notify Vendor Unique Sense	Disabled (Default)						
Sense Data Conversion	No Conversion (Default)	Customize SK4 → SK6 SKB → SK6	No Conversion (Default)				
Mode Sense Command Settings							
Reservation Conflict Response (Write Exclusive)	RESERVATION CONFLICT (Default)						
Other Settings							
Command Monitor Time	Default (25sec.)						
Load Balance Response Status	CHECK CONDITION / UNIT ATTENTION (Default)						
iSCSI Discovery Reply Mode	All - Reply All Ports (Default)						
iSCSI Reservation Range	Storage System (Default)						
Host Response	Default	Solaris MPxIO	HP-UX	AIX	AIX VxVM	VS850/SVC	BS2000

*1 : "PRHL" indicates "Peripheral device addressing (Default)" and "FLAT" indicates "Flat space addressing".

*2 : This parameter is ignored when the LUN addressing setting is "Flat".

*3 : This parameter is ignored when the LUN addressing setting is "PRHL (Default)".

Parameters Setting

In this screen, set host response parameters.

Host Response Name

Item	Description	Setting values
Name	Specify the host response name. An existing host response name cannot be used.	Up to 16 alphanumeric characters, symbols (except "," (comma) and "?"), and spaces

LUN Settings

Item	Description	Setting values
LUN Addressing	<p>Select the appropriate LUN addressing for each OS.</p> <ul style="list-style-type: none"> Peripheral device addressing (Default) This mode enables mapping to 256 LUNs. Flat space addressing This mode enables mapping to 4096 LUNs. <p>Caution</p> <ul style="list-style-type: none"> If the host response whose "LUN Addressing" is "Flat space addressing" is used, the maximum number of connectible hosts per CA port is 32 (or four for the ETERNUS DX60 S5). Therefore, make sure to connect 32 or less hosts (or four or less hosts for the ETERNUS DX60 S5) to the target CA port. If the number of connected hosts exceeds the limit, the volume may become inaccessible from any of the hosts assigned to the target CA port. 	Peripheral device addressing (Default) Flat space addressing
LUN Expand Mode (Peripheral Device Addressing)	<p>Select the LUN expand mode.</p> <ul style="list-style-type: none"> When expanding the maximum LUNs that can be mapped to 4096, select "Enable". When the maximum LUNs that can be mapped are not expanded, select "Disable (Default)". <p>Caution</p> <ul style="list-style-type: none"> Some restrictions are applied for environments to use "LUN Expand Mode (Peripheral Device Addressing)". Refer to "Setting the Host Responses" in "Configuration Guide - Server Connection-" (*1) for details. If the host response whose "LUN Expand Mode (Peripheral Device Addressing)" is "Enable" is used, the maximum number of connectible hosts per CA port is 32 (or four for the ETERNUS DX60 S5). Therefore, make sure to connect 32 or less hosts (or four or less hosts for the ETERNUS DX60 S5) to the target CA port. If the number of connected hosts exceeds the limit, the volume may become inaccessible from any of the hosts assigned to the target CA port. The number of LUNs that can be referenced from the host is determined by the "LUN Addressing" settings and the "LUN Expand Mode (Peripheral Device Addressing)" settings for the host response. When changing a host response that is already allocated to a host group with the host affinity setting or a host with the host affinity setting, check the LUN setting state. If LUNs that are LUN#256 onward are used, the referable LUN setting cannot be changed to "256 LUN" (*2). Refer to "Host Response and Referable Number of LUNs" for details. <p>*1 : Configuration Guide -Server Connection- Fibre Channel/ ETERNUS AF series, ETERNUS DX200F All-Flash Arrays, ETERNUS DX S5/S4/S3 series Hybrid Storage Systems Settings</p> <p>*2 : "Peripheral device addressing (Default)" is specified for LUN addressing and "Disable (Default)" is selected for the LUN Expand Mode (Peripheral Device Addressing).</p> <p>Note</p> <ul style="list-style-type: none"> This parameter is available only when the LUN addressing setting is "Peripheral device addressing (Default)". 	Enable Disable (Default)

ALUA Settings

Item	Description	Setting values
Asymmetric / Symmetric Logical Unit Access	<p>Select the access type from the host to a volume.</p> <ul style="list-style-type: none"> ACTIVE-ACTIVE / PREFERRED_PATH <p>There are recommended paths and non-recommended paths for each volume. By using a CA port in the Controlling CM of a RAID group in which the volume belongs for the recommended paths (other ports are regarded as non-recommended paths), data migration between CMs (cross access) can be reduced.</p> <ul style="list-style-type: none"> ACTIVE / ACTIVE <p>All of the paths to the volume are regarded as being recommended paths. The multipath driver determines which paths are used.</p> <div style="background-color: #fff9c4; padding: 10px; margin-top: 10px;"> <p>Caution</p> <ul style="list-style-type: none"> This parameter is only available when the TPGS mode is "Enable (Default)". Note that this parameter is enabled regardless of the TPGS mode setting when the ETERNUS Multipath Driver is used. For storage systems other than the ETERNUS DX900 S5 or the ETERNUS DX8900 S4, when setting "ACTIVE / ACTIVE", a data migration occurs between CMs and there may be a reduction in performance. </div>	<p>For the ETERNUS DX900 S5 or the ETERNUS DX8900 S4: ACTIVE-ACTIVE / PREFERRED_PATH ACTIVE / ACTIVE (Default)</p> <p>For the other models: ACTIVE-ACTIVE / PREFERRED_PATH (Default) ACTIVE / ACTIVE</p>
TPGS Mode	<p>Select "Enable (Default)" or "Disable" for the Target Port Group Support (TPGS) mode.</p> <p>TPGS is a standard that is used to achieve Asymmetric Logical Unit Access (ALUA) for multipath control. By notifying the path status (recommend or non-recommend) of each volume, the selection conditions of paths for multipath control can be determined. If the TPGS mode is "Disable", the multipath driver decides which paths are used.</p>	<p>Enable (Default) Disable</p>
TPG Referrals Mode	<p>Select "Enable" or "Disable (Default)" for the TPGS referrals setting.</p> <p>The TPG Referrals function determines the priority path for each block when accessing volumes via the ETERNUS Multipath Driver in order to prevent cross access.</p> <div style="background-color: #fff9c4; padding: 10px; margin-top: 10px;"> <p>Caution</p> <ul style="list-style-type: none"> The TPG Referrals function is performed when "Enable" is selected and all of the following conditions apply: <ul style="list-style-type: none"> The ETERNUS Multipath Driver supports the TPG Referrals function "Enable (Default)" is selected for "TPGS Mode" This parameter is available for Standard, WSV, TPV, FTV, and Standard (LUN Concatenation) type volumes. </div>	<p>Enable Disable (Default)</p>

Inquiry Command Settings

Item	Description	Setting values
Peripheral Device Type (Peripheral Device Addressing)	If the LUN addressing setting is "Peripheral device addressing (Default)", select a Peripheral Device type for unconnected LUNs. Note • This parameter can only be specified when the LUN addressing setting is "Peripheral device addressing (Default)".	No Device Type (3Fh) (Default) Not Supported (7Fh) Not Connected (20h)
Peripheral Device Type (Flat Space Addressing)	When the LUN addressing setting is "Flat space addressing", select the Peripheral Device type for LUN0. Note • This parameter can only be specified when the LUN addressing setting is "Flat space addressing".	No Device Type (3Fh) (Default) Controller Device (0Ch)
SCSI Version	Select the version of the SCSI specification that is installed in the storage system.	Version 6 (Default) Version 5 Version 4 Version 3
NACA	Select "Enable" or "Disable (Default)" for the Normal Auto Contingent Allegiance (NACA) bit.	Enable Disable (Default)
Device ID Type	Select the format of the volume identification information.	Type3 (Default) Type1 Type1 + Type3
Product ID	Select "Default" or "Respond as ETERNUS DX S2" for the product ID that is responded to the host.	Default Respond as ETERNUS DX S2
Product Revision	Select whether to respond with the firmware version as the product revision. If "Not Respond (Default)" is selected, the fixed value (0000) is sent for this item.	Respond Not Respond (Default)

Test Unit Ready Command Settings

Item	Description	Setting values
Reservation Conflict Response	Select the response status when a command to the volume is received while the relevant volume is reserved by another host.	GOOD (Default) RESERVATION CONFLICT

Sense Settings

Item	Description	Setting values
Notify Change of Volume Mapping	Select whether the host is notified ("Enable (Default)") or not notified ("Disable") when volumes are added to LUN groups set with host affinity.	Enable (Default) Disable
Notify Change of Volume Expansion	Select the host is notified ("Enable (Default)") or not notified ("Disable") when the volume capacity is changed.	Enable (Default) Disable

6. Connectivity
Host Response

Item	Description	Setting values
Notify Vendor Unique Sense	<p>Select whether asynchronous sense reports module disconnection in the storage system to the host ("Enable") or does not report module disconnection in the storage system to the host ("Disable (Default)").</p> <p>Caution</p> <ul style="list-style-type: none"> A vendor unique sense code is used for sense data that is to be notified. Do not select "Enable" for this item if status monitoring of the storage system is not performed from the host. 	Enable Disable (Default)
Sense Data Conversion	<p>Select whether or not to send the unconverted sense data to the host.</p> <ul style="list-style-type: none"> No Conversion (Default) Sense data is sent to the host without any conversion. Customize Customized sense data is sent to the host. Select "Customize" to display the sense data conversion setting field. <ul style="list-style-type: none"> From SK/ASC/ASCQ To SK/ASC/ASCQ <p>Note</p> <ul style="list-style-type: none"> Click the [Add] button. Enter SK/ASC/ASCQ of the conversion target in the "From" field, and SK/ASC/ASCQ of the conversion destination in the "To" field. Specify "From SK/ASC/ASCQ" and "To SK/ASC/ASCQ" values in pairs. The sense data that matching the "From SK/ASC/ASCQ" value is changed to the specified "To SK/ASC/ASCQ" value. "*" indicates a wild-card, and targets all values. The maximum number of sense data conversions is eight patterns. Click each link to change the setting contents. <ul style="list-style-type: none"> Sense Key (SK): SK indicates sense keys included in the sense information. 0 - f or "*" <ul style="list-style-type: none"> Additional Sense Code (ASC): ASC indicates sense codes included in the sense information. 0 - ff or "*" <ul style="list-style-type: none"> Additional Sense Code Qualifier (ASCQ): ASCQ indicates additional sense code qualifier included in the sense information. 0 - ff or "*" <p>(Example 1) The sense information (4/f1/0) is converted to (4/f1/1) before responding to the host.</p> <ul style="list-style-type: none"> From SK/ASC/ASCQ: 4/f1/0 To SK/ASC/ASCQ: 4/f1/1 <p>(Example 2) The sense information (4/f1/0 - ff) is converted to (6/f1/0 - ff) before responding to the host.</p> <p>"*" indicates all patterns from "0" to "ff". The "*" part is not converted.</p> <ul style="list-style-type: none"> From SK/ASC/ASCQ: 4/f1/* To SK/ASC/ASCQ: 6/f1/* 	No Conversion (Default) Customize

Mode Sense Command Settings

Item	Description	Setting values
Reservation Conflict Response (Write Exclusive)	<p>Select the response status when the "Mode Sense" command to the volume is received while the relevant volume is reserved with "Write Exclusive" by the host. "Write Exclusive" is a reservation type. Refer to the [Reservation] function for details.</p> <ul style="list-style-type: none"> GOOD RESERVATION CONFLICT (Default) <p>Caution</p> <ul style="list-style-type: none"> To use Veritas InfoScale (formerly known as Symantec Storage Foundation), select "GOOD" for this item. 	<p>GOOD RESERVATION CONFLICT (Default)</p>

Other Settings

Item	Description	Setting values
Command Monitor Time	<p>Select one of the following options for command timeouts:</p> <ul style="list-style-type: none"> Default (25sec.) Specify 25 seconds. Customize Input a value between 10 and 255 seconds. 	<p>Default (25sec.) Customize (10 - 255 sec.)</p>
Load Balance Response Status	<p>Select the response status for the load balancing function.</p> <p>Caution</p> <ul style="list-style-type: none"> This item is only available when "Enable" is selected for "Load Balance" in the subsystem parameter. 	<p>CHECK CONDITION / UNIT ATTENTION (Default) BUSY TASK SET FULL</p>
iSCSI Discovery Reply Mode	<p>Select the response mode for iSCSI Discovery requests.</p> <ul style="list-style-type: none"> All - Reply All Ports (Default) Replies to the server with the information for all the iSCSI ports (iSCSI names and IP addresses). Port - Reply Target Port Only Replies to the server with only the information for the specified iSCSI ports (iSCSI names and IP addresses). 	<p>All - Reply All Ports (Default) Port - Reply Target Port Only</p>
iSCSI Reservation Range	<p>Select the reservation management unit of the iSCSI connection.</p> <ul style="list-style-type: none"> Storage System (Default) The reservation status of volumes is managed for each storage system. CA Port The reservation status of volumes is managed for each CA port. 	<p>Storage System (Default) CA Port</p>

Function Button

Item	Description
[Add]	<p>Adds sense data conversion patterns.</p> <p>The [Add] button is displayed only when "Customize" has been selected in the "Sense Data Conversion" field.</p> <p>If the maximum number of sense data conversion patterns has already been created, the [Add] button cannot be clicked.</p>

Item	Description
[Delete]	Deletes the sense data conversion patterns in the corresponding field from the sense data conversion list. The [Add] button is displayed only when "Customize" has been selected in the "Sense Data Conversion" field. If no sense data conversion pattern has been added, the [Delete] button is not displayed.

Function Link

Item	Description
[From SK/ASC/ASCQ]	Edits the corresponding sense data conversion patterns.
[To SK/ASC/ASCQ]	

■ **Operating Procedures**

In this screen, add a host response.

Procedure ▶▶▶

- 1 Click [Add Host Response] in [Action].
- 2 Specify the host response name, set each parameter, and click the [Add] button.
→ A confirmation screen appears.

Caution

- An error screen appears in the following conditions:
 - The "Name" is not entered
 - The "Name" does not satisfy the input conditions
 - The "Name" overlaps with an existing host response name

- 3 Click the [OK] button.
→ Addition of the host response starts.
- 4 Click the [Done] button to return to the [Host Response] screen.



Delete Host Response

- ["■ Overview" \(page 806\)](#)
- ["■ User Privileges" \(page 807\)](#)
- ["■ Operating Procedures" \(page 807\)](#)

■ **Overview**

This function deletes a host response.

Caution

- A host response that is being used cannot be deleted. In this case, release the assignment from the host groups or the hosts before performing this function. Refer to the [Modify Host Group (FC)] function, the [Modify Host Group (iSCSI)] function, the [Modify Host Group (SAS)] function, the [Modify FC Host] function, the [Modify iSCSI Host] function, or the [Modify SAS Host] function for details.
- The recommended pattern and the default setting of the host response cannot be deleted.

■ User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	✓
StorageAdmin	✓
AccountAdmin	
SecurityAdmin	
Maintainer	✓

Refer to "[A. User Roles and Policies](#)" (page 1580) for details on the policies and roles.

■ Operating Procedures

In this screen, delete a host response.

Procedure ▶▶▶

- 1 Select the host response that is to be deleted (multiple selections can be made) and click [Delete Host Response] in [Action].
→ A confirmation screen appears.
- 2 Click the [OK] button.
→ Deletion of the host response starts.
- 3 Click the [Done] button to return to the [Host Response] screen.



Modify Host Response

- "[■ Overview](#)" (page 807)
- "[■ User Privileges](#)" (page 809)
- "[■ Settings](#)" (page 809)
- "[■ Operating Procedures](#)" (page 816)

■ Overview

This function modifies host response settings.

For more details on setting the host response parameters, refer to "Configuration Guide -Server Connection-" for each OS type.

Caution

- The server may need to be rebooted after host response parameters are changed. Refer to ["Requirements for Changing Parameters" \(page 808\)](#) for details.
- If an appropriate host response is not configured to the host affinity, the path may not be switched correctly or the volume may not be recognized correctly.
- When customizing the host response, make sure to understand the setting parameters and create the host response with careful attention.
- The recommended pattern and the default setting of the host response cannot be modified.
- When Asymmetric Logical Unit Access (ALUA) is set for the volume, ALUA is given priority over the "Asymmetric / Symmetric Logical Unit Access" setting that is specified in this function. Refer to "ALUA" in the [Performance (Host I/O)] function for details.

Note

- Assign a host response when adding or changing a host group. Refer to the [Add FC Host Group] function, the [Add iSCSI Host Group] function, or the [Modify Host Group] function for details.
- Assign a host response when adding or changing a host. Refer to the [Add FC Host] function, the [Add iSCSI Host] function, the [Modify FC Host] function, or the [Modify iSCSI Host] function for details.
- Assign a host response to the CA port when "All" is specified with host affinity for the host group or the host. Refer to the [Create Host Affinity] function or the [Modify Host Affinity] function for details.
- To add a host response, use the [Add Host Response] function.

Requirements for Changing Parameters

Some parameters that allow online modification can be changed during operation. If parameters that do not allow online modifications are changed, the server may need to be rebooted after these parameters are changed.

Category	Parameter	Online modification is available	Online modification is not available
Host Response Name	Name	✓	-
LUN Settings	LUN Addressing	-	✓
	LUN Expand Mode (Peripheral Device Addressing)	-	✓
ALUA Settings	Asymmetric / Symmetric Logical Unit Access	-	✓
	TPGS Mode	-	✓
	TPG Referrals Mode	-	✓

6. Connectivity
Host Response

Category	Parameter	Online modification is available	Online modification is not available
Inquiry Command Settings	Peripheral Device Type (Peripheral Device Addressing)	-	✓
	Peripheral Device Type (Flat Space Addressing)	-	✓
	SCSI Version	-	✓
	NACA	-	✓
	Device ID Type	-	✓
	Product ID	-	✓
	Product Revision	-	✓
Test Unit Ready Command Settings	Reservation Conflict Response	✓	-
Sense Settings	Notify Change of Volume Mapping	✓	-
	Notify Change of Volume Expansion	✓	-
	Notify Vendor Unique Sense	✓	-
	Sense Data Conversion	✓	-
Mode Sense Command Settings	Reservation Conflict Response (Write Exclusive)	✓	-
Other Settings	Command Monitor Time	✓	-
	Load Balance Response Status	✓	-
	iSCSI Discovery Reply Mode	✓	-
	iSCSI Reservation Range	-	✓

■ User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	✓
StorageAdmin	✓
AccountAdmin	
SecurityAdmin	
Maintainer	✓

Refer to "A. User Roles and Policies" (page 1580) for details on the policies and roles.

■ Settings

Modify the host response settings.

Parameters Setting

In this screen, change host response parameters.

Host Response Name

Item	Description	Setting values
Name	Renames a host response. An existing host response name cannot be used.	Up to 16 alphanumeric characters, symbols (except ",", (comma) and "?"), and spaces

LUN Settings

Item	Description	Setting values
LUN Addressing	<p>Select the appropriate LUN addressing for each OS.</p> <ul style="list-style-type: none"> Peripheral device addressing (Default) This mode enables mapping to 256 LUNs. Flat space addressing This mode enables mapping to 4096 LUNs. <p>Caution</p> <ul style="list-style-type: none"> If the host response whose "LUN Addressing" is "Flat space addressing" is used, the maximum number of connectible hosts per CA port is 32 (or four for the ETERNUS DX60 S5). Therefore, make sure to connect 32 or less hosts (or four or less hosts for the ETERNUS DX60 S5) to the target CA port. If the number of connected hosts exceeds the limit, the volume may become inaccessible from any of the hosts assigned to the target CA port. 	Peripheral device addressing (Default) Flat space addressing

6. Connectivity
Host Response

Item	Description	Setting values
LUN Expand Mode (Peripheral Device Addressing)	<p>Select the LUN expand mode.</p> <ul style="list-style-type: none"> When expanding the maximum LUNs that can be mapped to 4096, select "Enable". When the maximum LUNs that can be mapped are not expanded, select "Disable (Default)". <p>Caution</p> <ul style="list-style-type: none"> Some restrictions are applied for environments to use "LUN Expand Mode (Peripheral Device Addressing)". Refer to "Setting the Host Responses" in "Configuration Guide - Server Connection-" (*1) for details. If the host response whose "LUN Expand Mode (Peripheral Device Addressing)" is "Enable" is used, the maximum number of connectible hosts per CA port is 32 (or four for the ETERNUS DX60 S5). Therefore, make sure to connect 32 or less hosts (or four or less hosts for the ETERNUS DX60 S5) to the target CA port. If the number of connected hosts exceeds the limit, the volume may become inaccessible from any of the hosts assigned to the target CA port. The number of LUNs that can be referenced from the host is determined by the "LUN Addressing" settings and the "LUN Expand Mode (Peripheral Device Addressing)" settings for the host response. When changing a host response that is already allocated to a host group with the host affinity setting or a host with the host affinity setting, check the LUN setting state. If LUNs that are LUN#256 onward are used, the referable LUN setting cannot be changed to "256 LUN" (*2). Refer to "Host Response and Referable Number of LUNs" for details. <p>*1 : Configuration Guide -Server Connection- Fibre Channel/ ETERNUS AF series, ETERNUS DX200F All-Flash Arrays, ETERNUS DX S5/S4/S3 series Hybrid Storage Systems Settings</p> <p>*2 : "Peripheral device addressing (Default)" is specified for LUN addressing and "Disable (Default)" is selected for the LUN Expand Mode (Peripheral Device Addressing).</p> <p>Note</p> <ul style="list-style-type: none"> This parameter is available only when the LUN addressing setting is "Peripheral device addressing (Default)". 	Enable Disable (Default)

ALUA Settings

Item	Description	Setting values
Asymmetric / Symmetric Logical Unit Access	<p>Select the access type from the host to a volume.</p> <ul style="list-style-type: none"> ACTIVE-ACTIVE / PREFERRED_PATH <p>There are recommended paths and non-recommended paths for each volume. By using a CA port in the Controlling CM of a RAID group in which the volume belongs for the recommended paths (other ports are regarded as non-recommended paths), data migration between CMs (cross access) can be reduced.</p> <ul style="list-style-type: none"> ACTIVE / ACTIVE <p>All of the paths to the volume are regarded as being recommended paths. The multipath driver determines which paths are used.</p> <div style="background-color: #fff9c4; padding: 10px; margin-top: 10px;"> <p>Caution</p> <ul style="list-style-type: none"> This parameter is only available when the TPGS mode is "Enable (Default)". Note that this parameter is enabled regardless of the TPGS mode setting when the ETERNUS Multipath Driver is used. For storage systems other than the ETERNUS DX900 S5 or the ETERNUS DX8900 S4, when setting "ACTIVE / ACTIVE", a data migration occurs between CMs and there may be a reduction in performance. </div>	<p>For the ETERNUS DX900 S5 or the ETERNUS DX8900 S4: ACTIVE-ACTIVE / PREFERRED_PATH ACTIVE / ACTIVE (Default)</p> <p>For the other models: ACTIVE-ACTIVE / PREFERRED_PATH (Default) ACTIVE / ACTIVE</p>
TPGS Mode	<p>Select "Enable (Default)" or "Disable" for the Target Port Group Support (TPGS) mode.</p> <p>TPGS is a standard that is used to achieve Asymmetric Logical Unit Access (ALUA) for multipath control. By notifying the path status (recommend or non-recommend) of each volume, the selection conditions of paths for multipath control can be determined. If the TPGS mode is "Disable", the multipath driver determines which paths are used.</p>	<p>Enable (Default) Disable</p>
TPG Referrals Mode	<p>Select "Enable" or "Disable (Default)" for the TPGS referrals setting.</p> <p>The TPG Referrals function determines the priority path for each block when accessing volumes via the ETERNUS Multipath Driver in order to prevent cross access.</p> <div style="background-color: #fff9c4; padding: 10px; margin-top: 10px;"> <p>Caution</p> <ul style="list-style-type: none"> The TPG Referrals function is performed when "Enable" is selected and all of the following conditions apply: <ul style="list-style-type: none"> The ETERNUS Multipath Driver supports the TPG Referrals function "Enable (Default)" is selected for "TPGS Mode" This parameter is available for Standard, WSV, TPV, FTV, and Standard (LUN Concatenation) type volumes. </div>	<p>Enable Disable (Default)</p>

Inquiry Command Settings

Item	Description	Setting values
Peripheral Device Type (Peripheral Device Addressing)	If the LUN addressing setting is "Peripheral device addressing (Default)", select a Peripheral Device type for unconnected LUNs. Note • This parameter can only be specified when the LUN addressing setting is "Peripheral device addressing (Default)".	No Device Type (3Fh) (Default) Not Supported (7Fh) Not Connected (20h)
Peripheral Device Type (Flat Space Addressing)	When the LUN addressing setting is "Flat space addressing", select the Peripheral Device type for LUN0. Note • This parameter can only be specified when the LUN addressing setting is "Flat space addressing".	No Device Type (3Fh) (Default) Controller Device (0Ch)
SCSI Version	Select the version of the SCSI specification that is installed in the storage system.	Version 6 (Default) Version 5 Version 4 Version 3
NACA	Select "Enable" or "Disable (Default)" for the Normal Auto Contingent Allegiance (NACA) bit.	Enable Disable (Default)
Device ID Type	Select the format of the volume identification information.	Type3 (Default) Type1 Type1 + Type3
Product ID	Select "Default" or "Respond as ETERNUS DX S2" for the product ID that is responded to the host.	Default Respond as ETERNUS DX S2
Product Revision	Select whether to respond with the firmware version as the product revision. If "Not Respond (Default)" is selected, the fixed value (0000) is sent for this item.	Respond Not Respond (Default)

Test Unit Ready Command Settings

Item	Description	Setting values
Reservation Conflict Response	Select the response status when a command to the volume is received while the relevant volume is reserved by another host.	GOOD (Default) RESERVATION CONFLICT

Sense Settings

Item	Description	Setting values
Notify Change of Volume Mapping	Select whether the host is notified ("Enable (Default)") or not notified ("Disable") when volumes are added to LUN groups set with host affinity.	Enable (Default) Disable
Notify Change of Volume Expansion	Select the host is notified ("Enable (Default)") or not notified ("Disable") when the volume capacity is changed.	Enable (Default) Disable

6. Connectivity
Host Response

Item	Description	Setting values
Notify Vendor Unique Sense	<p>Select whether asynchronous sense reports module disconnection in the storage system to the host ("Enable") or does not report module disconnection in the storage system to the host ("Disable (Default)").</p> <p>Caution</p> <ul style="list-style-type: none"> A vendor unique sense code is used for sense data that is to be notified. Do not select "Enable" for this item if status monitoring of the storage system is not performed from the host. 	Enable Disable (Default)
Sense Data Conversion	<p>Select whether or not to send the unconverted sense data to the host.</p> <ul style="list-style-type: none"> No Conversion (Default) Sense data is sent to the host without any conversion. Customize Customized sense data is sent to the host. Select "Customize" to display the sense data conversion setting field. <ul style="list-style-type: none"> From SK/ASC/ASCQ To SK/ASC/ASCQ <p>Note</p> <ul style="list-style-type: none"> Click the [Add] button. Enter SK/ASC/ASCQ of the conversion target in the "From" field, and SK/ASC/ASCQ of the conversion destination in the "To" field. Specify "From SK/ASC/ASCQ" and "To SK/ASC/ASCQ" values in pairs. The sense data that matching the "From SK/ASC/ASCQ" value is changed to the specified "To SK/ASC/ASCQ" value. "*" indicates a wild-card, and targets all values. The maximum number of sense data conversions is eight patterns. Click each link to change the setting contents. <ul style="list-style-type: none"> Sense Key (SK): SK indicates sense keys included in the sense information. 0 - f or "*" <ul style="list-style-type: none"> Additional Sense Code (ASC): ASC indicates sense codes included in the sense information. 0 - ff or "*" <ul style="list-style-type: none"> Additional Sense Code Qualifier (ASCQ): ASCQ indicates additional sense code qualifiers included in the sense information. 0 - ff or "*" <p>(Example 1) The sense information (4/f1/0) is converted to (4/f1/1) before responding to the host.</p> <ul style="list-style-type: none"> From SK/ASC/ASCQ: 4/f1/0 To SK/ASC/ASCQ: 4/f1/1 <p>(Example 2) The sense information (4/f1/0 - ff) is converted to (6/f1/0 - ff) before responding to the host.</p> <p>"*" indicates all patterns from "0" to "ff". The "*" part is not converted.</p> <ul style="list-style-type: none"> From SK/ASC/ASCQ: 4/f1/* To SK/ASC/ASCQ: 6/f1/* 	No Conversion (Default) Customize

Mode Sense Command Settings

Item	Description	Setting values
Reservation Conflict Response (Write Exclusive)	<p>Select the response status when the "Mode Sense" command to the volume is received while the relevant volume is reserved with "Write Exclusive" by the host. "Write Exclusive" is a reservation type. Refer to the [Reservation] function for details.</p> <ul style="list-style-type: none"> • GOOD • RESERVATION CONFLICT (Default) <p>Caution</p> <ul style="list-style-type: none"> • To use Veritas InfoScale (formerly known as Symantec Storage Foundation), select "GOOD" for this item. 	<p>GOOD RESERVATION CONFLICT (Default)</p>

Other Settings

Item	Description	Setting values
Command Monitor Time	<p>Select one of the following options for command timeouts:</p> <ul style="list-style-type: none"> • Default (25sec.) Specify 25 seconds. • Customize Input a value between 10 and 255 seconds. 	<p>Default (25sec.) Customize (10 - 255 sec.)</p>
Load Balance Response Status	<p>Select the response status for the load balancing function.</p> <p>Caution</p> <ul style="list-style-type: none"> • This item is only available when "Enable" is selected for "Load Balance" in the subsystem parameter. 	<p>CHECK CONDITION / UNIT ATTENTION (Default) BUSY TASK SET FULL</p>
iSCSI Discovery Reply Mode	<p>Select the response mode for iSCSI Discovery requests.</p> <ul style="list-style-type: none"> • All - Reply All Ports (Default) Replies to the server with the information for all the iSCSI ports (iSCSI names and IP addresses). • Port - Reply Target Port Only Replies to the server with only the information for the specified iSCSI ports (iSCSI names and IP addresses). 	<p>All - Reply All Ports (Default) Port - Reply Target Port Only</p>
iSCSI Reservation Range	<p>Select the reservation management unit of the iSCSI connection.</p> <ul style="list-style-type: none"> • Storage System (Default) The reservation status of volumes is managed for each storage system. • CA Port The reservation status of volumes is managed for each CA port. 	<p>Storage System (Default) CA Port</p>

Function Button

Item	Description
[Add]	<p>Adds sense data conversion patterns.</p> <p>The [Add] button is displayed only when "Customize" has been selected in the "Sense Data Conversion" field.</p> <p>If the maximum number of sense data conversion patterns has already been created, the [Add] button cannot be clicked.</p>

Item	Description
[Delete]	Deletes the sense data conversion patterns in the corresponding field from the sense data conversion list. The [Add] button is displayed only when "Customize" has been selected in the "Sense Data Conversion" field. If no sense data conversion pattern has been added, the [Delete] button is not displayed.

Function Link

Item	Description
[From SK/ASC/ASCQ]	Edits the corresponding sense data conversion patterns.
[To SK/ASC/ASCQ]	

■ **Operating Procedures**

In this screen, change a host response settings.

Procedure ▶▶▶

- 1 Select the host response to be modified, and click [Modify Host Response] in [Action].
- 2 Modify the host response name or each item, and click the [Modify] button.
→ A confirmation screen appears.

Caution

- An error screen appears in the following conditions:
 - The "Name" is not entered
 - The "Name" does not satisfy the input conditions
 - The "Name" overlaps with an existing host response name
 - Some LUNs cannot be referenced

- 3 Click the [OK] button.
→ Modification of the host response starts.
- 4 Click the [Done] button to return to the [Host Response] screen.



CA Reset Group

- ["■ Overview" \(page 816\)](#)
- ["■ User Privileges" \(page 817\)](#)
- ["■ Display Contents" \(page 817\)](#)

■ **Overview**

This function displays a list of the registered CA reset groups.
A "CA reset group" is a group of CA ports that are affected if the volumes are rest.

■ User Privileges

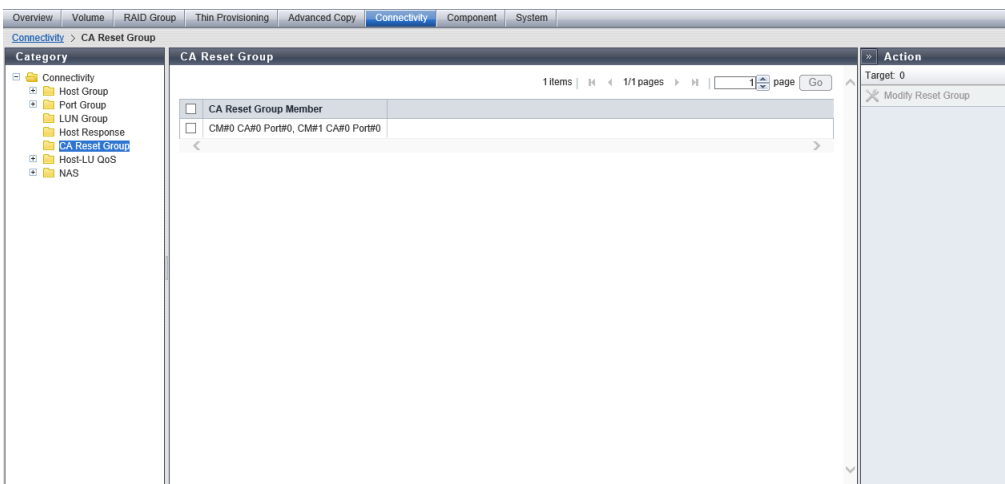
Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	✓
Admin	✓
StorageAdmin	✓
AccountAdmin	
SecurityAdmin	✓
Maintainer	✓

Refer to "A. User Roles and Policies" (page 1580) for details on the policies and roles.

■ Display Contents

The list of CA reset groups is displayed.



Item	Description
CA Reset Group Member	The location information of member ports of each CA reset group is displayed. For the ETERNUS DX900 S5 or the ETERNUS DX8900 S4 CE#x CM#y CA#z Port#w For the other models CM#y CA#z Port#w x: CE number y: CM number z: CA number w: Port number

Modify CA Reset Group

- "■ Overview" (page 818)
- "■ User Privileges" (page 818)

- ["■ Display Contents" \(page 819\)](#)
- ["■ Settings" \(page 819\)](#)
- ["■ Operating Procedures" \(page 820\)](#)

■ Overview

This function modifies a CA reset group.

By default, all of the ports are configured to be members of one CA reset group. This function can create a CA reset group with only specific ports or change the member ports of an existing CA reset group.

The maximum number of CA reset groups is equal to the number of ports.

Caution

- One port cannot be registered in multiple CA reset groups.
- Only the ports in the port mode of "CA" or "CA/RA" can be registered in a CA reset group.

Note

- This function configures a CA reset group to release the volumes reserved by the port that became inaccessible without affecting other ports that do not belong to the CA reset group.
- If a port is shared by multiple servers using the host affinity function, only volumes that are included in the LUN group, where host affinity with the target server is configured, can be released with instructions by the target server.
- CA reset groups are required for certain servers to switch clusters correctly.
- Ports with different CA types can be members of the same CA reset group.

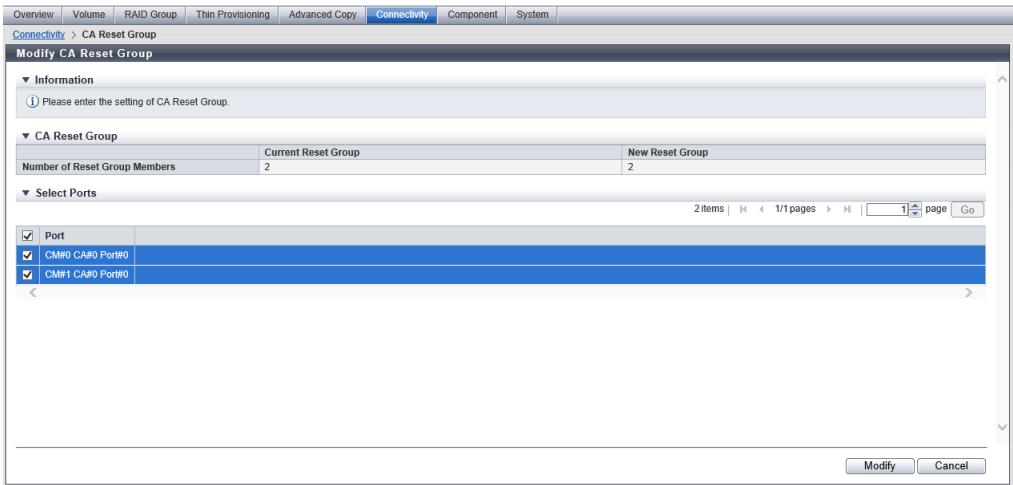
■ User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	✓
StorageAdmin	✓
AccountAdmin	
SecurityAdmin	
Maintainer	✓

Refer to ["A. User Roles and Policies" \(page 1580\)](#) for details on the policies and roles.

■ Display Contents



CA Reset Group

The number of member ports of the current CA reset groups and of the new CA reset groups are displayed.

Item		Description
Number of Reset Group Members	Current Reset Group	The number of member ports in the current reset group are displayed.
	New Reset Group	By default, the same number of member ports as that of the "Current Reset Group" are displayed. Selecting or clearing the port selection checkboxes can update the number of member ports in a new reset group.

■ Settings

Select Ports

Item	Description
Checkbox to select a port	<p>Checkboxes of the member ports of the specified CA reset group are selected. Select the checkbox of the port that is to be added in the corresponding CA reset group. Clear the checkbox of the port to be deleted from the corresponding CA reset group.</p> <div style="background-color: #f0f0f0; padding: 10px; margin-top: 10px;"> <p>Note</p> <ul style="list-style-type: none"> If some ports have been removed from the setting target CA reset group, a different group is created using those ports. For instance, if ports (Port#2 and Port#3) have been removed from the setting target CA reset group A (Port#0, Port#1, Port#2 and Port#3), a CA reset group A (Port#0 and Port#1) and a CA reset group B (Port#2 and Port#3) are created. The minimum number of ports per CA reset group is one port. </div>

Item	Description
Port	The location information of the port is displayed. For the ETERNUS DX900 S5 or the ETERNUS DX8900 S4 CE#x CM#y CA#z Port#w For the other models CM#y CA#z Port#w x: CE number y: CM number z: CA number w: Port number

■ Operating Procedures

Procedure ▶▶▶

- 1 Select the CA reset group to be set, and click [Modify Reset Group] in [Action].
- 2 Set the member ports in a CA reset group, and click the [Modify] button.
→ A confirmation screen appears.

Caution

- One port cannot be registered in multiple CA reset groups.
If a member port of another CA reset group has been selected, the member port is deleted from the existing CA reset group.

- 3 Click the [OK] button.
→ Modification of the CA reset group starts.
- 4 Click the [Done] button to return to the [CA Reset Group] screen.



Host-LU QoS

- ["■ Overview" \(page 820\)](#)
- ["■ User Privileges" \(page 821\)](#)
- ["■ Display Contents" \(page 821\)](#)

■ Overview

This function displays a list of Host-LU QoS.

The Host-LU QoS list shows the association between "Host", "CA Port", and "LUN Group", bandwidth limit (performance limits), and performance information.

Caution

- The ETERNUS DX60 S5 does not support this function.
- When using Web GUI, schedule settings for QoS parameters and displaying scheduled QoS parameters are not available. Use CLI to check the scheduled QoS parameters that are specified using CLI. Web GUI displays only the bandwidth limit and the performance information that are specified by using Web GUI.
- Host-LU QoS does not support from LUN#1024 onward. If volumes are mapped from LUN#1024 onward, only the first 1024 LUNs (LUN#0 - LUN#1023) are displayed.

Note

- Whether the QoS mode is enabled or disabled can be checked in the action field. Refer to the [Enable/Disable QoS] function for details.
- Host-LU QoS starts its operation by configuring the bandwidth limit on "hosts", "CA ports", or "Host LUNs", and enabling the QoS mode.
- This function displays the performance information that is obtained during performance monitoring regardless of whether the QoS mode is enabled or disabled. When the performance information is displayed before stopping performance monitoring, the performance information that is obtained from the start time until the time when displaying the performance information is requested is displayed. This function displays the total performance information for the host and the performance information for each host LUN.
- The performance information of each CA port can also be displayed. Refer to the [Port QoS] function for details.

User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	✓
StorageAdmin	✓
AccountAdmin	
SecurityAdmin	
Maintainer	✓

Refer to "A. User Roles and Policies" (page 1580) for details on the policies and roles.

Display Contents

The screenshot shows the ETERNUS Web GUI interface for Host-LU QoS configuration. The breadcrumb path is Connectivity > Host-LU QoS. The main content area displays a table titled "Host - CA Port - LUN Group : LU QoS Group Connection" with 4 items. The table columns are Host : Bandwidth Limit, Host Group, CA Port : Bandwidth Limit, and CA Port Group. The rows show configurations for HostG00 and HostG01 across different CA ports (Port#2, Port#3, Port#0, Port#1) with unlimited bandwidth limits. The right-hand side of the interface shows an "Action" panel with a "Target: 0" and several available actions such as "Enable QoS", "Disable QoS", "Initialize QoS", "Set Host-LU QoS", "Release Host-LU QoS", "Start Perform", "Stop Perform", "Set Host QoS Pattern", "Set Port QoS Pattern", and "Set LU QoS Pattern".

Host-LU QoS List

The Host-LU QoS list displays the bandwidth limit on the hosts, CA ports, and host LUNs.

Item	Description
Host : Bandwidth Limit	<p>[Host]</p> <p>The host name for which the host affinity setting is configured is displayed.</p> <p>If any host can be the connection target, "All" is displayed.</p> <p>[Bandwidth Limit]</p> <p>The maximum performance is displayed in IOPS (throughput value).</p> <p>If the performance limit has not been configured, "Unlimited" is displayed.</p> <p>Refer to the "Host QoS" column in "Bandwidth Limit" (page 823) for details.</p> <p>If "All" has been selected for hosts, a "-" (hyphen) is displayed.</p> <p>Click the [Host : Bandwidth Limit] link to display the performance information for all hosts or for each host LUN.</p> <p>Refer to the ""[Host-LU QoS Performance Information] Screen" (page 824)" for details.</p>
Host Group	<p>If a host belongs to a host group as a member, the host group name is displayed.</p> <p>If the host does not belong to a host group as a member, a "-" (hyphen) is displayed.</p> <p>If any host can be the connection target, "All" is displayed.</p>
CA Port : Bandwidth Limit	<p>[CA Port]</p> <p>The location information of the CA port with the host affinity setting is displayed.</p> <p>For the ETERNUS DX900 S5 or the ETERNUS DX8900 S4 CE#x CM#y CA#z Port#w</p> <p>For the other models CM#y CA#z Port#w</p> <p>x: CE number y: CM number z: CA number w: Port number</p> <p>[Bandwidth Limit]</p> <p>The maximum performance is displayed in IOPS (throughput value).</p> <p>If the performance limit has not been configured, "Unlimited" is displayed.</p> <p>Refer to the "Port QoS" column in "Bandwidth Limit" (page 823) for details.</p>
CA Port Group	<p>If a CA port belongs to a CA port group as a member, the CA port group name is displayed.</p> <p>If the CA port does not belong to a CA port group as a member, a "-" (hyphen) is displayed.</p>
LUN Group : LU QoS Group	<p>[LUN Group]</p> <p>The LUN group name is displayed.</p> <p>If the host, ports, and LUNs are allocated without specifying a host group or port group by an application other than Web GUI, a "-" (hyphen) is displayed.</p> <p>[LU QoS Group]</p> <p>The LU QoS group number (0 to 1055) is displayed.</p> <p>If an LU QoS group number has not been configured, a "-" (hyphen) is displayed.</p> <p>Click the [LUN Group : LU QoS Group] link to display a bandwidth limit on each host LUN.</p> <p>Refer to the ""[LUN Group : LU QoS Group Detailed Information] Screen" (page 822)" for details.</p>

[LUN Group : LU QoS Group Detailed Information] Screen

Click the [LUN Group : LU QoS Group] link on the Host-LU QoS list to display a bandwidth limit on each host LUN.

LUN Group : LU QoS Group information

Item	Description
LUN Group	The LUN group name is displayed. If the host, ports, and LUNs are allocated without specifying a host group or port group by an application other than Web GUI, a "-" (hyphen) is displayed.
LU QoS Group No.	The LU QoS group number (0 to 1055) is displayed. If an LU QoS group number has not been configured, a "-" (hyphen) is displayed.

A list of the host LUNs, which have been registered in the corresponding host group, is displayed.

Item	Description
Host LUN	The host LUN (0 to 1023) is displayed.
Name	The volume name allocated to the host LUN is displayed.
Bandwidth Limit	The maximum performance is displayed in IOPS (throughput value). If the performance limit has not been configured, "Unlimited" is displayed. Refer to the "LUN QoS" column in " Bandwidth Limit " (page 823) for details.

Bandwidth Limit

The QoS pattern for hosts, CA ports, host LUNs, and volumes can be set with Web GUI or CLI according to the target QoS.

The default bandwidth limits are as follows:

	Host QoS	Port QoS	LUN QoS	Volume QoS
Bandwidth Limit	Unlimited	Unlimited	Unlimited	Unlimited
	15000 IOPS (800 MB/s)	27000 IOPS (1000 MB/s)	15000 IOPS (800 MB/s)	15000 IOPS (800 MB/s)
	12600 IOPS (700 MB/s)	21000 IOPS (850 MB/s)	12600 IOPS (700 MB/s)	12600 IOPS (700 MB/s)
	10020 IOPS (600 MB/s)	15000 IOPS (700 MB/s)	10020 IOPS (600 MB/s)	10020 IOPS (600 MB/s)
	7500 IOPS (500 MB/s)	10020 IOPS (600 MB/s)	7500 IOPS (500 MB/s)	7500 IOPS (500 MB/s)
	5040 IOPS (400 MB/s)	8040 IOPS (500 MB/s)	5040 IOPS (400 MB/s)	5040 IOPS (400 MB/s)
	3000 IOPS (300 MB/s)	6000 IOPS (400 MB/s)	3000 IOPS (300 MB/s)	3000 IOPS (300 MB/s)
	1020 IOPS (200 MB/s)	5040 IOPS (300 MB/s)	1020 IOPS (200 MB/s)	1020 IOPS (200 MB/s)
	780 IOPS (100 MB/s)	4020 IOPS (250 MB/s)	780 IOPS (100 MB/s)	780 IOPS (100 MB/s)
	600 IOPS (70 MB/s)	3000 IOPS (200 MB/s)	600 IOPS (70 MB/s)	600 IOPS (70 MB/s)
	420 IOPS (40 MB/s)	2040 IOPS (160 MB/s)	420 IOPS (40 MB/s)	420 IOPS (40 MB/s)
	300 IOPS (25 MB/s)	1020 IOPS (125 MB/s)	300 IOPS (25 MB/s)	300 IOPS (25 MB/s)
	240 IOPS (20 MB/s)	720 IOPS (90 MB/s)	240 IOPS (20 MB/s)	240 IOPS (20 MB/s)
	180 IOPS (15 MB/s)	480 IOPS (60 MB/s)	180 IOPS (15 MB/s)	180 IOPS (15 MB/s)
	120 IOPS (10 MB/s)	240 IOPS (30 MB/s)	120 IOPS (10 MB/s)	120 IOPS (10 MB/s)
	60 IOPS (5 MB/s)	120 IOPS (15 MB/s)	60 IOPS (5 MB/s)	60 IOPS (5 MB/s)

Note

- The bandwidth limit can be changed using the following functions. The bandwidth limit changed by using the CLI command is also applied to the bandwidth limit that is specified with Web GUI.
 - Set Host QoS Pattern
 - Set Port QoS Pattern
 - Set LU QoS Pattern
 - Set Volume QoS Pattern
 - "set qos-bandwidth-limit" CLI command

[Host-LU QoS Performance Information] Screen

When a host affinity setting with a specific host group is already configured, the total performance information for the host and the performance information of each host LUN are displayed. If a host affinity setting with any host is configured ("All" is displayed as the target host), the performance information of each host LUN is displayed.

Caution

- The monitoring status of the performance information and obtained performance information are cleared in the following conditions:
 - The port mode is changed (from CA or CA/RA to other port modes)
 - The storage system is rebooted
 - An error is detected in the storage system
 - The hot maintenance of the CM is performed
 - The hot controller firmware upgrade is performed

Host - CA Port - LUN Group Information

Item	Description
Host : Bandwidth Limit	The host name and the bandwidth limit of the selected host is displayed in "Host : Bandwidth Limit" format. If any host can be the connection target, "All" is displayed for "Host" and a "-" (hyphen) is displayed for "Bandwidth Limit". If the performance limit has not been configured, "Unlimited" is displayed for "Bandwidth Limit". Refer to the "Host QoS" column in " Bandwidth Limit " (page 823) for details.
Host Group	The name of the host group to which the selected host belongs is displayed. If any host can be the connection target, "All" is displayed. If the host does not belong to a host group, a "-" (hyphen) is displayed.
WWN	The WWN for the selected host is displayed. This item is displayed when the host affinity setting is configured and the selected host is "FC".
iSCSI Name	The iSCSI name of the selected host is displayed. This item is displayed when the host affinity setting is configured and the selected host is "iSCSI".
IP Version	The IP version of the iSCSI host is displayed. This item is displayed when the host affinity setting is configured and the selected host is "iSCSI". IPv4 IPv6

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Item	Description
IP Address	<p>The IP address of the selected iSCSI host is displayed.</p> <p>Note that the IPv6 address is displayed as an abbreviation. If the IP address is not specified, the field is blank. This item is displayed when the host affinity setting is configured and the selected host is "iSCSI".</p> <p>For IPv4 address xxx.xxx.xxx.xxx xxx: 0 - 255 (decimal)</p> <p>For IPv6 address xxxx:xxxx:xxxx:xxxx:xxxx:xxxx:xxxx:xxxx xxxx: 0 - ffff (hexadecimal, "a" - "f" are lowercase letters) Refer to "IPv6 Address Notation" (page 659) for details.</p> <p>Blank</p>
SAS Address	<p>The SAS address of the selected host is displayed.</p> <p>This item is displayed when the host affinity setting is configured and the selected host is "SAS".</p>
CA Port : Bandwidth Limit	<p>The location information and the bandwidth limit of the selected CA port is displayed in "CA Port : Bandwidth Limit" format.</p> <p>[CA Port]</p> <p>For the ETERNUS DX900 S5 or the ETERNUS DX8900 S4 CE#x CM#y CA#z Port#w</p> <p>For the other models CM#y CA#z Port#w</p> <p>x: CE number y: CM number z: CA number w: Port number</p> <p>[Bandwidth Limit]</p> <p>If the performance limit has not been configured, "Unlimited" is displayed for "Bandwidth Limit". Refer to the "Port QoS" column in "Bandwidth Limit" (page 823) for details.</p>
CA Port Group	<p>If a CA port that is connected to the selected host belongs to a CA port group as a member, the CA port group name is displayed.</p> <p>If the CA port does not belong to a CA port group as a member, a "-" (hyphen) is displayed.</p>
LUN Group : LU QoS Group	<p>The LUN group name and LU QoS group number (0 to 1055) are displayed in "LUN Group : LU QoS Group" format.</p> <p>If the host, ports, and LUNs are allocated without specifying a host group or port group by an application other than Web GUI, a "-" (hyphen) is displayed.</p> <p>If an LU QoS group number has not been configured, a "-" (hyphen) is displayed as "LU QoS Group".</p>

Performance Information

Item	Description
Login IP Address	<p>IP address that is logged in is displayed.</p> <p>The performance information is displayed for each specified IP address. Note that the IPv6 address is displayed as an abbreviation. If there is no IP address, a "-" (hyphen) is displayed.</p> <p>This item is displayed for the iSCSI host when the host affinity setting is configured, the iSCSI name is specified, and the IP address is not specified.</p> <p>For IPv4 address xxx.xxx.xxx.xxx xxx: 0 - 255 (decimal)</p> <p>For IPv6 address xxxx:xxxx:xxxx:xxxx:xxxx:xxxx:xxxx:xxxx xxxx: 0 - ffff (hexadecimal, "a" - "f" are lowercase letters)</p> <p>Refer to "IPv6 Address Notation" (page 659) for details.</p>

Performance Monitoring

Item	Description
State	<p>The status of performance monitoring for the host is displayed.</p> <p>Active</p> <p>Stopped</p>

Item	Description			
Start Time	The start time and the end time for performance monitoring are displayed.			
	The displayed time varies depending on how the performance monitoring is started or ended.			
Stop / Collect Time	Start/End monitoring method	State	Start Time (YYYY-MM-DD hh:mm:ss)	Stop / Collect Time (YYYY-MM-DD hh:mm:ss)
	Before monitoring is started (*1)	Stopped	"-" (hyphen)	"-" (hyphen)
	Monitoring is started	Stopped ↓ Active	The time when performance monitoring is started is displayed.	The time when the performance information is obtained is displayed.
	Monitoring is started while the monitoring session has already been started	Active	The last time when performance monitoring is started is displayed.	The time when the performance information is obtained is displayed.
	Monitoring is stopped	Active ↓ Stopped	The last time when performance monitoring is started is displayed.	The time when performance monitoring is stopped is displayed.
	Monitoring is stopped while the monitoring session has already been stopped	Stopped	The last time when performance monitoring is started is displayed.	The first time when performance monitoring is stopped is displayed.
<p>*1: If performance monitoring is not being performed after the storage system is started, a "-" (hyphen) is displayed.</p> <p>In the following conditions, "-" is displayed for "Start Time" and "Stop / Collect Time".</p> <ul style="list-style-type: none"> • When no iSCSI host with the host affinity setting is connected • When no IP address for an iSCSI host with the host affinity setting is logged in <div style="background-color: #fff9c4; padding: 10px; margin-top: 10px;"> <p>Caution</p> <ul style="list-style-type: none"> • If performance monitoring is restarted during an active performance monitoring session, the performance information that is already obtained is deleted and the collection of performance information starts again. </div>				

Host Total Performance

When the host affinity setting is configured by a port and a specific host group, the total performance information for the specific host that is connected to the port is displayed.

If an IP address is not specified and multiple IP addresses are logged in with the iSCSI host that is connected to the target port, the performance information of each IP address is displayed.

Item	Description	
IOPS	Ave	The performance information from when performance monitoring is started until performance monitoring is ended (or performance information is displayed) is displayed. In this field, the average I/O count per second, the minimum I/O count per second, and the maximum I/O count per second are displayed.
	Min	
	Max	
Throughput	Ave	The transfer data size from when performance monitoring is started until performance monitoring is ended (or performance information is displayed) is displayed. In this field, the average data transfer size per second, the minimum data transfer size per second, and the maximum data transfer size per second are displayed.
	Min	
	Max	

Item		Description
Delay Time	Total	The total delay time for executing a command from when performance monitoring is started until performance monitoring is ended (or performance information is displayed) is displayed. If the total delay time reaches the maximum value, "Overflow" is displayed.
	Ave	The average delay time per command from when performance monitoring is started until performance monitoring is ended (or performance information is displayed) is displayed.

Host LUN Performance

The performance information of each LUN is displayed for the specific host (when "All" is specified for the host, any host) that is connected to the port.

Item		Description
Host LUN		The host LUN (0 to 1023) is displayed.
Volume Name		The volume name is displayed.
IOPS	Ave	The performance information from when performance monitoring is started until performance monitoring is ended (or performance information is displayed) is displayed. In this field, the average I/O count per second, the minimum I/O count per second, and the maximum I/O count per second are displayed.
	Min	
	Max	
Throughput	Ave	The transfer data size from when performance monitoring is started until performance monitoring is ended (or performance information is displayed) is displayed. In this field, the average data transfer size per second, the minimum data transfer size per second, and the maximum data transfer size per second are displayed.
	Min	
	Max	
Delay Time	Total	The total delay time for executing a command from when performance monitoring is started until performance monitoring is ended (or performance information is displayed) is displayed. If the total delay time reaches the maximum value, "Overflow" is displayed.
	Ave	The average delay time per command from when performance monitoring is started until performance monitoring is ended (or performance information is displayed) is displayed.

Enable QoS/Disable QoS

- ["■ Overview" \(page 828\)](#)
- ["■ User Privileges" \(page 829\)](#)
- ["■ Operating Procedures" \(page 829\)](#)

■ Overview

This function enables or disables the QoS mode.

Note

- If the QoS mode is changed from "Enable" to "Disable", the configured bandwidth limit is saved.
- If the QoS mode is changed from "Disable" to "Enable", the QoS operates within the saved bandwidth limit.
- If the bandwidth limit is not specified when the QoS mode is changed to "Enable", "Unlimited" is applied to all the bandwidth limit settings for hosts, ports, host LUNs, and volumes (the setting value is not changed).

■ User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	✓
StorageAdmin	✓
AccountAdmin	
SecurityAdmin	
Maintainer	✓

Refer to "[A. User Roles and Policies](#)" (page 1580) for details on the policies and roles.

■ Operating Procedures

Enabling QoS Mode

Procedure ▶▶▶

- 1 Click [Enable QoS] in [Action].
→ A confirmation screen appears.

Caution

- If the QoS mode has already been enabled, [Enable QoS] cannot be clicked.

- 2 Click the [OK] button.
→ Enabling of QoS starts.
- 3 Click the [Done] button to return to the [Host-LU QoS] screen.



Disabling QoS Mode

Procedure ▶▶▶

- 1 Click [Disable QoS] in [Action].
→ A confirmation screen appears.

Caution

- If the QoS mode has already been disabled, [Disable QoS] cannot be clicked.

- 2 Click the [OK] button.
→ Disabling of QoS starts.
- 3 Click the [Done] button to return to the [Host-LU QoS] screen.



Initialize QoS

- ["■ Overview" \(page 830\)](#)
- ["■ User Privileges" \(page 830\)](#)
- ["■ Operating Procedures" \(page 830\)](#)

■ Overview

This function initializes all the QoS settings (e.g. Host-LU QoS, volume QoS, and QoS patterns).

This function changes the bandwidth limit for hosts, ports, host LUNs, and volumes to the default value ("Unlimited") and deletes all the LU QoS groups.

Note that the following settings are not initialized.

- QoS mode (enabled/disabled)
- Host-LU QoS performance information acquisition state (started/stopped)

■ User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	✓
StorageAdmin	✓
AccountAdmin	
SecurityAdmin	
Maintainer	✓

Refer to ["A. User Roles and Policies" \(page 1580\)](#) for details on the policies and roles.

■ Operating Procedures

In this screen, initialize the QoS settings.

Procedure ▶▶▶

- 1 Click [Initialize QoS] in [Action].
→ A confirmation screen appears.
- 2 Click the [OK] button.
→ The QoS initialization starts.
- 3 Click the [Done] button to return to the [Host-LU QoS] screen.



Set Host-LU QoS

- ["■ Overview" \(page 831\)](#)
- ["■ User Privileges" \(page 831\)](#)
- ["■ Settings" \(page 831\)](#)
- ["■ Operating Procedures" \(page 832\)](#)

■ Overview

This function assigns an LU QoS group to a "host - CA port - LUN group" on which the host affinity setting has been configured. A bandwidth limit (the maximum performance limit) is configured to each host LUN in an LU QoS group.

Caution

- This function can be used, irrespective of whether the QoS mode has been enabled or disabled. However, if the QoS mode has been disabled, the host starts the operation within the configured bandwidth limit only when the QoS mode is enabled.
- When assigning an LU QoS group to the "Host - CA Port - LUN Group", check the number of host LUNs and the current usage for the LUN group, and assign the appropriate LU QoS group.

Note

- Before executing this function, configure a bandwidth limit on each host LUN. Refer to the [Add LU QoS Group] function for details.
- To check the number of host LUNs and the bandwidth limit of each LUN in the LU QoS group, use the [Modify LU QoS Group] function.
- Configure the bandwidth limit on each host. Refer to the [Set FC Host QoS] function, the [Set iSCSI Host QoS] function, or the [Set SAS Host QoS] function for details.
- Configure the CA port bandwidth limit on each CA port. Refer to the [Set FC Port QoS] function, the [Set iSCSI Port QoS] function, or the [Set SAS Port QoS] function for details.

■ User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	✓
StorageAdmin	✓
AccountAdmin	
SecurityAdmin	
Maintainer	✓

Refer to "[A. User Roles and Policies](#)" (page 1580) for details on the policies and roles.

■ Settings

Host - CA Port - LUN Group : LU QoS Group Setting

Item	Description
Host	The host name for which the host affinity setting is configured is displayed. If any host can be the connection target, "All" is displayed.
Host Group	If a host belongs to a host group as a member, the host group name is displayed. If the host does not belong to a host group as a member, a "-" (hyphen) is displayed. If any host can be the connection target, "All" is displayed.

Item	Description
CA Port	The location information of the CA port with the host affinity setting is displayed. For the ETERNUS DX900 S5 or the ETERNUS DX8900 S4 CE#x CM#y CA#z Port#w For the other models CM#y CA#z Port#w x: CE number y: CM number z: CA number w: Port number
CA Port Group	If a CA port belongs to a CA port group as a member, the CA port group name is displayed. If the CA port does not belong to a CA port group as a member, a "-" (hyphen) is displayed.
LUN Group: LU QoS Group No.	[LUN group] The LUN group name with the host affinity setting is displayed. If the host, ports, and LUNs are allocated without specifying a host group or port group by an application other than Web GUI, a "-" (hyphen) is displayed. [LU QoS Group No.] If an LU QoS group has already been assigned to a LUN group, the LU QoS group number is displayed. To add or change a LU QoS group number, click the [Browse...] button, and select a LU QoS group number to assign on the "[Select LU QoS Group] Screen" (page 832).

[Select LU QoS Group] Screen

Item	Description
Radio buttons to select an LU QoS group	Select the radio button for the LU QoS group number to assign to a "Host - CA port - LUN group".
LU QoS Group No.	The LU QoS group number (0 to 1055), which has been registered in the storage system, is displayed.

Function Button

Item	Description
[Browse...]	The [Select LU QoS Group] screen is displayed.

■ **Operating Procedures**

Procedure ▶▶▶

- 1 Select the "Host - CA Port - LUN Group" to set the Host-LU QoS (multiple selections can be made) and click [Set Host-LU QoS] in [Action].
- 2 Click the [Browse...] button for a "LUN Group : LU QoS Group No.". → The [Select LU QoS Group] screen is displayed.
- 3 Select an LU QoS group, and click the [OK] button. → The display returns to the initial screen.
- 4 After confirming the association between "Host" and "CA Port" as well as "LUN Group" and "LU QoS Group No.", click the [Set] button. → A confirmation screen appears.

- 5 Click the [OK] button.
→ The Host-LU QoS setting starts.
- 6 Click the [Done] button to return to the [Host-LU QoS] screen.



Release Host-LU QoS

- "[■ Overview](#)" (page 833)
- "[■ User Privileges](#)" (page 833)
- "[■ Operating Procedures](#)" (page 833)

■ Overview

This function releases the LU QoS groups that are assigned to a "Host - CA Port - LUN Group" with host affinity settings.

■ User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	✓
StorageAdmin	✓
AccountAdmin	
SecurityAdmin	
Maintainer	✓

Refer to "[A. User Roles and Policies](#)" (page 1580) for details on the policies and roles.

■ Operating Procedures

Procedure ▶▶▶

- 1 Select the "Host - CA Port - LUN Group" for which the Host-LU QoS is to be released (multiple selections can be made) and click [Release Host-LU QoS] in [Action].
→ A confirmation screen appears.

Caution

- [Release Host-LU QoS] cannot be clicked if a "Host - CA Port - LUN Group" for which a LU QoS group is not assigned is selected.

- 2 Click the [OK] button.
→ Releasing of the Host-LU QoS starts.
- 3 Click the [Done] button to return to the [Host-LU QoS] screen.



Start Host-LU QoS Performance Monitoring

- ["■ Overview" \(page 834\)](#)
- ["■ User Privileges" \(page 834\)](#)
- ["■ Operating Procedures" \(page 835\)](#)

■ Overview

This function starts performance monitoring of Host-LU QoS.

Target ports for monitoring performance

- If this function is started from the [Host-LU QoS] screen, this function starts performance monitoring of the ports that satisfy all the following conditions.
 - All FC, iSCSI, and SAS ports that are installed in the storage system
 - Ports which port mode are "CA" or "CA/RA"
 - Ports without "🔴Undefined" or "🔴Undefined (Error)" state
- If this function is started from each [Port QoS] screen of the FC, iSCSI, or SAS, this function starts performance monitoring of the selected port (multiple selections can be made).

Caution

- When this function is started after port selection, ports with different host interfaces cannot be selected at the same time.

Note

- This function can be used, irrespective of whether the QoS mode has been enabled or disabled.
- Performance monitoring can be started even if other performance information is being obtained. If performance monitoring is restarted, the performance information that is already obtained is deleted and the collection of performance starts again. The start time is changed to the last time when performance monitoring was restarted.

■ User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	✓
StorageAdmin	✓
AccountAdmin	
SecurityAdmin	
Maintainer	✓

Refer to ["A. User Roles and Policies" \(page 1580\)](#) for details on the policies and roles.

■ Operating Procedures

When this Function is Selected in the [Host-LU QoS] Screen

Procedure ▶▶▶

- 1 Click [Start Perfmon] in [Action].
→ A confirmation screen appears.
 - 2 Click the [OK] button.
→ Acquisition of Host-LU QoS performance information starts.
 - 3 Click the [Done] button to return to the [Host-LU QoS] screen.
-



When this Function is Selected in the [Port QoS] Screen for Each Host Interface

Procedure ▶▶▶

- 1 Select the port to start the Host-LU QoS performance monitoring for (multiple selections can be made) and click [Start Perfmon] in [Action].
→ A confirmation screen appears.
 - 2 Click the [OK] button.
→ Acquisition of Host-LU QoS performance information starts.
 - 3 Click the [Done] button to return to the screen when starting this function in Step 1.
-



Stop Host-LU QoS Performance Monitoring

- ["■ Overview" \(page 835\)](#)
- ["■ User Privileges" \(page 836\)](#)
- ["■ Operating Procedures" \(page 836\)](#)

■ Overview

This function stops performance monitoring of Host-LU QoS.

Target Ports to Stop the Performance Monitoring

- If this function is started from the [Host-LU QoS] screen, this function stops performance monitoring of the ports that satisfy all the following conditions.
 - All FC, iSCSI, and SAS ports that are installed in the storage system
 - Ports which port mode are "CA" or "CA/RA"
 - Ports without "○Undefined" or "○Undefined (Error)" state
- If this function is started from each [Port QoS] screen of the FC, iSCSI, or SAS, this function stops performance monitoring of the selected port (multiple selections can be made).

Caution

- When this function is started after port selection, ports with different host interfaces cannot be selected at the same time.

Note

- This function can be used, irrespective of whether the QoS mode has been enabled or disabled.

■ User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	✓
StorageAdmin	✓
AccountAdmin	
SecurityAdmin	
Maintainer	✓

Refer to "A. User Roles and Policies" (page 1580) for details on the policies and roles.

■ Operating Procedures

When this Function is Selected in the [Host-LU QoS] Screen

Procedure ▶▶▶

- 1 Click [Stop Perfmon] in [Action].
→ A confirmation screen appears.
- 2 Click the [OK] button.
→ Acquisition of Host-LU QoS performance information stops.
- 3 Click the [Done] button to return to the [Host-LU QoS] screen.



When this Function is Selected in the [Port QoS] Screen for Each Host Interface

Procedure ▶▶▶

- 1 Select the port to stop the Host-LU QoS performance monitoring for (multiple selections can be made) and click [Stop Perfmon] in [Action].
→ A confirmation screen appears.
- 2 Click the [OK] button.
→ Acquisition of Host-LU QoS performance information stops.
- 3 Click the [Done] button to return to the screen when starting this function in Step 1.



Set Host QoS Pattern

- "■ Overview" (page 837)
- "■ User Privileges" (page 837)
- "■ Settings" (page 837)

- ["Operating Procedures" \(page 838\)](#)

■ Overview

This function sets the QoS patterns of the host.

The maximum bandwidth limit of the host QoS can be changed by setting a host QoS pattern.

Caution

- If the Automated QoS function of ETERNUS SF Storage Cruiser is used, set the IOPS and throughput values that correspond to the bandwidth limit (No.1 to No.15) in descending order. If values are not in descending order, the Automated QoS function may not operate as expected.

Note

- This function can be used, irrespective of whether the QoS mode has been enabled or disabled.
- The host QoS patterns set with this function are applied to the options of the host QoS bandwidth limit. Refer to the [Set FC Host QoS] function, the [Set iSCSI Host QoS] function, or the [Set SAS Host QoS] function for details.
- The following QoS patterns can be set.
 - Use the [Set Port QoS Pattern] function to set the port QoS patterns.
 - Use the [Set LU QoS Pattern] function to set the host LUN QoS patterns.
 - Use the [Set Volume QoS Pattern] function to set the volume QoS patterns.
- The bandwidth limit can also be changed with the "set qos-bandwidth-limit" CLI command. If the bandwidth limit is changed by using CLI, that value is also applied to the bandwidth limit that is specified with Web GUI.

■ User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	✓
StorageAdmin	✓
AccountAdmin	
SecurityAdmin	
Maintainer	✓

Refer to ["A. User Roles and Policies" \(page 1580\)](#) for details on the policies and roles.

■ Settings

QoS Pattern Settings

Item	Description	Setting values
No.	The pattern number (0 to 15) of the host QoS is displayed.	

Item	Description	Setting values
IOPS	Enter the maximum performance (IOPS). Note that "No.0" (Unlimited) cannot be changed. The current value is displayed when this function starts.	No.0 "Unlimited" No.1 - No.15 60 - 4294967295 Refer to the "Host QoS" column in " "Bandwidth Limit" (page 823) " for the default value.
Throughput (MB/s)	Enter the maximum performance (throughput value). Note that "No.0" (Unlimited) cannot be changed. The current value is displayed when this function starts.	No.0 "Unlimited" No.1 - No.15 1 - 2097151 Refer to the "Host QoS" column in " "Bandwidth Limit" (page 823) " for the default value.

■ Operating Procedures

Procedure ▶▶▶

- 1 Click [Set Host QoS Pattern] in [Action].
- 2 Specify parameters, and click the [Set] button.
→ A confirmation screen appears.

Note

- The QoS patterns (No.1 to No.15) can be reset to the default value. Click the [Default] button to display the default value and click the [Set] button. Refer to the "Host QoS" column in "["Bandwidth Limit" \(page 823\)](#)" for the settings content. Note that initializing a specific QoS pattern is not available.

- 3 Click the [OK] button.
→ The host QoS pattern setting starts.
- 4 Click the [Done] button to return to the [Host-LU QoS] screen.



Set Port QoS Pattern

- "[■ Overview](#)" (page 838)
- "[■ User Privileges](#)" (page 839)
- "[■ Settings](#)" (page 839)
- "[■ Operating Procedures](#)" (page 840)

■ Overview

This function sets the QoS patterns of the port.
The maximum bandwidth limit of the port QoS can be changed by setting a port QoS pattern.

Caution

- If the Automated QoS function of ETERNUS SF Storage Cruiser is used, set the IOPS and throughput values that correspond to the bandwidth limit (No.1 to No.15) in descending order. If values are not in descending order, the Automated QoS function may not operate as expected.

Note

- This function can be used, irrespective of whether the QoS mode has been enabled or disabled.
- The port QoS patterns set with this function are applied to the options of the port QoS bandwidth limit. Refer to the [Set FC Port QoS] function, the [Set iSCSI Port QoS] function, or the [Set SAS Port QoS] function for details.
- The following QoS patterns can be set.
 - Use the [Set Host QoS Pattern] function to set the host QoS patterns.
 - Use the [Set LU QoS Pattern] function to set the host LUN QoS patterns.
 - Use the [Set Volume QoS Pattern] function to set the volume QoS patterns.
- The bandwidth limit can also be changed with the "set qos-bandwidth-limit" CLI command. If the bandwidth limit is changed by using CLI, that value is also applied to the bandwidth limit that is specified with Web GUI.

■ **User Privileges**

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	✓
StorageAdmin	✓
AccountAdmin	
SecurityAdmin	
Maintainer	✓

Refer to ["A. User Roles and Policies" \(page 1580\)](#) for details on the policies and roles.

■ **Settings**

QoS Pattern Settings

Item	Description	Setting values
No.	The pattern number (0 to 15) of the port QoS is displayed.	
IOPS	Enter the maximum performance (IOPS). Note that "No.0" (Unlimited) cannot be changed. The current value is displayed when this function starts.	No.0 "Unlimited" No.1 - No.15 60 - 4294967295 Refer to the "Port QoS" column in "Bandwidth Limit" (page 823) for the default value.
Throughput (MB/s)	Enter the maximum performance (throughput value). Note that "No.0" (Unlimited) cannot be changed. The current value is displayed when this function starts.	No.0 "Unlimited" No.1 - No.15 1 - 2097151 Refer to the "Port QoS" column in "Bandwidth Limit" (page 823) for the default value.

■ Operating Procedures

Procedure ▶▶▶

- 1 Click [Set Port QoS Pattern] in [Action].
- 2 Specify parameters, and click the [Set] button.
→ A confirmation screen appears.

Note

- The port QoS patterns (No.1 to No.15) can be reset to the default value. Click the [Default] button to display the default value and click the [Set] button. Refer to the "Port QoS" column in ""[Bandwidth Limit](#)" (page 823)" for the settings content.
- Note that initializing a specific port QoS No. is not available.

- 3 Click the [OK] button.
→ The port QoS pattern setting starts.
 - 4 Click the [Done] button to return to the [Host-LU QoS] screen.
-



Set LU QoS Pattern

- "[■ Overview](#)" (page 840)
- "[■ User Privileges](#)" (page 841)
- "[■ Settings](#)" (page 841)
- "[■ Operating Procedures](#)" (page 842)

■ Overview

This function sets the QoS patterns of the host LUN.

The maximum bandwidth limit of the host LUN can be changed by setting a host LUN QoS pattern.

Caution

- If the Automated QoS function of ETERNUS SF Storage Cruiser is used, set the IOPS and throughput values that correspond to the bandwidth limit (No.1 to No.15) in descending order. If values are not in descending order, the Automated QoS function may not operate as expected.

Note

- This function can be used, irrespective of whether the QoS mode has been enabled or disabled.
- The LU QoS patterns set with this function are applied to the options of the LU QoS group bandwidth limit. Refer to the [Add LU QoS Group] function or the [Modify LU QoS Group] function for details.
- The following QoS patterns can be set.
 - Use the [Set Host QoS Pattern] function to set the host QoS patterns.
 - Use the [Set Port QoS Pattern] function to set the port QoS patterns.
 - Use the [Set Volume QoS Pattern] function to set the volume QoS patterns.
- The bandwidth limit can also be changed with the "set qos-bandwidth-limit" CLI command. If the bandwidth limit is changed by using CLI, that value is also applied to the bandwidth limit that is specified with Web GUI.

■ **User Privileges**

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	✓
StorageAdmin	✓
AccountAdmin	
SecurityAdmin	
Maintainer	✓

Refer to "[A. User Roles and Policies](#)" (page 1580) for details on the policies and roles.

■ **Settings**

QoS Pattern Settings

Item	Description	Setting values
No.	The pattern number (0 to 15) of the host LUN QoS is displayed.	
IOPS	Enter the maximum performance (IOPS). Note that "No.0" (Unlimited) cannot be changed. The current value is displayed when this function starts.	No.0 "Unlimited" No.1 - No.15 60 - 4294967295 Refer to the "LUN QoS" column in " "Bandwidth Limit" " (page 823)" for the default value.
Throughput (MB/s)	Enter the maximum performance (throughput value). Note that "No.0" (Unlimited) cannot be changed. The current value is displayed when this function starts.	No.0 "Unlimited" No.1 - No.15 1 - 2097151 Refer to the "LUN QoS" column in " "Bandwidth Limit" " (page 823)" for the default value.

■ Operating Procedures

Procedure ▶▶▶

- 1 Click [Set LU QoS Pattern] in [Action].
- 2 Specify parameters, and click the [Set] button.
→ A confirmation screen appears.

Note

- The QoS patterns (No.1 to No.15) can be reset to the default value. Click the [Default] button to display the default value and click the [Set] button. Refer to the "LUN QoS" column in ""[Bandwidth Limit](#)" (page 823)" for the settings content. Note that initializing a specific QoS pattern is not available.

- 3 Click the [OK] button.
→ The LU QoS pattern setting starts.
- 4 Click the [Done] button to return to the [Host-LU QoS] screen.



Host QoS

- "[■ Overview](#)" (page 842)
- "[■ User Privileges](#)" (page 842)
- Display Contents ("[FC Host QoS](#)" (page 843), "[iSCSI Host QoS](#)" (page 843), "[SAS Host QoS](#)" (page 844))

■ Overview

This function displays the bandwidth limit of the host registered in the storage system. A list of the FC host QoS, the iSCSI host QoS, and the SAS host QoS is displayed for each interface type.

Note

- The hosts registered in the storage system are displayed regardless of whether they are host group members.

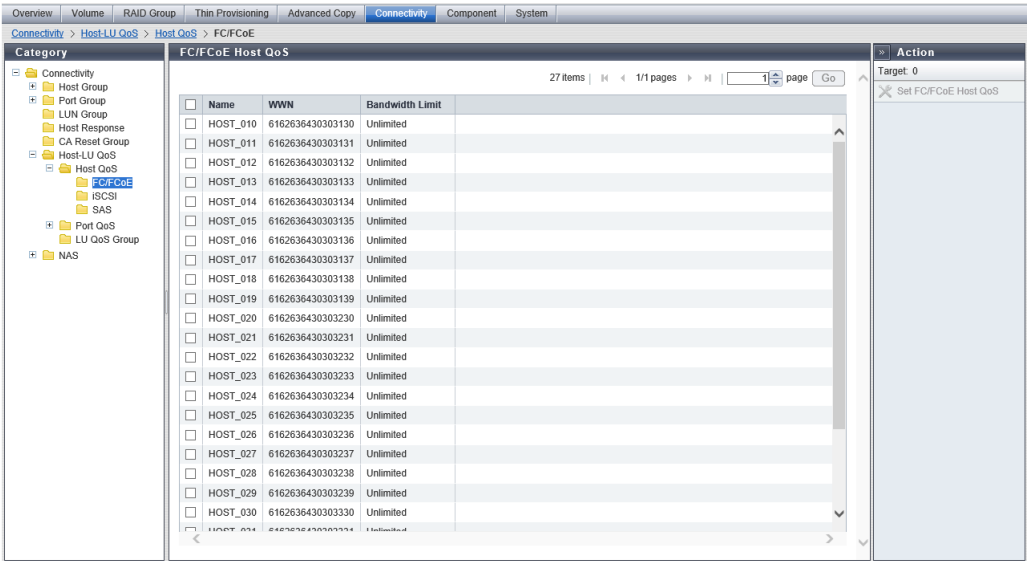
■ User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	✓
StorageAdmin	✓
AccountAdmin	
SecurityAdmin	
Maintainer	✓

Refer to "[A. User Roles and Policies](#)" (page 1580) for details on the policies and roles.

■ Display Contents



FC Host QoS

In this screen, the bandwidth limit of the FC host registered in the storage system is displayed.

Item	Description
Name	The FC host name is displayed.
WWN	The FC host WWN is displayed.
Bandwidth Limit	The maximum performance of the FC host is displayed in IOPS (throughput value). If the performance limit has not been configured, "Unlimited" is displayed. Refer to the "Host QoS" column in " Bandwidth Limit " (page 823) for details.

iSCSI Host QoS

In this screen, the bandwidth limit of the iSCSI host registered in the storage system is displayed.

Item	Description
Name	The iSCSI host name is displayed.
IP Version	The IP version of the iSCSI host is displayed. IPv4 IPv6
IP Address	The IP address of the iSCSI host is displayed. Note that the IPv6 address is displayed as an abbreviation. If the IP address is not specified, the field is blank. For IPv4 address xxx.xxx.xxx.xxx xxx: 0 - 255 (decimal) For IPv6 address xxxx:xxxx:xxxx:xxxx:xxxx:xxxx:xxxx:xxxx xxxx: 0 - ffff (hexadecimal, "a" - "f" are lowercase letters) Refer to " IPv6 Address Notation " (page 659) for details. Blank

Item	Description
Bandwidth Limit	The maximum performance of the iSCSI host is displayed in IOPS (throughput value). If the performance limit has not been configured, "Unlimited" is displayed. Refer to the "Host QoS" column in "Bandwidth Limit" (page 823) for details.

SAS Host QoS

This function displays the bandwidth limit of the SAS host registered in the storage system.

Caution

- The SAS host QoS is supported in the ETERNUS DX100 S5/DX200 S5.

Item	Description
Name	The SAS host name is displayed.
SAS Address	The SAS address of the SAS host is displayed.
Bandwidth Limit	The maximum performance of the SAS host is displayed in IOPS (throughput value). If the bandwidth limit has not been configured (the bandwidth has not been limited), "Unlimited" is displayed. Refer to the "Host QoS" column in "Bandwidth Limit" (page 823) for details.

■ Host QoS (Basic)

- ["■ Overview" \(page 844\)](#)
- ["■ User Privileges" \(page 844\)](#)

■ Overview

Follow the message in the Information area to configure a bandwidth limit on each host.

■ User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	✓
StorageAdmin	✓
AccountAdmin	
SecurityAdmin	
Maintainer	✓

Refer to ["A. User Roles and Policies" \(page 1580\)](#) for details on the policies and roles.

Set FC Host QoS

- ["■ Overview" \(page 845\)](#)
- ["■ User Privileges" \(page 845\)](#)
- ["■ Settings" \(page 845\)](#)
- ["■ Operating Procedures" \(page 845\)](#)

Overview

This function configures the bandwidth limit (the maximum performance limit) of the FC host.

Caution

- This function can be used, irrespective of whether the QoS mode has been enabled or disabled. However, if the QoS mode has been disabled, the host starts the operation within the configured bandwidth limit only when the QoS mode is enabled.

Note

- Configure the port bandwidth limit on each port. Refer to the [Set FC Port QoS] function, the [Set iSCSI Port QoS] function, or the [Set SAS Port QoS] function for details.
- The host LUN bandwidth limit can be configured in the LU QoS group. Refer to the [Set Host-LU QoS] function for details.

User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	✓
StorageAdmin	✓
AccountAdmin	
SecurityAdmin	
Maintainer	✓

Refer to "A. User Roles and Policies" (page 1580) for details on the policies and roles.

Settings

FC Host QoS Setting

Configure the bandwidth limit of the FC host that is registered in the storage system.

Item	Description
Name	The FC host name is displayed.
WWN	The FC host WWN is displayed.
Bandwidth Limit	Select the maximum performance in IOPS (throughput value). When not setting the performance limit, select "Unlimited". The bandwidth limit can be changed using the [Set Host QoS Pattern] function or the "set qos-bandwidth-limit" CLI command. If the value is changed, that value is displayed as an option for this item. Refer to the "Host QoS" column in "'Bandwidth Limit" (page 823)" for the setting value and the default value.

Operating Procedures

Procedure ▶▶▶

- 1 Select the FC host to configure a bandwidth limit (multiple selections can be made), and click [Set FC Host QoS] in [Action].

- 2 Select an FC host bandwidth limit, and click the [Set] button.
→ A confirmation screen appears.
- 3 Click the [OK] button.
→ The FC host QoS setting starts.
- 4 Click the [Done] button to return to the [FC Host QoS] screen.



Set iSCSI Host QoS

- "[■ Overview](#)" (page 846)
- "[■ User Privileges](#)" (page 846)
- "[■ Settings](#)" (page 846)
- "[■ Operating Procedures](#)" (page 847)

■ Overview

Configure the bandwidth limit (the maximum performance limit) of the iSCSI host.

Caution

- This function can be used, irrespective of whether the QoS mode has been enabled or disabled. However, if the QoS mode has been disabled, the host starts the operation within the configured bandwidth limit only when the QoS mode is enabled.

Note

- Configure the port bandwidth limit on each port. Refer to the [Set FC Port QoS] function, the [Set iSCSI Port QoS] function, or the [Set SAS Port QoS] function for details.
- The host LUN bandwidth limit can be configured in the LU QoS group. Refer to the [Set Host-LU QoS] function for details.

■ User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	✓
StorageAdmin	✓
AccountAdmin	
SecurityAdmin	
Maintainer	✓

Refer to "[A. User Roles and Policies](#)" (page 1580) for details on the policies and roles.

■ Settings

iSCSI Host QoS Setting

Configure the bandwidth limit of the iSCSI host that is registered in the storage system.

Item	Description
Name	The iSCSI host name is displayed.
IP Version	The IP version when the IP address was registered for the iSCSI host is displayed. IPv4 IPv6
IP Address	The IP address of the iSCSI host is displayed. Note that the IPv6 address is displayed as an abbreviation. If the IP address is not specified, the field is blank. For IPv4 address xxx.xxx.xxx.xxx xxx: 0 - 255 (decimal) For IPv6 address xxxx:xxxx:xxxx:xxxx:xxxx:xxxx:xxxx:xxxx xxxx: 0 - ffff (hexadecimal, "a" - "f" are lowercase letters) Refer to "IPv6 Address Notation" (page 659) for details. Blank
Bandwidth Limit	Select the maximum performance in IOPS (throughput value). When not setting the performance limit, select "Unlimited". The bandwidth limit can be changed using the [Set Host QoS Pattern] function or the "set qos-bandwidth-limit" CLI command. If the value is changed, that value is displayed as an option for this item. Refer to the "Host QoS" column in "Bandwidth Limit" (page 823) for the setting value and the default value.

■ Operating Procedures

Procedure ▶▶▶

- 1 Select the iSCSI host to configure a bandwidth limit (multiple selections can be made), and click [Set iSCSI Host QoS] in [Action].
- 2 Select the iSCSI host bandwidth limit, and click the [Set] button.
→ A confirmation screen appears.
- 3 Click the [OK] button.
→ The iSCSI host QoS setting starts.
- 4 Click the [Done] button to return to the [iSCSI Host QoS] screen.



Set SAS Host QoS

- ["■ Overview" \(page 847\)](#)
- ["■ User Privileges" \(page 848\)](#)
- ["■ Settings" \(page 848\)](#)
- ["■ Operating Procedures" \(page 849\)](#)

■ Overview

Configure the bandwidth limit (the maximum performance limit) of the SAS host.

Caution

- This function is supported in the ETERNUS DX100 S5/DX200 S5.
- This function can be used, irrespective of whether the QoS mode has been enabled or disabled. If the QoS mode has been disabled, the port starts the operation within the configured bandwidth limit after the QoS mode is enabled.

Note

- Configure the port bandwidth limit on each port. Refer to the [Set FC Port QoS] function, the [Set iSCSI Port QoS] function, or the [Set SAS Port QoS] function for details.
- The host LUN bandwidth limit can be configured in the LU QoS group. Refer to the [Set Host-LU QoS] function for details.

■ **User Privileges**

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	✓
StorageAdmin	✓
AccountAdmin	
SecurityAdmin	
Maintainer	✓

Refer to "[A. User Roles and Policies](#)" (page 1580) for details on the policies and roles.

■ **Settings**

SAS Host QoS Setting

Configure the bandwidth limit of the SAS host that is registered in the storage system.

Item	Description
Name	The SAS host name is displayed.
SAS Address	The SAS address of the SAS host is displayed.
Bandwidth Limit	<p>Select the maximum performance in IOPS (throughput value). When not setting the performance limit, select "Unlimited".</p> <p>Refer to the "Host QoS" column in ""Bandwidth Limit" (page 823)" for the setting value and the default value.</p> <div> <p>Note</p> </div> <ul style="list-style-type: none"> • The bandwidth limit can be changed using the [Set Host QoS Pattern] function or the "set qos-bandwidth-limit" CLI command. If the value is changed, that value is displayed as an option for this item.

■ Operating Procedures

Procedure ▶▶▶

- 1 Select the SAS host to configure a bandwidth limit (multiple selections can be made), and click [Set SAS Host QoS] in [Action].
 - 2 Select the SAS host bandwidth limit, and click the [Set] button.
→ A confirmation screen appears.
 - 3 Click the [OK] button.
→ The SAS host QoS setting starts.
 - 4 Click the [Done] button to return to the [SAS Host QoS] screen.
-



Port QoS

- ["■ Overview" \(page 849\)](#)
- ["■ User Privileges" \(page 850\)](#)
- Display Contents ("[FC Port QoS" \(page 850\)](#), "[iSCSI Port QoS" \(page 852\)](#), "[SAS Port QoS" \(page 854\)](#)")

■ Overview

This function displays the bandwidth limit and the performance information of the ports that are registered in the storage system.

A list of the FC port QoS, the iSCSI port QoS, and the SAS port QoS is displayed for each type.

Caution

- The monitoring status of the performance information and obtained performance information are cleared in the following conditions:
 - The port mode is changed (from CA or CA/RA to other port modes)
 - The storage system is rebooted
 - An error is detected in the storage system
 - The hot maintenance of the CM is performed
 - The hot controller firmware upgrade is performed

Note

- The ports in the port mode of "CA" or "CA/RA" registered with the storage system are displayed, regardless of whether the ports are CA port group members.
- This function displays the performance information that is obtained during performance monitoring regardless of whether the QoS mode is enabled or disabled. When the performance information is displayed before stopping performance monitoring, the performance information that is obtained from the start time until the time when displaying the performance information is requested is displayed. This function displays the performance information of each port.

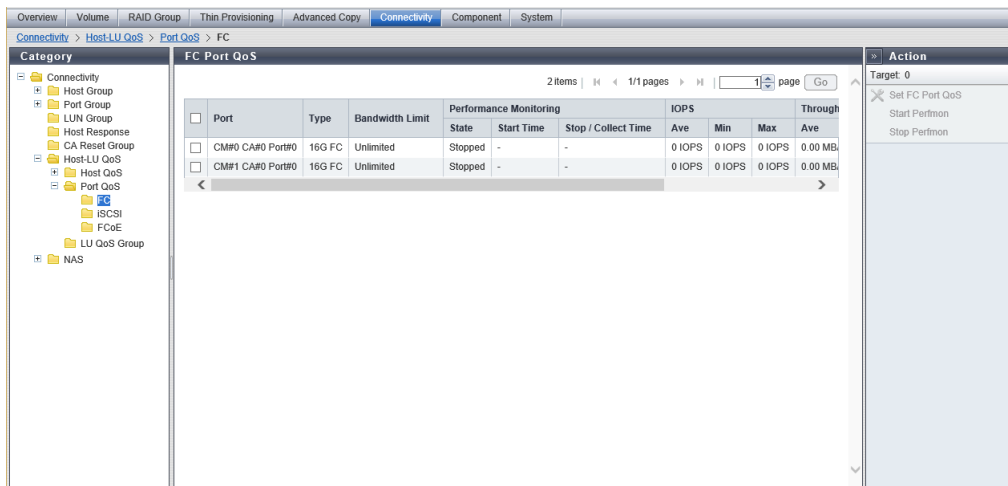
■ User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	✓
StorageAdmin	✓
AccountAdmin	
SecurityAdmin	
Maintainer	✓

Refer to "A. User Roles and Policies" (page 1580) for details on the policies and roles.

■ Display Contents



FC Port QoS

In this screen, the bandwidth limit and the performance information of the FC port are displayed.

Item	Description
Port	The location information of the target port is displayed. For the ETERNUS DX900 S5 or the ETERNUS DX8900 S4 CE#x CM#y CA#z Port#w For the other models CM#y CA#z Port#w x: CE number y: CM number z: CA number w: Port number
Type	The type of the target port is displayed. 16G FC 32G FC

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Item		Description			
Bandwidth Limit		The maximum performance of the target port is displayed in IOPS (throughput value). If the performance limit has not been configured, "Unlimited" is displayed. Refer to the "Port QoS" column in " Bandwidth Limit " (page 823) for details.			
Performance Monitoring	State	The status of performance monitoring for the port is displayed. Active Stopped			
	Start Time	The start time and the end time for performance monitoring are displayed.			
	Stop / Collect Time	The displayed time varies depending on how the performance monitoring is started or ended.			
		Start/End monitoring method	State	Start Time (YYYY-MM-DD hh:mm:ss)	Stop / Collect Time (YYYY-MM-DD hh:mm:ss)
		Before monitoring is started (*1)	Stopped	"-" (hyphen)	"-" (hyphen)
		Monitoring is started	Stopped ↓ Active	The time when performance monitoring is started is displayed.	The time when the performance information is obtained (displayed) is displayed.
		Monitoring is started while the monitoring session has already been started	Active	The last time when performance monitoring is started is displayed.	The time when the performance information is obtained (displayed) is displayed.
		Monitoring is stopped	Active ↓ Stopped	The last time when performance monitoring is started is displayed.	The time when performance monitoring is stopped is displayed.
Monitoring is stopped while the monitoring session has already been stopped	Stopped	The last time when performance monitoring is started is displayed.	The first time when performance monitoring is stopped is displayed.		
<p>*1: If performance monitoring is not being performed after the storage system is started, a "-" (hyphen) is displayed.</p> <div style="background-color: #fff9c4; padding: 10px; border: 1px solid #ccc;"> <p>Caution</p> <ul style="list-style-type: none"> If performance monitoring is restarted during an active performance monitoring session, the performance information that is already obtained is deleted and the collection of performance information starts again. </div>					
IOPS	Ave	The performance information from when performance monitoring is started until performance monitoring is ended (or performance information is displayed) is displayed. In this field, the average I/O count per second, the minimum I/O count per second, and the maximum I/O count per second are displayed.			
	Min				
	Max				
Throughput	Ave	The transfer data size from when performance monitoring is started until performance monitoring is ended (or performance information is displayed) is displayed. In this field, the average data transfer size per second, the minimum data transfer size per second, and the maximum data transfer size per second are displayed.			
	Min				
	Max				

6. Connectivity
Host-LU QoS

Item		Description
Delay Time	Total	The total delay time for executing a command from when performance monitoring is started until performance monitoring is ended (or performance information is displayed) is displayed. If the total delay time reaches the maximum value, "Overflow" is displayed.
	Ave	The average delay time per command from when performance monitoring is started until performance monitoring is ended (or performance information is displayed) is displayed.

iSCSI Port QoS

In this screen, the bandwidth limit and the performance information of the iSCSI port are displayed.

Item		Description
Port		The location information of the target port is displayed. For the ETERNUS DX900 S5 or the ETERNUS DX8900 S4 CE#x CM#y CA#z Port#w For the other models CM#y CA#z Port#w x: CE number y: CM number z: CA number w: Port number
Type		The type of the target port is displayed. <ul style="list-style-type: none"> • 1G iSCSI 1Gbit/s iSCSI. • 10G iSCSI 10Gbit/s iSCSI.
Bandwidth Limit		The maximum performance of the target port is displayed in IOPS (throughput value). If the performance limit has not been configured, "Unlimited" is displayed. Refer to the "Port QoS" column in " Bandwidth Limit " (page 823) for details.

6. Connectivity
Host-LU QoS

Item		Description			
Performance Monitoring	State	The status of performance monitoring for the port is displayed. Active Stopped			
	Start Time	The start time and the end time for performance monitoring are displayed.			
	Stop / Collect Time	The displayed time varies depending on how the performance monitoring is started or ended.			
		Start/End monitoring method	State	Start Time (YYYY-MM-DD hh:mm:ss)	Stop / Collect Time (YYYY-MM-DD hh:mm:ss)
		Before monitoring is started (*1)	Stopped	"-" (hyphen)	"-" (hyphen)
		Monitoring is started	Stopped ↓ Active	The time when performance monitoring is started is displayed.	The time when the performance information is obtained (displayed) is displayed.
		Monitoring is started while the monitoring session has already been started	Active	The last time when performance monitoring is started is displayed.	The time when the performance information is obtained (displayed) is displayed.
		Monitoring is stopped	Active ↓ Stopped	The last time when performance monitoring is started is displayed.	The time when performance monitoring is stopped is displayed.
Monitoring is stopped while the monitoring session has already been stopped	Stopped	The last time when performance monitoring is started is displayed.	The first time when performance monitoring is stopped is displayed.		
		<p>*1: If performance monitoring is not being performed after the storage system is started, a "-" (hyphen) is displayed.</p> <div style="background-color: #fff9c4; padding: 10px; border: 1px solid #ccc;"> <p>Caution</p> <ul style="list-style-type: none"> If performance monitoring is restarted during an active performance monitoring session, the performance information that is already obtained is deleted and the collection of performance information starts again. </div>			
IOPS	Ave	The performance information from when performance monitoring is started until performance monitoring is ended (or performance information is displayed) is displayed. In this field, the average I/O count per second, the minimum I/O count per second, and the maximum I/O count per second are displayed.			
	Min				
	Max				
Throughput	Ave	The transfer data size from when performance monitoring is started until performance monitoring is ended (or performance information is displayed) is displayed. In this field, the average data transfer size per second, the minimum data transfer size per second, and the maximum data transfer size per second are displayed.			
	Min				
	Max				
Delay Time	Total	The total delay time for executing a command from when performance monitoring is started until performance monitoring is ended (or performance information is displayed) is displayed. If the total delay time reaches the maximum value, "Overflow" is displayed.			
	Ave	The average delay time per command from when performance monitoring is started until performance monitoring is ended (or performance information is displayed) is displayed.			

SAS Port QoS

In this screen, the bandwidth limit and the performance information of the SAS ports in the storage system are displayed.

Caution

- The SAS port QoS is supported in the ETERNUS DX100 S5/DX200 S5.

Item	Description
Port	The location information of the target port is displayed. CM#x CA#y Port#z x: CM number y: CA number z: Port number
Type	The type of the target port is displayed. 12G SAS
Bandwidth Limit	The maximum performance of the target port is displayed in IOPS (throughput value). If the performance limit has not been configured, "Unlimited" is displayed. Refer to "Bandwidth Limit" (page 823) for details.

6. Connectivity
Host-LU QoS

Item		Description			
Performance Monitoring	State	The status of performance monitoring for the port is displayed. Active Stopped			
	Start Time	The start time and the end time for performance monitoring are displayed.			
	Stop / Collect Time	The displayed time varies depending on how the performance monitoring is started or ended.			
		Start/End monitoring method	State	Start Time (YYYY-MM-DD hh:mm:ss)	Stop / Collect Time (YYYY-MM-DD hh:mm:ss)
		Before monitoring is started (*1)	Stopped	"-" (hyphen)	"-" (hyphen)
		Monitoring is started	Stopped ↓ Active	The time when performance monitoring is started is displayed.	The time when the performance information is obtained is displayed.
		Monitoring is started while the monitoring session has already been started	Active	The last time when performance monitoring is started is displayed.	The time when the performance information is obtained is displayed.
		Stop	Active ↓ Stopped	The last time when performance monitoring is started is displayed.	The time when performance monitoring is stopped is displayed.
		Monitoring is stopped while the monitoring session has already been stopped	Stopped	The last time when performance monitoring is started is displayed.	The first time when performance monitoring is stopped is displayed.
	<p>*1: If performance monitoring is not being performed after the storage system is started, a "-" (hyphen) is displayed. When the start time is "0", "-" is displayed for "Start Time" and "Stop / Collect Time".</p> <div style="background-color: #fff9c4; padding: 10px;"> <p>Caution</p> <ul style="list-style-type: none"> If performance monitoring is restarted during an active performance monitoring session, the performance information that is already obtained is deleted and the collection of performance information starts again. </div>				
IOPS	Ave	The performance information from when performance monitoring is started until performance monitoring is ended (or performance information is displayed) is displayed. In this field, the average I/O count per second, the minimum I/O count per second, and the maximum I/O count per second are displayed.			
	Min				
	Max				
Throughput	Ave	The transfer data size from when performance monitoring is started until performance monitoring is ended (or performance information is displayed) is displayed. In this field, the average data transfer size per second, the minimum data transfer size per second, and the maximum data transfer size per second are displayed.			
	Min				
	Max				
Delay Time	Total	The total delay time for executing a command from when performance monitoring is started until performance monitoring is ended (or performance information is displayed) is displayed. If the total delay time reaches the maximum value, "Overflow" is displayed.			
	Ave	The average delay time per command from when performance monitoring is started until performance monitoring is ended (or performance information is displayed) is displayed.			

■ Port QoS (Basic)

- "[■ Overview](#)" (page 856)
- "[■ User Privileges](#)" (page 856)

■ Overview

This function displays descriptions on the Port QoS.

■ User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	✓
StorageAdmin	✓
AccountAdmin	
SecurityAdmin	
Maintainer	✓

Refer to "[A. User Roles and Policies](#)" (page 1580) for details on the policies and roles.

Set FC Port QoS

- "[■ Overview](#)" (page 856)
- "[■ User Privileges](#)" (page 857)
- "[■ Settings](#)" (page 857)
- "[■ Operating Procedures](#)" (page 857)

■ Overview

This function configures the bandwidth limit (the maximum performance limit) of the FC port.

Caution

- The bandwidth limit can be configured only for the ports in the port mode of "CA" or "CA/RA". For ports of other port modes, the bandwidth limit cannot be configured.
- If the port mode has been changed from "CA" or "CA/RA" to other port modes, the bandwidth limit returns to the default value.
- This function can be used, irrespective of whether the QoS mode has been enabled or disabled. However, if the QoS mode has been disabled, the host starts the operation within the configured bandwidth limit only when the QoS mode is enabled.

Note

- Configure the bandwidth limit on each host. Refer to the [Set FC Host QoS] function, the [Set iSCSI Host QoS] function, or the [Set SAS Host QoS] function for details.
- The host LUN bandwidth limit can be configured in the LU QoS group. Refer to the [Set Host-LU QoS] function for details.

■ User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	✓
StorageAdmin	✓
AccountAdmin	
SecurityAdmin	
Maintainer	✓

Refer to "[A. User Roles and Policies](#)" (page 1580) for details on the policies and roles.

■ Settings

FC Port QoS Setting

Configure the bandwidth limit of the FC port.

Item	Description
Port	The location information of the target port is displayed. For the ETERNUS DX900 S5 or the ETERNUS DX8900 S4 CE#x CM#y CA#z Port#w For the other models CM#y CA#z Port#w x: CE number y: CM number z: CA number w: Port number
Type	The type of the target port is displayed. 8G FC 16G FC 32G FC
Bandwidth Limit	Select the maximum performance in IOPS (throughput value). When not setting the performance limit, select "Unlimited". The bandwidth limit can be changed using the [Set Port QoS Pattern] function or the "set qos-bandwidth-limit" CLI command. If the value is changed, that value is displayed as an option for this item. Refer to the "Port QoS" column in " Bandwidth Limit " (page 823) for the setting value and the default value.

■ Operating Procedures

Procedure ▶▶▶

- 1 Select the FC port to configure the bandwidth limit (multiple selections can be made), and click [Set FC Port QoS] in [Action].
- 2 Select an FC port bandwidth limit, and click the [Set] button.
→ A confirmation screen appears.

- 3 Click the [OK] button.
→ The FC Port QoS setting starts.
- 4 Click the [Done] button to return to the [FC Port QoS] screen.



Set iSCSI Port QoS

- ["■ Overview" \(page 858\)](#)
- ["■ User Privileges" \(page 858\)](#)
- ["■ Settings" \(page 859\)](#)
- ["■ Operating Procedures" \(page 859\)](#)

■ Overview

This function configures the bandwidth limit (the maximum performance limit) of the iSCSI port.

Caution

- The bandwidth limit can be configured only for the ports in the port mode of "CA" or "CA/RA". For the ports in the port mode of "RA", the bandwidth limit cannot be configured.
- If the port mode has been changed from "CA" or "CA/RA" to "RA", the bandwidth limit returns to the default value.
- This function can be used, irrespective of whether the QoS mode has been enabled or disabled. However, if the QoS mode has been disabled, the host starts the operation within the configured bandwidth limit only when the QoS mode is enabled.

Note

- Configure the bandwidth limit on each host. Refer to the [Set FC Host QoS] function, the [Set iSCSI Host QoS] function, or the [Set SAS Host QoS] function for details.
- The host LUN bandwidth limit can be configured in the LU QoS group. Refer to the [Set Host-LU QoS] function for details.

■ User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	✓
StorageAdmin	✓
AccountAdmin	
SecurityAdmin	
Maintainer	✓

Refer to ["A. User Roles and Policies" \(page 1580\)](#) for details on the policies and roles.

■ Settings

iSCSI Port QoS Setting

In this screen, configure the bandwidth limit of the iSCSI port.

Item	Description
Port	The location information of the target port is displayed. For the ETERNUS DX900 S5 or the ETERNUS DX8900 S4 CE#x CM#y CA#z Port#w For the other models CM#y CA#z Port#w x: CE number y: CM number z: CA number w: Port number
Type	The type of the target port is displayed. 1G iSCSI 10G iSCSI
Bandwidth Limit	Select the maximum performance in IOPS (throughput value). When not setting the performance limit, select "Unlimited". The bandwidth limit can be changed using the [Set Port QoS Pattern] function or the "set qos-bandwidth-limit" CLI command. If the value is changed, that value is displayed as an option for this item. Refer to the "Port QoS" column in "" Bandwidth Limit " (page 823)" for the setting value and the default value.

■ Operating Procedures

Procedure ▶▶▶

- 1 Select the iSCSI port to configure the bandwidth limit (multiple selections can be made), and click [Set iSCSI Port QoS] in [Action].
- 2 Select the iSCSI port bandwidth limit, and click the [Set] button.
→ A confirmation screen appears.
- 3 Click the [OK] button.
→ The iSCSI Port QoS setting starts.
- 4 Click the [Done] button to return to the [iSCSI Port QoS] screen.



Set SAS Port QoS

- "[■ Overview](#)" (page 859)
- "[■ User Privileges](#)" (page 860)
- "[■ Settings](#)" (page 860)
- "[■ Operating Procedures](#)" (page 861)

■ Overview

Configure the bandwidth limit (the maximum performance limit) of the SAS port.

Caution

- This function is supported in the ETERNUS DX100 S5/DX200 S5.
- This function can be used, irrespective of whether the QoS mode has been enabled or disabled. If the QoS mode has been disabled, the port starts the operation within the configured bandwidth limit after the QoS mode is enabled.

Note

- Configure the host bandwidth limit on each host. Refer to the [Set FC Host QoS] function, the [Set iSCSI Host QoS] function, or the [Set SAS Host QoS] function for details.
- The host LUN bandwidth limit can be configured in the LU QoS group. Refer to the [Set Host-LU QoS] function for details.

■ User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	✓
StorageAdmin	✓
AccountAdmin	
SecurityAdmin	
Maintainer	✓

Refer to "[A. User Roles and Policies](#)" (page 1580) for details on the policies and roles.

■ Settings

SAS Port QoS Setting

In this screen, configure the bandwidth limit of the SAS port.

Item	Description
Port	The location information of the target port is displayed. CM#x CA#y Port#z x: CM number y: CA number z: Port number
Type	The type of the target port is displayed. 12G SAS

Item	Description
Bandwidth Limit	<p>Select the maximum performance in IOPS (throughput value). When not setting the performance limit, select "Unlimited".</p> <p>Refer to the "Port QoS" column in "Bandwidth Limit" (page 823) for the setting value and the default value.</p> <div style="background-color: #f0f0f0; padding: 10px; margin-top: 10px;"> <p>Note</p> <ul style="list-style-type: none"> The bandwidth limit can be changed using the [Set Port QoS Pattern] function or the "set qos-bandwidth-limit" CLI command. If the value is changed, that value is displayed as an option for this item. </div>

■ Operating Procedures

Procedure ▶▶▶

- 1 Select the SAS port to configure the bandwidth limit (multiple selections can be made), and click [Set SAS Port QoS] in [Action].
- 2 Select the SAS port bandwidth limit, and click the [Set] button.
→ A confirmation screen appears.
- 3 Click the [OK] button.
→ The SAS Port QoS setting starts.
- 4 Click the [Done] button to return to the [SAS Port QoS] screen.



LU QoS Group

- ["Overview" \(page 861\)](#)
- ["User Privileges" \(page 861\)](#)
- ["Display Contents" \(page 862\)](#)

■ Overview

This function displays the LU QoS group list.

An LU QoS group is a group with the bandwidth limit (the maximum performance) configured for each Host LUN.

Note

- Assigning an LU QoS group to a LUN group with the [host affinity](#) set, the bandwidth limit can be configured for each host LUN. Refer to the [Set Host-LU QoS] function for details.

■ User Privileges

Availability of Executions in the Default Role

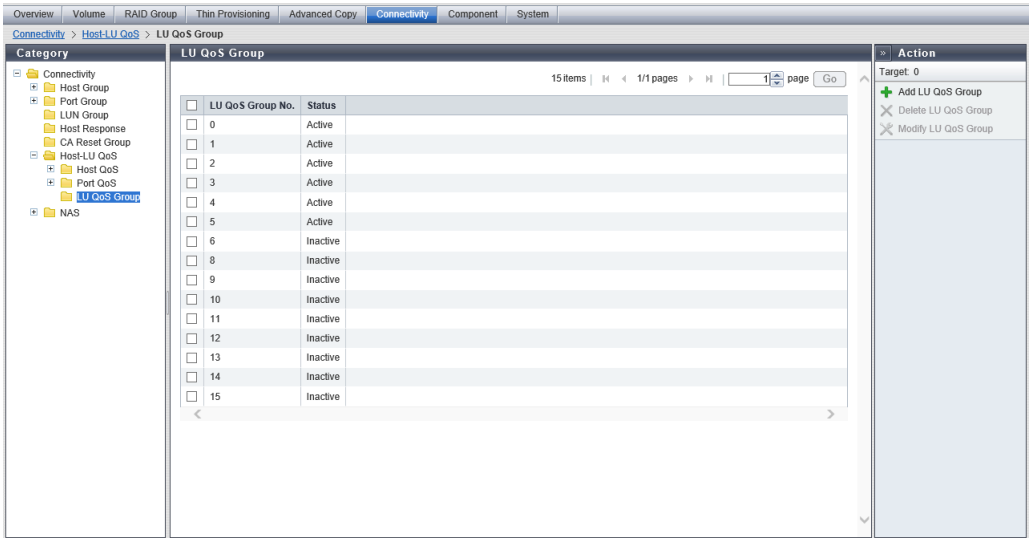
Default role	Availability of executions
Monitor	
Admin	✓
StorageAdmin	✓
AccountAdmin	

6. Connectivity
Host-LU QoS

Default role	Availability of executions
SecurityAdmin	
Maintainer	✓

Refer to "A. User Roles and Policies" (page 1580) for details on the policies and roles.

■ Display Contents



LU QoS Group

A list of the LU QoS groups registered in the storage system is displayed.

Item	Description
LU QoS Group No.	The LU QoS group number (0 to 1055) is displayed.
Status	Whether a LU QoS group is assigned to a LUN group with the host affinity setting is displayed. <ul style="list-style-type: none"> Active The LU QoS group is assigned to a LUN group. Inactive The LU QoS group is not assigned to a LUN group.

Add LU QoS Group

- "■ Overview" (page 862)
- "■ User Privileges" (page 863)
- "■ Display Contents" (page 863)
- "■ Settings" (page 863)
- "■ Operating Procedures" (page 864)

■ Overview

This function adds LU QoS groups with bandwidth limit (the maximum performance limit) settings to each host LUN.

Caution

- Use one LU QoS group number per 512 host LUNs as an internal resource. When there are LU QoS groups with a bandwidth limit other than "Unlimited" from Host LUN#512 onward, the maximum number of LU QoS groups cannot be created.
- Host-LU QoS does not support from LUN#1024 onward. Even if volumes are mapped from LUN#1024 onward, only up to 1024 LUNs (LUN#0 - LUN#1023) can be specified for the bandwidth limit.

Note

- Assigning an LU QoS group to a LUN group with host affinity set, the bandwidth limit can be configured for each host LUN. Refer to the [Set Host-LU QoS] function for details.

■ **User Privileges**

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	✓
StorageAdmin	✓
AccountAdmin	
SecurityAdmin	
Maintainer	✓

Refer to "[A. User Roles and Policies](#)" (page 1580) for details on the policies and roles.

■ **Display Contents**

Target LU QoS Group

Item	Description
LU QoS Group No.	The LU QoS group number (0 to 1055) is displayed. The LU QoS group number is allocated from the smallest unused decimal number in ascending order.

■ **Settings**

LU QoS Group Setting

Configure the bandwidth limit for Host LUNs.

Item	Description
Host LUN	The host LUN (0 to 1023) is displayed.

Item	Description
Bandwidth Limit	<p>Select the maximum performance in IOPS (throughput value). When not setting the performance limit, select "Unlimited".</p> <p>Refer to the "LUN QoS" column in ""Bandwidth Limit" (page 823)" for the setting value and the default value.</p> <div style="background-color: #f0f0f0; padding: 10px; margin-top: 10px;"> <p>Note</p> <ul style="list-style-type: none"> The bandwidth limit can be changed using the [Set LU QoS Pattern] function or the "set qos-bandwidth-limit" CLI command. If the value is changed, that value is displayed as an option for this item. </div>

■ Operating Procedures

Procedure ▶▶▶

- 1 Click [Add LU QoS Group] in [Action].
- 2 Select a host LUN bandwidth limit, and click the [Add] button.
→ A confirmation screen appears.
- 3 Click the [OK] button.
→ Addition of LU QoS Group starts.
- 4 Click the [Done] button to return to the [LU QoS Group] screen.



Delete LU QoS Group

- "["Overview" \(page 864\)](#)
- "["User Privileges" \(page 864\)](#)
- "["Operating Procedures" \(page 864\)](#)

■ Overview

This function deletes LU QoS groups.

■ User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	✓
StorageAdmin	✓
AccountAdmin	
SecurityAdmin	
Maintainer	✓

Refer to "["A. User Roles and Policies" \(page 1580\)](#) for details on the policies and roles.

■ Operating Procedures

In this screen, delete LU QoS groups.

Procedure ▶▶▶

- 1 Select the LU QoS group that is to be deleted (multiple selections can be made) and click [Delete LU QoS Group] in [Action].
→ A confirmation screen appears.

Caution

- [Delete LU QoS Group] cannot be clicked if an LU QoS group with the status of "Active" is selected.

- 2 Click the [OK] button.
→ Deletion of the LU QoS group starts.
- 3 Click the [Done] button to return to the [LU QoS Group] screen.

Modify LU QoS Group

- ["■ Overview" \(page 865\)](#)
- ["■ User Privileges" \(page 865\)](#)
- ["■ Display Contents" \(page 866\)](#)
- ["■ Settings" \(page 866\)](#)
- ["■ Operating Procedures" \(page 866\)](#)

■ Overview

Change the bandwidth limit (the maximum performance limit) for the Host LUN.

Caution

- Use one LU QoS group number per 512 Host LUNs as an internal resource. When there are LU QoS groups with a bandwidth limit other than "Unlimited" from Host LUN#512 onward, the maximum number of LU QoS groups cannot be created.
- Host-LU QoS does not support from LUN#1024 onward. Even if volumes are mapped from LUN#1024 onward, only up to 1024 LUNs (LUN#0 - LUN#1023) can be specified for the bandwidth limit.

■ User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	✓
StorageAdmin	✓
AccountAdmin	
SecurityAdmin	
Maintainer	✓

Refer to ["A. User Roles and Policies" \(page 1580\)](#) for details on the policies and roles.

■ Display Contents

Target LU QoS Group

Item	Description
LU QoS Group No.	The LU QoS group number (0 to 1055) is displayed.

■ Settings

LU QoS Group Setting

Change the bandwidth limit for Host LUNs.

Item	Description
Host LUN	The host LUN (0 to 1023) is displayed.
Bandwidth Limit	Select the maximum performance in IOPS (throughput value). When not setting the performance limit, select "Unlimited". The bandwidth limit can be changed using the [Set LU QoS Pattern] function or the "set qos-bandwidth-limit" CLI command. If the value is changed, that value is displayed as an option for this item. Refer to the "LUN QoS" column in " Bandwidth Limit " (page 823) for details.

■ Operating Procedures

Procedure ▶▶▶

- 1 Select the LU QoS group to modify the bandwidth limit, and click [Modify LU QoS Group] in [Action].
- 2 Select a host LUN bandwidth limit, and click the [Change] button.
→ A confirmation screen appears.
- 3 Click the [OK] button.
→ Modification of LU QoS groups starts.
- 4 Click the [Done] button to return to the [LU QoS Group] screen.



NAS

- "[■ Overview](#)" (page 866)
- "[■ User Privileges](#)" (page 867)
- "[■ Display Contents](#)" (page 867)

■ Overview

This function displays a list of shared folders that are used in a NAS environment.
This function is displayed in a Unified Storage environment.

Caution

- This function is not supported for the ETERNUS DX60 S5, the ETERNUS DX900 S5, the ETERNUS DX8100 S4/DX8900 S4, and the ETERNUS AF150 S3/AF250 S3/AF650 S3.
- When attempting to display the list of shard folders while a meta cache redistribution is being performed for NAS volumes (NAS user volumes or NAS backup volumes), the process may be delayed for a maximum of two minutes.

Note

- A unified upgrade is necessary for a storage system that will be used in a Unified Storage environment if it was previously used in a SAN environment. Refer to the [Register Unified Storage License] function and the [Apply Controller Firmware] function for details. This function is added in the category after the unified upgrade is complete.
- Shared folders include home directories.
"Home directory" is created for each user and is used as a dedicated shared folder that can be used freely by the user. Users that are authenticated by the Active Directory authentication server or the local user authentication use home directories with a CIFS connection.

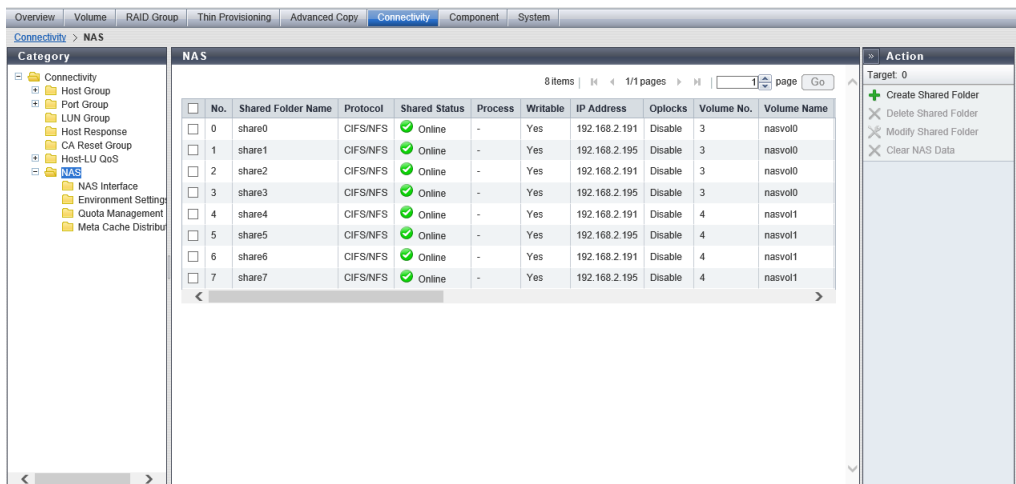
User Privileges

Availability of Executions in the Default Role




Default role	Availability of executions
Monitor	✓
Admin	✓
StorageAdmin	✓
AccountAdmin	
SecurityAdmin	✓
Maintainer	✓

Refer to "'A. User Roles and Policies" (page 1580)" for details on the policies and roles.

Display Contents



Shared Folder

Item	Description
No.	<p>The shared folder number (0 to 255) is displayed.</p> <div style="background-color: #fff9c4; padding: 10px; border: 1px solid #ccc;"> <p>Caution</p> <ul style="list-style-type: none"> When a NAS backup volume is restored, shared folder numbers that belong to the NAS backup volume targeted for restoration, may be changed. Use this function to check the shared folder number after restoration. Note that a shared folder number is not changed when the folder has not been restored. </div>
Shared folder name	<p>The shared folder name is displayed.</p> <p>If "homes" is displayed for this item, the relevant shared folder is a home directory. User dedicated shared folders are created under the "homes" folder. For home directories, some display items are fixed. Refer to ""Setting Contents for Home Directories" (page 869)" for details.</p>
Protocol	<p>The protocol for the shared folder is displayed.</p> <ul style="list-style-type: none"> When the Windows CIFS protocol is used, select "CIFS" When the UNIX NFS protocol is used, select "NFS" When the Windows CIFS or the UNIX NFS protocol is used, "CIFS/NFS" is displayed
Shared Status	<p>The shared status is displayed.</p> <ul style="list-style-type: none">  Online The folder is shared.  Offline The folder is not shared.  Unknown Other than above status.
Process	<p>A process that is being performed for the shared folder is displayed.</p> <p>If the NAS data is being deleted, "Clearing Data" is displayed.</p> <p>If no process is being performed, a "-" (hyphen) is displayed.</p>
Writable	<p>When the write permission is specified for the shared folder, "Yes" is displayed. When the write permission is not specified, "No" is displayed.</p>
IP Address	<p>The IP address to access the shared folder is displayed.</p>
Oplocks	<p>When using the Opportunistic locking (Oplocks) function to avoid conflicts between files by locking the files in the shared folder, "Enable" is displayed. When this function is not used, "Disable" is displayed.</p> <p>A "-" (hyphen) is displayed when the protocol is "NFS".</p>
Volume No.	<p>The NAS user volume number to which the shared folder belongs is displayed.</p>
Volume Name	<p>The NAS user volume name to which the shared folder belongs is displayed.</p>
Volume Total Capacity	<p>The total capacity (400.00 GB to 128.00 TB) of the NAS user volume to which the shared folder belongs is displayed.</p>
Volume Total Free Space	<p>The total free space (0.00 MB to 128.00 TB) in the NAS user volume to which the shared folder belongs is displayed.</p>
Owner	<p>The owner of the shared folder is displayed.</p>
Group	<p>The group of the shared folder is displayed.</p>
SMB Encryption of Data Access	<p>The current SMB encryption setting (enabled or disabled) for the data access is displayed.</p> <p>When SMB encryption is performed for data while accessing the shared folder, "Enable" is displayed. When data is not encrypted, "Disable" is displayed.</p> <p>A "-" (hyphen) is displayed when the protocol is "NFS".</p>

6. Connectivity NAS

Item	Description
Access Based Enumeration	The current setting (enabled or disabled) for the enumeration based on the access permission is displayed. When shared folders and directories that cannot be accessed are hidden according to the access control list (ACL function), "Enable" is displayed. When inaccessible shared folders and directories are not hidden, "Disable" is displayed. A "-" (hyphen) is displayed when the protocol is "NFS".
CIFS Allowed Hosts	A list of CIFS Allowed Hosts is displayed.
CIFS Denied Hosts	A list of CIFS Denied Hosts is displayed.
NFS Allowed Hosts	A list of NFS Allowed Hosts is displayed.
CIFS Permissions	<p>The CIFS access permissions that are set for the shared folder are displayed. A "-" (hyphen) is displayed when the protocol is "NFS".</p> <ul style="list-style-type: none"> The CIFS access permissions are displayed in the following format. User name or group name [Type, Authority] <ul style="list-style-type: none"> Type This item shows whether the displayed name is for user or group (u: User, g: Group). Authority This item shows the access permission (r: Read Only, rw: Read/Write) for the displayed name. <ul style="list-style-type: none"> "Read/Write" indicates that reading from and writing to the shared folder is allowed. "Read Only" indicates that the shared folder is read only. If "Everyone" is displayed as the group name, the specified authority is applied to all users and groups. In this case, "Type" is omitted. <p>[Example] aaa000 [u, rw] (Type is "User", name is "aaa000", and authority is "Read/Write") group0 [g, r] (Type is "Group", name is "group0", and authority is "Read Only") Everyone [rw] (Type is "Everyone" and authority is "Read/Write")</p> <p>Note</p> <ul style="list-style-type: none"> User and group are user information that is managed in the Active Directory authentication server. "Read/Write" is given priority over "Read Only". <ul style="list-style-type: none"> If "Read Only" is specified for UserA and "Read/Write" is specified for GroupA in which UserA is a part of, "Read/Write" is set for all users in GroupA including UserA. If "Read/Write" is specified for UserA and "Read Only" is specified for GroupA in which UserA is a part of, "Read/Write" is set for UserA and "Read Only" is set for other users in GroupA excluding UserA. If "Everyone" is selected for the CIFS access permission type, the authority is set with the same conditions as when "Read/Write" or "Read Only" is set to all groups in the ETERNUS DX S5 series.

Setting Contents for Home Directories

For home directories, the following contents are fixed.

Item	Display contents
Shared folder name	homes
Protocol	CIFS
Writable	Yes
Access Based Enumeration	Disable
NFS Allowed Hosts	Blank

Item	Display contents
CIFS Permissions	Blank

Create Shared Folder

- "[■ Overview](#)" (page 870)
- "[■ User Privileges](#)" (page 871)
- "[■ Settings](#)" (page 871)
- "[■ Operating Procedures](#)" (page 879)

■ Overview

This function creates shared folders.

Specify the access protocols, hosts which are allowed or denied access, and CIFS access permissions to each shared folder.

This function also creates home directories. The home directory is a type of shared folder.

This function is used in a Unified Storage environment.

Number of Shared Folders That Can Be Registered

Protocol	Number of shared folders (*1)
Windows CIFS	256
UNIX NFS	256
Total number of Windows CIFS and UNIX NFS	256

*1: The maximum number of shared folders may be less in some operating environments.

Caution

- The following settings must be performed before creating shared folders.
 - Create the [TPPs](#) that are to be used in the Unified Storage environment. Refer to the [Create Thin Provisioning Pool] function for details.
 - This function creates NAS user volumes. Refer to the [Create Volume] function for details.
- Confirm that the authentication server setup is complete in advance. To set the authentication server, use the [Set Authentication Server] function.
- An error occurs when the total number of input characters exceeds the maximum (5120 characters). Confirm the used characters when this error occurs even if the total of input characters does not exceed the maximum. Note that a double quotation (0x22) and a single quotation (0x27) are regarded as being two characters.
- If the shared folder creation has not been completed successfully, wait for the storage system status to return to normal and then try again.
- If shared folders are created in the NAS user volume where a meta cache redistribution is being performed, the process may be delayed for a maximum of two minutes.
- The CIFS access permission is enabled from the next CIFS access session that is established after the permission is set.

Note

- When a new shared folder is created, the following setup items are automatically specified for the created shared folder.
 - "Yes (Writable)" is specified for "Writable"
 - "Disable (Not use)" is specified for "Oplocks"
 Note that the "Writable" and the "Oplocks" settings can be changed. Refer to the [Modify Shared Folder] function for details.
- "Home directory" is created for each user and is used as a dedicated shared folder that can be used freely by the user. Users use the home directory with a CIFS connection. Home directories can be used by users that are authenticated by the Active Directory authentication server or the local user authentication.

■ **User Privileges**

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	✓
StorageAdmin	✓
AccountAdmin	
SecurityAdmin	
Maintainer	✓

Refer to ""[A. User Roles and Policies](#)" (page 1580)" for details on the policies and roles.

■ **Settings**

Shared Folder Settings

Item	Description	Setting values
Usage	Select the usage of the shared folder. <ul style="list-style-type: none"> • To create a regular shared folder, select "File Sharing". • To create a home directory, select "Home Directory". 	File Sharing Home Directory

6. Connectivity
NAS

Item	Description	Setting values
Shared Folder Name	<p>If "File Sharing" is selected for "Usage", enter the shared folder name.</p> <p>An existing shared folder name cannot be specified.</p> <p>If "Home Directory" is selected for "Usage", "homes" is displayed for this item.</p>	<ul style="list-style-type: none"> If "File Sharing" is selected for "Usage" <ul style="list-style-type: none"> Alphanumeric characters and symbols (in the US-ASCII format) Note that the following symbols and characters cannot be used. <ul style="list-style-type: none"> Symbols (backslash (0x5C), slash (0x2F), colon (0x3A), asterisk (0x2A), question mark (0x3F), double quotation (0x22), less-than sign (0x3C), greater-than sign (0x3E), vertical line (0x7C), equal (0x3D), comma (0x2C), semicolon (0x3B), left square bracket (0x5B), right square bracket (0x5D), plus (0x2B), and percent (0x25)) Spaces (0x20) Reserved words (".", "..", ".snap", "global", "homes", "printers", and "IPC\$") (Entered letters are not case-sensitive.) "\$bak" and strings ending with "\$bak" "@GMT" and strings starting with "@GMT" (Entered letters are not case-sensitive.) Up to 76 characters If "Home Directory" is selected for "Usage" <ul style="list-style-type: none"> homes
Protocol	<p>If "File Sharing" is selected for "Usage", select a protocol that is used by the file system.</p> <ul style="list-style-type: none"> When the Windows CIFS protocol is used, select "CIFS" When the UNIX NFS protocol is used, select "NFS" When the Windows CIFS or UNIX NFS protocol is used, "CIFS/NFS" is displayed <div style="background-color: #fff9c4; padding: 5px; margin-top: 10px;"> <p>Caution</p> <ul style="list-style-type: none"> If "Home Directory" is selected for "Usage", "CIFS" is displayed for this item. </div>	<p>CIFS</p> <p>NFS</p> <p>CIFS/NFS</p>
IP Address	<p>Enter the IP address to access the shared folder (IPv4 address, or a global or unique local IPv6 address).</p>	<ul style="list-style-type: none"> For IPv4 address <ul style="list-style-type: none"> xxx.xxx.xxx.xxx xxx: 1 - 255 for the top field (decimal) xxx: 0 - 255 for other fields (decimal) Class must be A, B, or C. For IPv6 address <ul style="list-style-type: none"> xxxx:xxxx:xxxx:xxxx:xxxx:xxxx:xxxx:xxxx xxxx: 0 - ffff (FFFF) (hexadecimal, alphanumeric characters) <p>Refer to "IPv6 Address Notation" (page 1220) for details.</p>

6. Connectivity
NAS

Item	Description	Setting values
Owner	<p>Input the owner of the shared folder.</p> <p>Enter the user name for the domain to which the storage system belongs.</p> <p>If "Home Directory" is selected for "Usage", the "Owner" setting is used when the following functions are executed.</p> <ul style="list-style-type: none"> • Backup • Restoration <p>The user specified as the owner can access shared folders ("\$homes" or "homes\$bak") that are available when restoring or mounting backups that include home directories.</p>	<p>Alphanumeric characters and symbols (0x20 - 0x7E in the US-ASCII format)</p> <p>Note that the following symbols and characters cannot be used.</p> <ul style="list-style-type: none"> • Symbols (slash (0x2F), left square bracket (0x5B), right square bracket (0x5D), colon (0x3A), semicolon (0x3B), vertical line (0x7C), equal (0x3D), comma (0x2C), plus (0x2B), asterisk (0x2A), question mark (0x3F), less-than sign (0x3C), greater-than sign (0x3E), double quotation (0x22), and at sign (0x40)) • The following reserved words "root", "bin", "daemon", "adm", "lp", "sync", "shutdown", "halt", "mail", "operator", "games", "ftp", "nobody", "systemd-network", "dbus", "polkitd", "sshd", "rpc", "gluster", "ntp", "nscd", "tss", "nslcd", "rpcuser", "nfsnobody", "tcpdump", and "oprofile" <p>Up to 255 characters root</p>

6. Connectivity
NAS

Item	Description	Setting values
Group	<p>Input the group of the shared folder. Enter the group name for the domain to which the storage system belongs. If "Home Directory" is selected for "Usage", the "Group" setting is used when the following functions are executed.</p> <ul style="list-style-type: none"> • Backup • Restoration <p>The specified group can access shared folders ("\$homes" or "homes\$bak") that are available when restoring or mounting backups that include home directories. Note that BUILTIN groups cannot be specified.</p>	<p>Alphanumeric characters and symbols (0x20 - 0x7E in the US-ASCII format) Note that the following symbols and characters cannot be used.</p> <ul style="list-style-type: none"> • Symbols (slash (0x2F), left square bracket (0x5B), right square bracket (0x5D), colon (0x3A), semicolon (0x3B), vertical line (0x7C), equal (0x3D), comma (0x2C), plus (0x2B), asterisk (0x2A), question mark (0x3F), less-than sign (0x3C), greater-than sign (0x3E), double quotation (0x22), and at sign (0x40)) • The following reserved words "adm", "audio", "audit", "bin", "cdrom", "daemon", "dbus", "dialout", "disk", "dump", "floppy", "ftp", "games", "gluster", "input", "kmem", "ldap", "lock", "lp", "mail", "man", "mem", "nasconf-ct-group", "nfsnobody", "nobody", "nscd", "ntp", "oprofile", "polkitd", "root", "rpc", "rpcuser", "ssh_keys", "sshd", "sys", "systemd-journal", "systemd-network", "tape", "tcpdump", "tss", "tty", "users", "utempter", "utmp", "video", and "wheel" <p>Up to 255 characters root</p>
SMB Encryption of Data Access	<p>When performing SMB encryption for data while accessing the shared folder, select "Enable". When not encrypting, select "Disable". This item can be set when "CIFS" or "CIFS/NFS" is selected for "Protocol".</p> <div style="background-color: #fff9c4; padding: 10px; margin-top: 10px;"> <p>Caution</p> <ul style="list-style-type: none"> • If a client does not support SMB3.0 or SMB3.1, accessing a shared folder where "Enable" is selected for "SMB Encryption of Data Access" is not available. • Note that the system performance may be reduced when "Enable" is selected for this item. </div>	<p>Enable Disable</p>

6. Connectivity
NAS

Item	Description	Setting values
Access Based Enumeration	<p>To hide the shared folders and directories that cannot be accessed according to the access control list (ACL function), select "Enable". To display inaccessible shared folders and directories, select "Disable".</p> <p>This item can be set when "CIFS" or "CIFS/NFS" is selected for "Protocol".</p> <div style="background-color: #fff9c4; padding: 5px;"> <p>Caution</p> <ul style="list-style-type: none"> • If "Home Directory" is selected for "Usage", "Disable" is displayed for this item. </div>	<p>Enable</p> <p>Disable</p>
CIFS Allowed Hosts	<p>Input all of the hosts that are allowed access to the shared folder by using the CIFS protocol. When this parameter is omitted, access from all hosts is allowed. To specify multiple hosts, separate each input value with a comma (0x2C). Refer to "Method for Inputting Hosts" (page 876) for details.</p> <p>This item can be set when "CIFS" or "CIFS/NFS" is selected for "Protocol".</p> <div style="background-color: #fff9c4; padding: 5px;"> <p>Caution</p> <ul style="list-style-type: none"> • If both "CIFS Allowed Hosts" and "CIFS Denied Hosts" are omitted, access from all hosts is allowed. • If the same host is specified for both "CIFS Allowed Hosts" and "CIFS Denied Hosts", access from the relevant host is allowed because the "CIFS Allowed Hosts" setting has priority. </div>	<p>IP address (IPv4 address, or a global or unique local IPv6 address), FQDN, or host name</p> <p>Alphanumeric characters and symbols (0x20 - 0x7E in the US-ASCII format)</p> <p>(except the question mark (0x3F) and the backslash (0x5C))</p> <p>Up to 1023 characters (note that any commas (0x2C) that are used to separate the values are also included in the number of characters)</p>
CIFS Denied Hosts	<p>Input all of the hosts that are denied access to the shared folder by using the CIFS protocol. To specify multiple hosts, separate each input value with a comma (0x2C). Refer to "Method for Inputting Hosts" (page 876) for details.</p> <p>This item can be set when "CIFS" or "CIFS/NFS" is selected for "Protocol".</p> <div style="background-color: #fff9c4; padding: 5px;"> <p>Caution</p> <ul style="list-style-type: none"> • If both "CIFS Allowed Hosts" and "CIFS Denied Hosts" are omitted, access from all hosts is allowed. • If the same host is specified for both "CIFS Allowed Hosts" and "CIFS Denied Hosts", access from the relevant host is allowed because the "CIFS Allowed Hosts" setting has priority. </div>	<p>IP address (IPv4 address, or a global or unique local IPv6 address), FQDN, or host name</p> <p>Alphanumeric characters and symbols (0x20 - 0x7E in the US-ASCII format)</p> <p>(except the question mark (0x3F) and the backslash (0x5C))</p> <p>Up to 1023 characters (note that any commas (0x2C) that are used to separate the values are also included in the number of characters)</p>

6. Connectivity

NAS

Item	Description	Setting values
NFS Allowed Hosts	<p>Input all of the hosts that are allowed access to the shared folder by using the NFS protocol. When this parameter is omitted, access from all hosts is allowed. To specify multiple hosts, separate each input value with a comma (0x2C). Refer to "Method for Inputting Hosts" (page 876) for details.</p> <p>This item can be set when "NFS" or "CIFS/NFS" is selected for "Protocol" and "File Sharing" is selected for "Usage".</p>	<p>IP address (IPv4 address, or a global or unique local IPv6 address), FQDN, or host name</p> <p>Alphanumeric characters and symbols (0x20 - 0x7E in the US-ASCII format)</p> <p>(except the question mark (0x3F) and the backslash (0x5C))</p> <p>Up to 1023 characters (note that any commas (0x2C) that are used to separate the values are also included in the number of characters)</p>

Method for Inputting Hosts

Specify CIFS Allowed Hosts, CIFS Denied Hosts, or NFS Allowed Hosts by using one of the following formats. If a value other than an IP address is specified, the value is regarded as being an FQDN.

- Specifying a single host
(Example 1) 192.0.2.1
- Specifying multiple hosts
Separate each input value with a comma (0x2C).
 - Specify the hosts by using IP addresses.
(Example 2) 192.0.2.1, 192.0.2.2, 192.0.2.3
 - Specify the IP address and the subnet mask.
(Example 3) 203.0.113.0/255.255.255.0
(Example 4) 203.0.113.0/24

CIFS Permissions

The list of CIFS access permissions that are set for the shared folders is displayed. This item is displayed when "CIFS" or "CIFS/NFS" is selected for "Protocol" and "File Sharing" is selected for "Usage".

Item	Description
Checkbox to permit CIFS access	Select the checkbox for the CIFS access permissions that are to be deleted (multiple selections can be made).
Type	<p>The type of the CIFS access permission is displayed.</p> <p>If "Everyone" is displayed, all "User" and "Group" are selected as setting targets.</p> <p>User</p> <p>Group</p> <p>Everyone</p>
Name	<p>The CIFS access permission target user name or group name is displayed.</p> <p>This item is available when "User" or "Group" is selected for the CIFS access permission type.</p>
Authority	<p>The CIFS access permissions for reading from or writing to the shared folders are displayed.</p> <p>Read Write</p> <p>Read Only</p>

Function Button

The function buttons are available when "CIFS" or "CIFS/NFS" is selected as the protocol.

Button	Description
[Add]	Adds "CIFS Permissions". Click this item to display the [Add CIFS Permission] screen.
[Delete]	Deletes "CIFS Permissions" that is specified with selected checkboxes to permit CIFS access. If no deletion target items are selected, the [Delete] button cannot be clicked.

Select Volume

The NAS user volumes registered in the storage system are displayed.

Item	Description	Setting values
Radio buttons to select a volume	Select a NAS user volume to assign the shared folder by using the radio button.	When only one NAS user volume exists: The checkbox for the relevant volume is selected When multiple NAS user volumes exist: All the checkboxes are cleared
No.	The NAS user volume number is displayed.	
Name	The NAS user volume name is displayed.	
Total Capacity	The total capacity [GB/TB] of the NAS user volume is displayed.	

[Add CIFS Permission] Screen

In this screen, add the CIFS access permissions.

Item	Description	Setting values
Type	Select the type for setting the CIFS access permissions. To select all users and groups, select "Everyone". Note <ul style="list-style-type: none"> User and group are user information that is managed in the Active Directory authentication server. 	User Group Everyone

6. Connectivity
NAS

Item	Description	Setting values
Name	<p>Enter the CIFS access permission target user name or group name. (Entered letters are not case-sensitive.)</p> <p>This item can only be set when "User" or "Group" is selected for the CIFS access permission type.</p> <div style="background-color: #fff9c4; padding: 5px;"> <p>Caution</p> <ul style="list-style-type: none"> • "Everyone" cannot be entered as the name. (Entered letters are not case-sensitive.) • The user names and group names which have already been used cannot be entered. </div>	<p>Alphanumeric characters and symbols (in the US-ASCII format)</p> <p>Note that the following symbols and characters cannot be used.</p> <p>Symbols (slash (0x2F), colon (0x3A), asterisk (0x2A), question mark (0x3F), double quotation (0x22), less-than sign (0x3C), greater-than sign (0x3E), vertical line (0x7C), equal (0x3D), comma (0x2C), semicolon (0x3B), left square bracket (0x5B), right square bracket (0x5D), plus (0x2B), and at sign (0x40))</p> <p>Up to 2048 characters</p>
Authority	<p>Select the CIFS access permissions for shared folders.</p> <ul style="list-style-type: none"> • To allow reading and writing to, select "Read/Write". • To allow reading only, select "Read Only". <p>The setting conditions for each CIFS access permission type are as follows.</p> <ul style="list-style-type: none"> • If "User" or "Group" is selected for the CIFS access permission type, the CIFS access permission is set only for the specified users or groups. Note that other users and groups cannot access the relevant shared folder. • If "Everyone" is selected for the CIFS access permission type, the CIFS access permission is set for all users and groups. <div style="background-color: #fff9c4; padding: 5px;"> <p>Caution</p> <ul style="list-style-type: none"> • Both "Read/Write" and "Read Only" cannot be set to a single user at the same time. • Both "Read/Write" and "Read Only" cannot be set to a single group at the same time. </div> <div style="background-color: #e0e0e0; padding: 5px;"> <p>Note</p> <ul style="list-style-type: none"> • "Read/Write" is given priority over "Read Only". <ul style="list-style-type: none"> - If "Read Only" is specified for UserA and "Read/Write" is specified for GroupA in which UserA is a part of, "Read/Write" is set for all users in GroupA including UserA. - If "Read/Write" is specified for UserA and "Read Only" is specified for GroupA in which UserA is a part of, "Read/Write" is set for UserA and "Read Only" is set for all other users in GroupA excluding UserA. - If "Everyone" is selected for the CIFS access permission type, the authority is set with the same conditions as when "Read/Write" or "Read Only" is set to all groups in the storage system. </div>	<p>Read/Write</p> <p>Read Only</p>

■ Operating Procedures

When "CIFS" or "CIFS/NFS" Is Selected As the Protocol

Procedure ▶▶▶

- 1 Click [Create Shared Folder] in [Action].
- 2 Specify parameters. When adding a CIFS access permission, click the [Add] button in the "CIFS Permissions" field.
→ The [Add CIFS Permission] screen appears.

Note

- If no CIFS access permissions are added, proceed to Step 4.

- 3 Enter each item of the CIFS access permissions and then click the [OK] button.
→ The display returns to the initial screen.

Caution

- If the entered parameters do not satisfy the input conditions, an error screen appears.

Note

- To change CIFS access permissions, delete the relevant "CIFS Permissions" and then add it again using this function.

- 4 After confirming the settings, click the [Create] button.
→ A confirmation screen appears.

Caution

- If the entered parameters do not satisfy the input conditions, an error screen appears.

- 5 Click the [OK] button.
→ Shared folder creation starts.
- 6 Click the [Done] button to return to the [NAS] screen.



When "NFS" Is Selected As the Protocol

Procedure ▶▶▶

- 1 Click [Create Shared Folder] in [Action].
- 2 Specify parameters, and click the [Create] button.
→ A confirmation screen appears.

Caution

- If the entered parameters do not satisfy the input conditions, an error screen appears.

- 3 Click the [OK] button.
→ Shared folder creation starts.

- 4 Click the [Done] button to return to the [NAS] screen.



Delete Shared Folder

- ["■ Overview" \(page 880\)](#)
- ["■ User Privileges" \(page 880\)](#)
- ["■ Operating Procedures" \(page 880\)](#)

■ Overview

This function deletes shared folders.
This function can also delete home directories.
This function is used in a Unified Storage environment.

Caution

- Before deleting the shared folders, all user data and directories in the relevant shared folder must be deleted in advance. Shared folders cannot be deleted if user data or directories exist. Refer to the [Clear NAS Data] function to forcibly delete user data and directories.
- Shared folders cannot be deleted if they are connected from a client via CIFS (or if client sessions exist).
- When deleting shared folders, quota setting information assigned to that shared folder is also deleted at the same time.
- If shared folders are deleted from the NAS user volume where a meta cache redistribution is being performed, the process for this function may be delayed for a maximum of two minutes.

■ User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	✓
StorageAdmin	✓
AccountAdmin	
SecurityAdmin	
Maintainer	✓

Refer to ["A. User Roles and Policies" \(page 1580\)](#) for details on the policies and roles.

■ Operating Procedures

Procedure ▶▶▶

- 1 Select the shared folder that is to be deleted (multiple selections can be made) and click [Delete Shared Folder] in [Action].
→ A confirmation screen appears.
- 2 Click the [OK] button.
→ Deletion of a shared folder starts.

- 3 Click the [Done] button to return to the [NAS] screen.



Modify Shared Folder

- "[■ Overview](#)" (page 881)
- "[■ User Privileges](#)" (page 881)
- "[■ Settings](#)" (page 882)
- "[■ Operating Procedures](#)" (page 889)

■ Overview

This function changes the shared folder settings.

Set the write privileges, Oplocks, hosts which are allowed or denied access, and CIFS access permissions to each shared folder.

This function can also change the home directory settings.

This function is used in a Unified Storage environment.

Caution

- An error occurs when the total number of input characters exceeds the maximum (5120 characters). Confirm the used characters when this error occurs even if the total of input characters does not exceed the maximum. Note that a double quotation (0x22) and a single quotation (0x27) are regarded as being two characters.
- If the shared folder modification has not been completed successfully, wait for the storage system status to return to normal and then try again.
- If the settings for shared folders in the NAS user volume where a meta cache redistribution is being performed are changed, the process may be delayed for a maximum of two minutes.
- The CIFS access permission is enabled from the next CIFS access session that is established after the permission is set. Note that if the CIFS access session is established before the CIFS access permission is set, the session operates with authority when this function is started.

■ User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	✓
StorageAdmin	✓
AccountAdmin	
SecurityAdmin	
Maintainer	✓

Refer to "[A. User Roles and Policies](#)" (page 1580) for details on the policies and roles.

■ Settings

Shared Folder Settings

Item	Description	Setting values
Usage	The shared folder usage is displayed. File Sharing Home Directory	
Shared Folder Name	The shared folder name is displayed. For the home directory, "homes" is displayed for this item.	
Protocol	The protocol is displayed. CIFS NFS CIFS/NFS	
Writable	To set the write permission for the shared folder, select "Yes". To not set a write permission, select "No". If "Usage" is "File Sharing", the write permission can be selected. If "Usage" is "Home Directory", "Yes" is displayed for this item.	Yes No
IP Address	Enter the IP address to access the shared folder (IPv4 address, or a global or unique local IPv6 address).	<ul style="list-style-type: none"> For IPv4 address <ul style="list-style-type: none"> xxx.xxx.xxx.xxx xxx: 1 - 255 for the top field (decimal) xxx: 0 - 255 for other fields (decimal) Class must be A, B, or C. For IPv6 address xxxx:xxxx:xxxx:xxxx:xxxx:xxxx:xxxx:xxxx xxxx: 0 - ffff (FFFF) (hexadecimal, alphanumeric characters) Refer to "IPv6 Address Notation" (page 1220) for details.
Oplocks	To use the Opportunistic locking (Oplocks) function to avoid conflicts between files by locking the files in the shared folder, select "Enable". To stop use of this function, select "Disable". <div style="background-color: #fff9c4; padding: 5px; border: 1px solid #ccc;"> <p>Caution</p> <ul style="list-style-type: none"> This item can be set when "Protocol" is "CIFS" or "CIFS/NFS". Note that enabling the Oplocks function is not recommended when "CIFS/NFS" is selected. </div>	Enable Disable

6. Connectivity
NAS

Item	Description	Setting values
Owner	<p>Input the owner of the shared folder.</p> <p>Enter the user name for the domain to which the storage system belongs.</p> <p>If "Usage" is "Home Directory", the "Owner" setting is used when the following functions are executed.</p> <ul style="list-style-type: none"> • Backup • Restoration <p>The user specified as the owner can access shared folders ("\$homes" or "homes\$bak") that are available when restoring or mounting backups that include home directories.</p>	<p>Alphanumeric characters and symbols (0x20 - 0x7E in the US-ASCII format)</p> <p>Note that the following symbols and characters cannot be used.</p> <ul style="list-style-type: none"> • Symbols (slash (0x2F), left square bracket (0x5B), right square bracket (0x5D), colon (0x3A), semicolon (0x3B), vertical line (0x7C), equal (0x3D), comma (0x2C), plus (0x2B), asterisk (0x2A), question mark (0x3F), less-than sign (0x3C), greater-than sign (0x3E), double quotation (0x22), and at sign (0x40)) • The following reserved words "root", "bin", "daemon", "adm", "lp", "sync", "shutdown", "halt", "mail", "operator", "games", "ftp", "nobody", "systemd-network", "dbus", "polkitd", "sshd", "rpc", "gluster", "ntp", "nscd", "tss", "nslcd", "rpcuser", "nfsnobody", "tcpdump", and "oprofile" <p>Up to 255 characters</p>

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Item	Description	Setting values
Group	<p>Input the group of the shared folder.</p> <p>Enter the group name for the domain to which the storage system belongs.</p> <p>If "Usage" is "Home Directory", the "Group" setting is used when the following functions are executed.</p> <ul style="list-style-type: none"> • Backup • Restoration <p>The specified group can access shared folders ("\$homes" or "homes\$bak") that are available when restoring or mounting backups that include home directories.</p> <p>Note that BUILTIN groups cannot be specified.</p>	<p>Alphanumeric characters and symbols (0x20 - 0x7E in the US-ASCII format)</p> <p>Note that the following symbols and characters cannot be used.</p> <ul style="list-style-type: none"> • Symbols (slash (0x2F), left square bracket (0x5B), right square bracket (0x5D), colon (0x3A), semicolon (0x3B), vertical line (0x7C), equal (0x3D), comma (0x2C), plus (0x2B), asterisk (0x2A), question mark (0x3F), less-than sign (0x3C), greater-than sign (0x3E), double quotation (0x22), and at sign (0x40)) • The following reserved words "adm", "audio", "audit", "bin", "cdrom", "daemon", "dbus", "dialout", "disk", "dump", "floppy", "ftp", "games", "gluster", "input", "kmem", "ldap", "lock", "lp", "mail", "man", "mem", "nasconf-ct-group", "nfsnobody", "nobody", "nscd", "ntp", "oprofile", "polkitd", "root", "rpc", "rpcuser", "ssh_keys", "sshd", "sys", "systemd-journal", "systemd-network", "tape", "tcpdump", "tss", "tty", "users", "utempter", "utmp", "video", and "wheel" <p>Up to 255 characters</p>
SMB Encryption of Data Access	<p>When performing SMB encryption for data while accessing the shared folder, select "Enable". When not encrypting, select "Disable".</p> <p>This item can be set when "Protocol" is "CIFS" or "CIFS/NFS".</p> <div style="background-color: #fff9c4; padding: 10px;"> <p>Caution</p> <ul style="list-style-type: none"> • If a client does not support SMB3.0 or SMB3.1, accessing a shared folder where "Enable" is selected for "SMB Encryption of Data Access" is not available. • Note that the system performance may be reduced when "Enable" is selected for this item. • If this setting is changed for existing shared folders, sessions that have access to relevant shared folders are temporarily disconnected. However, if sessions that have already been accessing shared folders exist, the storage system waits for these sessions to complete. </div>	<p>Enable</p> <p>Disable</p>

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NAS

Item	Description	Setting values
Access Based Enumeration	<p>To hide the shared folders and directories that cannot be accessed according to the access control list (ACL function), select "Enable". To display inaccessible shared folders and directories, select "Disable".</p> <p>This item can be set when "Protocol" is "CIFS" or "CIFS/NFS". However, if "Usage" is "Home Directory", "Disable" is displayed for this item.</p> <div style="background-color: #fff9c4; padding: 10px;"> <p>Caution</p> <ul style="list-style-type: none"> • If this setting is changed for existing shared folders, sessions that have access to relevant shared folders are temporarily disconnected. </div>	<p>Enable</p> <p>Disable</p>
CIFS Allowed Hosts	<p>Input all of the hosts that are allowed access to the shared folder by using the CIFS protocol.</p> <p>When this parameter is omitted, access from all hosts are allowed. To specify multiple hosts, separate each input value with a comma (0x2C). Refer to "Method for Inputting Hosts" (page 886) for details.</p> <p>This item can be set when "Protocol" is "CIFS" or "CIFS/NFS".</p> <div style="background-color: #fff9c4; padding: 10px;"> <p>Caution</p> <ul style="list-style-type: none"> • Specify all the hosts that have already been allowed access, and hosts that will be allowed access. • If both "CIFS Allowed Hosts" and "CIFS Denied Hosts" are omitted, access from all hosts is allowed. • If the same host is specified for both "CIFS Allowed Hosts" and "CIFS Denied Hosts", access from the relevant host is allowed because the "CIFS Allowed Hosts" setting has priority. </div>	<p>IP address (IPv4 address, or a global or unique local IPv6 address), FQDN, or host name</p> <p>Alphanumeric characters and symbols (0x20 - 0x7E in the US-ASCII format)</p> <p>(except the question mark (0x3F) and the backslash (0x5C))</p> <p>Up to 1023 characters (note that any commas (0x2C) that are used to separate the values are also included in the number of characters)</p>

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Item	Description	Setting values
CIFS Denied Hosts	<p>Input all of the hosts that are denied access to the shared folder by using the CIFS protocol.</p> <p>To specify multiple hosts, separate each input value with a comma (0x2C). Refer to "Method for Inputting Hosts" (page 886) for details.</p> <p>This item can be set when "Protocol" is "CIFS" or "CIFS/NFS".</p> <div style="background-color: #fff9c4; padding: 10px; margin-top: 10px;"> <p>Caution</p> <ul style="list-style-type: none"> Specify all the hosts that have already been denied access, and hosts that will be denied access. If both "CIFS Allowed Hosts" and "CIFS Denied Hosts" are omitted, access from all hosts is allowed. If the same host is specified for both "CIFS Allowed Hosts" and "CIFS Denied Hosts", access from the relevant host is allowed because the "CIFS Allowed Hosts" setting has priority. </div>	<p>IP address (IPv4 address, or a global or unique local IPv6 address), FQDN, or host name</p> <p>Alphanumeric characters and symbols (0x20 - 0x7E in the US-ASCII format)</p> <p>(except the question mark (0x3F) and the backslash (0x5C))</p> <p>Up to 1023 characters (note that any commas (0x2C) that are used to separate the values are also included in the number of characters)</p>
NFS Allowed Hosts	<p>Input all of the hosts that are allowed access to the shared folder by using the NFS protocol.</p> <p>When this parameter is omitted, access from all hosts is allowed. To specify multiple hosts, separate each input value with a comma (0x2C). Refer to "Method for Inputting Hosts" (page 886) for details.</p> <p>This item can be set when "Protocol" is "NFS" or "CIFS/NFS" and "Usage" is "File Sharing".</p> <div style="background-color: #fff9c4; padding: 10px; margin-top: 10px;"> <p>Caution</p> <ul style="list-style-type: none"> Specify all the hosts that have already been allowed access, and hosts that will be allowed access. </div>	<p>IP address (IPv4 address, or a global or unique local IPv6 address), FQDN, or host name</p> <p>Alphanumeric characters and symbols (0x20 - 0x7E in the US-ASCII format)</p> <p>(except the question mark (0x3F) and the backslash (0x5C))</p> <p>Up to 1023 characters (note that any commas (0x2C) that are used to separate the values are also included in the number of characters)</p>

Method for Inputting Hosts

Specify CIFS Allowed Hosts, CIFS Denied Hosts, or NFS Allowed Hosts by using one of the following formats.

If a value other than an IP address is specified, the value is regarded as being an FQDN.

- Specifying a single host
(Example 1) 192.0.2.1
- Specifying multiple hosts
Separate each input value with a comma (0x2C).
 - Specify the hosts by using IP addresses.
(Example 2) 192.0.2.1, 192.0.2.2, 192.0.2.3
 - Specify the IP address and the subnet mask.
(Example 3) 203.0.113.0/255.255.255.0
(Example 4) 203.0.113.0/24

CIFS Permissions

The list of CIFS access permissions that are set for the selected shared folder is displayed. This item is displayed when "Protocol" is "CIFS" or "CIFS/NFS" and "Usage" is "File Sharing".

Item	Description
Checkbox to permit CIFS access	Select the checkbox for the CIFS access permissions that are to be deleted (multiple selections can be made).
Type	The type of the CIFS access permission is displayed. If "Everyone" is displayed, all "User" and "Group" are selected as setting targets. User Group Everyone
Name	The CIFS access permission target user name or group name is displayed. This item is available when "User" or "Group" is selected for the CIFS access permission type.
Authority	The CIFS access permissions for reading from or writing to the shared folders are displayed. Read Write Read Only

Function Button

The function buttons are available when "CIFS" or "CIFS/NFS" is selected as the protocol.

Button	Description
[Add]	Adds "CIFS Permissions". Click this item to display the [Add CIFS Permission] screen.
[Delete]	Deletes "CIFS Permissions" that is specified with selected checkboxes to permit CIFS access. If no deletion target items are selected, the [Delete] button cannot be clicked.

Target Volume

The NAS user volume where the selected shared folder belongs to is displayed.

Item	Description
No.	The NAS user volume number is displayed.
Name	The NAS user volume name is displayed.
Total Capacity	The total capacity [GB/TB] of the NAS user volume is displayed.

[Add CIFS Permission] Screen

In this screen, add the CIFS access permissions.

Item	Description	Setting values
Type	Select the type for setting the CIFS access permissions. To select all users and groups, select "Everyone". Note <ul style="list-style-type: none"> User and group are user information that is managed in the Active Directory authentication server. 	User Group Everyone

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Item	Description	Setting values
Name	<p>Enter the CIFS access permission target user name or group name. (Entered letters are not case-sensitive.) This item can only be set when "User" or "Group" is selected for the CIFS access permission type.</p> <p>Caution</p> <ul style="list-style-type: none"> • "Everyone" cannot be entered as the name. (Entered letters are not case-sensitive.) • The user names and group names which have already been used cannot be entered. 	<p>Alphanumeric characters and symbols (in the US-ASCII format) Note that the following symbols and characters cannot be used. Symbols (slash (0x2F), colon (0x3A), asterisk (0x2A), question mark (0x3F), double quotation (0x22), less-than sign (0x3C), greater-than sign (0x3E), vertical line (0x7C), equal (0x3D), comma (0x2C), semicolon (0x3B), left square bracket (0x5B), right square bracket (0x5D), plus (0x2B), and at sign (0x40)) Up to 2048 characters</p>
Authority	<p>Select the CIFS access permissions for shared folders.</p> <ul style="list-style-type: none"> • To allow reading and writing to, select "Read/Write". • To allow reading only, select "Read Only". <p>The setting conditions for each CIFS access permission type are as follows.</p> <ul style="list-style-type: none"> • If "User" or "Group" is selected for the CIFS access permission type, the CIFS access permission is set only for the specified users or groups. Note that other users and groups cannot access the relevant shared folder. • If "Everyone" is selected for the CIFS access permission type, the CIFS access permission is set for all users and groups. <p>Caution</p> <ul style="list-style-type: none"> • Both "Read/Write" and "Read Only" cannot be set to a single user at the same time. • Both "Read/Write" and "Read Only" cannot be set to a single group at the same time. <p>Note</p> <ul style="list-style-type: none"> • "Read/Write" is given priority over "Read Only". <ul style="list-style-type: none"> - If "Read Only" is specified for UserA and "Read/Write" is specified for GroupA in which UserA is a part of, "Read/Write" is set for all users in GroupA including UserA. - If "Read/Write" is specified for UserA and "Read Only" is specified for GroupA in which UserA is a part of, "Read/Write" is set for UserA and "Read Only" is set for all other users in GroupA excluding UserA. - If "Everyone" is selected for the CIFS access permission type, the authority is set with the same conditions as when "Read/Write" or "Read Only" is set to all groups in the storage system. 	<p>Read/Write Read Only</p>

■ Operating Procedures

When the Protocol of the Shared Folder That Is to Be Modified Is "CIFS" or "CIFS/NFS"

Procedure ▶▶▶

- 1 Select the shared folder that is to be changed and click [Modify Shared Folder] in [Action].
- 2 Change the parameters. When adding a CIFS access permission, click the [Add] button in the "CIFS Permissions" field.
→ The [Add CIFS Permission] screen appears.

Caution

- If this function is used, all the existing "CIFS Permissions" settings are overwritten. Do not delete the "CIFS Permissions" settings that are to be used.

Note

- When deleting a CIFS access permission, select "CIFS Permissions" that is to be deleted and click the [Delete] button. Proceed to Step 4.
- If no CIFS access permissions are added, proceed to Step 4.
- If no CIFS access permissions are changed, proceed to Step 4.

- 3 Enter each item of the CIFS access permissions and then click the [OK] button.
→ The display returns to the initial screen.

Caution

- If the entered parameters do not satisfy the input conditions, an error screen appears.

Note

- To change CIFS access permissions, delete the relevant "CIFS Permissions" and then add it again using this function.

- 4 After confirming the settings, click the [Modify] button.
→ A confirmation screen appears.

Caution

- If the entered parameters do not satisfy the input conditions, an error screen appears.

- 5 Click the [OK] button.
→ Modification of shared folder setting starts.
- 6 Click the [Done] button to return to the [NAS] screen.



When the Protocol of the Shared Folder That Is to Be Modified Is "NFS"

Procedure ▶▶▶

- 1 Select the shared folder that is to be changed and click [Modify Shared Folder] in [Action].

- 2 Change the parameters, and click the [Modify] button.
→ A confirmation screen appears.

Caution

- If the entered parameters do not satisfy the input conditions, an error screen appears.

- 3 Click the [OK] button.
→ Modification of shared folder setting starts.
- 4 Click the [Done] button to return to the [NAS] screen.



Clear NAS Data

- "[■ Overview](#)" (page 890)
- "[■ User Privileges](#)" (page 890)
- "[■ Operating Procedures](#)" (page 890)

■ Overview

This function deletes all user data and directories in the shared folder.
This function can also delete user data in the home directory.
This function is used in a Unified Storage environment.

Note

- If shared folders cannot be deleted, use this function to delete NAS data in the shared folders (including home directories).
- Use the [NAS] screen to check whether the NAS data is being deleted. Refer to the [NAS] function for details.

■ User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	✓
StorageAdmin	✓
AccountAdmin	
SecurityAdmin	
Maintainer	✓

Refer to "[A. User Roles and Policies](#)" (page 1580) for details on the policies and roles.

■ Operating Procedures

Procedure ▶▶▶

- 1 Select the shared folder where the NAS data to be deleted exists (multiple selections can be made) and click [Clear NAS Data] in [Action].
→ A confirmation screen appears.

- 2 Click the [OK] button.
→ Deletion of the NAS data starts.
- 3 Click the [Done] button to return to the [NAS] screen.



NAS Interface

- ["■ Overview" \(page 891\)](#)
- ["■ User Privileges" \(page 891\)](#)
- ["■ Display Contents" \(page 892\)](#)

■ Overview

This function displays a list of the NAS interfaces.
This function is displayed in a Unified Storage environment.

Note

- A unified upgrade is necessary for a storage system that will be used in a Unified Storage environment if it was previously used in a SAN environment. Refer to the [Register Unified Storage License] function and the [Apply Controller Firmware] function for details. This function is added in the category after the unified upgrade is complete.

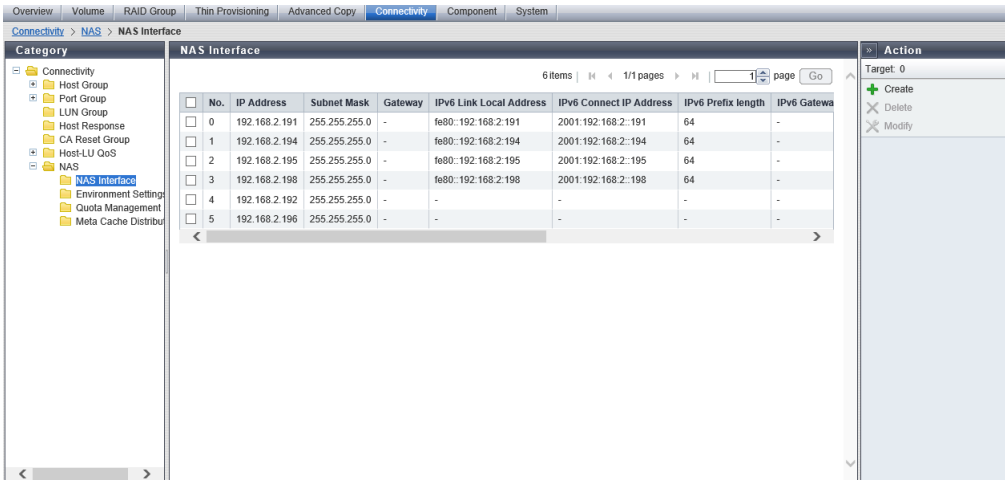
■ User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	✓
Admin	✓
StorageAdmin	✓
AccountAdmin	
SecurityAdmin	✓
Maintainer	✓

Refer to ["A. User Roles and Policies" \(page 1580\)](#) for details on the policies and roles.

■ Display Contents



NAS Interface

Item	Description
No.	The NAS interface number (0 to 159) is displayed.
IP Address	The IPv4 address of the target port is displayed.
Subnet Mask	The subnet mask of the target port is displayed.
Gateway	The IPv4 gateway address of the target port is displayed.
IPv6 Link Local Address	The IPv6 link local address of the target port is displayed.
IPv6 Connect IP Address	The IPv6 connect IP address of the target port is displayed.
IPv6 Prefix length	The IPv6 prefix length of the target port is displayed.
IPv6 Gateway	The IPv6 gateway address of the target port is displayed.
VLAN ID	The VLAN ID of the target port is displayed. If the VLAN ID is not specified, a "-" (hyphen) is displayed.
Port	The location information of the port with the NAS interface setting is displayed. If the port is not specified, a "-" (hyphen) is displayed. CM#x CA#y Port#z x: CM number y: CA number z: Port number
Redundant Port	The location information of the pair port, which configure multipath setting with the target port, is displayed. If the redundant port is not specified, a "-" (hyphen) is displayed. CM#x CA#y Port#z x: CM number y: CA number z: Port number

Item	Description
Failover Status	<p>The failover status of the multipath is displayed.</p> <p>A "-" (hyphen) is displayed when the multipath is not set (or when "Redundancy" is "Single").</p> <ul style="list-style-type: none"> • Normal The multipath setting between the "Port" and "Redundant Port" is in a normal state. • CM#x CA#y Port#z is currently inactive The multipath between the "Port" and "Redundant Port" is set, but the "CM#x CA#y Port#z" port is not used. <p>x: CM number y: CA number z: Port number</p>
Redundancy	<p>The connection type of the target port is displayed.</p> <p>When the connection type is "Active-Active" or "Active-Standby", the "Redundant Port" information is displayed.</p> <ul style="list-style-type: none"> • Active - Active Combine the ports in both of the CMs and configure the redundant ports. For this configuration, the ports of both CMs can be used at any time. • Active - Standby Combine the ports in both of the CMs and configure the redundant ports. For this configuration, one port remains in standby status. • Single Use only for the ports in the CM that are not redundant.

Create NAS Interface

- ["■ Overview" \(page 893\)](#)
- ["■ User Privileges" \(page 893\)](#)
- ["■ Settings" \(page 894\)](#)
- ["■ Operating Procedures" \(page 895\)](#)

■ Overview

This function creates NAS interfaces. Up to 160 NAS interfaces can be created.
This function is used in a Unified Storage environment.

Caution

- If the NAS interface creation has not been completed successfully, wait for the storage system status to return to normal and then try again.

Note

- To use the Active-Active connection, specify different IP addresses on the same subnetwork for the ports of each CM that will be duplicated.

■ User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	✓

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Default role	Availability of executions
StorageAdmin	✓
AccountAdmin	
SecurityAdmin	
Maintainer	✓

Refer to "[A. User Roles and Policies](#)" (page 1580) for details on the policies and roles.

■ Settings

NAS Interface Settings

In this screen, perform the NAS interface settings.

Item	Description	Setting values
Port	Select the port in which the NAS interface is to be created. Only the NAS ports that are not configured in a NAS interface are displayed as options in the list box. Note that bonding ports (or member ports for Bonding) are not displayed.	CM#x CA#y Port#z x: CM number y: CA number z: Port number The port that satisfies the requirements described above with the smallest CM number, CA number, and port number
Redundant Port	Select which redundant port is used for the multipath configuration of the target port. If a multipath configuration is not used, select "None". When a multipath configuration is not used for the target port, "single ports with NAS interface settings" and "None" are displayed as options. Ports in a different CM from the target port are displayed as redundant ports. Note that bonding ports (or member ports for Bonding) are not displayed. If a multipath configuration is already used for the target port, a redundant port is displayed.	CM#x CA#y Port#z x: CM number y: CA number z: Port number None The port that satisfies the requirements described above with the smallest CM number, CA number, and port number
IP Address	Input the IPv4 address of the target port.	xxx.xxx.xxx.xxx xxx: 1 - 255 for the top field (decimal) xxx: 0 - 255 for other fields (decimal) Class must be A, B, or C.
Subnet Mask	Input the subnet mask of the target port.	192.0.0.0 - 255.255.255.252
Gateway	Input the IPv4 gateway address of the target port.	xxx.xxx.xxx.xxx xxx: 0 - 255 for all the fields (decimal) Class must be A, B, or C.
IPv6 Link Local Address	Input the IPv6 link local address of the target port.	fe80::xxxx:xxxx:xxxx:xxxx xxxx: 0 - ffff (FFFF) (hexadecimal, alphanumeric characters) Refer to " "IPv6 Address Notation" (page 1220)" for details.
IPv6 Connect IP Address	Input the IPv6 connect IP address of the target port.	xxxx:xxxx:xxxx:xxxx:xxxx:xxxx:xxxx:xxxx xxxx: 0 - ffff (FFFF) (hexadecimal, alphanumeric characters) Refer to " "IPv6 Address Notation" (page 1220)" for details.

Item	Description	Setting values
IPv6 Gateway	Input the IPv6 gateway address of the target port.	xxxx:xxxx:xxxx:xxxx:xxxx:xxxx:xxxx:xxxx xxxx: 0 - ffff (FFFF) (hexadecimal, alphanumeric characters) Refer to "IPv6 Address Notation" (page 1220) for details.
IPv6 Prefix length	Input the IPv6 prefix length of the target port.	3 - 128

■ Operating Procedures

Procedure ▶▶▶

- 1 Click [Create] in [Action].
- 2 Specify parameters, and click the [Create] button.
→ A confirmation screen appears.

Caution

- An error screen appears in the following conditions:
 - Each parameter fails to satisfy the input conditions
 - The IP address and the network address are the same
 - The IP address and the broadcast address are the same
 - The gateway is set and the gateway and the network address are the same
 - The gateway is set and the gateway and the broadcast address are the same

- 3 Click the [OK] button.
→ The NAS interface creation starts.
- 4 Click the [Done] button to return to the [NAS Interface] screen.



Delete NAS Interface

- ["■ Overview" \(page 895\)](#)
- ["■ User Privileges" \(page 895\)](#)
- ["■ Operating Procedures" \(page 896\)](#)

■ Overview

This function deletes the NAS interfaces.
This function is used in a Unified Storage environment.

Caution

- If a NAS interface is deleted, the multipath settings of the relevant ports are released.

■ User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	✓

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Default role	Availability of executions
StorageAdmin	✓
AccountAdmin	
SecurityAdmin	
Maintainer	✓

Refer to "A. User Roles and Policies" (page 1580) for details on the policies and roles.

■ Operating Procedures

Procedure ▶▶▶

- 1 Select the NAS interface that is to be deleted (multiple selections can be made) and click [Delete] in [Action].
→ A confirmation screen appears.
- 2 Click the [OK] button.
→ Deletion of a NAS interface starts.
- 3 Click the [Done] button to return to the [NAS Interface] screen.



Modify NAS Interface

- "■ Overview" (page 896)
- "■ User Privileges" (page 896)
- "■ Settings" (page 897)
- "■ Operating Procedures" (page 898)

■ Overview

This function changes the NAS interface settings.
This function is used in a Unified Storage environment.

Caution

- If the NAS interface modification has not been completed successfully, wait for the storage system status to return to normal and then try again.

Note

- To use the Active-Active connection, specify different IP addresses on the same subnetwork for the ports of each CM that will be duplicated.

■ User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	✓
StorageAdmin	✓
AccountAdmin	

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Default role	Availability of executions
SecurityAdmin	
Maintainer	✓

Refer to "[A. User Roles and Policies](#)" (page 1580) for details on the policies and roles.

■ Settings

NAS Interface Settings

Change the NAS interface settings.

Item	Description	Setting values
No.	The NAS interface number (0 to 159) is displayed.	
Port	The location information of the port is displayed. If the port is not specified, a "-" (hyphen) is displayed. CM#x CA#y Port#z x: CM number y: CA number z: Port number	
Redundant Port	Select which redundant port is used for the multipath configuration of the target port. If a multipath configuration is not used, select "None". When a multipath configuration is not used for the target port, "single ports with NAS interface settings" and "None" are displayed as options. Ports in a different CM from the target port are displayed as redundant ports. Note that bonding ports (or member ports for Bonding) are not displayed. If a multipath configuration is already used for the target port, a redundant port is displayed. This item is available when a port is specified.	CM#x CA#y Port#z x: CM number y: CA number z: Port number None
IP Address	Input the IPv4 address of the target port.	xxx.xxx.xxx.xxx xxx: 1 - 255 for the top field (decimal) xxx: 0 - 255 for other fields (decimal) Class must be A, B, or C.
Subnet Mask	Input the subnet mask of the target port.	192.0.0.0 - 255.255.255.252
Gateway	Input the IPv4 gateway address of the target port.	xxx.xxx.xxx.xxx xxx: 0 - 255 for all the fields (decimal) Class must be A, B, or C.
IPv6 Link Local Address	Input the IPv6 link local address of the target port.	fe80::xxxx:xxxx:xxxx:xxxx xxxx: 0 - ffff (FFFF) (hexadecimal, alphanumeric characters) Refer to " IPv6 Address Notation " (page 1220)" for details.
IPv6 Connect IP Address	Input the IPv6 connect IP address of the target port.	xxxx:xxxx:xxxx:xxxx:xxxx:xxxx:xxxx:xxxx xxxx: 0 - ffff (FFFF) (hexadecimal, alphanumeric characters) Refer to " IPv6 Address Notation " (page 1220)" for details.
IPv6 Gateway	Input the IPv6 gateway address of the target port.	xxxx:xxxx:xxxx:xxxx:xxxx:xxxx:xxxx:xxxx xxxx: 0 - ffff (FFFF) (hexadecimal, alphanumeric characters) Refer to " IPv6 Address Notation " (page 1220)" for details.

Item	Description	Setting values
IPv6 Prefix length	Input the IPv6 prefix length of the target port.	3 - 128

■ Operating Procedures

Procedure ▶▶▶

- 1 Select the NAS interface that is to be changed, and click [Modify] in [Action].
- 2 Change the parameters, and click the [Modify] button.
→ A confirmation screen appears.

Caution

- An error screen appears in the following conditions:
 - Each parameter fails to satisfy the input conditions
 - The IP address and the network address are the same
 - The IP address and the broadcast address are the same
 - The gateway is set and the gateway and the network address are the same
 - The gateway is set and the gateway and the broadcast address are the same

- 3 Click the [OK] button.
→ Changing of NAS interface settings starts.
- 4 Click the [Done] button to return to the [NAS Interface] screen.



Environment Settings

- ["■ Overview" \(page 898\)](#)
- ["■ User Privileges" \(page 899\)](#)
- ["■ Display Contents" \(page 899\)](#)

■ Overview

This function displays the setup information of the servers (NAS servers, DNS servers, and authentication servers) and the local user authentication that is used for the NAS system.
This function is displayed in a Unified Storage environment.

Note

- A unified upgrade is necessary for a storage system that will be used in a Unified Storage environment if it was previously used in a SAN environment. Refer to the [Register Unified Storage License] function and the [Apply Controller Firmware] function for details. This function is added in the category after the unified upgrade is complete.
- The local user authentication cannot be used when an Active Directory authentication server or an LDAP authentication server is used. In this case, the setting item names are displayed in the [Local User] tab and the [Local Group] tab, but all contents are blank.
- If the local user authentication is used, an Active Directory authentication server and an LDAP authentication server cannot be used. In this case, the setting item names are displayed for the Active Directory authentication server and the LDAP authentication server, but all contents are blank.

User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	✓
Admin	✓
StorageAdmin	✓
AccountAdmin	
SecurityAdmin	✓
Maintainer	✓

Refer to "A. User Roles and Policies" (page 1580) for details on the policies and roles.

Display Contents



NAS Server

Item	Description
Name	The NAS server name is displayed.

DNS Server

Item	Description
Primary IP Address	The IPv4 primary IP address of the DNS server is displayed. If the relevant IP address is not specified, the field is blank.
Secondary IP Address	The IPv4 secondary IP address of the DNS server is displayed. If the relevant IP address is not specified, the field is blank.
IPv6 Primary IP Address	The IPv6 primary IP address of the DNS server is displayed. If the relevant IP address is not specified, the field is blank.
IPv6 Secondary IP Address	The IPv6 secondary IP address of the DNS server is displayed. If the relevant IP address is not specified, the field is blank.

Active Directory Authentication Server

Item	Description
Domain name	The domain name of the Active Directory authentication server is displayed. If the authentication server is not specified, the field is blank.
Domain Administrator	The administrator name of the Active Directory authentication server is displayed. If the authentication server is not specified, the field is blank.
Authentication Server (1)	The IPv4 address, the IPv6 address, or the FQDN of the Active Directory authentication server is displayed. If the Authentication Server (1) is not specified, the field is blank.
Authentication Server (2)	The IPv4 address, the IPv6 address, or the FQDN of the Active Directory authentication server is displayed. If the Authentication Server (2) is not specified, the field is blank.
Authentication Server (3)	The IPv4 address, the IPv6 address, or the FQDN of the Active Directory authentication server is displayed. If the Authentication Server (3) is not specified, the field is blank.

LDAP Authentication Server

Item	Description
Domain name	The domain name of the LDAP authentication server is displayed. If the authentication server is not specified, the field is blank.
Domain Administrator	The administrator name of the LDAP authentication server is displayed. If the authentication server is not specified, the field is blank.
Authentication Server (1)	The IPv4 address, the IPv6 address, or the FQDN of the LDAP authentication server is displayed. If the Authentication Server (1) is not specified, the field is blank.
Authentication Server (2)	The IPv4 address, the IPv6 address, or the FQDN of the LDAP authentication server is displayed. If the Authentication Server (2) is not specified, the field is blank.
Authentication Server (3)	The IPv4 address, the IPv6 address, or the FQDN of the LDAP authentication server is displayed. If the Authentication Server (3) is not specified, the field is blank.

[Local User] Tab

The list of local users registered in the storage system is displayed.

Item	Description
ID	The user ID of the local user is displayed. If the local user is not registered in the storage system, the field is blank. 500 - 999
Name	The local user name is displayed. If the local user is not registered in the storage system, the field is blank. Local user name
Primary Group	The primary group name to which the local user belongs is displayed. If the local user is not registered in the storage system, the field is blank. Primary group name
Secondary Group	The secondary group name to which the local user belongs is displayed. If multiple secondary groups exist, all factors are separated with a "," (comma) and displayed. If no secondary group name exists, a "-" (hyphen) is displayed. If the local user is not registered in the storage system, the field is blank. BUILTIN_Administrators BUILTIN_Users BUILTIN_BackupOperators Secondary group name

[Local Group] Tab

The list of local groups registered in the storage system is displayed.

Item	Description
ID	The group ID for the local group is displayed. For details about group IDs for local groups that are automatically created in the storage system, refer to ""Special Group" (page 902) . 450 451 500 - 999 1002 1003 1004
Name	The local group name is displayed. For details about group names for local groups that are automatically created in the storage system, refer to ""Special Group" (page 902) . BUILTIN_Administrators BUILTIN_Users BUILTIN_BackupOperators Local group name
User(s) who belongs to a Primary Group	The local user names that belong to the primary group are displayed. If multiple local user names exist, all factors are separated with a "," (comma) and displayed. If no local user name exists, a "-" (hyphen) is displayed. If the local user is not registered in the storage system, the field is blank.
User(s) who belongs to a Secondary Group	The local user names that belong to the secondary group are displayed. If multiple local user names exist, all factors are separated with a "," (comma) and displayed. If no local user name exists, a "-" (hyphen) is displayed. If the local user is not registered in the storage system, the field is blank.

Special Group

Local group ID	Local group name	Description
1002	BUILTIN Administrators	One of the BUILTIN groups (*1). Users who belong to this group can execute all operations for all domain controllers within the domain.
1003	BUILTIN Users	One of the BUILTIN groups (*1). Users who belong to this group can execute most of the general operations.
1004	BUILTIN BackupOperators	One of the BUILTIN groups (*1). Users who belong to this group can perform file backups and file recoveries regardless of the access permissions for all the files of domain controllers within the domain.

*1: "BUILTIN groups" are groups that are included in the storage system as standard. If local users belong to these groups, the backup and restore function of Arcserve can be used.

Change NAS Server Name

- ["■ Overview" \(page 902\)](#)
- ["■ User Privileges" \(page 903\)](#)
- ["■ Settings" \(page 903\)](#)
- ["■ Operating Procedures" \(page 903\)](#)

■ Overview

This function changes the server name (host name) specified in the storage system that is used for the NAS system.

This function is used in a Unified Storage environment.

Caution

- When performing an Active Directory authentication, the ETERNUS DX S5 series' NAS engine uses the NAS server name as the NetBIOS name. If the NAS server name is changed, the Active Directory authentication server must be reconfigured.
- If the Active Directory authentication server has already been registered before changing the NAS server name, perform the following operations.

Procedure ▶▶▶

- 1 Delete the setup information for the Active Directory authentication server before starting this function.
- 2 Execute this function to change the NAS server name and then register the Active Directory authentication server again.

Refer to [Set Authentication Server] for procedures on how to delete and re-register the Active Directory authentication server setup information.

Note

- As a factory default NAS server name, "DXyyyyyyyyyy" ("DX" is fixed and "yyyyyyyyyy" indicates the serial number of the storage system) is specified for this storage system.
- To revert back to the default NAS server name, clear the "Name" field and click the [Change] button.

■ User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	✓
StorageAdmin	✓
AccountAdmin	
SecurityAdmin	
Maintainer	✓

Refer to "[A. User Roles and Policies](#)" (page 1580) for details on the policies and roles.

■ Settings

NAS Server Settings

Item	Description	Setting values
Name	Input the NAS server name for the ETERNUS DX S5 series.	Alphanumeric characters and symbols (in the US-ASCII format) The following list shows the available characters: <ul style="list-style-type: none">• 0 (0x30) - 9 (0x39)• A (0x41) - Z (0x5A), a (0x61) - z (0x7A)• A hyphen (0x2D) except as the first and/or the last character Up to 15 characters "DXyyyyyyyyyy" ("DX" is fixed and "yyyyyyyyyy" indicates the serial number of the storage system)

■ Operating Procedures

Procedure ▶▶▶

- 1 Click [Change NAS Server Name] in [Action].
- 2 Enter the name and click the [Change] button.
→ A confirmation screen appears.

Caution

- If the entered name does not satisfy the input conditions, an error screen appears.

- 3 Click the [OK] button.
→ Changing of the NAS server name starts.
- 4 Click the [Done] button to return to the [Environment Settings] screen.

Set DNS Server

- "[■ Overview](#)" (page 904)
- "[■ User Privileges](#)" (page 904)

- ["■ Settings" \(page 904\)](#)
- ["■ Operating Procedures" \(page 905\)](#)

■ Overview

This function sets the Domain Name System (DNS) server that is used for the NAS system. This function is used in a Unified Storage environment.

Caution

- The DNS server settings must be performed before configuring the authentication server.

Note

- To delete the DNS server settings, clear the setting fields and complete the setup.

■ User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	✓
StorageAdmin	✓
AccountAdmin	
SecurityAdmin	
Maintainer	✓

Refer to ["A. User Roles and Policies" \(page 1580\)](#) for details on the policies and roles.

■ Settings

DNS Server Settings

Item	Description	Setting values
Primary IP Address	Input the primary IP address of the DNS server that is used for operation LAN. Specify the IP address with the IPv4 format. Note that the IPv4 address cannot be the same as the secondary IP address.	xxx.xxx.xxx.xxx xxx: 1 - 255 for the top field (decimal) xxx: 0 - 255 for other fields (decimal)
Secondary IP Address	Input the secondary IP address of the DNS server that is used for operation LAN. Specify the IP address with the IPv4 format. Note that the IPv4 address cannot be the same as the primary IP address. When specifying the secondary IP address, the primary IP address settings cannot be omitted.	xxx.xxx.xxx.xxx xxx: 1 - 255 for the top field (decimal) xxx: 0 - 255 for other fields (decimal)

Item	Description	Setting values
IPv6 Primary IP Address	<p>Input the primary IP address of the DNS server that is used for operation LAN. Specify the IP address with the IPv6 format.</p> <p>The following IPv6 addresses can be used; "global address" or "unique local address". Refer to "Available IPv6 Address (page 1221)" for details.</p> <p>When the current setting is displayed, the IPv6 address is displayed as an abbreviation.</p> <p>Note that the IPv6 address cannot be the same as the secondary IP address.</p>	<p>xxxx:xxxx:xxxx:xxxx:xxxx:xxxx:xxxx:xxxx</p> <p>xxxx: 0 - ffff (FFFF) (hexadecimal, alphanumeric characters)</p> <p>Refer to "IPv6 Address Notation (page 1220)" for details.</p>
IPv6 Secondary IP Address	<p>Input the secondary IP address of the DNS server that is used for operation LAN. Specify the IP address with the IPv6 format.</p> <p>The following IPv6 addresses can be used; "global address" or "unique local address". Refer to "Available IPv6 Address (page 1221)" for details.</p> <p>When the current setting is displayed, the IPv6 address is displayed as an abbreviation.</p> <p>Note that the IPv6 address cannot be the same as the primary IP address.</p> <p>When specifying the IPv6 secondary IP address, the IPv6 primary IP address settings cannot be omitted.</p>	<p>xxxx:xxxx:xxxx:xxxx:xxxx:xxxx:xxxx:xxxx</p> <p>xxxx: 0 - ffff (FFFF) (hexadecimal, alphanumeric characters)</p> <p>Refer to "IPv6 Address Notation (page 1220)" for details.</p>

■ Operating Procedures

Procedure ▶▶▶

- 1 Click [Set DNS Server] in [Action].
- 2 Specify parameters, and click the [Modify] button.
→ A confirmation screen appears.

Caution

- An error screen appears in the following conditions:
 - Each parameter fails to satisfy the input conditions
 - The same IPv4 address is specified for the primary IP address and the secondary IP address
 - The same IPv6 address is specified for the IPv6 primary IP address and the IPv6 secondary IP address
 - The secondary IP address is specified but the primary IP address is set with a blank field
 - The IPv6 secondary IP address is specified but the IPv6 primary IP address is set with a blank field

- 3 Click the [OK] button.
→ DNS server setting starts.
- 4 Click the [Done] button to return to the [Environment Settings] screen.



Set Authentication Server

- "[■ Overview](#)" (page 906)
- "[■ User Privileges](#)" (page 907)
- "[■ Settings](#)" (page 907)
- "[■ Operating Procedures](#)" (page 909)

■ Overview

This function sets the Active Directory authentication server and the LDAP authentication server that are used for the NAS function.

By setting the Active Directory authentication server, access to the directories and files for users can be managed with the CIFS protocol. If local user authentication is being used, the local user settings and the local group settings must be deleted in advance.

By setting the LDAP authentication server, access to the directories and files for users can be managed with the NFS protocol.

This function is used in a Unified Storage environment.

Caution

- The NAS interface settings must be completed in advance. Refer to the [Create NAS Interface] function for details.
- Make sure to access the authentication server from both CMs (CM#0 and CM#1) to enable communications in advance.
"Enable communication" indicates that both CMs satisfy all of the following conditions.
 - An IP address is assigned to at least one port. Refer to the [Create NAS Interface] function for details.
 - Communication between the port assigned with an IP address and the authentication server is enabled (the port is in a Link up status). To check the link status, use the [Channel Adapter] function.
- To set a new authentication server, the following information must also be specified; the domain name, the domain administrator, and one or more servers among the three authentication servers.
- Specify the authentication server with an IP address or an FQDN. To specify an authentication server with an FQDN, a DNS server for name resolution is required. The DNS server settings must be performed before configuring the authentication server. Refer to the [Set DNS Server] function for details. Note that the DNS server must be set up to use the Active Directory authentication server. Therefore, to use the Active Directory authentication server, make sure to set the DNS server with the [Set DNS Server] function. If the DNS server is not set, the Active Directory authentication server is temporarily used as a DNS server.
- To use the Active Directory authentication server, time synchronization is required between the storage system and the Active Directory authentication server. Using NTP for automatic time correction is recommended. Refer to the [Modify Date and Time] function for details.
- If the authentication server setup has not been completed successfully, wait for the system status to return to normal and then try again.
- This function cannot be executed if the local user authentication is used. Delete all the local users and local groups before using this function. However, there is no need to delete the BUILTIN groups (or "BUILTIN_Administrators", "BUILTIN_Users", "BUILTIN_BackupOperators").

Note

- To use the CIFS protocol, set the Active Directory authentication server.
- To use the NFS protocol, set the LDAP authentication server.
- To use both the CIFS protocol and the NFS protocol, refer to "Configuration/Operation Guide (NAS)" for details.
- To delete the Active Directory authentication settings, clear all of the setting fields and complete the setup.
- To delete the LDAP authentication settings, clear all of the setting fields and complete the setup.

■ User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	✓
StorageAdmin	✓
AccountAdmin	
SecurityAdmin	
Maintainer	✓

Refer to "[A. User Roles and Policies](#)" (page 1580) for details on the policies and roles.

■ Settings

Active Directory Authentication Settings

Item	Description	Setting values
Domain Name	Input the domain name of the Active Directory authentication server.	Alphanumeric characters and symbols (0x20 - 0x7E in the US-ASCII format) (except the question mark (0x3F) and the backslash (0x5C)) Up to 255 characters
Domain Administrator	Input the administrator name for the Active Directory authentication server management. Caution • If the domain administrator's name is changed, the password must also be changed.	Alphanumeric characters and symbols (0x20 - 0x7E in the US-ASCII format) (except the question mark (0x3F) and the backslash (0x5C)) Up to 255 characters
Change Password	To change the administrator password for the Active Directory authentication server, select the checkbox.	Selected: Change Cleared
Domain Administrator's Password	Input the administrator password for the Active Directory authentication server management. When the domain administrator's password is specified, select the "Change Password" checkbox.	Alphanumeric characters and symbols (0x20 - 0x7E in the US-ASCII format) (except the question mark (0x3F) and the backslash (0x5C)) Up to 255 characters

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Item	Description	Setting values
Confirm Password	Input the same password as the "Domain Administrator's Password" field for the Active Directory authentication server.	Alphanumeric characters and symbols (0x20 - 0x7E in the US-ASCII format) (except the question mark (0x3F) and the backslash (0x5C)) Up to 255 characters
Authentication Server (1)	Input the IPv4 address, the IPv6 address, or the FQDN of the Active Directory authentication server. The following IPv6 addresses can be used; "global address" or "unique local address".	Alphanumeric characters and symbols (in the US-ASCII format) The following list shows the available characters: <ul style="list-style-type: none"> • "0"(0x30) - "9"(0x39) • A (0x41) - Z (0x5A), a (0x61) - z (0x7A) • Hyphen (0x2D), period (0x2E), comma (0x3A) Up to 255 characters
Authentication Server (2)	Input the IPv4 address, the IPv6 address, or the FQDN of the Active Directory authentication server. The following IPv6 addresses can be used; "global address" or "unique local address".	Alphanumeric characters and symbols (in the US-ASCII format) The following list shows the available characters: <ul style="list-style-type: none"> • "0"(0x30) - "9"(0x39) • A (0x41) - Z (0x5A), a (0x61) - z (0x7A) • Hyphen (0x2D), period (0x2E), comma (0x3A) Up to 255 characters
Authentication Server (3)	Input the IPv4 address, the IPv6 address, or the FQDN of the Active Directory authentication server. The following IPv6 addresses can be used; "global address" or "unique local address".	Alphanumeric characters and symbols (in the US-ASCII format) The following list shows the available characters: <ul style="list-style-type: none"> • "0"(0x30) - "9"(0x39) • A (0x41) - Z (0x5A), a (0x61) - z (0x7A) • Hyphen (0x2D), period (0x2E), comma (0x3A) Up to 255 characters

LDAP Authentication Settings

Item	Description	Setting values
Domain Name	Input the domain name of the LDAP authentication server.	Alphanumeric characters and symbols (0x20 - 0x7E in the US-ASCII format) (except the question mark (0x3F) and the backslash (0x5C)) Up to 255 characters
Domain Administrator	Input the administrator name for the LDAP authentication server management. <div style="background-color: #fff9c4; padding: 5px;"> <p>Caution</p> <ul style="list-style-type: none"> • If the domain administrator's name is changed, the password must also be changed. </div>	Alphanumeric characters and symbols (0x20 - 0x7E in the US-ASCII format) (except the question mark (0x3F) and the backslash (0x5C)) Up to 255 characters
Change Password	To change the administrator password for the LDAP authentication server, select the checkbox.	Selected: Change Cleared

Item	Description	Setting values
Domain Administrator's Password	Input the administrator password for the LDAP authentication server management. When the domain administrator's password is specified, select the "Change Password" checkbox.	Alphanumeric characters and symbols (0x20 - 0x7E in the US-ASCII format) (except the question mark (0x3F) and the backslash (0x5C)) Up to 255 characters
Confirm Password	Input the same password as the "Domain Administrator's Password" field for the LDAP authentication server.	Alphanumeric characters and symbols (0x20 - 0x7E in the US-ASCII format) (except the question mark (0x3F) and the backslash (0x5C)) Up to 255 characters
Authentication Server (1)	Input the IPv4 address, IPv6 address, or the FQDN of the LDAP authentication server. The following IPv6 addresses can be used; "global address" or "unique local address".	Alphanumeric characters and symbols (in the US-ASCII format) The following list shows the available characters: <ul style="list-style-type: none"> • "0"(0x30) - "9"(0x39) • A (0x41) - Z (0x5A), a (0x61) - z (0x7A) • Hyphen (0x2D), period (0x2E), comma (0x3A) Up to 255 characters
Authentication Server (2)	Input the IPv4 address, IPv6 address, or the FQDN of the LDAP authentication server. The following IPv6 addresses can be used; "global address" or "unique local address".	Alphanumeric characters and symbols (in the US-ASCII format) The following list shows the available characters: <ul style="list-style-type: none"> • "0"(0x30) - "9"(0x39) • A (0x41) - Z (0x5A), a (0x61) - z (0x7A) • Hyphen (0x2D), period (0x2E), comma (0x3A) Up to 255 characters
Authentication Server (3)	Input the IPv4 address, IPv6 address, or the FQDN of the LDAP authentication server. The following IPv6 addresses can be used; "global address" or "unique local address".	Alphanumeric characters and symbols (in the US-ASCII format) The following list shows the available characters: <ul style="list-style-type: none"> • "0"(0x30) - "9"(0x39) • A (0x41) - Z (0x5A), a (0x61) - z (0x7A) • Hyphen (0x2D), period (0x2E), comma (0x3A) Up to 255 characters

■ Operating Procedures

Procedure ▶▶▶

- 1 Click [Set Authentication Server] in [Action].
- 2 Specify parameters, and click the [Set] button.
→ A confirmation screen appears.

Caution

- An error screen appears in the following conditions:
 - The authentication server information cannot be obtained
 - Each parameter fails to satisfy the input conditions

- 3 Click the [OK] button.
→ Authentication server setting starts.

4 Click the [Done] button to return to the [Environment Settings] screen.



Add Local User

- "[■ Overview](#)" (page 910)
- "[■ User Privileges](#)" (page 910)
- "[■ Settings](#)" (page 911)
- "[■ Operating Procedures](#)" (page 913)

■ Overview

This function adds local users that are used for the local user authentication. For added local users, CIFS access, NFS access, and FTP access to the shared folders are available on a per user basis.

Up to 100 local users can be added in the storage system.

This function is used in a Unified Storage environment.

Caution

- This function cannot be executed if an Active Directory authentication server or an LDAP authentication server is used. Remove all the authentication servers before using this function.
- This function cannot be executed if the port for changing the local user authentication password is in the open state.
Use the "set nas-port" CLI command to open and close the port for changing the local user authentication password. Use the "show nas-port" CLI command to check the port status. Refer to "ETERNUS CLI User's Guide" for details about each command.

Note

- Local users can be deleted. Refer to the [Delete Local User] function for details.
- The password for a local user and the groups (primary and secondary groups) to which the local user belongs can be changed. Refer to the [Modify Local User] function for details.
- Create local groups to which local users belong. Refer to the [Add Local Group] function for details.

■ User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	✓
StorageAdmin	✓
AccountAdmin	
SecurityAdmin	
Maintainer	✓

Refer to "["A. User Roles and Policies"](#) (page 1580)" for details on the policies and roles.

■ Settings

Local User Settings

Item	Description	Setting values
Name	<p>Enter a local user name.</p> <p>Caution</p> <ul style="list-style-type: none"> An existing local user name cannot be used. The user name that has been registered for logging in to the NAS engine (for FTP) cannot be used. <p>The user name for logging in to the NAS engine is created with the "create nas-engine-user" CLI command.</p> <ul style="list-style-type: none"> Entered letters are not case-sensitive. 	<p>Up to 32 alphanumeric characters and symbols (in the US-ASCII format)</p> <ul style="list-style-type: none"> A hyphen (0x2D), an underscore (0x5F), and a dollar sign (0x24) can be used. Alphanumeric characters or an underscore (0x5F) can be used for the first character. A dollar sign (0x24) can only be used for the last character. The following reserved words cannot be used. "adm", "audio", "bin", "cdrom", "daemon", "dbus", "dialout", "disk", "floppy", "ftp", "games", "gluster", "halt", "input", "kmem", "ldap", "lock", "lp", "mail", "man", "mem", "nfsnobody", "nobody", "nscd", "nslcd", "ntp", "operator", "oprofile", "polkitd", "root", "rpc", "rpcuser", "shutdown", "ssh_keys", "sshd", "sync", "sys", "systemd-journal", "systemd-network", "tape", "tcpdump", "tss", "tty", "users", "utempter", "utmp", "video", and "wheel"
User ID	<p>Enter a local user ID for the local user.</p> <p>If this item is omitted, an unused number is assigned in ascending order starting from "500".</p> <p>Caution</p> <ul style="list-style-type: none"> If "shareuser\$" is entered for "Name", only "450" can be set for this item. An existing user ID cannot be used. 	<p>450</p> <p>500 - 999</p>
Password	Enter a password for the local user.	8 - 32 alphanumeric characters and symbols (0x20 - 0x7E in the US-ASCII format)
Confirm new Password	Input the same character string as the value entered in the "New Password" field for confirmation.	8 - 32 alphanumeric characters and symbols (0x20 - 0x7E in the US-ASCII format)

[Primary Group] Tab

A list of local groups registered in the storage system that can be used as primary groups is displayed. Select a primary group to which the added local user will belong.

Item	Description	Setting values
Radio buttons to select a primary group	Select a radio button for primary group to which the local user will belong. Caution <ul style="list-style-type: none"> The same group as the secondary group cannot be selected. 	Primary Group Selected Cleared Or select "sharegroup\$" (default).
ID	The group ID for the primary group is displayed. <ul style="list-style-type: none"> For "shareuser\$" 450 For "sharegroup\$" 451 500 - 999	
Name	The group name for the primary group is displayed. Local group name	
User(s) who belongs to a Primary Group	The local user names that belong to the primary group are displayed. If no local users belong to the primary group, a "-" (hyphen) is displayed.	

[Secondary Group] Tab

A list of local groups registered in the storage system that can be used as secondary groups is displayed. Select secondary groups to which the added local user will belong. Multiple secondary groups can be selected.

Item	Description
Checkbox to select a secondary group	Select the checkboxes for the secondary groups to which the local user will belong. The local user can belong to a maximum of 16 groups or the local user may not belong to any secondary group. Caution <ul style="list-style-type: none"> The same group as the primary group cannot be selected.
ID	The group ID for the secondary group is displayed. For details about group IDs for secondary groups that are automatically created in the storage system, refer to " Special Group ". 450 451 500 - 999 1002 1003 1004
Name	The group name for the secondary group is displayed. For details about group name for secondary groups that are automatically created in the storage system, refer to " Special Group ". BUILTIN_Administrators BUILTIN_Users BUILTIN_BackupOperators Local group name

Item	Description
User(s) who belongs to a Secondary Group	The local user names that belong to the secondary group are displayed. If no local users belong to the secondary group, a "-" (hyphen) is displayed.

Special Group (Affiliation possible: ✓, Affiliation not possible: -)

Local group ID	Local group name	Description	Available groups	
			Primary group	Secondary group
1002	BUILTIN Administrators	One of the BUILTIN groups (*1). Users who belong to this group can execute all operations for all domain controllers within the domain.	-	✓
1003	BUILTIN Users	One of the BUILTIN groups (*1). Users who belong to this group can execute most of the general operations.	-	✓
1004	BUILTIN BackupOperators	One of the BUILTIN groups (*1). Users who belong to this group can perform file backups and file recoveries regardless of the access permissions for all the files of domain controllers within the domain.	-	✓

*1: "BUILTIN groups" are groups that are included in the storage system as standard. If local users belong to these groups, the backup and restore function of Arcserve can be used.

■ **Operating Procedures**

Procedure ▶▶▶

- 1 Click [Add Local User] in [Action].
- 2 Specify parameters, and click the [Add] button.
→ A confirmation screen appears.

Caution

- An error screen appears in the following conditions:
 - Each parameter fails to satisfy the input conditions
 - "Password" does not match "Confirm Password"
 - The number of selected secondary groups exceeds the maximum number per local user
 - The total number of local users has reached the maximum number of local users for the storage system

- 3 Click the [OK] button.
→ Addition of the local user starts.
- 4 Click the [Done] button to return to the [Environment Settings] screen.



Delete Local User

- ["■ Overview" \(page 914\)](#)
- ["■ User Privileges" \(page 914\)](#)
- ["■ Operating Procedures" \(page 914\)](#)

■ Overview

This function deletes the local user.
One local user can be deleted at a time.
This function is used in a Unified Storage environment.

Caution

- A local user that is currently accessing the shared folder cannot be deleted.
- This function cannot be used to delete a home directory that belongs to the deletion target local user. To delete home directories, use the [Delete Shared Folder] function.
- This function cannot be executed if the port for changing the local user authentication password is in the open state.

■ User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	✓
StorageAdmin	✓
AccountAdmin	
SecurityAdmin	
Maintainer	✓

Refer to "[A. User Roles and Policies](#)" (page 1580) for details on the policies and roles.

■ Operating Procedures

Procedure ▶▶▶

- 1 Select the local user that is to be deleted, and click [Delete Local User] in [Action].
→ A confirmation screen appears.
- 2 Click the [OK] button.
→ The local user deletion starts.
- 3 Click the [Done] button to return to the [Environment Settings] screen.



Modify Local User

- "[■ Overview](#)" (page 914)
- "[■ User Privileges](#)" (page 915)
- "[■ Settings](#)" (page 915)
- "[■ Operating Procedures](#)" (page 917)

■ Overview

This function changes the password and groups of the local user.
One local user can be modified at a time.
This function is used in a Unified Storage environment.

Caution

- "Name" and "User ID" of the existing local users cannot be changed. To change "Name" or "User ID", delete the relevant local user and then create it again.
- This function cannot be executed if the port for changing the local user authentication password is in the open state.

■ **User Privileges**

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	✓
StorageAdmin	✓
AccountAdmin	
SecurityAdmin	
Maintainer	✓

Refer to "[A. User Roles and Policies](#)" (page 1580) for details on the policies and roles.

■ **Settings**

Local User Settings

Item	Description	Setting values
Name	The local user name is displayed.	
User ID	The user ID of the local user is displayed. 450 500 - 999	
Change Password	Only when changing the password, select the "Change Password" checkbox. When the "Change Password" checkbox is selected, enter a new password in "Password" and "Confirm Password".	"Change Password" checkbox Selected Cleared
Password	Enter a password for the local user.	8 - 32 alphanumeric characters and symbols (0x20 - 0x7E in the US-ASCII format)
Confirm new Password	Input the same character string as the value entered in the "New Password" field for confirmation.	8 - 32 alphanumeric characters and symbols (0x20 - 0x7E in the US-ASCII format)

[Primary Group] Tab

A list of local groups registered in the storage system that can be used as primary groups is displayed. Select a primary group to which the added local user will belong.

6. Connectivity
NAS

Item	Description
Radio buttons to select a primary group	<p>The radio button for the primary group to which the specified local user currently belongs is selected. To change the primary group, select the radio button for the primary group to which the local user will belong.</p> <p>Caution</p> <ul style="list-style-type: none"> The same group as the secondary group cannot be selected.
ID	<p>The group ID for the primary group is displayed.</p> <p>For details about group IDs for primary groups that are automatically created in the storage system, refer to "Special Group".</p> <p>450 451 500 - 999</p>
Name	<p>The group name for the primary group is displayed.</p> <p>For details about group name for primary groups that are automatically created in the storage system, refer to "Special Group".</p> <p>Local group name</p>
User(s) who belongs to a Primary Group	<p>The local user names that belong to the primary group are displayed.</p> <p>If no local users belong to the primary group, a "-" (hyphen) is displayed.</p>

[Secondary Group] Tab

A list of local groups registered in the storage system that can be used as secondary groups is displayed. Select secondary groups to which the added local user will belong. Multiple secondary groups can be selected.

Item	Description
Checkbox to select a secondary group	<p>The checkboxes for the secondary group to which the specified local user currently belongs are selected. To change the secondary group, select the checkboxes for the secondary groups to which the local user will belong and clear checkboxes for the secondary groups to which the local user will not belong. The local user can belong to a maximum of 16 groups or the local user may not belong to any secondary group.</p> <p>Caution</p> <ul style="list-style-type: none"> The same group as the primary group cannot be selected.
ID	<p>The group ID for the secondary group is displayed.</p> <p>For details about group IDs for secondary groups that are automatically created in the storage system, refer to "Special Group".</p> <p>450 451 500 - 999 1002 1003 1004</p>

Item	Description
Name	The group name for the secondary group is displayed. For details about group name for secondary groups that are automatically created in the storage system, refer to " Special Group ". BUILTIN_Administrators BUILTIN_Users BUILTIN_BackupOperators Local group name
User(s) who belongs to a Secondary Group	The local user names that belong to the secondary group are displayed. If no local users belong to the secondary group, a "-" (hyphen) is displayed.

Special Group (Affiliation possible: ✓, Affiliation not possible: -)

Local group ID	Local group name	Description	Available groups	
			Primary group	Secondary group
1002	BUILTIN_Administrators	One of the BUILTIN groups (*1). Users who belong to this group can execute all operations for all domain controllers within the domain.	-	✓
1003	BUILTIN_Users	One of the BUILTIN groups (*1). Users who belong to this group can execute most of the general operations.	-	✓
1004	BUILTIN_BackupOperators	One of the BUILTIN groups (*1). Users who belong to this group can perform file backups and file recoveries regardless of the access permissions for all the files of domain controllers within the domain.	-	✓

*1: "BUILTIN groups" are groups that are included in the storage system as standard. If local users belong to these groups, the backup and restore function of Arcserve can be used.

■ **Operating Procedures**

Procedure ▶▶▶

- 1 Select the local user that is to be modified, and click [Modify Local User] in [Action].
- 2 Specify the parameters, and click the [Modify] button.
→ A confirmation screen appears.

Caution

- An error screen appears in the following conditions:
 - Each parameter fails to satisfy the input conditions
 - The "Change Password" checkbox is selected and "Password" and/or "Confirm Password" is not entered
 - The "Change Password" checkbox is selected and "Password" does not match "Confirm Password"
 - The number of selected secondary groups exceeds the maximum number per local user

- 3 Click the [OK] button.
→ Modification of the local user settings starts.

- 4 Click the [Done] button to return to the [Environment Settings] screen.



Add Local Group

- "[■ Overview](#)" (page 918)
- "[■ User Privileges](#)" (page 918)
- "[■ Settings](#)" (page 919)
- "[■ Operating Procedures](#)" (page 920)

■ Overview

This function adds local groups to which the local users belong.

For added local groups, CIFS access, NFS access, and FTP access to the shared folders are available on a per group basis.

Up to 100 local groups can be added in the storage system.

This function is used in a Unified Storage environment.

Caution

- This function cannot be executed if an Active Directory authentication server or an LDAP authentication server is used. Remove all the authentication servers before using this function.
- "Name" and "Group ID" of the existing local groups cannot be changed. To change "Name" or "Group ID", delete the relevant local group and then create it again.
- Note that this function cannot be used to create the following special groups because these groups are automatically created by the storage system. Special groups are included in the maximum number of groups.
 - BUILTIN_Admistrators
 - BUILTIN_Users
 - BUILTIN_BackupOperators
- This function cannot be executed if the port for changing the local user authentication password is in the open state.
Use the "set nas-port" CLI command to open and close the port for changing the local user authentication password. Use the "show nas-port" CLI command to check the port status. Refer to "ETERNUS CLI User's Guide" for details about each command.

Note

- Local groups can be deleted. Refer to the [Delete Local Group] function for details.
- Local users are registered to the local group. Refer to the [Add Local User] function for details.

■ User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	✓
StorageAdmin	✓
AccountAdmin	

Default role	Availability of executions
SecurityAdmin	
Maintainer	✓

Refer to "[A. User Roles and Policies](#)" (page 1580) for details on the policies and roles.

■ Settings

Local Group Settings

Item	Description	Setting values
Name	<p>Enter a local group name.</p> <p>Caution</p> <ul style="list-style-type: none"> An existing local group name cannot be used. The user name that has been registered for logging in to the NAS engine (for FTP) cannot be used. The user name for logging in to the NAS engine is created with the "create nas-engine-user" CLI command. Entered letters are not case-sensitive. Local group names that consist of only numbers cannot be used. 	<p>Up to 32 alphanumeric characters and symbols (in the US-ASCII format)</p> <ul style="list-style-type: none"> A hyphen (0x2D), an underscore (0x5F), and a dollar sign (0x24) can be used. Alphanumeric characters or an underscore (0x5F) can be used for the first character. A dollar sign (0x24) can only be used for the last character. The following reserved words cannot be used. "adm", "audio", "bin", "cdrom", "daemon", "dbus", "dialout", "disk", "floppy", "ftp", "games", "gluster", "halt", "input", "kmem", "ldap", "lock", "lp", "mail", "man", "mem", "nfsnobody", "nobody", "nscd", "nslcd", "ntp", "operator", "oprofile", "polkitd", "root", "rpc", "rpcuser", "shutdown", "ssh_keys", "sshd", "sync", "sys", "systemd-journal", "systemd-network", "tape", "tcpdump", "tss", "tty", "users", "utempter", "utmp", "video", and "wheel" The following special group names cannot be used. "BUILTIN_Admistrators", "BUILTIN_Users", "BUILTIN_BackupOperators"
Group ID	<p>Enter a local group ID for the local group. If this item is omitted, an unused number is assigned in ascending order starting from "500".</p> <p>Caution</p> <ul style="list-style-type: none"> If "shareuser\$" is entered for "Name", only "450" can be set for this item. An existing group ID cannot be used. 	<p>450 500 - 999</p>

■ Operating Procedures

Procedure ▶▶▶

- 1 Click [Add Local Group] in [Action].
- 2 Specify parameters, and click the [Add] button.
→ A confirmation screen appears.

Caution

- An error screen appears in the following conditions:
 - Each parameter fails to satisfy the input conditions
 - The total number of local groups has reached the maximum number of local groups for the storage system

- 3 Click the [OK] button.
→ Addition of the local group starts.
- 4 Click the [Done] button to return to the [Environment Settings] screen.



Delete Local Group

- "[■ Overview](#)" (page 920)
- "[■ User Privileges](#)" (page 921)
- "[■ Operating Procedures](#)" (page 921)

■ Overview

This function deletes the local group.
One local group can be deleted at a time.
This function is used in a Unified Storage environment.

Caution

- This function cannot be executed if the port for changing the local user authentication password is in the open state.
- The following local groups cannot be deleted.
 - A local group that is specified as the primary group of a local user
 - BUILTIN_Administrators
 - BUILTIN_Users
 - BUILTIN_BackupOperators

Note

- If a local group is used as a secondary group for the local users, that local group is deleted from the secondary group.

■ User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	✓
StorageAdmin	✓
AccountAdmin	
SecurityAdmin	
Maintainer	✓

Refer to "[A. User Roles and Policies](#)" (page 1580) for details on the policies and roles.

■ Operating Procedures

Procedure ▶▶▶

- 1 Select the local group that is to be deleted, and click [Delete Local Group] in [Action].
→ A confirmation screen appears.
- 2 Click the [OK] button.
→ The local group deletion starts.
- 3 Click the [Done] button to return to the [Environment Settings] screen.



Quota Management

- "[■ Overview](#)" (page 921)
- "[■ User Privileges](#)" (page 922)
- "[■ Display Contents](#)" (page 922)
- "[■ Filter Setting](#)" (page 925)

■ Overview

The list of quota setting information is displayed.

Quota is a function that limits drive space or the number of files used on a NAS user volume or a shared folder to prevent the depletion of resources in the storage system. There are two types of thresholds ("Warning" and "Limit").

This function is displayed in a Unified Storage environment.

Caution

- Quotas for NAS user volumes are set for users or groups that are registered in the authentication server. When using this function, registering the users or groups in the authentication server in advance is necessary.
- Quotas for shared folders are set for shared folders that are registered in the storage system. Create the shared folders in advance. Refer to the [Create Shared Folder] function for details.

Note

- A unified upgrade is necessary for a storage system that will be used in a Unified Storage environment if it was previously used in a SAN environment. Refer to the [Register Unified Storage License] function and the [Apply Controller Firmware] function for details. This function is added in the category after the unified upgrade is complete.
- Shared folders include home directories.

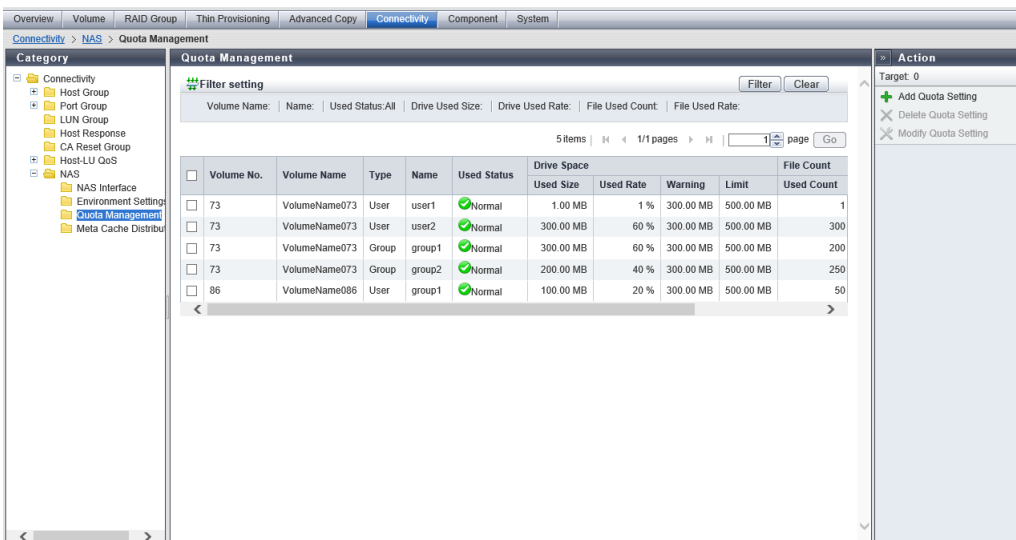
User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	✓
Admin	✓
StorageAdmin	✓
AccountAdmin	
SecurityAdmin	✓
Maintainer	✓

Refer to "A. User Roles and Policies" (page 1580) for details on the policies and roles.

Display Contents











In this screen, the quota setting information is displayed.

Quota Setting Information List

Item	Description
Volume No.	The volume number of the quota setting target volume is displayed.
Volume Name	The name of the quota setting target volume is displayed.

6. Connectivity
NAS

Item	Description
Type	<p>The quota target type is displayed.</p> <p>User Group Share</p>
Name	<p>The quota target user name, group name, or shared folder name is displayed.</p> <p>For the home directory, "homes" is displayed for this item.</p>
Used Status	<p>The use state for the quota target drive space or file count is displayed.</p> <p>If the drive space use state and the file count use state do not match, the use state is displayed according to the priority.</p> <ul style="list-style-type: none"> •  Normal Normal status (The usage is below the warning value. If the warning value is not specified, the usage is below the limit value.) •  Warning The usage has exceeded the warning value but is below the limit value. •  Exceeded The usage has exceeded the limit value. •  Unknown Other than above. <p>The priority for the use state is " Unknown" > " Exceeded" > " Warning" > " Normal".</p>

6. Connectivity
NAS

Item		Description
Drive Space	Used Size	<p>The current drive usage amount [TB/GB/MB] is displayed.</p> <p>If no quota target user or group is registered in the authentication server, or if the usage amount cannot be obtained, a "-" (hyphen) is displayed.</p> <div style="background-color: #f0f0f0; padding: 5px;"> <p>Note</p> <ul style="list-style-type: none"> The usage amount is displayed with the largest unit (TB/GB/MB) after rounding off to two decimal places. For example, if the usage amount in the storage system is "1572864000 KB", "1.46 TB" is displayed. </div>
	Used Rate	<p>The usage rate (0 to 100 %) of the drive usage limit value is displayed.</p> <p>Used Rate = Used Size ÷ Limit</p> <p>A "-" (hyphen) is displayed in the following conditions:</p> <ul style="list-style-type: none"> The limit value is not specified No quota target user or group is registered in the authentication server The used size cannot be obtained <div style="background-color: #f0f0f0; padding: 5px;"> <p>Note</p> <ul style="list-style-type: none"> For the used rate, the result of the division is rounded up to two decimal places. If the used rate is larger than "0" but smaller than or equal to "1", "1 %" is displayed. </div>
	Warning	<p>The warning value [TB/GB/MB] for the drive space is displayed.</p> <p>If not specified, "Not Specified" is displayed. If the warning value cannot be obtained, a "-" (hyphen) is displayed.</p> <div style="background-color: #f0f0f0; padding: 5px;"> <p>Note</p> <ul style="list-style-type: none"> The warning value is displayed with the largest unit (TB/GB/MB) after rounding off to two decimal places. Refer to the remarks of "Used Size" for details. </div>
	Limit	<p>The limit value [TB/GB/MB] for the drive space is displayed.</p> <p>If not specified, "Not Specified" is displayed. If the warning value cannot be obtained, a "-" (hyphen) is displayed.</p> <div style="background-color: #f0f0f0; padding: 5px;"> <p>Note</p> <ul style="list-style-type: none"> The limit value is displayed with the largest unit (TB/GB/MB) after rounding off to two decimal places. Refer to the remarks of "Used Size" for details. </div>

Item		Description
File Count	Used Count	The current file count is displayed. If no quota target user or group is registered in the authentication server, or if the used count cannot be obtained, a "-" (hyphen) is displayed.
	Used Rate	The usage rate (0 to 100 %) of the file count limit value is displayed. Used Rate = Used Count ÷ Limit A "-" (hyphen) is displayed in the following conditions: <ul style="list-style-type: none"> • The limit value is not specified • No quota target user or group is registered in the authentication server • The used count cannot be obtained <div style="border: 1px solid #ccc; background-color: #f9f9f9; padding: 5px; margin-top: 10px;"> <p>Note</p> <ul style="list-style-type: none"> • For the used rate, the result of the division is rounded up to two decimal places. If the used rate is larger than "0" but smaller than or equal to "1", "1 %" is displayed. </div>
	Warning	The warning value for the file count is displayed. If not specified, "Not Specified" is displayed. If the warning value cannot be obtained, a "-" (hyphen) is displayed.
	Limit	The current limit value for the file count is displayed in the numeric characters. If not specified, "Not Specified" is displayed. If the warning value cannot be obtained, a "-" (hyphen) is displayed.

■ Filter Setting

Function Description

Filter setting is a function used to display a list of only the quota setting information satisfying all the specified conditions.

No filtering is set by default. The following table shows conditions that can be specified.

Item	Description	Setting values
Volume Name	Input the volume name that is to be displayed. When not using the volume name for filtering, leave this item blank.	Volume name Blank
Name	Input the user name, group name, shared folder name of the quota target that is to be displayed, or "homes". When not using the name for filtering, leave this item blank.	User name Group name Shared folder name "homes" Blank
Used Status	Select the used state that is to be displayed.	All Normal Warning Exceeded Unknown
Drive Space	Input the used size of the drive that is to be displayed. The quota setting information is displayed if the drive used size is larger than or equal to the specified value. When not using the drive used size for filtering, leave this item blank.	Up to 10-digit decimal number Unit [TB/GB/MB] 0
Drive Used Rate	Input the used rate of the drive that is to be displayed. The quota setting information is displayed if the drive usage rate is larger than or equal to the specified value. When not using the drive used rate for filtering, leave this item blank.	Up to 3-digit decimal number Blank

Item	Description	Setting values
File Used Count	Input the number of used files that is to be displayed. The quota setting information is displayed if the number of used files is greater than or equal to the specified value. When not using the file used count for filtering, leave this item blank.	Up to 10-digit decimal number Blank
File Used Rate	Input the used rate for the file that is to be displayed. The quota setting information is displayed if the file usage rate is larger than or equal to the specified value. When not using the file used rate for filtering, leave this item blank.	Up to 3-digit decimal number Blank

Add Quota Setting

- ["■ Overview" \(page 926\)](#)
- ["■ User Privileges" \(page 928\)](#)
- ["■ Settings" \(page 928\)](#)
- ["■ Operating Procedures" \(page 931\)](#)

■ Overview

This function adds a new quota setting information. Drive space and file count thresholds (Warning and Limit) can be set.

Quota is a function that limits drive space or the number of files used on a NAS user volume or a shared folder to prevent the depletion of resources in the storage system.

This function is displayed in a Unified Storage environment.

Maximum Quota Setting Information for Each Model

Model	Maximum quota setting information (*1)
ETERNUS DX100 S5	5000
ETERNUS DX200 S5	10000
ETERNUS DX500 S5	15000
ETERNUS DX600 S5	20000

*1: The maximum number of quota setting information for this function may be less in some operating environments.

Caution

- Quotas for NAS user volumes are set for users or groups that are registered in the authentication server. When using this function, registering the users or groups in the authentication server in advance is necessary.
- Quotas for shared folders are set for shared folders that are registered in the storage system. Create the shared folders in advance. Refer to the [Create Shared Folder] function for details.
- To configure the quota information for each shared folder to which the NAS user volume belongs where the NAS FS version is "2", "3", or "4", updating the file system version and reconfiguring the file system information are required. Perform the following procedure before setting the quota using this function.

Procedure ▶▶▶

- 1** Unmount CIFS and NFS from the client.
- 2** Use the [Reconfigure NAS Volume] function to reconfigure the relevant NAS user volume. The NAS FS version is changed to "5".
- 3** Unmount the relevant NAS user volume with the "forced nas-fsunmount" CLI command.
- 4** Create quota information on the file system with the "start nas-fsck" CLI command. (Select "repair" or "force-repair" for the "mode" parameter.)
- 5** Mount the relevant NAS user volume again with the "forced nas-fsmount" CLI command.

Refer to "ETERNUS CLI User's Guide" for details about each command.

- When inconsistencies in the quota information occur, restore the quota information by executing the "start nas-fsck" CLI command.
Refer to "ETERNUS CLI User's Guide" for details.
- This function sets thresholds (Warning, Limit, or both Warning and Limit) for the drive space or the file count.
 - When exceeding the warning threshold
This is a predictive notification and writing to the relevant NAS user volume is not prohibited.
 - When exceeding the limit threshold
Writing to the relevant NAS user volume is prohibited.
- In each NAS user volume, add a quota setting information to multiple users, groups, and shared folders. Note that the maximum number of quota setting information that can be added in a single operation (by clicking the [Add] button on the bottom of the screen) is 100 regardless of the operating environment.
- When deleting NAS user volumes, quota setting information assigned to that volume is also deleted at the same time.
- When deleting shared folders, quota setting information assigned to that shared folder is also deleted at the same time.

Note

- Event notifications for the conditions described below can be sent using the specified method. Refer to the [Setup Event Notification] function for details.
 - The drive space or the file count has exceeded the threshold
 - The drive space or the file count has returned to a normal state below the threshold value
- The quota setting information in the storage system can be checked. Refer to the [Quota Management] function for details.
- The quota setting information in the storage system can be changed. Refer to the [Modify Quota Setting] function for details.
- The quota setting information in the storage system can be deleted. Refer to the [Delete Quota Setting] function for details.
- The "NAS FS Version" for the NAS user volume can be checked in the [Volume Detail] screen. Refer to the [Volume (Basic Information)] function for details.
- Shared folders include home directories.

■ **User Privileges**

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	✓
StorageAdmin	✓
AccountAdmin	
SecurityAdmin	
Maintainer	✓

Refer to "A. User Roles and Policies" (page 1580) for details on the policies and roles.

■ **Settings**

The list of NAS user volumes registered in the storage system is displayed. Select a NAS user volume to apply the quota setting.
If no NAS user volume exists in the storage system, [Select Volume] is not displayed.

Select Volume

Item	Description	Setting values
Radio buttons to select a NAS user volume	<p>Select a quota target NAS user volume.</p> <p>Note</p> <ul style="list-style-type: none"> When performing a quota setting for the shared folder, if the NAS user volume to which the relevant shared folder belongs is unknown, skip the selection of the NAS user volume. <p>Caution</p> <ul style="list-style-type: none"> If "Share" is selected for "Type" in the [Add Quota Target] screen, a radio button becomes available for the NAS user volume where the relevant shared folder belongs. In this case, other NAS user volumes cannot be selected. 	<p>Radio button</p> <p>The default value varies depending on the number of NAS user volumes registered in the storage system.</p> <ul style="list-style-type: none"> If only one NAS user volume exists, the relevant volume is selected If two or more NAS user volumes exist, no volumes are selected
No.	The NAS user volume number is displayed.	
Name	The NAS user volume name is displayed.	
Total Capacity	The total capacity (400.00 GB to 128.00 TB) of the NAS user volume is displayed.	

Quota Target

The settings that are specified in the [Add Quota Target] screen are displayed. Each line in the quota target list is equivalent to one quota setting information. Up to 100 lines of quota setting information can be added at the same time. If no quota setting information is registered, only the item names are displayed.

Item	Description
Checkbox to select a quota setting information	<p>Select a quota setting information to be deleted.</p> <p>Only the quota setting information that was added can be deleted. Multiple quota setting information can be selected at the same time.</p>
Type	<p>The quota target type is displayed.</p> <p>Click this item to display the [Edit Quota Target] screen.</p> <p>User Group Share</p>
Name	<p>The quota target user name, group name, or shared folder name is displayed.</p> <p>For the home directory, "homes" is displayed for this item.</p>

Item		Description
Drive Space	Warning	The warning value [MB/GB/TB] for the use of the quota target drive is displayed. If not specified, "Not Specified" is displayed. Note <ul style="list-style-type: none"> The warning value entered by the user is displayed with the largest unit (TB/GB/MB) after rounding off to two decimal places. For example, if the entered warning value is "1500 GB", "1.46 TB" is displayed.
	Limit	The limit value [MB/GB/TB] for the use of the quota target drive is displayed. If not specified, "Not Specified" is displayed. Note <ul style="list-style-type: none"> The limit value entered by the user is displayed with the largest unit (TB/GB/MB) after rounding off to two decimal places. Refer to the "Warning" remarks for details.
File Count	Warning	The warning value for the number of quota target files is displayed in the numeric characters. If not specified, "Not Specified" is displayed.
	Limit	The limit value for the number of quota target files is displayed in the numeric characters. If not specified, "Not Specified" is displayed.

Function Button

Button	Description
[Add]	Adds new quota setting information. The [Add] button cannot be clicked under the following conditions: <ul style="list-style-type: none"> The total number of quota setting information to be added exceeds 100 lines The total number of existing quota setting information and quota setting information to be added exceeds the maximum number of information for each model
[Delete]	Deletes the quota setting information that was selected with the checkbox. If no quota setting information is added, the [Delete] button cannot be clicked.

[Add Quota Target] or [Edit Quota Target] Screen

In this screen, add or edit the quota setting information for the selected NAS user volume. When the [Type] link is clicked to proceed to the [Edit Quota Target] screen, the items that were previously set are displayed.

Item	Description	Setting values
Type	Select a type for the quota target.	User Group Share

Item	Description		Setting values
Name	<p>If "User" or "Group" is selected for the quota target type, enter the user name or the group name of the quota target.</p> <p>If "Share" is selected for the quota target type, select the shared folder name of the quota target.</p> <div style="background-color: #f0f0f0; padding: 5px;"> <p>Note</p> <ul style="list-style-type: none"> If the NAS user volume is selected in the initial screen, only the shared folders that belong to the relevant NAS user volume are displayed as options. If the NAS user volume is not selected, all the shared folders that are registered in the storage system are displayed as options. </div>		<ul style="list-style-type: none"> If "User" or "Group" is selected for the quota target type Alphanumeric characters and symbols (0x20 - 0x7E in the US-ASCII format) (except the question mark (0x3F) and the at sign (0x40)) Up to 255 characters If "Share" is selected for the quota target type Shared Folder Name homes
Drive Space	Warning	<p>Enter the warning value for the drive usage in the quota target.</p> <p>If "0" is entered or no values are specified, "Not Specified" (unlimited) is registered in the storage system.</p>	0 - 128 TB Unit [MB/GB/TB]
	Limit	<p>Enter the limit value for the drive usage in the quota target.</p> <p>If "0" is entered or no values are specified, "Not Specified" (unlimited) is registered in the storage system.</p> <div style="background-color: #fff9c4; padding: 5px;"> <p>Caution</p> <ul style="list-style-type: none"> If both the warning and limit values are specified, the limit value must be larger than the warning value. </div>	0 - 128 TB Unit [MB/GB/TB]
File Count	Warning	<p>Enter the warning value for the number of files in the quota target.</p> <p>If "0" is entered, "Not Specified" (unlimited) is registered in the storage system</p>	0 (Default) - 134217723
	Limit	<p>Enter the limit value for the number of files in the quota target.</p> <p>If "0" is entered, "Not Specified" (unlimited) is registered in the storage system</p> <div style="background-color: #fff9c4; padding: 5px;"> <p>Caution</p> <ul style="list-style-type: none"> If both the warning and limit values are specified, the limit value must be larger than the warning value. </div>	0 (Default) - 134217723

■ Operating Procedures

Procedure ▶▶▶

1 Click [Add Quota Setting] in [Action].

Note

- When performing a quota setting for the shared folder, if the NAS user volume to which the relevant shared folder belongs is unknown, proceed to Step 3.

2 Select a NAS user volume to add a quota setting information.

- 3 Click the [Add] button on the bottom right of the quota target list.
→ The "[Add Quota Target] or [Edit Quota Target] Screen" (page 930) appears.

Note

- When a NAS user volume is not selected in the initial screen and "Share" is selected for "Type" in the [Add Quota Target] screen, all the shared folders that are registered in the storage system are displayed as options for "Name".

- 4 Input or edit the Quota setting information, and click the [OK] button.
→ The display returns to the initial screen.

Note

- By re-clicking the [Add] button on the bottom right of the quota target list in the initial screen, the quota setting information that was specified previously is displayed in the [Add Quota Target] screen.
- If the [Type] link for the added quota setting information is clicked, the "[Add Quota Target] or [Edit Quota Target] Screen" (page 930) is displayed. The quota setting information can be edited in the displayed screen.
- When deleting the added quota setting information from the quota target list, select the relevant quota setting information, and click the [Delete] button.

Caution

- A total of four threshold values can be set (two for the drive space and two for the file count) in a single quota setting information (for each line in the quota target list). However, specifying "0" for all the thresholds (which includes changing the drive space value to "Not Specified") is not allowed. At least one threshold must have a valid value.
- An error screen appears in the following conditions:
 - The "Name" is not entered (when "User" or "Group" is selected for the quota target type)
 - The "Name" does not satisfy the input conditions (when "User" or "Group" is selected for the quota target type)
 - The quota setting information with the same "Type" and "Name" already exists
 - The "Warning" or "Limit" does not satisfy the input conditions

- 5 To set multiple quota settings for the selected NAS user volume, repeat Step 3 and Step 4.

- 6 Click the [Add] button.
→ A confirmation screen appears.

Caution

- An error screen appears in the following conditions:
 - A NAS user volume for setting the quota is not selected
 - Quota targets do not exist
 - A quota setting information with the same "NAS user volume", the same "Type" of quota target, and the same "Name" of the quota target already exists

- 7 Click the [OK] button.
→ Adding of the quota setting starts.

- 8 Click the [Done] button to return to the [Quota Management] screen.



Delete Quota Setting

- "[■ Overview](#)" (page 933)
- "[■ User Privileges](#)" (page 933)
- "[■ Operating Procedures](#)" (page 933)

■ Overview

This function deletes the quota setting information.
This function is displayed in a Unified Storage environment.

Note

- This function can also delete the quota setting information for home directories.

■ User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	✓
StorageAdmin	✓
AccountAdmin	
SecurityAdmin	
Maintainer	✓

Refer to "[A. User Roles and Policies](#)" (page 1580) for details on the policies and roles.

■ Operating Procedures

Procedure ▶▶▶

- 1 Select the quota setting information that is to be deleted (multiple selections can be made) and click [Delete Quota Setting] in [Action].
→ A confirmation screen appears.
- 2 Click the [OK] button.
→ Deletion of the quota setting starts.
- 3 Click the [Done] button to return to the [Quota Management] screen.



Modify Quota Setting

- "[■ Overview](#)" (page 934)
- "[■ User Privileges](#)" (page 934)
- "[■ Settings](#)" (page 935)
- "[■ Display Contents](#)" (page 936)

- "[Operating Procedures](#)" (page 938)

■ Overview

This function changes the quota setting information. Drive space and file count thresholds (Warning and Limit) can be changed.

Quota is a function that limits drive space or the number of files used on a NAS user volume or a shared folder to prevent the depletion of resources in the storage system.

This function is displayed in a Unified Storage environment.

Caution

- Quotas for NAS user volumes are set for users or groups that are registered in the authentication server. When using this function, registering the users or groups in the authentication server in advance is necessary.
- Quotas for shared folders are set for shared folders that are registered in the storage system. Create the shared folders in advance. Refer to the [Create Shared Folder] function for details.
- This function sets thresholds (Warning, Limit, or both Warning and Limit) for the drive space or the file count.
 - When exceeding the warning threshold
This is a predictive notification and writing to the relevant NAS user volume is not prohibited.
 - When exceeding the limit threshold
Writing to the relevant NAS user volume is prohibited.
- The type (of User/Group/Share) and name (of the User/Group/Shared folder) of the quota setting target information cannot be changed. To change the "Type" or "Name", delete the relevant quota setting information and add the setting again.

Note

- Event notifications for the conditions described below can be sent using the specified method. Refer to the [Setup Event Notification] function for details.
 - The drive space or the file count has exceeded the threshold
 - The drive space or the file count has returned to a normal state below the threshold value
- The quota setting information can be added. Refer to the [Add Quota Setting] function for details.
- The quota setting information in the storage system can be deleted. Refer to the [Delete Quota Setting] function for details.
- The quota setting information in the storage system can be checked. Refer to the [Quota Management] function for details.
- Shared folders include home directories.

■ User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	✓
StorageAdmin	✓
AccountAdmin	

Default role	Availability of executions
SecurityAdmin	
Maintainer	✓

Refer to "[A. User Roles and Policies](#)" (page 1580) for details on the policies and roles.

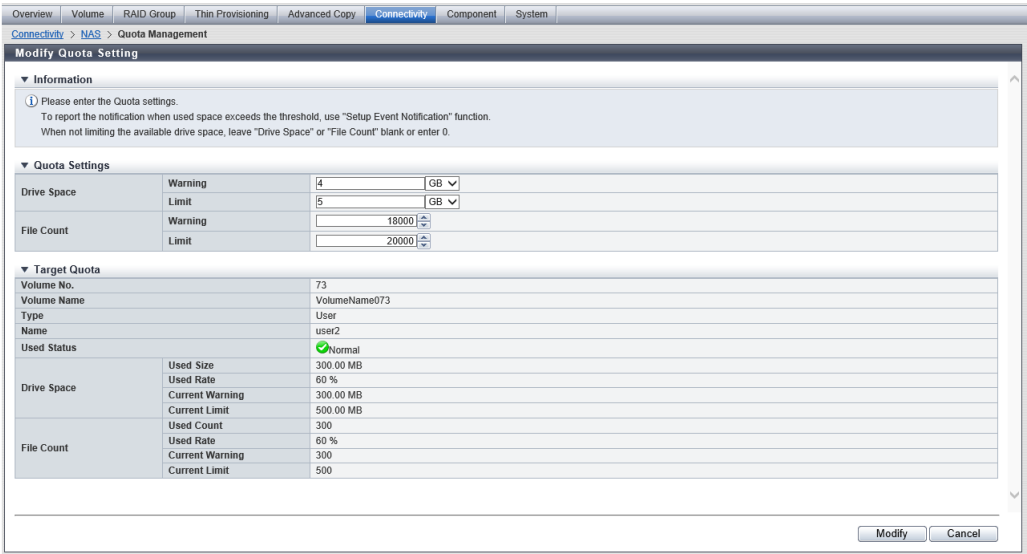
■ Settings

Change the quota setting information.

Quota Settings

Item		Description	Setting values
Drive Space	Warning	<p>The current warning value for the drive space is displayed when this function starts. Change the warning value for the drive space. If "0" is entered or no values are specified, "Not Specified" (unlimited) is registered in the storage system.</p> <p>Note</p> <ul style="list-style-type: none"> When this function starts, the warning value is displayed with the largest unit (TB/GB/MB) after rounding down to the nearest whole number. For example, if the warning value in the storage system is "1572864000 KB", "1500 GB" is displayed. 	0 - 128 TB Unit [MB/GB/TB]
	Limit	<p>The current limit value for the drive space is displayed when this function starts. Change the limit value for the drive space. If "0" is entered or no values are specified, "Not Specified" (unlimited) is registered in the storage system.</p> <p>Caution</p> <ul style="list-style-type: none"> If both the warning and limit values are specified, the limit value must be larger than the warning value. <p>Note</p> <ul style="list-style-type: none"> When this function starts, the limit value is displayed with the largest unit (TB/GB/MB) after rounding down to the nearest whole number. Refer to the "Warning" remarks for details. 	0 - 128 TB Unit [MB/GB/TB]
File Count	Warning	<p>The current warning value for the file count is displayed when this function starts. Change the warning value for the file count. If "0" is entered, "Not Specified" (unlimited) is registered in the storage system.</p>	0 - 134217723
	Limit	<p>The current limit value for the file count is displayed when this function starts. Change the limit value for the file count. If "0" is entered, "Not Specified" (unlimited) is registered in the storage system.</p> <p>Caution</p> <ul style="list-style-type: none"> If both the warning and limit values are specified, the limit value must be larger than the warning value. 	0 - 134217723

■ Display Contents



In this screen, the current quota setting information for the modification target is displayed.

Target Quota

Item	Description
Volume No.	The volume number of the quota setting target volume is displayed.
Volume Name	The name of the quota setting target volume is displayed.
Type	The quota target type is displayed. User Group Share
Name	The quota target user name, group name, or shared folder name is displayed. For the home directory, "homes" is displayed for this item.
Used Status	The use state for the quota target drive space or file count is displayed. If the drive space use state and the file count use state do not match, the use state is displayed according to the priority. <ul style="list-style-type: none"> • Normal Normal status (The usage is below the warning value. If the warning value is not specified, the usage is below the limit value.) • Warning The usage has exceeded the warning value but is below the limit value. • Exceeded The usage has exceeded the limit value. • Unknown Other than above. The priority for the use state is " Unknown" > " Exceeded" > " Warning" > " Normal".

6. Connectivity
NAS

Item		Description
Drive Space	Used Size	<p>The current drive usage amount [TB/GB/MB] is displayed.</p> <p>If no quota target user or group is registered in the authentication server, or if the usage amount cannot be obtained, a "-" (hyphen) is displayed.</p> <div style="background-color: #f0f0f0; padding: 5px;"> <p>Note</p> <ul style="list-style-type: none"> The usage amount is displayed with the largest unit (TB/GB/MB) after rounding off to two decimal places. For example, if the usage amount in the storage system is "1572864000 KB", "1.46 TB" is displayed. </div>
	Used Rate	<p>The usage rate (0 to 100 %) of the drive usage limit value is displayed.</p> <p>Used Rate = Used Size ÷ Current Limit</p> <p>A "-" (hyphen) is displayed in the following conditions:</p> <ul style="list-style-type: none"> The limit value is not specified No quota target user or group is registered in the authentication server The used size cannot be obtained <div style="background-color: #f0f0f0; padding: 5px;"> <p>Note</p> <ul style="list-style-type: none"> For the used rate, the result of the division is rounded up to two decimal places. If the used rate is larger than "0" but smaller than or equal to "1", "1 %" is displayed. </div>
	Current Warning	<p>The current warning value [TB/GB/MB] for the drive space is displayed.</p> <p>If not specified, "Not Specified" is displayed. If the warning value cannot be obtained, a "-" (hyphen) is displayed.</p> <div style="background-color: #f0f0f0; padding: 5px;"> <p>Note</p> <ul style="list-style-type: none"> The warning value is displayed with the largest unit (TB/GB/MB) after rounding off to two decimal places. Refer to the remarks of "Used Size" for details. </div>
	Current Limit	<p>The current limit value [TB/GB/MB] for the drive space is displayed.</p> <p>If not specified, "Not Specified" is displayed. If the warning value cannot be obtained, a "-" (hyphen) is displayed.</p> <div style="background-color: #f0f0f0; padding: 5px;"> <p>Note</p> <ul style="list-style-type: none"> The limit value is displayed with the largest unit (TB/GB/MB) after rounding off to two decimal places. Refer to the remarks of "Used Size" for details. </div>

Item		Description
File Count	Used Count	The current file count is displayed. If no quota target user or group is registered in the authentication server, or if the used count cannot be obtained, a "-" (hyphen) is displayed.
	Used Rate	The usage rate (0 to 100 %) of the file count limit value is displayed. Used Rate = Used Count ÷ Current Limit A "-" (hyphen) is displayed in the following conditions: <ul style="list-style-type: none"> • The limit value is not specified • No quota target user or group is registered in the authentication server • The used count cannot be obtained <div style="background-color: #f0f0f0; padding: 5px; margin-top: 10px;"> <p>Note</p> <ul style="list-style-type: none"> • For the used rate, the result of the division is rounded up to two decimal places. If the used rate is larger than "0" but smaller than or equal to "1", "1 %" is displayed. </div>
	Current Warning	The current warning value for the file count is displayed in the numeric characters. If not specified, "Not Specified" is displayed. If the warning value cannot be obtained, a "-" (hyphen) is displayed.
	Current Limit	The current limit value for the file count is displayed in the numeric characters. If not specified, "Not Specified" is displayed. If the warning value cannot be obtained, a "-" (hyphen) is displayed.

■ Operating Procedures

Procedure ▶▶▶

- 1 Select the quota setting information that is to be changed and click [Modify Quota Setting] in [Action].
- 2 Edit the quota setting information, and click the [Modify] button.
→ A confirmation screen appears.

Caution

- A total of four threshold values can be set (two for the drive space and two for the file count) in a single quota setting information. However, specifying "0" for all the thresholds (which includes changing the drive space value to "Not Specified") is not allowed. At least one threshold must have a valid value.
- In the following conditions, a warning message indicates that writing to the drive is prohibited.
 - The modified limit value is less than the currently used drive size
 - The modified limit value for the number of files is less than the current number of files
- If the entered "Warning" or "Limit" does not satisfy the input conditions, an error screen appears.

- 3 Click the [OK] button.
→ Changing of the quota setting starts.
- 4 Click the [Done] button to return to the [Quota Management] screen.



Meta Cache Distribution

- ["■ Overview" \(page 939\)](#)
- ["■ User Privileges" \(page 939\)](#)
- ["■ Display Contents" \(page 940\)](#)

■ Overview

This function displays the setting state of the automatic meta cache distribution and the location of the [meta cache](#).

This function is displayed in a Unified Storage environment.

Caution

- This function is not supported for the ETERNUS DX60 S5, the ETERNUS DX900 S5, the ETERNUS DX8100 S4/DX8900 S4, and the ETERNUS AF150 S3/AF250 S3/AF650 S3.

Note

- A unified upgrade is necessary for a storage system that will be used in a Unified Storage environment if it was previously used in a SAN environment. Refer to the [Register Unified Storage License] function and the [Apply Controller Firmware] function for details. This function is added in the category after the unified upgrade is complete.
- Manually performing a meta cache distribution is recommended. Refer to the [Initialize Meta Cache Distribution] function for details.
- The meta cache distribution can be initialized automatically. Refer to the [Enable Automatic Meta Cache Distribution] function for details.
- Automatic meta cache distribution can be disabled. Refer to the [Disable Automatic Meta Cache Distribution] function for details.

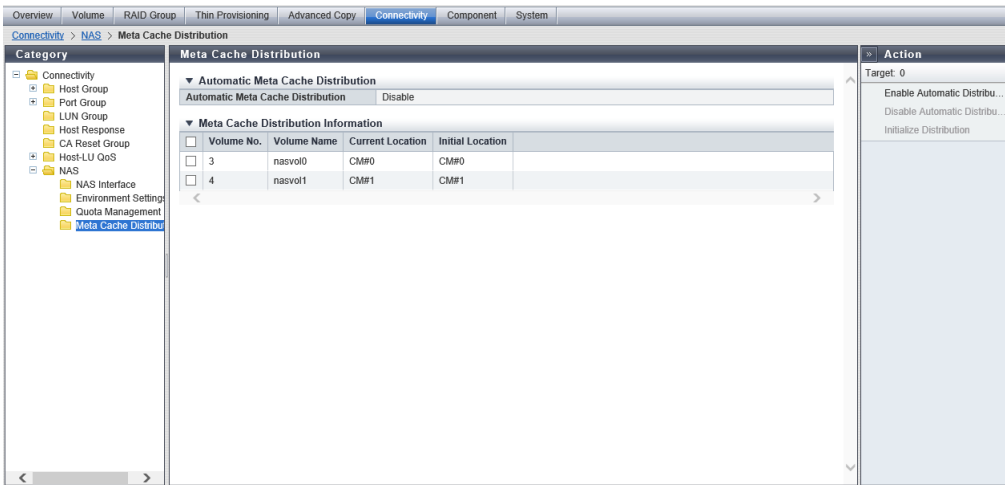
■ User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	✓
Admin	✓
StorageAdmin	✓
AccountAdmin	
SecurityAdmin	✓
Maintainer	✓

Refer to ["A. User Roles and Policies" \(page 1580\)](#) for details on the policies and roles.

■ Display Contents



Automatic Meta Cache Distribution

Item	Description
Automatic Meta Cache Distribution	<p>Whether the automatic meta cache distribution is enabled or not is displayed.</p> <p>If this item is "Enable", the meta cache distribution is checked for all registered NAS volumes in the storage system for the times described below. If "Current Location" and "Initial Location" do not match, a redistribution is performed.</p> <ul style="list-style-type: none"> • When the NAS Engine is started • Every hour on the half hour <p>Caution</p> <ul style="list-style-type: none"> • To redistribute the meta cache, using the [Initialize Meta Cache Distribution] function is recommended. If the [Enable Automatic Meta Cache Distribution] function is used, a meta cache redistribution is performed every hour on the half hour regardless of the host I/O and the processes that are related to NAS may be delayed for a maximum of two minutes.

Meta Cache Distribution Information

Item	Description
Volume No.	The NAS volume number is displayed.
Volume Name	The NAS volume name is displayed.
Current Location	<p>The current meta cache distribution is displayed.</p> <p>When the distribution information cannot be obtained, a "-" (hyphen) is displayed.</p> <p>CM#0 CM#1</p>
Initial Location	<p>The location of the meta cache when the NAS volume was created is displayed.</p> <p>When the distribution information cannot be obtained, a "-" (hyphen) is displayed.</p> <p>CM#0 CM#1</p>

Enable Automatic Meta Cache Distribution

- "[■ Overview](#)" (page 941)
- "[■ User Privileges](#)" (page 942)
- "[■ Operating Procedures](#)" (page 942)

■ Overview

This function enables the automatic meta cache distribution.

If "Current Location" of the [meta cache](#) is different from "Initial Location", the meta cache of every NAS volume in the storage system is automatically returned to the initial location for the following times.

- When the NAS Engine or the CM is activated
- Every hour on the half hour

To redistribute the meta cache, using the [Initialize Meta Cache Distribution] function is recommended. If this function is used, a meta cache redistribution is performed every hour on the half hour regardless of the host I/O and the processes that are related to NAS may be delayed for a maximum of two minutes. This function is used in a Unified Storage environment.

Caution

- If the following operations are executed for NAS volumes where a meta cache redistribution is being performed, the process may be delayed for a maximum of two minutes in each NAS volume until the redistribution is complete.
 - Deletion of the NAS volumes
 - Displaying the NAS volume status
 - Displaying the shared folder list
 - Creation of the shared folders
 - Deletion of the shared folders
 - Modification of the shared folder settings
- If the following operations conflict with the automatic meta cache distribution, the process that was started earlier is given priority.
 - Expanding the NAS user volume capacity
 - Backing up of the NAS user volume
 - Acquiring snapshots

If the process that was started earlier is not complete within five minutes, an error occurs for the process that was started later.
- Automatic meta cache distribution is executed when all of the following processes are complete.
 - Application of the controller firmware
 - Matching the controller firmware versions of both CMs (CM#0 and CM#1)
 - Activation of the CM

Note

- The current and the initial meta cache locations can be checked. Refer to the [Meta Cache Distribution] function for details.

■ User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	✓
StorageAdmin	✓
AccountAdmin	
SecurityAdmin	
Maintainer	✓

Refer to "A. User Roles and Policies" (page 1580) for details on the policies and roles.

■ Operating Procedures

Procedure ▶▶▶

- 1 Click [Enable Automatic Distribution] in [Action].
→ A confirmation screen appears.

Caution

- [Enable Automatic Distribution] cannot be clicked if the automatic meta cache distribution is already enabled.

- 2 Click the [OK] button.
→ Enabling of the automatic meta cache distribution starts.
- 3 Click the [Done] button to return to the [Meta Cache Distribution] screen.



Disable Automatic Meta Cache Distribution

- "■ Overview" (page 942)
- "■ User Privileges" (page 942)
- "■ Operating Procedures" (page 943)

■ Overview

This function disables the automatic meta cache distribution.
This function is used in a Unified Storage environment.

■ User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	✓
StorageAdmin	✓
AccountAdmin	

Default role	Availability of executions
SecurityAdmin	
Maintainer	✓

Refer to "A. User Roles and Policies" (page 1580) for details on the policies and roles.

■ Operating Procedures

Procedure ▶▶▶

- 1 Click [Disable Automatic Distribution] in [Action].
→ A confirmation screen appears.

Caution

- [Disable Automatic Distribution] cannot be clicked if the automatic meta cache distribution is already disabled.

- 2 Click the [OK] button.
→ Disabling of the automatic meta cache distribution starts.
 - 3 Click the [Done] button to return to the [Meta Cache Distribution] screen.
-



Initialize Meta Cache Distribution

- "■ Overview" (page 943)
- "■ User Privileges" (page 944)
- "■ Operating Procedures" (page 945)

■ Overview

This function restores the [meta cache](#) of selected NAS volumes to the initial location at an arbitrary time. This function is used in a Unified Storage environment.

Caution

- Redistributing the meta cache (or the process of restoring the initial location) may take a maximum of two minutes for each NAS volume (or NAS user volume and NAS backup volume).
- If the meta cache is being redistributed at the scheduled start time of the snapshot acquisition, the start time of the snapshot acquisition may be delayed. Make sure to execute this function while snapshot acquisitions are not reserved.
- If the following operations are executed for NAS volumes where a meta cache redistribution is being performed, the process may be delayed for a maximum of two minutes in each NAS volume until the redistribution is complete.
 - Deletion of the NAS volumes
 - Displaying the NAS volume status
 - Displaying the shared folder list
 - Creation of the shared folders
 - Deletion of the shared folders
 - Modification of the shared folder settings
- The meta data cannot be redistributed for the following conditions.
 - Automatic meta cache distribution is executing
 - A snapshot is being acquired (and the snapshot acquisition is not complete within a certain period of time)
 - The storage system is in the high-load state (*1)

*1: If the message indicates that the meta cache distribution cannot be initialized due to the storage system being overloaded, wait at least 30 minutes and then try again.

Note

- The current and the initial meta cache locations can be checked. Refer to the [Meta Cache Distribution] function for details.
- The meta cache distribution can be initialized automatically. Refer to the [Enable Automatic Meta Cache Distribution] function for details.
- The meta cache distribution can be manually restored in the initial location even if "Automatic Meta Cache Distribution" is "Enable".

■ **User Privileges**

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	✓
StorageAdmin	✓
AccountAdmin	
SecurityAdmin	
Maintainer	✓

Refer to "A. User Roles and Policies" (page 1580) for details on the policies and roles.

■ Operating Procedures

Procedure ▶▶▶

- 1 Select the NAS volume (multiple selections can be made) to redistribute the meta cache and click [Initialize Distribution] in [Action].
→ A confirmation screen appears.

Note

- Redistributing the meta cache is available for NAS volumes of which "Current Location" and "Initial Location" do not match in the [Meta Cache Distribution] screen. If NAS volumes with the same "Current Location" and "Initial Location" are selected and [Initialize Distribution] is clicked, the process is completed normally without redistribution.

- 2 Click the [OK] button.
→ Initialization of the meta cache distribution starts.
- 3 Click the [Done] button to return to the [Meta Cache Distribution] screen.



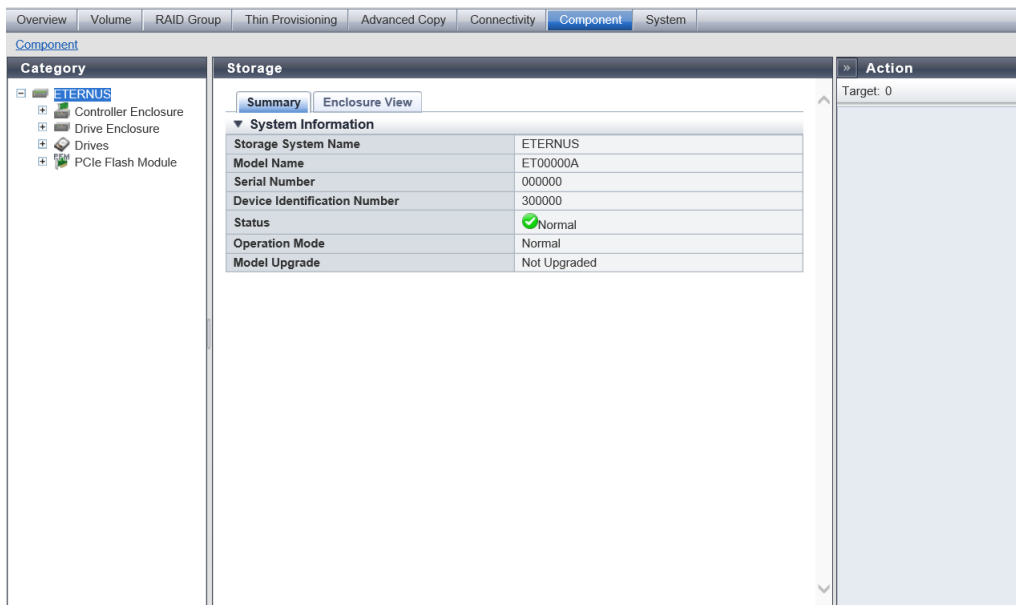
7. Component

- ["■ Overview" \(page 946\)](#)
- ["■ Display Function List" \(page 946\)](#)
- ["■ Action List" \(page 947\)](#)

■ Overview

This function can perform Status Display and maintenance for each part installed on the storage system.

■ Display Function List



Category	Function	Description
(Storage System Name)	"Storage" (page 948)	The status of the entire storage system is displayed.
Controller Enclosure	"Controller Enclosure" (page 979)	The Controller Enclosure (CE) status is displayed.
Controller Module	"Controller Module" (page 995)	The controller (CM) status is displayed.
Performance	"Performance (CM)" (page 1013)	The controller (CM) performance information is displayed.
Channel Adapter	"Channel Adapter" (page 1016)	The Channel Adapter (CA) status is displayed.
Performance	"Performance (CA)" (page 1049)	The Channel Adapter (CA) performance information is displayed.
Login Host	"Login Host" (page 1050)	The hosts that are currently logged in to the port is displayed.
PCIe Flash Module	"PCIe Flash Module" (page 1053)	The PCIe Flash Module (PFM) status is displayed.
Performance	"Performance (PCIe Flash Module)" (page 1061)	The PCIe Flash Module (PFM) performance information is displayed.
Bootup and Utility Device	"Bootup and Utility Device" (page 1062)	The BUD status list is displayed. [DX900 S5/DX8100 S4/ DX8900 S4]
Power Supply Unit	"Power Supply Unit (CE)" (page 1064)	The status of the power supply unit for the controller is displayed.
Battery (BBU)	"Battery (BBU)" (page 1067)	The battery (BBU) status is displayed. [DX60 S5/DX100 S5/ DX200 S5]
Battery (BTU/BCU)	"Battery (BTU/BCU)" (page 1068)	The battery (BTU/BCU) status is displayed.

7. Component

Category	Function	Description
Frontend Enclosure	"Frontend Enclosure" (page 1070)	The Frontend Enclosure (FE) information is displayed. [DX900 S5/DX8900 S4]
Frontend Router	"Frontend Router" (page 1073)	The Frontend Router (FRT) information is displayed. [DX900 S5/DX8900 S4]
Service Controller	"Service Controller" (page 1076)	The Service Controller (SVC) information is displayed. [DX900 S5/DX8900 S4]
Power Supply Unit (FE)	"Power Supply Unit (FE)" (page 1078)	The information of the Power Supply Unit (PSU) for FE is displayed. [DX900 S5/DX8900 S4]
FAN Unit	"FAN Unit" (page 1080)	The FAN Unit information is displayed. [DX900 S5/DX8900 S4]
Operation Panel	"Operation Panel" (page 1082)	The Operation Panel information is displayed. [DX900 S5/DX8900 S4]
Drive Enclosure	"Drive Enclosure" (page 1083)	The Drive Enclosure (DE) status is displayed.
I/O Module	"I/O Module" (page 1102)	The I/O Module status is displayed.
Error Statistics	"Port Error Statistics" (page 1104)	The port error information is displayed.
Power Supply Unit	"Power Supply Unit (DE)" (page 1107)	The status of the power supply unit for the Drive Enclosure is displayed.
Fan Expander Module	"Fan Expander Module" (page 1109)	The status of the Fan Expander Module for the Drive Enclosure is displayed.
Drives	"Drives" (page 1112)	The drive status is displayed.
Performance	"Performance (Drives)" (page 1136)	The drive performance information is displayed.
Error Statistics	"Drive Error Statistics" (page 1138)	The drive error information is displayed.

■ Action List

Action	Function	Description
Start/End Maintenance	"Start/End Maintenance" (page 950)	Switch the storage system to the maintenance operation mode.
Model Upgrade	"Model Upgrade" (page 952)	Upgrade the storage system from a low-end model to a high-end model.
Turn on locator beacon	"Turn on Locator Beacon/Turn off Locator Beacon" (page 993)	Turn on/off the LED to indicate the location of the storage system.
Turn off locator beacon		
Preventive Maintenance	"Hot Preventive Maintenance" (page 956)	Perform hot preventive maintenance for selected parts.
Force Enable	"Force Enable Module" (page 965)	Forcibly enable selected parts.
Force Disable	"Force Disable Module" (page 971)	Forcibly disable selected parts.
Sanitize Drive	"Sanitize Drive" (page 1133)	Start a data sanitization process for drives.
Add Controller Enclosure	"Add Controller Enclosure" (page 987)	Add CEs. [DX900 S5/DX8900 S4]
Add Controller Module	"Add Controller Module" (page 1000)	Add controllers.
Add Memory	"Add Memory" (page 1004)	Add memory to the controller.
Export Performance Info	"Export Performance Information" (page 194)	Export the performance information.
Add Channel Adapter	"Add Channel Adapter" (page 1033)	Add CAs.
Add Channel Adapter Port	"Add Channel Adapter Port" (page 1039)	Add CA ports.
Remove Channel Adapter	"Remove Channel Adapter" (page 1042)	Remove CAs.
Add PCIe Flash Module	"Add PCIe Flash Module" (page 1056)	Add PFM.

7. Component Storage

Action	Function	Description
Remove PCIe Flash Module	"Remove PCIe Flash Module" (page 1059)	Remove PFMs.
Add Drive Enclosure	"Add Drive Enclosure" (page 1087)	Add DEs.
Remove Drive Enclosure	"Remove Drive Enclosure" (page 1097)	Remove DEs.
Recover NAS System Volume	"Recover NAS System Volume" (page 1015)	Recover the NAS system volumes (RootFS) that are used by the NAS Engine.
Assign Global HS	"Assign Global Hot Spare" (page 1118)	Assign Global Hot Spares.
Release Global HS	"Release Global Hot Spare" (page 1119)	Release Global Hot Spares.
Assign Dedicated HS	"Assign Dedicated Hot Spare" (page 1120)	Assign Dedicated Hot Spares.
Release Dedicated HS	"Release Dedicated Hot Spare" (page 1124)	Release Dedicated Hot Spares.
Remove Disk Drive	"Remove Disk Drive" (page 1125)	Remove disk drives.
Start Diagnosis	"Start Disk Diagnosis" (page 1128)	Start disk diagnosis.
Clear All Error	"Clear Drive Error Statistics (All Drives)" (page 1139)	Clear error statistics of all drives.
Clear Error	"Clear Drive Error Statistics (Selected Drives)" (page 1140)	Clear error statistics of selected drives.

Storage

- ["■ Overview" \(page 948\)](#)
- ["■ User Privileges" \(page 948\)](#)
- ["■ Display Contents" \(page 948\)](#)

■ Overview

This function displays the general information for the storage system.

■ User Privileges

Availability of Executions in the Default Role

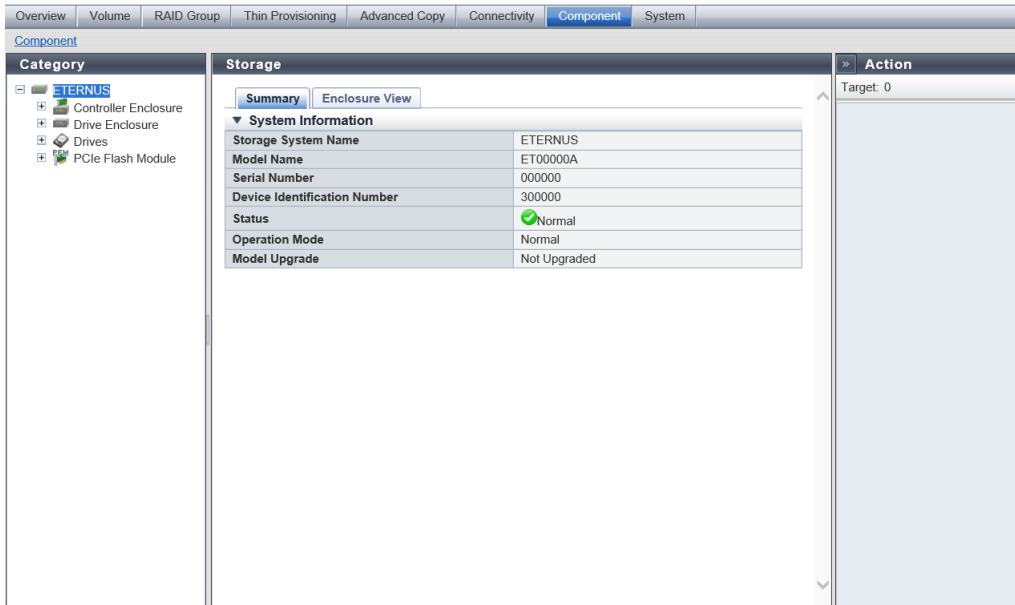
Default role	Availability of executions
Monitor	✓
Admin	✓
StorageAdmin	✓
AccountAdmin	
SecurityAdmin	✓
Maintainer	✓

Refer to ["A. User Roles and Policies" \(page 1580\)](#) for details on the policies and roles.

■ Display Contents

The general information for the storage system is displayed.

7. Component Storage



[Summary] Tab

System Information

Item	Description
Storage System Name	The name of the storage system is displayed.
Model Name	The model name of the storage system is displayed.
Serial Number	The serial number of the storage system is displayed.
Device Identification Number	The identification number of the storage system is displayed.
Status	The general status (detail) of the storage system is displayed. Refer to "Storage System General Status (Detail)" (page 1603) for details.
Battery	The battery charge level is displayed. When the battery charge level is 90% or more, "Full Charge" is displayed. When the battery charge level is less than 90%, "xx%" is displayed. For the ETERNUS DX900 S5 or the ETERNUS DX8900 S4, the lowest battery charge level among all CEs is displayed. Click this item to display the [Controller Enclosure] screen. Refer to the [Controller Enclosure] function for details. This item is displayed for the ETERNUS DX500 S5/DX600 S5/DX900 S5, the ETERNUS DX8100 S4/DX8900 S4, and the ETERNUS AF650 S3.
Operation Mode	The operation mode is displayed. <ul style="list-style-type: none"> • Normal The storage system is in operation. • Maintenance Mode The storage system is under maintenance.
Model Upgrade	The model upgrade status is displayed. If this item is not displayed, a model upgrade cannot be performed. <ul style="list-style-type: none"> • Not Upgraded A model upgrade has never been performed. • Upgraded A model upgrade has already been performed.

[Enclosure View] Tab

Item	Description
(Storage system image)	<p>The front view of the enclosure that is installed in the storage system is displayed. The enclosure status is displayed with an icon.</p> <p>For the ETERNUS DX500 S5/DX600 S5 and the ETERNUS AF650 S3, specify the range of the DEs. Click the DE to display the [Drive Enclosure Detail] screen.</p> <p>For the ETERNUS DX900 S5 or the ETERNUS DX8900 S4, the [CE/FE] button and the [DE#xx] button are displayed. Click the [CE/FE] button to display the CE#x (x: CE number) and the Frontend Enclosure (FE) screen. Click the CE#x to display the [Controller Enclosure Detail] screen. Click the FE to display the [Frontend Enclosure] screen.</p> <p>Click the [DE#xx] button to display the DEs in the relevant range. Click the DE#xx to display the [Drive Enclosure Detail] screen.</p> <p>For the other models, click the CE to display the [Controller Enclosure Detail] screen. Click the DE to display the [Drive Enclosure Detail] screen.</p> <p>Refer to ""Component Status" (page 1607)" for details.</p>

Start/End Maintenance

- "[■ Overview](#)" (page 950)
- "[■ User Privileges](#)" (page 951)
- "[■ Display Contents](#)" (page 952)
- "[■ Operating Procedures](#)" (page 952)

■ Overview

This function prepares a suitable status of the storage system for maintenance, and notifies the storage system that maintenance operation has started or ended.

When a start maintenance operation is being performed, the operation mode of the storage system is changed to "Maintenance Mode". In addition, reporting of Maintenance Mode sense information and SNMP notifications are suppressed.

When using the Remote Support function, this function notifies the REMCS center of the starting or ending of a maintenance operation by sending an event. While the operation mode is "Maintenance Mode", the Remote Support (REMCS) status is changed from "Operating" to "Stopping". In addition, automatic notification of storage system failures to the REMCS center is suppressed.

When performing the end maintenance operation, the operation mode is changed to "Normal", and the Remote Support (REMCS) function is automatically resumed.

The start maintenance operation needs to be performed when the following functions are used:

- Firmware maintenance
- Hot preventive maintenance
- Adding a component in hot mode
- Removing a component in hot mode

Make sure to perform the end maintenance operation after maintenance operation is complete.

Caution

- Force disable and force enable can be performed when the start maintenance operation has not been performed. However, it is recommended to perform the start maintenance operation.
- If the Remote Support function is "Stopping" or the Remote Support setting is not configured, this function does not notify the REMCS center of the start or end of maintenance.
- If the communication between storage system and REMCS center is not established, the notification fails. However, the start/end of maintenance operation is performed irrespectively.
- If three hours elapses without any maintenance operation being performed after the start maintenance operation is executed, the maintenance mode is automatically canceled.

Note

- If maintenance operations can be performed, "Maintenance Mode" is displayed on the Web GUI screen header.
- Under the following conditions, maintenance operations can be performed without performing start maintenance operations.
 - When using the ETERNUS DX60 S5, the ETERNUS DX100 S5/DX200 S5, or the ETERNUS AF150 S3/AF250 S3, a user with the "Storage Management" policy can perform the [Add Drive Enclosure] function.
 - When the minimum port type CA (*1) is installed in the ETERNUS DX60 S5/DX100 S5 CM, a user with the "Storage Management" policy can perform the [Add Channel Adapter Port] function.
*1: CAs with the minimum number of ports. 1-port types and 2-port types are available.
 - A user with the "Firmware Management" policy can use the [Apply Controller Firmware] function in simple mode.
- After the maintenance mode is changed from "Maintenance Mode" to "Normal", the [Clear Sense Data] function and the [Automatic Log Transmission] function (when using REMCS) are automatically started.

■ User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	
StorageAdmin	
AccountAdmin	
SecurityAdmin	
Maintainer	✓

Refer to ["A. User Roles and Policies" \(page 1580\)](#) for details on the policies and roles.

■ Display Contents

System Information

Item	Description
Operation Mode	The operation mode of the storage system is displayed. <ul style="list-style-type: none">• "Normal" is displayed when maintenance is not being performed on the storage system• "Maintenance Mode" is displayed when maintenance is being performed on the storage system

■ Operating Procedures

Starting Maintenance Operations

Start the maintenance operation.

Procedure ▶▶▶

- 1 Click [Start/End Maintenance] in [Action].
- 2 Click the [Start] button.
→ A confirmation screen appears.
- 3 Click the [OK] button.
→ The maintenance mode starts.
- 4 Click the [Done] button to return to the screen when starting this function in Step 1.
→ "Maintenance Mode" is displayed on the Web GUI screen header.



Ending Maintenance Operations

End the maintenance operation.

Procedure ▶▶▶

- 1 Click [Start/End Maintenance] in [Action].
- 2 Click the [End] button.
→ A confirmation screen appears.
- 3 Click the [OK] button.
→ The maintenance mode ends.
- 4 Click the [Done] button to return to the screen when starting this function in Step 1.
→ The "Maintenance Mode" that is displayed on the Web GUI screen header is hidden.



Model Upgrade

- ["■ Overview" \(page 953\)](#)
- ["■ User Privileges" \(page 954\)](#)
- ["■ Display Contents" \(page 954\)](#)
- ["■ Operating Procedures" \(page 955\)](#)

■ Overview

To improve the system performance and to increase the maximum number of installable drives, this function upgrades the storage system from a lower model to a higher model.

This function provides the following features:

- User data is taken over without any changes.
- All the configuration information for the storage system including licenses (for Advanced Copy and for port expansion) is taken over.

Note that the unique information of the storage system (such as the serial number, the model name, and the product ID) is not included if the storage system is replaced due to a model upgrade.

- After a model upgrade is performed, the maximum parameters (such as the number of DEs, drives, LUNs, hosts, and copy sessions) of the higher model apply.

Available Combinations of Models for a Model Upgrade (Type Change)

Lower model	Higher model
ETERNUS DX60 S5	ETERNUS DX100 S5
ETERNUS DX100 S5	ETERNUS DX200 S5
ETERNUS DX500 S5	ETERNUS DX600 S5
ETERNUS AF150 S3	ETERNUS AF250 S3

Available Combinations of Models for a Model Upgrade (Storage System Replacement)

Lower model	Higher model
ETERNUS DX200 S5	ETERNUS DX500 S5
ETERNUS AF250 S3	ETERNUS AF650 S3

Caution

- This function requires a license key and replacement parts for the upgrade. Make sure to obtain these items before starting this function.
- Before starting this function, collect the storage system logs and configuration information in case a system restoration is required.
- Make sure to stop any access from hosts when performing this function.
- Do not change the storage system configuration (for example, creating RAID groups or volumes) when performing this function.
- Perform the start maintenance operation by using the [Start/End Maintenance] function before starting this function. If this operation has not been performed, a model upgrade cannot start.
- If there are any parts that cannot be installed in higher models, this function is stopped. Remove the unacceptable parts in advance.
- Since parts replacement work is carried out while performing this function, the storage system is turned off automatically.
- This function cannot be used if the lower model is in the following conditions:
 - The general status of the storage system is not "**Normal** (green)"
 - No drives are installed (*1)
 - Expansion of RAID group by LDE is being performed

7. Component Storage

- Volumes undergoing formatting, LUN Concatenation, encryption, or RAID migration exist in the storage system
- Thin Provisioning Pools (TPP) or Flexible Tier Pools (FTRP) are being formatted
- An Advanced Copy session (including the ODX or XCOPY function, or the copy functions with Virtual Volumes (VVOLs)) is currently operating (or when an Advanced Copy session exists in the storage system)
- A RAID group diagnosis is being performed
- A disk diagnosis is being performed
- The lower model is the ETERNUS DX100 S5 1 port CA model
- The lower model is the ETERNUS DX200 5 1CM model
- The CA port that is used by the Storage Cluster function exists
- The Veeam Storage Integration License is registered

*1: Drives must be installed as follows.

- For the ETERNUS DX60 S5/DX100 S5/DX200 S5 or the ETERNUS AF150 S3/AF250 S3, drives must be installed in both slot#0 and slot#1 of the CE
- For the ETERNUS DX500 S5, drives must be installed in both slot#0 and slot#1 of the CE

Note

- Applying the controller firmware is required after replacing parts.
- The [Storage] screen shows whether or not this function has already been used. Refer to the [Storage] function for details.

■ User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	
StorageAdmin	
AccountAdmin	
SecurityAdmin	
Maintainer	✓

Refer to "[A. User Roles and Policies](#)" (page 1580) for details on the policies and roles.

■ Display Contents

The following screens are displayed by the wizard.

[Start] Screen

A message to start the model upgrade and cautions when using this function are displayed.

[Register Model Upgrade License] Screen

In this screen, input the model name and the license key to be registered.

Model Name Setting

Item	Description	Setting values
Model Name	If a message is displayed in the Information field, enter the new model name after model upgrading.	Up to 12 capital letters and numeric characters

Model Upgrade license key

Item	Description	Setting values
License Key	Input the license key.	16 alphanumeric characters and symbols

[Confirm Model Upgrade] Screen

The lower model that is to be upgraded and the higher model after model upgrading are displayed.

Model

Item	Description
Current Model	The current model (lower model) is displayed.
New Model	The device model (higher model) that can be upgraded from the current model is displayed.

[Finish] Screen

A message that indicates the completion of license registration and a procedure for changing parts are displayed.

Caution

- After the preparation for a model upgrade is complete, the storage system is automatically turned off.

■ Operating Procedures

Procedure ▶▶▶

- 1 Click [Model Upgrade] in [Action].
→ The "[Start] Screen" (page 954) appears.

Caution

- [Model Upgrade] can be clicked for the ETERNUS DX60 S5, the ETERNUS DX100 S5/DX200 S5, the ETERNUS DX500 S5, and the ETERNUS AF150 S3/AF250 S3.

- 2 Click the [Next >>] button.
→ The "[Register Model Upgrade License] Screen" (page 954) appears.
- 3 Enter the model name and the license key, and click the [Next >>] button.
→ The "[Confirm Model Upgrade] Screen" (page 955) appears.

Caution

- An error screen appears in the following conditions:
 - The general status of the storage system is not normal
 - The license key does not satisfy the input conditions
 - The function that changes the device configuration is being performed
 - No drives are installed
 - The lower model is the ETERNUS DX100 S5 1 port CA model
 - The lower model is the ETERNUS DX200 S5 1CM model
 - For model upgrades that require a storage system replacement, the model name is not entered

- 4 Confirm the current model and the new model after model upgrading, and click the [Next >>] button.
→ The registration of the license is performed and the "[Finish] Screen" (page 955) appears.
- 5 After the preparation for the model upgrade is complete, the storage system is automatically turned off.



Hot Preventive Maintenance

- "■ Overview" (page 956)
- "■ User Privileges" (page 963)
- "■ Display Contents" (page 963)
- "■ Operating Procedures" (page 964)

■ Overview

This function replaces the components which may fail, while the storage system is operating. Replacing maintenance parts can prevent malfunctions.

Availability of Hot Preventive Maintenance (For the ETERNUS DX60 S5, the ETERNUS DX100 S5/DX200 S5, and the ETERNUS AF150 S3/AF250 S3) (Hot preventive maintenance is possible: ✓, Hot preventive maintenance is not possible or not applicable: -)

Component		Hot preventive maintenance		
		ETERNUS DX60 S5	ETERNUS DX100 S5/DX200 S5	ETERNUS AF150 S3/AF250 S3
Controller Enclosure (CE)		-	-	-
Controller Module (CM)		✓	✓	✓
	Memory	✓(*1)	✓(*1)	✓(*1)
	BBU	✓(*1)	✓(*1)	✓(*1)
	BUD	✓(*1)	✓(*1)	✓(*1)
32G FC-CA		-	✓(*1)	✓(*1)
	SFP+	-	✓	✓
16G FC-CA		✓(*2)	✓(*1)	✓(*1)

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Component		Hot preventive maintenance		
		ETERNUS DX60 S5	ETERNUS DX100 S5/DX200 S5	ETERNUS AF150 S3/AF250 S3
	SFP+	✓	✓	✓
8G FC-CA (*3)		✓(*2)	-	-
	SFP+	✓	-	-
10G iSCSI-CA		-	✓(*1)	✓(*1)
	SFP+	-	✓	✓
10G Base-T iSCSI		✓(*2)	✓(*1)	✓(*1)
	Port	-	-	-
1G iSCSI-CA		✓(*2)	✓(*1)	-
	Port	-	-	-
10G NAS-CA		-	✓(*1)	-
	SFP+	-	✓	-
1G NAS-CA		-	✓(*1)	-
	Port	-	-	-
12G SAS-CA		✓(*2)	✓(*1)	-
	SFP	✓	✓	-
Power Supply Unit (PSU)		✓	✓	✓
Drive		✓	✓	✓
Power Cord		-	-	-
Panel		-	-	-
Drive Enclosure (DE)		-	-	-
Power Supply Unit (PSU)		✓	✓	✓
Drive		✓	✓	✓
Panel		-	-	-
I/O Module (IOM)		✓	✓	✓
Fan Expander Module (FEM)		-	✓(*4)	-
Power Cord		-	-	-
SAS Cable		✓	✓	✓

*1 : When the component is selected for hot preventive maintenance, the CM mounting the component is isolated.

*2 : To perform a hot preventive maintenance of CA, use the hot preventive maintenance function for the CM that includes the CA.

*3 : Only for the ETERNUS DX60 S5.

*4 : A component that is installed in high density DEs.

7. Component
Storage

Availability of Hot Preventive Maintenance (For the ETERNUS DX500 S5/DX600 S5 and the ETERNUS AF650 S3) (Hot preventive maintenance is possible: ✓, Hot preventive maintenance is not possible or not applicable: -)

Component		Hot Preventive Maintenance	
		ETERNUS DX500 S5/DX600 S5	ETERNUS AF650 S3
Controller Enclosure (CE)		-	-
Controller Module (CM)		✓	✓
	Memory	✓(*1)	✓(*1)
	BUD	✓(*1)	✓(*1)
	FAN Unit	✓(*1)	✓(*1)
	PCIe SW	-	-
	IOC Port	-	-
	EXP Port	-	-
32G FC-CA		✓	✓
	SFP+	✓	✓
16G FC-CA		✓	✓
	SFP+	✓	✓
10G iSCSI-CA		✓	✓
	SFP+	✓	✓
1G iSCSI-CA		✓	-
	Port	-	-
iSCSI-RA		✓	✓
	Port	-	-
10G NAS-CA		✓	-
	SFP+	✓	-
1G NAS-CA		✓	-
	Port	-	-
PCIe Flash Module (PFM)		✓	-
Controller Enclosure Power Supply Unit (CPSU)		✓	✓
Operation Panel (OPNL)		-	-
Battery Unit		-	-
	Battery Control Unit (BCU)	✓	✓
	Battery Unit (BTU)	✓	✓
Drive		✓	✓
Drive Enclosure (DE)		-	-

7. Component Storage

Component	Hot Preventive Maintenance	
	ETERNUS DX500 S5/DX600 S5	ETERNUS AF650 S3
Power Supply Unit (PSU)	✓	✓
Drive	✓	✓
Panel	-	-
I/O Module (IOM)	✓	✓
Fan Expander Module (FEM)	✓(*2)	-
Power Cord	-	-
SAS Cable	✓	✓

*1 : When the component is selected for hot preventive maintenance, the CM mounting the component is isolated. If the target component is "BUD", the CM is isolated.

*2 : A component that is installed in high density DEs.

Availability of Hot Preventive Maintenance (For the ETERNUS DX8100 S4) (Hot preventive maintenance is possible: ✓, Hot preventive maintenance is not possible or not applicable: -)

Component	Hot Preventive Maintenance
Controller Enclosure (CE)	-
Controller Module (CM)	✓
Memory	✓(*1)
BUD	✓(*1)
FAN Unit	✓(*1)
PCIe SW	-
IOC Port	-
EXP Port	-
32G FC-CA	✓
SFP+	✓
16G FC-CA	✓
SFP+	✓
10G iSCSI-CA	✓
SFP+	✓
1G iSCSI-CA	✓
Port	-
iSCSI-RA	✓
Port	-
CEMP	-
CEMP-D	-
Controller Enclosure Power Supply Unit (CPSU)	✓
Operation Panel (OPNL)	-

7. Component Storage

Component		Hot Preventive Maintenance
Battery Unit		-
	Battery Control Unit (BCU)	✓
	Battery Unit (BTU)	✓
Power Cord		-
Drive		✓(*2)
Drive Enclosure (DE)		-
Power Supply Unit (PSU)		✓
Drive		✓
Panel		-
I/O Module (IOM)		✓
Power Cord		-
SAS Cable		✓

*1 : When the component is selected for hot preventive maintenance, the CM mounting the component is isolated.

*2 : A component that is installed in the CE of the ETERNUS DX8100 S4.

Availability of Hot Preventive Maintenance (For the ETERNUS DX900 S5 or the ETERNUS DX8900 S4)
(Hot preventive maintenance is possible: ✓, Hot preventive maintenance is not possible or not applicable: -)

Component		Hot Preventive Maintenance
Controller Enclosure (CE)		-
Controller Module (CM)		✓
	Memory	✓(*1)
	BUD	✓
	FAN Unit	✓(*1)
	PCIe SW	-
	IOC Port	-
	BE Port	-
	FRT Port	-
	SVC Port	-
32G FC-CA		✓
	SFP+	✓
16G FC-CA		✓
	SFP+	✓
10G iSCSI-CA		✓
	SFP+	✓
1G iSCSI-CA		✓
	Port	-

7. Component Storage

Component		Hot Preventive Maintenance
iSCSI-RA		✓
	Port	-
CEMP		-
CEMP-D		-
PCIe Flash Module (PFM)		✓
Controller Enclosure Power Supply Unit (CPSU)		✓
Operation Panel (OPNL)		-
Battery Unit		-
	Battery Control Unit (BCU)	✓
	Battery Unit (BTU)	✓
Power Cord		-
Drive		✓
Frontend Enclosure (FE)		-
Frontend Enclosure Power Supply Unit (FE PSU)		✓
Frontend Router (FRT)		✓
	QSFP+	✓
Service Controller (SVC)		✓
	Port	-
Management Cable		✓
FE MP		-
FE MP BRG		-
Operation Panel (OPNL)		✓
FAN Unit (FANU)		✓
FPO-SW		-
Drive Enclosure (DE)		-
Power Supply Unit (PSU)		✓
Drive		✓
Panel		-
I/O Module (IOM)		✓
Fan Expander Module (FEM)		✓(*2)
Power Cord		-
SAS Cable		✓

*1 : When the component is selected for hot preventive maintenance, the CM mounting the component is isolated.

*2 : A component that is installed in high density DEs.

Caution

- Perform the start maintenance operation by using the [Start/End Maintenance] function before starting hot preventive maintenance. If the operation has not been performed, hot preventive maintenance cannot be started.
- Hot preventive maintenance can be performed only on one component at a time.
- This function can be performed when the component is in a normal state.
- Be sure to use authorized maintenance parts for replacement. If components other than the authorized maintenance parts are used, operation is not guaranteed.
- Not all maintenance parts can be replaced by using this function. Refer to the following tables for the availability of hot preventive maintenance for each part.
 - "[Availability of Hot Preventive Maintenance \(For the ETERNUS DX60 S5, the ETERNUS DX100 S5/DX200 S5, and the ETERNUS AF150 S3/AF250 S3\)](#)"
 - "[Availability of Hot Preventive Maintenance \(For the ETERNUS DX500 S5/DX600 S5 and the ETERNUS AF650 S3\)](#)"
 - "[Availability of Hot Preventive Maintenance \(For the ETERNUS DX8100 S4\)](#)"
 - "[Availability of Hot Preventive Maintenance \(For the ETERNUS DX900 S5 or the ETERNUS DX8900 S4\)](#)"
- This function cannot be used under the following conditions:
 - The selected component is in the "Error" state
 - The selected component is not installed in the storage system (except drives)
 - The selected drive is being rebuilt
 - A CM, an IOM, a SAS cable, or an FEM#0 is selected on a 1CM model
 - A CM-FC (CM with direct mount CA) has been installed in the ETERNUS DX100 S5 and "CA#0" is selected
 - A CA is selected from the [Internal Parts] tab in the [Controller Module Detail] screen for the ETERNUS DX60 S5
- The Master CM is switched in the following conditions:
 - The Master CM is selected
 - The selected component is one of the following and the CM, on which the selected component is installed, is a Master CM
 - Memory
 - BUD
 - CA (for the ETERNUS DX100 S5/DX200 S5 and the ETERNUS AF150 S3/AF250 S3)
 - FAN Unit (for the ETERNUS DX500 S5/DX600 S5/DX900 S5, the ETERNUS DX8100 S4/DX8900 S4, and the ETERNUS AF650 S3)

Note

- To perform a hot preventive maintenance of CA#0 for the ETERNUS DX100 S5 with a CM-FC (CM with direct mount CA), use the hot preventive maintenance function for the CM.
- To perform a hot preventive maintenance of the CA for the ETERNUS DX60 S5 with a CM-FC (CM with direct mount CA), use the hot preventive maintenance function for the CM.

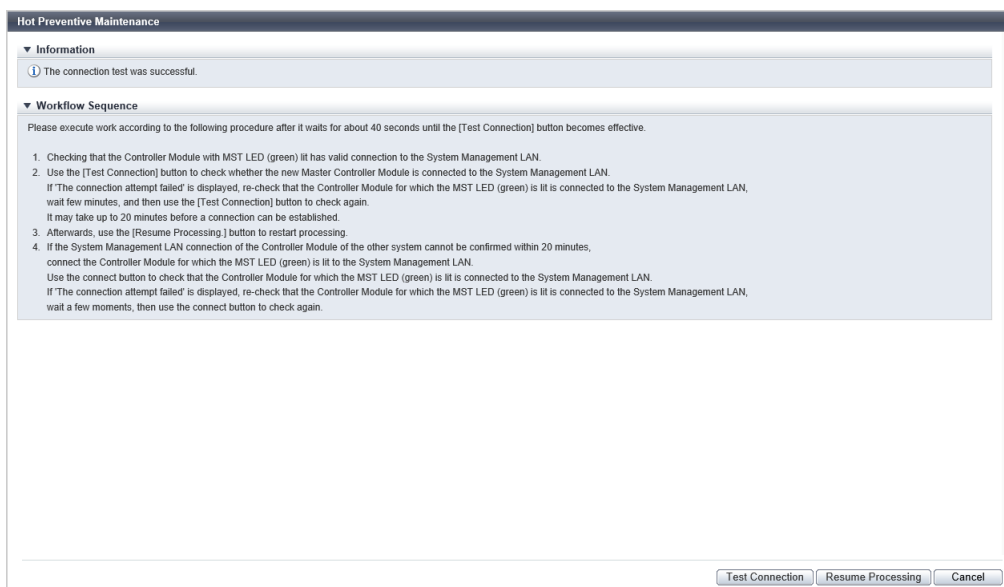
■ User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	
StorageAdmin	
AccountAdmin	
SecurityAdmin	
Maintainer	✓

Refer to ["A. User Roles and Policies" \(page 1580\)](#) for details on the policies and roles.

■ Display Contents



[Test Connection] Screen

This screen is displayed when the Master CM is affected by the hot preventive maintenance. Follow the displayed procedure to confirm that the new Master CM is connected to a LAN.

Function Button

Button	Description
[Test Connection]	Click this button after confirming that the new Master CM is connected to a LAN. The connection status of the new Master CM and the LAN is checked.

[Test Connection Result] Screen

This screen is displayed when the Master CM is affected by the hot preventive maintenance. The connection status check result of the new Master CM and the LAN is displayed.

Function Button

Button	Description
[Test Connection]	If connection has failed, reconfirm the new Master CM is connected to a LAN, and click this button. The connection status of the new Master CM and the LAN is checked again.
[Resume Processing]	Click this button when connection was successful. Isolation of the CM starts.

■ Operating Procedures

Procedure ▶▶▶

- 1 Select the component to perform preventive maintenance on, and click [Preventive Maintenance] in [Action].
→ A confirmation screen appears.

Caution

- When there is a component which can be affected by hot preventive maintenance, a message to that effect is displayed. Check the component which might be affected.

- 2 Click the [OK] button.
→ The operations to be started and the displayed screen vary depending on the conditions as follows.
 - When the Master CM can be affected by the hot preventive maintenance
→ The Master CM is switched, and the "[Test Connection] Screen" (page 963) appears. Proceed to Step 3.
 - When the Master CM cannot be affected by the hot preventive maintenance
→ Isolation of the target component starts. Proceed to Step 6.
- 3 Follow the displayed procedure to confirm that the new Master CM is connected to a LAN.
- 4 After confirming the connection, click the [Test Connection] button.
→ The "[Test Connection Result] Screen" (page 963) appears.
- 5 Confirm the connection status check result, and click the [Resume Processing] button.
→ Isolation of the target component starts.

Caution

- If the connection of the new Master CM and the LAN fails, check the connection status again and return to Step 4.

- 6 Click the [Done] button to return to the screen when the target component was selected in Step 1.

Note

- When performing a hot preventive maintenance for a NAS-CA or a NAS-CA port, the process may take a maximum of 5 minutes to complete. Click the [Done] button and wait for the process to complete. Make sure that the Fault LED (Orange) is on for the relevant target component and then replace the component.



Force Enable Module

- ["■ Overview" \(page 965\)](#)
- ["■ User Privileges" \(page 971\)](#)
- ["■ Operating Procedures" \(page 971\)](#)

■ Overview

When there is an isolated component from the storage system caused by an error, etc., this function forces the component to be enabled without replacing it (called "force enable" hereinafter).

This function is performed in a situation such as when there is a normal component which has been affected by a failed component and isolated from the storage system.

Availability of Force Enable (For the ETERNUS DX60 S5, the ETERNUS DX100 S5/DX200 S5, and the ETERNUS AF150 S3/AF250 S3) (Force enable is possible: ✓, Force enable is not possible or not applicable: -)

Component	Force Enable		
	ETERNUS DX60 S5	ETERNUS DX100 S5/DX200 S5	ETERNUS AF150 S3/AF250 S3
Controller Enclosure (CE)	-	-	-
Controller Module (CM)	✓	✓	✓
Memory	-	-	-
BBU	-	-	-
Bootup and Utility Device (BUD)	-	-	✓(*1)
NAS Engine	-	✓(*2)	-
32G FC-CA	-	✓	✓
SFP+	-	✓	✓
16G FC-CA	✓(*3)	✓	✓
SFP+	✓	✓	✓
8G FC-CA	✓(*3)	-	-
SFP+	✓	-	-
10G iSCSI-CA	-	✓	✓
SFP+	-	✓	✓
10G Base-T iSCSI	✓(*3)	✓	✓
Port	-	-	-
1G iSCSI-CA	✓(*3)	✓	-
Port	-	-	-
10G NAS-CA	-	✓	-
SFP+	-	✓	-
1G NAS-CA	-	✓	-
Port	-	-	-

7. Component Storage

Component	Force Enable		
	ETERNUS DX60 S5	ETERNUS DX100 S5/DX200 S5	ETERNUS AF150 S3/AF250 S3
12G SAS-CA	✓(*3)	✓	✓
SFP	✓	✓	✓
Mid Plane (MP)	-	-	-
Power Supply Unit (PSU)	-	-	-
Drive	✓	✓	✓
Power Cord	-	-	-
Panel	-	-	-
Drive Enclosure (DE)	-	-	-
Power Supply Unit (PSU)	-	-	-
Drive	✓	✓	✓
Panel	-	-	-
I/O Module (IOM)	✓	✓	✓
Fan Expander Module (FEM)	-	✓(*4)	✓
Power Cord	-	-	-
SAS Cable	-	-	-

*1 : Force enable is available only for the ETERNUS AF250 S3.

*2 : This item is available only in a Unified Storage environment.

*3 : To perform a force enable of CA, use the force enable function for the CM that includes the CA.

*4 : A component that is installed in high density DEs.

Availability of Force Enable (For the ETERNUS DX500 S5/DX600 S5 and the ETERNUS AF650 S3) (Force enable is possible: ✓, Force enable is not possible or not applicable: -)

Component	Force Enable Module	
	ETERNUS DX500 S5/DX600 S5	ETERNUS AF650 S3
Controller Enclosure (CE)	-	-
Controller Module (CM)	✓	✓
Memory	-	-
BUD	✓	✓
FAN Unit	-	-
PCIe SW	-	-
IOC Port	-	-
EXP Port	-	-
NAS Engine	✓(*1)	-
32G FC-CA	✓	✓
SFP+	✓	✓
16G FC-CA	✓	✓
SFP+	✓	✓

7. Component Storage

Component	Force Enable Module	
	ETERNUS DX500 S5/DX600 S5	ETERNUS AF650 S3
10G iSCSI-CA	✓	✓
SFP+	✓	✓
1G iSCSI-CA	✓	-
Port	-	-
iSCSI-RA	✓	✓
Port	-	-
10G NAS-CA	✓	-
SFP+	✓	-
1G NAS-CA	✓	-
Port	-	-
CBP	-	-
PCIe Flash Module (PFM)	✓	-
Controller Enclosure Power Supply Unit (CPSU)	-	-
Operation Panel (OPNL)	-	-
Battery Unit	-	-
Battery Control Unit (BCU)	-	-
Battery Unit (BTU)	-	-
Drive	✓	✓
Drive Enclosure (DE)	-	-
Power Supply Unit (PSU)	-	-
Drive	✓	✓
Panel	-	-
I/O Module (IOM)	✓	✓
Fan Expander Module (FEM)	✓(*2)	-
Power Cord	-	-
SAS Cable	-	-

*1 : This item is available only in a Unified Storage environment.

*2 : A component that is installed in high density DEs.

Availability of Force Enable (For the ETERNUS DX8100 S4) (Force enable is possible: ✓, Force enable is not possible or not applicable: -)

Component	Force Enable Module
Controller Enclosure (CE)	-
Controller Module (CM)	✓

7. Component Storage

Component		Force Enable Module
	Memory	-
	BUD	✓
	FAN Unit	-
	PCIe SW	-
	IOC Port	-
	EXP Port	-
32G FC-CA		✓
	SFP+	✓
16G FC-CA		✓
	SFP+	✓
10G iSCSI-CA		✓
	SFP+	✓
1G iSCSI-CA		✓
	Port	-
iSCSI-RA		✓
	Port	-
CEMP		-
CEMP-D		-
Controller Enclosure Power Supply Unit (CPSU)		-
Operation Panel (OPNL)		-
Battery Unit		-
	Battery Control Unit (BCU)	-
	Battery Unit (BTU)	-
Power Cord		-
Drive		✓(*1)
Drive Enclosure (DE)		-
	Power Supply Unit (PSU)	-
	Drive	✓
	Panel	-
	I/O Module (IOM)	✓
	Power Cord	-
	SAS Cable	-

*1: A component that is installed in the CE of the ETERNUS DX8100 S4.

Availability of Force Enable (For the ETERNUS DX900 S5 or the ETERNUS DX8900 S4) (Force enable is possible: ✓, Force enable is not possible or not applicable: -)

Component	Force Enable Module
Controller Enclosure (CE)	-

7. Component Storage

Component		Force Enable Module
Controller Module (CM)		✓
	Memory	-
	BUD	✓
	FAN Unit	-
	PCIe SW	-
	IOC Port	-
	BE Port	-
	FRT Port	-
	SVC Port	-
32G FC-CA		✓
	SFP+	✓
16G FC-CA		✓
	SFP+	✓
10G iSCSI-CA		✓
	SFP+	✓
1G iSCSI-CA		✓
	Port	-
iSCSI-RA		✓
	Port	-
CEMP		-
CEMP-D		-
PCIe Flash Module (PFM)		✓
Controller Enclosure Power Supply Unit (CPSU)		-
Operation Panel (OPNL)		-
Battery Unit		-
	Battery Control Unit (BCU)	-
	Battery Unit (BTU)	-
Power Cord		-
Drive		✓
Frontend Enclosure (FE)		-
Frontend Enclosure Power Supply Unit (FE PSU)		-
Frontend Router (FRT)		✓
	QSFP+	✓
Service Controller (SVC)		✓
	Port	-
Management Cable		-
FE MP		-
FE MP BRG		-

7. Component Storage

Component	Force Enable Module
Operation Panel (OPNL)	-
FAN Unit (FANU)	-
FPO-SW	-
Drive Enclosure (DE)	-
Power Supply Unit (PSU)	-
Drive	✓
Panel	-
I/O Module (IOM)	✓
Fan Expander Module (FEM)	✓(*1)
Power Cord	-
SAS Cable	-

*1 : A component that is installed in high density DEs.

Caution

- Force enable can be performed only on one component at a time.
- Not all components can be forcibly enabled by using this function. Refer to the following tables for the availability of force enable for each part.
 - ["Availability of Force Enable \(For the ETERNUS DX60 S5, the ETERNUS DX100 S5/DX200 S5, and the ETERNUS AF150 S3/AF250 S3\)"](#)
 - ["Availability of Force Enable \(For the ETERNUS DX500 S5/DX600 S5 and the ETERNUS AF650 S3\)"](#)
 - ["Availability of Force Enable \(For the ETERNUS DX8100 S4\)"](#)
 - ["Availability of Force Enable \(For the ETERNUS DX900 S5 or the ETERNUS DX8900 S4\)"](#)
- When installing the component that cannot be forcibly enabled in the storage system, use the Hot Maintenance or the [Hot Preventive Maintenance] function.
- This function cannot be used under the following conditions:
 - The selected drive is not in the "❌Broken" or "❌Not Supported" state
 - A component (other than a drive) whose state is other than "❌Error" is selected
 - A CM, an IOM, or a SAS cable is selected on a 1CM model
 - A CA is selected from the [Internal Parts] tab in the [Controller Module Detail] screen for the ETERNUS DX60 S5
- Perform the force enable of the NAS Engine by following the instructions given by a maintenance engineer.

Note

- To perform a force enable of the CA for the ETERNUS DX60 S5 with a CM-FC (CM with direct mount CA), use the force enable function for the CM that includes the CA.

■ User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	✓
StorageAdmin	
AccountAdmin	
SecurityAdmin	
Maintainer	✓

Refer to "[A. User Roles and Policies](#)" (page 1580) for details on the policies and roles.

■ Operating Procedures

Procedure ▶▶▶

- 1 Select the component to perform the force enable on, and click [Force Enable] in [Action].
→ A confirmation screen appears.
- 2 Click the [OK] button.
→ The force enable starts.
- 3 Click the [Done] button to return to the screen when the target component was selected in Step 1.

Note

- When forcibly enabling a NAS-CA or a NAS-CA port, access to the network may not be available just after mounting the components. Connect to the network after waiting approximately 10 minutes.

Force Disable Module

- "[Overview](#)" (page 971)
- "[User Privileges](#)" (page 977)
- "[Display Contents](#)" (page 978)
- "[Operating Procedures](#)" (page 978)

■ Overview

When there is a component which cannot be isolated from the storage system in a normal way, this function forces the component to be isolated from the storage system (called "force disable" hereinafter).

This function is used when preparing a component to be removed from the storage system using the hot maintenance or hot preventive maintenance functions, and the status of the component cannot be changed to normal. If the component is installed in the storage system, this function can be performed, irrespective of the status.

7. Component
Storage

Availability of Force Disable (For the ETERNUS DX60 S5, the ETERNUS DX100 S5/DX200 S5, and the ETERNUS AF150 S3/AF250 S3) (Force disable is possible: ✓, Force disable is not possible or not applicable: -)

Component	Force Disable		
	ETERNUS DX60 S5	ETERNUS DX100 S5/DX200 S5	ETERNUS AF150 S3/AF250 S3
Controller Enclosure (CE)	-	-	-
Controller Module (CM)	✓	✓	✓
Memory	-	-	-
BBU	-	-	-
Bootup and Utility Device (BUD)	-	-	✓(*1)
32G FC-CA	-	✓	✓
SFP+	-	✓	✓
16G FC-CA	✓(*2)	✓	✓
SFP+	✓	✓	✓
8G FC-CA	✓(*2)	-	-
SFP+	✓	-	-
10G iSCSI-CA	-	✓	✓
SFP+	-	✓	✓
10G Base-T iSCSI	✓(*2)	✓	✓
Port	✓	✓	✓
1G iSCSI-CA	✓(*2)	✓	-
Port	✓	✓	-
10G NAS-CA	-	✓	-
SFP+	-	✓	-
1G NAS-CA	-	✓	-
Port	-	✓	-
12G SAS-CA	✓(*2)	✓	-
SFP	✓	✓	-
Mid Plane (MP)	-	-	-
Power Supply Unit (PSU)	✓	✓	✓
Drive	✓	✓	✓
Power Cord	-	-	-
Panel	-	-	-
Drive Enclosure (DE)	-	-	-

7. Component Storage

Component	Force Disable		
	ETERNUS DX60 S5	ETERNUS DX100 S5/DX200 S5	ETERNUS AF150 S3/AF250 S3
Power Supply Unit (PSU)	✓	✓	✓
Drive	✓	✓	✓
Panel	-	-	-
I/O Module (IOM)	✓	✓	✓
Fan Expander Module (FEM)	-	✓(*3)	-
Power Cord	-	-	-
SAS Cable	✓	✓	✓

*1 : Force disable is available only for the ETERNUS AF250 S3.

*2 : To perform a force disable of CA, use the force disable function for the CM that includes the CA.

*3 : A component that is installed in high density DEs.

Availability of Force Disable (For the ETERNUS DX500 S5/DX600 S5 and the ETERNUS AF650 S3) (Force disable is possible: ✓, Force disable is not possible or not applicable: -)

Component		Force Disable Module	
		ETERNUS DX500 S5/DX600 S5	ETERNUS AF650 S3
Controller Enclosure (CE)		-	-
Controller Module (CM)		✓	✓
	Memory	-	-
	BUD	✓	✓
	FAN Unit	-	-
	PCIe SW	-	-
	IOC Port	-	-
	EXP Port	-	-
32G FC-CA		✓	✓
	SFP+	✓	✓
16G FC-CA		✓	✓
	SFP+	✓	✓
10G iSCSI-CA		✓	✓
	SFP+	✓	✓
1G iSCSI-CA		✓	-
	Port	✓	-
iSCSI-RA		✓	✓
	Port	✓	✓
10G NAS-CA		✓	-
	SFP+	✓	-

7. Component Storage

Component		Force Disable Module	
		ETERNUS DX500 S5/DX600 S5	ETERNUS AF650 S3
1G NAS-CA		✓	-
	Port	✓	-
CBP		-	-
PCIe Flash Module (PFM)		✓	-
Controller Enclosure Power Supply Unit (CPSU)		✓	✓
Operation Panel (OPNL)		-	-
Battery Unit		-	-
	Battery Control Unit (BCU)	✓	✓
	Battery Unit (BTU)	✓	✓
Drive		✓	✓
Drive Enclosure (DE)		-	-
Power Supply Unit (PSU)		✓	✓
Drive		✓	✓
Panel		-	-
I/O Module (IOM)		✓	✓
Fan Expander Module (FEM)		✓(*1)	-
Power Cord		-	-
SAS Cable		✓	✓

*1: A component that is installed in high density DEs.

Availability of Force Disable (For the ETERNUS DX8100 S4) (Force disable is possible: ✓, Force disable is not possible or not applicable: -)

Component		Force Disable Module
Controller Enclosure (CE)		-
Controller Module (CM)		✓
	Memory	-
	BUD	✓
	FAN Unit	-
	PCIe SW	-
	IOC Port	-
	EXP Port	-
32G FC-CA		✓
	SFP+	✓
16G FC-CA		✓
	SFP+	✓

7. Component Storage

Component		Force Disable Module
10G iSCSI-CA		✓
	SFP+	✓
1G iSCSI-CA		✓
	Port	✓
iSCSI-RA		✓
	Port	✓
CEMP		-
CEMP-D		-
Controller Enclosure Power Supply Unit (CPSU)		✓
Operation Panel (OPNL)		-
Battery Unit		-
	Battery Control Unit (BCU)	✓
	Battery Unit (BTU)	✓
Power Cord		-
Drive		✓(*1)
Drive Enclosure (DE)		-
Power Supply Unit (PSU)		✓
Drive		✓
Panel		-
I/O Module (IOM)		✓
Power Cord		-
SAS Cable		✓

*1: A component that is installed in the CE of the ETERNUS DX8100 S4.

Availability of Force Disable (For the ETERNUS DX900 S5 or the ETERNUS DX8900 S4) (Force disable is possible: ✓, Force disable is not possible or not applicable: -)

Component		Force Disable Module
Controller Enclosure (CE)		-
Controller Module (CM)		✓
	Memory	-
	BUD	✓
	FAN Unit	-
	PCIe SW	-
	IOC Port	-
	BE Port	-
	FRT Port	-
	SVC Port	-

7. Component Storage

Component	Force Disable Module
32G FC-CA	✓
SFP+	✓
16G FC-CA	✓
SFP+	✓
10G iSCSI-CA	✓
SFP+	✓
1G iSCSI-CA	✓
Port	✓
iSCSI-RA	✓
Port	✓
CEMP	-
CEMP-D	-
PCIe Flash Module (PFM)	✓
Controller Enclosure Power Supply Unit (CPSU)	✓
Operation Panel (OPNL)	-
Battery Unit	-
Battery Control Unit (BCU)	✓
Battery Unit (BTU)	✓
Power Cord	-
Drive	✓
Frontend Enclosure (FE)	-
Frontend Enclosure Power Supply Unit (FE PSU)	✓
Frontend Router (FRT)	✓
QSFP+	✓
Service Controller (SVC)	✓
Port	-
Management Cable	✓
FE MP	-
FE MP BRG	-
Operation Panel (OPNL)	✓
FAN Unit (FANU)	✓
FPO-SW	-
Drive Enclosure (DE)	-

7. Component Storage

Component	Force Disable Module
Power Supply Unit (PSU)	✓
Drive	✓
Panel	-
I/O Module (IOM)	✓
Fan Expander Module (FEM)	✓(*1)
Power Cord	-
SAS Cable	✓

*1: A component that is installed in high density DEs.

Caution

- Force disable can be performed only on one component at a time.
- Not all components can be forcibly disabled by using this function. Refer to the following tables for the availability of force disable for each part.
 - ["Availability of Force Disable \(For the ETERNUS DX60 S5, the ETERNUS DX100 S5/DX200 S5, and the ETERNUS AF150 S3/AF250 S3\)"](#)
 - ["Availability of Force Disable \(For the ETERNUS DX500 S5/DX600 S5 and the ETERNUS AF650 S3\)"](#)
 - ["Availability of Force Disable \(For the ETERNUS DX8100 S4\)"](#)
 - ["Availability of Force Disable \(For the ETERNUS DX900 S5 or the ETERNUS DX8900 S4\)"](#)
- This function cannot be used under the following conditions:
 - The selected drive is in the "✘Broken" or "✘Not Supported" state
 - A component (other than a drive) whose state is "○Undefined" is selected
 - A CM is selected on a 1CM model
 - One CM is in error status and the other CM is selected on a 2CM model
 - A CA is selected from the [Internal Parts] tab in the [Controller Module Detail] screen for the ETERNUS DX60 S5

Note

- To perform a force disable of the CA for the ETERNUS DX60 S5 with a CM-FC (CM with direct mount CA), use the force disable function for the CM that includes the CA.

■ User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	
StorageAdmin	
AccountAdmin	
SecurityAdmin	

7. Component Storage

Default role	Availability of executions
Maintainer	✓

Refer to "[A. User Roles and Policies](#)" (page 1580) for details on the policies and roles.

■ Display Contents

[Test Connection] Screen

This screen is displayed when the Master CM is affected by the force disable.
Follow the displayed procedure to confirm that the new Master CM is connected to a LAN.

Function Button

Button	Description
[Test Connection]	Click this button after confirming that the new Master CM is connected to a LAN. The connection status of the new Master CM and the LAN is checked.

[Test Connection Result] Screen

This screen is displayed when the Master CM is affected by the force disable.
The connection status check result of the new Master CM and the LAN is displayed.

Function Button

Button	Description
[Test Connection]	If connection has failed, reconfirm the new Master CM is connected to a LAN, and click this button. The connection status of the new Master CM and the LAN is checked again.
[Resume Processing]	Click this button when connection was successful. Isolation of the CM starts.

■ Operating Procedures

Procedure ▶▶▶

- 1 Select the component to perform the force disable on, and click [Force Disable] in [Action].
→ A confirmation screen appears.

Caution

- When there is a component which can be affected by force disable, a message to that effect is displayed. Check the component which might be affected.

- 2 Click the [OK] button.
→ The operations to be started and the displayed screen vary depending on the conditions as follows.
 - When the Master CM can be affected by the force disable
→ The Master CM is switched, and the "[\[Test Connection\] Screen](#)" (page 978) appears. Proceed to Step 3.
 - When the Master CM cannot be affected by the force disable
→ Isolation of the target component starts. Proceed to Step 6.
- 3 Follow the displayed procedure to confirm that the new Master CM is connected to a LAN.

- 4 After confirming the connection, click the [Test Connection] button.
→ The "[Test Connection Result] Screen" (page 978) appears.
- 5 Confirm the connection status check result, and click the [Resume Processing] button.
→ Isolation of the target component starts.

Caution

- If the connection of the new Master CM and the LAN fails, check the connection status again and return to Step 4.

- 6 Click the [Done] button to return to the screen when the target component was selected in Step 1.

Note

- When forcibly disabling a NAS-CA or a NAS-CA port, the process may take a maximum of 5 minutes to complete. Click the [Done] button and wait for the process to complete.



Controller Enclosure

- "[■ Overview](#)" (page 979)
- "[■ User Privileges](#)" (page 979)
- "[■ Display Contents](#)" (page 979)

■ Overview

This function displays the Controller Enclosure (CE) information.

■ User Privileges

Availability of Executions in the Default Role

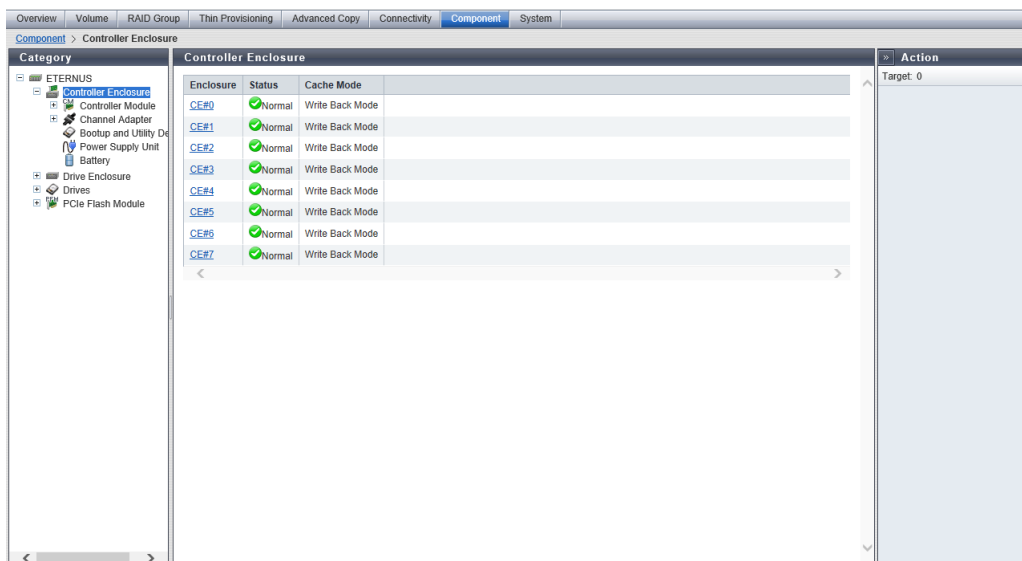
Default role	Availability of executions
Monitor	✓
Admin	✓
StorageAdmin	✓
AccountAdmin	
SecurityAdmin	✓
Maintainer	✓

Refer to "[A. User Roles and Policies](#)" (page 1580)" for details on the policies and roles.

■ Display Contents

The CE information is displayed.

7. Component Controller Enclosure



CE List

The CE list is displayed only for the ETERNUS DX900 S5 or the ETERNUS DX8900 S4.

Item	Description
Enclosure	The CE number is displayed. Click this item to display the "[Controller Enclosure Detail] Screen" (page 981). CE#x x: CE number
Status	The CE status is displayed. Refer to "[Component Status] (page 1607)" for details.

7. Component Controller Enclosure

Item	Description
Cache Mode	<p>The current status and the factor of the cache are displayed. The normal status is "Write Back Mode".</p> <ul style="list-style-type: none"> • Write Back Mode When a Write request is issued from the host, "Write Complete" is displayed after writing to the cache area is complete. • Write Through Mode When a Write request is issued from the host, "Write Complete" is displayed after writing to the cache area and the drives is complete. In the Write Through Mode, "Write Through (factors)" is displayed. When there are multiple factors, all the factors are separated with a "/" (slash) and displayed. Factors of the Write Through Mode are displayed in the following formats. <ul style="list-style-type: none"> - Write Through (Pinned Data) A large amount of pinned data occurred in the storage system. - Write Through (Battery) The battery charge level is low. - Write Through (Maintenance) The following function is currently being used: <ul style="list-style-type: none"> • Upgrading the controller firmware in hot mode • Changing the Controlling CM of the RAID group • Adding the Controller Module (*1) • Setting the Deduplication/Compression mode (when enabling) • Setting the exclusive read cache size - Write Through (1CM) The storage system is operated with 1CM. (*2) <p>*1 : When reassigning the Controlling CM for the RAID group using all normal CMs including the added CM, the cache mode is temporarily changed to "Write Through Mode" during a configuration.</p> <p>*2 : This mode is displayed when "1CM Write Through" is enabled by using the [Setup Subsystem Parameters] function and the storage system is operated with 1CM (only 1CM can be used due to an error such as a CM failure). The "1CM Write Through" setting for the "Setup Subsystem Parameters" function is displayed and can be changed when logged in using a user account with the "Maintenance Operation" policy. The default value is "Disable".</p>

[Controller Enclosure Detail] Screen

[Summary] Tab

CE#x Information (For the ETERNUS DX900 S5 or the ETERNUS DX8900 S4)/CE Information (For the Other Models)

Item	Description
Cache Mode	<p>The current status and the factor of the cache are displayed. This is displayed for the ETERNUS DX900 S5 or the ETERNUS DX8900 S4.</p> <p>Write Back Mode Write Through (Pinned Data) Write Through (Battery) Write Through (Maintenance) Write Through (1CM)</p>
Serial Number	The serial number of the CE is displayed.
Other Information	Other information of the CE is displayed.

7. Component Controller Enclosure

Item	Description
Location	The installation location of the thermal sensor is displayed. Intake Temp Internal Temp
Status	The thermal sensor status is displayed. Normal Warning Maintenance Error Unknown
Error Code	The error code of the thermal sensor is displayed.
Sensor 1	The temperature of CM#0 is displayed. If the thermal information is not available due to problem such as a sensor failure, a "-" (hyphen) is displayed. C: Celsius temperature F: Fahrenheit temperature
Sensor 2	The temperature of CM#1 is displayed. If the thermal information is not available due to problem such as a sensor failure, a "-" (hyphen) is displayed. C: Celsius temperature F: Fahrenheit temperature

[Front View] Tab (For the ETERNUS DX60 S5/DX100 S5/DX200 S5 and the ETERNUS AF150 S3/AF250 S3)

CE Front View

Item	Description
(Storage system image)	The front view of the CE that is installed in the storage system is displayed. When no drives are installed: Blank The drive status is displayed with an icon. Click the drive image to display the [Drive Detail] screen. Refer to "Component Status" (page 1607) for details.

CE Drives Information

Item	Description
Parts	Drive numbers are displayed. Click this item to display the [Drive Detail] screen. Drive#x
Status	The drive status is displayed. Refer to "Drive Status" (page 1607) for details.
Capacity	The capacity of the drive is displayed. Caution <ul style="list-style-type: none"> The displayed drive capacity may differ from the product's actual capacity. For example, the drive capacity of a "1.92 TB SSD" is displayed as "2.00 TB" and the capacity of an "18 TB Nearline SAS disk" is displayed as "17.9 TB".

7. Component Controller Enclosure

Item	Description
Speed	<p>The drive speed is displayed.</p> <p>For SSD or SSD SED, a "-" (hyphen) is displayed.</p> <p>15000 rpm 10000 rpm 7200 rpm "- " (hyphen)</p>
Type	<p>The drive type is displayed.</p> <ul style="list-style-type: none"> • Drive type <ul style="list-style-type: none"> - For SAS disks: Online - For Nearline SAS disks: Nearline - For SSDs, the following items are displayed depending on the SSD type. <ul style="list-style-type: none"> • For SSD-Hs (12 Gbit/s): SSD-H (*1) • For SSD-Ms (12 Gbit/s): SSD-M (*1) • For SSD-Ls (12 Gbit/s): SSD-L (*1) <p>Note that "SED" is also displayed for self encrypting drives and "AF" is also displayed for Advanced Format compliant drives.</p> <p>*1: The displayed item varies depending on the interface speed (bandwidth) or the capacity of the reserved space. Unless otherwise specified, "SSD-H", "SSD-M", and "SSD-L" are collectively referred to as "SSD". In addition, there may be cases when "SSD SED" is used as the collective term for self encrypting SSD-Hs, SSD-Ms, and SSD-Ls.</p>
Usage	<p>The usage of the drive is displayed.</p> <ul style="list-style-type: none"> • Data A drive that is used for user data or an unused drive • Global Hot Spare A drive that is registered as a Global Hot Spare • Dedicated Hot Spare A drive that is registered as a Dedicated Hot Spare
RAID Group	<p>When the drive belongs to a RAID group, the RAID group number and the RAID group name are displayed. However, if the drive usage is "Dedicated Hot Spare", the RAID group number and the RAID group name are displayed even when the drive is not used as a hot spare. Click this item to display the "[RAID Group Detail] Screen ([Basic] Tab)" (page 256).</p> <p>When the usage is not "Dedicated Hot Spare" and the drive is not registered in a RAID group, a "-" (hyphen) is displayed.</p>
Health	<p>The drive lifetime information (0 to 100 %) is displayed. As the lifetime of the drive is reduced, the health level of the drive is decreased.</p> <p>A "-" (hyphen) is displayed in the following conditions:</p> <ul style="list-style-type: none"> • The drive is neither "SSD" nor "SSD SED" • Data sanitization is in progress • The lifetime information cannot be obtained

[Front View] Tab (For the ETERNUS DX500 S5/DX600 S5, the ETERNUS DX900 S5, the ETERNUS DX8100 S4, the ETERNUS DX8900 S4, and the ETERNUS AF650 S3)

CE#x Front View

7. Component Controller Enclosure

Item	Description
(Storage system image)	<p>The front view of the CE that is installed in the storage system is displayed.</p> <p>For the ETERNUS DX8100 S4 or the ETERNUS AF650 S3, 24 drives can be installed.</p> <p>For the ETERNUS DX500 S5/DX600 S5, the ETERNUS DX900 S5, or the ETERNUS DX8900 S4, 16 drives can be installed in slot#0 to slot#15. For slot#16 to slot#23, eight drives or PFMs can be installed. For PFMs, "PFM" is displayed on the image.</p> <p>If both drives and PFMs are not installed, the field is blank.</p> <p>The drive and PFM states are displayed with an icon.</p> <p>Click the drive image to display the [Drive Detail] screen.</p> <p>Click PFM to display the [PCIe Flash Module Detail] screen.</p> <p>The Battery Backup Unit (BBU) status is displayed with an icon.</p> <p>Click the BBU number to display the [Battery Unit Detail] screen.</p> <p>Refer to ""Component Status" (page 1607)" for details.</p>

CE#x Internal Parts Information

Item	Description
Parts	<p>The Battery Unit (BTU) number and the Battery Control Unit (BCU) number are displayed.</p> <p>Click the BTU number to display the [Battery Unit Detail] screen.</p> <p>Click the BCU number to display the [Battery Charger Unit Detail] screen.</p> <p>BTU#x BCU#y x: BTU number y: BCU number</p>
Status	<p>The status of each component is displayed.</p> <p>Refer to ""Component Status" (page 1607)" for details.</p>
Status Code	The status code of each component is displayed.
Error Code	The error code of each component is displayed.

CE#x PCIe Flash Module Information (For the ETERNUS DX900 S5 or the ETERNUS DX8900 S4)/CE PCIe Flash Module Information (For the ETERNUS DX500 S5/DX600 S5)

The PCIe Flash Module information is displayed for the ETERNUS DX500 S5/DX600 S5/DX900 S5 or the ETERNUS DX8900 S4.

Item	Description
Slot No.	The slot number (16 to 23) is displayed.
Parts	<p>The PFM number is displayed.</p> <p>PFM#x x: PFM number</p>
Status	<p>The PFM status is displayed.</p> <p>Refer to ""Component Status" (page 1607)" for details.</p>
Status Code	The PFM status code is displayed.
Error Code	The PFM error code is displayed.

CE#x Drives Information (For the ETERNUS DX900 S5 or the ETERNUS DX8900 S4)/CE Drives Information (For the Other Models)

Item	Description
Slot No.	The slot number (0 to 23) is displayed. Click this item to display the [Drive Detail] screen.
Status	The drive status is displayed. Refer to ""Drive Status" (page 1607)" for details.
Capacity	The capacity of the drive is displayed. <div style="background-color: #fff9c4; padding: 10px; border: 1px solid #ccc;"> <p>Caution</p> <ul style="list-style-type: none"> The displayed drive capacity may differ from the product's actual capacity. For example, the drive capacity of a "1.92 TB SSD" is displayed as "2.00 TB" and the capacity of an "18 TB Nearline SAS disk" is displayed as "17.9 TB". </div>
Speed	The drive speed is displayed. For SSD or SSD SED, a "-" (hyphen) is displayed. 15000 rpm 10000 rpm 7200 rpm
Type	The drive type is displayed. <ul style="list-style-type: none"> Drive type <ul style="list-style-type: none"> For SAS disks: Online For Nearline SAS disks: Nearline For SSDs, the following items are displayed depending on the SSD type. <ul style="list-style-type: none"> For SSD-Hs (12 Gbit/s): SSD-H (*1) For SSD-Ms (12 Gbit/s): SSD-M (*1) For SSD-Ls (12 Gbit/s): SSD-L (*1) <p>Note that "SED" is also displayed for self encrypting drives and "AF" is also displayed for Advanced Format compliant drives.</p> <p>*1: The displayed item varies depending on the interface speed (bandwidth) or the capacity of the reserved space. Unless otherwise specified, "SSD-H", "SSD-M", and "SSD-L" are collectively referred to as "SSD". In addition, there may be cases when "SSD SED" is used as the collective term for self encrypting SSD-Hs, SSD-Ms, and SSD-Ls.</p>
Usage	The usage of the drive is displayed. <ul style="list-style-type: none"> Data A drive that is used for user data or an unused drive Global Hot Spare A drive that is registered as a Global Hot Spare Dedicated Hot Spare A drive that is registered as a Dedicated Hot Spare
RAID Group	When the drive belongs to a RAID group, the RAID group number and the RAID group name are displayed. However, if the drive usage is "Dedicated Hot Spare", the RAID group number and the RAID group name are displayed even when the drive is not used as a hot spare. Click this item to display the [RAID Group Detail] Screen . When the usage is not "Dedicated Hot Spare" and the drive is not registered in a RAID group, a "-" (hyphen) is displayed.

7. Component
Controller Enclosure

Item	Description
Health	<p>The drive lifetime information (or remaining life) is displayed. As the lifetime (0 to 100 %) of the drive is reduced, the health level of the drive is decreased.</p> <p>A "-" (hyphen) is displayed in the following conditions:</p> <ul style="list-style-type: none"> • The drive is neither "SSD" nor "SSD SED" • Data sanitization is in progress • The lifetime information cannot be obtained

[Rear View] Tab (For the ETERNUS DX60 S5/DX100 S5/DX200 S5 and the ETERNUS AF150 S3/AF250 S3)

CE Rear View

Item	Description
(Storage system image)	<p>The rear view of the CE that is installed in the storage system is displayed.</p> <p>The CM and Power Supply Unit (PSU) states are displayed with an icon.</p> <p>Click the CM number to display the [Controller Module Detail] screen.</p> <p>Click the PSU number to display the [PSU/CPSU Detail] screen.</p> <p>Refer to ""Component Status" (page 1607)" for details.</p>

CE Internal Parts Information

Item	Description
Parts	<p>The CM number and the PSU number are displayed.</p> <p>Click the CM number to display the [Controller Module Detail] screen.</p> <p>Click the PSU number to display the [PSU/CPSU Detail] screen.</p> <p>CM#x PSU#y x: CM number y: PSU number</p>
Status	<p>The status of each component is displayed.</p> <p>Refer to ""Component Status" (page 1607)" for details.</p>

[Rear View] Tab

CE#x Rear View (For the ETERNUS DX900 S5 or the ETERNUS DX8900 S4)/CE Rear View (For the Other Models)

Item	Description
(Storage system image)	<p>The rear view of the CE that is installed in the storage system is displayed.</p> <p>The CM, CA, BUD, and CPSU states are displayed with an icon.</p> <p>Click the CM number to display the [Controller Module Detail] screen.</p> <p>Click the CA number to display the [Channel Adapter Detail] screen.</p> <p>Click the BUD number to display the [Bootup and Utility Device Detail] screen.</p> <p>Click the CPSU number to display the [PSU/CPSU Detail] screen.</p> <p>Refer to ""Component Status" (page 1607)" for details.</p>

CE#x Internal Parts Information (For the ETERNUS DX900 S5 or the ETERNUS DX8900 S4)/CE Internal Parts Information (For the Other Models)

Item	Description
Parts	<p>The CM number, the CA number, the BUD number, and the CPSU number are displayed.</p> <p>Click the CM number to display the [Controller Module Detail] screen.</p> <p>Click the CA number to display the [Channel Adapter Detail] screen.</p> <p>Click the BUD number to display the [Bootup and Utility Device Detail] screen.</p> <p>Click the CPSU number to display the [PSU/CPSU Detail] screen.</p> <p>CM#x CM#x CA#y CM#x BUD#z CPSU#w x: CM number y: CA number z: BUD number w: CPSU number</p>
Status	<p>The status of each component is displayed.</p> <p>Refer to "Component Status" (page 1607) for details.</p>

Add Controller Enclosure

- ["■ Overview" \(page 987\)](#)
- ["■ User Privileges" \(page 989\)](#)
- ["■ Display Contents" \(page 990\)](#)
- ["■ Operating Procedures" \(page 992\)](#)

■ Overview

This function adds a Controller Enclosure (CE) without stopping the storage system. After installing a CE for the storage system, activate it via Web GUI. The number of CEs that can be added is as follows:

- For the ETERNUS DX900 S5: CE#1
- For the ETERNUS DX8900 S4: CE#1 - CE#B

Caution

- CEs must be added one at a time.
- Perform the start maintenance operation by using the [Start/End Maintenance] function before adding a CE. If the operation has not been performed, addition cannot be started.
- Be sure to use authorized additional parts. If parts other than the additional parts are used, operation is not guaranteed.
- The Controlling CM for the existing RAID groups is not changed just by adding CEs. (RAID groups are not assigned to the added CMs.) After adding CEs, reassign the Controlling CM for the RAID groups using all CMs including the added CMs. Refer to the [Change Controlling CM] function for details.
- Do not add CEs when Storage Migration paths are set.
- This function cannot be used under the following conditions:
 - Multiple CEs that are targets of a cold addition have been installed
 - The general status of the storage system is not "Normal" (except when using this function to recover the CE adding process (*1))
 - *1: When adding the target CE again after the adding process failed midway through, this function must be started over from the beginning. The "recovery" process initializes (or restores) the CE to the state prior to installing in the storage system.
 - There are no CEs that can be the target of a hot addition, cold addition, or recovery
 - One of the following functions is being performed in the storage system:
 - Format volume
 - Expand volume (LUN Concatenation)
 - Encrypt volume
 - Format TPP
 - Format FTRP
 - Expand RAID group (LDE)
 - There is an REC session in a status other than "✔Suspend"
 - There is a RAID group in the "🔄Rebuild", "🔄Copyback", or "🔄Redundant Copy" state

Note

- To add a CE in cold mode, turn off the storage system, install the target CE, and connect the cables between the CE and the FE. After turning on the storage system, activate the CE via Web GUI.
- If the storage system is configured with four CEs and "ETERNUS DX8900 S4 (4controller enclosure or less)" is being used, CEs cannot be added. Replace "Expansion Frontend enclosure for DX8900 S4" in advance and start this function again.

The Procedure for Adding a Controller Enclosure in Hot Mode

- Normal CE adding process

Procedure ▶▶▶

- 1 Use this function to start adding CEs in hot mode.
- 2 Install the target CE.
- 3 Connect cables between the installed CE (CM#0) - FE.
- 4 Connect cables between the installed CE (CM#1) - FE.
- 5 Activate the installed CE in the storage system.
- 6 Activate the installed CM on the added CE in the storage system.
- 7 Complete the [Add Controller Enclosure] function.
- 8 Change the Controlling CM.

- Recovering the failed CE adding process

Procedure ▶▶▶

- 1 Use this function to start adding CEs in hot mode.
- 2 Initialize the CE to restart the adding process.
- 3 Disconnect the cable from the initialized CE, and then remove the CE from the rack.
- 4 Reinstall the disconnected CE.
- 5 Connect cables between the installed CE (CM#0) - FE.
- 6 Connect cables between the installed CE (CM#1) - FE.
- 7 Activate the installed CE in the storage system.
- 8 Activate the installed CM on the added CE in the storage system.
- 9 Complete the [Add Controller Enclosure] function.
- 10 Change the Controlling CM.

■ User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	
StorageAdmin	
AccountAdmin	
SecurityAdmin	

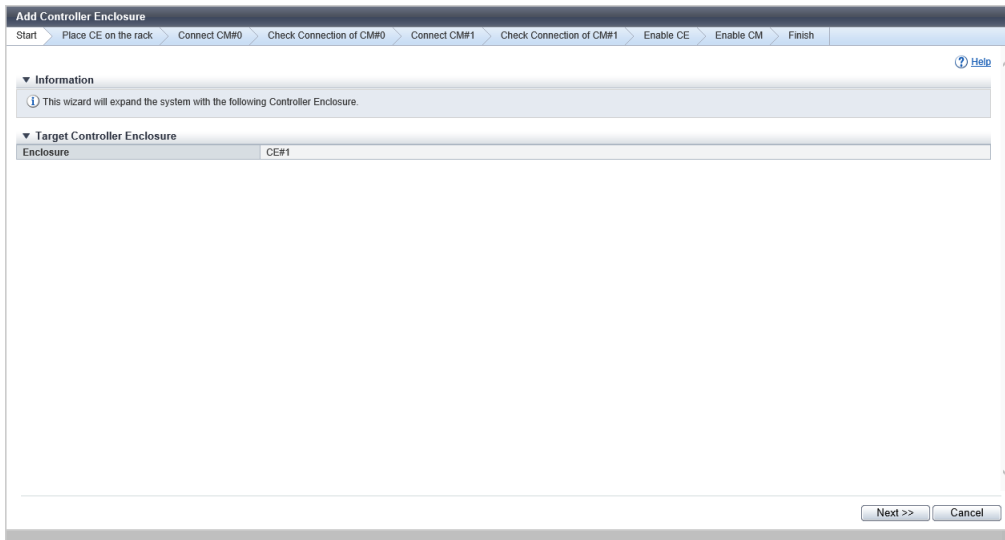
7. Component Controller Enclosure

Default role	Availability of executions
Maintainer	✓

Refer to ["A. User Roles and Policies" \(page 1580\)](#) for details on the policies and roles.

■ Display Contents

The following screens are displayed by the wizard.



[Start] Screen

The CE that is to be added is displayed.

Target Controller Enclosure

Item	Description
Enclosure	The CE number that is to be added is displayed. CE#x x: CE number

[Start] Screen (Initialization Progress)

The status monitoring progress for the CE and CM that are to be added is displayed. This screen is displayed when adding the target CE in cold mode or when recovering the CE adding process.

Status Check

Item	Description
Parts	The status monitoring target component is displayed. CE#x CE#x CM#y x: CE number y: CM number
Progress	The progress rate (0 to 100 %) of the status monitoring is displayed.

7. Component Controller Enclosure

Item	Description
Status	The status of the monitoring target components is displayed.

[Start] Screen (Detach Cable)

The cable and CE removal procedures are displayed.
This screen is displayed when recovering the CE adding process.

[Place CE on the rack] Screen

The procedure to install a CE is displayed.

[Connect CM#0] Screen

The cable connection procedure for CM#0 is displayed.

[Check Connection of CM#0] Screen

The cable connection progress for CM#0 is displayed with a bar and progress rate.

Status Check

Item	Description
Parts	The port that is connected to the target CM is displayed. FRT#x Port (CE#y CM#0) SVC#z Port (CE#y CM#0) x: FRT number y: CE number z: SVC number
Progress	The status monitoring progress rate (0 to 100 %) of the target component is displayed.
Status	The port status that is connected to the target CM is displayed.

[Connect CM#1] Screen

The cable connection procedure for CM#1 is displayed.

[Check Connection of CM#1] Screen

The cable connection progress for CM#1 is displayed with a bar and progress rate.

Status Check

Item	Description
Parts	The port that is connected to the target CM is displayed. FRT#x Port (CE#y CM#1) SVC#z Port (CE#y CM#1) x: FRT number y: CE number z: SVC number
Progress	The status monitoring progress rate (0 to 100 %) of the target component is displayed.
Status	The port status that is connected to the target CM is displayed.

[Enable CE] Screen

The progress rate of the activation process of the CE is displayed.

Status Check

Item	Description
Parts	The components in the CE that is to be added are displayed. CE#x CM#y CE#x CM#y DMA Port#z FRT#w Port (CE#x CM#y) SVC#v Port (CE#x CM#y) CE#x CPSU#X CE#x BCU#Y CE#x BTU#Z x: CE number y: CM number z: DMA Port number w: FRT number v: SVC number X: CPSU number Y: BCU number Z: BTU number
Progress	The component activation progress rate (0 to 100 %) is displayed.
Status	The component status in the CE that is to be added is displayed.

[Enable CM] Screen

The progress rate of the activation process of the CM is displayed.

Status Check

Item	Description
Parts	The CMs in the CE that is to be added are displayed. CE#x CM#y x: CE number y: CM number
Progress	The progress rate (0 to 100 %) of the activation process of the CM is displayed.
Status	The CM status in the CE that is to be added is displayed.

[Finish] Screen

A message indicating that the CE was added successfully is displayed.

■ Operating Procedures

Procedure ▶▶▶

- 1 Click [Add Controller Enclosure] in [Action].
→ The "[Start] Screen" (page 990) appears.

- 2** Click the [Next >>] button.
→ The displayed screen may vary depending on whether the recovery CE adding process is required or not.
 - When the recovery CE adding process is required:
→ The "[Start] Screen (Initialization Progress)" (page 990) appears. When the initialization is complete, the "[Start] Screen (Detach Cable)" (page 991) appears. Proceed to Step 3.
 - When the recovery CE adding process is not required
→ The "[Place CE on the rack] Screen" (page 991) appears. Proceed to Step 4.
- 3** Disconnect the cables and the CE according to the displayed procedure and click the [Next >>] button.
→ The "[Place CE on the rack] Screen" (page 991) appears.
- 4** Mount the CE in the rack according to the displayed procedure and click the [Next >>] button.
→ The "[Connect CM#0] Screen" (page 991) appears.
- 5** Connect the cables according to the displayed procedure and click the [Next >>] button.
→ The "[Check Connection of CM#0] Screen" (page 991) appears. After connecting cables is complete, the "[Connect CM#1] Screen" (page 991) appears.
- 6** Connect the cables according to the displayed procedure and click the [Next >>] button.
→ The "[Check Connection of CM#1] Screen" (page 991) appears. After connecting cables is complete, the "[Enable CE] Screen" (page 992) appears.
- 7** Check the activation state of the CE.
→ After the CE activation is complete, the "[Enable CM] Screen" (page 992) appears.
- 8** Check the activation state of the CM.
→ When the CM activation is complete, the "[Finish] Screen" (page 992) appears.
- 9** Click the [Done] button to return to the [Controller Enclosure] screen.

Note

- The Controlling CM for the existing RAID groups is not changed just by adding CEs. After adding CEs, reassign the Controlling CM for the RAID groups using all CMs including the added CMs. Refer to the [Change Controlling CM] function for details.



Turn on Locator Beacon/Turn off Locator Beacon

- "[■ Overview](#)" (page 993)
- "[■ User Privileges](#)" (page 994)
- "[■ Operating Procedures](#)" (page 995)

■ Overview

This function blinks or turns off the locator beacon of the Controller Enclosure (CE), the Controller Module (CM), the Drive Enclosure (DE), or Frontend Enclosure (FE) (only for the ETERNUS DX900 S5 or the ETERNUS DX8900 S4) to identify the component that requires maintenance.

In regards to the CE, DE, or FE, when instructing the LEDs to turn on/turn off, the "IDENTIFY LED" lamps shown below will blink/turn off.

Controlled LEDs

Designated target component		LED controlled target component
CE		The front cover of the CE
		The CM in the rear of the CE (CM#0, CM#1)
DE	2.5" DE	The front cover of the DE
	3.5" DE	The IOM in the rear of the DE (IOM#0, IOM#1)
	3.5" high density DE	The front cover of the DE
		The IOM in the rear of the DE (IOM#0, IOM#1)
		The FEM in the rear of the DE (FEM#0, FEM#1)
	FE	
The FRT in the rear of the FE (FRT#0 - FRT#3)		

Note

- When the LEDs in the CE are instructed to turn on/off, the LEDs on the front cover of the CE and the LEDs for the CM on the rear of the CE are blinked/turned off. Note that the option to turn on/off the LEDs for a specific component is not available. Instructing the CE LEDs to turn on/off is performed by using the [Controller Enclosure Detail] screen. Refer to the [Controller Enclosure] function for details.
- When the LEDs in the DE are instructed to turn on/off, the LEDs on the front cover of the DE, the IOM LEDs on the rear of the DE, and the FEMs on the rear of the DE (high density DE only) are blinked/turned off. Note that the option to turn on/off the LEDs for a specific component is not available. Instructing the DE LEDs to turn on/off is performed by using the [Drive Enclosure Detail] screen. Refer to the [Drive Enclosure] function for details.
- When the LEDs in the FE are instructed to turn on/off, the LEDs on the front cover of the FE and the LEDs for the FRT on the rear of the FE are blinked/turned off. Note that the option to turn on/off the LEDs for a specific component is not available. Instructing the FE LEDs to turn on/off is performed by using the [Frontend Enclosure] screen. Refer to the [Frontend Enclosure] function for details.
- Turning the LED of the drive on or off is instructed from CLI. Refer to "set led" in the "ETERNUS CLI User's Guide" for details.

■ User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	✓
Admin	✓
StorageAdmin	✓
AccountAdmin	
SecurityAdmin	✓
Maintainer	✓

Refer to ["A. User Roles and Policies" \(page 1580\)](#) for details on the policies and roles.

■ Operating Procedures

Turning on the LED

Procedure ▶▶▶

- 1 Click [Turn on locator beacon] in [Action].
→ A confirmation screen appears.

Caution

- If the LED is already blinked, [Turn on locator beacon] cannot be selected.

- 2 Click the [OK] button.
→ The locator beacon is turned on.
- 3 Click the [Done] button to return to the screen when starting this function in Step 1.



Turning off the LED

Procedure ▶▶▶

- 1 Click [Turn off locator beacon] in [Action].
→ A confirmation screen appears.

Caution

- If the LED is already turned off, [Turn off locator beacon] cannot be selected.

- 2 Click the [OK] button.
→ The locator beacon is turned off.
- 3 Click the [Done] button to return to the screen when starting this function in Step 1.



Controller Module

- ["■ Overview" \(page 995\)](#)
- ["■ User Privileges" \(page 995\)](#)
- ["■ Display Contents" \(page 996\)](#)

■ Overview

This function displays the Controller Module (CM) information.

■ User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	✓
Admin	✓

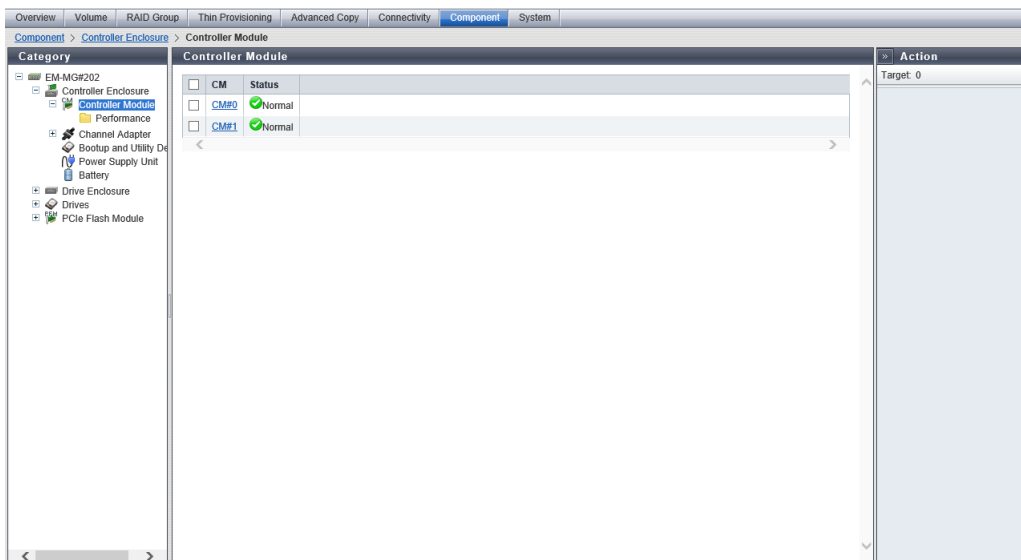
7. Component Controller Enclosure

Default role	Availability of executions
StorageAdmin	✓
AccountAdmin	
SecurityAdmin	✓
Maintainer	✓

Refer to "[A. User Roles and Policies](#)" (page 1580)" for details on the policies and roles.

■ Display Contents

In this screen, controller module information is displayed.



Controller Module List

Item	Description
Enclosure	The Controller Enclosure (CE) number is displayed. Click this item to display the " [Controller Enclosure Detail] Screen " (page 981). This item is displayed for the ETERNUS DX900 S5 or the ETERNUS DX8900 S4. CE#x x: CE number
CM	The CM number is displayed. Click this item to display the " [Controller Module Detail] Screen " (page 996). CM#x x: CM number
Status	The CM status is displayed. Refer to " Component Status " (page 1607)" for details.

[Controller Module Detail] Screen

In this screen, the detailed CM information is displayed.

[Summary] Tab

CE#x CM#y Information (For the ETERNUS DX900 S5 or the ETERNUS DX8900 S4)/CM#y Information (For the Other Models)

Item	Description
Location	The CM number is displayed. For the ETERNUS DX900 S5 or the ETERNUS DX8900 S4 CE#x CM#y For the other models CM#y x: CE number y: CM number
Status	The CM status is displayed. <div style="background-color: #fff9c4; padding: 10px; border: 1px solid #ccc;"> <p>Caution</p> <ul style="list-style-type: none"> In the Unified Storage environment, "Maintenance" is displayed as a CM status until a NAS system volume is generated. The CM status changes to "Normal" after a NAS user volume is created and the NAS system volume is generated. </div> <p>Refer to "Component Status" (page 1607)" for details.</p>
Memory Size	The cache memory capacity of the CM is displayed.
Part Number	The CM port number is displayed.
Serial Number	The serial number of the CM is displayed.
Hardware Revision	The hardware version of the CM is displayed.
MAC Address (MNT)	The MAC address of the MNT Port is displayed.
MAC Address (RMT)	The MAC address of the RMT Port is displayed.
MAC Address (FST)	The MAC address of the FST Port is displayed. This item is displayed for the ETERNUS DX500 S5/DX600 S5/DX900 S5, the ETERNUS DX8100 S4/DX8900 S4, and the ETERNUS AF650 S3.
Active EC	The Edition Control (EC) number of the currently running firmware is displayed. EC#x x: EC number
Next EC	The EC number of the firmware that is to be run at the next power-on is displayed. EC#x x: EC number
CPU Clock	The CPU clock frequency is displayed.
CPU Status	The CPU status is displayed. Refer to " Component Status " (page 1607)" for details.
CPU Status Code	The CPU status code is displayed.
CPU Error Code	The CPU error code is displayed.

[Internal Parts] Tab

CE#x CM#y Internal Parts Information (For the ETERNUS DX900 S5 or the ETERNUS DX8900 S4)/CM#y Internal Parts Information (For the Other Models)

Item	Description
Parts	<p>The component name and the component number are displayed.</p> <p>A link is displayed when the part is "SAS Cable". Click this item to display the "[SAS Cable Detail] Screen" (page 998).</p> <p>The following items are displayed for the ETERNUS DX900 S5 or the ETERNUS DX8900 S4.</p> <ul style="list-style-type: none"> • A link is displayed when the part is "Frontend Cable". Click this item to display the "[Frontend Cable Detail] Screen" (page 999). • A link is displayed when the part is "Management Cable". Click this item to display the "[Management Cable Detail] Screen" (page 999). • A link is displayed when the part is "BUD". Click this item to display the "[Bootup and Utility Device Detail] Screen" (page 1000).
Status	<p>The component status is displayed.</p> <p>Refer to "'Component Status' (page 1607)" for details.</p>
Error Code	<p>The component error code is displayed.</p>
Notes	<p>Remarks are displayed.</p> <ul style="list-style-type: none"> • When "Parts" is "Memory", the memory capacity is displayed. • When "Parts" is "BBU", the battery charge level is displayed (for the ETERNUS DX60 S5/DX100 S5/DX200 S5 and the ETERNUS AF150 S3/AF250 S3). When the battery charge level is 90% or more, "Full Charge" is displayed. When the battery charge level is less than 90%, "xx%" is displayed. • When "Parts" is "SATA SSD Controller", the firmware version of the currently running EC is displayed (for the ETERNUS DX100 S5/DX200 S5 and the ETERNUS AF150 S3/AF250 S3).

[View] Tab

CE#x CM#y Rear View (For the ETERNUS DX900 S5 or the ETERNUS DX8900 S4)/CM#y Rear View (For the Other Models)

Item	Description
(Storage system image)	<p>The rear view of the CE that is installed in the storage system is displayed.</p> <p>The CM number, the CA number, and the BUD number are displayed.</p> <p>Components that are not CMs are grayed out.</p> <p>The CM status is displayed with an icon.</p> <p>Click the CM number to display the [Controller Module Detail] screen.</p> <p>Click the CA number to display the [Channel Adapter Detail] screen.</p> <p>Click the BUD number to display the [Bootup and Utility Device Detail] screen.</p> <p>Refer to "'Component Status' (page 1607)" for details.</p>

[SAS Cable Detail] Screen

The details of SAS cable is displayed.

[Summary] Tab

CE#x CM#y SAS Cable#n (OUT) Information (For the ETERNUS DX900 S5 or the ETERNUS DX8900 S4)/CM#y SAS Cable#n (OUT) Information (For the Other Models)

Item	Description
Status	The SAS cable status is displayed. Refer to "" Component Status " (page 1607)" for details.
Status Code	The SAS cable status code is displayed.
Error Code	The SAS cable error code is displayed.

[Frontend Cable Detail] Screen

The details of Frontend cable is displayed.
This screen is displayed for the ETERNUS DX900 S5 or the ETERNUS DX8900 S4.

[Summary] Tab

CE#x CM#y Frontend Cable (FRT#z) Information

Item	Description
Status	The Frontend cable status is displayed. Refer to "" Component Status " (page 1607)" for details.
Status Code	The Frontend cable status code is displayed.
Error Code	The Frontend cable error code is displayed.
Type	The Frontend cable type is displayed. <ul style="list-style-type: none"> "Cu" is displayed when the connection cable between the CM-FRT is a Frontend electric cable. "AOC (Active Optical Cable)" is displayed when the connection cable between the CM-FRT is a Frontend optical cable.
Part Number	The part number of the Frontend cable is displayed.
Serial Number	The serial number of the Frontend cable is displayed.
Hardware Revision	The hardware version of the Frontend cable is displayed. If the hardware version cannot be obtained, the field is blank.

[Management Cable Detail] Screen

The details of Management cable is displayed.
This screen is displayed for the ETERNUS DX900 S5 or the ETERNUS DX8900 S4.

[Summary] Tab

CE#x CM#y Management Cable (SVC#z) Information

Item	Description
Status	The Management cable status is displayed. Refer to "" Component Status " (page 1607)" for details.
Status Code	The Management cable status code is displayed.
Error Code	The Management cable error code is displayed.

[Bootup and Utility Device Detail] Screen

The details of Bootup and Utility Device (BUD) is displayed.

This screen is displayed for the ETERNUS DX500 S5/DX600 S5/DX900 S5, the ETERNUS DX8100 S4/DX8900 S4, and the ETERNUS AF650 S3.

[Summary] Tab

CM#y BUD#z Information (For the ETERNUS DX500 S5/DX600 S5, the ETERNUS DX8100 S4, or the ETERNUS AF650 S3)/CE#x CM#y BUD#z Information (For the ETERNUS DX900 S5 or the ETERNUS DX8900 S4)

Item	Description
Location	The location of the BUD is displayed. For the ETERNUS DX500 S5/DX600 S5, the ETERNUS DX8100 S4, or the ETERNUS AF650 S3 CM#y BUD#z For the ETERNUS DX900 S5 or the ETERNUS DX8900 S4 CE#x CM#y BUD#z x: CE number y: CM number z: BUD number
Status	The BUD status is displayed. Refer to " Component Status " (page 1607)" for details.
Status Code	The BUD status code is displayed.
Error Code	The BUD error code is displayed.
Part Number	The BUD part number is displayed.
Serial Number	The BUD serial number is displayed.
Hardware Revision	The hardware version of the BUD is displayed.

[View] Tab

CM#y BUD#z Rear View (For the ETERNUS DX500 S5/DX600 S5, the ETERNUS DX8100 S4, or the ETERNUS AF650 S3)/CE#x CM#y BUD#z Rear View (For the ETERNUS DX900 S5 or the ETERNUS DX8900 S4)

Item	Description
(Storage system image)	The rear view of the CE that is installed in the storage system is displayed. Components that are not BUD are grayed out. The BUD status is displayed with an icon. Refer to " Component Status " (page 1607)" for details.

Add Controller Module

- "[Overview](#)" (page 1001)
- "[User Privileges](#)" (page 1001)
- "[Display Contents](#)" (page 1002)
- "[Operating Procedures](#)" (page 1003)

■ Overview

This function adds a Controller Module (CM) and an I/O Module (IOM) while the storage system is operating.

After installing a CM and an IOM in the storage system, activate them via Web GUI.

Caution

- Perform the start maintenance operation by using the [Start/End Maintenance] function before adding a CM and an IOM. If the operation has not been performed, addition cannot be started.
- Be sure to use authorized additional parts. If parts other than the additional parts are used, operation is not guaranteed.
- This function can be used on the following storage system:
 - ETERNUS DX60 S5/DX100 S5/DX200 S5 equipped with one CM
- Even when a CM that is to be added already has a CA, the CA is not activated at the same time as the CM. After a CM is added, the CA must be activated by using the [Add Channel Adapter] function.

For the ETERNUS DX60 S5, adding the CA is not required because the CA is defined when adding a CM.
- Do not add CMs when Storage Migration paths are set.
- This function cannot be used under the following conditions:
 - The general status of the storage system is not "Normal"
When performing the recovery process before adding a CM, execute this function even if the general status of the storage system is other than "Normal".
 - One of the following functions is being performed in the storage system:
 - Format Volume
 - Format Thin Provisioning Pool (TPP)
 - Format Flexible Tier Pool (FTRP)
 - Expand RAID Group
 - Encrypt Volume
 - An REC Disk Buffer is being used
 - There is an REC session in a status other than "✔Suspend"
 - There is a RAID group in the "🔄Rebuild", "🔄Copyback", or "🔄Redundant Copy" state

Note

- Even if addition of a CM fails due to a malfunction, it can be resumed from where it was interrupted after repairing the broken component.
- When adding CMs in the ETERNUS DX900 S5 or the ETERNUS DX8900 S4, adding a CE is required. CMs that are already installed in the CE are added when adding CEs. Refer to the [Add Controller Enclosure] function for details.

■ User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	

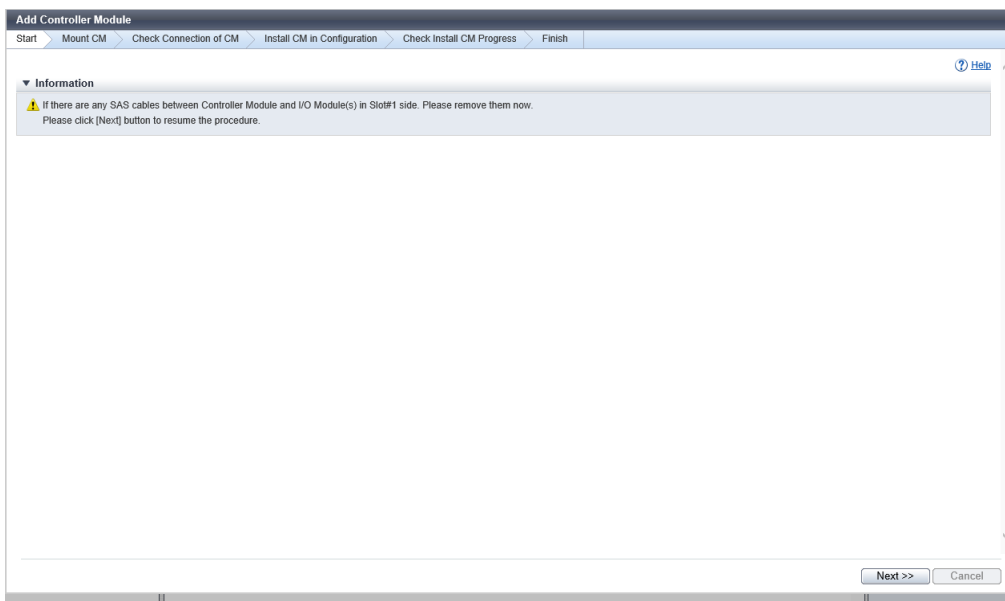
7. Component Controller Enclosure

Default role	Availability of executions
Admin	
StorageAdmin	
AccountAdmin	
SecurityAdmin	
Maintainer	✓

Refer to ["A. User Roles and Policies" \(page 1580\)](#) for details on the policies and roles.

■ Display Contents

The following screens are displayed by the wizard.



[Start] Screen/[Start] Screen (Start Recovery Process)

A message that indicates the start of adding a CM and an IOM appears.

If the recovery process needs to be performed, a message that indicates the start of recovery operation appears. Perform the recovery operation according to the displayed procedure.

[Mount IOM] Screen

The procedure to add an IOM is displayed. Mount the IOM according to the displayed procedure.

[Mount CM] Screen

The procedure to add a CM is displayed. Mount the CM according to the displayed procedure.

[Check Connection of CM] Screen / [Check Install CM/IOM Progress] Screen

The progress rate of the connection confirmation of the added CM or the progress rate of the installation process of the added CM and IOM is displayed.

Item	Description
Parts	The added CM and IOM numbers are displayed. CM#x x: CM number DE#yy IOM#z yy: DE number z: IOM number
Progress	The progress rate (0 to 100 %) of the connection confirmation of the CM or the progress rate (0 to 100 %) of the installation process of the CM and IOM is displayed.
Status	The CM state and IOM state when they are added are displayed.

[Finish] Screen

A message indicating that the CM was added successfully is displayed.

■ Operating Procedures

Procedure ▶▶▶

- 1 Click [Add Controller Module] in [Action].
→ The displayed screen may vary depending on whether the recovery process is required or not.
 - When the recovery process is required:
→ The "[Start] Screen/[Start] Screen (Start Recovery Process)" (page 1002) is displayed to start the recovery process. Proceed to Step 2.
 - When the recovery process is not required:
→ The "[Start] Screen/[Start] Screen (Start Recovery Process)" (page 1002) appears. Proceed to Step 3.
- 2 Perform the recovery operation according to the displayed procedure. When the recovery operation is complete, click the [Next >>] button.
→ The "[Mount IOM] Screen" (page 1002) appears. Proceed to Step 4.
- 3 Click the [Next >>] button.
→ The "[Mount IOM] Screen" (page 1002) appears.
- 4 Install the IOM according to the displayed procedure and click the [Next >>] button.
→ The "[Mount CM] Screen" (page 1002) appears.
- 5 Install the CM according to the displayed procedure and click the [Next >>] button.
→ The "[Check Connection of CM] Screen / [Check Install CM/IOM Progress] Screen" (page 1002) appears.
After confirming the connection status, the [Install CM/IOM in Configuration] screen appears.
- 6 Click the [Next >>] button.
→ The "[Check Connection of CM] Screen / [Check Install CM/IOM Progress] Screen" (page 1002) appears.
After the installation is complete, the "[Finish] Screen" (page 1003) appears.
- 7 Click the [Done] button to return to the [Controller Module] screen.

Note

- The Controlling CMs for RAID groups are reassigned using all normal CMs installed in the storage system, including the added CM. The assignment sequence is the same as when "Automatic" is selected in the [Change Controlling CM] function.



Add Memory

- ["■ Overview" \(page 1004\)](#)
- ["■ User Privileges" \(page 1006\)](#)
- ["■ Display Contents" \(page 1006\)](#)
- ["■ Operating Procedures" \(page 1011\)](#)

■ Overview

This function adds memory while the storage system is operating.

After memory is added to the memory slot of the Controller Module (CM), activate it from Web GUI.

Memory Specifications of Each Model (per CM)

Model	Memory type	Memory size	Possible number of memory modules installed	Memory expansion unit (per CM)
ETERNUS DX100 S5	16 GB, 32 GB (*1)	32 GB, 64 GB	1	1
ETERNUS DX500 S5	16 GB, 32 GB, 64 GB	64 GB, 128 GB, 256 GB	4	4
ETERNUS DX600 S5	16 GB, 32 GB, 64 GB	96 GB, 192 GB, 384 GB	6	6
ETERNUS DX8100 S4	16 GB	48 GB	3	3
ETERNUS DX900 S5 ETERNUS DX8900 S4	16 GB, 32 GB, 64 GB, 128 GB	96 GB, 192 GB, 384 GB, 768 GB	6	6
ETERNUS AF650 S3	64 GB, 128 GB	384 GB, 768 GB	6	6

*1: The "32 GB" memory type is a "Memory Extension" that is used in the Unified Storage environment. To register a Unified License in a customer environment, "Memory Extension" must be added in advance.

Caution

- Perform the start maintenance operation by using the [Start/End Maintenance] function before adding memory. If the operation has not been performed, addition cannot be started.
- Be sure to use authorized additional parts. If parts other than the additional parts are used, operation is not guaranteed.
- For the ETERNUS DX8900 S4, a license must be registered to use the added memory. Refer to the [Expand System Memory Capacity] function for details.
- If the CM to which memory is to be added is a Master CM, the Master CM is switched.
- The memory is added to all the enabled CMs installed in the storage system.
- This function is not available for the ETERNUS DX60 S5 and the ETERNUS AF150 S3/AF250 S3.
- Refer to ""[Memory Specifications of Each Model \(per CM\)](#)" (page 1004)" to make sure to observe the memory expansion unit when adding memory. If the number of installed memory modules is less than the number of installed memory expansion units, the installed memory modules cannot be used.
- Do not add memory when Storage Migration paths are set.
- This function cannot be used under the following conditions:
 - The general status of the storage system is not normal
 - The Drive Enclosure (DE) may be blocked
 - Maintenance for the CM cannot be performed
 - A recovery operation for the CM is being performed
 - The Master CM cannot be switched
 - An error exists in another part

Note

- If an activation fails midway through the memory adding process for models other than the ETERNUS DX900 S5 and the ETERNUS DX8900 S4, the [Add Memory] function must be executed again.
Perform the following procedure.

Procedure ▶▶▶

- 1** Perform a maintenance for the target component that failed to be added.
- 2** Restore the memory that failed to be added back to the initial state (by performing a preventive maintenance for the target CM to remove the memory).
Refer to ["Hot Preventive Maintenance" \(page 956\)](#) for details.
- 3** Execute this function again.

- Even if an activation fails midway through the memory adding process for the ETERNUS DX900 S5 or the ETERNUS DX8900 S4, the process can be resumed from where it was interrupted by executing this function again after a maintenance for the target component that failed to be added is complete.
- For the ETERNUS DX900 S5 or the ETERNUS DX8900 S4, memory is added in descending order from the CM (CE#x CM#y) that is installed in the CE with the largest number. Add the memory in the Master CM last.
- The physical capacity of the installed memory in the CM is displayed in the "Memory Size" field on the [Controller Module Detail] screen. Refer to the [Controller Module] function for details.

■ User Privileges

Availability of Executions in the Default Role

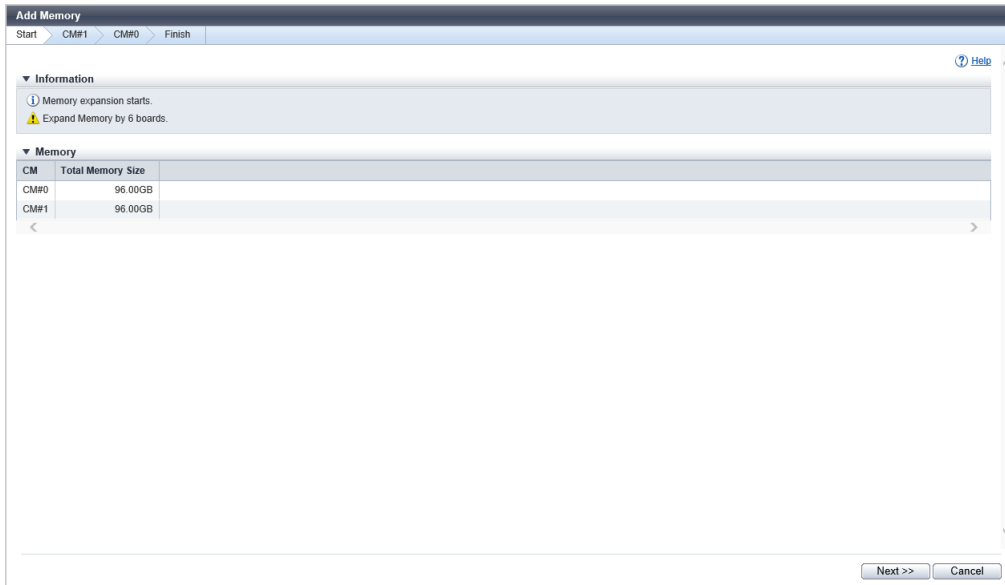
Default role	Availability of executions
Monitor	
Admin	
StorageAdmin	
AccountAdmin	
SecurityAdmin	
Maintainer	✓

Refer to ["A. User Roles and Policies" \(page 1580\)](#) for details on the policies and roles.

■ Display Contents

The following screens are displayed by the wizard.

7. Component Controller Enclosure



[Start] Screen

A message that indicates the start of memory expansion appears. In addition, the current memory capacity of the CM is displayed.

Memory

Item	Description
CM	The CM number is displayed. For the ETERNUS DX900 S5 or the ETERNUS DX8900 S4 CE#x CM#y For the other models CM#y x: CE number y: CM number
Total Memory Size	The total memory capacity installed on each CM is displayed.
Activated Memory Size	The memory capacity that can be used for each CM is displayed.

[CM#x Start] Screen

The parts information which can be affected by adding memory is displayed.

Expansion Operation

Item	Description	Setting values
Mode	<p>Select the memory expansion mode.</p> <ul style="list-style-type: none"> Expansion memory Memory capacity expansion by replacing the DIMMs. Cache memory capacity expansion without memory expansion Memory capacity expansion without replacing the DIMMs. <p>This mode is available only when the "GS License" has not been registered in the ETERNUS DX8900 S4.</p> <p>Note</p> <ul style="list-style-type: none"> When adding memory to the first CM in the list, "Expansion memory" is selected by default. When adding memory to the second and subsequent CMs in the list, the mode that is selected for the previous memory expansion is selected. If the [Expand System Memory Capacity] function is used to register the "memory expansion license", select "Cache memory capacity expansion without memory expansion" to expand the cache memory capacity. 	<p>Expansion memory (Default (*1))</p> <p>Cache memory capacity expansion without memory expansion</p> <p>*1: Refer to "Note" in the description for details.</p>

Memory

Item	Description
Target Component	<p>The CM number to which memory is to be added is displayed.</p> <p>For the ETERNUS DX900 S5 or the ETERNUS DX8900 S4 CE#x CM#y Memory</p> <p>For the other models CM#y Memory</p> <p>x: CE number y: CM number</p>
Associated Component	<p>The parts which can be affected by adding memory are displayed.</p> <p>For the ETERNUS DX500 S5/DX600 S5, the ETERNUS DX8100 S4, or the ETERNUS AF650 S3 CM#y CM#y CA#z BUD FAN SFP</p> <p>For the ETERNUS DX900 S5 or the ETERNUS DX8900 S4 CE#x CM#y CE#x CM#y CA#z BUD FAN SFP</p> <p>For the other models CM#y CM#y CA#z BUD SFP</p> <p>x: CE number y: CM number z: CA number</p>

7. Component Controller Enclosure

Item	Description
Total Memory Size	The total memory capacity installed on the target CM is displayed.
Activated Memory Size	The memory capacity that can be used for the target CM is displayed.

Item	Description
Slot	The slot number in which memory is installed is displayed. Slot#x x: Slot number
Memory Size	The installed memory capacity is displayed.

[Test Connection] Screen

This screen is displayed when the CM to which memory is added is a Master CM.
Follow the displayed procedure to confirm that the new Master CM is connected to a LAN.

Function Button

Button	Description
[Test Connection]	Click this button after confirming that the new Master CM is connected to a LAN. The connection status of the new Master CM and the LAN is checked.

[Test Connection Result] Screen

This screen is displayed when the CM to which memory is added is a Master CM.
The connection status check result of the new Master CM and the LAN is displayed.

Function Button

Button	Description
[Test Connection]	If connection has failed, reconfirm the new Master CM is connected to a LAN, and click this button. The connection status of the new Master CM and the LAN is checked again.
[Resume Processing]	Click this button when connection was successful. Isolation of the CM starts.

[Isolation Progress] Screen

The progress rate of isolating the CM is displayed.

Status Check

Item	Description
CM	The CM number is displayed. For the ETERNUS DX900 S5 or the ETERNUS DX8900 S4 CE#x CM#y For the other models CM#y x: CE number y: CM number
Progress	The progress rate (0 to 100 %) of isolating the CM is displayed.

7. Component Controller Enclosure

Item	Description
Status	The CM status is displayed.

[Workflow] Screen

Memory

Item	Description
Target Component	The CM number to which memory is to be added is displayed. For the ETERNUS DX900 S5 or the ETERNUS DX8900 S4 CE#x CM#y Memory For the other models CM#y Memory x: CE number y: CM number
Total Memory Size	The total memory capacity installed on the target CM is displayed.
Activated Memory Size	The memory capacity that can be used for the target CM is displayed.

Item	Description
Slot	The slot number in which memory is installed is displayed. Slot#x x: Slot number
Memory Size	The installed memory capacity is displayed.

Workflow Sequence

The procedure to add memory is displayed. Add memory according to the displayed procedure.

[Activation Progress] Screen

The progress rate of the activation process of the CM and the IOM is displayed.

Status Check

Item	Description
Parts	The target CM and the IOM which is connected to the CM are displayed. For the ETERNUS DX900 S5 or the ETERNUS DX8900 S4 CE#x CM#y DE#zz IOM#w For the other models CM#y DE#zz IOM#w x: CE number y: CM number zz: DE number w: IOM number
Progress	The progress rate (0 to 100 %) of the activation process of the CM and the IOM is displayed.
Status	The status of CM and IOM is displayed.

[CM#x End] Screen

The CM with the added memory is displayed.

Memory

Item	Description
Target Component	The CM number to which memory has been added is displayed. For the ETERNUS DX900 S5 or the ETERNUS DX8900 S4 CE#x CM#y Memory For the other models CM#y Memory x: CE number y: CM number
Total Memory Size	The total memory capacity installed on the target CM is displayed.
Activated Memory Size	The memory capacity that can be used for the target CM is displayed.

Item	Description
Slot	The slot number in which memory is installed is displayed. Slot#x x: Slot number
Memory Size	The installed memory capacity is displayed.

[Finish] Screen

All the CMs to which memory has been added are displayed.

Memory

Item	Description
CM	The CM number is displayed. For the ETERNUS DX900 S5 or the ETERNUS DX8900 S4 CE#x CM#y For the other models CM#y x: CE number y: CM number
Total Memory Size	The total memory capacity installed on each CM is displayed.
Activated Memory Size	The memory capacity that can be used for each CM is displayed.

■ Operating Procedures

Procedure ▶▶▶

- 1 Click [Add Memory] in [Action].
→ The "[Start] Screen" (page 1007) appears.
- 2 Click the [Next >>] button.
→ The "[CM#x Start] Screen" (page 1007) appears.

- 3** Check the parts which can be affected by adding memory and click the [Next >>] button.
→ The operations to be started and the displayed screen vary depending on the conditions as follows.
 - When the CM to which memory is added is a Master CM
→ The Master CM is switched, and the "[Test Connection] Screen" (page 1009) appears. Proceed to Step 4.
 - When the CM to which memory is added is a Slave CM
→ The CM isolation process starts, and the "[Isolation Progress] Screen" (page 1009) appears. When the CM isolation is complete, the "[Workflow] Screen" (page 1010) appears. Proceed to Step 7.

Note

- Note that the [Next >>] button is disabled in any of the following conditions:
 - "Cache memory capacity expansion without memory expansion" is selected for "Mode"
 - "Activated Memory Size" has reached the maximum value of the registered memory expansion license
- For the ETERNUS DX900 S5 or the ETERNUS DX8900 S4, the [Skip] button is displayed. Clicking this button skips the memory adding process and moves to the [CM#x Start] screen for the next CM.

- 4** Follow the displayed procedure to confirm that the new Master CM is connected to a LAN.
- 5** After confirming the connection, click the [Test Connection] button.
→ The "[Test Connection Result] Screen" (page 1009) appears.
- 6** Confirm the connection status check result, and click the [Resume Processing] button.
→ CM isolation starts, and the "[Isolation Progress] Screen" (page 1009) appears. When the CM isolation is complete, the "[Workflow] Screen" (page 1010) appears.

Caution

- If the connection of the new Master CM and the LAN fails, check the connection status again and return to Step 5.

- 7** Add memory according to the displayed procedure. When the addition is complete, click the [Next >>] button.
→ The operation to be performed depends on the selected mode.
 - When "Expansion memory" is selected
→ The CM and IOM activation starts, and the "[Activation Progress] Screen" (page 1010) appears. When the CM and IOM activation is complete, the "[CM#x End] Screen" (page 1011) appears.
 - When "Cache memory capacity expansion without memory expansion" is selected
→ The forced activation of the CM starts. When the force CM activation is complete, the "[CM#x End] Screen" (page 1011) appears.
- 8** Click the [Next >>] button.
→ The "[Finish] Screen" (page 1011) appears.

Caution

- If there is a CM of which memory addition has not been complete, the "[CM#x Start] Screen" (page 1007) appears. Returns to Step 3.

- 9 Click the [Done] button to return to the [Controller Module] screen.



Performance (CM)

- "[■ Overview](#)" (page 1013)
- "[■ User Privileges](#)" (page 1013)
- "[■ Display Contents](#)" (page 1013)

■ Overview

This function displays the performance information of the CM.

Note

- Performance information is obtained when performance monitoring is operated from Web GUI, CLI, or any other monitoring software. Refer to the [Start/Stop Performance Monitoring] function for details on how to start performance monitoring with Web GUI.
- The interval for acquiring performance information can be specified when starting the monitoring. When using Web GUI, the default interval is 30 seconds.
- The average performance values during the specified interval are displayed.

■ User Privileges

Availability of Executions in the Default Role

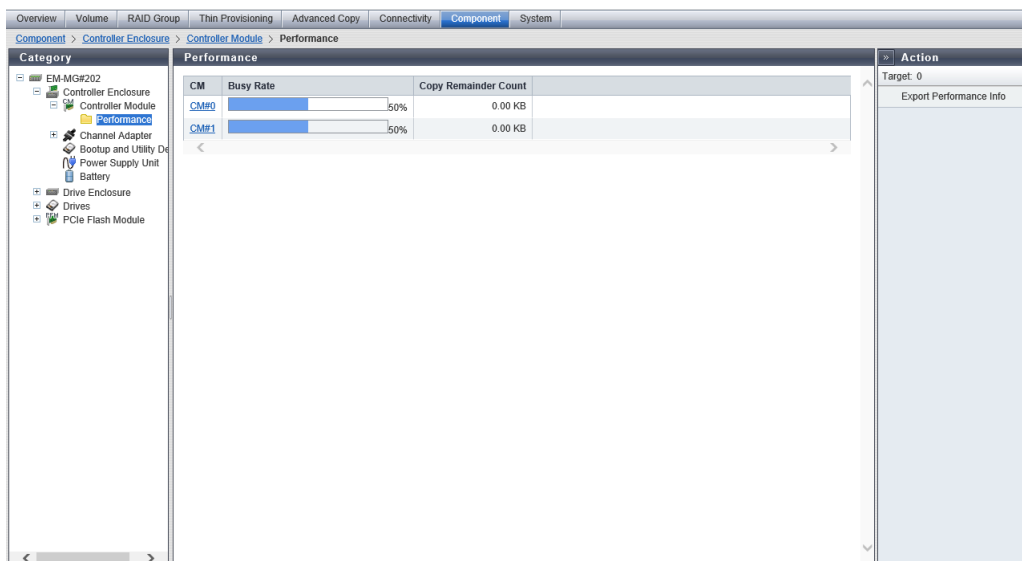
Default role	Availability of executions
Monitor	✓
Admin	✓
StorageAdmin	✓
AccountAdmin	
SecurityAdmin	✓
Maintainer	✓

Refer to "[A. User Roles and Policies](#)" (page 1580)" for details on the policies and roles.

■ Display Contents

In this screen, performance information of the CM is displayed. When the performance monitoring function is stopped, "0" is displayed for the busy rate and the copy remainder count.

7. Component Controller Enclosure



Item	Description
Enclosure	The Controller Enclosure (CE) number is displayed. This is displayed for the ETERNUS DX900 S5 or the ETERNUS DX8900 S4. CE#x x: CE number
CM	The CM number is displayed. Click this item to display the " [Detailed CM Performance Information] Screen " (page 1014). CM#x x: CM number
Busy Rate	The busy rate (0 to 100 %) of the CPU is displayed.
Copy Remainder Count	The copy remainder size of a copy session is displayed. "Copy Remainder Count" is displayed for each Controlling CM in the RAID group to which the copy source volume belongs.

[Detailed CM Performance Information] Screen

CE#x CM#y Information (For the ETERNUS DX900 S5 or the ETERNUS DX8900 S4)/CM#y Information (For the Other Models)

Item	Description
Location	The CM number is displayed. For the ETERNUS DX900 S5 or the ETERNUS DX8900 S4 CE#x CM#y For the other models CM#y x: CE number y: CM number
Busy Rate	The busy rate (0 to 100 %) of the CPU is displayed.
Copy Remainder Count	The copy remainder size of a copy session is displayed.

CE#x CM#y Core CPU Busy Rate (For the ETERNUS DX900 S5 or the ETERNUS DX8900 S4)/CM#y Core CPU Busy Rate (For the Other Models)

Item	Description
Core	The core number is displayed. Core#z z: Core number
Busy Rate	The busy rate (0 to 100 %) of the core is displayed.

Export Performance Information

Refer to "[Export Performance Information](#)" (page 194) for details.

Recover NAS System Volume

- "[Overview](#)" (page 1015)
- "[User Privileges](#)" (page 1015)
- "[Operating Procedures](#)" (page 1016)

Overview

This function recovers the NAS system volumes (RootFS) that are used by the target NAS Engine and forcibly enables the NAS Engine.

A "RootFS" is a volume that stores the root file system of the NAS Engine in each CM. If a malfunction occurs in the NAS Engine due to an inconsistency between the both RootFSs, use this function to recover the RootFS and forcibly enable the NAS Engine again.

This function is displayed in a Unified Storage environment.

Caution

- This function is not supported for the ETERNUS DX60 S5, the ETERNUS DX900 S5, the ETERNUS DX8100 S4/DX8900 S4, and the ETERNUS AF150 S3/AF250 S3/AF650 S3.
- This function is available when the following target NAS system volumes exist.
 - The target NAS system volume in CM#0 is \$SYSVOL2
 - The target NAS system volume in CM#1 is \$SYSVOL3
- Execute this function according to the instructions given by a maintenance engineer.

User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	✓
StorageAdmin	
AccountAdmin	
SecurityAdmin	
Maintainer	✓

Refer to "[A. User Roles and Policies](#)" (page 1580) for details on the policies and roles.

■ Operating Procedures

Procedure ▶▶▶

- 1 Select the NAS Engine that is to be recovered and click [Recover NAS System Volume] in [Action].
→ A confirmation screen appears.
 - 2 Click the [OK] button.
→ Recovery of the NAS system volumes starts.
 - 3 Click the [Done] button to return to the [Controller Module] screen.
-



Channel Adapter

- ["■ Overview" \(page 1016\)](#)
- ["■ User Privileges" \(page 1016\)](#)
- ["■ Display Contents" \(page 1016\)](#)

■ Overview

This function displays the Channel Adapter (CA) information.

■ User Privileges

Availability of Executions in the Default Role

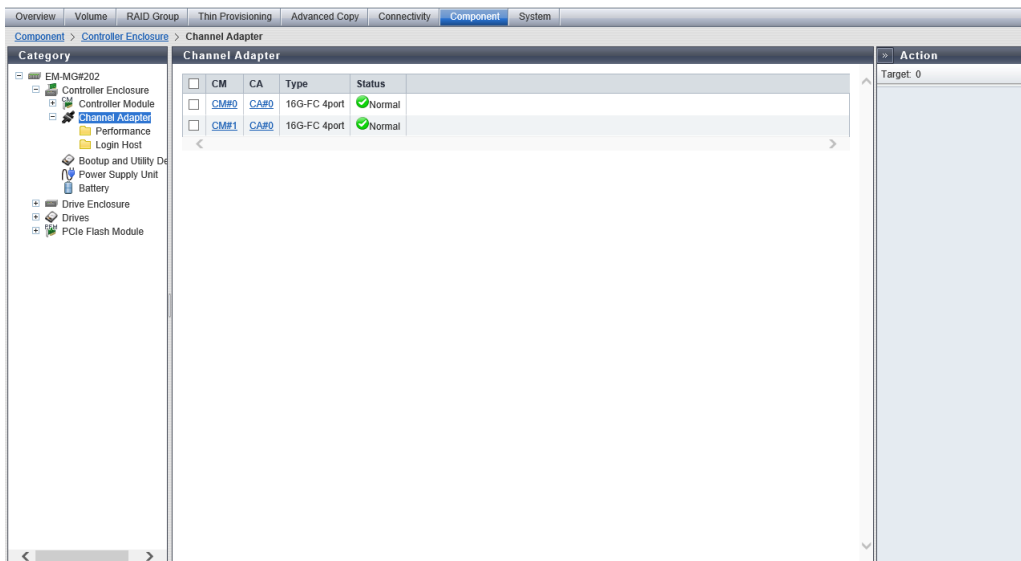
Default role	Availability of executions
Monitor	✓
Admin	✓
StorageAdmin	✓
AccountAdmin	
SecurityAdmin	✓
Maintainer	✓

Refer to ["A. User Roles and Policies" \(page 1580\)](#) for details on the policies and roles.

■ Display Contents

A list of CA information is displayed.

7. Component Controller Enclosure



CA List

Item	Description
Enclosure	<p>The Controller Enclosure (CE) number is displayed.</p> <p>Click this item to display the "[Controller Enclosure Detail] Screen" (page 981).</p> <p>This item is displayed for the ETERNUS DX900 S5 or the ETERNUS DX8900 S4.</p> <p>CE#x x: CE number</p>
CM	<p>The Controller Module (CM) number is displayed.</p> <p>Click this item to display the "[Controller Module Detail] Screen" (page 996).</p> <p>CM#x x: CM number</p>
CA	<p>The CA number is displayed.</p> <p>Click this item to display the "[Channel Adapter Detail] Screen" (page 1018).</p> <p>CA#x x: CA number</p>
Type	<p>The CA type is displayed.</p> <p>Note</p> <ul style="list-style-type: none"> Note that a 1-port type CA for the ETERNUS DX60 S5/DX100 S5 is displayed as "2port" (for 8G-FC, "8G-FC 2port" is displayed). Similarly, a 2-port type CA (1G-NAS) is displayed as "1G-NAS 4port". Available ports can be checked in the [Internal Parts] tab. Note that 1-port type CAs and 2-port type CAs are not available in some regions. When a CA is installed in the storage system, the CA is regarded as an undefined CA. "Initial Pattern" is displayed for undefined CAs. Use the [Add Channel Adapter] function to define the type (such as "FC" or "iSCSI") for undefined CAs. Note that the [Add Channel Adapter] function can be performed by a maintenance engineer who has the "Maintenance Operation" policy.
Status	<p>The CA status is displayed.</p> <p>Refer to ""Component Status" (page 1607)" for details.</p>

[Channel Adapter Detail] Screen

The detailed CA information is displayed.

[Summary] Tab

CE#x CM#y CA#z Information (For the ETERNUS DX900 S5 or the ETERNUS DX8900 S4)/CM#y CA#z Information (For the Other Models)

Item	Description
Location	<p>The CA installation location is displayed.</p> <p>For the ETERNUS DX900 S5 or the ETERNUS DX8900 S4 CE#x CM#y CA#z</p> <p>For the other models CM#y CA#z</p> <p>x: CE number y: CM number z: CA number</p>
CA Type	<p>The CA type is displayed.</p> <div style="background-color: #f0f0f0; padding: 10px; margin-top: 10px;"> <p>Note</p> <ul style="list-style-type: none"> Note that a 1-port type CA for the ETERNUS DX60 S5/DX100 S5 is displayed as "2port" (for 8G-FC, "8G-FC 2port" is displayed). Similarly, a 2-port type CA (1G-NAS) is displayed as "1G-NAS 4port". Available ports can be checked in the [Internal Parts] tab. Note that 1-port type CAs and 2-port type CAs are not available in some regions. When a CA is installed in the storage system, the CA is regarded as an undefined CA. "Initial Pattern" is displayed for undefined CAs. Use the [Add Channel Adapter] function to define the type (such as "FC" or "iSCSI") for undefined CAs. Note that the [Add Channel Adapter] function can be performed by a maintenance engineer who has the "Maintenance Operation" policy. </div>
Status	<p>The CA status is displayed.</p> <p>Refer to ""Component Status"" (page 1607)" for details.</p>
Status Code	<p>The CA status code is displayed.</p>
Part Number	<p>The part number of the CA is displayed.</p> <p>If the part number cannot be acquired, a "-" (hyphen) is displayed.</p>
Serial Number	<p>The serial number of the CA is displayed.</p> <p>If the serial number cannot be acquired, a "-" (hyphen) is displayed.</p>
Hardware Revision	<p>The hardware version of the CA is displayed.</p> <p>If the hardware version cannot be acquired, a "-" (hyphen) is displayed.</p>
Chip#n Status	<p>The status of Chip#0 or Chip#1 is displayed.</p> <p>Refer to ""Component Status"" (page 1607)" for details.</p>
Chip#n Status Code	<p>The status code of Chip#0 or Chip#1 is displayed.</p>
Chip#n Error Code	<p>The error code of Chip#0 or Chip#1 is displayed.</p>
Chip#n Active EC	<p>A "-" (hyphen) is displayed.</p>
Chip#n Next EC	<p>A "-" (hyphen) is displayed.</p>

CE#x CM#y CA#z Port Information (For the ETERNUS DX900 S5 or the ETERNUS DX8900 S4)/CM#y CA#z Port Information (For the Other Models)

The detailed information of all the ports is displayed. Refer to ["FC Port" \(page 1019\)](#), ["iSCSI Port" \(page 1024\)](#), ["SAS Port" \(page 1027\)](#), or ["NAS Port" \(page 1029\)](#) for display contents.

[Internal Parts] Tab

CE#x CM#y CA#z Internal Parts Information (For the ETERNUS DX900 S5 or the ETERNUS DX8900 S4)/CM#y CA#z Internal Parts Information (For the Other Models)

Item	Description
Port	The CA port number is displayed. Click this item to display the "[Port Detail] Screen" (page 1019) . For the ETERNUS DX900 S5 or the ETERNUS DX8900 S4 CE#x CM#y CA#z Port#w For the other models CM#y CA#z Port#w x: CE number y: CM number z: CA number w: Port number
Status	The CA port status is displayed. Refer to "Component Status" (page 1607) for details.
Error Code	The error code of the CA port is displayed.

[View] Tab

CE#x CM#y CA#z Rear View (For the ETERNUS DX900 S5 or the ETERNUS DX8900 S4)/CM#y CA#z Rear View (For the Other Models)

Item	Description
(Storage system image)	The rear view of the CE that is installed in the storage system is displayed. Components that are not CA are grayed out.

[Port Detail] Screen

The detailed information of the port is displayed. The displayed contents vary depending on whether the port type is ["FC Port" \(page 1019\)](#), ["iSCSI Port" \(page 1024\)](#), ["SAS Port" \(page 1027\)](#), or ["NAS Port" \(page 1029\)](#).

FC Port

The detailed FC port information is displayed.

[Summary] Tab

CE#x CM#y CA#z Port#w Information (For the ETERNUS DX900 S5 or the ETERNUS DX8900 S4)/CM#y CA#z Port#w Information (For the Other Models)

Item	Description
Location	The location information of the port is displayed. For the ETERNUS DX900 S5 or the ETERNUS DX8900 S4 CE#x CM#y CA#z Port#w For the other models CM#y CA#z Port#w x: CE number y: CM number z: CA number w: Port number
Port Mode	The port mode is displayed. CA RA CA/RA Initiator
Status	The port status is displayed. Refer to " Component Status " (page 1607)" for details.
Status Code	The port status code is displayed.
Error Code	The port error code is displayed.
Type	The port type is displayed. 8G FC 16G FC 32G FC
Connection	The connection type of the port is displayed. <ul style="list-style-type: none"> Fabric A connection type that enables simultaneous communication among multiple nodes through a Fibre Channel switch. This connection type can also be used for a direct connection when "Transfer Rate" is "16 Gbit/s" or more. FC-AL A connection type that connects multiple nodes in a loop.
Loop ID	When the connection type of the target port is "FC-AL" (0x00 - 0x7D), the Loop ID is displayed. When the Loop ID is manually specified, the ID that is to be set for the port is displayed in hexadecimal. When the Loop ID is automatically specified, "Ascending" or "Descending" is displayed. A "-" (hyphen) is displayed when the connection type of the target port is "Fabric".
Class	The service class of the port is displayed.
Transfer Rate	The transfer speed of the port is displayed. A "-" (hyphen) is displayed when "Status" is "Unknown". Auto-negotiation 4 Gbit/s 8 Gbit/s 16 Gbit/s 32 Gbit/s

7. Component Controller Enclosure

Item	Description
Link Status	<p>The link status of the port is displayed.</p> <p>A "-" (hyphen) is displayed when "Status" is "Unknown".</p> <p>Link Down 4 Gbit/s Link Up 8 Gbit/s Link Up 16 Gbit/s Link Up 32 Gbit/s Link Up</p>
WWN	<p>The WWN of the port is displayed.</p> <p>This item is displayed when the port mode is "CA", "RA", or "CA/RA".</p> <p>If the port mode is "Initiator", the display status varies according to the screen. A "-" is displayed for the CM#x CA#y port information in the [Channel Adapter Detail] screen. This item is not displayed in the [Port Detail] screen.</p>
WWN (Port Name)	<p>The WWPN of the port is displayed.</p> <p>This item is displayed when the port mode is "Initiator".</p> <p>If the port mode is not "Initiator", the display status varies according to the screen. A "-" is displayed for the CM#x CA#y port information in the [Channel Adapter Detail] screen. This item is not displayed in the [Port Detail] screen.</p>
WWN (Node Name)	<p>The WWNN of the port is displayed.</p> <p>This item is displayed when the port mode is "Initiator".</p> <p>If the port mode is not "Initiator", the display status varies according to the screen. A "-" is displayed for the CM#x CA#y port information in the [Channel Adapter Detail] screen. This item is not displayed in the [Port Detail] screen.</p>
Affinity Mode	<p>The affinity mode of the port is displayed.</p> <p>ON OFF</p>
TFO Transfer Mode	<p>Whether the TFO transfer mode is enabled or disabled for the port is displayed.</p> <p>A "-" (hyphen) is displayed when the port mode is "CA" or "Initiator".</p> <p>This item is only displayed when "Enable" is selected for the Storage Cluster function.</p>
TFO WWN Mode	<p>When the port is being used by the Storage Cluster function, "Custom" is displayed if WWN has been changed, and "Default" is displayed if no changes have been made.</p> <p>A "-" (hyphen) is displayed when the port mode is "RA", "CA/RA", or "Initiator".</p> <p>This item is only displayed when "Enable" is selected for the Storage Cluster function.</p>
TFO Port	<p>When the port is being used by the Storage Cluster function, "Used" is displayed, and "Unused" is displayed when the port is not used.</p> <p>This item is only displayed when "Enable" is selected for the Storage Cluster function.</p>
FC Frame Size	<p>The frame size of the port is displayed.</p> <p>512 bytes 1024 bytes 2048 bytes</p>
Part Number	<p>The part number of the port is displayed.</p> <p>If the part number cannot be acquired, a "-" (hyphen) is displayed.</p>
Serial Number	<p>The serial number of the port is displayed.</p> <p>If the serial number cannot be acquired, a "-" (hyphen) is displayed.</p>
Hardware Revision	<p>The hardware version of the port is displayed.</p> <p>If the hardware version cannot be acquired, a "-" (hyphen) is displayed.</p>

7. Component Controller Enclosure

Item	Description
SFP Type	The SFP type of the port is displayed. If an SFP is not installed, "Unmount" is displayed. 16G SFP+(SMF): 16G LongWave 16G SFP+(MMF): 16G SFP+ 32G SFP+(MMF): 32G SFP+ Unknown: SFP type other than above
Temperature	The real time temperature of the SFP in the port is displayed. When the information cannot be obtained, a "-" (hyphen) is displayed. This item is displayed as the CM#x CA#y port information in the [Channel Adapter Detail] screen. In the [Port Detail] screen, "" Sensor Information " (page 1022)" is displayed. x: -128.00 to 128.00 y: -198.40 to 262.40 C: Celsius temperature F: Fahrenheit temperature
Voltage	The real time voltage (0.00 to 6.55) of the SFP in the port is displayed. When the information cannot be obtained, a "-" (hyphen) is displayed. This item is displayed as the CM#x CA#y port information in the [Channel Adapter Detail] screen. In the [Port Detail] screen, "" Sensor Information " (page 1022)" is displayed.
Current	The real time current (0.00 to 131.00) of the SFP in the port is displayed. When the information cannot be obtained, a "-" (hyphen) is displayed. This item is displayed as the CM#x CA#y port information in the [Channel Adapter Detail] screen. In the [Port Detail] screen, "" Sensor Information " (page 1022)" is displayed.
TX Power	The real time transmission power (0.00 to 6.55) of the SFP in the port is displayed. When the information cannot be obtained, a "-" (hyphen) is displayed. This item is displayed as the CM#x CA#y port information in the [Channel Adapter Detail] screen. In the [Port Detail] screen, "" Sensor Information " (page 1022)" is displayed.
RX Power	The real time received power (0.00 to 6.55) of the SFP in the port is displayed. When the information cannot be obtained, a "-" (hyphen) is displayed. This item is displayed as the CM#x CA#y port information in the [Channel Adapter Detail] screen. In the [Port Detail] screen, "" Sensor Information " (page 1022)" is displayed.

Sensor Information

The real time and threshold values (Low/High) for the temperature, voltage, current, transmission power, and received power are displayed in the Sensor Information.

The target components for this information are "FC", "10G iSCSI", and "10G NAS" type CAs that have SFPs from which information can be obtained.

- An SFP is regarded as being in Warning status when the real time value is lower than the Warning threshold (Low) and higher than the Alarm threshold (Low).
- An SFP is regarded as being in Warning status when the real time value is higher than the Warning threshold (High) and lower than the Alarm threshold (High).
- An SFP is regarded as being in Alarm status when the real time value is lower than the Alarm threshold (Low) or higher than the Alarm threshold (High).

7. Component
Controller Enclosure

Item		Description	
Temperature	Present	The real time temperature of the SFP in the port is displayed. When the information cannot be obtained, a "-" (hyphen) is displayed. x: -128.00 to 128.00 y: -198.40 to 262.40 C: Celsius temperature F: Fahrenheit temperature	
	Warning	Low	The Warning threshold (Low/High) for the temperature of the SFP in the port is displayed.
		High	When the information cannot be obtained, a "-" (hyphen) is displayed. x: -128.00 to 128.00 y: -198.40 to 262.40 C: Celsius temperature F: Fahrenheit temperature
	Alarm	Low	The Alarm threshold (Low/High) for the temperature of the SFP in the port is displayed.
		High	When the information cannot be obtained, a "-" (hyphen) is displayed. x: -128.00 to 128.00 y: -198.40 to 262.40 C: Celsius temperature F: Fahrenheit temperature
	Voltage	Present	The real time voltage (0.00 to 6.55 V) of the SFP in the port is displayed. When the information cannot be obtained, a "-" (hyphen) is displayed.
Warning		Low	The Warning threshold (0.00 to 6.55 V) for the voltage of the SFP in the port is displayed.
		High	When the information cannot be obtained, a "-" (hyphen) is displayed.
Alarm		Low	The Alarm threshold (0.00 to 6.55 V) for the voltage of the SFP in the port is displayed.
		High	When the information cannot be obtained, a "-" (hyphen) is displayed.
Current		Present	The real time current (0.00 to 131.00 mA) of the SFP in the port is displayed. When the information cannot be obtained, a "-" (hyphen) is displayed.
	Warning	Low	The Warning threshold (0.00 to 131.00 mA) for the current of the SFP in the port is displayed.
		High	When the information cannot be obtained, a "-" (hyphen) is displayed.
	Alarm	Low	The Alarm threshold (0.00 to 131.00 mA) for the current of the SFP in the port is displayed.
		High	When the information cannot be obtained, a "-" (hyphen) is displayed.
	TX Power	Present	The real time transmission power (0.00 to 6.55 mW) of the SFP in the port is displayed. When the information cannot be obtained, a "-" (hyphen) is displayed.
Warning		Low	The Warning threshold (0.00 to 6.55 mW) for the transmission power of the SFP in the port is displayed.
		High	When the information cannot be obtained, a "-" (hyphen) is displayed.
Alarm		Low	The Alarm threshold (0.00 to 6.55 mW) for the transmission power of the SFP in the port is displayed.
		High	When the information cannot be obtained, a "-" (hyphen) is displayed.
RX Power		Present	The real time received power (0.00 to 6.55 mW) of the SFP in the port is displayed. When the information cannot be obtained, a "-" (hyphen) is displayed.
	Warning	Low	The Warning threshold (0.00 to 6.55 mW) for the received power of the SFP in the port is displayed.
		High	When the information cannot be obtained, a "-" (hyphen) is displayed.
	Alarm	Low	The Alarm threshold (0.00 to 6.55 mW) for the received power of the SFP in the port is displayed.
		High	When the information cannot be obtained, a "-" (hyphen) is displayed.

iSCSI Port

The detailed iSCSI port information is displayed.

[Summary] Tab

CE#x CM#y CA#z Port#w Information (For the ETERNUS DX900 S5 or the ETERNUS DX8900 S4)/CM#y CA#z Port#w Information (For the Other Models)

Item	Description
Location	The location information of the port is displayed. For the ETERNUS DX900 S5 or the ETERNUS DX8900 S4 CE#x CM#y CA#z Port#w For the other models CM#y CA#z Port#w x: CE number y: CM number z: CA number w: Port number
Port Mode	The port mode is displayed. CA RA CA/RA
Status	The port status is displayed. Refer to " Component Status " (page 1607) for details.
Status Code	The port status code is displayed.
Error Code	The port error code is displayed.
Type	The port type is displayed. 1G iSCSI 10G iSCSI 10G Base-T iSCSI iSCSI RA (for older storage system connection)
Multiple VLAN	Whether the Multiple VLAN is enabled or disabled for the port is displayed. A "-" (hyphen) is displayed when the port mode is "RA".
Number of IP Addresses	The number of IP addresses (1 to 16) that are registered in the port is displayed. In this field, the total number of IP addresses (one basic IP address and the IP addresses that are specified by using Multiple VLAN (up to 15)) is displayed. "1" is displayed when the port mode is "RA" or when "Multiple VLAN" is disabled.
Transfer Rate	The transfer speed of the port is displayed. A "-" (hyphen) is displayed when "Status" is "Unknown". Auto-negotiation 100 Mbit/s 1 Gbit/s 10 Gbit/s
Link Status	The link status of the port is displayed. A "-" (hyphen) is displayed when "Status" is "Unknown". Link Down 100 Mbit/s Link Up 1 Gbit/s Link Up 10 Gbit/s Link Up

7. Component Controller Enclosure

Item	Description
iSCSI Name	The iSCSI name is displayed.
iSCSI Alias Name	The iSCSI Alias name is displayed.
iSCSI IP Address	The IPv4 address of the iSCSI is displayed. If not specified, a "-" (hyphen) is displayed. IPv4 address xxx.xxx.xxx.xxx xxx: 0 - 255 (decimal)
iSCSI Subnet Mask	The subnet mask of the iSCSI is displayed. If not specified, a "-" (hyphen) is displayed.
iSCSI Gateway	The IPv4 address of the iSCSI gateway is displayed. If not specified, a "-" (hyphen) is displayed. IPv4 address xxx.xxx.xxx.xxx xxx: 0 - 255 (decimal)
iSCSI IPv6 Link Local Address	The IPv6 link local address of the iSCSI is displayed. Note that the IPv6 address is displayed as an abbreviation. If not specified, a "-" (hyphen) is displayed. Refer to "IPv6 Address Notation" (page 659) for details.
iSCSI IPv6 Connect IP Address	The IPv6 connect IP address of the iSCSI is displayed. Note that the IPv6 address is displayed as an abbreviation. If not specified, a "-" (hyphen) is displayed. Refer to "IPv6 Address Notation" (page 659) for details.
iSCSI IPv6 Gateway	The gateway IPv6 address of the target port is displayed. Note that the IPv6 address is displayed as an abbreviation. If not specified, a "-" (hyphen) is displayed. Refer to "IPv6 Address Notation" (page 659) for details.
VLAN ID	The VLAN ID (0 to 4095) of the port is displayed. If the VLAN ID is not specified, a "-" (hyphen) is displayed.
Affinity Mode	The affinity mode of the port is displayed. ON OFF
TFO Transfer Mode	Whether the TFO transfer mode is enabled or disabled for the port is displayed. A "-" (hyphen) is displayed when the port mode is "CA". This item is only displayed when "Enable" is selected for the Storage Cluster function.
TFO Port	When the port is being used by the Storage Cluster function, "Used" is displayed, and "Unused" is displayed when the port is not used. This item is only displayed when "Enable" is selected for the Storage Cluster function.
Bandwidth Limit	The bandwidth limit (10 to 400 Mbit/s) of the iSCSI is displayed. A "-" (hyphen) is displayed when the type is "1G iSCSI", "10G iSCSI", or "10G Base-T iSCSI".

7. Component Controller Enclosure

Item	Description
MTU Size	<p>The MTU size of the iSCSI is displayed.</p> <p>A "-" (hyphen) is displayed when the port mode is "CA".</p> <p>When the port type is "1G iSCSI" or "10G iSCSI": 576 - 9000</p> <p>When the port type is "iSCSI RA": 1000 1050 1100 1150 1200 1250 1300 1350 1400 1438</p>
CHAP	<p>The CHAP authentication status is displayed.</p> <p>When the port mode is "CA/RA": x / y x: The CHAP authentication status of the CA port y: The CHAP authentication status of the RA port</p>
MAC Address	The MAC address of the port is displayed.
Part Number	<p>The part number of the port is displayed.</p> <p>If the part number cannot be acquired, a "-" (hyphen) is displayed.</p>
Serial Number	<p>The serial number of the port is displayed.</p> <p>If the serial number cannot be acquired, a "-" (hyphen) is displayed.</p>
Hardware Revision	<p>The hardware version of the port is displayed.</p> <p>If the hardware version cannot be acquired, a "-" (hyphen) is displayed.</p>
SFP Type	<p>When the port type is "10G iSCSI", the SFP type of the port is displayed. If an SFP is not installed, "Unmount" is displayed.</p> <p>If the "Type" is not "10G iSCSI", the display status varies according to the screen. A "-" is displayed for the CM#x CA#y port information in the [Channel Adapter Detail] screen. This item is not displayed in the [Port Detail] screen.</p> <p>SFP+ SFP+ Copper Unknown Unmount</p>
Temperature	<p>When the port type is "10G iSCSI", the real time temperature of the SFP in the port is displayed. When the information cannot be obtained, a "-" (hyphen) is displayed.</p> <p>This item is displayed as the CM#x CA#y port information in the [Channel Adapter Detail] screen. In the [Port Detail] screen, ""Sensor Information"" (page 1022) is displayed.</p> <p>x: -128.00 to 128.00 y: -198.40 to 262.40 C: Celsius temperature F: Fahrenheit temperature</p>
Voltage	<p>When the port type is "10G iSCSI", the real time voltage (0.00 to 6.55 V) of the SFP in the port is displayed. When the information cannot be obtained, a "-" (hyphen) is displayed.</p> <p>This item is displayed as the CM#x CA#y port information in the [Channel Adapter Detail] screen. In the [Port Detail] screen, ""Sensor Information"" (page 1022) is displayed.</p>

7. Component Controller Enclosure

Item	Description
Current	When the port type is "10G iSCSI", the real time current (0.00 to 131.00 mA) of the SFP in the port is displayed. When the information cannot be obtained, a "-" (hyphen) is displayed. This item is displayed as the CM#x CA#y port information in the [Channel Adapter Detail] screen. In the [Port Detail] screen, ""Sensor Information" (page 1022)" is displayed.
TX Power	When the port type is "10G iSCSI", the real time transmission power (0.00 to 6.55 mW) of the SFP in the port is displayed. When the information cannot be obtained, a "-" (hyphen) is displayed. This item is displayed as the CM#x CA#y port information in the [Channel Adapter Detail] screen. In the [Port Detail] screen, ""Sensor Information" (page 1022)" is displayed.
RX Power	When the port type is "10G iSCSI", the real time received power (0.00 to 6.55 mW) of the SFP in the port is displayed. When the information cannot be obtained, a "-" (hyphen) is displayed. This item is displayed as the CM#x CA#y port information in the [Channel Adapter Detail] screen. In the [Port Detail] screen, ""Sensor Information" (page 1022)" is displayed.

Additional IP Address Information #x (x: 1 - 15)

When the Multiple VLAN setting is "Enable", the IP address information (up to 15 IP addresses) that is registered in the port is displayed.

Item	Description
VLAN ID	The VLAN ID (0 to 4095) of the iSCSI port is displayed. If not specified, a "-" (hyphen) is displayed.
iSCSI IP Address	The IPv4 address of the iSCSI port is displayed. If not specified, a "-" (hyphen) is displayed. IPv4 address xxx.xxx.xxx.xxx xxx: 0 - 255 (decimal)
iSCSI Subnet Mask	The subnet mask of the iSCSI port is displayed. If not specified, a "-" (hyphen) is displayed.
iSCSI Gateway	The gateway IPv4 address of the iSCSI port is displayed. If not specified, a "-" (hyphen) is displayed. IPv4 address xxx.xxx.xxx.xxx xxx: 0 - 255 (decimal)
iSCSI IPv6 Link Local Address	The IPv6 link local address of the iSCSI port is displayed. Note that the IPv6 address is displayed as an abbreviation. If not specified, a "-" (hyphen) is displayed. Refer to ""IPv6 Address Notation" (page 659)" for details.
iSCSI IPv6 Connect IP Address	The IPv6 connect IP address of the iSCSI port is displayed. Note that the IPv6 address is displayed as an abbreviation. If not specified, a "-" (hyphen) is displayed. Refer to ""IPv6 Address Notation" (page 659)" for details.
iSCSI IPv6 Gateway	The gateway IPv6 address of the iSCSI port is displayed. Note that the IPv6 address is displayed as an abbreviation. If not specified, a "-" (hyphen) is displayed. Refer to ""IPv6 Address Notation" (page 659)" for details.

SAS Port

The detailed SAS port information is displayed.

[Summary] Tab

CM#x CA#y Port#z Information

Item	Description
Location	The location information of the port is displayed. CM#x CA#y Port#z x: CM number y: CA number z: Port number
Status	The port status is displayed. Refer to " Component Status " (page 1607) for details.
Status Code	The port status code is displayed.
Error Code	The port error code is displayed.
Type	The port type is displayed. 6G SAS 12G SAS
Transfer Rate	The transfer speed of the port is displayed. A "-" (hyphen) is displayed when "Status" is "Unknown". Auto-negotiation 1.5 Gbit/s 3 Gbit/s 6 Gbit/s 12 Gbit/s "-" (hyphen)
Link Status	The link status for each Phy is displayed. A "-" (hyphen) is displayed when "Status" is "Unknown". Phy#0 - 3:x "x" indicates one of the following statuses: Link Down 1.5 Gbit/s Link Up 3 Gbit/s Link Up 6 Gbit/s Link Up 12 Gbit/s Link Up "-" (hyphen)
SAS Address	The SAS address is displayed. If not specified, a "-" (hyphen) is displayed.
Affinity Mode	The affinity mode of the port is displayed. ON OFF
Part Number	The part number of the port is displayed. If the part number cannot be acquired, a "-" (hyphen) is displayed.
Serial Number	The serial number of the port is displayed. If the serial number cannot be acquired, a "-" (hyphen) is displayed.
Hardware Revision	The hardware version of the port is displayed. If the hardware version cannot be acquired, a "-" (hyphen) is displayed.

7. Component Controller Enclosure

Item	Description
SFP Type	The SFP type of the port is displayed. If an SFP is not installed, "Unmount" is displayed. 12G SFP Unmount Unknown

NAS Port

The detailed NAS port information is displayed.

[Summary] Tab

CM#x CA#y Port#z Information

Item	Description
Location	The location information of the port is displayed. CM#x CA#y Port#z x: CM number y: CA number z: Port number
Port Mode	The port mode is displayed. CA
Status	The port status is displayed. Refer to "Component Status" (page 1607) for details.
Status Code	The port status code is displayed.
Error Code	The port error code is displayed.
Type	The port type is displayed. 10G NAS 1G NAS
Redundancy	The connection type of the port is displayed. When the connection type is "Active-Active" or "Active-Standby", the "Redundant Port" information is displayed. <ul style="list-style-type: none"> Active - Active Combine the ports in both of the CMs and configure the redundant ports. For this configuration, the ports of both CMs can be used at any time. Active - Standby Combine the ports in both of the CMs and configure the redundant ports. For this configuration, one port remains in standby status. Single Use only for the ports in the CM that are not redundant.
Redundant Port	The installation locations of the ports that are configured for redundancy with the target port are displayed. When redundancy is configured for each bonding port, all of the related ports are displayed. A "-" (hyphen) is displayed when "Redundancy" is "Single". CM#x CA#y Port#z x: CM number y: CA number z: Port number "-" (hyphen)

7. Component Controller Enclosure

Item	Description
Failover Status	<p>The failover status of the multipath is displayed.</p> <p>A "-" (hyphen) is displayed when the multipath is not set (or when "Redundancy" is "Single").</p> <ul style="list-style-type: none"> • Normal The multipath setting between the "Location" port and "Redundant Port" is in a normal state. • CM#x CA#y Port#z is currently inactive The multipath between the "Location" port and "Redundant Port" is set, but the "CM#x CA#y Port#z" port is not used. <p>x: CM number y: CA number z: Port number "- " (hyphen)</p>
Port Bonding Mode	<p>The bonding mode for the port is displayed. If the bonding port is not configured, a "-" (hyphen) is displayed.</p> <ul style="list-style-type: none"> • Master The representative port among the ports that configure the bonding port. The IP address of the bonding port is assigned to the master port. • Member Ports that configure the bonding port.
Bonding Master Port	<p>The installation location of the master port, which is a member of the ports that configure the bonding port, is displayed. If the bonding port is not configured, a "-" (hyphen) is displayed.</p> <p>CM#x CA#y Port#z x: CM number y: CA number z: Port number "- " (hyphen)</p>
Bonding Port	<p>The installation locations of all the member ports that configure the bonding port are displayed. If the bonding port is not configured, a "-" (hyphen) is displayed.</p> <p>CM#x CA#y Port#z x: CM number y: CA number z: Port number "- " (hyphen)</p>
Number of VLAN IP Addresses	<p>The number of VLAN IP addresses (0 to 160) for the port is displayed. If VLAN is not set, "0" is displayed.</p>
Transfer Rate	<p>The transfer speed of the port is displayed.</p> <p>A "-" (hyphen) is displayed when "Status" is "Unknown".</p> <p>Auto-negotiation 100 Mbit/s 1 Gbit/s 10 Gbit/s "- " (hyphen)</p>

7. Component Controller Enclosure

Item	Description
Link Status	<p>The link status of the port is displayed.</p> <p>A "-" (hyphen) is displayed when "Status" is "Unknown".</p> <p>Link Down</p> <p>10 Mbit/s Full Duplex Link Up</p> <p>10 Mbit/s Half Duplex Link Up</p> <p>100 Mbit/s Full Duplex Link Up</p> <p>100 Mbit/s Half Duplex Link Up</p> <p>1 Gbit/s Full Duplex Link Up</p> <p>1 Gbit/s Half Duplex Link Up</p> <p>10 Gbit/s Full Duplex Link Up</p> <p>10 Gbit/s Half Duplex Link Up</p> <p>"-" (hyphen)</p>
IP Address	<p>An IPv4 address without VLAN IDs is displayed.</p> <p>If not specified, a "-" (hyphen) is displayed.</p> <p>IPv4 address</p> <p>xxx.xxx.xxx.xxx</p> <p>xxx: 0 - 255 (decimal)</p> <p>"-" (hyphen)</p>
Subnet Mask	<p>An IPv4 subnet mask without VLAN IDs is displayed.</p> <p>If not specified, a "-" (hyphen) is displayed.</p>
Gateway Address	<p>An IPv4 address for the gateway without VLAN IDs is displayed.</p> <p>If not specified, a "-" (hyphen) is displayed.</p> <p>IPv4 address</p> <p>xxx.xxx.xxx.xxx</p> <p>xxx: 0 - 255 (decimal)</p> <p>"-" (hyphen)</p>
IPv6 Link Local Address	<p>An IPv6 link local address without VLAN IDs is displayed.</p> <p>Note that the IPv6 address is displayed as an abbreviation. If not specified, a "-" (hyphen) is displayed.</p> <p>IPv6 address</p> <p>fe80::xxxx:xxxx:xxxx:xxxx</p> <p>xxxx: 0 - ffff (hexadecimal, "a" - "f" are lowercase letters)</p> <p>Refer to "IPv6 Address Notation (page 659)" for details.</p> <p>"-" (hyphen)</p>
IPv6 Connect IP Address	<p>An IPv6 connect IP address without VLAN IDs is displayed.</p> <p>Note that the IPv6 address is displayed as an abbreviation. If not specified, a "-" (hyphen) is displayed.</p> <p>IPv6 address</p> <p>xxxx:xxxx:xxxx:xxxx:xxxx:xxxx:xxxx:xxxx</p> <p>xxxx: 0 - ffff (hexadecimal, "a" - "f" are lowercase letters)</p> <p>Refer to "IPv6 Address Notation (page 659)" for details.</p> <p>"-" (hyphen)</p>
IPv6 Gateway Address	<p>The IPv6 address for the gateway without VLAN IDs is displayed.</p> <p>Note that the IPv6 address is displayed as an abbreviation. If not specified, a "-" (hyphen) is displayed.</p> <p>IPv6 address</p> <p>xxxx:xxxx:xxxx:xxxx:xxxx:xxxx:xxxx:xxxx</p> <p>xxxx: 0 - ffff (hexadecimal, "a" - "f" are lowercase letters)</p> <p>Refer to "IPv6 Address Notation (page 659)" for details.</p> <p>"-" (hyphen)</p>
MTU Size	<p>The MTU size is displayed.</p> <p>A "-" (hyphen) is displayed when the MTU size is "0".</p> <p>576 - 9014</p> <p>"-" (hyphen)</p>

7. Component Controller Enclosure

Item	Description
MAC Address	The MAC address of the port is displayed.
Part Number	The part number of the port is displayed. If the part number cannot be acquired, a "-" (hyphen) is displayed.
Serial Number	The serial number of the port is displayed. If the serial number cannot be acquired, a "-" (hyphen) is displayed.
Hardware Revision	The hardware version of the port is displayed. If the hardware version cannot be acquired, a "-" (hyphen) is displayed.
SFP Type	When the port type is "10G NAS", SFP type in the port is displayed. If an SFP is not installed, "Unmount" is displayed. If the "Type" is not "10G NAS", the display status varies according to the screen. This item is not displayed in the [Port Detail] screen. SFP+ SFP+ Copper Unknown Unmount
Temperature	When the port type is "10G NAS", the real time temperature of the SFP in the port is displayed. When the information cannot be obtained, a "-" (hyphen) is displayed. This item is displayed as the CM#x CA#y port information in the [Channel Adapter Detail] screen. In the [Port Detail] screen, "" Sensor Information "" (page 1022) is displayed. x C / y F x: -128.00 to 128.00 y: -198.40 to 262.40 C: Celsius temperature F: Fahrenheit temperature "" (hyphen)
Voltage	When the port type is "10G NAS", the real time voltage (0.00 to 6.55 V) of the SFP in the port is displayed. When the information cannot be obtained, a "-" (hyphen) is displayed. This item is displayed as the CM#x CA#y port information in the [Channel Adapter Detail] screen. In the [Port Detail] screen, "" Sensor Information "" (page 1022) is displayed.
Current	When the port type is "10G NAS", the real time current (0.00 to 131.00 mA) of the SFP in the port is displayed. When the information cannot be obtained, a "-" (hyphen) is displayed. This item is displayed as the CM#x CA#y port information in the [Channel Adapter Detail] screen. In the [Port Detail] screen, "" Sensor Information "" (page 1022) is displayed.
TX Power	When the port type is "10G NAS", the real time transmission power (0.00 to 6.55 mW) of the SFP in the port is displayed. When the information cannot be obtained, a "-" (hyphen) is displayed. This item is displayed as the CM#x CA#y port information in the [Channel Adapter Detail] screen. In the [Port Detail] screen, "" Sensor Information "" (page 1022) is displayed.
RX Power	When the port type is "10G NAS", the real time received power (0.00 to 6.55 mW) of the SFP in the port is displayed. When the information cannot be obtained, a "-" (hyphen) is displayed. This item is displayed as the CM#x CA#y port information in the [Channel Adapter Detail] screen. In the [Port Detail] screen, "" Sensor Information "" (page 1022) is displayed.

Additional VLAN IP Address

Item	Description
VLAN ID	The VLAN ID (1 to 4094) of the NAS port is displayed. The following items are displayed for all of the VLAN settings.

7. Component Controller Enclosure

Item	Description
IP Address	The IPv4 address of the NAS port is displayed. If not specified, a "-" (hyphen) is displayed. IPv4 address xxx.xxx.xxx.xxx xxx: 0 - 255 (decimal) "-" (hyphen)
Subnet Mask	The subnet mask of the NAS port is displayed. If not specified, a "-" (hyphen) is displayed.
Gateway Address	The gateway IPv4 address of the NAS port is displayed. If not specified, a "-" (hyphen) is displayed. IPv4 address xxx.xxx.xxx.xxx xxx: 0 - 255 (decimal) "-" (hyphen)
IPv6 Link Local Address	The IPv6 link local address of the NAS port is displayed. Note that the IPv6 address is displayed as an abbreviation. If not specified, a "-" (hyphen) is displayed. IPv6 address fe80::xxxx:xxxx:xxxx:xxxx xxxx: 0 - ffff (hexadecimal, "a" - "f" are lowercase letters) Refer to "IPv6 Address Notation" (page 659) for details. "-" (hyphen)
IPv6 Connect IP Address	The IPv6 connect IP address of the NAS port is displayed. Note that the IPv6 address is displayed as an abbreviation. If not specified, a "-" (hyphen) is displayed. IPv6 address xxxx:xxxx:xxxx:xxxx:xxxx:xxxx:xxxx:xxxx xxxx: 0 - ffff (hexadecimal, "a" - "f" are lowercase letters) Refer to "IPv6 Address Notation" (page 659) for details. "-" (hyphen)
IPv6 Gateway Address	The gateway IPv6 address of the NAS port is displayed. Note that the IPv6 address is displayed as an abbreviation. If not specified, a "-" (hyphen) is displayed. IPv6 address xxxx:xxxx:xxxx:xxxx:xxxx:xxxx:xxxx:xxxx xxxx: 0 - ffff (hexadecimal, "a" - "f" are lowercase letters) Refer to "IPv6 Address Notation" (page 659) for details. "-" (hyphen)

Add Channel Adapter

- ["Overview" \(page 1033\)](#)
- ["User Privileges" \(page 1034\)](#)
- ["Display Contents \(for the ETERNUS DX100 S5/DX200 S5 or the ETERNUS AF150 S3/AF250 S3\)" \(page 1034\)](#)
- ["Display Contents \(For the ETERNUS DX500 S5/DX600 S5/DX900 S5, the ETERNUS DX8100 S4/DX8900 S4, or the ETERNUS AF650 S3\)" \(page 1036\)](#)
- ["Operating Procedures" \(page 1038\)](#)

■ Overview

This function adds a Channel Adapter (CA) without stopping the storage system. After installing a CA for the storage system, activate it via Web GUI.

Caution

- Perform the start maintenance operation by using the [Start/End Maintenance] function before adding a CA. If the operation has not been performed, addition cannot be started.
 - Be sure to use authorized additional parts. If parts other than the additional parts are used, operation is not guaranteed.
 - Only one CA can be added at a time.
 - When the storage system is a 1CM model, mount the CA that is to be added into the CM in advance. (For the ETERNUS DX100 S5/DX200 S5)
 - This function cannot be used under the following conditions:
 - The status of the CA that is to be added or the CM to which the target CA belongs is not normal
 - The maximum number of CAs specified for the model have already been installed
 - For the ETERNUS DX60 S5: 1 per CM (All CAs are directly installed in the CM.)
 - For the ETERNUS DX100 S5/DX200 S5 and the ETERNUS AF150 S3/AF250 S3: Up to two CAs per CM
 - For the ETERNUS DX500 S5: Up to two CAs per CM
 - For the ETERNUS DX600 S5/DX900 S5, the ETERNUS DX8900 S4, and the ETERNUS AF650 S3: Up to four CAs per CM
 - For the ETERNUS DX8100 S4: Up to two CAs per CM
 - No CA is added to the expansion slot
 - The minimum port type CA (*1) is installed in the storage system
- *1: CAs with the minimum number of ports that can be installed in the ETERNUS DX100 S5. 1-port types and 2-port types are available.

Note

- When the minimum port type CA is used, first add a port and then perform this function. Refer to the [Add Channel Adapter Port] function for details.

■ User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	
StorageAdmin	
AccountAdmin	
SecurityAdmin	
Maintainer	✓

Refer to ""A. User Roles and Policies" (page 1580)" for details on the policies and roles.

■ Display Contents (for the ETERNUS DX100 S5/DX200 S5 or the ETERNUS AF150 S3/AF250 S3)

The following screens are displayed by the wizard.

[Start] Screen

A message that indicates the start of CA expansion appears.

[Select CA] Screen

Select the CA that is to be added.

Item	Description
Radio button	Select the CA that is to be added.
CM	The CM number to which the CA is added is displayed. CM#x x: CM number
CA	The CA number is displayed. CA#x x: CA number

[Test Connection] Screen

This screen is displayed when the CM to which the CA is added is a Master CM.
Follow the displayed procedure to confirm that the new Master CM is connected to a LAN.

Function Button

Button	Description
[Test Connection]	Click this button after confirming that the new Master CM is connected to a LAN. The connection status of the new Master CM and the LAN is checked.

[Test Connection Result] Screen

This screen is displayed when the CM to which the CA is added is a Master CM.
The connection status check result of the new Master CM and the LAN is displayed.

Function Button

Button	Description
[Test Connection]	If connection has failed, reconfirm the new Master CM is connected to a LAN, and click this button. The connection status of the new Master CM and the LAN is checked again.
[Resume Processing]	Click this button when connection was successful. Isolation of the CM starts.

[Isolate CM] Screen

The progress rate of isolating the CM is displayed.

Item	Description
CM	The CM number to which the CA is added is displayed. CM#x x: CM number
Progress	The progress rate (0 to 100 %) of isolating the CM is displayed.

7. Component Controller Enclosure

Item	Description
Status	The CM status is displayed.

[Workflow] Screen

The procedure to install a CA is displayed. Install a CA according to the displayed procedure.

[Status Check] Screen

The progress rate for the activation processing of the added CA is displayed.

Status Check

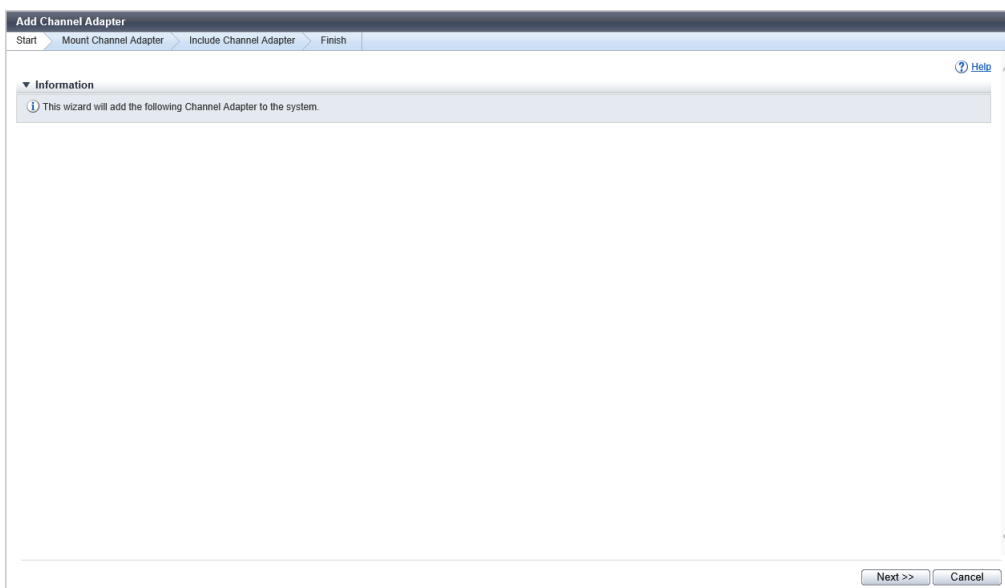
Item	Description
CM	The CM number to which the CA has been added is displayed. CM#x x: CM number
CA	The added CA number is displayed. CA#x x: CA number
Progress	The progress rate (0 to 100 %) of the status check is displayed.
Status	The CA status is displayed.
Type	The CA type is displayed.

[Finish] Screen

A message that indicates the CA is added successfully is displayed.

- Display Contents (For the ETERNUS DX500 S5/DX600 S5/DX900 S5, the ETERNUS DX8100 S4/DX8900 S4, or the ETERNUS AF650 S3)

The following screens are displayed by the wizard.



[Start] Screen

A message that indicates the start of CA expansion appears.

[Workflow] Screen

The procedure to install a CA is displayed. Install a CA according to the displayed procedure.

[Get Status] Screen

The progress rate of status confirmation for the added CA is displayed.

Item	Description
Progress	The progress rate (0 to 100 %) of the status check is displayed.

[Select CA] Screen

Select the added CA.

Item	Description
Radio button	Select the added CA.
Enclosure	The CE number is displayed to determine the CM that is installed with a CA. This is displayed for the ETERNUS DX900 S5 or the ETERNUS DX8900 S4. CE#x x: CE number
CM	The CM number to which the CA belongs is displayed. CM#x x: CM number
CA	The CA number is displayed. CA#x x: CA number
Type	The CA type is displayed.

[Status Check] Screen

The progress rate for the activation processing of the added CA is displayed.

Status Check

Item	Description
Enclosure	The CE number is displayed to determine the CM that is installed with the added CA. This is displayed for the ETERNUS DX900 S5 or the ETERNUS DX8900 S4. CE#x x: CE number
CM	The CM number to which the CA has been added is displayed. CM#x x: CM number
CA	The added CA number is displayed. CA#x x: CA number
Progress	The progress rate (0 to 100 %) of the status check is displayed.

Item	Description
Status	The CA status is displayed.

[Finish] Screen

A message that indicates the CA is added successfully is displayed.

■ Operating Procedures

For the ETERNUS DX100 S5/DX200 S5 or the ETERNUS AF150 S3/AF250 S3

Procedure ▶▶▶

- 1 Click [Add Channel Adapter] in [Action].
→ The "[Start] Screen" (page 1035) appears.
- 2 Click the [Next >>] button.
→ The "[Select CA] Screen" (page 1035) appears.
- 3 Select the CA that is to be added, and click the [Next >>] button.
→ The operations to be started and the displayed screen vary depending on the conditions as follows.
 - When it is a 1CM model
→ The CA activation starts, and the "[Status Check] Screen" (page 1036) appears. After the CA activation is complete, the "[Finish] Screen" (page 1036) appears. Proceed to Step 8.
 - When it is a 2CM model and CM to which a CA is added is a Master CM
→ The Master CM is switched, and the "[Test Connection] Screen" (page 1035) appears. Proceed to Step 4.
 - When it is a 2CM model and CM to which a CA is added is a Slave CM
→ CM isolation starts, and the "[Isolate CM] Screen" (page 1035) appears. When the CM isolation is complete, the "[Workflow] Screen" (page 1036) appears. Proceed to Step 7.
- 4 Follow the displayed procedure to confirm that the new Master CM is connected to a LAN.
- 5 After confirming the connection, click the [Test Connection] button.
→ The "[Test Connection Result] Screen" (page 1035) appears.
- 6 Confirm the connection status check result, and click the [Resume Processing] button.
→ CM isolation starts, and the "[Isolate CM] Screen" (page 1035) appears. When the CM isolation is complete, the "[Workflow] Screen" (page 1036) appears.

Caution

- If the connection of the new Master CM and the LAN fails, check the connection status again and return to Step 5.

- 7 Install a CA according to the displayed procedure. When the installation is complete, click the [Next >>] button.
→ The CA activation starts, and the "[Status Check] Screen" (page 1036) appears. After the CA activation is complete, the "[Finish] Screen" (page 1036) appears.
- 8 Click the [Done] button to return to the [Channel Adapter] screen.



For the ETERNUS DX500 S5/DX600 S5/DX900 S5, the ETERNUS DX8100 S4/DX8900 S4, or the ETERNUS AF650 S3

Procedure ▶▶▶

- 1 Click [Add Channel Adapter] in [Action].
→ The "[Start] Screen" (page 1037) appears.
- 2 Click the [Next >>] button.
→ The "[Workflow] Screen" (page 1037) appears.
- 3 Add the CA according to the displayed procedure and click the [Next >>] button.
→ The status check of the added CA starts, and the "[Get Status] Screen" (page 1037) appears. When the status check is complete, the "[Select CA] Screen" (page 1037) appears.
- 4 Select the added CA, and click the [Next >>] button.
→ The "[Status Check] Screen" (page 1037) appears. When the status check is complete, the "[Finish] Screen" (page 1038) appears.
- 5 Click the [Done] button to return to the [Channel Adapter] screen.

Add Channel Adapter Port

- "■ Overview" (page 1039)
- "■ User Privileges" (page 1040)
- "■ Display Contents" (page 1040)
- "■ Operating Procedures" (page 1042)

■ Overview

This function enables a Channel Adapter (CA) port to be added without stopping the storage system.

Caution

- Perform the start maintenance operation by using the [Start/End Maintenance] function before adding a CA port. If the operation has not been performed, addition cannot be started. Note that when the user has the "Storage Management" policy, start maintenance operation is not required.
- CA ports can be added for FC, iSCSI, SAS, or NAS host interfaces.
- This function cannot be used under the following conditions:
 - The general status of the storage system is not "Normal"
 - The minimum port type CA (*1) is not installed in the storage system

*1: CAs with the minimum number of ports that can be installed in the ETERNUS DX60 S5/DX100 S5. 1-port types or 2-port types are available.

Note

- This function is available only when the ETERNUS DX60 S5/DX100 S5 has a minimum port type CA. Input the license key for each host interface with the minimum port type, and then add the port.
- The following examples explain how the minimum port type CAs are displayed. Refer to the [Channel Adapter] function for details.
 - For 1-port type
"2port" is displayed as the port type in the [Channel Adapter] screen. However, only one port is displayed in the [Internal Parts] tab of the [Channel Adapter Detail] screen.
 - For 2-port type
"4port" is displayed as the port type in the [Channel Adapter] screen. However, only two ports are displayed in the [Internal Parts] tab of the [Channel Adapter Detail] screen.

■ User Privileges

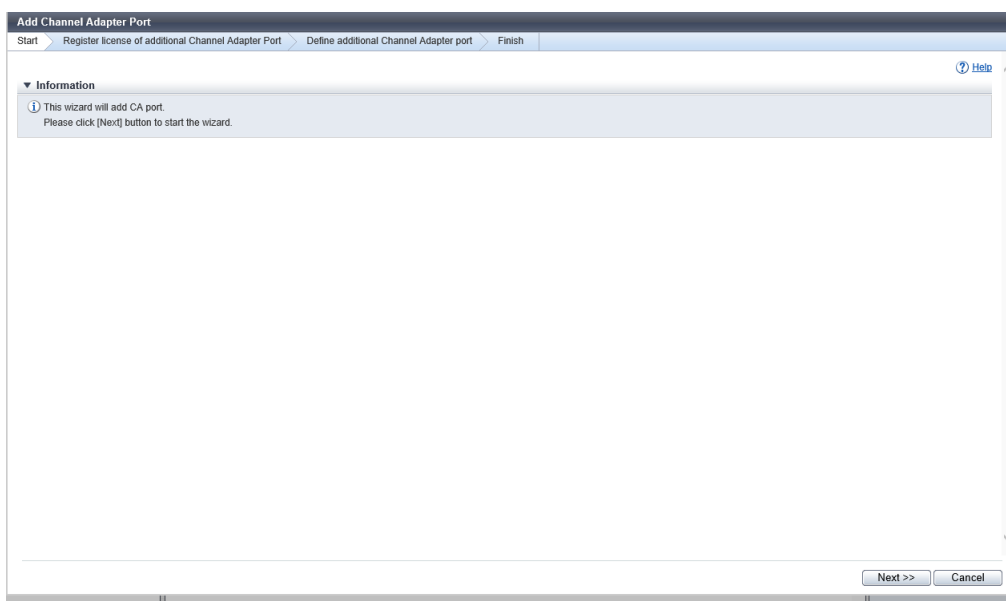
Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	✓
StorageAdmin	
AccountAdmin	
SecurityAdmin	
Maintainer	✓

Refer to "'A. User Roles and Policies" (page 1580)" for details on the policies and roles.

■ Display Contents

The following screens are displayed by the wizard.



[Start] Screen

A message that indicates the start of CA port expansion appears.

[Register license of additional Channel Adapter Port] Screen

This screen is displayed when the license key is not registered yet.
Input the license key.

Item	Description	Setting values
License Key	Input the license key.	16 capital letters and numeric characters

[Set License Key] Screen

The registration progress of the license key is displayed.

[Workflow] Screen

The procedure to add a CA port is displayed. Add a CA port according to the displayed procedure.

[Check SFP Installation] Screen

The status of the CA port and the installation progress of the SFP are displayed.


Status Check

Item	Description
CA Port	The CA port number is displayed. CM#x CA#y Port#z x: CM number y: CA number z: Port number
Progress	The installation progress (0 to 100 %) of an SFP is displayed.
Status	The CA port status is displayed. Refer to "Component Status" (page 1607) for details.

[Status Check] Screen

The status of the CA port and the installation progress are displayed.

Status Check

Item	Description
CA Port	The CA port number is displayed. CM#x CA#y Port#z x: CM number y: CA number z: Port number
Progress	The installation progress (0 to 100 %) of a CA port is displayed.
Status	The CA port status is displayed. If the CA port does not have an SFP,  "Unconnected" is displayed. Refer to "Component Status" (page 1607) for details.

[Finish] Screen

A message that indicates the CA port was added successfully is displayed.

■ Operating Procedures

Procedure ▶▶▶

- 1 Click [Add Channel Adapter Port] in [Action].
→ The "[Start] Screen" (page 1041) appears.
- 2 Click the [Next >>] button.
→ The displayed screen may vary depending on whether the installation of license key is required or not.
 - When the license key is not registered:
→ The "[Register license of additional Channel Adapter Port] Screen" (page 1041) appears. Proceed to Step 3.
 - When the license key is already registered:
→ The "[Workflow] Screen" (page 1041) appears. Proceed to Step 4.
- 3 Input the license key, and click the [Next >>] button.
→ The "[Set License Key] Screen" (page 1041) appears. The "[Workflow] Screen" (page 1041) appears after the registration of the license key is complete.
- 4 Add the CA port according to the displayed procedure and click the [Next >>] button.
→ The operations and displayed screen vary depending on the host interface type that is used.
 - For FC, 10G iSCSI, or 10G-NAS host interfaces:
→ The installation of the SFP starts and the "[Check SFP Installation] Screen" (page 1041) appears.
After the installation of the SFP is complete (when the CA includes an SFP), the installation of the CA port starts and the "[Status Check] Screen" (page 1041) appears.
After the installation of the CA ports is complete, the "[Finish] Screen" (page 1042) appears.
 - For 1G iSCSI, SAS, or 1G-NAS host interfaces:
→ The CA port installation starts and the "[Status Check] Screen" (page 1041) appears.
After the installation is complete, the "[Finish] Screen" (page 1042) appears.
- 5 Click the [Done] button to return to the [Channel Adapter] screen.



Remove Channel Adapter

- "■ Overview" (page 1042)
- "■ User Privileges" (page 1043)
- "■ Display Contents (for the ETERNUS DX100 S5/DX200 S5 or the ETERNUS AF150 S3/AF250 S3)" (page 1043)
- "■ Display Contents (For the ETERNUS DX500 S5/DX600 S5/DX900 S5, the ETERNUS DX8100 S4/DX8900 S4, or the ETERNUS AF650 S3)" (page 1046)
- "■ Operating Procedures" (page 1047)

■ Overview

This function removes a Channel Adapter (CA) while the storage system is operating.

After isolation of the CA to be removed and the controller module (CM) in which the CA is installed, the CA is removed from the storage system.

Caution

- Perform the start maintenance operation by using the [Start/End Maintenance] function before the removing task. If the operation has not been performed, the removal cannot be started.
- Only one CA can be removed at a time.
- For 1CM model, the [Finish] screen is displayed without executing isolation of the CM. Remove the CA according to the displayed procedure. (For the ETERNUS DX100 S5/DX200 S5)
- This function cannot be used under the following conditions:
 - The status of the CA that is to be removed or the CM to which the target CA belongs is not normal
 - Storage Migration paths are set for the CA that is to be removed
 - No CAs are installed
(including when the NAS-CAs are installed in the storage system that is not part of a Unified Storage environment)
 - A CM-FC (CM with direct mount CA) has been installed in the ETERNUS DX100 S5 and "CA#0" is selected
 - The port for the CA that is to be removed is used for the Storage Cluster function
 - When removing a NAS-CA and the CA port is being used by the multipath configuration
 - When removing a NAS-CA and the CA port is being used by the Bonding configuration
 - When removing a NAS-CA and the CA port is being used by the NAS interface configuration
 - The CA that is to be removed is directly mounted in the CM (for the ETERNUS DX60 S5)

Note

- If a CA that is set with copy path information is removed, the copy path information is automatically deleted.

■ User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	
StorageAdmin	
AccountAdmin	
SecurityAdmin	
Maintainer	✓

Refer to "'A. User Roles and Policies" (page 1580)" for details on the policies and roles.

■ Display Contents (for the ETERNUS DX100 S5/DX200 S5 or the ETERNUS AF150 S3/AF250 S3)

The following screens are displayed by the wizard.

[Start] Screen

The CA that is to be removed is displayed.

7. Component Controller Enclosure

Item	Description
CM	The CM number to which the CA that is to be removed belongs is displayed. CM#x x: CM number
CA	The CA number that is to be removed is displayed. CA#x x: CA number
Type	The CA type is displayed. <div style="background-color: #f0f0f0; padding: 10px;"> <p>Note</p> <ul style="list-style-type: none"> Note that a 1-port type CA for the ETERNUS DX60 S5/DX100 S5 is displayed as "2port" (for 8G-FC, "8G-FC 2port" is displayed). Similarly, a 2-port type CA (1G-NAS) is displayed as "1G-NAS 4port". Available ports can be checked in the [Internal Parts] tab of the [Channel Adapter Detail] screen under [Channel Adapter]. Refer to the [Channel Adapter] function for details. </div>
Status	The CA status is displayed. Refer to "" Component Status " (page 1607)" for details.

[Check CA Status] Screen

The status of the CA and the progress rate of isolating the CA are displayed.

Status Check

Item	Description
CM	The CM number to which the CA that is to be removed belongs is displayed. CM#x x: CM number
CA	The CA number that is to be removed is displayed. CA#x x: CA number
Progress	The progress rate (0 to 100 %) of isolating the CA is displayed.
Status	The CA status is displayed.

[Test Connection] Screen

This screen is displayed when the CM from which the CA is removed is a Master CM. Follow the displayed procedure to confirm that the new Master CM is connected to a LAN.

Function Button

Button	Description
[Test Connection]	Click this button after confirming that the new Master CM is connected to a LAN. The connection status of the new Master CM and the LAN is checked.

[Test Connection Result] Screen

This screen is displayed when the CM from which the CA is removed is a Master CM. The connection status check result of the new Master CM and the LAN is displayed.

Function Button

Button	Description
[Test Connection]	If connection has failed, reconfirm the new Master CM is connected to a LAN, and click this button. The connection status of the new Master CM and the LAN is checked again.
[Resume Processing]	Click this button when connection was successful. Isolation of the CM starts.

[Isolate CM] Screen

The progress rate of isolating the CM is displayed.

Status Check

Item	Description
CM	The CM number to which the CA that is to be removed belongs is displayed. CM#x x: CM number
Progress	The progress rate (0 to 100 %) of isolating the CM is displayed.
Status	The CM status is displayed.

[Workflow] Screen

The CA removal procedure is displayed on this screen. Remove the CA according to the displayed procedure.

[Check CM Status] Screen

The progress rate of the CM activation process from which the CA was removed is displayed.

Status Check

Item	Description
CM	The CM number from which the CA is removed is displayed. CM#x x: CM number
Progress	The progress rate (0 to 100 %) of the activation process of the CM is displayed.
Status	The CM status is displayed.

[Finish] Screen

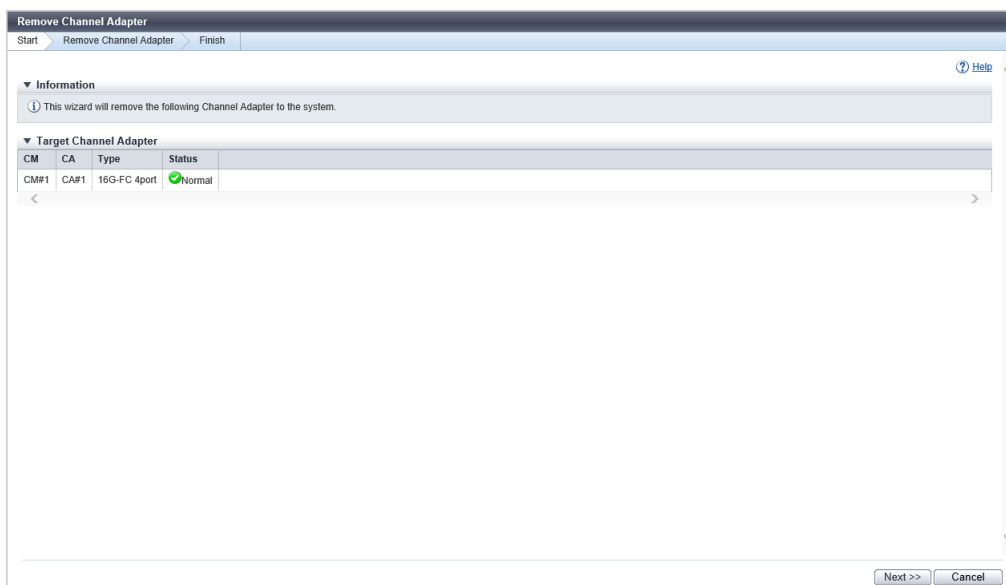
Except for the 1CM model, a message that indicates the completion of removal for the CA appears. For the 1CM model, the CA removal procedure is displayed. Remove the CA according to the displayed procedure.

Target Channel Adapter

Item	Description
CM	For the 1CM models, the CM number of the CA that is to be removed is displayed. For models other than 1CM models, the CM number for the removed CA is displayed. CM#x x: CM number
CA	For the 1CM models, the CA number that is to be removed is displayed. For models other than 1CM models, the removed CA number is displayed. CA#x x: CA number

■ **Display Contents (For the ETERNUS DX500 S5/DX600 S5/DX900 S5, the ETERNUS DX8100 S4/DX8900 S4, or the ETERNUS AF650 S3)**

The following screens are displayed by the wizard.



[Start] Screen

The CA that is to be removed is displayed.

Item	Description
Enclosure	The CE number is displayed to determine the CM that is installed with the CA to be removed. This is displayed for the ETERNUS DX900 S5 or the ETERNUS DX8900 S4. CE#x x: CE number
CM	The CM number to which the CA that is to be removed belongs is displayed. CM#x x: CM number
CA	The CA number that is to be removed is displayed. CA#x x: CA number
Type	The CA type is displayed.

7. Component Controller Enclosure

Item	Description
Status	The CA status is displayed.

[Status Check] Screen

The status of the CA and the progress rate of isolating the CA are displayed.

Status Check

Item	Description
Enclosure	The CE number is displayed to determine the CM that is installed with the CA to be removed. This is displayed for the ETERNUS DX900 S5 or the ETERNUS DX8900 S4. CE#x x: CE number
CM	The CM number to which the CA that is to be removed belongs is displayed. CM#x x: CM number
CA	The CA number that is to be removed is displayed. CA#x x: CA number
Progress	The progress rate (0 to 100 %) of isolating the CA is displayed.
Status	The CA status is displayed.

[Finish] Screen

The CA removal procedure is displayed on this screen. Remove the CA according to the displayed procedure.

Target Channel Adapter

Item	Description
Enclosure	The CE number is displayed to determine the CM that is installed with the CA to be removed. This is displayed for the ETERNUS DX900 S5 or the ETERNUS DX8900 S4. CE#x x: CE number
CM	The CM number to which the CA that is to be removed belongs is displayed. CM#x x: CM number
CA	The CA number that is to be removed is displayed. CA#x x: CA number

■ Operating Procedures

For the ETERNUS DX100 S5/DX200 S5 or the ETERNUS AF150 S3/AF250 S3

Procedure ▶▶▶

- 1 Select the CA that is to be removed, and click [Remove Channel Adapter] in [Action].
→ The "[Start] Screen" (page 1043) appears.

- 2** Check the CA that is to be removed, and click the [Next >>] button.
→ CA isolation starts, and the "[Check CA Status] Screen" (page 1044) screen appears.
After CA isolation is complete, the operations to be started and the displayed screen vary depending on the conditions as follows.
 - When it is a 1CM model
→ The "[Finish] Screen" (page 1045) appears. Remove the CA according to the displayed procedure. After removing CA is complete, proceed to Step 7.
 - When it is a 2CM model and CM from which a CA is removed is a Master CM
→ The Master CM is switched, and the "[Test Connection] Screen" (page 1044) appears. Proceed to Step 3.
 - When it is a 2CM model and CM from which a CA is removed is a Slave CM
→ CM isolation starts, and the "[Isolate CM] Screen" (page 1045) appears. When the CM isolation is complete, the "[Workflow] Screen" (page 1045) appears. Proceed to Step 6.
- 3** Follow the displayed procedure to confirm that the new Master CM is connected to a LAN.
- 4** After confirming the connection, click the [Test Connection] button.
→ The "[Test Connection Result] Screen" (page 1044) appears.
- 5** Confirm the connection status check result, and click the [Resume Processing] button.
→ CM isolation starts, and the "[Isolate CM] Screen" (page 1045) appears. When the CM isolation is complete, the "[Workflow] Screen" (page 1045) appears.

Caution

- If the connection of the new Master CM and the LAN fails, check the connection status again and return to Step 4.

- 6** Remove the CA according to the displayed procedure. When removing CA is complete, click the [Next >>] button.
→ The CM activation starts, and the "[Check CM Status] Screen" (page 1045) appears. When the CM activation is complete, the "[Finish] Screen" (page 1045) appears.
- 7** Click the [Done] button to return to the [Channel Adapter] screen.



For the ETERNUS DX500 S5/DX600 S5/DX900 S5, the ETERNUS DX8100 S4/DX8900 S4, or the ETERNUS AF650 S3

Procedure ▶▶▶

- 1** Select the CA that is to be removed, and click [Remove Channel Adapter] in [Action].
→ The "[Start] Screen" (page 1046) appears.
- 2** Check the CA that is to be removed, and click the [Next >>] button.
→ CA isolation starts, and the "[Status Check] Screen" (page 1047) screen appears.
When isolation of the CA is complete, the "[Finish] Screen" (page 1047) screen appears.
- 3** Remove the CA according to the displayed procedure.
- 4** Click the [Done] button to return to the [Channel Adapter] screen.



Performance (CA)

- ["■ Overview" \(page 1049\)](#)
- ["■ User Privileges" \(page 1049\)](#)
- ["■ Display Contents" \(page 1049\)](#)

■ Overview

This function displays the performance information of Channel Adapter Ports.

Note

- Performance information is obtained when performance monitoring is operated from Web GUI, CLI, or any other monitoring software. Refer to the [Start/Stop Performance Monitoring] function for details on how to start performance monitoring with Web GUI.
- The interval for acquiring performance information can be specified when starting the monitoring. When using Web GUI, the default interval is 30 seconds.
- The average performance values during the specified interval are displayed.
- When the port mode is "Initiator", the CA port performance is not displayed.

■ User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	✓
Admin	✓
StorageAdmin	✓
AccountAdmin	
SecurityAdmin	✓
Maintainer	✓

Refer to ["A. User Roles and Policies" \(page 1580\)](#) for details on the policies and roles.

■ Display Contents

In this screen, performance information of Channel Adapter Ports is displayed.

7. Component Controller Enclosure

CM	CA	Port	Port Mode	Read IOPS	Write IOPS	Read Throughput	Write Throughput
CM#0	CA#0	Port#0	CA	0IOPS	0IOPS	0MB/s	0MB/s
CM#0	CA#0	Port#1	CA	0IOPS	0IOPS	0MB/s	0MB/s
CM#0	CA#0	Port#2	CA	0IOPS	0IOPS	0MB/s	0MB/s
CM#0	CA#0	Port#3	CA	0IOPS	0IOPS	0MB/s	0MB/s
CM#1	CA#0	Port#0	CA	0IOPS	0IOPS	0MB/s	0MB/s
CM#1	CA#0	Port#1	CA	0IOPS	0IOPS	0MB/s	0MB/s
CM#1	CA#0	Port#2	CA	0IOPS	0IOPS	0MB/s	0MB/s
CM#1	CA#0	Port#3	CA	0IOPS	0IOPS	0MB/s	0MB/s

Item	Description
Enclosure	The Controller Enclosure (CE) number is displayed. This is displayed for the ETERNUS DX900 S5 or the ETERNUS DX8900 S4. CE#x x: CE number
CM	The CM number is displayed. CM#x x: CM number
CA	The CA number is displayed. CA#x x: CA number
Port	The port number is displayed. Port#x x: Port number
Port Mode	The port mode is displayed. CA RA CA/RA
Read IOPS	The number of reads per second is displayed.
Write IOPS	The number of writes per second is displayed.
Read Throughput	The amount of transferred data that is read per second is displayed.
Write Throughput	The amount of transferred data that is written per second is displayed.

Export Performance Information

Refer to ["Export Performance Information" \(page 194\)](#) for details.

Login Host

- ["Overview" \(page 1051\)](#)
- ["User Privileges" \(page 1051\)](#)
- ["Display Contents" \(page 1051\)](#)

7. Component Controller Enclosure

- ["Filter Setting" \(page 1052\)](#)

■ Overview

This function displays the hosts that are currently logged in to the port. Display target ports are FC ports, iSCSI ports, and SAS ports.

Note

- This function does not display CA ports where no hosts are logged in.
- If all of the following conditions are satisfied, the information of the remote storage system for REC is displayed as a host that is logged in to the RA port.
 - The Advanced Copy license has been registered
 - An REC path has been configured between the local and remote storage systems

■ User Privileges

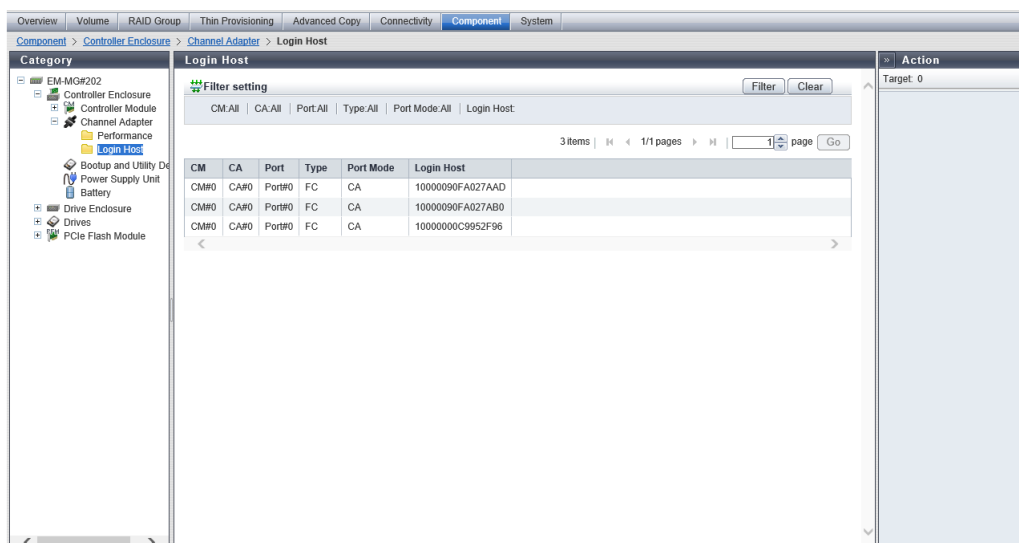
Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	✓
Admin	✓
StorageAdmin	✓
AccountAdmin	
SecurityAdmin	✓
Maintainer	✓

Refer to ["A. User Roles and Policies" \(page 1580\)](#) for details on the policies and roles.

■ Display Contents

The location information of the port and the information of the host that is currently logged in to the relevant port are displayed.



7. Component Controller Enclosure

Item	Description																
Enclosure	The CE number is displayed. This item is displayed for the ETERNUS DX900 S5 or the ETERNUS DX8900 S4. CE#x x: CE number																
CM	The CM number is displayed. CM#x x: CM number																
CA	The CA number is displayed. CA#x x: CA number																
Port	The port number is displayed. Port#x x: Port number																
Type	The port type is displayed. FC iSCSI SAS																
Port Mode	The port mode of the port is displayed. If the port mode is "CA/RA" and the port is used as a CA port, "CA/RA (CA)" is displayed. If the port mode is "CA/RA" and the port is used as an RA port, "CA/RA (RA)" is displayed. CA CA/RA (CA) RA CA/RA (RA)																
Login Host	The information of the host that is currently logged in to the port is displayed. If multiple hosts are logged in to a single port, the information of each host is displayed as follows. <table border="1"> <thead> <tr> <th>Type</th> <th>Port mode</th> <th>Host information</th> </tr> </thead> <tbody> <tr> <td rowspan="2">FC</td> <td>CA CA/RA (CA)</td> <td>WWN of the currently logged in host</td> </tr> <tr> <td>RA CA/RA (RA)</td> <td>WWN of the remote storage system for REC</td> </tr> <tr> <td rowspan="2">iSCSI</td> <td>CA CA/RA (CA)</td> <td>IP address (*1) and iSCSI name of the currently logged in host</td> </tr> <tr> <td>RA CA/RA (RA)</td> <td>IP address (*1) and iSCSI name of the remote storage system for REC</td> </tr> <tr> <td>SAS</td> <td>CA</td> <td>SAS address of the currently logged in host</td> </tr> </tbody> </table> <p>*1: IP addresses are displayed in the IPv4 or IPv6 format.</p>	Type	Port mode	Host information	FC	CA CA/RA (CA)	WWN of the currently logged in host	RA CA/RA (RA)	WWN of the remote storage system for REC	iSCSI	CA CA/RA (CA)	IP address (*1) and iSCSI name of the currently logged in host	RA CA/RA (RA)	IP address (*1) and iSCSI name of the remote storage system for REC	SAS	CA	SAS address of the currently logged in host
Type	Port mode	Host information															
FC	CA CA/RA (CA)	WWN of the currently logged in host															
	RA CA/RA (RA)	WWN of the remote storage system for REC															
iSCSI	CA CA/RA (CA)	IP address (*1) and iSCSI name of the currently logged in host															
	RA CA/RA (RA)	IP address (*1) and iSCSI name of the remote storage system for REC															
SAS	CA	SAS address of the currently logged in host															

■ Filter Setting

Function Description

Filter setting is a function used to display a list of only the ports satisfying all the specified conditions. No filtering is set by default. The following table shows conditions that can be specified.

7. Component Controller Enclosure

Item	Description	Setting values
Enclosure	Select the enclosure of the port that is to be displayed. When not using enclosure for filtering, select "All". This item is displayed for the ETERNUS DX900 S5 or the ETERNUS DX8900 S4.	All CE#x x: CE number
CM	Select the CM number of the port that is to be displayed. When not using the CM number for filtering, select "All".	All CM#x x: CM number
CA	Specify the CA number of the port that is to be displayed. When not using the CA number for filtering, select "All".	All CA#x x: CA number
Port	Select the port number of the port that is to be displayed. When not using the port number for filtering, select "All".	All Port#x x: Port number
Type	Select the type of the port that is to be displayed. When not using the port type for filtering, select "All".	All FC iSCSI SAS
Port Mode	Select the port mode of the port that is to be displayed. When not using the port mode for filtering, select "All".	All CA CA/RA (CA) RA CA/RA (RA)
Login Host	Input the host information of the host that is currently logged in to the port that is to be displayed. Ports matching or partially matching the entered WWN, IP address, iSCSI name, or SAS address are displayed. When not using the login host for filtering, leave this item blank.	WWN IP address iSCSI name SAS address Blank

PCIe Flash Module

- ["■ Overview" \(page 1053\)](#)
- ["■ User Privileges" \(page 1054\)](#)
- ["■ Display Contents" \(page 1054\)](#)

■ Overview

This function displays the [PCIe Flash Module \(PFM\)](#) information.

Caution

- If a PFM is not available for reading and writing, "⊗Error" is displayed for the status. If this occurs, replace the PFM.

Note

- PFMs can be installed in the ETERNUS DX500 S5/DX600 S5/DX900 S5 and the ETERNUS DX8900 S4.
- The PFM capacity in each CE is used as an Extreme Cache capacity.
- With this function, the PFMs that are only installed (before the hot expansion operation) in the storage system are displayed.

■ User Privileges

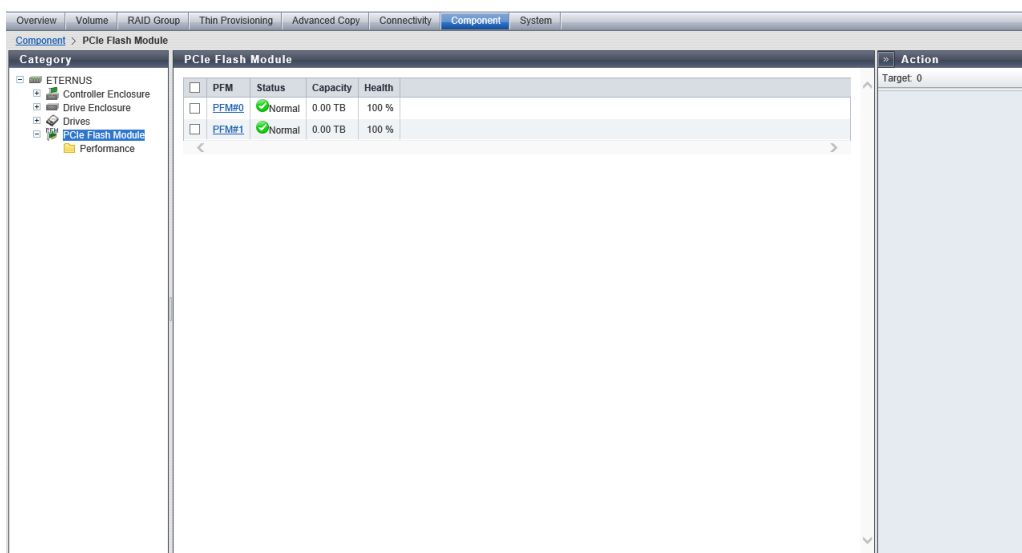
Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	✓
Admin	✓
StorageAdmin	✓
AccountAdmin	
SecurityAdmin	✓
Maintainer	✓

Refer to "[A. User Roles and Policies](#)" (page 1580)" for details on the policies and roles.

■ Display Contents

In this screen, PFM information is displayed.



PFM List

Item	Description
Enclosure	The CE number is displayed. This is displayed for the ETERNUS DX900 S5 or the ETERNUS DX8900 S4. CE#x x: CE number
PFM	The PFM number is displayed. Click this item to display the " [PCIe Flash Module Detail] Screen " (page 1055). PFM#x x: PFM number
Status	The PFM status is displayed. Refer to " Component Status " (page 1607)" for details.
Capacity	The PFM capacity is displayed.

7. Component Controller Enclosure

Item	Description
Owner	<p>The CE where PFM's are installed is displayed.</p> <p>If the Extreme Cache capacity is not specified for the PFM, a "-" (hyphen) is displayed.</p> <p>This item is displayed only when the ETERNUS DX900 S5 or the ETERNUS DX8900 S4 is used and the Extreme Cache function for the storage system is enabled.</p> <p>CE#x x: CE number</p>
Health	<p>The PFM lifetime information (or remaining life) (0 to 100 %) is displayed.</p> <ul style="list-style-type: none"> • 100 % - 6 % The PFM is available. • 5 % - 1 % "⚠Warning" is displayed as the status. The PFM is approaching its end of life. • 0% "❌Error" is displayed as the status. Reading from or writing to the PFM is not available.

[PCIe Flash Module Detail] Screen

In this screen, detailed PFM information is displayed.

[Summary] Tab

CE#x CM#y PFM#z Information (For the ETERNUS DX900 S5 or the ETERNUS DX8900 S4)/CM#y PFM#z Information (For the Other Models)

Item	Description
Location	<p>The installation location of the PFM is displayed.</p> <p>For the ETERNUS DX900 S5 or the ETERNUS DX8900 S4 CE#x PFM#y</p> <p>For the other models PFM#y</p> <p>x: CE number y: PFM number</p>
Status	<p>The PFM status is displayed.</p> <p>Refer to "Component Status" (page 1607) for details.</p>
Status Code	The PFM status code is displayed.
Error Code	The PFM error code is displayed.
Capacity	The PFM capacity is displayed.
Owner	<p>The CE where PFM's are installed is displayed.</p> <p>If the Extreme Cache capacity is not specified for the PFM, a "-" (hyphen) is displayed.</p> <p>This item is displayed only when the ETERNUS DX900 S5 or the ETERNUS DX8900 S4 is used and the Extreme Cache function for the storage system is enabled.</p> <p>CE#x x: CE number</p>
Health	The PFM lifetime information (or remaining life) (0 to 100 %) is displayed.
Part Number	The PFM part number is displayed.
Serial Number	The PFM serial number is displayed.
Hardware Revision	The hardware version of the PFM is displayed.

7. Component Controller Enclosure

Item	Description
Firmware Version	The PFM firmware version is displayed.

[Internal Parts] Tab

CE#x CM#y PFM#z Front View (For the ETERNUS DX900 S5 or the ETERNUS DX8900 S4)/CM#y PFM#z Front View (For the Other Models)

Item	Description
Port	The location information of the PFM port is displayed. For the ETERNUS DX900 S5 or the ETERNUS DX8900 S4 CE#x PFM#y Port#z For the other models PFM#y Port#z x: CE number y: PFM number z: Port number
Status	The PFM port status is displayed. Refer to ""Component Status" (page 1607)" for details.
Error Code	The error code of the PFM port is displayed.

[View] Tab

CE#x CM#y PFM#z Front View (For the ETERNUS DX900 S5 or the ETERNUS DX8900 S4)/CM#y PFM#z Front View (For the Other Models)

Item	Description
(Storage system image)	The front view of the CE (CM) where PFMs are installed is displayed. Components that are not the PFM are grayed out. The PFM status is displayed with an icon. Refer to ""Component Status" (page 1607)" for details.

Add PCIe Flash Module

- ["■ Overview" \(page 1056\)](#)
- ["■ User Privileges" \(page 1057\)](#)
- ["■ Settings" \(page 1057\)](#)
- ["■ Operating Procedures" \(page 1059\)](#)

■ Overview

This function adds [PCIe Flash Module \(PFM\)](#) while the storage system is operating. After installing a PFM in the storage system, activate it via Web GUI.

Expanding Specifications of PFMs

- PFMs can be installed in the ETERNUS DX500 S5/DX600 S5/DX900 S5 and the ETERNUS DX8900 S4.
- Install PFMs in slot#16 to slot#23 of each CE before starting this function. There are no installation order requirements.
- Multiple PFMs can be added with a single operation (for example, CE#0 PFM#0 and CE#1 PFM#1 can be added at the same time).

- After adding the PFMs in hot mode, the Extreme Cache capacity must be set. Refer to the [Setup Extreme Cache] function for details.
- PFMs can be added to a storage system where PFMs are already installed regardless of the following conditions.
 - Enabling/disabling the Extreme Cache function
 - Extreme Cache capacity

Caution

- Perform the start maintenance operation by using the [Start/End Maintenance] function before adding a PFM. If the operation has not been performed, addition cannot be started.
- PFMs cannot be added if the storage system is not in the normal state.
- If the Extreme Cache capacity is not set after adding PFMs in hot mode, the PFMs cannot be used as Extreme Cache. Refer to the [Setup Extreme Cache] function for details.

Note

- For the ETERNUS DX900 S5 or the ETERNUS DX8900 S4, installing the same number of PFMs for each CE is not required. The PFM capacity in each CE is used as an Extreme Cache capacity.

■ User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	
StorageAdmin	
AccountAdmin	
SecurityAdmin	
Maintainer	✓

Refer to ""[A. User Roles and Policies](#)" (page 1580)" for details on the policies and roles.

■ Settings

In this screen, add PFMs using the wizard.

[Start] Screen

Select the PFMs that are to be added.

Target PFMs

Item	Description
Checkbox to select a PFM	Select the checkbox for the PFM that is to be added. PFMs that are added in the cold mode are displayed in slot#16 to slot#23 of each CE.

7. Component Controller Enclosure

Item	Description
PFM	The location information of the PFM is displayed. For the ETERNUS DX900 S5 or the ETERNUS DX8900 S4 CE#x PFM#y For the other models PFM#y x: CE number y: PFM number
Status	The PFM status is displayed. If the PFM status is "Undefined", a "-" (hyphen) is displayed. Refer to "Component Status" (page 1607) for details.

[Mount PFM] Screen

The target PFM and the mount procedure are displayed. Install the PFM according to the displayed procedure.

Target PFMs

Item	Description
Target PFMs	The number of the PFM to be added is displayed. When multiple PFMs are selected in the [Start] screen, all of the PFMs are displayed with a "," (comma) and a space inserted between each one of them. For the ETERNUS DX900 S5 or the ETERNUS DX8900 S4 CE#x PFM#y For the other models PFM#y x: CE number y: PFM number

[Define PFM] Screen

The progress rate for the activation processing of the added PFM is displayed.

Status Check

Item	Description
PFM	The number of the PFM to be added is displayed. For the ETERNUS DX900 S5 or the ETERNUS DX8900 S4 CE#x PFM#y For the other models PFM#y x: CE number y: PFM number
Progress	The progress rate (0 to 100 %) of the activation process of the PFM is displayed. After the PFM is activated, the result is displayed.
Status	The status of the PFM that is to be added is displayed.

[Finish] Screen

A message indicating that the PFM was added successfully is displayed.

■ Operating Procedures

Procedure ▶▶▶

- 1 Click [Add PCIe Flash Module] in [Action].
→ The "[Start] Screen" (page 1057) appears.
- 2 Select the PFM that is to be added, and click the [Next >>] button.
→ The "[Mount PFM] Screen" (page 1058) appears.
- 3 Install a PFM according to the displayed procedure. When the installation is complete, click the [Next >>] button.
→ The "[Define PFM] Screen" (page 1058) appears and activation of the PFM starts.
- 4 After all of the PFMs are activated, click the [Next >>] button.
→ The "[Finish] Screen" (page 1058) appears.
- 5 Click the [Done] button to return to the [PCIe Flash Module] screen.



Remove PCIe Flash Module

- "■ Overview" (page 1059)
- "■ User Privileges" (page 1059)
- "■ Settings" (page 1060)
- "■ Operating Procedures" (page 1061)

■ Overview

This function removes PCIe Flash Module (PFM) while the storage system is operating. After the target PFMs are isolated, remove these PFMs from the storage system.

Removing Specifications of PFMs

- Multiple PFMs can be removed with a single operation (for example, CE#0 PFM#0 and CE#A PFM#7 can be removed at the same time).
- Before removing the PFMs, Extreme Cache must be released. Extreme Cache is released for each CE. Refer to the [Release Extreme Cache] function for details.

Caution

- Perform the start maintenance operation by using the [Start/End Maintenance] function before the removing task. If the operation has not been performed, the removal cannot be started.
- PFMs cannot be removed in the following conditions:
 - PFMs are used as Extreme Cache
 - Maintenance for PFMs is not available

■ User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	

7. Component Controller Enclosure

Default role	Availability of executions
StorageAdmin	
AccountAdmin	
SecurityAdmin	
Maintainer	✓

Refer to "[A. User Roles and Policies](#)" (page 1580) for details on the policies and roles.

■ Settings

In this screen, remove PFM's using the wizard.

[Start] Screen

The target PFM's that are to be removed are displayed.

Target PFM's

Item	Description
PFM	The location information of the PFM that is to be removed is displayed. For the ETERNUS DX900 S5 or the ETERNUS DX8900 S4 CE#x PFM#y For the other models PFM#y x: CE number y: PFM number
Status	The status of PFM's that are to be removed is displayed. Refer to " Component Status " (page 1607) for details.

[Remove PFM] Screen

The isolation progress of the target PFM is displayed.

Status Check

Item	Description
PFM	The number of the PFM to be removed is displayed. For the ETERNUS DX900 S5 or the ETERNUS DX8900 S4 CE#x PFM#y For the other models PFM#y x: CE number y: PFM number
Progress	The progress rate (0 to 100 %) of isolating the PFM is displayed. After the PFM is isolated, the result is displayed. Complete Timeout
Status	The status of PFM's that are to be removed is displayed.

[Finish] Screen

A message that indicates the PFM is removed successfully is displayed.

■ Operating Procedures

Procedure ▶▶▶

- 1 Select the PFM that is to be removed (multiple selections can be made), and click [Remove PCIe Flash Module] in [Action].
→ The "[Start] Screen" (page 1060) appears.
- 2 Check the PFM to be removed, and click the [Next >>] button.
→ The "[Remove PFM] Screen" (page 1060) appears and the isolation process starts.
- 3 After the PFM is isolated, remove the PFM by following the displayed procedure. When the removal is complete, click the [Next >>] button.
- 4 Click the [Done] button to return to the [PCIe Flash Module] screen.
→ The "[Finish] Screen" (page 1060) appears.

Performance (PCIe Flash Module)

- "■ Overview" (page 1061)
- "■ User Privileges" (page 1061)
- "■ Display Contents" (page 1062)

■ Overview

This function displays the performance information of the PFM.

Note

- Performance information is obtained when performance monitoring is operated from Web GUI, CLI, or any other monitoring software. Refer to the [Start/Stop Performance Monitoring] function for details on how to start performance monitoring with Web GUI.
- The interval for acquiring performance information can be specified when starting the monitoring. When using Web GUI, the default interval is 30 seconds.
- The average performance values during the specified interval are displayed.
- PFMs can be installed in the ETERNUS DX500 S5/DX600 S5/DX900 S5 and the ETERNUS DX8900 S4.

■ User Privileges

Availability of Executions in the Default Role

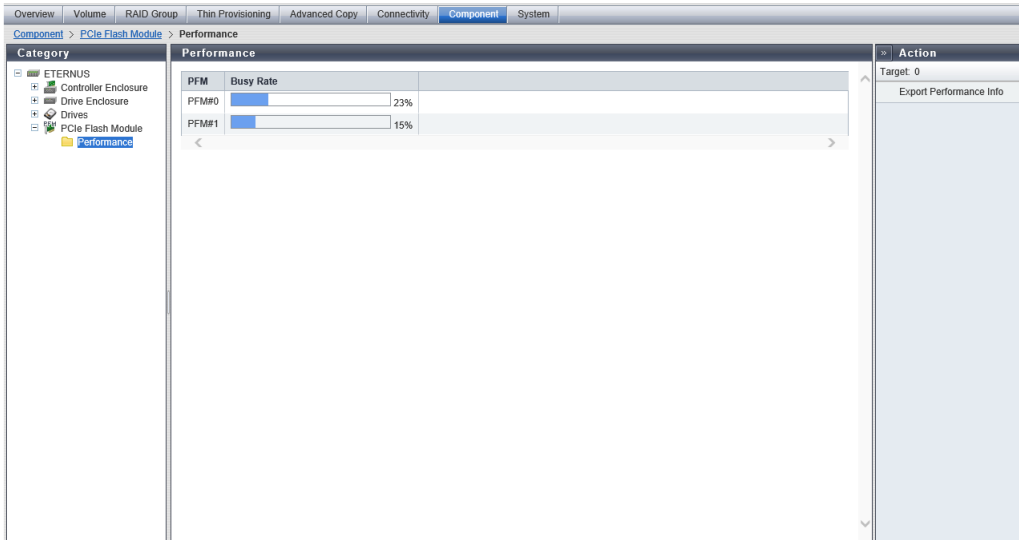
Default role	Availability of executions
Monitor	✓
Admin	✓
StorageAdmin	✓
AccountAdmin	
SecurityAdmin	✓
Maintainer	✓

7. Component Controller Enclosure

Refer to "[A. User Roles and Policies](#)" (page 1580)" for details on the policies and roles.

■ Display Contents

In this screen, the performance information of the PFM is displayed.



PFM List

Item	Description
Enclosure	The CE number is displayed. This is displayed for the ETERNUS DX900 S5 or the ETERNUS DX8900 S4. CE#x x: CE number
PFM	The PFM number is displayed. PFM#x x: PFM number
Busy Rate	When performance monitoring has started, the busy rate (0 to 100 %) of the PFM is displayed with a bar and a numerical number. If performance monitoring has stopped, "0 %" is displayed for the busy rate.

Bootup and Utility Device

- "[Overview](#)" (page 1062)
- "[User Privileges](#)" (page 1063)
- "[Display Contents](#)" (page 1063)

■ Overview

This function displays the **BUD** information.

This function is displayed for the ETERNUS DX500 S5/DX600 S5/DX900 S5, the ETERNUS DX8100 S4/DX8900 S4, and the ETERNUS AF650 S3.

■ User Privileges

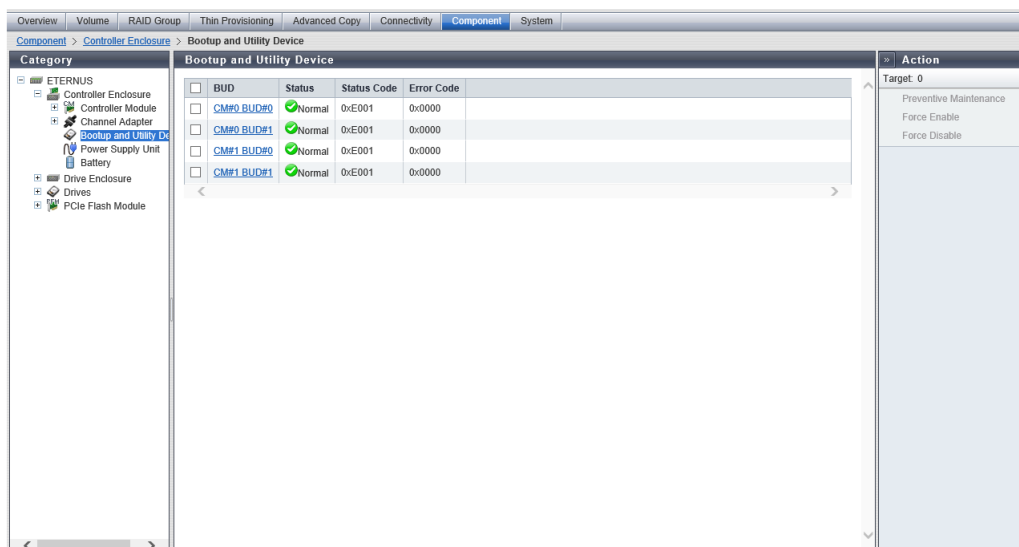
Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	✓
Admin	✓
StorageAdmin	✓
AccountAdmin	
SecurityAdmin	✓
Maintainer	✓

Refer to "[A. User Roles and Policies](#)" (page 1580)" for details on the policies and roles.

■ Display Contents

The BUD information is displayed.



Bootup and Utility Device List

Item	Description
Enclosure	The Controller Enclosure (CE) number is displayed. This item is displayed for the ETERNUS DX900 S5 or the ETERNUS DX8900 S4. CE#x x: CE number
BUD	The BUD number is displayed. Click this item to display the " [Bootup and Utility Device Detail] Screen " (page 1064). CM#x BUD#y x: CM number y: BUD number
Status	The BUD status is displayed. Refer to " Component Status " (page 1607)" for details.

7. Component Controller Enclosure

Item	Description
Status Code	The BUD status code is displayed.
Error Code	The BUD error code is displayed.

[Bootup and Utility Device Detail] Screen

The details of Bootup and Utility Device (BUD) is displayed.

[Summary] Tab

CE#x CM#y BUD#z Information (For the ETERNUS DX900 S5 or the ETERNUS DX8900 S4)/CM#y BUD#z Information (For the ETERNUS DX500 S5/DX600 S5, ETERNUS DX8100 S4, or the ETERNUS AF650 S3)

Item	Description
Location	The location of the BUD is displayed. For the ETERNUS DX900 S5 or the ETERNUS DX8900 S4 CE#x CM#y BUD#z For the other models CM#y BUD#z x: CE number y: CM number z: BUD number
Status	The BUD status is displayed. Refer to "Component Status" (page 1607) for details.
Status Code	The BUD status code is displayed.
Error Code	The BUD error code is displayed.
Part Number	The BUD part number is displayed.
Serial Number	The BUD serial number is displayed.
Hardware Revision	The hardware version of the BUD is displayed.

[View] Tab

CE#x CM#y BUD#z Rear View (For the ETERNUS DX900 S5 or the ETERNUS DX8900 S4)/CM#y BUD#z Rear View (For the ETERNUS DX500 S5/DX600 S5, the ETERNUS DX8100 S4, or the ETERNUS AF650 S3)

Item	Description
(Storage system image)	The rear view of the CE that is installed in the storage system is displayed. Components that are not BUD are grayed out. The BUD status is displayed with an icon. Refer to "Component Status" (page 1607) for details.

Power Supply Unit (CE)

- ["■ Overview" \(page 1065\)](#)
- ["■ User Privileges" \(page 1065\)](#)
- ["■ Display Contents" \(page 1065\)](#)

■ Overview

This function displays the information of the Power Supply Unit (PSU) for the Controller Enclosure (CE).

■ User Privileges

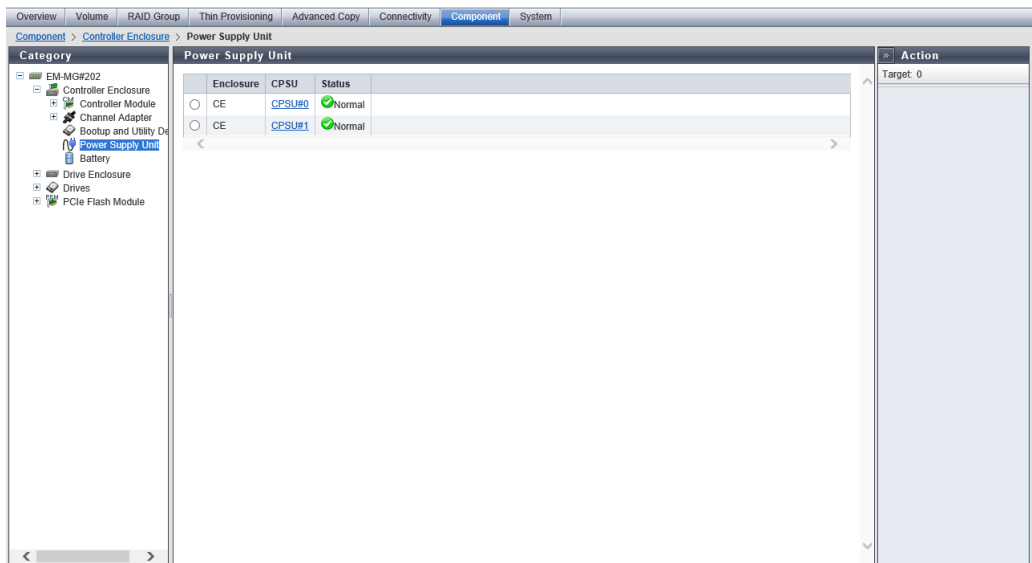
Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	✓
Admin	✓
StorageAdmin	✓
AccountAdmin	
SecurityAdmin	✓
Maintainer	✓

Refer to "'A. User Roles and Policies" (page 1580)" for details on the policies and roles.

■ Display Contents

The information of the PSU is displayed.



Item	Description
Enclosure	The enclosure where the PSU or the CPSU is installed is displayed. For the ETERNUS DX900 S5 or the ETERNUS DX8900 S4 CE#x For the other models CE x: CE number

7. Component Controller Enclosure

Item	Description
PSU	<p>The PSU number is displayed.</p> <p>Click this item to display the "[PSU/CPSU Detail] Screen" (page 1066).</p> <p>This item is displayed for the ETERNUS DX60 S5/DX100 S5/DX200 S5 and the ETERNUS AF150 S3/AF250 S3.</p> <p>PSU#x x: PSU number</p>
CPSU	<p>The Controller Enclosure Power Supply Unit (CPSU) number is displayed.</p> <p>Click this item to display the "[PSU/CPSU Detail] Screen" (page 1066).</p> <p>This item is displayed for the ETERNUS DX500 S5/DX600 S5/DX900 S5, the ETERNUS DX8100 S4/DX8900 S4, and the ETERNUS AF650 S3.</p> <p>CPSU#x x: CPSU number</p>
Status	<p>The PSU status or the CPSU status is displayed.</p> <p>Refer to "'Component Status' (page 1607)" for details.</p>

[PSU/CPSU Detail] Screen

The detailed information for the PSU or the CPSU is displayed.

[Summary] Tab

CE#x CPSU#y Information (For the ETERNUS DX900 S5 or the ETERNUS DX8900 S4)/CE CPSU#y Information (For the ETERNUS DX500 S5/DX600 S5, the ETERNUS DX8100 S4, and the ETERNUS AF650 S3)/CE PSU#z Information (For the Other Models)

Item	Description
Location	<p>The installation location of PSU or CPSU is displayed.</p> <p>For the ETERNUS DX900 S5 or the ETERNUS DX8900 S4 CE#x CPSU#y</p> <p>For the ETERNUS DX500 S5/DX600 S5, the ETERNUS DX8100 S4, and the ETERNUS AF650 S3 CE CPSU#y</p> <p>For the other models CE PSU#z x: CE number y: CPSU number z: PSU number</p>
Status	<p>The PSU status or the CPSU status is displayed.</p> <p>Refer to "'Component Status' (page 1607)" for details.</p>
Status Code	The status code of the PSU or the CPSU is displayed.
Error Code	The error code of PSU or CPSU is displayed.
Part Number	The part number of PSU or CPSU is displayed.
Serial Number	The serial number of PSU or CPSU is displayed.
Hardware Revision	The hardware version of PSU or CPSU is displayed.

[View] Tab

CE#x CPSU#y Rear View (for the ETERNUS DX900 S5 or the ETERNUS DX8900 S4)/CE CPSU#y Rear View (For the ETERNUS DX500 S5/DX600 S5, the ETERNUS DX8100 S4, and the ETERNUS AF650 S3)/CE PSU#z Rear View (For the Other Models)

Item	Description
(Storage system image)	The rear view of the CE that is installed in the storage system is displayed. Components that are not PSU or CPSU are grayed out. The PSU status or the CPSU status is displayed with an icon. Refer to "Component Status" (page 1607) for details.

Battery (BBU)

- ["■ Overview" \(page 1067\)](#)
- ["■ User Privileges" \(page 1067\)](#)
- ["■ Display Contents" \(page 1068\)](#)

■ Overview

This function displays the Battery Backup Unit (BBU) information.

This function is displayed for the ETERNUS DX60 S5/DX100 S5/DX200 S5 and the ETERNUS AF150 S3/AF250 S3.

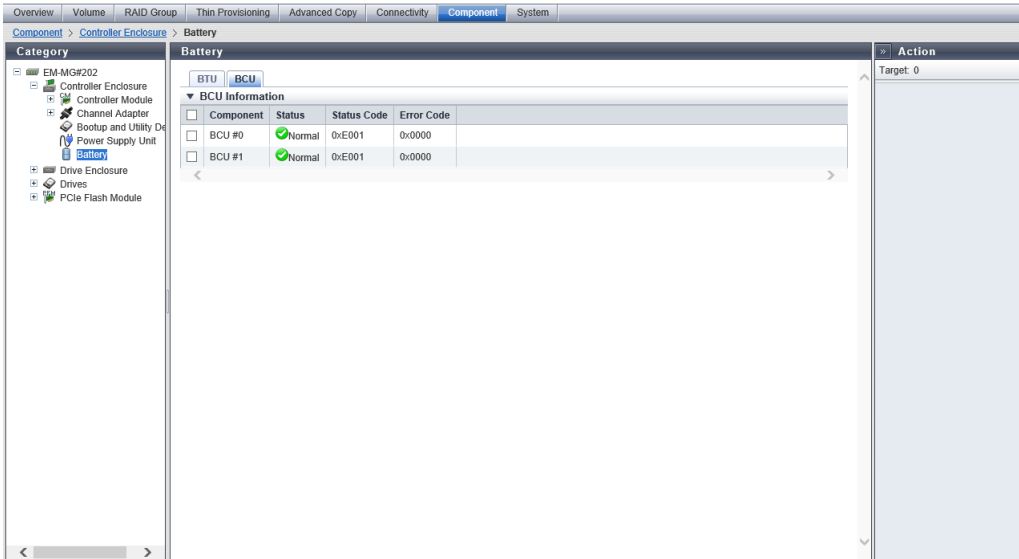
■ User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	✓
Admin	✓
StorageAdmin	✓
AccountAdmin	
SecurityAdmin	✓
Maintainer	✓

Refer to ["A. User Roles and Policies" \(page 1580\)](#) for details on the policies and roles.

■ Display Contents



The BBU information is displayed.

Item	Description
BBU	The BBU number is displayed. CM#x BBU x: CM number
Status	The BBU status is displayed. Refer to "Component Status" (page 1607) for details.
Status Code	The BBU status code is displayed.
Error Code	The BBU error code is displayed.
Charge Rate	The BBU charge level is displayed. When the battery charge level is 90% or more, "Full Charge" is displayed. When the battery charge level is less than 90%, "xx%" is displayed.
Expiration Date	The BBU expiration date is displayed. YYYY-MM YYYY: Year (AD) MM: Month (01 - 12)

Battery (BTU/BCU)

- ["Overview" \(page 1068\)](#)
- ["User Privileges" \(page 1069\)](#)
- ["Display Contents" \(page 1069\)](#)

■ Overview

This function displays the Battery Unit (BTU) information and the Battery Control Unit (BCU) information. This function is displayed for the ETERNUS DX500 S5/DX600 S5/DX900 S5, the ETERNUS DX8100 S4/DX8900 S4, and the ETERNUS AF650 S3.

■ User Privileges

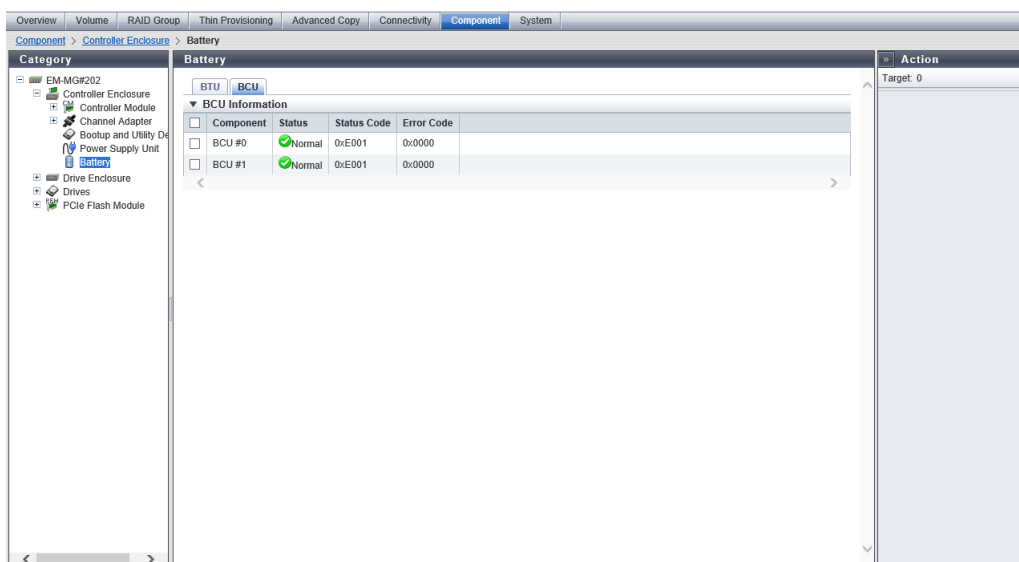
Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	✓
Admin	✓
StorageAdmin	✓
AccountAdmin	
SecurityAdmin	✓
Maintainer	✓

Refer to "[A. User Roles and Policies](#)" (page 1580)" for details on the policies and roles.

■ Display Contents

The information of the BTU and the BCU is displayed.



[BTU] Tab

BTU Information

Item	Description
Enclosure	The Controller Enclosure (CE) number is displayed. This is displayed only for the ETERNUS DX900 S5 or the ETERNUS DX8900 S4. CE#x x: CE number
Component	The BTU number is displayed. BTU#x x: BTU number
Status	The BTU status is displayed. Refer to " Component Status " (page 1607)" for details.

7. Component Frontend Enclosure

Item	Description
Status Code	The BTU status code is displayed.
Error Code	The BTU error code is displayed.
Charge Rate	The BTU charge level is displayed. When the battery charge level is 90% or more, "Full Charge" is displayed. When the battery charge level is less than 90%, "xx%" is displayed.
Expiration Date	The BTU expiration date is displayed. YYYY-MM YYYY: Year (AD) MM: Month (01 - 12)

[BCU] Tab

BCU Information

Item	Description
Enclosure	The Controller Enclosure (CE) number is displayed. This is displayed only for the ETERNUS DX900 S5 or the ETERNUS DX8900 S4. CE#x x: CE number
Component	The BCU number is displayed. BCU#x x: BCU number
Status	The BCU status is displayed. Refer to "Component Status" (page 1607) for details.
Status Code	The BCU status code is displayed.
Error Code	The BCU error code is displayed.

Frontend Enclosure

- ["■ Overview" \(page 1070\)](#)
- ["■ User Privileges" \(page 1070\)](#)
- ["■ Display Contents" \(page 1071\)](#)

■ Overview

This function displays the Frontend Enclosure (FE) information.
This is displayed for the ETERNUS DX900 S5 or the ETERNUS DX8900 S4.

■ User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	✓
Admin	✓
StorageAdmin	✓

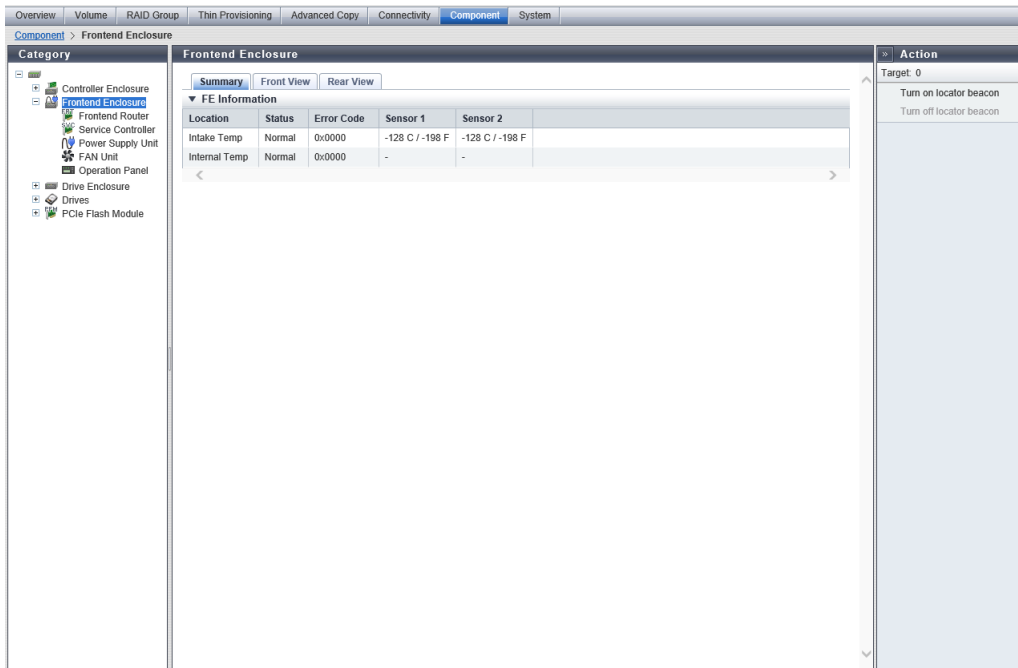
7. Component Frontend Enclosure

Default role	Availability of executions
AccountAdmin	
SecurityAdmin	✓
Maintainer	✓

Refer to ["A. User Roles and Policies" \(page 1580\)](#) for details on the policies and roles.

■ Display Contents

In this screen, FE information is displayed.



[Summary] Tab

FE Information

Item	Description
Location	The installation location of the thermal sensor is displayed. Intake Temp Internal Temp
Status	The thermal sensor status is displayed. Normal Warning Maintenance Error Unknown
Error Code	The error code of the thermal sensor is displayed.

7. Component Frontend Enclosure

Item		Description
Sensor 1	Intake Temp	The temperature of SVC#0 is displayed. If the thermal information is not available due to problem such as a sensor failure, a "-" (hyphen) is displayed. C: Celsius temperature F: Fahrenheit temperature
	Internal Temp	A "-" (hyphen) is usually displayed.
Sensor 2	Intake Temp	The temperature of SVC#1 is displayed. If the thermal information is not available due to problem such as a sensor failure, a "-" (hyphen) is displayed. C: Celsius temperature F: Fahrenheit temperature
	Internal Temp	A "-" (hyphen) is usually displayed.

[Front View] Tab

FE Front View

Item	Description
(Storage system image)	The front view of the FE that is installed in the storage system is displayed. The Service Controller (SVC) status and the FANU Unit (FANU) status are indicated by icons. Click the SVC number to display the [Service Controller Detail] screen. Click the FANU number to display the [FAN Unit Detail] screen. Refer to "Component Status" (page 1607) for details.

FE Internal Parts Information

Item	Description
Parts	The SVC number and the FANU number are displayed. Click the SVC number to display the [Service Controller Detail] screen. Click the FANU number to display the [FAN Unit Detail] screen. SVC#x FANU#y x: SVC number y: FANU number
Status	The status of each component is displayed. Refer to "Component Status" (page 1607) for details.
Status Code	The status code of each component is displayed.
Error Code	The error code of each component is displayed.

[Rear View] Tab

FE Rear View

Item	Description
(Storage system image)	The rear view of the FE that is installed in the storage system is displayed. The Frontend Router (FRT) status and the FE Power Supply Unit (FPSU) status are indicated by icons. Click the FRT number to display the [Frontend Router Detail] screen. Click the FPSU number to display the [FE Power Supply Unit Detail] screen. Refer to " Component Status " (page 1607) for details.

FE Internal Parts Information

Item	Description
Parts	The FRT number and the FPSU number are displayed. Click the FRT number to display the [Frontend Router Detail] screen. Click the FPSU number to display the [FE Power Supply Unit Detail] screen. FRT#x FPSU#y x: FRT number y: FPSU number
Status	The status of each component is displayed. Refer to " Component Status " (page 1607) for details.
Status Code	The status code of each component is displayed.
Error Code	The error code of each component is displayed.

Turn on Locator Beacon/Turn off Locator Beacon

Refer to "[Turn on Locator Beacon/Turn off Locator Beacon](#)" (page 993) for details.

Frontend Router

- "[Overview](#)" (page 1073)
- "[User Privileges](#)" (page 1073)
- "[Display Contents](#)" (page 1074)

■ Overview

This function displays the Frontend Router (FRT) information.
This is displayed for the ETERNUS DX900 S5 or the ETERNUS DX8900 S4.

■ User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	✓
Admin	✓
StorageAdmin	✓

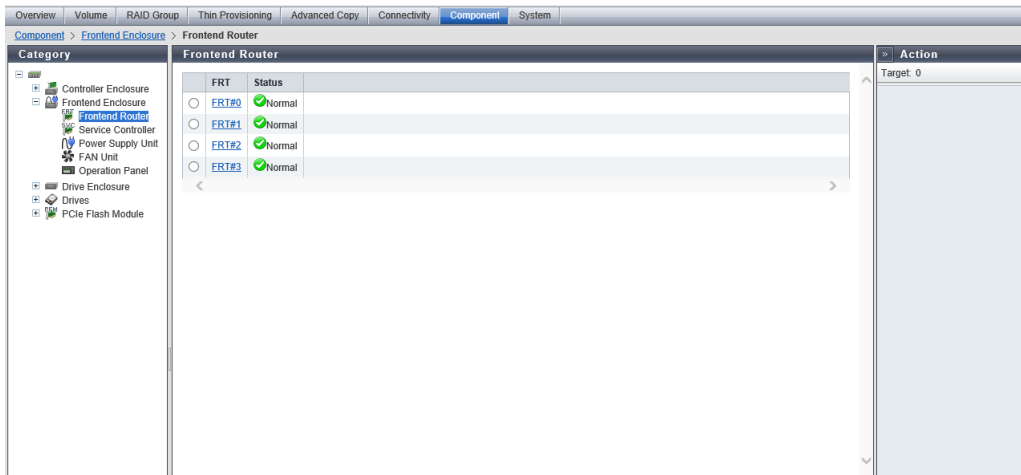
7. Component Frontend Enclosure

Default role	Availability of executions
AccountAdmin	
SecurityAdmin	✓
Maintainer	✓

Refer to ["A. User Roles and Policies" \(page 1580\)](#) for details on the policies and roles.

■ Display Contents

The FRT information is displayed.



Item	Description
FRT	The FRT number is displayed. Click this item to display the "[FRT Detail] Screen" (page 1074) . FRT#x x: FRT number
Status	The FRT status is displayed. Refer to "Component Status" (page 1607) for details.

[FRT Detail] Screen

In this screen, detailed FRT information is displayed.

[Summary] Tab

FRT#x Information

Item	Description
Location	The FRT number is displayed. FRT#x x: FRT number
Status	The FRT status is displayed. Refer to "Component Status" (page 1607) for details.
Status Code	The FRT status code is displayed.
Error Code	The FRT error code is displayed.

7. Component Frontend Enclosure

Item	Description
Part Number	The part number of the FRT is displayed.
Serial Number	The serial number of the FRT is displayed.
Hardware Revision	The hardware version of the FRT is displayed.

[Internal Parts] Tab

FRT#x Internal Parts Information

Item	Description
Parts	Information for the Frontend cable that connects between the CM and FRT is displayed. Click this item to display the "[Frontend Cable Detail] Screen" (page 1075). Frontend Cable (CE#x CM#y) x: CE number y: CM number
Status	The Frontend cable status is displayed. Refer to "'Component Status' (page 1607)" for details.
Error Code	The Frontend cable error code is displayed.
Type	The Frontend cable type is displayed. <ul style="list-style-type: none"> "Cu" is displayed when the connection cable between the CM-FRT is a Frontend electric cable. "AOC (Active Optical Cable)" is displayed when the connection cable between the CM-FRT is a Frontend optical cable.

[View] Tab

FRT#x Rear View

Item	Description
(Storage system image)	The rear view of the FE that is installed in the storage system is displayed. Components that are not the target FRT are grayed out. The FRT status is displayed with an icon. Refer to "'Component Status' (page 1607)" for details.

[Frontend Cable Detail] Screen

The detailed information of Frontend cable is displayed.

[Summary] Tab

FRT#x Frontend Cable (CE#y CM#z) Information (x: FRT Number, y: CE Number, z: CM Number)

Item	Description
Status	The Frontend cable status is displayed. Refer to "'Component Status' (page 1607)" for details.
Status Code	The Frontend cable status code is displayed.
Error Code	The Frontend cable error code is displayed.
Type	The Frontend cable type is displayed. Cu AOC

7. Component Frontend Enclosure

Item	Description
Part Number	The part number of the Frontend cable is displayed.
Serial Number	The Frontend cable serial number is displayed.
Hardware Revision	The hardware version of the Frontend cable is displayed.

Service Controller

- ["■ Overview" \(page 1076\)](#)
- ["■ User Privileges" \(page 1076\)](#)
- ["■ Display Contents" \(page 1076\)](#)

■ Overview

This function displays the Service Controller (SVC) information. This is displayed for the ETERNUS DX900 S5 or the ETERNUS DX8900 S4.

■ User Privileges

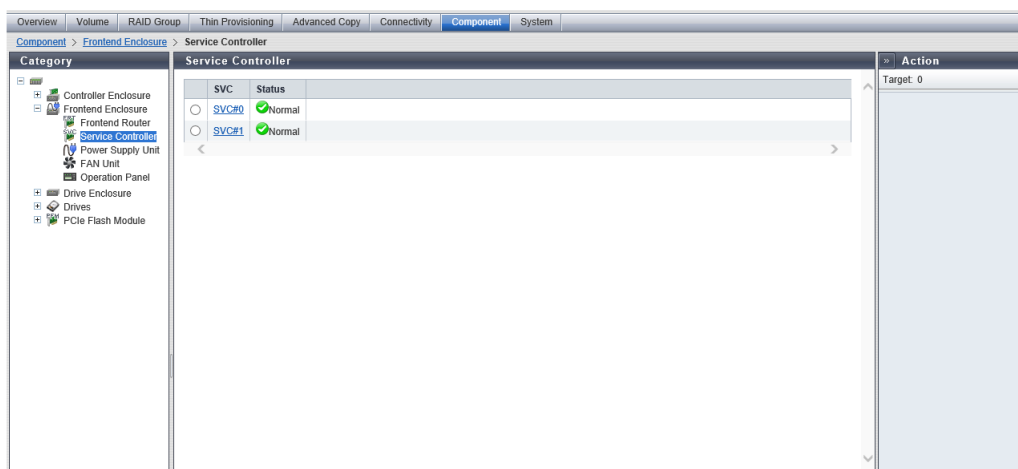
Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	✓
Admin	✓
StorageAdmin	✓
AccountAdmin	
SecurityAdmin	✓
Maintainer	✓

Refer to ["A. User Roles and Policies" \(page 1580\)](#) for details on the policies and roles.

■ Display Contents

The SVC information is displayed.



7. Component Frontend Enclosure

Item	Description
SVC	The SVC number is displayed. Click this item to display the "[Service Controller Detail] Screen" (page 1077). SVC#x x: SVC number
Status	The SVC status is displayed. Refer to "'Component Status' (page 1607)" for details.

[Service Controller Detail] Screen

The detailed information of the SVC is displayed.

[Summary] Tab

SVC#x Information

Item	Description
Location	The SVC number is displayed. SVC#x x: SVC number
Status	The SVC status is displayed. Refer to "'Component Status' (page 1607)" for details.
Status Code	The SVC status code is displayed.
Error Code	The SVC error code is displayed.
Part Number	The SVC part number is displayed.
Serial Number	The SVC serial number is displayed.
Hardware Revision	The hardware version of the SVC is displayed.
Active EC	The EC number of the current controller firmware is displayed. EC#x x: EC number
Next EC	The EC number of the controller firmware that is to be run at the next power-on is displayed. EC#x x: EC number
Firmware Version	The current controller firmware version is displayed.

[Internal Parts] Tab

SVC#x Internal Parts Information

Item	Description
Parts	Information for the Management cable that connects between the CM and SVC is displayed. Click this item to display the "[Management Cable Detail] Screen" (page 1078). Management Cable (CE#x CM#y) x: CE number y: CM number
Status	The Management cable status is displayed. Refer to "'Component Status' (page 1607)" for details.

7. Component Frontend Enclosure

Item	Description
Error Code	The Management cable error code is displayed.

[View] Tab

SVC#x Front View

Item	Description
(Storage system image)	The front view of the FE that is installed in the storage system is displayed. Components that are not the target SVC are grayed out. The SVC status is displayed with an icon. Refer to ""Component Status" (page 1607)" for details.

[Management Cable Detail] Screen

The detailed information of the Management cable is displayed.

[Summary] Tab

SVC#x Management Cable (CE#y CM#z) Information

Item	Description
Status	The Management cable status is displayed. Refer to ""Component Status" (page 1607)" for details.
Status Code	The Management cable status code is displayed.
Error Code	The Management cable error code is displayed.

Power Supply Unit (FE)

- ["■ Overview" \(page 1078\)](#)
- ["■ User Privileges" \(page 1078\)](#)
- ["■ Display Contents" \(page 1079\)](#)

■ Overview

This function displays the information of the Power Supply Unit (PSU) for the Frontend Enclosure (FE). This is displayed for the ETERNUS DX900 S5 or the ETERNUS DX8900 S4.

■ User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	✓
Admin	✓
StorageAdmin	✓
AccountAdmin	
SecurityAdmin	✓

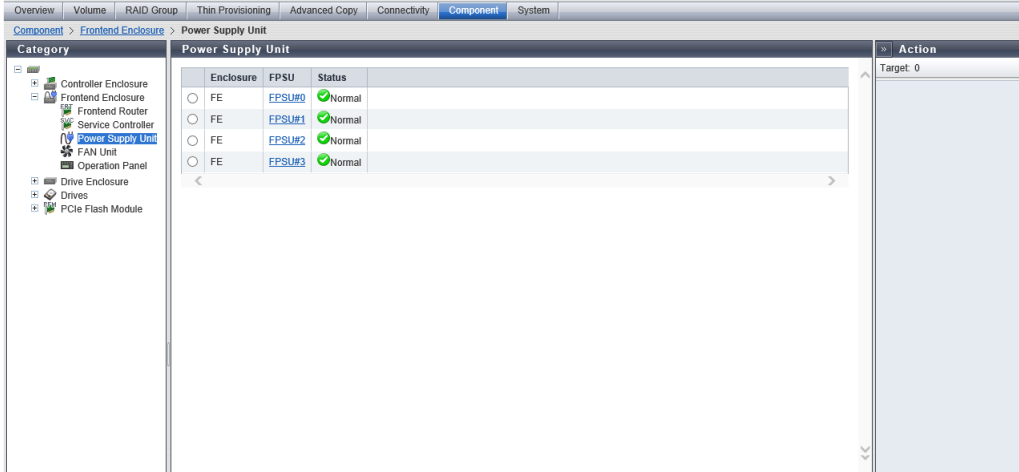
7. Component Frontend Enclosure

Default role	Availability of executions
Maintainer	✓

Refer to ["A. User Roles and Policies" \(page 1580\)](#) for details on the policies and roles.

■ Display Contents

In this screen, FPSU information is displayed.



Item	Description
Enclosure	The enclosure where the FPSU is installed is displayed. FE
FPSU	The FPSU number is displayed. Click this item to display the "[FE Power Supply Unit Detail] Screen" (page 1079) . FPSU#x x: FPSU number
Status	The FPSU status is displayed. Refer to "Component Status" (page 1607) for details.

[FE Power Supply Unit Detail] Screen

The detailed information of FPSU is displayed.

[Summary] Tab

FE FPSU#x Information

Item	Description
Location	The installation location of FPSU is displayed. FE FPSU#x x: FPSU number
Status	The FPSU status is displayed. Refer to "Component Status" (page 1607) for details.
Status Code	The FPSU status code is displayed.
Error Code	The FPSU error code is displayed.
Part Number	The FPSU part number is displayed.

7. Component Frontend Enclosure

Item	Description
Serial Number	The FPSU serial number is displayed.
Hardware Revision	The hardware version of the FPSU is displayed.

[View] Tab

FE FPSU#x Rear View

Item	Description
(Storage system image)	The rear view of the FE that is installed in the storage system is displayed. Components that are not FPSU are grayed out. The FPSU status is displayed with an icon. Refer to "Component Status" (page 1607) for details.

FAN Unit

- ["■ Overview" \(page 1080\)](#)
- ["■ User Privileges" \(page 1080\)](#)
- ["■ Display Contents" \(page 1080\)](#)

■ Overview

This function displays the FAN Unit (FANU) information.
This is displayed for the ETERNUS DX900 S5 or the ETERNUS DX8900 S4.

■ User Privileges

Availability of Executions in the Default Role

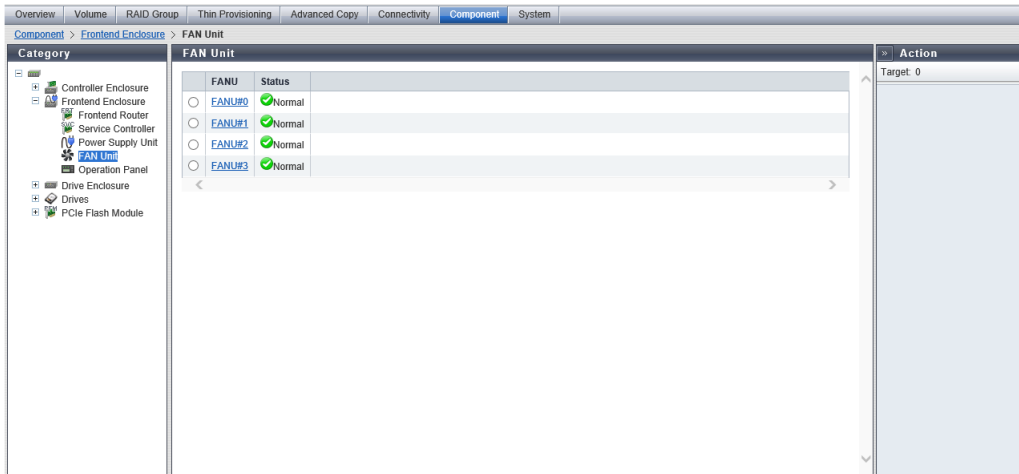
Default role	Availability of executions
Monitor	✓
Admin	✓
StorageAdmin	✓
AccountAdmin	
SecurityAdmin	✓
Maintainer	✓

Refer to ["A. User Roles and Policies" \(page 1580\)](#) for details on the policies and roles.

■ Display Contents

The information of the FAN Unit is displayed.

7. Component Frontend Enclosure



Item	Description
FANU	The FANU number is displayed. Click this item to display the "[FAN Unit Detail] Screen" (page 1081). FANU#x x: FANU number
Status	The FANU status is displayed. Refer to "'Component Status' (page 1607)" for details.

[FAN Unit Detail] Screen

[Summary] Tab

FANU#x Information

Item	Description
Location	The FANU number is displayed. FANU#x x: FANU number
Status	The FANU status is displayed. Refer to "'Component Status' (page 1607)" for details.
Status Code	The FANU status code is displayed.
Error Code	The FANU error code is displayed.
Part Number	The FANU part number is displayed.
Serial Number	The FANU serial number is displayed.
Hardware Revision	The hardware version of the FANU is displayed.

[View] Tab

FANU#x Front View

Item	Description
(Storage system image)	The front view of the FE that is installed in the storage system is displayed. Components that are not the target FANU are grayed out. The FANU status is displayed with an icon. Refer to " Component Status " (page 1607) for details.

Operation Panel

- "[Overview](#)" (page 1082)
- "[User Privileges](#)" (page 1082)
- "[Display Contents](#)" (page 1082)

■ Overview

This function displays the Operation Panel (OPNL) information.
This is displayed for the ETERNUS DX900 S5 or the ETERNUS DX8900 S4.

■ User Privileges

Availability of Executions in the Default Role

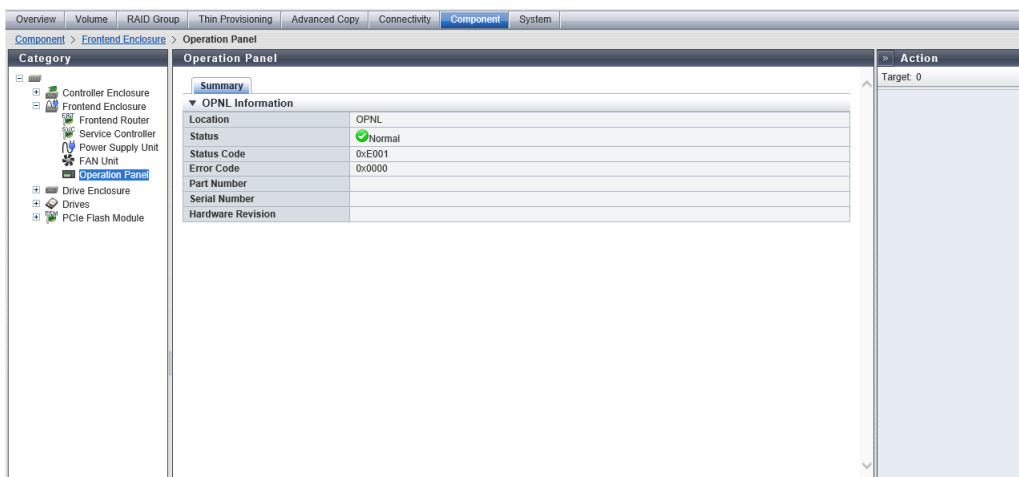
Default role	Availability of executions
Monitor	✓
Admin	✓
StorageAdmin	✓
AccountAdmin	
SecurityAdmin	✓
Maintainer	✓

Refer to "[A. User Roles and Policies](#)" (page 1580) for details on the policies and roles.

■ Display Contents

The information of OPNL is displayed.

7. Component Drive Enclosure



[Summary] Tab

OPNL Information

Item	Description
Location	The OPNL is displayed.
Status	The OPNL status is displayed. Refer to "Component Status" (page 1607) for details.
Status Code	The OPNL status code is displayed.
Error Code	The OPNL error code is displayed.
Part Number	The OPNL part number is displayed.
Serial Number	The OPNL serial number is displayed.
Hardware Revision	The hardware version of the OPNL is displayed.

Drive Enclosure

- ["Overview" \(page 1083\)](#)
- ["User Privileges" \(page 1083\)](#)
- ["Display Contents" \(page 1084\)](#)

■ Overview

This function displays the Drive Enclosure (DE) information.

■ User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	✓
Admin	✓
StorageAdmin	✓

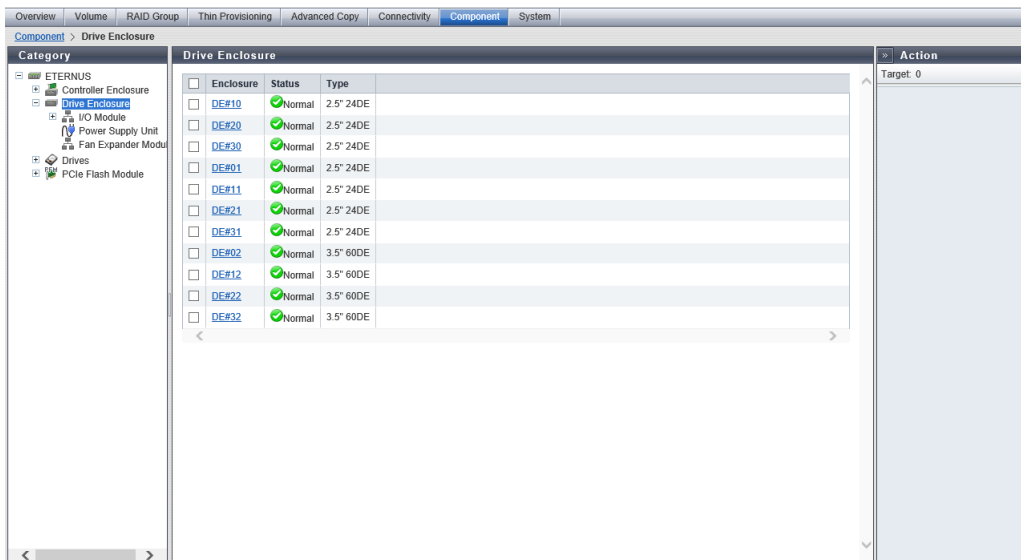
7. Component Drive Enclosure

Default role	Availability of executions
AccountAdmin	
SecurityAdmin	✓
Maintainer	✓

Refer to ["A. User Roles and Policies" \(page 1580\)](#) for details on the policies and roles.

■ Display Contents

The DE information is displayed.



Drive Enclosure List

Item	Description
Enclosure	The DE number is displayed. Click this item to display the "[Drive Enclosure Detail] Screen" (page 1084) . DE#xx xx: DE number
Status	The DE status is displayed. Refer to "Component Status" (page 1607) for details.
Type	The DE type is displayed. The DE type indicates the drive size and the maximum number of drives that can be installed. 2.5" 24DE 3.5" 12DE 3.5" 60DE

[Drive Enclosure Detail] Screen

The detailed information of the DE is displayed.

[Summary] Tab

DE#xx Information

Item	Description
Serial Number	The serial number of the DE is displayed.
Other Information	Additional information for the DE is displayed.

Item	Description	
Location	The installation location of the thermal sensor is displayed. Intake Temp Internal Temp	
Status	The thermal sensor status is displayed. Normal Warning Maintenance Error Unknown	
Error Code	The error code of the thermal sensor is displayed.	
Sensor 1	Intake Temp	The temperature of IOM#0 is displayed. If the thermal information is not available due to problem such as a sensor failure, a "-" (hyphen) is displayed. C: Celsius temperature F: Fahrenheit temperature
	Internal Temp	A "-" (hyphen) is usually displayed.
Sensor 2	Intake Temp	The temperature of IOM#1 is displayed. If the thermal information is not available due to problem such as a sensor failure, a "-" (hyphen) is displayed. This item is not displayed when the storage system is a 1CM model. C: Celsius temperature F: Fahrenheit temperature
	Internal Temp	A "-" (hyphen) is usually displayed.

[Front View] Tab

DE#xx Front View

Item	Description
(Storage system image)	The front view of the DE that is installed in the storage system is displayed. The following number of drives can be installed for each DE type. 2.5" DE: 24 (24 drives are lined up horizontally) 3.5" DE: 12 (3 drives are lined up vertically and 4 drives are lined up horizontally) 3.5" high density DE: 60 (5 drives are lined up vertically and 12 drives are lined up horizontally) When no drives are installed: Blank The drive status is displayed with an icon. Click the drive image to display the [Drive Detail] screen. Refer to "" Component Status " (page 1607)" for details.

DE#xx Drives Information

Item	Description
Slot No.	The slot number is displayed. Click this item to display the "[Drive Detail] Screen" (page 1114).
Status	The drive status is displayed. Refer to "'Drive Status' (page 1607)" for details.
Capacity	The capacity of the drive is displayed. <div style="background-color: #fff9c4; padding: 10px; border: 1px solid #ccc;"> <p>Caution</p> <ul style="list-style-type: none"> The displayed drive capacity may differ from the product's actual capacity. For example, the drive capacity of a "1.92 TB SSD" is displayed as "2.00 TB" and the capacity of an "18 TB Nearline SAS disk" is displayed as "17.9 TB". </div>
Speed	The drive speed is displayed. For SSD or SSD SED, a "-" (hyphen) is displayed. 15000 rpm 10000 rpm 7200 rpm
Type	The drive type is displayed. <ul style="list-style-type: none"> Drive type <ul style="list-style-type: none"> For SAS disks: Online For Nearline SAS disks: Nearline For SSDs, the following items are displayed depending on the SSD type. <ul style="list-style-type: none"> For SSD-Hs (12 Gbit/s): SSD-H (*1) For SSD-Ms (12 Gbit/s): SSD-M (*1) For SSD-Ls (12 Gbit/s): SSD-L (*1) <p>Note that "SED" is also displayed for self encrypting drives and "AF" is also displayed for Advanced Format compliant drives.</p> <p>*1: The displayed item varies depending on the interface speed (bandwidth) or the capacity of the reserved space. Unless otherwise specified, "SSD-H", "SSD-M", and "SSD-L" are collectively referred to as "SSD". In addition, there may be cases when "SSD SED" is used as the collective term for self encrypting SSD-Hs, SSD-Ms, and SSD-Ls.</p>
Usage	The usage of the drive is displayed. <ul style="list-style-type: none"> Data A drive that is used for user data or an unused drive Global Hot Spare A drive that is registered as a Global Hot Spare Dedicated Hot Spare A drive that is registered as a Dedicated Hot Spare
RAID Group	When the drive belongs to a RAID group, the RAID group number and the RAID group name are displayed. However, if the drive usage is "Dedicated Hot Spare", the RAID group number and the RAID group name are displayed even when the drive is not used as a Hot Spare. Click this item to display the [RAID Group Detail] Screen . When the usage is not "Dedicated Hot Spare" and the drive is not registered in a RAID group, a "-" (hyphen) is displayed.

7. Component Drive Enclosure

Item	Description
Health	<p>The drive lifetime information (0 to 100 %) is displayed. As the lifetime of the drive is reduced, the health level of the drive is decreased.</p> <p>A "-" (hyphen) is displayed in the following conditions:</p> <ul style="list-style-type: none">• The drive is neither "SSD" nor "SSD SED"• Data sanitization is in progress• The lifetime information cannot be obtained

[Rear View] Tab

DE#xx Rear View

Item	Description
(Storage system image)	<p>The rear view of the DE that is installed in the storage system is displayed.</p> <p>The status of the I/O Module (IOM), the Power Supply Unit (PSU), and the Fan Expander Module (FEM) are displayed with icons.</p> <p>Click the IOM number to display the [I/O Module Detail] screen.</p> <p>Click the PSU number to display the [Power Supply Unit (DE) Detail] screen.</p> <p>Click the FEM number to display the [Fan Expander Module Detail] screen.</p> <p>Refer to ""Component Status" (page 1607)" for details.</p>

DE#xx Internal Parts Information

Item	Description
Parts	<p>The IOM number, the PSU number, or the FEM number is displayed.</p> <p>Click the IOM number to display the [I/O Module Detail] screen.</p> <p>Click the PSU number to display the [Power Supply Unit (DE) Detail] screen.</p> <p>Click the FEM number to display the [Fan Expander Module Detail] screen.</p> <p>IOM#x PSU#x FEM#x x: IOM number, PSU number, or FEM number</p>
Status	<p>The status of IOM, PSU, or FEM is displayed.</p> <p>Refer to ""Component Status" (page 1607)" for details.</p>

Add Drive Enclosure

- "[■ Overview](#)" (page 1087)
- "[■ User Privileges](#)" (page 1090)
- "[■ Display Contents](#)" (page 1090)
- "[■ Operating Procedures](#)" (page 1096)

■ Overview

This function adds a Drive Enclosure (DE) without stopping the storage system. After installing a DE for the storage system, activate it via Web GUI.

Caution

- Perform the start maintenance operation by using the [Start/End Maintenance] function before adding a DE. If the operation has not been performed, addition cannot be started.
Note that when using the ETERNUS DX60 S5/DX100 S5/DX200 S5 and the ETERNUS AF250 S3, and the user has the "Storage Management" policy, the [Start/End Maintenance] operation is not required.
- When DE hot expansion is performed, multiple DEs can be added with a single operation.
Note that multiple DEs can only be added when they are allocated to the same SAS cascade configuration (*1). Multiple DEs that are allocated to different SAS cascade configurations cannot be added. Refer to ""DEs on the Same SAS Cascade" (page 1089)" for details.

*1: "SAS cascade" refers to DEs that are attached to one DI port.

- 2.5" DEs, 3.5" DEs, and 3.5" high density DEs can be added to the same storage system. Note the following conditions:
 - For the ETERNUS DX8100 S4, only 2.5" DEs can be installed.
 - For the ETERNUS AF250 S3/AF650 S3, only 2.5" DEs can be added. Note that 3.5" DEs and 3.5" high density DEs cannot be added.
- Be sure to use authorized additional parts. If parts other than the additional parts are used, operation is not guaranteed.
- If the maximum number of drives that can be allocated to the same SAS cascade is exceeded, DEs cannot be added to the relevant SAS cascade configuration.
- This function cannot be used under the following conditions:
 - The general status of the storage system is not "Normal"
 - The maximum number of DEs for each model is already installed (and the status of the following DEs is "🟢Normal")
 - For the ETERNUS DX60 S5: DE#03
 - For the ETERNUS DX100 S5: DE#0A
 - For the ETERNUS DX200 S5: DE#0A
 - For the ETERNUS DX500 S5: DE#05, DE#15, DE#25, and DE#35
 - For the ETERNUS DX600 S5: DE#0A, DE#1A, DE#2A, and DE#3A
 - For the ETERNUS DX900 S5: DE#x3, DE#x7, DE#xB, and DE#xF (x: E or F)
 - For the ETERNUS DX8100 S4: DE#10
 - For the ETERNUS DX8900 S4: DE#x3, DE#x7, DE#xB, and DE#xF (x: 0 - B)
 - For the ETERNUS AF250 S3: DE#0A
 - For the ETERNUS AF650 S3: DE#0A, DE#1A, DE#2A, and DE#3A
- This function is available for one of the following users.
 - For the ETERNUS DX60 S5/DX100 S5/DX200 S5 or the ETERNUS AF250 S3
 - A user with the "Storage Management" policy
 - A user with the "Maintenance Operation" policy who executed the start maintenance operation using the [Start/End Maintenance] function
 - For the other models
A user with the "Maintenance Operation" policy who executed the start maintenance operation using the [Start/End Maintenance] function

Note

- DEs can be added regardless of whether drives are installed or not.

DEs on the Same SAS Cascade

The DEs that are allocated to the same SAS cascade configuration are as follows:

- For the ETERNUS DX60 S5
DE#01, DE#02, and DE#03, which are connected to DI Port No.0.
- For the ETERNUS DX100 S5/DX200 S5
DE#01, DE#02, DE#03, DE#04, DE#05, DE#06, DE#07, DE#08, DE#09, and DE#0A, which are connected to DI Port No.0.
- For the ETERNUS DX500 S5
CE, DE#01, DE#02, DE#03, DE#04, and DE#05, which are connected to DI Port No.0.
DE#y0, DE#y1, DE#y2, DE#y3, DE#y4, and DE#y5, which are connected to DI Port No.x.
ETERNUS DX500 S5: $x = 1 - 3$, $y = 1 - 3$
(Example) DE#10, DE#11, DE#12, DE#13, DE#14, and DE#15, which are connected to DI Port No.1.
- For the ETERNUS DX600 S5
CE, DE#01, DE#02, DE#03, DE#04, DE#05, DE#06, DE#07, DE#08, DE#09, and DE#0A, which are connected to DI Port No.0.
DE#y0, DE#y1, DE#y2, DE#y3, DE#y4, DE#y5, DE#y6, DE#y7, DE#y8, DE#y9, and DE#yA, which are connected to DI Port No.x.
ETERNUS DX600 S5: $x = 1 - 3$, $y = 1 - 3$
(Example) DE#10, DE#11, DE#12, DE#13, DE#14, DE#15, DE#16, DE#17, DE#18, DE#19, and DE#1A, which are connected to DI Port No.1.
- For the ETERNUS DX900 S5
Two CEs can be installed in the ETERNUS DX900 S5.
DE#x1, DE#x2, and DE#x3 that are connected to CE#x/DI Port#0 (x: 0, 1, C, D, E, or F)
DE#x4, DE#x5, DE#x6, and DE#x7 that are connected to CE#x/DI Port#1 (x: 0, 1, C, D, E, or F)
DE#x8, DE#x9, DE#xA, and DE#xB that are connected to CE#x/DI Port#2 (x: 0, 1, C, D, E, or F)
DE#xC, DE#xD, DE#xE, and DE#xF that are connected to CE#x/DI Port#3 (x: 0, 1, C, D, E, or F)
(Example) DE#01, DE#02, and DE#03 that are connected to CE#0/DI Port#0 are on the same SAS cascade.
- For the ETERNUS DX8100 S4
There are no DEs on the same SAS cascade.
- For the ETERNUS DX8900 S4
Multiple CEs can be installed in the ETERNUS DX8900 S4.
DE#x1, DE#x2, and DE#x3 that are connected to CE#x/DI Port#0 (x:0 - B)
DE#x4, DE#x5, DE#x6, and DE#x7 that are connected to CE#x/DI Port#1 (x:0 - B)
DE#x8, DE#x9, DE#xA, and DE#xB that are connected to CE#x/DI Port#2 (x:0 - B)
DE#xC, DE#xD, DE#xE, and DE#xF that are connected to CE#x/DI Port#3 (x:0 - B)
(Example) DE#01, DE#02, and DE#03 that are connected to CE#0/DI Port#0 are on the same SAS cascade.
- For the ETERNUS AF250 S3
DE#01, DE#02, DE#03, DE#04, DE#05, DE#06, DE#07, DE#08, DE#09, DE#0A, which are connected to DI Port No.0.
- For the ETERNUS AF650 S3
CE, DE#01, DE#02, DE#03, DE#04, DE#05, DE#06, DE#07, DE#08, DE#09, and DE#0A, which are connected to DI Port No.0.
DE#y0, DE#y1, DE#y2, DE#y3, DE#y4, DE#y5, DE#y6, DE#y7, DE#y8, DE#y9, and DE#yA, which are connected to DI Port No.x.

7. Component Drive Enclosure

ETERNUS AF650 S3: x = 1 - 3, y = 1 - 3

■ User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	✓
StorageAdmin	
AccountAdmin	
SecurityAdmin	
Maintainer	✓

Refer to ["A. User Roles and Policies" \(page 1580\)](#) for details on the policies and roles.

■ Display Contents

The following screens are displayed by the wizard.

Enclosure	Type
DE#01	2.5" 24DE
DE#02	2.5" 24DE
DE#03	2.5" 24DE
DE#04	-
DE#05	-
DE#06	-
DE#07	-
DE#08	-
DE#09	-
DE#0A	-

[Start] Screen

Select the DE that is to be added.

7. Component
Drive Enclosure

Select Location

Item	Description	Setting values
Range of Drive Enclosure	<p>Select the range of the DEs that are to be added. In the list box, the range of the DEs that can be added at the one time is displayed.</p> <p>This item is displayed for the ETERNUS DX500 S5/ DX600 S5/DX900 S5, the ETERNUS DX8100 S4/ DX8900 S4, and the ETERNUS AF650 S3.</p>	<p>For the ETERNUS DX500 S5 DE#01 - DE#05 DE#10 - DE#15 DE#20 - DE#25 DE#30 - DE#35</p> <p>For the ETERNUS DX600 S5 DE#01 - DE#0A DE#10 - DE#1A DE#20 - DE#2A DE#30 - DE#3A</p> <p>For the ETERNUS DX900 S5 DE#01 - DE#E3 DE#04 - DE#E7 DE#08 - DE#EB DE#0C - DE#EF DE#11 - DE#F3 DE#14 - DE#F7 DE#18 - DE#FB DE#1C - DE#FF</p> <p>For the ETERNUS DX8100 S4 DE#10</p> <p>For the ETERNUS DX8900 S4 DE#x1 - DE#x3 DE#x4 - DE#x7 DE#x8 - DE#xB DE#xC - DE#xF (x: 0 - B)</p> <p>For the ETERNUS AF650 S3 DE#01 - DE#0A DE#10 - DE#1A DE#20 - DE#2A DE#30 - DE#3A</p>
Maximum Drive Slot Count	The maximum number of drive slots that can be allocated to a single SAS cascade configuration is displayed.	
Current Drive Slot Count	<p>The current number of drive slots that are allocated to the SAS cascade configuration to which the DEs that were selected for "Range of Drive Enclosure" belong is displayed.</p> <p>When the DE type is selected for "Target Drive Enclosure", the value that is recalculated for the number of drive slots for each DE type is displayed.</p>	

Target Drive Enclosure

Item	Description
Enclosure	For the ETERNUS DX60 S5/DX100 S5/DX200 S5 and the ETERNUS AF250 S3, the CE and the DE#0x are displayed. For the other models, the DEs in the SAS cascade that is selected with "Range of Drive Enclosure" are displayed. DE#xx xx: DE number
Type	Select the DE type that is to be added. When the DE is not a target to be added, select "-" (hyphen). For the ETERNUS DX60 S5, "2.5" 24DE" and "3.5" 12DE" can be selected. For the ETERNUS DX8100 S4, only "2.5" 24DE" can be selected. For the ETERNUS AF250 S3/AF650 S3, only "2.5" 24 DE" can be selected. For the other models that can add DEs, "2.5" 24DE", "3.5" 12DE", and "3.5" 60DE" can be selected. 2.5" 24DE 3.5" 12DE 3.5" 60DE

[Place DE on the rack] Screen

Target Drive Enclosure

Item	Description
Enclosure	The DE that is to be added is displayed. DE#xx xx: DE number
Type	The DE type that is to be added is displayed. 2.5" 24DE 3.5" 12DE 3.5" 60DE

Follow the procedure to connect the added DE with the following ports or DEs.

For the ETERNUS DX60 S5

DI Port No.	Expandable DE		
0	DE#01	DE#02	DE#03

For the ETERNUS DX100 S5/DX200 S5

DI Port No.	Expandable DE									
0	DE#01	DE#02	DE#03	DE#04	DE#05	DE#06	DE#07	DE#08	DE#09	DE#0A

(Example)

To add DE#01, connect with "DI Port No.0". To add DE#03, connect with the preceding "DE#02". Similarly for the ETERNUS DX500 S5/DX600 S5, connect the first DE to the "DI Port", and the other DEs to the preceding DE in the "Expandable DE".

For the ETERNUS DX500 S5

DI Port No.	Expandable DE					
0	-	DE#01	DE#02	DE#03	DE#04	DE#05

7. Component
Drive Enclosure

DI Port No.	Expandable DE					
1	DE#10	DE#11	DE#12	DE#13	DE#14	DE#15
2	DE#20	DE#21	DE#22	DE#23	DE#24	DE#25
3	DE#30	DE#31	DE#32	DE#33	DE#34	DE#35

For the ETERNUS DX600 S5

DI Port No.	Expandable DE										
0	-	DE#01	DE#02	DE#03	DE#04	DE#05	DE#06	DE#07	DE#08	DE#09	DE#0A
1	DE#10	DE#11	DE#12	DE#13	DE#14	DE#15	DE#16	DE#17	DE#18	DE#19	DE#1A
2	DE#20	DE#21	DE#22	DE#23	DE#24	DE#25	DE#26	DE#27	DE#28	DE#29	DE#2A
3	DE#30	DE#31	DE#32	DE#33	DE#34	DE#35	DE#36	DE#37	DE#38	DE#39	DE#3A

For the ETERNUS DX900 S5

CE No./ Port No.	Expandable DE											
CE#0/Port#0	-	DE#01	DE#02	DE#03	DE#C0	DE#C1	DE#C2	DE#C3	DE#E0	DE#E1	DE#E2	DE#E3
CE#0/Port#1	DE#04	DE#05	DE#06	DE#07	DE#C4	DE#C5	DE#C6	DE#C7	DE#E4	DE#E5	DE#E6	DE#E7
CE#0/Port#2	DE#08	DE#09	DE#0A	DE#0B	DE#C8	DE#C9	DE#CA	DE#CB	DE#E8	DE#E9	DE#EA	DE#EB
CE#0/Port#3	DE#0C	DE#0D	DE#0E	DE#0F	DE#CC	DE#CD	DE#CE	DE#CF	DE#EC	DE#ED	DE#EE	DE#EF
CE#1/Port#0	-	DE#11	DE#12	DE#13	DE#D0	DE#D1	DE#D2	DE#D3	DE#F0	DE#F1	DE#F2	DE#F3
CE#1/Port#1	DE#14	DE#15	DE#16	DE#17	DE#D4	DE#D5	DE#D6	DE#D7	DE#F4	DE#F5	DE#F6	DE#F7
CE#1/Port#2	DE#18	DE#19	DE#1A	DE#1B	DE#D8	DE#D9	DE#DA	DE#DB	DE#F8	DE#F9	DE#FA	DE#FB
CE#1/Port#3	DE#1C	DE#1D	DE#1E	DE#1F	DE#DC	DE#DD	DE#DE	DE#DF	DE#FC	DE#FD	DE#FE	DE#FF

For the ETERNUS DX8100 S4

DI Port No.	Expandable DE
1	DE#10

For the ETERNUS DX8900 S4

CE No./ Port No.	Expandable DE			
CE#0/DI Port#0	-	DE#01	DE#02	DE#03
CE#0/DI Port#1	DE#04	DE#05	DE#06	DE#07
CE#0/DI Port#2	DE#08	DE#09	DE#0A	DE#0B
CE#0/DI Port#3	DE#0C	DE#0D	DE#0E	DE#0F
CE#1/DI Port#0	-	DE#11	DE#12	DE#13
CE#1/DI Port#1	DE#14	DE#15	DE#16	DE#17
CE#1/DI Port#2	DE#18	DE#19	DE#1A	DE#1B
CE#1/DI Port#3	DE#1C	DE#1D	DE#1E	DE#1F
CE#2/DI Port#0	-	DE#21	DE#22	DE#23
CE#2/DI Port#1	DE#24	DE#25	DE#26	DE#27
CE#2/DI Port#2	DE#28	DE#29	DE#2A	DE#2B

7. Component
Drive Enclosure

CE No./ Port No.	Expandable DE			
CE#2/DI Port#3	DE#2C	DE#2D	DE#2E	DE#2F
CE#3/DI Port#0	-	DE#31	DE#32	DE#33
CE#3/DI Port#1	DE#34	DE#35	DE#36	DE#37
CE#3/DI Port#2	DE#38	DE#39	DE#3A	DE#3B
CE#3/DI Port#3	DE#3C	DE#3D	DE#3E	DE#3F
CE#4/DI Port#0	-	DE#41	DE#42	DE#43
CE#4/DI Port#1	DE#44	DE#45	DE#46	DE#47
CE#4/DI Port#2	DE#48	DE#49	DE#4A	DE#4B
CE#4/DI Port#3	DE#4C	DE#4D	DE#4E	DE#4F
CE#5/DI Port#0	-	DE#51	DE#52	DE#53
CE#5/DI Port#1	DE#54	DE#55	DE#56	DE#57
CE#5/DI Port#2	DE#58	DE#59	DE#5A	DE#5B
CE#5/DI Port#3	DE#5C	DE#5D	DE#5E	DE#5F
CE#6/DI Port#0	-	DE#61	DE#62	DE#63
CE#6/DI Port#1	DE#64	DE#65	DE#66	DE#67
CE#6/DI Port#2	DE#68	DE#69	DE#6A	DE#6B
CE#6/DI Port#3	DE#6C	DE#6D	DE#6E	DE#6F
CE#7/DI Port#0	-	DE#71	DE#72	DE#73
CE#7/DI Port#1	DE#74	DE#75	DE#76	DE#77
CE#7/DI Port#2	DE#78	DE#79	DE#7A	DE#7B
CE#7/DI Port#3	DE#7C	DE#7D	DE#7E	DE#7F
CE#8/DI Port#0	-	DE#81	DE#82	DE#83
CE#8/DI Port#1	DE#84	DE#85	DE#86	DE#87
CE#8/DI Port#2	DE#88	DE#89	DE#8A	DE#8B
CE#8/DI Port#3	DE#8C	DE#8D	DE#8E	DE#8F
CE#9/DI Port#0	-	DE#91	DE#92	DE#93
CE#9/DI Port#1	DE#94	DE#95	DE#96	DE#97
CE#9/DI Port#2	DE#98	DE#99	DE#9A	DE#9B
CE#9/DI Port#3	DE#9C	DE#9D	DE#9E	DE#9F
CE#A/DI Port#0	-	DE#A1	DE#A2	DE#A3
CE#A/DI Port#1	DE#A4	DE#A5	DE#A6	DE#A7
CE#A/DI Port#2	DE#A8	DE#A9	DE#AA	DE#AB
CE#A/DI Port#3	DE#AC	DE#AD	DE#AE	DE#AF
CE#B/DI Port#0	-	DE#B1	DE#B2	DE#B3
CE#B/DI Port#1	DE#B4	DE#B5	DE#B6	DE#B7
CE#B/DI Port#2	DE#B8	DE#B9	DE#BA	DE#BB
CE#B/DI Port#3	DE#BC	DE#BD	DE#BE	DE#BF

For the ETERNUS AF250 S3

DI Port No.	Expandable DE										
0	DE#01	DE#02	DE#03	DE#04	DE#05	DE#06	DE#07	DE#08	DE#09	DE#0A	

For the ETERNUS AF650 S3

DI Port No.	Expandable DE										
0	-	DE#01	DE#02	DE#03	DE#04	DE#05	DE#06	DE#07	DE#08	DE#09	DE#0A
1	DE#10	DE#11	DE#12	DE#13	DE#14	DE#15	DE#16	DE#17	DE#18	DE#19	DE#1A
2	DE#20	DE#21	DE#22	DE#23	DE#24	DE#25	DE#26	DE#27	DE#28	DE#29	DE#2A
3	DE#30	DE#31	DE#32	DE#33	DE#34	DE#35	DE#36	DE#37	DE#38	DE#39	DE#3A

[Enable DE] Screen

Status Check

Item	Description
Enclosure	The DE that is to be added is displayed. DE#xx xx: DE number
Type	The DE type that is to be added is displayed. 2.5" 24DE 3.5" 12DE 3.5" 60DE
Parts	The components in the DE that is to be added are displayed. IOM#x FEM#y PSU#z x: IOM number y: FEM number z: PSU number
Progress	The progress rate (0 to 100 %) of the activation process of the DE is displayed.
Status	The status of the DE that is to be added is displayed.

[Disable IOM#1] Screen

Target Drive Enclosure

Item	Description
Enclosure	The DE in which the parts that are to be disabled are installed is displayed. DE#xx xx: DE number
Type	The type of the DE in which the components that are to be disabled are installed is displayed. 2.5" 24DE 3.5" 12DE 3.5" 60DE

7. Component Drive Enclosure

Item	Description
Parts	The components that are to be disabled are displayed. FEM#1 is only displayed when the DE type is 3.5" 60DE. IOM#1 FEM#1
Status	The status of the components that are to be disabled is displayed. Refer to "" Component Status "" (page 1607) for details.

[Check Disable IOM#1 Progress] Screen

Status Check

Item	Description
Enclosure	The DE in which the components (IOM#1 and FEM#1) that are to be isolated are installed is displayed. DE#xx xx: DE number
Type	The type of the DE in which the components (IOM#1 and FEM#1) that are to be isolated are installed is displayed. 2.5" 24DE 3.5" 12DE 3.5" 60DE
Parts	The components that are to be isolated are displayed. FEM#1 is only displayed when the DE type is 3.5" 60DE. IOM#1 FEM#1
Progress	The isolation progress rate (0 to 100 %) is displayed.
Status	The states of the parts (IOM#1 and FEM#1) that are to be isolated are displayed.

[Finish] Screen

A message indicating that the DE was added successfully is displayed.

■ Operating Procedures

Procedure ▶▶▶

- 1 Click [Add Drive Enclosure] in [Action].
→ The "[Start] Screen" (page 1090) appears.
- 2 Specify the parameters, and click the [Next >>] button.
→ The "[Place DE on the rack] Screen" (page 1092) appears.
- 3 Add the DE according to the installation procedure and click the [Next >>] button.
→ The "[Enable DE] Screen" (page 1095) appears.
- 4 After the DEs are activated, isolate IOM#1.
→ The "[Disable IOM#1] Screen" (page 1095) appears.
- 5 Check the status of the target components and then click the [Next >>] button.
→ The "[Check Disable IOM#1 Progress] Screen" (page 1096) appears.
- 6 After IOM#1 is isolated, disconnect the SAS cables.
→ The [Disconnect SAS Cable] screen appears.

- 7 Disconnect the SAS cables by following the disconnection procedure and then click the [Next >>] button.
→ The [Connect SAS Cable] screen appears.
- 8 Connect the SAS cables by following the connection procedure and then click the [Next >>] button.
→ The [Enable IOM#1] screen appears.
- 9 Enable the IOM#1 according to the installation procedure and click the [Next >>] button.
→ The "[Finish] Screen" (page 1096) appears.
- 10 Click the [Done] button to return to the [Drive Enclosure] screen.



Remove Drive Enclosure

- ["■ Overview" \(page 1097\)](#)
- ["■ User Privileges" \(page 1099\)](#)
- ["■ Display Contents" \(page 1099\)](#)
- ["■ Operating Procedures" \(page 1101\)](#)

■ Overview

This function removes a Drive Enclosure (DE) without stopping the storage system. After the target DEs are isolated, remove these DEs from the storage system.

Caution

- Perform the start maintenance operation by using the [Start/End Maintenance] function before the removing task. If the operation has not been performed, the removal cannot be started.
- When DE hot removal is performed, multiple DEs can be removed with a single operation. Note that multiple DEs can only be removed when they are allocated to the same SAS cascade configuration (*1). Multiple DEs that are allocated to different SAS cascade configurations cannot be removed. Refer to ""DEs on the Same SAS Cascade" (page 1098)" for details.

*1: "SAS cascade" refers to DEs that are attached to one DI port.

- The DEs that are sequentially located from the terminal DE in each SAS cascade configuration can be removed.
- 2.5" DEs, 3.5" DEs, and 3.5" high density DEs can be removed at the same time.
- This function cannot be used under the following conditions:
 - Drives in the DE, which is to be removed, are registered in the RAID groups, the hot spares, the Thin Provisioning Pools, the Flexible Tier Pools, the REC Disk Buffers, or the Extreme Cache Pools.
 - The status of the DE below is "○Undefined"
 - For the ETERNUS DX60 S5: DE#01
 - For the ETERNUS DX100 S5/DX200 S5: DE#01
 - For the ETERNUS DX500 S5: DE#01, DE#10, DE#20, and DE#30
 - For the ETERNUS DX600 S5: DE#01, DE#10, DE#20, and DE#30
 - For the ETERNUS DX900 S5: DE#x1, DE#x4, DE#x8, and DE#xC (x: 0 - 1)
 - For the ETERNUS DX8100 S4: DE#10
 - For the ETERNUS DX8900 S4: DE#x1, DE#x4, DE#x8, and DE#xC (x: 0 - B)

- For the ETERNUS AF250 S3: DE#01
- For the ETERNUS AF650 S3: DE#01, DE#10, DE#20, and DE#30

DEs on the Same SAS Cascade

The DEs that are allocated to the same SAS cascade configuration are as follows:

- For the ETERNUS DX60 S5
DE#01, DE#02, and DE#03, which are connected to DI Port No.0.
- For the ETERNUS DX100 S5/DX200 S5
DE#01, DE#02, DE#03, DE#04, DE#05, DE#06, DE#07, DE#08, DE#09, and DE#0A, which are connected to DI Port No.0.
- For the ETERNUS DX500 S5
CE, DE#01, DE#02, DE#03, DE#04, and DE#05, which are connected to DI Port No.0.
DE#y0, DE#y1, DE#y2, DE#y3, DE#y4, and DE#y5, which are connected to DI Port No.x.
ETERNUS DX500 S5: $x = 1 - 3, y = 1 - 3$
(Example) DE#10, DE#11, DE#12, DE#13, DE#14, and DE#15, which are connected to DI Port No.1.
- For the ETERNUS DX600 S5
CE, DE#01, DE#02, DE#03, DE#04, DE#05, DE#06, DE#07, DE#08, DE#09, and DE#0A, which are connected to DI Port No.0.
DE#y0, DE#y1, DE#y2, DE#y3, DE#y4, DE#y5, DE#y6, DE#y7, DE#y8, DE#y9, and DE#yA, which are connected to DI Port No.x.
ETERNUS DX600 S5: $x = 1 - 3, y = 1 - 3$
(Example) DE#10, DE#11, DE#12, DE#13, DE#14, DE#15, DE#16, DE#17, DE#18, DE#19, and DE#1A, which are connected to DI Port No.1.
- For the ETERNUS DX900 S5
Two CEs can be installed in the ETERNUS DX900 S5.
DE#x1, DE#x2, and DE#x3 that are connected to CE#x/DI Port#0 (x: 0, 1, C, D, E, or F)
DE#x4, DE#x5, DE#x6, and DE#x7 that are connected to CE#x/DI Port#1 (x: 0, 1, C, D, E, or F)
DE#x8, DE#x9, DE#xA, and DE#xB that are connected to CE#x/DI Port#2 (x: 0, 1, C, D, E, or F)
DE#xC, DE#xD, DE#xE, and DE#xF that are connected to CE#x/DI Port#3 (x: 0, 1, C, D, E, or F)
(Example) DE#01, DE#02, and DE#03 that are connected to CE#0/DI Port#0 are on the same SAS cascade.
- For the ETERNUS DX8100 S4
DE#01, which is connected to DI Port No.0.
- For the ETERNUS DX8900 S4
Multiple CEs can be installed in the ETERNUS DX8900 S4.
DE#x1, DE#x2, and DE#x3 that are connected to CE#x/DI Port#0 (x:0 - B)
DE#x4, DE#x5, DE#x6, and DE#x7 that are connected to CE#x/DI Port#1 (x:0 - B)
DE#x8, DE#x9, DE#xA, and DE#xB that are connected to CE#x/DI Port#2 (x:0 - B)
DE#xC, DE#xD, DE#xE, and DE#xF that are connected to CE#x/DI Port#3 (x:0 - B)
(Example) DE#01, DE#02, and DE#03 that are connected to CE#0/DI Port#0 are on the same SAS cascade.
- For the ETERNUS AF250 S3
DE#01, DE#02, DE#03, DE#04, DE#05, DE#06, DE#07, DE#08, DE#09, DE#0A, which are connected to DI Port No.0.
- For the ETERNUS AF650 S3
CE, DE#01, DE#02, DE#03, DE#04, DE#05, DE#06, DE#07, DE#08, DE#09, and DE#0A, which are connected to DI Port No.0.
DE#y0, DE#y1, DE#y2, DE#y3, DE#y4, DE#y5, DE#y6, DE#y7, DE#y8, DE#y9, and DE#yA, which are connected to DI Port No.x.
ETERNUS AF650 S3: $x = 1 - 3, y = 1 - 3$

■ User Privileges

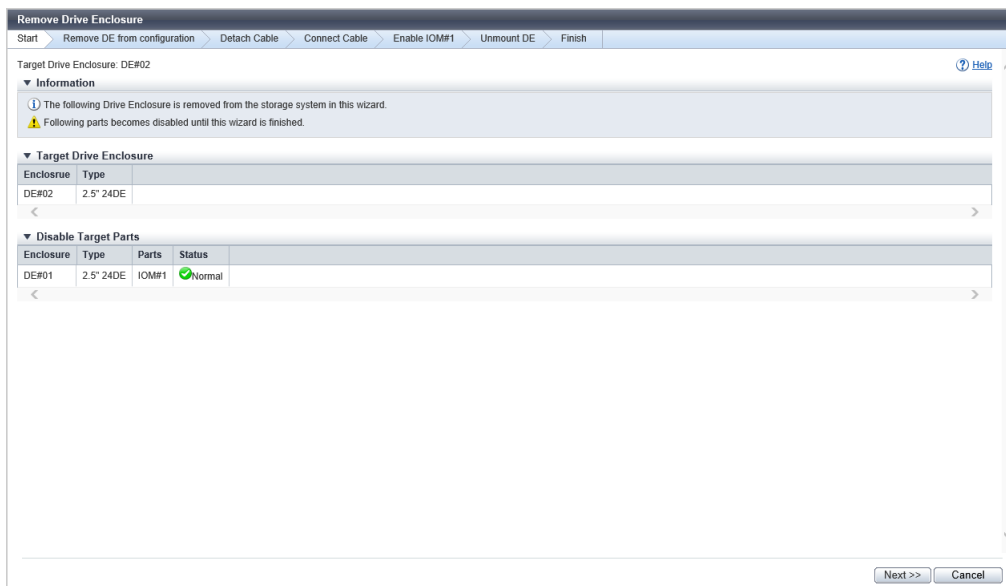
Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	
StorageAdmin	
AccountAdmin	
SecurityAdmin	
Maintainer	✓

Refer to ["A. User Roles and Policies" \(page 1580\)](#) for details on the policies and roles.

■ Display Contents

The following screens are displayed by the wizard.



[Start] Screen

The DE that is to be removed is displayed.

Target Drive Enclosure

Item	Description
Enclosure	The DE that is to be removed is displayed. DE#xx xx: DE number
Type	The DE type that is to be removed is displayed. <ul style="list-style-type: none"> For 2.5" DEs, "2.5" 24DE" is displayed. For 3.5" DEs, "3.5" 12DE" is displayed. For 3.5" high density DEs, "3.5" 60DE" is displayed.

7. Component Drive Enclosure

If DEs are removed while the storage system is running, a list of the components that will be disabled after the DEs are removed is displayed.

Disable Target Parts

Item	Description
Enclosure	The DE in which the components that are to be disabled are installed is displayed. DE#xx xx: DE number
Type	The type of the DE in which the components that are to be disabled are installed is displayed. <ul style="list-style-type: none">• For 2.5" DEs, "2.5" 24DE" is displayed.• For 3.5" DEs, "3.5" 12DE" is displayed.• For 3.5" high density DEs, "3.5" 60DE" is displayed.
Parts	The components that are to be disabled are displayed. "FEM#1" is displayed only for 3.5" high density DEs. IOM#1 FEM#1
Status	The status of the components that are to be disabled is displayed. Refer to "Component Status" (page 1607) for details.

[Remove DE from configuration] Screen

The DEs that are to be removed are displayed as the target drive enclosures. When multiple DEs are removed, the items are separated with a "," (comma) and displayed. The status of the components in the DE and the progress rate of isolating the DE are displayed in "Status Check".

Status Check

Item	Description
Enclosure	The DEs in the target SAS cascade configuration are displayed. DE#xx xx: DE number
Type	The DE type is displayed. <ul style="list-style-type: none">• For 2.5" DEs, "2.5" 24DE" is displayed.• For 3.5" DEs, "3.5" 12DE" is displayed.• For 3.5" high density DEs, "3.5" 60DE" is displayed.
Parts	The components in the DE that is to be removed are displayed. IOM#x FEM#y PSU#z x: IOM number y: FEM number z: PSU number
Progress	The progress rate (0 to 100 %) of isolating the component is displayed.
Status	The component status is displayed.

[Enable IOM#1] Screen

The DEs that are to be removed are displayed as the target drive enclosures. When multiple DEs are removed, the items are separated with a "," (comma) and displayed.

The activation progress of the IOM#1 with the SAS cable is displayed in "Status Check".

Status Check

Item	Description
Enclosure	The DEs that remain in the target SAS cascade configuration are displayed. DE#xx xx: DE number
Type	The DE type is displayed. <ul style="list-style-type: none">• For 2.5" DEs, "2.5" 24DE" is displayed.• For 3.5" DEs, "3.5" 12DE" is displayed.• For 3.5" high density DEs, "3.5" 60DE" is displayed.
Parts	The components in the DE that is to be removed are displayed. IOM#x FEM#y x: IOM number y: FEM number
Progress	The component activation progress rate (0 to 100 %) is displayed.
Status	The component status is displayed.

[Unmount DE] Screen

The DE removal procedure is displayed on this screen. Remove the DE according to the displayed procedure.

Item	Description
Target Drive Enclosure	The DE that is to be removed is displayed. DE#xx xx: DE number
Type	The DE type is displayed. <ul style="list-style-type: none">• For 2.5" DEs, "2.5" 24DE" is displayed.• For 3.5" DEs, "3.5" 12DE" is displayed.• For 3.5" high density DEs, "3.5" 60DE" is displayed.

[Finish] Screen

A message that indicates the DE is removed successfully is displayed.

■ Operating Procedures

Procedure ▶▶▶

- 1 Select DEs that are to be removed (multiple selections can be made), and click [Remove Drive Enclosure] in [Action].
→ The "[Start] Screen" (page 1099) appears.

- 2** Check the DE to be removed, and click the [Next >>] button.
→The DEs in the same SAS cascade configuration as the target DEs are isolated. The "[Remove DE from configuration] Screen" (page 1100) appears.
When the DE isolation is complete, the [Detach Cable] screen appears.
- 3** Disconnect the SAS cables according to the displayed work procedure and click the [Next >>] button.
The screen that is displayed depends on the DE status in the target SAS cascade configuration.
 - When there are DEs that remain in the SAS cascade configuration after the target DEs are removed
→The [Connect Cable] screen appears. Proceed to Step 4.
 - When all of the removal processes for the relevant DEs are complete
→ The "[Unmount DE] Screen" (page 1101) appears. Proceed to Step 5.
- 4** Connect the SAS cables according to the displayed procedure and click the [Next >>] button.
→ The activation of IOM#1, which was not removed, starts. The "[Enable IOM#1] Screen" (page 1101) is displayed.
After IOM#1 is activated, the "[Unmount DE] Screen" (page 1101) appears.
- 5** Remove the relevant DE from the storage system according to the displayed workflow and click the [Next >>] button.
→ The "[Finish] Screen" (page 1101) appears.
- 6** Click the [Done] button to return to the [Drive Enclosure] screen.



I/O Module

- "[I/O Module Overview](#)" (page 1102)
- "[I/O Module User Privileges](#)" (page 1102)
- "[I/O Module Display Contents](#)" (page 1103)
- "[I/O Module Filter Setting](#)" (page 1104)

■ Overview

This function displays the information of the I/O Module (IOM).

■ User Privileges

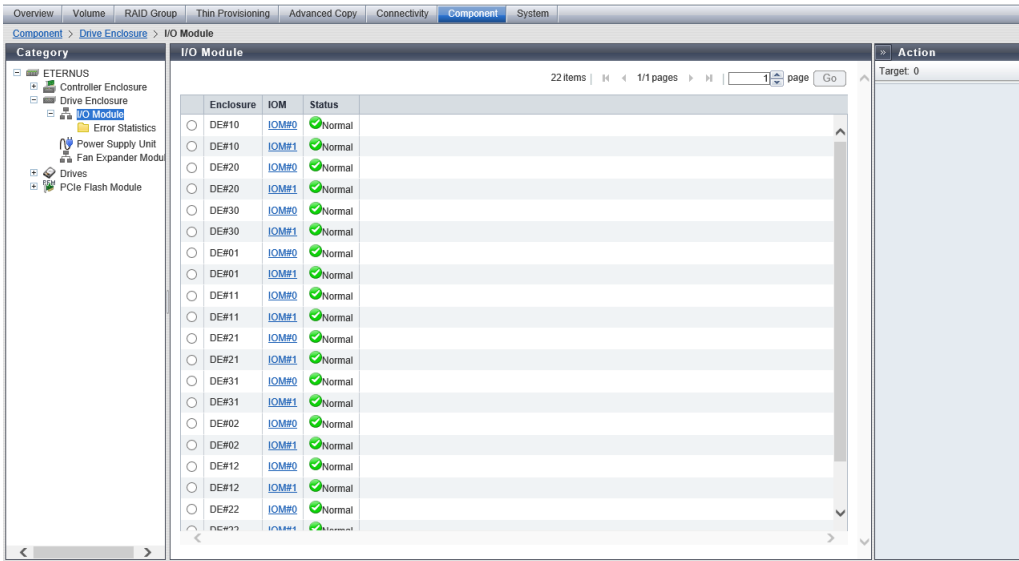
Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	✓
Admin	✓
StorageAdmin	✓
AccountAdmin	
SecurityAdmin	✓
Maintainer	✓

Refer to "[A. User Roles and Policies](#)" (page 1580) for details on the policies and roles.

■ Display Contents

The IOM information is displayed.



IOM List

Item	Description
Enclosure	The enclosure in which the IOM is installed is displayed. DE#xx xx: DE number
IOM	The IOM number is displayed. Click this item to display the "[I/O Module Detail] Screen" (page 1103). IOM#x x: IOM number
Status	The IOM status is displayed. Refer to "'Component Status' (page 1607)" for details.

[I/O Module Detail] Screen

The IOM details are displayed.

[Summary] Tab

DE#xx IOM#y Information

Item	Description
Status	The IOM status is displayed. Refer to "'Component Status' (page 1607)" for details.
Status Code	The IOM status code is displayed.
Error Code	The IOM error code is displayed.
WWN	The IOM WWN is displayed.
Part Number	The IOM part number is displayed.
Serial Number	The serial number of the IOM is displayed.

7. Component Drive Enclosure

Item	Description
Firmware Version	The current controller firmware version is displayed.
Hardware Revision	The hardware version of the IOM is displayed.

[Internal Parts] Tab

DE#xx IOM#y Internal Parts Information

Item	Description
Parts	The internal parts of the IOM are displayed. A link is displayed when the part is "SAS Cable". Click this item to display the " [SAS Cable Detail] Screen " (page 998). When the part is a high density DE, "IOM FEM Port#y" (y: 0, 1) is displayed. SAS Cable (IN) SAS Cable (OUT) IOM FEM Port#y (y: 0, 1)
Status	The internal parts status of the IOM is displayed. Refer to " Component Status " (page 1607) for details.
Error Code	The error code for the internal parts of the IOM is displayed.

[View] Tab

DE#xx IOM#y Rear View

Item	Description
(Storage system image)	The rear view of the DE that is installed in the storage system is displayed. Components that are not IOM are grayed out. The IOM status is displayed with an icon. Refer to " Component Status " (page 1607) for details.

■ Filter Setting

Function Description

Filter setting is a function used to display a list of only the IOMs satisfying all the specified conditions. No filtering is set by default. The following table shows conditions that can be specified. This is displayed for the ETERNUS DX900 S5 or the ETERNUS DX8900 S4.

Item	Description	Setting values
Enclosure	Select the DE where the IOM that is to be displayed is installed. All the DEs are shown as options.	All DE#xx xx: DE number
Status	Select the status of the IOM that is to be displayed.	All Refer to " Component Status " (page 1607)".

Port Error Statistics

- "[Overview](#)" (page 1105)
- "[User Privileges](#)" (page 1105)
- "[Display Contents](#)" (page 1105)

- ["Filter Setting" \(page 1107\)](#)

Overview

This function displays the total number of errors for CM expander and DE IOM ports. An increasing number of error occurrences in the information is used to indicate early replacement of warning status components, and for analysis information when performance degradation occurs.

Note

- Errors that occur in the SAS transmission line are detected in CM and recovered by retries. Note that detecting an error is not an immediate cause of data failure.

User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	✓
StorageAdmin	
AccountAdmin	
SecurityAdmin	✓
Maintainer	✓

Refer to ["A. User Roles and Policies" \(page 1580\)](#) for details on the policies and roles.

Display Contents

In this screen, error information of CM expander and DE IOM ports is displayed.

Enclosure	Expander	Port No.	Phy No.	Status	Invalid Dword	Disparity Error	Loss of Dword Synchronization	Phy Reset Problem
CE	CM#0 IOC	Port#0	PHY#0	Link Up	0	0	0	0
			PHY#1	Link Up	0	0	0	0
		Port#1	PHY#0	Link Up	0	0	0	0
			PHY#1	Link Up	0	0	0	0
	CM#0 Expander	Port#0	PHY#0	Link Down	-	-	-	-
			PHY#1	Link Down	-	-	-	-
		Port#1	PHY#0	Link Down	-	-	-	-
			PHY#1	Link Down	-	-	-	-
	CM#1 IOC	Port#0	PHY#0	Link Up	0	0	0	0
			PHY#1	Link Up	0	0	0	0
		Port#1	PHY#0	Link Up	0	0	0	0
			PHY#1	Link Up	0	0	0	0
CM#1 Expander	Port#0	PHY#0	Link Down	-	-	-	-	
		PHY#1	Link Down	-	-	-	-	
	Port#1	PHY#0	Link Down	-	-	-	-	
		PHY#1	Link Down	-	-	-	-	

7. Component Drive Enclosure

Item	Description
Enclosure	Enclosures (Controller Enclosure, Drive Enclosure) that have ports are displayed. For the ETERNUS DX900 S5 or the ETERNUS DX8900 S4 CE#x DE#yy For the other models CE DE#yy x: CE number yy: DE number
Expander	The chip installation location that is targeted by the port error detection is displayed. For the ETERNUS DX900 S5 or the ETERNUS DX8900 S4 CE#x CM#y IOC#z CE#x CM#y Expander For the ETERNUS DX600 S5, the ETERNUS DX8100 S4, and the ETERNUS AF650 S3 CM#y IOC#z CM#y Expander For the other models CM#y IOC CM#y Expander x: CE number y: CM number z: IOC number <For all models> For high density DEs DE#xx FEM#y EXP#z xx: DE number y: Fan Expander Module number z: Expander number For other DEs DE#xx IOM#y xx: DE number y: IOM number
Port No.	The port number that is targeted by the port error detection is displayed. Port#x x: Port number
Phy No.	The Phy number of the port that is targeted by the port error detection is displayed. PHY#x x: Phy number
Status	The Phy status is displayed. Link Up Link Down N/A
Invalid Dword	The number of Invalid Dword occurrences (0 to 4294967295) is displayed. "Invalid Dword" indicates an error in the SAS transmission line. The SAS interface encodes 8-bit to 10-bit to improve the transmission error ratio. This error is detected when the SAS interface fails encoding.
Disparity Error	The number of Disparity Error occurrences (0 to 4294967295) is displayed. "Disparity Error" indicates an error in the SAS transmission line. The SAS interface encodes 8-bit to 10-bit to improve the transmission error ratio. This error is detected when the SAS interface fails encoding.

7. Component Drive Enclosure

Item	Description
Loss of Dword Synchronization	The number of Loss of Dword Synchronization occurrences (0 to 4294967295) is displayed. "Loss of Dword Synchronization" indicates that the SAS interface failed encoding and the SAS link synchronization is broken.
Phy Reset Problem	The number of Phy Reset Problem occurrences (0 to 4294967295) is displayed. "Phy Reset Problem" is detected when resetting and recovering the port in which an error occurred.

■ Filter Setting

Function Description

Filter setting is a function used to display a list of only the chips satisfying all the specified conditions. No filtering is set by default. The following table shows conditions that can be specified.

Item	Description	Setting values
Expander	Select the installation location of the chip that is to be displayed. The installation location of the chip that is currently displayed is shown as an option.	<p>All</p> <p>For the ETERNUS DX900 S5 or the ETERNUS DX8900 S4 CE#x CM#y IOC#z CE#x CM#y Expander</p> <p>For the ETERNUS DX600 S5, the ETERNUS DX8100 S4, and the ETERNUS AF650 S3 CM#y IOC#z CM#y Expander</p> <p>For the other models CM#y IOC CM#y Expander</p> <p>x: CE number y: CM number z: IOC number</p> <p><For all models></p> <p>For high density DEs DE#xx FEM#y EXP#z xx: DE number y: Fan Expander Module number z: Expander number</p> <p>For other DEs DE#xx IOM#y xx: DE number y: IOM number</p>

Power Supply Unit (DE)

- ["■ Overview" \(page 1107\)](#)
- ["■ User Privileges" \(page 1108\)](#)
- ["■ Display Contents" \(page 1108\)](#)

■ Overview

This function displays the information of the Power Supply Unit (PSU) for the Drive Enclosure (DE).

■ User Privileges

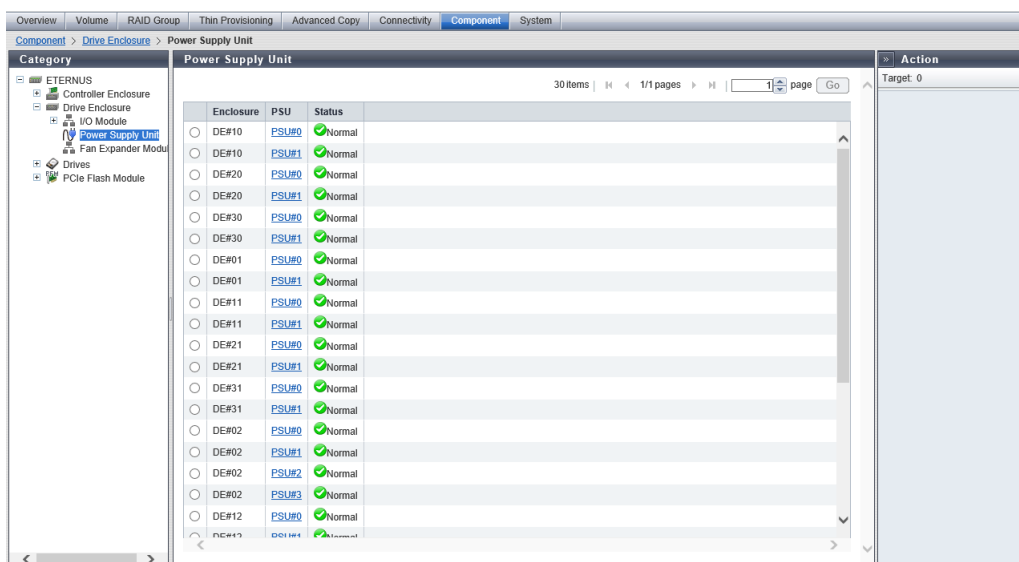
Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	✓
Admin	✓
StorageAdmin	✓
AccountAdmin	
SecurityAdmin	✓
Maintainer	✓

Refer to "[A. User Roles and Policies](#)" (page 1580)" for details on the policies and roles.

■ Display Contents

The information of the PSU is displayed.



Item	Description
Enclosure	The enclosure where the PSU is installed is displayed. DE#xx xx: DE number
PSU	The PSU number is displayed. Click this item to display the " [Power Supply Unit Detail] Screen " (page 1108). PSU#x x: PSU number
Status	The PSU status is displayed. Refer to " Component Status " (page 1607)" for details.

[Power Supply Unit Detail] Screen

The detailed information of PSU is displayed.

[Summary] Tab

DE#xx PSU#y Information

Item	Description
Location	The installation location of PSU is displayed. DE#xx PSU#0 DE#xx PSU#1 xx: DE number
Status	The PSU status is displayed. Refer to " Component Status " (page 1607)" for details.
Status Code	The PSU status code is displayed.
Error Code	The PSU error code is displayed.
Part Number	The PSU part number is displayed.
Serial Number	The PSU serial number is displayed.
Hardware Revision	The hardware version of the PSU is displayed.

[View] Tab

DE#xx PSU#y Rear View

Item	Description
(Storage system image)	The rear view of the DE that is installed in the storage system is displayed. Components that are not PSU are grayed out. The PSU status is displayed with an icon. Refer to " Component Status " (page 1607)" for details.

Fan Expander Module

- "[Overview](#)" (page 1109)
- "[User Privileges](#)" (page 1109)
- "[Display Contents](#)" (page 1110)

■ Overview

This function displays the [Fan Expander Module \(FEM\)](#) information.

■ User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	✓
Admin	✓
StorageAdmin	✓
AccountAdmin	
SecurityAdmin	✓

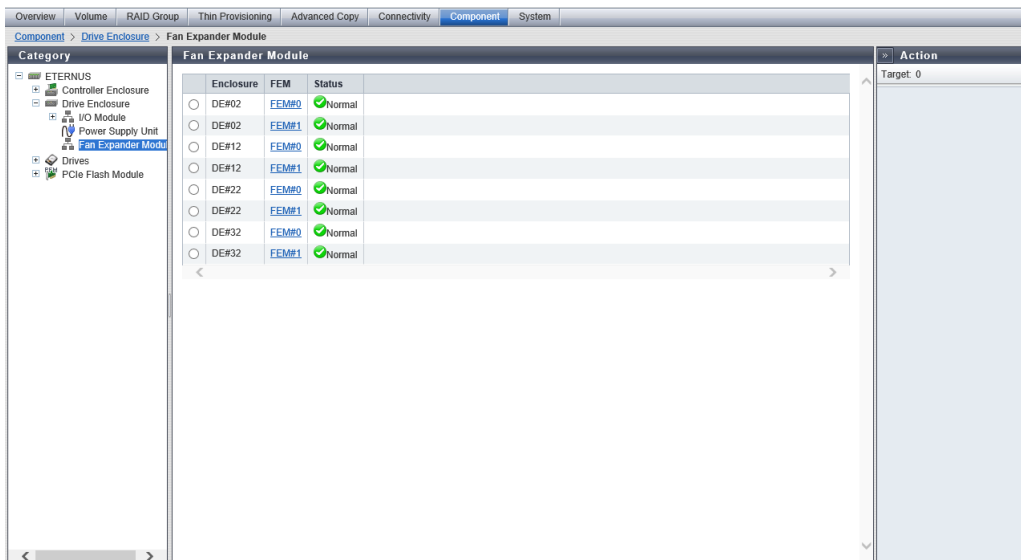
7. Component Drive Enclosure

Default role	Availability of executions
Maintainer	✓

Refer to ["A. User Roles and Policies" \(page 1580\)](#) for details on the policies and roles.

■ Display Contents

In this screen, FEM information is displayed.



FEM List

Item	Description
Enclosure	The drive enclosure number is displayed. DE#xx xx: DE number
FEM	The FEM number is displayed. Click this item to display the "[FEM Detail] Screen" (page 1110). FEM#x x: FEM number
Status	The FEM status is displayed. Refer to "Component Status" (page 1607) for details.

[FEM Detail] Screen

The detailed information of FEM is displayed.

[Summary] Tab

DE#xx FEM#y Information (xx: DE Number, y: FEM Number)

Item	Description
Location	The location information of the FEM is displayed. DE#x FEM#y x: DE number y: FEM number

7. Component Drive Enclosure

Item	Description
Status	The FEM status is displayed. Refer to "Component Status" (page 1607) for details.
Status Code	The FEM status code is displayed.
Error Code	The FEM error code is displayed.
Part Number	The FEM part number is displayed.
Serial Number	The serial number of the FEM is displayed.
Hardware Revision	The hardware version of the FEM is displayed.
EXP#n Status	The status of FEM Expander#n (n=0,1) is displayed. Refer to "Component Status" (page 1607) for details.
EXP#n Status Code	The status code of FEM Expander#n (n=0,1) is displayed.
EXP#n Error Code	The error code of FEM Expander#n (n=0,1) is displayed.
EXP#n WWN	The WWN of FEM Expander#n (n=0,1) is displayed.
EXP#n Active EC	The EC number of FEM Expander#n (n=0,1) that is currently running is displayed. EC#1 EC#2
EXP#n Next EC	The EC number of FEM Expander#n (n=0,1) that is to be run after the next power-on is displayed. EC#1 EC#2
EXP#n Firmware Version	The revision number of the firmware that is currently running in FEM Expander#n (n=0,1) is displayed.

[Internal Parts] Tab

DE#xx FEM#y Internal Parts Information (xx: DE Number, y: FEM Number)

Item	Description
Parts	The component information is displayed. EXP#n Port n: 0,1
Status	The component status is displayed. Refer to "Component Status" (page 1607) for details.
Error Code	The component error code is displayed.

[View] Tab

DE#xx FEM#y Rear View (xx: DE Number, y: FEM Number)

Item	Description
(Storage system image)	The rear view of the DE that is installed in the storage system is displayed. Components that are not FEMs are grayed out. The FEM status is displayed with an icon. Refer to "Component Status" (page 1607) for details.

Drives

- ["■ Overview" \(page 1112\)](#)
- ["■ User Privileges" \(page 1112\)](#)
- ["■ Display Contents" \(page 1112\)](#)
- ["■ Filter Setting" \(page 1116\)](#)

■ Overview

This function displays the drive information.

■ User Privileges

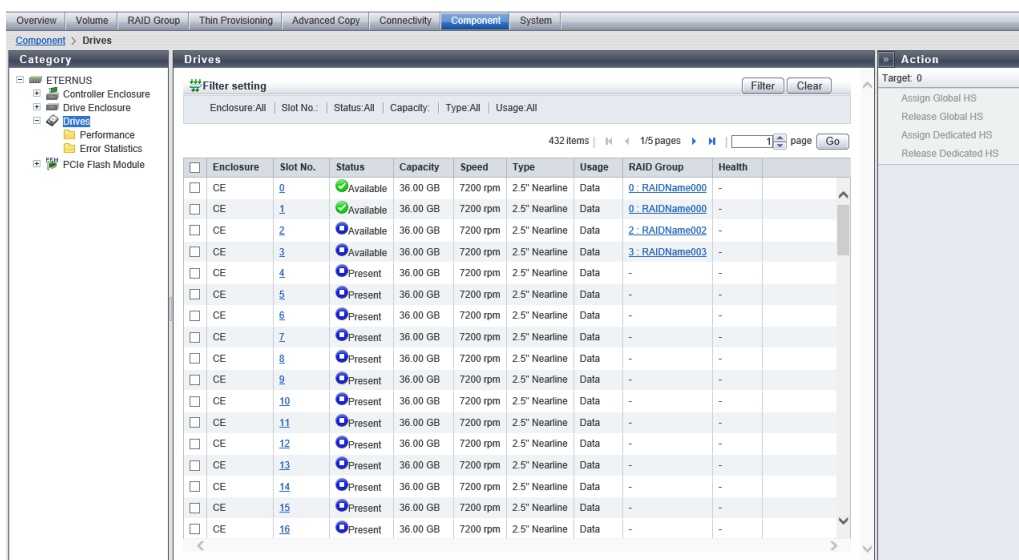
Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	✓
Admin	✓
StorageAdmin	✓
AccountAdmin	
SecurityAdmin	✓
Maintainer	✓

Refer to ["A. User Roles and Policies" \(page 1580\)](#) for details on the policies and roles.

■ Display Contents

The drive information is displayed.



7. Component Drives

Drive List

Item	Description
Enclosure	<p>The enclosure where the drive is installed is displayed.</p> <p>CE: Controller Enclosure (2.5" and 3.5") DE: Drive Enclosure (2.5", 3.5", and 3.5" high density DEs)</p> <p>CE CE#x DE#yy x: CE number yy: DE number</p>
Slot No.	<p>The slot number of the enclosure where the drive is installed is displayed.</p> <p>Click this item to display the "[Drive Detail] Screen" (page 1114).</p> <p>2.5" CE/DE: 0 - 23 3.5" CE/DE: 0 - 11 3.5" high density DE: 0 - 59</p>
Status	<p>The drive status is displayed.</p> <p>Refer to ""Drive Status" (page 1607)" for details.</p>
Capacity	<p>The capacity of the drive is displayed.</p> <div style="background-color: #fff9c4; padding: 10px; border: 1px solid #ccc;"> <p>Caution</p> <ul style="list-style-type: none"> The displayed drive capacity may differ from the product's actual capacity. For example, the drive capacity of a "1.92 TB SSD" is displayed as "2.00 TB" and the capacity of an "18 TB Nearline SAS disk" is displayed as "17.9 TB". </div>
Speed	<p>The drive speed is displayed.</p> <p>For SSD or SSD SED, a "-" (hyphen) is displayed.</p> <p>15000 rpm 10000 rpm 7200 rpm</p>
Type	<p>The drive type displayed for this item is a combination of the following.</p> <ul style="list-style-type: none"> Drive size <ul style="list-style-type: none"> For 2.5-inch drives: 2.5" For 3.5-inch drives: 3.5" Drive type <ul style="list-style-type: none"> For SAS disks: Online For Nearline SAS disks: Nearline For SSDs, the following items are displayed depending on the SSD type. <ul style="list-style-type: none"> For SSD-Hs (12 Gbit/s): SSD-H (*1) For SSD-Ms (12 Gbit/s): SSD-M (*1) For SSD-Ls (12 Gbit/s): SSD-L (*1) <p>Note that "SED" is also displayed for self encrypting drives and "AF" is also displayed for Advanced Format compliant drives.</p> <p>*1: The displayed item varies depending on the interface speed (bandwidth) or the capacity of the reserved space. Unless otherwise specified, "SSD-H", "SSD-M", and "SSD-L" are collectively referred to as "SSD". In addition, there may be cases when "SSD SED" is used as the collective term for self encrypting SSD-Hs, SSD-Ms, and SSD-Ls.</p>

7. Component Drives

Item	Description
Usage	<p>The usage of the drive is displayed.</p> <ul style="list-style-type: none"> • Data A drive that is used for user data or an unused drive • Global Hot Spare A drive that is registered as a Global Hot Spare • Dedicated Hot Spare A drive that is registered as a Dedicated Hot Spare
RAID Group	<p>When the drive belongs to a RAID group, the RAID group number and the RAID group name are displayed. However, if the drive usage is "Dedicated Hot Spare", the RAID group number and the RAID group name are displayed even when the drive is not used as a Hot Spare. Click this item to display the [RAID Group Detail] Screen. When the usage is not "Dedicated Hot Spare" and the drive is not registered in a RAID group, a "-" (hyphen) is displayed.</p>
Health	<p>The drive lifetime information (0 to 100 %) is displayed. As the lifetime of the drive is reduced, the health level of the drive is decreased.</p> <p>A "-" (hyphen) is displayed in the following conditions:</p> <ul style="list-style-type: none"> • The drive is neither "SSD" nor "SSD SED" • Data sanitization is in progress • The lifetime information cannot be obtained

[Drive Detail] Screen

The detailed information of the drive is displayed.

[Summary] Tab

Controller Enclosure#x Slot#z Information (x: CE Number, z: Slot Number)/Drive Enclosure#yy Slot#z Information (yy: DE Number, z: Slot Number)

Item	Description
Location	<p>The installation location of the drive is displayed.</p> <p>Slot#x x: 0 - 23 2.5" CE/DE x: 0 - 11 3.5" CE/DE x: 0 - 59 3.5" high density DE</p>
Status	<p>The drive status is displayed.</p> <p>Refer to ""Drive Status" (page 1607) for details.</p>
Status Code	The drive status code is displayed.
Error Code	The drive error code is displayed.
Capacity	The capacity of the drive is displayed.

7. Component Drives

Item	Description
Type	<p>The drive type displayed for this item is a combination of the following.</p> <ul style="list-style-type: none"> • Drive size <ul style="list-style-type: none"> - For 2.5-inch drives: 2.5" - For 3.5-inch drives: 3.5" • Drive type <ul style="list-style-type: none"> - For SAS disks: Online - For Nearline SAS disks: Nearline - For SSDs, the following items are displayed depending on the SSD type. <ul style="list-style-type: none"> • For SSD-Hs (12 Gbit/s): SSD-H (*1) • For SSD-Ms (12 Gbit/s): SSD-M (*1) • For SSD-Ls (12 Gbit/s): SSD-L (*1) <p>Note that "SED" is also displayed for self encrypting drives and "AF" is also displayed for Advanced Format compliant drives.</p> <p>*1: The displayed item varies depending on the interface speed (bandwidth) or the capacity of the reserved space. Unless otherwise specified, "SSD-H", "SSD-M", and "SSD-L" are collectively referred to as "SSD". In addition, there may be cases when "SSD SED" is used as the collective term for self encrypting SSD-Hs, SSD-Ms, and SSD-Ls.</p>
Speed	<p>The drive speed is displayed.</p> <p>This item is not displayed when the drive type is "SSD" or "SSD SED".</p> <p>15000 rpm 10000 rpm 7200 rpm</p>
Health	<p>The drive lifetime information (0 to 100 %) is displayed. As the lifetime of the drive is reduced, the health level of the drive is decreased. This item is displayed when the drive type is "SSD" and "SSD SED". A "-" (hyphen) is displayed in the following conditions:</p> <ul style="list-style-type: none"> • Data sanitization is in progress • The lifetime information cannot be obtained
Usage	<p>The usage of the drive is displayed.</p> <p>Data Global Hot Spare Dedicated Hot Spare</p>
RAID Group	<p>When the drive belongs to a RAID group, the RAID group number and the RAID group name are displayed. However, if the drive usage is "Dedicated Hot Spare", the RAID group number and the RAID group name are displayed even when the drive is not used as a Hot Spare. Click this item to display the "[RAID Group Detail] Screen ([Basic] Tab)" (page 256).</p> <p>When the usage is not "Dedicated Hot Spare" and the drive is not registered in a RAID group, a "-" (hyphen) is displayed.</p>
Motor Status	<p>The drive motor status is displayed.</p> <p>When the drive motors are activated: "Active" When the drive motors are starting up: "In the Boot Process" When the drive motors are stopped: "Idle" When the drive motors are being stopped: "In the Stop Process" When the drive motors are turned off: "Power Off"</p>
Rebuild/Copyback Progress	<p>When executing rebuild or copyback, the progress rate (0 to 100 %) is displayed.</p> <p>A "-" (hyphen) is displayed in the following conditions:</p> <ul style="list-style-type: none"> • Rebuild/Copyback has been completed • Rebuild/Copyback has not been performed

7. Component Drives

Item	Description
Patrol	Total completed passes <p>The current total number of completed disk drive patrol cycles is displayed. "Completed passes" indicates the number of times the disk patrol for all of the target drives is complete.</p> <p>Caution</p> <ul style="list-style-type: none"> If the device configuration has been changed using the [Apply Configuration] function, the patrol progress information (total completed passes, progress with current pass, and complete passes since last power on) returns to the default settings.
	Progress with current pass <p>The progress rate (0 to 100 %) of the currently running disk drive patrol process is displayed. If the patrol is not operating for reasons such as a drive failure or a drive being formatted, a "-" (hyphen) is displayed.</p>
	Completed passes since last Power On <p>The current total number of completed disk drive patrol cycles since the last power on is displayed.</p> <p>Caution</p> <ul style="list-style-type: none"> "Completed passes since last Power On" may be cleared when the Controller Firmware is applied, or due to a CM failure.
Vendor ID	The drive manufacturer name is displayed.
Product ID	The drive product name is displayed.
Serial Number	The serial number of the drive is displayed.
WWN	The drive WWN is displayed.
Firmware Revision	The drive firmware version is displayed.

[View] Tab

Controller Enclosure#x Slot#z Front View (x: CE Number, z: Slot Number)/Drive Enclosure#yy Slot#z Front View (yy: DE Number, z: Slot Number)

Item	Description
(Storage system image)	<p>The front view of the CE or DE that is installed in the storage system is displayed. The following number of drives can be installed for each enclosure.</p> <p>2.5" CE/DE: 24 (24 enclosures are lined up horizontally)</p> <p>3.5" CE/DE: 12 (3 enclosures are lined up vertically and 4 enclosures are lined up horizontally)</p> <p>3.5" high density DE: 60 (5 drives are lined up vertically and 12 drives are lined up horizontally)</p> <p>When no drives are installed: Blank</p> <p>Drives that are not selected in the [Drives] screen are grayed out.</p> <p>The drive status is displayed with an icon.</p> <p>Refer to "'Component Status' (page 1607)" for details.</p>

■ Filter Setting

Function Description

Filter setting is a function used to display only the disk drives matching all the specified conditions. No filtering is set by default. The following table shows conditions that can be specified.

7. Component Drives

Item	Description	Setting values
Enclosure	Select the enclosure in which the target drive is installed. When not using enclosure for filtering, please select "All".	All CE CE#x DE#yy x: CE number yy: DE number
Slot No.	Specify the slot number of the drive that is to be displayed. When not using the slot number for filtering, leave this item blank.	Blank 2.5" CE/DE: 0 - 23 3.5" CE/DE: 0 - 11 3.5" high density DE: 0 - 59
Status	Select the status of the drive that is to be displayed. When not using the drive status for filtering, select "All".	All Refer to "Drive Status" (page 1607) .
Capacity	Specify the capacity of the drive that is to be displayed. When not using the drive capacity for filtering, specify "0".	0 MB Capacity
Type	Select the drive type to be displayed. When not using the drive type for filtering, select "All".	All 3.5" Online 3.5" Online AF 2.5" Online 2.5" Online AF 3.5" Nearline 3.5" Nearline AF 2.5" Nearline 2.5" Nearline AF 3.5" SSD-H 3.5" SSD-M 3.5" SSD-L 2.5" SSD-H 2.5" SSD-M 2.5" SSD-L 3.5" Online SED 3.5" Online SED AF 2.5" Online SED 2.5" Online SED AF 3.5" Nearline SED 3.5" Nearline SED AF 2.5" Nearline SED 2.5" Nearline SED AF 3.5" SSD-H SED 3.5" SSD-M SED 3.5" SSD-L SED 2.5" SSD-H SED 2.5" SSD-M SED 2.5" SSD-L SED
Usage	Select the usage of the drive to be displayed. When not using the usage of the drive for filtering, select "All".	All Data Global Hot Spare Dedicated Hot Spare

Assign Global Hot Spare

- ["■ Overview" \(page 1118\)](#)
- ["■ User Privileges" \(page 1119\)](#)
- ["■ Operating Procedures" \(page 1119\)](#)

■ Overview

This function registers a drive as a Global Hot Spare.

A Global Hot Spare is a spare drive (hot spare) that is registered in the RAID group instead of the failed drive when a drive failure occurs. A Global Hot Spare, unlike a Dedicated Hot Spare, can be used by all of the RAID groups.

If a drive fails, data copy (rebuild) to a Global Hot Spare starts automatically.

If the Copybackless function is disabled and the failed drive is replaced with a normal drive, the data is copied back to the replacement drive. The Global Hot Spare that is used instead of the failed drive then returns as a spare drive.

If the Copybackless function is enabled, the Hot Spare is registered in the RAID group after rebuilding and is used as a data drive. The failed drive in the RAID group is changed to a Global Hot Spare after the rebuilding is complete. If the failed drive is replaced with a normal drive, the replacement drive can be used as a Global Hot Spare.

Requirements for Hot Spares

- Drives that are currently used cannot be registered as a hot spare.
 - The drive status is "**●**Present"
 - The drives are not registered in RAID groups, TPPs, FTRPs, REC Disk Buffers, or Extreme Cache Pools
- Make sure to register a hot spare with the same or a larger capacity than the data drives. If the hot spare capacity is smaller than the data drive, the drive does not work as the hot spare.
- When a mix of Online disks, Nearline disks, SSDs, Online SEDs, Nearline SEDs, and SSD SEDs is installed together in the storage system, a hot spare of each type is required. Register the Dedicated Hot Spare with the same capacity as the maximum capacity drive for each type.
- When multiple types of SSDs ([SSD-H/SSD-M/SSD-L/SSD-H SED/SSD-M SED/SSD-L SED](#)) are installed together in the storage system, a hot spare for each type is required. Register the hot spare with the same capacity as the maximum capacity SSD for each type.
- Hot spares can be registered in any slots of the CEs and the DEs.

Caution

- To use hot spares on a priority basis, make sure to register the Dedicated Hot Spare for a RAID group that contains important data using the [Assign Dedicated Hot Spare] function.
- The hot spare with the same type with a failed drive may not be used since the installed position (*1) of the hot spare is given higher priority than the drive type of the hot spare, and Online disks and Nearline disks can be substituted.

If different types of drives are mixed, the recommended action is to install a hot spare for each different drive type on each installed position (*1).

*1: For details about the installed position, refer to "Hot Spares" in "Design Guide".

The installed positions are given priority when hot spares are selected for the ETERNUS DX500 S5/DX600 S5/DX900 S5 and the ETERNUS DX8900 S4.

Note

- If the Dedicated Hot Spare is registered for a RAID group to which a failed drive belongs, the Dedicated Hot Spare is used before the Global Hot Spare. If there is no unused Dedicated Hot Spare and the drive fails, the Global Hot Spare is used.
- Depending on the hot spare usage status, a hot spare with a different capacity and type from the failed drive may be used.
- To use the Copybackless function, the rebuild destination Hot Spare must satisfy some conditions. Refer to the [Setup Subsystem Parameters] function for details.

■ User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	✓
StorageAdmin	✓
AccountAdmin	
SecurityAdmin	
Maintainer	✓

Refer to "[A. User Roles and Policies](#)" (page 1580) for details on the policies and roles.

■ Operating Procedures

Procedure ▶▶▶

- 1 Select the drive (multiple selections can be made) that is to be used as a Global Hot Spare and click [Assign Global HS] in [Action].
→ A confirmation screen appears.
- 2 Click the [OK] button.
→ Registration of the Global Hot Spare starts.
- 3 Click the [Done] button to return to the [Drives] screen.



Release Global Hot Spare

- "[Overview](#)" (page 1119)
- "[User Privileges](#)" (page 1120)
- "[Operating Procedures](#)" (page 1120)

■ Overview

This function releases a drive from being a Global Hot Spare.

A drive that is deleted can be used as a Global Hot Spare or a Dedicated Hot Spare for other RAID group.

Caution

- When the drive is already used as a hot spare, this function cannot be used.

■ User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	✓
StorageAdmin	✓
AccountAdmin	
SecurityAdmin	
Maintainer	✓

Refer to "[A. User Roles and Policies](#)" (page 1580) for details on the policies and roles.

■ Operating Procedures

Procedure ▶▶▶

- 1 Select a drive (multiple selections can be made) that is to be released from being a Global Hot Spare and click [Release Global HS] in [Action].
→ A confirmation screen appears.
- 2 Click the [OK] button.
→ Deletion of the Global Hot Spare starts.
- 3 Click the [Done] button to return to the [Drives] screen.



Assign Dedicated Hot Spare

- "[Overview](#)" (page 1120)
- "[User Privileges](#)" (page 1121)
- "[Settings](#)" (page 1122)
- "[Operating Procedures](#)" (page 1124)

■ Overview

This function registers a drive as a Dedicated Hot Spare for a RAID group.

A Dedicated Hot Spare is a spare drive (hot spare) that is registered in the RAID group instead of the failed drive when a drive failure occurs. A Dedicated Hot Spare, unlike a Global Hot Spare, is used only for the specific RAID group.

If a drive fails, data copy (rebuild) to a Dedicated Hot Spare starts automatically.

If the Copybackless function is disabled and the failed drive is replaced with a normal drive, the data is copied back to the replacement drive. The Dedicated Hot Spare that is used instead of the failed drive then returns as a spare drive.

If the Copybackless function is enabled, the Hot Spare is registered in the RAID group after rebuilding and is used as a data drive. The failed drive in the RAID group is changed to a Dedicated Hot Spare after

the rebuilding is complete. If the failed drive is replaced with a normal drive, the replacement drive can be used as a Dedicated Hot Spare.

Requirements for Hot Spares

- Drives that are currently used cannot be registered as a hot spare.
 - The drive status is "**P**resent"
 - The drives are not registered in RAID groups, TPPs, FTRPs, REC Disk Buffers, or Extreme Cache Pools
- Make sure to register a hot spare with the same or a larger capacity than the data drives. If the hot spare capacity is smaller than the data drive, the drive does not work as the hot spare.
- When a mix of Online disks, Nearline disks, SSDs, Online SEDs, Nearline SEDs, and SSD SEDs is installed together in the storage system, a hot spare of each type is required. Register the Dedicated Hot Spare with the same capacity as the maximum capacity drive for each type.
- When multiple types of SSDs (**SSD-H/SSD-M/SSD-L/SSD-H SED/SSD-M SED/SSD-L SED**) are installed together in the storage system, a hot spare for each type is required. Register the hot spare with the same capacity as the maximum capacity SSD for each type.
- Hot spares can be registered in any slots of the CEs and the DEs.

Caution

- Only one RAID group can be registered for each Dedicated Hot Spare. A Dedicated Hot Spare cannot be registered to multiple RAID groups.
- The Dedicated Hot Spares cannot be registered in the following RAID groups.
 - RAID groups that belong to TPPs
 - RAID groups that belong to FTSPs
 - RAID groups that are registered as REC Disk Buffers
 - RAID groups that are registered as Extreme Cache Pools

Note

- When the failed drive and the Dedicated Hot Spare are switched, a Dedicated Hot Spare with the same capacity as the failed drive is used on a priority basis. If there is no Dedicated Hot Spare with the same capacity, a Dedicated Hot Spare with a larger capacity than the failed drive is used.
- If the Dedicated Hot Spare is registered for a RAID group to which a failed drive belongs, the Dedicated Hot Spare is used before the Global Hot Spare. If there is no unused Dedicated Hot Spare and the drive fails, the Global Hot Spare is used.
- To use the Copybackless function, the rebuild destination Hot Spare must satisfy some conditions. Refer to the [Setup Subsystem Parameters] function for details.

■ User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	✓
StorageAdmin	✓
AccountAdmin	
SecurityAdmin	

7. Component Drives

Default role	Availability of executions
Maintainer	✓

Refer to ["A. User Roles and Policies" \(page 1580\)](#) for details on the policies and roles.

■ Settings

In this screen, select a RAID group in which the Dedicated Hot Spare is to be registered.

Assign Dedicated Hot Spare

Item	Description
Enclosure	<p>The enclosure where the drive is installed is displayed.</p> <p>CE: Controller Enclosure (2.5" and 3.5") DE: Drive Enclosure (2.5", 3.5", and 3.5" high density DEs)</p> <p>CE CE#x DE#yy x: CE number yy: DE number</p>
Slot No.	<p>The slot number of the enclosure where the drive is installed is displayed.</p> <p>2.5" CE/DE: 0 - 23 3.5" CE/DE: 0 - 11 3.5" high density DE: 0 - 59</p>
Drive Type	<p>The drive type displayed for this item is a combination of the following.</p> <ul style="list-style-type: none"> • Drive size <ul style="list-style-type: none"> - For 2.5-inch drives: 2.5" - For 3.5-inch drives: 3.5" • Drive type <ul style="list-style-type: none"> - For SAS disks: Online - For Nearline SAS disks: Nearline - For SSDs, the following items are displayed depending on the SSD type. <ul style="list-style-type: none"> • For SSD-Hs (12 Gbit/s): SSD-H (*1) • For SSD-Ms (12 Gbit/s): SSD-M (*1) • For SSD-Ls (12 Gbit/s): SSD-L (*1) <p>Note that "SED" is also displayed for self encrypting drives and "AF" is also displayed for Advanced Format compliant drives.</p> <p>*1 : The displayed item varies depending on the interface speed (bandwidth) or the capacity of the reserved space. Unless otherwise specified, "SSD-H", "SSD-M", and "SSD-L" are collectively referred to as "SSD". In addition, there may be cases when "SSD SED" is used as the collective term for self encrypting SSD-Hs, SSD-Ms, and SSD-Ls.</p>
Capacity	<p>The capacity of the drive is displayed.</p>
Speed	<p>The drive speed is displayed.</p> <p>For SSD or SSD SED, a "-" (hyphen) is displayed.</p> <p>15000 rpm 10000 rpm 7200 rpm</p>

Assign RAID Group

RAID groups in the following conditions are not displayed for the list of RAID groups in which the Dedicated Hot Spare can be registered:

- RAID groups that cannot use the selected drive as a Dedicated Hot Spare (due to the drive capacity limit)
- RAID groups that are registered as REC Disk Buffers
- RAID groups that are registered as Extreme Cache Pools
- RAID groups that are configured by drives that are a different type from the selected drive (note that RAID groups that are configured with "Online" disks and "Nearline" disks can be selected when the dedicated Hot Spare type is "Online" or "Nearline")
- RAID groups that are temporarily created while LDE is being performed (RAID groups for which "Usage" is "Temporary")

Item	Description
Radio button	Select a RAID group in which the Dedicated Hot Spare is to be registered.
Name	The RAID group name is displayed.
Status	The RAID group status is displayed. Refer to "RAID Group Status" (page 1605) for details.
RAID Level	The RAID level is displayed. High Performance (RAID1+0) High Capacity (RAID5) High Reliability (RAID6) High Reliability (RAID6-FR) Reliability (RAID5+0) Mirroring (RAID1) Striping (RAID0)
Capacity	The total capacity of the RAID groups is displayed.
Drive Type	The drive type registered to the RAID group is displayed. If multiple drive types are used in the RAID group, the drive type is displayed as described below. <ul style="list-style-type: none"> • If only "Online" type drives are used or if both "Online" and "Nearline" type drives are used, "Online" is displayed. • If only "Online SED" type drives are used or if both "Online SED" and "Nearline SED" type drives are used, "Online SED" is displayed. • If a single SSD type (SSD-H/SSD-M/SSD-L) is used or if multiple SSD types (SSD-H/SSD-M/SSD-L) are used, "SSD" is displayed. • If a single SSD type (SSD-H SED/SSD-M SED/SSD-L SED) is used or if multiple SSD types (SSD-H SED/SSD-M SED/SSD-L SED) are used, "SSD SED" is displayed.
Minimum Drive Capacity	The drive with the smallest capacity in the RAID group is displayed.

■ Operating Procedures

Procedure ▶▶▶

- 1 Select a drive (multiple selections can be made) that is to be used as a Dedicated Hot Spare and click [Assign Dedicated HS] in [Action].

Note

- Select the same type of drives that configure the target RAID group. If multiple types of drives are selected, the [Assign Dedicated HS] is not available. If SSDs are used to configure the target RAID group, the type of SSD can be checked from the [RAID Group Detail] screen. Refer to the [RAID Group (Basic Information)] function for details.

- 2 Select which RAID group to use the selected drive as a Dedicated Hot Spare for and click the [Assign] button.
→ A confirmation screen appears.
- 3 Click the [OK] button.
→ Registration of the Dedicated Hot Spare starts.
- 4 Click the [Done] button to return to the [Drives] screen.



Release Dedicated Hot Spare

- "[■ Overview](#)" (page 1124)
- "[■ User Privileges](#)" (page 1124)
- "[■ Operating Procedures](#)" (page 1125)

■ Overview

This function releases a drive from being a Dedicated Hot Spare.

A drive that is released can be used as a data drive, a Global Hot Spare, or a Dedicated Hot Spare for another RAID group.

Caution

- When the drive is already used as a hot spare, this function cannot be used.

■ User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	✓
StorageAdmin	✓
AccountAdmin	
SecurityAdmin	
Maintainer	✓

Refer to "[A. User Roles and Policies](#)" (page 1580) for details on the policies and roles.

■ Operating Procedures

Procedure ▶▶▶

- 1 Select the drive that is to be released from being a Dedicated Hot Spare and click [Release Dedicated HS] in [Action].
→ A confirmation screen appears.
- 2 Click the [OK] button.
→ Deletion of the Dedicated Hot Spare starts.
- 3 Click the [Done] button to return to the [Drives] screen.



Remove Disk Drive

- "[Overview](#)" (page 1125)
- "[User Privileges](#)" (page 1125)
- "[Display Contents](#)" (page 1126)
- "[Operating Procedures](#)" (page 1127)

■ Overview

This function logically isolates a drive without stopping the storage system. After the target drive is isolated, remove the drive from the storage system.

Caution

- Perform the start maintenance operation by using the [Start/End Maintenance] function before the removing task. If the operation has not been performed, the removal cannot be started.
- Up to 8 drives can be removed at a time.
- This function cannot be used under the following conditions:
 - The drive that is to be removed is currently being used
 - The status of the drive to be removed is not "Present" or "Broken"
 - The [Add Drive Enclosure] function is being performed
 - The drive enclosure is blocked

■ User Privileges

Availability of Executions in the Default Role

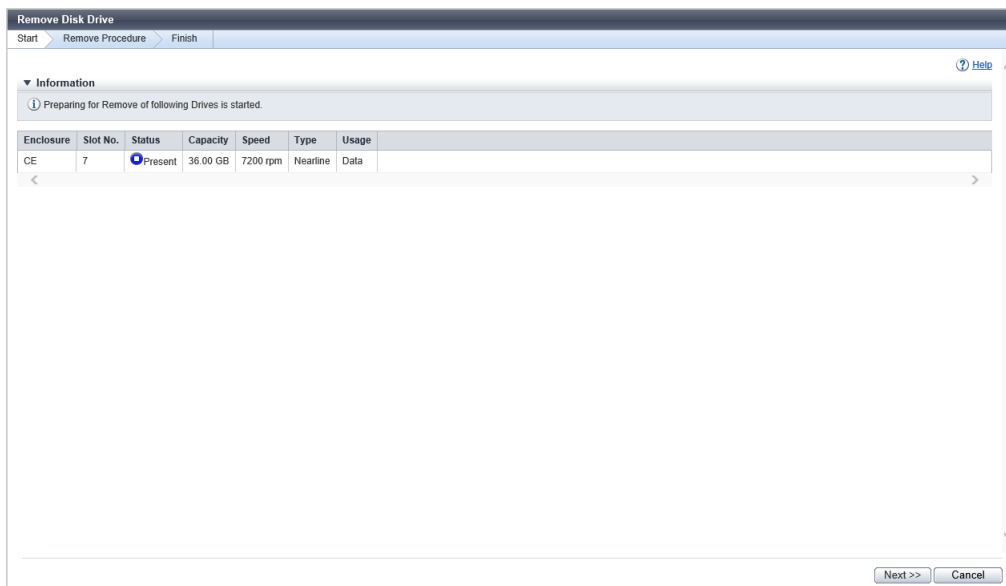
Default role	Availability of executions
Monitor	
Admin	
StorageAdmin	
AccountAdmin	
SecurityAdmin	
Maintainer	✓

7. Component Drives

Refer to ["A. User Roles and Policies" \(page 1580\)](#) for details on the policies and roles.

■ Display Contents

The following screens are displayed by the wizard.



[Start] Screen

The drive that is to be removed is displayed.

Item	Description
Enclosure	The enclosure where the drive is installed is displayed. CE : Controller Enclosure (2.5" and 3.5") DE : Drive Enclosure (2.5", 3.5", and 3.5" high density DEs) CE CE#x DE#yy x: CE number yy: DE number
Slot No.	The slot number of the enclosure where the drive is installed is displayed.
Status	The drive status is displayed. Refer to "Drive Status" (page 1607) for details.
Capacity	The capacity of the drive is displayed.
Speed	The drive speed is displayed. For SSD or SSD SED, a "-" (hyphen) is displayed. 15000 rpm 10000 rpm 7200 rpm
Type	The drive type is displayed. Online Nearline SSD Online SED Nearline SED SSD SED

7. Component Drives

Item	Description
Usage	The usage of the drive is displayed. Data Global Hot Spare Dedicated Hot Spare

[Isolation Progress] Screen

The status of the drive and the progress rate of isolating the drive are displayed.

Status Check

Item	Description
Enclosure	The enclosure where the drive is installed is displayed. CE CE#x DE#yy x: CE number yy: DE number
Slot No.	The slot number of the enclosure where the drive is installed is displayed. 2.5" CE/DE: 0 - 23 3.5" CE/DE: 0 - 11 3.5" high density DE: 0 - 59
Progress	The progress rate (0 to 100 %) of isolating the drive is displayed.
Status	The drive status is displayed. Refer to "Drive Status" (page 1607) for details.

[Finish] Screen

The drive removal procedure is displayed on this screen. Remove the drive according to the displayed procedure.

The drive that is to be removed is displayed in "Information" area.

■ Operating Procedures

Procedure ▶▶▶

- 1 Select the drives that are to be removed (up to 8 drives can be selected), and click [Remove Disk Drive] in [Action].
→ The ["\[Start\] Screen" \(page 1126\)](#) appears.
- 2 Check the drives that are to be removed, and click the [Next >>] button.
→ Drive isolation starts, and the ["\[Isolation Progress\] Screen" \(page 1127\)](#) appears.
When the drive isolation is complete, the ["\[Finish\] Screen" \(page 1127\)](#) appears.
- 3 Remove the drive according to the displayed procedure.
- 4 Click the [Done] button to return to the [Drives] screen.



Start Disk Diagnosis

- ["■ Overview" \(page 1128\)](#)
- ["■ User Privileges" \(page 1128\)](#)
- ["■ Display Contents" \(page 1129\)](#)
- ["■ Operating Procedures" \(page 1132\)](#)

■ Overview

This function starts the disk diagnosis.

The disk diagnosis checks the state of the selected disk when it is not being accessed by the host. This function can detect disk faults before configuring the system.

This function enables the starting and stopping of the disk diagnosis and the exporting of the results.

Caution

- The disk diagnosis cannot be executed while the storage system is in operation. Before starting the disk diagnosis, stop host access.
- Do not start the disk diagnosis while functions for accessing the disk or changing the RAID group status are running, such as Advanced Copy, RAID Migration, etc.
- If disk diagnosis is already running, a new disk diagnosis cannot be started.
- Once a disk diagnosis is started, other functions cannot be executed until the diagnosis is complete and the diagnosis results (diagnosis detailed information and error detailed information) are cleared.
- Disk diagnosis cannot be started in the following conditions:
 - The disk diagnosis or RAID group diagnosis results are not cleared
 - The RAID group diagnosis is being performed in the storage system
 - The disk contains a volume that is currently being formatted
 - The disk contains a volume that is currently being encrypted
 - The disk contains a volume where a rebuild, copyback, or redundant copy is currently being performed
 - Releasing the RAID group capacity which belongs to a Thin Provisioning Pool (TPP)
 - Releasing the RAID group capacity which belongs to a Flexible Tier Pool (FTRP)
 - The RAID migration is being performed in the storage system
 - The TPV balancing is being performed in the storage system
 - The FTRP balancing is being performed in the storage system
- The target disks that can be diagnosed using this function are Online disks, Nearline disks, Online SEDs, and Nearline SEDs. Solid State Drives (SSDs) and SSD SEDs cannot be diagnosed.

■ User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	
StorageAdmin	
AccountAdmin	

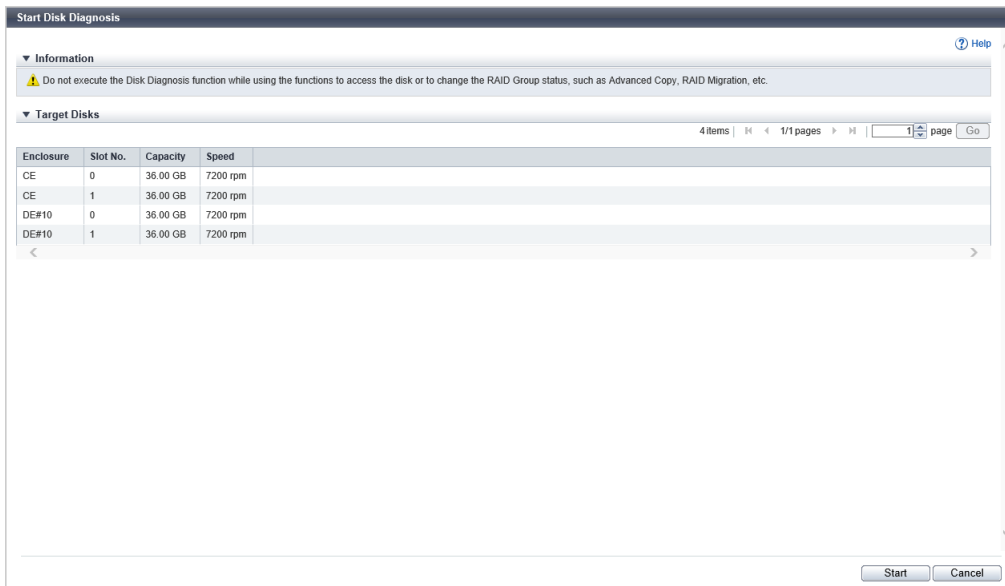
7. Component Drives

Default role	Availability of executions
SecurityAdmin	
Maintainer	✓

Refer to "[A. User Roles and Policies](#)" (page 1580) for details on the policies and roles.

■ Display Contents

In this screen, information of the selected disk is displayed.



Target Disks

Item	Description
Enclosure	The enclosure where the disk is installed is displayed. CE: Controller Enclosure DE: Drive Enclosure CE CE#x DE#yy x: CE number yy: DE number
Slot No.	The slot number of the enclosure where the disk is installed is displayed. 2.5" CE/DE: 0 - 23 3.5" CE/DE: 0 - 11 3.5" high density DE: 0 - 59
Capacity	The capacity of the disk is displayed.
Speed	The disk speed is displayed. 15000 rpm 10000 rpm 7200 rpm

[Disk Diagnosis Information] Screen

The disk diagnosis information is displayed.

7. Component Drives

Click the "[Function Button](#)" ([page 1131](#)) to update the disk diagnosis results, to stop disk diagnosis, or to export the diagnosis results.

Disk Diagnosis

Item	Description
Diagnosis Status	The status of the disk diagnosis is displayed. Before Diagnosis Diagnosing Complete Stop Error Stopped
Method	The diagnosis method is displayed. <ul style="list-style-type: none">• Read Only This diagnoses the read processes only of the disk.
Diagnosis Progress	Progress (0 to 100 %) of the disk diagnosis is displayed.

Target Disks

Item	Description
Enclosure	The enclosure where the disk is installed is displayed. CE : Controller Enclosure (2.5" and 3.5") DE : Drive Enclosure (2.5", 3.5", and 3.5" high density DEs) CE CE#x DE#yy x: CE number yy: DE number
Slot No.	The slot number of the enclosure where the disk is installed is displayed. Click this item to display the " [Detailed Disk Diagnosis Information] Screen " (page 1131). 2.5" CE/DE: 0 - 23 3.5" CE/DE: 0 - 11 3.5" high density DE: 0 - 59
Capacity	The capacity of the disk is displayed.
Speed	The disk speed is displayed. 15000 rpm 10000 rpm 7200 rpm
Diagnosis Status	The status of the disk diagnosis is displayed. Before Diagnosis Diagnosing Complete Stop Error Stopped Not Target
Diagnosis Result	The disk diagnosis result is displayed. Normal Cancel Warning

Function Button

Button	Description
[Stop]	Stops all of the disk diagnosis processes for which the diagnosis status is "Before Diagnosis" and "Diagnosing".
[Export]	Exports the diagnosis results. Click this button to display the "[Create Disk Diagnosis Result Data] Screen" (page 1131). This button is available only when the diagnosis is stopped with the [Stop] button or when the diagnosis is complete.
[Refresh]	Updates to the latest disk diagnosis information.
[Done]	Clears the diagnosis result and completes the disk diagnosis. This button is available only when the diagnosis is stopped with the [Stop] button or when the diagnosis is complete.

[Create Disk Diagnosis Result Data] Screen

Button	Description
[Export]	Creates the diagnosis result data.
[Cancel]	Returns to the [Disk Diagnosis Information] screen.

[Output Disk Diagnosis Result File] Screen

Button	Description
[Download]	Downloads the created diagnosis result file.
[Done]	Returns to the [Disk Diagnosis Information] screen.

[Detailed Disk Diagnosis Information] Screen

Disk Diagnosis

Detailed diagnosis information for the selected disk is displayed.

Item	Description
Diagnosis Status	The status of the disk diagnosis is displayed. Before Diagnosis Diagnosing Complete Stop Error Stopped Not Target
Diagnosis Result	The disk diagnosis result is displayed. Normal Cancel Warning
Diagnosis Progress	Progress (0 to 100 %) of the disk diagnosis is displayed.
Diagnosed Disk LBA Count	The number of blocks for which diagnosis is complete is displayed.
Diagnosed Disk LBA Count	The total number of blocks is displayed.
Hard Error Count	The number of detected hardware errors is displayed.
SMART Error Count	The number of Self-Monitoring Analysis and Reporting Technology (S.M.A.R.T.) incidents that are detected is displayed.

7. Component Drives

Item	Description
Compare Error Count	The number of detected data compare errors is displayed.
Medium Error Count	The number of detected medium errors is displayed. The number of errors equals the total of the values between "Head#0" and "Head#11" in the "Error Detail Information" and the value for "Other Error Count".
Recovered Error Count	The number of detected recovered errors is displayed. "Recovered errors" refer to errors that can be recovered by a retry or other operation during diagnosis. The number of errors equals the total of the values between "Head#0" and "Head#11" in the "Error Detail Information" and the value for "Other Error Count".
No Sense Error Count	The number of detected No Sense errors is displayed. "No Sense errors" refer to situations where no response is received from a disk within a fixed monitoring time during disk access.
Interface Error Count	The number of detected interface errors is displayed. An interface error occurs due to one of the following FC loop errors. <ul style="list-style-type: none">• Disk port is blocked• Installed disk is not recognized
Other Error Count	The number of other detected errors is displayed.

Error Detail Information

Item	Description
Medium Error	The number of medium errors that are detected on each disk head (Head#0 to Head#11) and the number of other medium errors are displayed.
Recovered Error	The number of recovered errors that are detected on disk heads (Head#0 to Head#11) and the number of other recovered errors are displayed.

■ Operating Procedures

When Starting a Disk Diagnosis

Procedure ▶▶▶

- 1 Select which disk(s) disk diagnosis is started from (multiple selections can be made) and click [Start Diagnosis] in [Action].

Caution

- If RAID group diagnosis or disk diagnosis is currently being executed in the storage system, a message to that effect appears.

- 2 Click the [Start] button.
→ A confirmation screen appears.
- 3 Click the [OK] button.
→ Disk diagnosis starts, and the "[Disk Diagnosis Information] Screen" (page 1129) appears.
- 4 After the diagnosis is complete, click the [Done] button.
→ A confirmation screen for deleting the disk diagnosis results appears.

Note

- Click the [Slot No.] link to display the "[Detailed Disk Diagnosis Information] Screen" (page 1131) of the selected disk.
- Click the [Refresh] button to display the latest disk diagnosis information.
- Click the [Stop] button to stop all of the diagnosis processes. After the process for stopping the diagnosis is complete, the display returns to the "[Disk Diagnosis Information] Screen" (page 1129).
- Click the [Export] button to download the diagnosis results after the disk diagnosis is stopped or complete. Refer to ""When Outputting Disk Diagnosis Result File" (page 1133)" for details.

- 5 Click the [OK] button.
→ Deletion of the diagnosis results starts.
- 6 Click the [Done] button to return to the [Drives] screen.



When Outputting Disk Diagnosis Result File

Procedure ▶▶▶

- 1 Click the [Export] button in the "[Disk Diagnosis Information] Screen" (page 1129).
→ The "[Create Disk Diagnosis Result Data] Screen" (page 1131) appears.
- 2 Click the [Export] button.
→ The "[Output Disk Diagnosis Result File] Screen" (page 1131) appears.
- 3 Click the [Download] button.
→ A dialog box to download the file appears.
- 4 Save the disk diagnosis result file.
The default file name is "DiskDiag_serial number for the storage system_YYYY-MM-DD_hh-mm-ss.txt". (YYYY-MM-DD_hh-mm-ss: the date and time when the [Download] button is displayed in the [Output Disk Diagnosis Result File] screen)
- 5 Click the [Done] button to return to the "[Disk Diagnosis Information] Screen" (page 1129).



Sanitize Drive

- "■ Overview" (page 1133)
- "■ User Privileges" (page 1135)
- "■ Operating Procedures" (page 1136)

■ Overview

This function starts a data sanitization process for drives.

Caution

- A data sanitization process is not complete with the execution of this function. This function is completed when the data deletion process for the selected drive is successfully started.

- Perform the start maintenance operation by using the [Start/End Maintenance] function before starting a drive data sanitization. If the operation has not been performed, [Sanitize Drive] cannot be clicked.
- Web GUI or CLI cannot stop a drive data sanitization that is already in progress.
- If this function is continuously executed, this function may stop due to an error.
- This function cannot be used for some drive types. If these drives are selected and this function is started, this function stops due to an error.
- This function cannot be used when one of the following drives is selected.
 - Drives without the "Present" state and the "Broken" state
 - Drives that are registered in RAID groups, TPPs, FTRPs, or REC Disk Buffers
 - Drives that are used as Extreme Cache Pools
 - Drives used as a "Global Hot Spare" or a "Dedicated Hot Spare"
- After a data sanitization is started, the data deletion processes for the multiple drives operate almost in parallel. The required time for deleting data depends on the drive capacity. Estimate the required time for deleting the data from the largest drive capacity. It takes approximately 0.6s/GB for SSDs, 15s/GB for online disks, and 20s/GB for Nearline disks to delete data.
- To perform operations such as removing drives after a data sanitization for drives in the "Broken" state, wait the estimated time that was calculated from the drive type and capacity, and then start the next procedure.
- If this function is started, event logs are output when the data sanitization is started and completed. However, the completion event log is not output for drives in the "Broken" state. To check the completion of the data sanitization via the event logs, use the [Force Enable Module] function to change the drive state to "Present" and then start this function. If the drive remains in the "Broken" state even after executing the [Force Enable Module] function, the process is assumed completed when the process time that is estimated from the drive type and capacity has passed. Refer to Note of this function for details.
- Do not perform any of the following operations when a data sanitization is in progress.
 - Turning off/on the storage system
 - Using the drive maintenance functions (or using the [Hot Preventive Maintenance] function, the [Force Enable Module] function, the [Force Disable Module] function, the [Remove Disk Drive] function, or performing a hot maintenance of the failed drives without the use of Web GUI)
 - Using the CM maintenance functions (or using the [Hot Preventive Maintenance] function, the [Force Enable Module] function, the [Force Disable Module] function, or performing a hot maintenance of the failed CMs without the use of Web GUI)
 - Application of the controller firmware or disk firmware
 - Obtaining the G-List
 - Executing functions that access drives (such as creating volumes)
 - Eco-mode
 - Rebooting all CMs
 - Disk diagnosis
- If prohibited operations are performed or a power failure occurs when data is being deleted, re-execute this function. If a drive failure occurs due to an operation, use the [Force Enable Module] function to activate the drive in the storage system.

Note

- Disk drive patrol is suspended when data is being deleted. After the data sanitization is complete, the disk drive patrol is automatically resumed.
 - The drive lifetime information (or remaining life) cannot be obtained when data is being deleted. A "-" (hyphen) is displayed for the "Health" of the drive. Refer to the [Drives] function for details.
 - Drives can be re-used after the data is deleted. To re-use the drives, perform one of the following operations.
 - Re-insert the drives
 - Use the [Force Disable Module] function and the [Force Enable Module] function
 - When this function is started, the "Sanitize Start" event log is output for each drive.
 - For sanitization of drives in the "Present" state, check for the completion of the sanitization indicated by the "Sanitize Complete" event log. Refer to "[About "Sanitize Complete" Event Log" \(page 1135\)](#)" for details.
 - For sanitization of drives in the "Broken" state, the "Sanitize Complete" event log is not output. Therefore, the process is assumed completed when the process time that is estimated from the drive type and capacity has passed. It takes approximately 0.6s/GB for SSDs, 15s/GB for online disks, and 20s/GB for Nearline disks to sanitize data.
- Refer to the [Display/Delete Event Log] function for details about the event logs.

About "Sanitize Complete" Event Log

The "Sanitize Complete" event log is output when the data sanitization in each drive type is completed for each controller.

For example, when the data sanitization is performed for ten Online SAS disks that are in the "Present" state on CM#0, ten "Sanitize Start" event logs are output and one "Sanitize Complete" event log is output for the ten Online SAS disks.

Completion of the data sanitization process can be checked via the "Sanitize Complete" event log that corresponds to the "Sanitize Start" event log. The corresponding event logs are recognized by the following controller and drive type.

- Controller
CM number
- Drive type
Output result of "Sanitize Start" and "Sanitize Complete":

Sanitize Start	Sanitize Complete
15000 rpm or 10000 rpm	HDD Online
7200 rpm	HDD Nearline
SSD	SSD

■ User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	
StorageAdmin	

7. Component Drives

Default role	Availability of executions
AccountAdmin	
SecurityAdmin	
Maintainer	✓

Refer to "[A. User Roles and Policies](#)" (page 1580) for details on the policies and roles.

■ Operating Procedures

Procedure ▶▶▶

- 1 Select the drive to sanitize data (multiple selections can be made) and click [Sanitize Drive] in [Action].
→ A confirmation screen appears.
- 2 Click the [OK] button.
→ The drive data sanitization process starts.
- 3 Click the [Done] button to return to the screen when starting this function in Step 1.



Performance (Drives)

- "[■ Overview](#)" (page 1136)
- "[■ User Privileges](#)" (page 1136)
- "[■ Display Contents](#)" (page 1137)
- "[■ Filter Setting](#)" (page 1137)

■ Overview

This function displays the performance information of drives.

Note

- Performance information is obtained when performance monitoring is operated from Web GUI, CLI, or any other monitoring software. Refer to the [Start/Stop Performance Monitoring] function for details on how to start performance monitoring with Web GUI.
- The interval for acquiring performance information can be specified when starting the monitoring. When using Web GUI, the default interval is 30 seconds.
- The average performance values during the specified interval are displayed.

■ User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	✓
Admin	✓
StorageAdmin	✓
AccountAdmin	
SecurityAdmin	✓

7. Component Drives

Default role	Availability of executions
Maintainer	✓

Refer to ["A. User Roles and Policies" \(page 1580\)](#) for details on the policies and roles.

■ Display Contents

In this screen, performance information of drives is displayed.

Item	Description
Enclosure	The enclosure where the drive is installed is displayed. CE: Controller Enclosure (2.5" and 3.5") DE: Drive Enclosure (2.5", 3.5", and 3.5" high density DEs) CE CE#x DE#yy x: CE number yy: DE number
Slot No.	The slot number of the enclosure where the drive is installed is displayed. 2.5" CE/DE: 0 - 23 3.5" CE/DE: 0 - 11 3.5" high density DE: 0 - 59
Busy Rate	The busy rate (0 to 100 %) of the drive is displayed with a bar and a numerical number. When a drive is in the "Broken" or "Not Supported" state, a "-" (hyphen) is displayed.

■ Filter Setting

Function Description

Filter setting is a function used to display only the disk drives matching all the specified conditions. No filtering is set by default. The following table shows conditions that can be specified.

7. Component Drives

Item	Description	Setting values
Enclosure	Select the enclosure to be displayed. When not using enclosure for filtering, please select "All".	All CE CE#x DE#yy x: CE number yy: DE number
Slot No.	Specify the slot number to be displayed. When not using the slot number for filtering, leave this item blank.	Blank 2.5" CE/DE: 0 - 23 3.5" CE/DE: 0 - 11 3.5" high density DE: 0 - 59
Minimum Busy Rate	Specify the minimum busy rate for the drive that is to be displayed. The drives with a busy rate that exceeds the specified minimum busy rate are displayed. When not using the minimum busy rate for filtering, leave this item blank.	Blank Busy rate [%] "- " (hyphen)

Export Performance Information

Refer to ["Export Performance Information" \(page 194\)](#) for details.

Drive Error Statistics

- ["■ Overview" \(page 1138\)](#)
- ["■ User Privileges" \(page 1138\)](#)
- ["■ Display Contents" \(page 1138\)](#)

■ Overview

This function displays the total number of errors for disk drives. An increasing number of error occurrences in the information is used to indicate early replacement of warning status components, and for analysis information when performance degradation occurs. Any unnecessary disk error information can be deleted.

■ User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	✓
StorageAdmin	
AccountAdmin	
SecurityAdmin	✓
Maintainer	✓

Refer to ["A. User Roles and Policies" \(page 1580\)](#) for details on the policies and roles.

■ Display Contents

In this screen, error information of disk drives is displayed.

7. Component Drives

Enclosure	Slot No.	Port No.	Media Error	Drive Error	Drive Recovered Error	S.M.A.R.T. Event	I/O Timeout	Link Error	Check Code Error
CE 0	0	Port#0	0	0	0	0	0	0	0
		Port#1	0	0	0	0	0	0	0
CE 1	1	Port#0	0	0	0	0	0	0	0
		Port#1	0	0	0	0	0	0	0
CE 2	2	Port#0	0	0	0	0	0	0	0
		Port#1	0	0	0	0	0	0	0
CE 3	3	Port#0	0	0	0	0	0	0	0
		Port#1	0	0	0	0	0	0	0
CE 4	4	Port#0	0	0	0	0	0	0	0
		Port#1	0	0	0	0	0	0	0
CE 5	5	Port#0	0	0	0	0	0	0	0
		Port#1	0	0	0	0	0	0	0
CE 6	6	Port#0	0	0	0	0	0	0	0
		Port#1	0	0	0	0	0	0	0
CE 7	7	Port#0	0	0	0	0	0	0	0
		Port#1	0	0	0	0	0	0	0

Item	Description
Enclosure	The enclosure where the drive is installed is displayed. CE: Controller Enclosure (2.5" and 3.5") DE: Drive Enclosure (2.5", 3.5", and 3.5" high density DEs) CE CE#x DE#yy x: CE number yy: DE number
Slot No.	The slot number of the enclosure where the drive is installed is displayed.
Port No.	The drive port number is displayed. Port#x x: Port number
Media Error	The number of Media Error occurrences (0 to 4294967295) is displayed.
Drive Error	The number of Drive Error occurrences (0 to 4294967295) is displayed.
Drive Recovered Error	The number of Drive Recovered Error occurrences (0 to 4294967295) is displayed.
S.M.A.R.T. Event	The number of S.M.A.R.T. Event occurrences (0 to 4294967295) is displayed.
I/O Timeout	The number of I/O Timeout occurrences (0 to 4294967295) is displayed.
Link Error	The number of Link Error occurrences (0 to 4294967295) is displayed.
Check Code Error	The number of Check Code Error occurrences (0 to 4294967295) is displayed.

Clear Drive Error Statistics (All Drives)

- ["■ Overview" \(page 1139\)](#)
- ["■ User Privileges" \(page 1140\)](#)
- ["■ Operating Procedures" \(page 1140\)](#)

■ Overview

This function deletes the error information from all of the drives.

Note

- This function can be performed without selecting the drive to delete error information or without the error information that is to be deleted.

■ User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	✓
StorageAdmin	
AccountAdmin	
SecurityAdmin	✓
Maintainer	✓

Refer to "[A. User Roles and Policies](#)" (page 1580) for details on the policies and roles.

■ Operating Procedures

Procedure ▶▶▶

- 1 Click [Clear All Error] in [Action].
→ A confirmation screen appears.
- 2 Click the [OK] button.
→ Deletion of the error information from all the drives starts.
- 3 Click the [Done] button to return to the [Drive Error Statistics] screen.



Clear Drive Error Statistics (Selected Drives)

- "[■ Overview](#)" (page 1140)
- "[■ User Privileges](#)" (page 1140)
- "[■ Operating Procedures](#)" (page 1141)

■ Overview

This function deletes the error information from the selected drive.

Note

- This function can only be performed when an error occurs in a drive.

■ User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	✓

7. Component Drives

Default role	Availability of executions
StorageAdmin	
AccountAdmin	
SecurityAdmin	✓
Maintainer	✓

Refer to "[A. User Roles and Policies](#)" (page 1580) for details on the policies and roles.

■ Operating Procedures

Procedure ▶▶▶

- 1** Select the drive to delete error information from (multiple selections can be made) and click [Clear Error] in [Action].
→ A confirmation screen appears.
- 2** Click the [OK] button.
→ Deletion of the error information from the selected drive starts.
- 3** Click the [Done] button to return to the [Drive Error Statistics] screen.



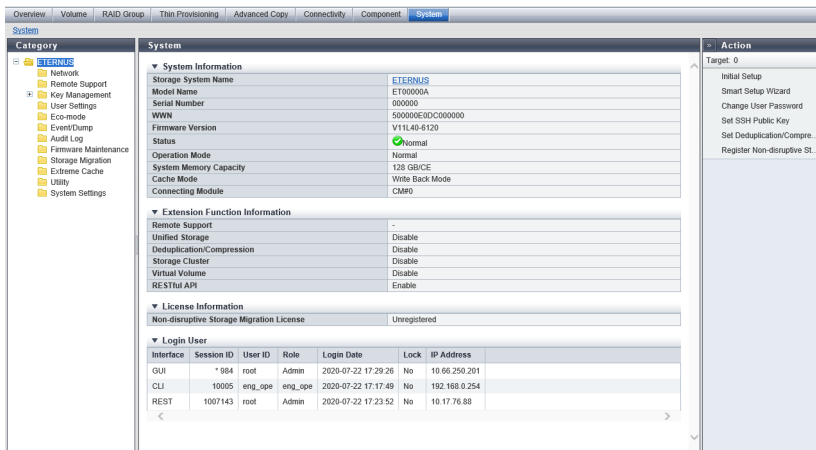
8. System

- ["System Overview" \(page 1142\)](#)
- ["System Display Function List" \(page 1142\)](#)
- ["System Action List" \(page 1143\)](#)

Overview

This function can change settings and perform operations for the entire storage system and also for sharing with the system.

Display Function List



Category	Function	Description
(Storage System Name)	"System" (page 1149)	The system information is displayed.
Network	"Network" (page 1208)	The network environment of each port in the storage system is displayed.
Remote Support	"Remote Support" (page 1265)	The operating status and settings for the remote support function are displayed.
REMCS	"REMCS" (page 1267)	The operating status of our remote maintenance system (REMCS) is displayed.
AIS Connect	"AIS Connect" (page 1301)	The AIS Connect setting information is displayed.
Root Certificate	"Root Certificate" (page 1318)	The root certificate that is used for SSL communication with the AIS Connect server is displayed.
Key Management	"Key Management" (page 1321)	The setting parameters for the key server is displayed.
Key Group	"Key Group" (page 1328)	The SED authentication key information that is used for a key group and the SSL/KMIP certificate information is displayed.
User Settings	"Define Role" (page 1343)	The registered custom roles in the storage system is displayed.
Eco-mode	"Eco-mode" (page 1369)	A list of the Eco-mode set state and the Eco-mode schedule that is registered in the storage system is displayed.
Event/Dump	"Event/Dump" (page 1383)	The description on the actions that can be started from the [Event/Dump] screen is displayed.
Audit Log	"Audit Log" (page 1417)	The audit log information is displayed.
Firmware Maintenance	"Firmware Maintenance" (page 1423)	The description of the firmware managed by the storage system is displayed.
Storage Migration	"Storage Migration" (page 1452)	The setting and progress of Storage Migration is displayed.

8. System

Category	Function	Description
Extreme Cache	"Extreme Cache" (page 1490)	The Extreme Cache information is displayed. [DX500 S5/DX600 S5/DX900 S5, DX8900 S4]
Extreme Cache Pool	"Extreme Cache Pool" (page 1500)	The Extreme Cache Pool information is displayed. [DX100 S5/DX200 S5]
External Drives	"External Drives" (page 1480)	The External Drive list is displayed.
Utility	"Utility" (page 1510)	The descriptions on the actions that can be started from the [Utility] screen is displayed.
System Settings	"System Settings" (page 1540)	The system setting information is displayed.

■ Action List

Action	Function	Description
System		
Start/End Maintenance	"Start/End Maintenance" (page 950)	Switch the storage system to the maintenance operation mode.
Initial Setup	"Initial Setup" (page 1156)	Perform the initial setup of the storage system.
Smart Setup Wizard	"Smart Setup Wizard" (page 1169)	Perform the initial settings (selecting hosts and volumes, and setting the host affinity) required to operate the storage system on a series of wizard screens.
Change User Password	"Change User Password" (page 1185)	Change the current user password.
Set SSH Public Key	"Set SSH Public Key" (page 1189)	Change the current SSH public key.
Expand System Memory Capacity	"Expand System Memory Capacity" (page 1193)	Expand the upper limit of the system memory capacity used in the storage system.
Register Unified License	"Register Unified Storage License" (page 1191)	Register the Unified Storage license.
Set Deduplication/Compression Mode	"Set Deduplication/Compression Mode" (page 1197)	Enable or disable Deduplication/Compression for the storage system.
Enable RESTful API	"Enable RESTful API" (page 1199)	Enable RESTful API.
Register GS License	"Register GS License" (page 1195)	Register the GS License.
Register RFCF License	"Register RFCF License" (page 1200)	Register an RFCF License.
Register Non-disruptive Storage Migration License	"Register Non-disruptive Storage Migration License" (page 1203)	Register the Non-disruptive Storage Migration License.
Delete Non-disruptive Storage Migration License	"Delete Non-disruptive Storage Migration License" (page 1207)	Delete the Non-disruptive Storage Migration License registered in the storage system.
Network		

8. System

Action	Function	Description
Setup Network	"Setup Network Environment" (page 1213)	Change the network settings of the storage system, such as IP address setting.
Setup Firewall	"Setup Firewall" (page 1224)	Change the firewall setting of the storage system.
Setup SNMP Interface	"Setup SNMP Agent Basic Interface" (page 1226)	Set up the basic operations for SNMP.
Setup SNMP Manager	"Setup SNMP Manager" (page 1229)	Set up the SNMP Agent Manager that is to be used.
Setup SNMP MIB View	"Setup SNMP Agent MIB Access View" (page 1232)	Set up the MIB View of the SNMP Agent.
Setup SNMP User	"Setup SNMP Agent User" (page 1235)	Set up the user of the SNMP Agent.
Setup SNMP Community	"Setup SNMP Agent Community" (page 1238)	Set up the SNMP Agent Community.
Setup SNMP Trap	"Setup SNMP Agent Trap" (page 1241)	Set up the trap notification destination of the SNMP Agent.
Download MIB File	"Download MIB File" (page 1244)	Download the MIB definition file.
Send SNMP Trap	"Send SNMP Trap Test" (page 1245)	Send the SNMP trap to confirm operations.
Display SMTP Log	"Display SMTP Log" (page 1246)	Display the communication log with the SMTP server.
Setup E-Mail Notification	"Setup E-Mail Notification" (page 1247)	Set up the operating environment for E-mail notifications such as E-mail notification destinations.
Setup Syslog	"Setup Syslog" (page 1250)	Set up the notification destination of the Syslog.
Setup SSH Server Key	"Setup SSH Server Key" (page 1252)	Set up the SSH server key.
Create SSL Certificate	"Create Self-signed SSL Certificate" (page 1254)	Create self-signed SSL certificate.
Create Key/CSR	"Create Key/CSR" (page 1257)	Create CSR and the SSL server key for the storage system.
Register SSL Certificate	"Register SSL Certificate" (page 1260)	Register the SSL certificate.
Setup SSL Security Configuration	"Setup SSL Security Configuration" (page 1264)	Set the security method of SSL communication.

Remote Support

8. System

Action	Function	Description
REMCS		
Display Communication Log	"Display Communication Log" (page 1270)	Display the communication log of REMCS.
Setup Remote Support	"Setup Remote Support" (page 1271)	Set up the operating environment of the remote support.
Update Customer Info	"Update Customer Information" (page 1279)	Update the customer information.
Update Connection Info	"Update Communication Environment Information" (page 1282)	Update the communication environment of the REMCS.
Setup Log Sending Parameters	"Setup Log Sending Parameters" (page 1288)	Send the log to the REMCS center.
Stop/Restart Remote Support	"Stop/Restart Remote Support" (page 1291)	Temporarily stop the Remote Support.
Download Firmware	"Download Controller Firmware" (page 1293)	Download the latest firmware from the REMCS center.
Setup Firmware Update from Peer Storage System	"Setup Firmware Update from Peer Storage System" (page 1298)	Download the latest firmware from another storage system.
AIS Connect		
Setup AIS Connect Environment	"Setup AIS Connect Environment" (page 1304)	Set up the basic information for AIS Connect.
Setup Remote Session Permission	"Setup Remote Session Permission" (page 1312)	Set up permission settings for remote sessions with the AIS Connect function.
Send Log	"Send Log" (page 1313)	Send a storage system log to the AIS Connect server.
Test Server Connectivity	"Test Server Connectivity" (page 1314)	Check the connection status between the storage system and an AIS Connect server.
Send AIS Connect Test Event	"Send AIS Connect Test Event" (page 1315)	Send a test event to the AIS Connect server.
Setup Customer Information	"Setup Customer Information" (page 1316)	Specify the customer information.
Import Root Certificate	"Import Root Certificate" (page 1320)	Update the root certificate that is used for SSL communication with the AIS Connect server.
Key Management		
Setup Key Machine Name	"Setup Key Management Machine Name" (page 1323)	Specify the name of the key management device (Key Management Machine).
Add Key Server	"Add Key Server" (page 1324)	Add a key server.
Delete Key Server	"Delete Key Server" (page 1326)	Delete key servers.
Modify Key Server	"Modify Key Server" (page 1326)	Change the key server settings.
Key Group		
Create Key Group	"Create Key Group" (page 1331)	Create a key group.
Delete Key Group	"Delete Key Group" (page 1335)	Delete the key group.
Modify Key Group	"Modify Key Group" (page 1336)	Change the key group settings.
Update SED Key	"Update SED Authentication Key" (page 1339)	Update SED authentication key in the key group.
Import SSL/KMIP Certificate	"Import SSL/KMIP Certificate" (page 1341)	Register the SSL/KMIP certificate in the storage system.

8. System

Action	Function	Description
User Settings		
Setup User Account	"Setup User Account" (page 1344)	Register, change, and delete a user account to log in to Web GUI.
Initialize User Account	"Initialize User Account" (page 1355)	Initialize all the user information to the default status.
Modify User Policy	"Modify User Policy" (page 1357)	Specify a user policy for user accounts to be registered in the storage system.
Modify RADIUS	"Modify RADIUS" (page 1360)	Set up the RADIUS server to be linked with.
Add Role	"Add Role" (page 1362)	Add a user-specific role (custom role).
Delete Role	"Delete Role" (page 1365)	Delete a user-specific role (custom role).
Modify Role	"Modify Role" (page 1366)	Change the role name and policies of user-specific roles (custom roles).
Eco-mode		
Modify Eco-mode Setting	"Modify Eco-mode General Setting" (page 1372)	Set up the Eco-mode.
Create Schedule	"Create Eco-mode Schedule" (page 1373)	Register the Eco-mode schedule.
Delete Schedule	"Delete Eco-mode Schedule" (page 1378)	Delete the Eco-mode schedule.
Modify Schedule	"Modify Eco-mode Schedule" (page 1379)	Change the Eco-mode schedule.
Event/Dump		
Setup Event Notification	"Setup Event Notification" (page 1383)	Change whether or not to notify each event.
Display/Delete Event Log	"Display/Delete Event Log" (page 1404)	Display, export, and delete event logs.
Export/Delete Log	"Export/Delete Log" (page 1407)	Export and delete the log file.
Export/Delete Panic Dump	"Export/Delete Panic Dump" (page 1411)	Export and delete the panic dump.
Get G-List	"Get G-List" (page 1415)	Export the G-List.
Audit Log		
Enable Audit Log	"Enable Audit Log" (page 1419)	Enable the audit log.
Disable Audit Log	"Disable Audit Log" (page 1420)	Disable the audit log.
Setup Audit Log	"Setup Audit Log" (page 1421)	Set up external servers for sending audit logs.
Firmware Maintenance		
Apply Firmware	"Apply Controller Firmware" (page 1425)	Register and apply the controller firmware.
Delete Firmware Schedule	"Delete Controller Firmware Schedule" (page 1444)	Delete the controller firmware application schedule.
Delete Firmware	"Delete Controller Firmware" (page 1441)	Delete the controller firmware.
Register Disk Firmware	"Register Disk Firmware" (page 1446)	Register the disk firmware.
Apply Disk Firmware	"Apply Disk Firmware" (page 1448)	Apply the disk firmware of the specified disk.
Delete Disk Firmware	"Delete Disk Firmware" (page 1451)	Delete the disk firmware.
Storage Migration		

8. System

Action	Function	Description
Start	"Start Storage Migration" (page 1458)	Load the Storage Migration setting file and start migration.
Download Template	"Download Template File for Storage Migration Settings" (page 1467)	Download the template of the Storage Migration setting file.
Delete Path	"Delete Storage Migration Path" (page 1474)	Delete path groups for the Storage Migration.
Download Result	"Download Storage Migration Result" (page 1476)	Download the execution result of the Storage Migration.
Restart	"Restart Storage Migration" (page 1477)	Restart the Storage Migration process.
Suspend	"Suspend Storage Migration" (page 1478)	Suspend the Storage Migration process.
Stop	"Stop Storage Migration" (page 1479)	Stop the Storage Migration process.
Extreme Cache		
Setup Extreme Cache	"Setup Extreme Cache" (page 1492)	Set up Extreme Cache. [DX500 S5/DX600 S5/DX900 S5, DX8900 S4]
Release Extreme Cache	"Release Extreme Cache" (page 1498)	Release the Extreme Cache. [DX500 S5/DX600 S5/DX900 S5, DX8900 S4]
Extreme Cache Pool		
Setup Extreme Cache Pool	"Setup Extreme Cache Pool" (page 1502)	Set up Extreme Cache Pool. [DX100 S5/DX200 S5]
Release Extreme Cache Pool	"Release Extreme Cache Pool" (page 1509)	Release the Extreme Cache Pool. [DX100 S5/DX200 S5]
External Drives		
Create	"Create External Drive" (page 1483)	Create External Drives by transferring the volume information in the external storage system to the local storage system.
Delete	"Delete External Drive" (page 1489)	Delete the registered External Drives.
Utility		

8. System

Action	Function	Description
Reset Backup/Restore Fail	"Reset Backup/Restore Fail" (page 1511)	Reset the Backup Fail or Restore Fail status.
Reset Machine Down Recovery Fail	"Reset Machine Down Recovery Fail" (page 1513)	Reset the Machine Down Recovery failure status.
Force Write Back	"Force Write Back" (page 1514)	Write all the data in the cache back to the disk.
Clear Sense Data	"Clear Sense Data" (page 1515)	Delete the sense data held by the storage system.
Initialize BUD	"Initialize BUD" (page 1516)	Initialize the BUD.
Force Restore	"Force Restore" (page 1517)	Forcibly restore the information of the system area.
Force Restore TPP	"Force Restore Thin Provisioning" (page 1519)	Forcibly restore the Thin Provisioning control table that is backed up in the BUD of the CM to the memory.
Change Master CM	"Change Master CM" (page 1520)	Switch the Master CM.
Reboot All CMs	"Reboot All CMs" (page 1523)	Reboot all CMs.
Shutdown/Restart	"Shutdown/Restart Storage System" (page 1524)	Shutdown or restart the storage system.
Apply Configuration	"Apply Configuration" (page 1525)	Apply the specified configuration.
Cancel Applying Configuration	"Cancel Applying Configuration" (page 1528)	Cancel the configuration information that is applied by the [Apply Configuration] function.
Backup Configuration	"Backup Configuration" (page 1529)	Back up the current configuration.
Export Configuration	"Export Configuration" (page 1531)	Download the current configuration to a file.
Setup Drive Monitor Parameters	"Setup Drive Monitor Parameters" (page 1532)	Update the drive monitor parameters.
Export Drive Monitor Parameters	"Export Drive Monitor Parameters" (page 1534)	Export the latest drive monitor parameters file that was applied to the storage system.
Start/Stop Perfmon	"Start/Stop Performance Monitoring" (page 1535)	Switch the start/stop performance monitoring.
Clear Cache	"Clear Cache" (page 1537)	Clear all of the data on the CM cache memory and the data on the PFM.

System Settings

8. System System

Action	Function	Description
Modify Storage Name	"Modify Storage System Name" (page 1541)	Change the name for the storage system.
Modify Date and Time	"Modify Date and Time" (page 1543)	Change the date and time of the built-in clock of the storage system.
Change Box ID	"Change Box ID" (page 1549)	Change the Box ID.
Setup Subsystem Parameters	"Setup Subsystem Parameters" (page 1551)	Change the subsystem parameters of the storage system.
Setup Encryption Mode	"Setup Encryption Mode" (page 1564)	Change the encryption mode for the firmware of the storage system.
Setup SMI-S Environment	"Setup SMI-S Environment" (page 1566)	Change the operating environment of the SMI-S.
Setup Debug Mode	"Setup Debug Mode" (page 1569)	Change the timing for exporting dump.
Register SED Key	"Register SED Authentication Key" (page 1571)	Set up an authentication key for the encrypted disk.
Setup Disk Patrol	"Setup Disk Drive Patrol" (page 1572)	Change patrol operations to monitor errors on disks.
Setup Disk Performance	"Modify Disk Performance Monitor" (page 1574)	Change operations to monitor disk performance.
Setup Power Management	"Setup Power Management" (page 1576)	Change operations associated with the power.
Setup Exclusive Read Cache	"Setup Exclusive Read Cache" (page 1578)	Set the exclusive read cache size.

System

- ["■ Overview" \(page 1149\)](#)
- ["■ User Privileges" \(page 1150\)](#)
- ["■ Display Contents" \(page 1151\)](#)

■ Overview

This function displays the system information and a list of users who are currently logged in.

Caution

- If the message "Currently Network Configuration is set to factory default." is displayed, the network environment settings for the MNT port must be performed. Use the [Setup Network Environment] function in the [Network] screen under the [System] navigation. Some functions are not available if the network environment settings are incomplete.
- If the message "Configuration was applied to storage system." is displayed in the system message field, the storage system must be rebooted. Any setting processes cannot be performed until the applied configuration information is enabled by rebooting the storage system.
- The "Login User" list is displayed only when a user account with the "User Management" policy is used to log in.
- The following login users are displayed:
 - Users who logged in to the Master CM via Web GUI
 - Users who logged in to the Slave CM via Web GUI
 - Users who logged in to the Master CM via CLI or other software
(Users who are logged in to the Slave CM from CLI or other software are not displayed.)
 - Users who logged in to the Master CM via RESTful API

Note

- If the system message "Unified storage license has been registered." is displayed, the unified upgrade must be performed. Use the [Apply Controller Firmware] function in the [Firmware Maintenance] screen under the [System] navigation and reboot the storage system. After changing the firmware for the active controller to the unified firmware (*1), apply the same unified firmware to the inactive controller. Refer to the [Apply Controller Firmware] function for details.

*1: A controller firmware with built-in Unified Storage functions.
- The storage system name is displayed at the top of the [System] navigation category. The "Storage System Name" is specified using the [Modify Storage System Name] function. Refer to the [Modify Storage System Name] function for details.
- Click the "Storage System Name" in the category again to display the latest information in the screen.

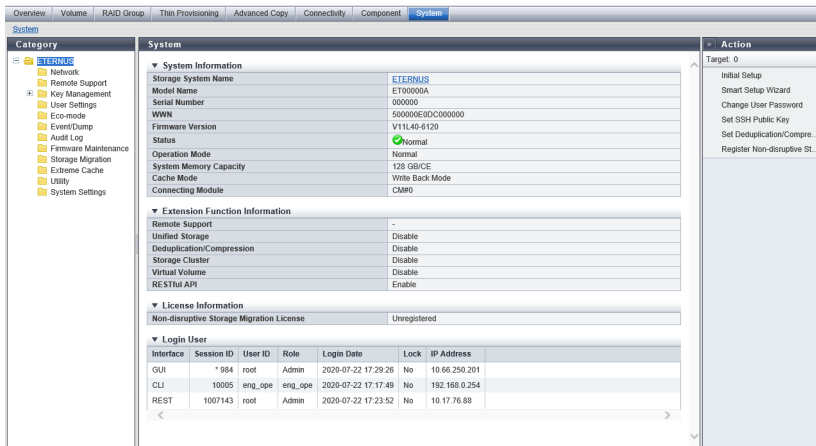
■ User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	✓
Admin	✓
StorageAdmin	✓
AccountAdmin	✓
SecurityAdmin	✓
Maintainer	✓

Refer to "[A. User Roles and Policies](#)" (page 1580) for details on the policies and roles.

■ Display Contents



System Information

Item	Description
Storage System Name	The name of the storage system is displayed. Click the [Storage System Name] link to display the [Storage] screen in the [Component] navigation.
Model Name	The model name of the storage system is displayed.
Serial Number	The serial number of the storage system is displayed.
WWN	The WWN of the storage system is displayed.
Firmware Version	The current controller firmware version is displayed. VxxLyy-zzzz Vxx: Version Lyy: Level zzzz: Release number
Status	The general status (detail) of the storage system is displayed. Refer to ""Storage System General Status (Detail)" (page 1603)" for details.
Operation Mode	The operation mode is displayed. <ul style="list-style-type: none"> Normal The storage system is in operation. Maintenance Mode The storage system is under maintenance.
System Memory Capacity	The system memory capacity of each CE that can be used in the storage system is displayed.

8. System System

Item	Description
Cache Mode	<p>The current status and the factor of the cache are displayed. The normal status is "Write Back Mode". For the ETERNUS DX900 S5 or the ETERNUS DX8900 S4, click this item to display the [Controller Enclosure] screen. Refer to the [Controller Enclosure] function for details.</p> <ul style="list-style-type: none"> • Write Back Mode When a Write request is issued from the host, "Write Complete" is displayed after writing to the cache area is complete. • Write Through Mode When a Write request is issued from the host, "Write Complete" is displayed after writing to the cache area and the drives is complete. In the Write Through Mode, "Write Through (factors)" is displayed. When there are multiple factors, all the factors are separated with a "/" (slash) and displayed. Factors of the Write Through Mode are displayed in the following formats. <ul style="list-style-type: none"> - Write Through (Pinned Data) A large amount of pinned data occurred in the storage system. - Write Through (Battery) The battery charge level is low. - Write Through (Maintenance) The following function is currently being used: <ul style="list-style-type: none"> • Upgrading the controller firmware in hot mode • Changing the Controlling CM of the RAID group • Adding the Controller Module (*1) • Setting the Deduplication/Compression mode (when enabling) • Setting the exclusive read cache size - Write Through (1CM) The storage system is operated with 1CM. (*2) <p>*1 : When reassigning the Controlling CM for the RAID group using all normal CMs including the added CM, the cache mode is temporarily changed to "Write Through Mode" during a configuration.</p> <p>*2 : This mode is displayed when "1CM Write Through" is enabled by using the [Setup Subsystem Parameters] function and the storage system is operated with 1CM (only 1CM can be used due to an error such as a CM failure). The "1CM Write Through" setting for the [Setup Subsystem Parameters] function is displayed and can be changed when logged in using a user account with the "Maintenance Operation" policy. The default value is "Disable".</p>
Connecting Module	<p>The CM that is connected to Web GUI is displayed.</p> <p>For the ETERNUS DX900 S5 or the ETERNUS DX8900 S4 CE#x CM#y</p> <p>For the other models CM#y</p> <p>x: CE number y: CM number</p>

Extension Function Information

Item	Description
Remote Support	<p>The remote support status (REMCS or AIS Connect) is displayed.</p> <ul style="list-style-type: none"> • Operating The remote support is operating. • Maintenance in Progress The ETERNUS DX is under maintenance and the remote support is temporarily stopped. After the maintenance is complete, remote support is automatically resumed. • Stopped The remote support is stopped. • "-" (hyphen) The remote support is not configured.
Unified Storage	<p>Whether the Unified Storage function is enabled or disabled is displayed.</p> <p>If the Unified Storage function is enabled, the storage system can be used as a Unified Storage system (a SAN and NAS system).</p> <p>For the ETERNUS DX60 S5, the ETERNUS DX900 S5, and the ETERNUS DX8100 S4/DX8900 S4, this item is not displayed.</p> <p>For the ETERNUS AF150 S3/AF250 S3/AF650 S3, "Disable" is displayed.</p> <div style="background-color: #f0f0f0; padding: 10px; margin-top: 10px;"> <p>Note</p> <ul style="list-style-type: none"> • When upgrading a SAN system to a Unified Storage system, after the unified firmware is applied to the active and inactive controllers, this item is changed to "Enable". </div>
Deduplication/ Compression	<p>Whether Deduplication/Compression for the storage system is enabled or disabled is displayed.</p> <p>This function is supported in the ETERNUS DX200 S5, the ETERNUS DX500 S5/DX600 S5/DX900 S5, the ETERNUS DX8900 S4, and the ETERNUS AF250 S3/AF650 S3. The ETERNUS DX8900 S4 supports Compression only.</p>
Storage Cluster	<p>If a license for the Storage Cluster function has already been registered, "Enable" is displayed. If the license is not registered, "Disable" is displayed.</p> <p>If this item is enabled, the total TFOV capacity per storage system (or the total capacity of volumes that are used for the Storage Cluster function in a storage system) is displayed in the "Enable (total TFOV capacity)" format.</p> <p>Note that Web GUI cannot be used to register a Storage Cluster license or to change the total TFOV capacity. To register the license, use ETERNUS SF Storage Cruiser. To change the total TFOV capacity, use CLI or ETERNUS SF Storage Cruiser (*1).</p> <p>For the ETERNUS DX60 S5, this item is not displayed.</p> <p>When the total TFOV capacity is expanded from the default capacity, the shared area in the cache memory is used. The default capacity of each model is as follows:</p> <ul style="list-style-type: none"> • For the ETERNUS DX100 S5: 256 TB • For the ETERNUS DX200 S5: 256 TB • For the ETERNUS DX500 S5: 384 TB • For the ETERNUS DX600 S5: 768 TB • For the ETERNUS DX900 S5: 1 PB • For the ETERNUS DX8900 S4: 1 PB • For the ETERNUS AF150 S3: 256 TB • For the ETERNUS AF250 S3: 256 TB • For the ETERNUS AF650 S3: 768 TB <p>*1: To change the total TFOV capacity with CLI, use the "max-tfo-capacity" parameter for the CLI command "set storage-cluster-license". To change the total TFOV capacity with ETERNUS SF Storage Cruiser, refer to the manuals provided with ETERNUS SF Storage Cruiser.</p>

8. System System

Item	Description
Virtual Volume	Whether the Virtual Volume function is enabled or disabled is displayed. The Virtual Volume function cannot be set with Web GUI. To set the Virtual Volume function, use ETERNUS SF Storage Cruiser. For the ETERNUS DX60 S5, this item is not displayed.
RESTful API	Whether the RESTful API function is enabled or disabled is displayed.

License Information

Item	Description
GS License	The registration status of the GS License is displayed. This item is available when logged in to the ETERNUS DX8100 S4/DX8900 S4 using a user account with the "Maintenance Operation" policy.
RFCF License	The registration status of the RFCF License is displayed. This item is displayed only when the "GS License" has been registered.
Non-disruptive Storage Migration License	The registration status of the Non-disruptive Storage Migration License is displayed. For the ETERNUS DX8100 S4, this item is not displayed.

Login User

Up to 96 sessions of user information for users who are logged in to the storage system from Web GUI, CLI, RESTful API, or SOFT (other software) are displayed in a list. The following shows the maximum number of sessions for each interface.

- Web GUI: Up to 16 sessions
- CLI (including SOFT): Up to 16 sessions
- Total number of sessions for RESTful API and Easy Administration View: Up to 64 sessions

For Web GUI, the users who are logged in to both the Master CM and Slave CM are displayed. For CLI, RESTful API, or SOFT (other software), the users who are logged in to the Master CM are displayed. Login user information is sorted according to interface (GUI → CLI → SOFT → REST), login date (ascending order), and session IDs (ascending order).

8. System System

Item	Description
Interface	<p>The interface type for users who are logged in is displayed.</p> <ul style="list-style-type: none"> • GUI The user logged in via Web GUI (Normal View). Otherwise, the user logged in via Web GUI (Normal View) from the AIS Connect server. • GUI2 The user logged in via Web GUI (Easy Administration View). Otherwise, the user logged in via Web GUI (Easy Administration View) from the AIS Connect server. • CLI The user logged in via CLI. Otherwise, the user logged in via CLI from the AIS Connect server. • SOFT The user logged in via software. "SOFT" is displayed for users in the following conditions: <ul style="list-style-type: none"> - Logged in from software with the default "Software" role via CLI - Logged in using SMI-S via software - Logged in from software using Dynamic LUN Mirroring (DLM) via CLI - Logged in using RESTful API JOB Agent (RJA) via RESTful API • REST The user logged in via RESTful API.
Session ID	<p>An identification number (0 to 1999999) for users who are logged in is displayed.</p> <p>A session ID is obtained for each login and released with each logout. Because the session ID is obtained discretely, the same session ID is not used even if the same user logs in again.</p> <p>The following shows the range of session IDs to be used.</p> <ul style="list-style-type: none"> • Web GUI (Normal View): 1 - 999 • CLI (including when the interface is "SOFT"): 10001 - 33999 • RESTful API and Easy Administration View: 1000001 - 1999999 <p>In a Unified Storage environment, Web GUI uses session IDs from 10001 onwards for internal processes in the same way as CLI. An "*" (asterisk) is added on top of the current user's (your) session ID.</p>
User ID	<p>The user name (user ID) for a user who is logged in is displayed. When the interface is "SOFT" (SMI-S/DLM/RJA [RESTful API JOB Agent]), the field is blank. The field is also blank for internal process sessions of Web GUI in a Unified Storage environment.</p>
Role	<p>The user role for a user who is logged in is displayed. A "-" (hyphen) is displayed for internal process sessions of Web GUI in a Unified Storage environment.</p> <p>Monitor Admin StorageAdmin AccountAdmin SecurityAdmin Maintainer Software Custom role</p>
Login Date	<p>The login date and time (YYYY-MM-DD hh:mm:ss) is displayed.</p>
Lock	<p>If a logged in user is updating data that is managed by the storage system, "Yes" is displayed. If a user is not updating data, "No" is displayed. When "Yes" is displayed for a user, other users with "No" displayed cannot update data. Note that multiple users cannot update data that is managed by the storage system at the same time. The storage system is exclusively used by a user who is updating the data. The exclusion is released when the updating is complete.</p>

Item	Description
IP Address	<p>The IP address for a user who is logged in is displayed. If an AIS Connect server is used to log in, "AIS Connect Server" is displayed. When the interface is "SOFT" (SMI-S/DLM/RJA [RESTful API JOB Agent]), the field is blank. The field is also blank for internal process sessions of Web GUI in a Unified Storage environment.</p> <p>For IPv4 address xxx.xxx.xxx.xxx xxx: 0 - 255 (decimal)</p> <p>For IPv6 address xxxx:xxxx:xxxx:xxxx:xxxx:xxxx:xxxx:xxxx xxxx: 0 - ffff (hexadecimal, "a" - "f" are lowercase letters) Refer to "IPv6 Address Notation" (page 659)" for details.</p>

Start/End Maintenance

Refer to "[Start/End Maintenance](#)" (page 950)" for details.

Initial Setup

- "[Overview](#)" (page 1156)
- "[User Privileges](#)" (page 1157)
- "[Initial Setup 1](#)" (page 1157)
 - "[Settings](#)" (page 1158)
 - "[Operating Procedures](#)" (page 1158)
- "[Initial Setup 2](#)" (page 1162)
 - "[Settings](#)" (page 1163)
 - "[Operating Procedures](#)" (page 1163)

■ Overview

This function performs the initial settings that must be set before operating the storage system on a series of wizard screens.

Initial Setup is divided into "Initial Setup 1" and "Initial Setup 2".

- Initial Setup 1
Performs the minimum settings required before using the storage system.
- Initial Setup 2
Makes the reporting settings for when an error occurs in the storage system. The settings can be omitted if the reporting function will not be used.

Caution

- If the browser is shut down during execution of Initial Setup, other functions will no longer be available. In this case, forcibly log in using the same user ID, and perform Initial Setup 1 again from the beginning. However, if you have already reached Initial Setup 2, the wizard is executed from the beginning of Initial Setup 2.
- The setting items varies depending on the login user role.
- If the message "Currently Network Configuration is set to factory default." is displayed in the system message field, the network environment settings for the MNT port must be performed. The following functions in Initial Setup 2 are not displayed until the network environment settings are complete.
 - Setup SNMP Agent Basic Interface
 - Setup SNMP Manager
 - Setup SNMP Agent MIB Access View
 - Setup SNMP Agent User
 - Setup SNMP Agent Community
 - Setup SNMP Agent Trap
 - Setup E-Mail Notification
 - Setup Syslog

Note

- The [Initial Setup 1] wizard is displayed when a user with the required policies for this setting performs the first login after installing the storage system. After the [Initial Setup 1] is complete and the user with the required policies logs in again, the [Initial Setup 2] wizard is displayed. For users without the required policies, the [Overview] screen is displayed at the first login.
- The settings made in the Initial Setup can be changed individually later.

■ **User Privileges**

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	✓
StorageAdmin	
AccountAdmin	
SecurityAdmin	✓
Maintainer	✓

Refer to ["A. User Roles and Policies" \(page 1580\)](#) for details on the policies and roles.

■ **Initial Setup 1**

The flow of wizard operations in Initial Setup 1 is shown below.

Procedure ▶▶▶

1 Set Storage System Name

This function registers the name, administrator, and the installation site of the storage system.

- 2** Change User Password
Change the password for the default account that is currently logged in before starting to use the storage system.
- 3** Set Thin Provisioning
If using the Thin Provisioning function, select "Enable" and set the maximum pool capacity.
- 4** Register Advanced Copy License
If using the Advanced Copy function, register the license here.
- 5** Register SED Authentication Key
Register the SED Authentication Key to enable encryption of the SEDs.
- 6** Setup Network Environment
Set the environment (such as IP address and subnet mask) for the storage system to communicate on the network.



Log out when the settings are complete. Log in again, and then proceed to ["Initial Setup 2" \(page 1162\)](#).

If SED has been installed before registering the SED authentication key, reboot the storage system before logging in again.

■ Settings

For the setting contents, refer to the details of each of the following functions.

Procedure ▶▶▶

- 1** ["Modify Storage System Name" \(page 1541\)](#)
- 2** ["Change User Password" \(page 1185\)](#)
- 3** ["Set Thin Provisioning" \(page 429\)](#)
- 4** ["Register Advanced Copy License" \(page 466\)](#)
- 5** ["Register SED Authentication Key" \(page 1571\)](#)
- 6** ["Setup Network Environment" \(page 1213\)](#)



■ Operating Procedures

Procedure ▶▶▶

- 1** Click [Initial Setup] in [Action].

Note

- The [Initial Setup] screen is displayed after logging in for the first time.

- 2** Click the [Next >>] button.
→ Initial Setup starts.
- 3** Proceed to [Set Storage System Name].
 - (1)** Specify the following items, and click the [Next >>] button.
 - Name (Required)

- Installation Location
- Administrator
- Description

→ A confirmation screen appears.

Caution

- An error screen appears in the following conditions:
 - The "Name" is not entered
 - A parameter that does not satisfy the input conditions exists

Note

- If not logging in for the first time, click the [Skip] button to proceed to the next screen without setting.

(2) Click the [OK] button.
→ Setting of the storage system name starts.

(3) Click the [Done] button.

4 Proceed to [Change User Password].

(1) Specify the following items, and click the [Next >>] button.

- Old Password
- New Password
- Confirm New Password

→ A confirmation screen appears.

Caution

- If a "number of days" or "Less than 24 hours" is displayed for the "Days To Password Change" field in "User Information", the password cannot be changed during that period.
- An error screen appears in the following conditions:
 - Each parameter is not entered
 - Each parameter fails to satisfy the input conditions
 - The old password is different from the current password
 - "New Password" does not match "Confirm New Password"
- The ETERNUS DX8100 S4 does not support the Thin Provisioning function. Click the [Done] button in the [Change User Password] screen to proceed to the [Register Advanced Copy License] screen.

Note

- If a date and time is displayed for the "Last Password Setting Date" field in "User Information", "Password Policy" for the relevant password is enabled. Check the "Password Policy" setting before changing the password. Refer to the [Modify User Policy] function for details.
- Click the [Skip] button to proceed to the next screen without setting.

(2) Click the [OK] button.
→ Changing of the user password starts.

(3) Click the [Done] button.

5 Proceed to [Set Thin Provisioning].

(1) Specify the following items, and click the [Next >>] button.

- Thin Provisioning (Enable/Disable)
- Maximum Pool Capacity

→ A confirmation screen appears.

Note

- Click the [Skip] button to proceed to the next screen without setting.

(2) Click the [OK] button.
→ The Thin Provisioning setting starts.

(3) Click the [Done] button.

6 Proceed to [Register Advanced Copy License].

(1) Specify the following items, and click the [Next >>] button.

- Registration Method (for the ETERNUS DX60 S5/DX100 S5/DX200 S5 and the ETERNUS AF150 S3/AF250 S3)
- License Key

→ A confirmation screen appears.

Caution

- Only when registering an Advanced Copy License (Full), the license key entry is required.
- If the entered license key does not satisfy the input conditions, an error screen appears.

Note

- When using ETERNUS SF AdvancedCopy Manager or ETERNUS SF Express, refer to the documents that are supplied with ETERNUS SF AdvancedCopy Manager or ETERNUS SF Express.
- If the Advanced Copy License (Full) is already registered, proceed to [Register SED Authentication Key].
- Click the [Skip] button to proceed to the next screen without setting.

(2) Click the [OK] button.
→ The Advanced Copy license registration is executed.

(3) Click the [Done] button.

7 Proceed to [Register SED Authentication Key].

(1) Click the [Next >>] button.

→ A confirmation screen appears.

Caution

- [Register SED Authentication Key] is displayed only when logged in using a user account with the "Security Setting" policy.

Note

- If the SED Authentication Key is already registered, proceed to [Setup Network Environment].

(2) Click the [OK] button.
→ SED Authentication Key registration starts.

(3) Click the [Done] button.

8 Proceed to [Setup Network Environment].

(1) Specify the following items, and click the [Next >>] button.

- Select Network Port
- LAN
- IPv4 Settings
- IPv6 Settings

→ A confirmation screen appears.

Caution

- Note the following points when specifying IP addresses (the connection IP address for IPv6) and subnet masks:
 - IP addresses must be specified with the IPv4 format or IPv6 format
 - The IP address of the RMT port must be in a different subnetwork from the MNT port
 - Specify the IP address of the Slave CM when connecting to the Slave CM. The IP address of the Slave CM must be in the same subnetwork as the Master CM.
 - Specify the IP address of "Gateway" when allowing access from outside of the subnetwork. The IP address must be in the same subnetwork as the port
 - For "Allowable IP Address", specify the IP address or the network address that is allowed to access to the storage system. These settings are not required for access from the network address (same subnetwork) which the storage system belongs to.

Note

- Click the [Skip] button to proceed to the next screen without setting.

(2) Click the [OK] button.
→ The network environment settings starts.

(3) Click the [Done] button.
→ A completed screen appears.

Caution

- Storage system management operation cannot be continued if the IP address of the storage system has been changed. Logging in again with the new IP address is required.

9 Click the [Close] button.
→ The browser is closed, and Initial Setup 1 is complete.

Note

- Follow the on-screen instructions to reboot the storage system if needed.
- Restart the browser, and wait a few minutes before logging into Web GUI again. After logging in again, continue with the initial setup. Proceed to Initial Setup 2.



■ **Initial Setup 2**

This function sets the various reports that are generated when an error occurs in the storage system. If monitoring the storage system, use this wizard to build an environment. The flow of wizard operations in Initial Setup 2 is shown below.

Note

- Some of the functions do not need to be set depending the SNMP version.

Procedure ▶▶▶

- 1** Set Date and Time
In this screen, specify the date/time and time zone (storage system location) of the internal clock in the storage system.
- 2** Setup SNMP Agent Basic Interface
This function sets up the SNMP Agent basic interface in the storage system.
- 3** Setup SNMP Manager
Specify the IP address of the SNMP Agent Manager.
- 4** Setup SNMP Agent MIB Access View
Set the MIB View of the SNMP Agent.
- 5** Setup SNMP Agent User
Set up the user which accesses the SNMP Agent.
The security level and the MIB access range are configured for each user.

Note

- This setting is not required to use SNMPv1 or SNMPv2c for SNMP communication.

- 6** Setup SNMP Agent Community
Set up the SNMP Agent Community.

Note

- This setting is not required to use SNMPv3 for SNMP communication.

- 7** Setup SNMP Agent Trap
Set up the environment to send notification of events that occur in the storage system to the SNMP Agent Manager by an SNMP Trap.
- 8** Setup E-Mail Notification
Set the E-mail notification for events that occur in the storage system.

- 9** Setup Syslog
This function sets up external servers (Syslog servers) for sending logs of events that are detected by the storage system.
-



■ Settings

For the setting contents, refer to the details of each of the following functions.

Procedure ▶▶▶

- 1 "Modify Date and Time" (page 1543)
 - 2 "Setup SNMP Agent Basic Interface" (page 1226)
 - 3 "Setup SNMP Manager" (page 1229)
 - 4 "Setup SNMP Agent MIB Access View" (page 1232)
 - 5 "Setup SNMP Agent User" (page 1235)
 - 6 "Setup SNMP Agent Community" (page 1238)
 - 7 "Setup SNMP Agent Trap" (page 1241)
 - 8 "Setup E-Mail Notification" (page 1247)
 - 9 "Setup Syslog" (page 1250)
-



■ Operating Procedures

Procedure ▶▶▶

- 1 Click [Initial Setup] in [Action].

Note

- When logging in again after Initial Setup 1 is complete, the [Initial Setup 2] screen appears.
- If all of the settings of Initial Setup 2 are not performed, click the [All Skip] button to exit the Initial Setup wizard.

- 2 Click the [Next >>] button.
→ Initial Setup restarts.
- 3 Proceed to [Set Date and Time].
 - (1) Specify the following items, and click the [Next >>] button.
 - Date/Time Settings
 - Time Zone Settings
 - Daylight Saving Time Settings
 - NTP Settings→ A confirmation screen appears.

Caution

- An error screen appears in the following conditions:
 - A non-existent date has been specified in the date/time settings
 - "By day of the week" is selected for the range of daylight saving time and the same day and time is entered for both the start day/time and the end day/time
 - "By Date" is selected for the range of daylight saving time and the same day and time is entered for both the start day/time and the end day/time
 - "By Date" is selected for the range of daylight saving time and a non-existent date is specified as the start date
 - "By Date" is selected for the range of daylight saving time and a non-existent date is specified as the end date
 - "Yes" is selected for "Synchronize with NTP Server" and the domain or the IP address is not entered for the primary NTP server
 - "Yes" is selected for "Synchronize with NTP Server" and the same domain or IP address is specified for the primary NTP server and the secondary NTP server
 - "Yes" is selected for "Synchronize with NTP Server", the LAN port that is used for the NTP server is "MNT", and the IPv4 address of the NTP server and the broadcast address of the MNT port are the same
 - "Yes" is selected for "Synchronize with NTP Server", the LAN port that is used for the NTP server is "RMT", and the IPv4 address of the NTP server and the broadcast address of the RMT port are the same
 - "Yes" is selected for "Synchronize with NTP Server" and one of the following conditions applies:
 - The IPv4 address for the NTP server and the local host address are the same
 - The IP address (IPv4 address or IPv6 address) for the NTP server and the network address are the same
 - The IP address (IPv4 address or IPv6 address) for the NTP server and the IP address for the MNT port are the same
 - The IP address (IPv4 address or IPv6 address) for the NTP server and the IP address for the RMT port are the same
 - The IP address (IPv4 address) for the NTP server and the IP address for the FST port are the same (for the ETERNUS DX500 S5/DX600 S5/DX900 S5, the ETERNUS DX8100 S4/DX8900 S4, and the ETERNUS AF650 S3)

Note

- When "By day of the week" is selected for the range of daylight saving time, "Last" can be selected to specify the start or end week.
- When "By Date" is selected for the range of daylight saving time, "Last Day" can be selected to specify the start or end date.
- Click the [Skip] button to proceed to the next screen without setting.

- (2)** Click the [OK] button.
→ Setting of the date and time starts.

Caution

- If "Yes" is selected for "Synchronize with NTP Server" when there is no NTP server connection or when communication with the NTP server is unstable, the required time for the date and time setting may take longer. Wait until the screen is updated. Even if a connection to the NTP server fails, the date and time setting appears to complete successfully. To confirm that the storage system is successfully connected to the NTP server, start the [Modify Date and Time] function and check "Access Status" in the "NTP Settings" field.

(3) Click the [Done] button.

4 Proceed to [Setup SNMP Agent Basic Interface].

(1) Specify the following items, and click the [Next >>] button.

- SNMP Function
- LAN Port used for SNMP
- Authentication Failure
- Engine ID
- MIB-II RFC Version

→ A confirmation screen appears.

Caution

- If the entered engine ID does not satisfy the input conditions, an error screen appears.

Note

- Click the [Skip] button to proceed to the next screen without setting.

(2) Click the [OK] button.
→ Setting of the SNMP Agent basic starts.

(3) Click the [Done] button.

5 Proceed to [Setup SNMP Manager].

(1) Click the [Add] button.

Caution

- If the "SNMP Function" is disabled, the [Setup SNMP Manager] function cannot be used.

Note

- Click the [Skip] button to proceed to the next screen without setting.

(2) Specify the following items, and click the [OK] button.

- IP Version
- Manager IP Address (IPv4)
- Manager IP Address (IPv6)

→ Returns to the original screen.

(3) Repeat Step 5-a and Step 5-b when registering multiple IP addresses.

- (4) When the IP addresses are set, click the [Next >>] button.
→ A confirmation screen appears.
- (5) Click the [OK] button.
→ The SNMP Manager setting starts.
- (6) Click the [Done] button.

6 Proceed to [Setup SNMP Agent MIB Access View].

- (1) Click the [Add] button.

Caution

- If the "SNMP Function" is disabled, the [Setup SNMP Agent MIB Access View] function cannot be used.

Note

- Click the [Skip] button to proceed to the next screen without setting.

- (2) Specify the following items, and click the [OK] button.
 - View Name
 - Subtree→ Returns to the original screen.
- (3) Repeat Step 6-a and Step 6-b to configure information for multiple MIB views.
- (4) When the setting of the MIB Access Views is complete, click the [Next>>] button.
→ A confirmation screen appears.
- (5) Click the [OK] button.
→ Setting of the SNMP Agent MIB Access View starts.
- (6) Click the [Done] button.

7 Proceed to [Setup SNMP Agent User].

- (1) Click the [Add] button.

Caution

- If the "SNMP Function" is disabled, the [Setup SNMP Agent User] function cannot be used.
- The [Setup SNMP Agent User] function must be set when using SNMPv3 in SNMP communication between the SNMP Agent and SNMP Agent Manager.

Note

- Click the [Skip] button to proceed to the next screen without setting.

- (2) Specify the following items, and click the [OK] button.
 - User Name
 - MIB View Setting
 - Authentication
 - Authentication Method
 - Authentication Password
 - Retype Authentication Password

- Encryption
 - Encryption Method
 - Encryption Password
 - Retype Encryption Password
- Returns to the original screen.

- (3) Repeat Step 7-a and Step 7-b to configure multiple user information.
- (4) When the setting of the user information is complete, click the [Next >>] button.
→ A confirmation screen appears.
- (5) Click the [OK] button.
→ The SNMP Agent User setting starts.
- (6) Click the [Done] button.

8 Proceed to [Setup SNMP Agent Community].

- (1) Click the [Add] button.

Caution

- If the "SNMP Function" is disabled, the [Setup SNMP Manager] function cannot be used.
- The [Setup SNMP Agent Community] function must be used when using SNMPv1 or SNMPv2c in SNMP communication between the SNMP Agent and SNMP Manager. The SNMP Community setting is not necessary when using SNMPv3 only.

Note

- Click the [Skip] button to proceed to the next screen without setting.

- (2) Specify the following items, and click the [OK] button.
 - Community Name
 - View Name
 - Allowed SNMP Manager List

→ Returns to the original screen.
- (3) Repeat Step 8-a and Step 8-b to configure multiple communities.
- (4) When the setting of the community is complete, click the [Next >>] button.
→ A confirmation screen appears.
- (5) Click the [OK] button.
→ The SNMP Agent Community setting starts.
- (6) Click the [Done] button.

9 Proceed to [Setup SNMP Agent Trap].

- (1) Click the [Add] button.

Caution

- If the "SNMP Function" is disabled, the [Setup SNMP Agent Trap] function cannot be used.

Note

- Click the [Skip] button to proceed to the next screen without setting.

(2) Specify the following items, and click the [OK] button.

- Manager No.
- SNMP Version
- Community Name
- User Name
- Port No.

→ Returns to the original screen.

(3) Repeat Step 9-a and Step 9-b to configure information for multiple traps.

(4) When the setting of the trap information is complete, click the [Next >>] button.

Caution

- An error screen appears in the following conditions:
 - "Manager No." or "Community Name/User Name" is not entered
 - A trap with the same parameters (except the "Trap No.") exists
 - A trap with the same parameters (except the "Trap No." and the "Port No.") exists

→ A confirmation screen appears.

(5) Click the [OK] button.

→ The SNMP Agent Trap setting starts.

(6) Click the [Done] button.

10 Proceed to [Setup E-Mail Notification].

(1) Specify the following items, and click the [Next >>] button.

- Notification E-Mail Settings
- Mail Server Settings

→ A confirmation screen appears.

Note

- Click the [Skip] button to proceed to the next screen without setting.

(2) Click the [OK] button.

→ The E-Mail Notification setting starts.

(3) Click the [Done] button.

11 Proceed to [Setup Syslog].

(1) Specify the following items, and click the [Next >>] button.

- Send Log
- Domain Name/IP Address
- Port No.
- LAN Port

→ A confirmation screen appears.

Note

- Click the [Skip] button to proceed to the next screen without setting.

- (2) Click the [OK] button.
→ Setting of the Syslog starts.

Caution

- An error screen appears if the specified IP address of the Syslog server conflicts with the internal IP address of the storage system.

- (3) Click the [Done] button.
→ A completed screen appears.

- 12 Click the [Finish] button.
→ Initial Setup 2 is complete, and the [System] screen appears.

Note

- For models other than the ETERNUS DX8100 S4/DX8900 S4, the [Start] screen of the "Smart Setup Wizard" is displayed after all of the [Initial Setup] operations (Initial Setup 1 and 2) are completed in the conditions described below.
 - The first login after installation of the storage system is complete
 - The [Initial Setup] is clicked in [Action] under the [System] screen.



Smart Setup Wizard

- ["■ Overview" \(page 1169\)](#)
- ["■ User Privileges" \(page 1171\)](#)
- ["■ Settings" \(page 1172\)](#)
- ["■ Operating Procedures" \(page 1182\)](#)

■ Overview

This function performs the initial settings required to operate the storage system on a series of wizard screens.

The workflow sequence of this wizard is described below.

Procedure ▶▶▶

- 1 Select Host
Select a host to connect to the storage system. Registering a new host is also available.
- 2 Select Volume
Select volumes to be assigned to the host. Creating new volumes is also available.
- 3 Set Host Affinity
Set host affinity between the selected host and volumes.



Caution

- The ETERNUS DX8100 S4 does not support this function.
- The volume type to be used as the host connection target is "TPV". If TPPs do not exist in models other than the ETERNUS DX8900 S4, a TPP is automatically created.
This wizard cannot be used to create volumes in RAID groups or to select arbitrary drives to configure TPPs. Use the dedicated functions provided by the storage system for these operations. Refer to the [Create Volume] function and the [Create Thin Provisioning Pool] function for details.
- Once this wizard starts, the storage system is occupied (locked state) until it is completed. Note that other users cannot update data that is managed by the storage system during this state.
- To register a new iSCSI host, advance login to the iSCSI port of the storage system from the host is required.
For more details, refer to "Configuration Guide -Server Connection- iSCSI" for each OS type.

Note

- This wizard is started by the following procedure.
 - For models other than the ETERNUS DX8900 S4, the [Start] screen of this wizard is displayed after all of the [Initial Setup] operations are completed. When the [Done] button is clicked after the operation is completed, the [System] screen appears.
 - Click [Smart Setup Wizard] in [Action] under the [System] navigation. When the [Done] button is clicked after the operation is completed, the wizard returns to the [System] screen.

Required Conditions for Using the Smart Setup Wizard

- The storage system and the host (server) must be connected
- The initial setup of the storage system must be completed. Refer to the [Initial Setup] function for details.
- The Thin Provisioning function is enabled
- An "FC", "iSCSI", or "SAS" host interface must be registered
- A CA port with a port mode of "CA" or "CA/RA" must exist
- A CA port without the host affinity setting or a CA port with the affinity mode enabled (On) must exist
- For the ETERNUS DX8900 S4, TPPs must be created
- If a TPP is not created in models other than the ETERNUS DX8900 S4, unused drives must be installed
The required number of drives is as follows:
 - For SSDs or SSD SEDs, five or more drives (except for the ETERNUS DX60 S5)
 - For other drives, seven or more drives
- The maximum number of volumes is not registered for each model

Operating Specification of the Smart Setup Wizard

The following shows the operating specification of the Smart Setup Wizard.

- If TPPs do not exist in models other than the ETERNUS DX8900 S4, a TPP is automatically created.
 - The priority for selecting drive types is as follows:
SSD > SSD SED > Online > Online SED > Nearline > Nearline SED
 - The RAID level and the number of drives for RAID groups that configure the TPP are as follows:

8. System System

Drive Type	RAID level	Number of drives
SSD / SSD SED (*1)	RAID5	Five or more
For other drives	RAID6	Seven or more

*1 : Supported by models other than the ETERNUS DX60 S5.

- The drives in the RAID groups that configure the TPP are as follows:
 - If the drive type is Online, Online SED, Nearline, or Nearline SED, the speed and capacity are the same
 - If the drive speeds are mixed, drives with a higher speed are given priority
 - If the drive capacities are mixed, drives with a larger capacity are given priority
- A Global Hot Spare is registered for each TPP.
- The same Deduplication/Compression setting as the Deduplication/Compression mode of the storage system is applied to the TPP.
- When this wizard is used, host affinity is automatically set by using the following hosts, ports, and LUN groups.
 - All hosts selected in the [Select Host] screen
 - All the CA ports registered in the storage system whose port mode is "CA" or "CA/RA" (If multiple types of CAs are installed in the storage system, the selected type of CA is used.)
 - The LUN groups to which all the volumes selected in the [Select Volume] screen belong
- The maximum number of connectable hosts (the maximum number of HBAs) per CA port is 256 (32 for the ETERNUS DX60 S5).
- The host response "Default" is assigned to the host.
- The "Name" entered in this wizard is only the host name. If new TPPs, volumes, and LUN groups are created, the name of the host is used.

Note

- If a host with the host affinity setting is selected, a volume (TPV) that is selected in this wizard is added to the existing LUN group. If a host without the host affinity setting is selected, a new LUN group is created.
- Note that this wizard does not create host groups or port groups. Host affinity is configured with the hosts, ports (all the CA ports or CA/RA ports of the selected CA type in the storage system), and LUN groups selected in this wizard.

■ User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	✓
StorageAdmin	
AccountAdmin	
SecurityAdmin	✓
Maintainer	✓

Refer to ["A. User Roles and Policies" \(page 1580\)](#) for details on the policies and roles.

■ Settings

[Start] Screen

Information for starting this wizard is displayed.

To use volumes other than "TPVs" as a host connection target, click the [Cancel] button to end this wizard.

[CA Type Selection] Screen

This screen appears only when multiple types of CAs are installed in the storage system.

CA Type Selection

Item	Description	Setting values
CA Type	Select a CA type to connect with the host. The types of CAs installed in the storage system are displayed.	FC iSCSI SAS The default value varies depending on the CA type installed in the storage system. The priority of the CA types is as follows: FC > iSCSI > SAS

[FC Connection Topology Selection] Screen

Select the connection topology of the FC port to connect with the host.

This screen is displayed only when the host affinity setting is not configured for the target port.

FC connection topology selection

Item	Description	Setting values
Connection	<p>Select the connection topology for the FC port from the "Fabric" or "FC-AL".</p> <ul style="list-style-type: none"> • Fabric A connection type that enables simultaneous communication among multiple nodes through a Fibre Channel switch. • FC-AL A connection type that connects multiple nodes in a loop. <div style="background-color: #fff9c4; padding: 10px; margin: 10px 0;"> <p>Caution</p> <ul style="list-style-type: none"> • Select "Fabric" for a direct connection when "Transfer Rate" is "16 Gbit/s" or more. Some destination Fibre Channel cards may require Fibre Channel switches. For details, refer to the Fibre Channel card specifications. • Select "FC-AL" for a direct connection when "Transfer Rate" is less than "16 Gbit/s". Note that there may be cases when "Fabric" must be selected depending on the Fibre Channel card of the connection destination. Refer to "Setting the To-Server Connection Type (Setting the FC Port Parameters)" in "Configuration Guide -Server Connection-" (*1) for details. <p>*1 : Configuration Guide -Server Connection- Fibre Channel/ ETERNUS AF series, ETERNUS DX200F All-Flash Arrays, ETERNUS DX S5/S4/S3 series Hybrid Storage Systems Settings</p> </div> <div style="background-color: #e0e0e0; padding: 10px; margin: 10px 0;"> <p>Note</p> <ul style="list-style-type: none"> • For parameters other than "Connection", the following values are specified for the FC port. <ul style="list-style-type: none"> - If "Connection" is "Fabric", the default FC port parameters are set. - If "Connection" is "FC-AL", the default FC port parameters are set for items other than the following. <ul style="list-style-type: none"> • "Automatic" for "Set Loop ID" • "Ascending" for "Loop ID" • FC port parameters are applied to all FC ports in the storage system (whose port mode is "CA" or "CA/RA"). </div>	Fabric FC-AL

[iSCSI Port IP Address Settings] Screen

Set the IP address of the iSCSI port to connect to the host.

This screen is displayed only when the host affinity setting is not configured for the target port.

iSCSI Port IP Address Setting

Item	Description	Setting values
New IP Address	<p>Enter a new IPv4 address of the iSCSI port.</p> <p>Caution</p> <ul style="list-style-type: none"> Use the IPv4 address for the iSCSI port. Note that the IPv6 address is not supported. <p>Note</p> <ul style="list-style-type: none"> Enter a "New IP Address" and click the [All Refresh] button to display the new IP address in "New IP Address" under the iSCSI port list. The new subnet mask is also displayed in "New Subnet Mask". <p>For the new IP address, the entered value is used as the starting address and the last three digits (xxx) are set in ascending order. For the new subnet mask, the same value as the current subnet mask is set. If the current subnet mask is not specified, "255.255.255.0" is set.</p>	<p>xxx.xxx.xxx.xxx</p> <p>xxx: 1 - 255 for the top field (decimal)</p> <p>xxx: 0 - 255 for other fields (decimal)</p> <p>Class must be A, B, or C.</p>

iSCSI Port List

Item	Description	Setting values
Port	<p>The location information of the iSCSI port is displayed.</p> <p>In the iSCSI port list, iSCSI ports without a default gateway address setting are displayed.</p> <p>For the ETERNUS DX900 S5 or the ETERNUS DX8900 S4 CE#x CM#y CA#z Port#w</p> <p>For the other models CM#y CA#z Port#w</p> <p>x: CE number y: CM number z: CA number w: Port number</p>	

8. System System

Item	Description	Setting values
New IP Address	<p>Enter a new IP address to change the current IP address.</p> <p>If the current IP address is not changed, this item remains a "-" (hyphen). If a value is not specified, the "Current IP Address" is set for the storage system.</p> <p>There are two methods available for setting a new IP address:</p> <ul style="list-style-type: none"> • Set new IP addresses in a single process Refer to Note for "New IP Address" in the "iSCSI Port IP Address Setting" field. • Set a new IP address individually Directly enter an IPv4 address of the iSCSI port. <p>Caution</p> <ul style="list-style-type: none"> • For the iSCSI port whose current IP address is not specified, the "New IP Address" setting is required. • Use the IPv4 address for the iSCSI port. Note that the IPv6 address is not supported. • IP addresses that are duplicated in the following manner cannot be specified: <ul style="list-style-type: none"> - There are multiple combinations of "New IP Address" and "New Subnet Mask" - For ports without a new IP address setting, the combination of "Current IP Address" and "Current Subnet Mask" is the same as that of "New IP Address" and "New Subnet Mask" 	<p>xxx.xxx.xxx.xxx</p> <p>xxx: 1 - 255 for the top field (decimal)</p> <p>xxx: 0 - 255 for other fields (decimal)</p> <p>Class must be A, B, or C.</p> <p>"-" (hyphen)</p>
New Subnet Mask	<p>Enter a new subnet mask to change the current subnet mask.</p> <p>If the current subnet mask is not changed, this item remains a "-" (hyphen). If a value is not specified, the "Current Subnet Mask" is set for the storage system.</p> <p>There are two methods available for setting a new subnet mask:</p> <ul style="list-style-type: none"> • Set a new subnet mask when setting the new IP address Refer to Note for "New IP Address" in the "iSCSI Port IP Address Setting" field. • Set a new subnet mask individually Directly enter a subnet mask of the iSCSI port. <p>Caution</p> <ul style="list-style-type: none"> • For the iSCSI port whose current subnet mask is not specified, the "New Subnet Mask" setting is required. 	<p>Numeric characters</p> <p>255.0.0.0 - 255.255.255.252</p> <p>"-" (hyphen)</p>
Current IP Address	<p>The current IP address of the iSCSI port is displayed.</p> <p>If the current IP address is not specified, a "-" (hyphen) is displayed.</p>	
Subnet Mask	<p>The current subnet (255.0.0.0 to 255.255.255.252) mask of the iSCSI port is displayed.</p> <p>If the current subnet mask is not specified, a "-" (hyphen) is displayed.</p>	
iSCSI Name	<p>The iSCSI name of the iSCSI port (up to 223 alphanumeric characters) is displayed.</p>	

[Register Host] Screen

A list of the hosts that have not been registered in the storage system is displayed. In this screen, register hosts.

Select Host

Item	Description
Checkbox to select a host	<p>Select the checkbox of the host that is to be registered in the storage system.</p> <div style="background-color: #fff9c4; padding: 10px; border: 1px solid #ccc;"> <p>Caution</p> <ul style="list-style-type: none"> Up to 500 hosts (*1) can be registered with this wizard. If 300 hosts have already been registered, 200 hosts can be added. <p>*1: Total of all hosts, regardless of the interface type. For the ETERNUS DX60 S5, the maximum number of hosts is 128.</p> </div>
WWN	<p>The WWN of the host is displayed.</p> <p>This item is displayed when the CA type is "FC" or "SAS".</p> <p>In this wizard, "SAS Address" is referred to as "WWN".</p>
iSCSI Name	<p>The iSCSI name of the host is displayed.</p> <p>This item is displayed when the CA type is "iSCSI".</p>

Setting Host NickName

Item	Description	Setting values
Name	<p>Enter the name of the host that is to be registered in the storage system.</p> <p>An existing host name cannot be specified.</p>	<p>Up to 16 alphanumeric characters, symbols (except "," (comma) and "?"), and spaces</p> <p>Note that "%" cannot be used as the first character.</p> <p>Refer to "Naming Conventions for Registering Hosts" (page 1176) for details.</p> <p>Default:</p> <ul style="list-style-type: none"> For FC host, "FC" For iSCSI host, "iSCSI" For SAS host, "SAS"

Naming Conventions for Registering Hosts

- A name is automatically added to a host with the "Name" and a suffix number "x" (decimal serial numbers starting with "0").
(Example 1) When "Name" is "FC" and a single host is selected → Example host name is "FC0"
(Example 2) When "Name" is "FC" and two hosts are selected → Example host names are "FC0" and "FC1"
- When the host name including the suffix number "x" has more than 16 characters, the excess number of characters is deleted from the "host name", starting with the last character and a suffix number "~x" will be added. Then, the name will contain only 16 characters.
(Example) When "Name" is "FC_HOST_ABCDEFGH" (16 characters) and two hosts are selected → Example host names are "FC_HOST_ABCDEF~0" and "FC_HOST_ABCDEF~1".
- When a host name including the suffix number already exists, the suffix number is increased by one (+1). The suffix number is increased by one (+1) until no host names overlap.

[Select Host] Screen

A list of the registered hosts in the storage system is displayed. In this screen, select a host to which to assign volumes.

Host Selection

Item	Description	Setting values
Checkbox to select a host	<p>Select a host to which to assign volumes. The following hosts can be selected.</p> <ul style="list-style-type: none"> • Hosts that are registered with this wizard • Hosts that are already registered in the storage system, but host affinity is not set • Hosts that are already registered in the storage system and host affinity is set, but are connected to only one LUN group <p>Note</p> <ul style="list-style-type: none"> • The hosts selected in this item are connected to all the ports. Up to 256 hosts can be selected (up to 32 hosts can be selected for the ETERNUS DX60 S5). • Hosts that are registered with this wizard are automatically selected. • If a host in the "Active" state is selected, hosts with the host affinity setting for the same LUN group are automatically selected. • If a host in the "Active" state is selected, hosts with the host affinity setting for a different LUN group cannot be selected. • The "Select All" checkbox on the top left is not displayed. • The following hosts with the host affinity setting cannot be selected. Checkbox cannot be selected. <ul style="list-style-type: none"> - Hosts that are connected to multiple LUN groups - Other hosts that are connected to LUN groups that cannot be selected - Hosts that are connected to LUN groups that use LUN#256 onward 	<p>Checkbox Selected Cleared</p>
Name	The name of the host is displayed.	
WWN	The WWN of the host is displayed. This item is displayed when the CA type is "FC" or "SAS".	
iSCSI Name	The iSCSI name of the host is displayed. This item is displayed when the CA type is "iSCSI".	
Status	<p>Whether the host is used ("Active") or not used ("Inactive") for the host affinity setting is displayed.</p> <ul style="list-style-type: none"> • Active The host is used for the host affinity setting. • Inactive The host is not used for the host affinity setting. 	
LUN Group	The name of the LUN group to which the volumes with the host affinity setting belong is displayed. If there are no LUN groups with the host affinity setting, the field is blank.	

[Register Volume] Screen

Register volumes that are to be connected to the host.

New Volume

Item	Description	Setting values
Capacity	<p>Enter the capacity of the volume to be created and select the unit of capacity. Up to a 15-digit number including the "." (decimal point) can be input. Note that when "MB" is selected, the specified value is rounded down to the nearest whole number. When "GB" or "TB" is selected, the specified value is converted to "MB" and rounded down to the nearest whole number.</p> <p>Note</p> <ul style="list-style-type: none"> The number of entered characters includes the "." (decimal point) and the "0" before the decimal point. (Example) 0.1234567890123 (15 characters) 	<p>24 MB - 128 TB (numeric characters) Unit: TB/GB/MB</p>
Number of Volumes	<p>Specify the number of volumes to be created. [The maximum number of volumes that can be created for each model]</p> <ul style="list-style-type: none"> ETERNUS DX60 S5: 1024 ETERNUS DX100 S5: 4096 ETERNUS DX200 S5: 8192 ETERNUS DX500 S5/DX600 S5: 16384 ETERNUS DX900 S5: 65535 ETERNUS DX8900 S4: 65535 ETERNUS AF150 S3: 4096 ETERNUS AF250 S3: 8192 ETERNUS AF650 S3: 16384 <p>Note</p> <ul style="list-style-type: none"> For the ETERNUS DX900 S5 or the ETERNUS DX8900 S4, up to 1024 volumes can be created at a time. Note that this limitation does not apply to other models. 	<p>ETERNUS DX60 S5: 1 - 1024</p> <p>ETERNUS DX100 S5: 1 - 4096</p> <p>ETERNUS DX200 S5: 1 - 8192</p> <p>ETERNUS DX500 S5/DX600 S5: 1 - 16384</p> <p>ETERNUS DX900 S5: 1 - 1024</p> <p>ETERNUS DX8900 S4: 1 - 1024</p> <p>ETERNUS AF150 S3: 1 - 4096</p> <p>ETERNUS AF250 S3: 1 - 8192</p> <p>ETERNUS AF650 S3: 1 - 16384</p> <p>1 (Default)</p>

Item	Description
Radio buttons to select a TPP	Select a TPP to create the volume.
Thin Provisioning Pool Name	The TPP name is displayed.

8. System System

Item	Description
Drive Type	<p>The type of drive that configures the TPP is displayed.</p> <p>If multiple drive types are used in the TPP, the drive type is displayed as described below.</p> <ul style="list-style-type: none"> • If only "Online" type drives are used or if both "Online" and "Nearline" type drives are used, "Online" is displayed. • If only "Online SED" type drives are used or if both "Online SED" and "Nearline SED" type drives are used, "Online SED" is displayed. • If a single SSD type (SSD-H/SSD-M/SSD-L) is used or if multiple SSD types (SSD-H/SSD-M/SSD-L) are used, "SSD" is displayed. • If a single SSD type (SSD-H SED/SSD-M SED/SSD-L SED) is used or if multiple SSD types (SSD-H SED/SSD-M SED/SSD-L SED) are used, "SSD SED" is displayed. <p> Online Nearline SSD Online SED Nearline SED SSD SED </p>
Total Capacity	The total capacity [PB/TB/GB] of TPP is displayed.
Total Free Capacity	The total capacity [PB/TB/GB/MB] of free space in the TPP is displayed.
Provisioned Capacity	The total logical capacity [PB/TB/GB/MB] of TPVs in the TPP is displayed.

Deduplication/Compression Status of the Created Volumes

The Deduplication/Compression status of the volumes to be created varies depending on the Deduplication/Compression setting of the selected TPP.

Deduplication/Compression setting for the destination TPP		Volumes that are to be created
Deduplication	Compression	
Enable	Enable	Deduplication/Compression Volumes where both Deduplication and Compression are enabled
Enable	Disable	Deduplication/Compression Volumes where only Deduplication is enabled
Disable	Enable	Deduplication/Compression Volumes where only Compression is enabled
Disable	Disable	TPVs for SAN where both Deduplication and Compression are disabled

[Select Volume] Screen

Select volumes to be assigned to the host.

Volume Selection

Item	Description
Checkbox to select a volume	<p>Select the checkbox for the volume that is to be assigned to the host.</p> <p>Only TPVs that can be registered in LUN groups are displayed in the volume list.</p> <p>The checkboxes for the volumes with the following conditions are selected (specified as a registration target volume in the LUN group) by default. If these volumes are not registered in the LUN group, clear the checkbox.</p> <ul style="list-style-type: none"> • Volumes that are created with this wizard • Volumes that are registered in the LUN group where host affinity is set with the host selected in the [Select Host] screen <p>Note</p> <ul style="list-style-type: none"> • Up to 256 volumes can be selected. This is the number of volumes that can be registered in a single LUN group.
No.	The volume number is displayed.
Name	The volume name is displayed.
Capacity	The volume capacity (24 MB to 128 TB) is displayed.
Host LUN Setting	<p>If the volume is already assigned to the host LUN (or the volume is already registered in the LUN group), "Enable" is displayed.</p> <p>If the volume is not assigned to the host LUN, the field is blank.</p>
Current Host LUN	<p>If the volume is currently assigned to the host LUN, the host LUN is displayed.</p> <p>If the volume is not currently assigned to the host LUN, the field is blank.</p>
New	<p>For volumes created with this wizard, "Yes" is displayed.</p> <p>For volumes not created with this wizard, the field is blank.</p>

[Check Automatic TPP Creation] Screen

Configuration of the TPP that is automatically created in the storage system is displayed.

Thin Provisioning Pool Configuration

Item	Description
Number	<p>The TPP number is displayed.</p> <p>A TPP number is allocated from the smallest unused decimal number in ascending order.</p>
Name	<p>The TPP name is displayed.</p> <p>The name specified in the "[Register Host] Screen" (page 1175) is used as the TPP name.</p>
Drive Type	<p>The type of drive that configures the TPP is displayed.</p> <p>The priority for selecting drive types is as follows: SSD > SSD SED > Online > Online SED > Nearline > Nearline SED</p> <p>The drive type is determined based on whether the following number of unused drives is available for the relevant drive type.</p> <ul style="list-style-type: none"> • For SSDs or SSD SEDs, 5 to 48 drives • For other drives, 7 to 48 drives (for the ETERNUS DX60 S5, 7 to 24 drives) <p>Online Nearline SSD Online SED Nearline SED SSD SED</p>

8. System System

Item	Description
Total Capacity	<p>The total capacity [PB/TB/GB] of TPP is displayed.</p> <p>This item shows the total capacity of the TPP when the following RAID groups are configured with the selected drive.</p> <ul style="list-style-type: none"> • For SSDs or SSD SEDs, RAID5 • For other drives, RAID6 <p>If the total capacity of the created TPP reaches the maximum pool capacity of the storage system, the total capacity is recalculated after one drive is removed from the configuration.</p>
Number of Drives	<p>The number of drives that are used for the automatic TPP creation is displayed.</p> <p>Number of Drives = Number of drives that configure the TPP + One Global Hot Spare</p>
Deduplication/ Compression	<p>If Deduplication/Compression of the storage system is enabled, Deduplication/Compression is also enabled for the TPP that is to be created.</p> <p>If Deduplication/Compression of the storage system is disabled, Deduplication/Compression is also disabled for the TPP that is to be created.</p>

[Review Summary] Screen

The settings that are specified in this wizard are displayed. Confirm the setting contents.

Selected Host

Item	Description
Name	The name of the host where host affinity is set is displayed.
WWN	The WWN of the host where host affinity is set is displayed. This item is displayed when the CA type is "FC" or "SAS".
iSCSI Name	The iSCSI name of the host where host affinity is set is displayed. This item is displayed when the CA type is "iSCSI".

Selected Volume (LUN Group: LUN Group Name [Create]) (*1)/Selected Volume (LUN Group: LUN Group Name [Modify]) (*2)

Item	Description
No.	The volume number is displayed.
Name	The volume name is displayed.
Capacity	The volume capacity (24 MB to 128 TB) is displayed.
Current Host LUN	<p>If the volume is currently assigned to the host LUN, the host LUN is displayed.</p> <p>If the volume is not currently assigned to the host LUN (or the volume is created with this wizard), the field is blank.</p>
New Host LUN	<p>For volumes that are created with this wizard, the host LUN that is to be assigned to the volume is displayed.</p> <p>If the volume is currently assigned to the host LUN, the field is blank.</p> <p>If the volume is currently assigned to the host LUN, but the volume is deleted from the LUN group using the [Select Volume] screen, "Remove" is displayed.</p>

*1 : If only unused hosts without the host affinity setting are selected, the [Create] screen appears.

*2 : If at least one host with the host affinity setting is selected, the [Modify] screen appears.

■ Operating Procedures

Procedure ▶▶▶

- 1 Click [Smart Setup Wizard] in [Action].
→ The "[Start] Screen" (page 1172) appears.
- 2 Click the [Next >>] button.
→ The next screen varies depending on whether multiple types of CAs are installed in the storage system.
 - This screen appears only when multiple types of CAs are installed in the storage system.
→ The "[CA Type Selection] Screen" (page 1172) appears.
 - If only "FC" type CAs are installed
The next screen varies depending on whether host affinity is set.
 - If host affinity is set
→ The "[Select Host] Screen" (page 1176) appears. Proceed to Step 7.
 - If host affinity is not set
→ The "[FC Connection Topology Selection] Screen" (page 1172) appears. Proceed to Step 4.
 - If only "iSCSI" type CAs are installed
The next screen varies depending on whether host affinity is set.
 - If host affinity is set
→ The "[Select Host] Screen" (page 1176) appears. Proceed to Step 7.
 - If host affinity is not set
→ The "[iSCSI Port IP Address Settings] Screen" (page 1173) appears. Proceed to Step 5.
 - If only "SAS" type CAs are installed
The next screen varies depending on whether hosts are registered.
 - If hosts are registered in the storage system
→ The "[Select Host] Screen" (page 1176) appears. Proceed to Step 7.
 - If hosts are not registered in the storage system
→ The "[Register Host] Screen" (page 1175) appears. Proceed to Step b under "When selecting by registering a new host in the storage system" of Step 7.

Caution

- If the requirements for using this wizard are not all satisfied, the [Next >>] button cannot be clicked. Refer to "'Required Conditions for Using the Smart Setup Wizard" (page 1170)" for details.

- 3 Select a CA type and click the [OK] button.
→ The displayed screen varies depending on the CA type.
 - If "FC" is selected
The next screen varies depending on whether host affinity is set.
 - If host affinity is set
→ The "[Select Host] Screen" (page 1176) appears. Proceed to Step 7.
 - If host affinity is not set
→ The "[FC Connection Topology Selection] Screen" (page 1172) appears.
 - If "iSCSI" is selected
The next screen varies depending on whether host affinity is set.
 - If host affinity is set
→ The "[Select Host] Screen" (page 1176) appears. Proceed to Step 7.

- If host affinity is not set
→ The "[iSCSI Port IP Address Settings] Screen" (page 1173) appears. Proceed to Step 5.
- If "SAS" is selected
The next screen varies depending on whether hosts are registered.
 - If hosts are registered in the storage system
→ The "[Select Host] Screen" (page 1176) appears. Proceed to Step 7.
 - If hosts are not registered in the storage system
→ The "[Register Host] Screen" (page 1175) appears. Proceed to Step b under "When selecting by registering a new host in the storage system" of Step 7.

4 Select a connection topology of the FC port and click the [OK] button.
→ The "[Select Host] Screen" (page 1176) appears. Proceed to Step 7.

5 Set the IP address and the subnet mask of the iSCSI port to connect to the host.
Check the "Current IP Address" and the "Current Subnet Mask" in the iSCSI port list. The following procedure varies depending on whether the "Current IP Address" and the "Current Subnet Mask" are used.

- If the "Current IP Address" and the "Current Subnet Mask" are to be used as is, click the [Cancel] button.
→ The "[Select Host] Screen" (page 1176) appears. Proceed to Step 7.
- If either or both of "Current IP Address" and "Current Subnet Mask" are not used, perform one of the following procedures.
 - To set "New IP Address" and "New Subnet Mask" with a single operation, enter a "New IP Address" and click the [All Refresh] button in the "iSCSI Port IP Address Setting" field.
→ New IP addresses and subnet masks are set for the number of ports in "New IP Address" and "New Subnet Mask" of the iSCSI port list.
 - To individually set a "New IP Address" or a "New Subnet Mask", directly enter an IP address or a subnet mask for each port.

6 Click the [OK] button.
→ The "[Select Host] Screen" (page 1176) appears.

7 Select a host to which to assign volumes.

Note

- If the [<< Back] button is clicked in the "[Select Host] Screen" (page 1176), the wizard returns to the "[Start] Screen" (page 1172). The configuration for the storage system remains.
- When selecting by registering a new host in the storage system
 - (1) Click the [Register] button.
→ The "[Register Host] Screen" (page 1175) appears.
 - (2) Select a host to register in the storage system, enter a nickname, and click the [OK] button.
→ The "[Select Host] Screen" (page 1176) appears. Proceed to "When selecting from the host list" in Step 7.

Caution

- If the host to be registered is not displayed in the host selection list, perform the following procedure and then click the [Refresh] button.
 - Make sure that there is no error in the connection environment, such as the connection between the host and the switch, and the CA port settings of the storage system.
 - For iSCSI hosts, check whether the login operation has been completed. For more details, refer to "Configuration Guide -Server Connection- iSCSI" for each OS type.

Note

- The "Name" entered in this screen is used not only for the host name, but also for the new TPP name, volume name, and LUN group name.

- When selecting from the host list

(1) Select a host from the host list and click the [Next >>] button.

→ The next screen varies depending on whether TPPs are registered in the storage system.

- If TPPs are registered and volumes are created

→ The "[Select Volume] Screen" (page 1179) appears. Proceed to Step 10.

- If TPPs are registered but no volumes are created

→ The "[Register Volume] Screen" (page 1177) appears. Proceed to Step 9.

- If no TPPs are registered

→ The "[Check Automatic TPP Creation] Screen" (page 1180) appears.

8 Check the TPP configuration to be registered in the storage system and click the [OK] button.

→ The "[Register Volume] Screen" (page 1177) appears.

Note

- The configuration of the TPPs to be registered in the storage system is displayed in the "Thin Provisioning Pool Configuration" field. Refer to "[Check Automatic TPP Creation] Screen" (page 1180) for details.
- If a drive that is not in the normal state exists in the storage system, the operation cannot be continued. Click the [Cancel] button to end this wizard. After repairing the drive, re-execute this wizard.
- To change the TPP configuration or the Deduplication/Compression setting, click the [Cancel] button to end this wizard.

9 Enter the volume capacity and number of volumes to be created, and then click the [OK] button.

→ The "[Select Volume] Screen" (page 1179) appears.

Note

- The name specified in the "[Register Host] Screen" (page 1175) is used as the volume name.

10 Select a volume to assign to the host and click the [Next >>] button.

→ The "[Review Summary] Screen" (page 1181) appears.

Note

- When adding a new volume, click the [Add] button. The "[Register Volume] Screen" (page 1177) appears. Proceed to Step 10.
- If the [<< Back] button is clicked in the "[Select Volume] Screen" (page 1179), the wizard returns to "[Select Host] Screen" (page 1176). The configuration for the storage system remains.

11 Check the setting contents and click the [Next >>] button.
→ A confirmation screen appears.

12 Click the [OK] button.
→ The modification of the host affinity starts.

Note

- Host affinity is set with the configuration displayed in the "[Review Summary] Screen" (page 1181).
 - A new LUN group is created with the volumes displayed in "Selected Volume (LUN Group: LUN Group Name [Create])".
The name specified in the "[Register Host] Screen" (page 1175) is used as the LUN group name.
 - The existing LUN group is changed with the volumes displayed in "Selected Volume (LUN Group: LUN Group Name [Modify])".
 - Configure host affinity using the selected host, all the CA ports or CA/RA ports of the selected CA type, and the LUN groups.
- The specified paths between the hosts and ports can be edited. Refer to the [Modify Host Affinity] function for details.

13 Click the [Done] button to return to the [System] screen.

Note

- Confirm that the volume assigned with this wizard can be successfully accessed from the host.
- To assign volumes to other hosts, click the [Restart] button to re-execute this wizard.



Change User Password

- "■ Overview" (page 1185)
- "■ User Privileges" (page 1186)
- "■ Display Contents" (page 1186)
- "■ Settings" (page 1187)
- "■ Operating Procedures" (page 1189)

■ Overview

This function changes the current user's (your) password.

Caution

- When RADIUS Authentication is used for login, the password cannot be changed.
- If a "number of days" or "Less than 24 hours" is displayed for the "Days To Password Change" field in "User Information", the password cannot be changed during that period.

Note

- If a date and time is displayed for the "Last Password Setting Date" field in "User Information", "Password Policy" for the relevant user account is enabled. Check the "Password Policy" setting before changing the password. Refer to the [Modify User Policy] function for details.

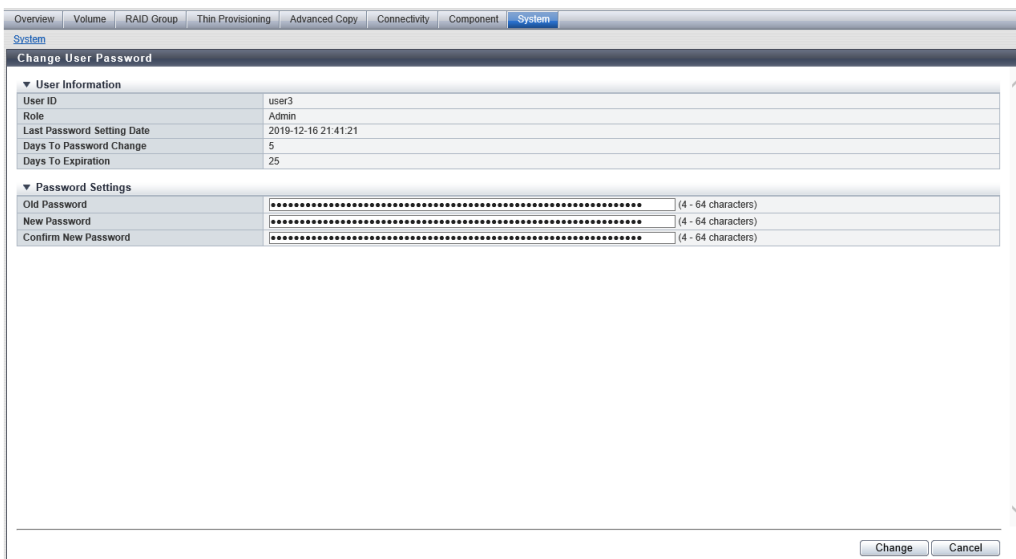
■ **User Privileges**

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	✓
Admin	✓
StorageAdmin	✓
AccountAdmin	✓
SecurityAdmin	✓
Maintainer	✓

Refer to ["A. User Roles and Policies" \(page 1580\)](#) for details on the policies and roles.

■ **Display Contents**



User Information

Item	Description
User ID	The ID of the current user is displayed.

8. System System

Item	Description
Role	Current user's (your) user role is displayed. Monitor Admin StorageAdmin AccountAdmin SecurityAdmin Maintainer Software Custom role
Last Password Setting Date	The date and time (YYYY-MM-DD hh:mm:ss) when the password was last changed is displayed. For user accounts with any of the following conditions, a "-" (hyphen) is displayed. <ul style="list-style-type: none"> User accounts with the "Password Policy" setting disabled User accounts with the "Password Policy" setting enabled, but "0 (Unrestricted)" is specified for the "Minimum Password Age" and the "Maximum Password Age" settings with the [Modify User Policy] function. User accounts registered with the "Password Policy" setting disabled. The setting is enabled later on but the password has not been changed yet.
Days To Password Change	The period in which the password becomes changeable from the current time is displayed with the "number of days", "Less than 24 hours", or "Changeable". This item displays the current state determined according to the "Minimum Password Age" (which can be configured in the "Password Policy" field of the [Modify User Policy] function) from "Last Password Setting Date". For example, if "Last Password Setting Date" is "2019-01-10 12:00:00" and the "Minimum Password Age" setting is "10", the following values are displayed. <ul style="list-style-type: none"> When the current date is January 15th, "5" is displayed (five days left until the password becomes changeable). When the current date is January 20th, "Less than 24 hours" is displayed (the password becomes changeable within 24 hours). When the current date is January 25th, "Changeable" is displayed. If a "-" (hyphen) is displayed for "Last Password Setting Date", a "-" (hyphen) is also displayed for this item.
Days To Expiration	The available period of the password from the current time is displayed with the "number of days", "Less than 24 hours", or "Expired". This item displays the current state determined according to the "Maximum Password Age" (which can be configured in the "Password Policy" field of the [Modify User Policy] function) from "Last Password Setting Date". For example, if "Last Password Setting Date" is "2019-01-10 12:00:00" and the "Maximum Password Age" setting is "30", the following values are displayed. <ul style="list-style-type: none"> When the current date is January 15th, "25" is displayed (the password is available for 25 days). When the current date is February 9th, "Less than 24 hours" is displayed (the password expires within 24 hours). When the current date is February 10th, "Expired" is displayed. If a "-" (hyphen) is displayed for "Last Password Setting Date", a "-" (hyphen) is also displayed for this item.

■ Settings

Password Settings

In this screen, change the current user's (your) password.

Item	Description	Setting values
Old Password	Input the current password.	4 - 64 alphanumeric characters and symbols (!, ", #, \$, %, &, ', (,), *, +, ,, -, ., /, @, [, \,], ^, _ {, , }, ~, ;, <, =, >, ?)

8. System System

Item	Description	Setting values
<p>New Password</p>	<p>Input a new password. Entered letters are case-sensitive. If "Password Policy" for the target user account is enabled, the following input conditions are added according to the configuration with the [Modify User Policy] function.</p> <ul style="list-style-type: none"> • Minimum Password Length • Password Complexity • Password History <div style="background-color: #fff9c4; padding: 10px; margin: 10px 0;"> <p>Caution</p> <ul style="list-style-type: none"> • Passwords must be changed if "Expired" is displayed for the "Days To Expiration" field in "User Information". • Passwords can be changed if "Changeable" is displayed for the "Days To Password Change" field in "User Information". • An error screen appears if the password does not satisfy the input conditions for changing passwords. Refer to the [Modify User Policy] function for details. The following shows procedures corresponding to each error. <ul style="list-style-type: none"> - If "Minimum Password Length" is not satisfied The entered password is less than the required number of characters. Check the minimum length ("x") displayed in the "x - 64" format to the right of the password input field. - If "Password Complexity" is not satisfied The required character types have not been used in the entered password. At least three of the following character types must be used; "uppercase letters", "lowercase letters", "numeric characters", and "symbols". - If "Password History" is not satisfied The entered password does not meet the reuse condition. The same password that was previously set (between the latest and the specified number of generations) cannot be used. Set a different password. </div> <div style="background-color: #e0e0e0; padding: 10px; margin: 10px 0;"> <p>Note</p> <ul style="list-style-type: none"> • Refer to the "Password Policy" settings in advance for details about "Password Complexity" and "Password History". Refer to the [Modify User Policy] function for details. </div>	<p>For user accounts in which "Password Policy" is disabled</p> <ul style="list-style-type: none"> • Number of characters 4 - 64 • Type of characters Alphanumeric characters and symbols (!, "", #, \$, %, &, ", ' (,), *, +, ,, -, ., /, '@, [, \,], ^, _ , ` , {, , }, ~, ~, ~, <, =, >, ?) <p>For user accounts in which "Password Policy" is enabled</p> <ul style="list-style-type: none"> • When "Password Complexity" is enabled <ul style="list-style-type: none"> - Number of characters "Minimum password length" to 64 (minimum password length: 4 - 64) - Type of characters At least three of the following character types must be used. <ul style="list-style-type: none"> • Uppercase letters (A - Z) • Lowercase letters (a - z) • Numeric characters (0 - 9) • Symbols (!, "", #, \$, %, &, ", ' (,), *, +, ,, -, ., /, '@, [, \,], ^, _ , ` , {, , }, ~, ~, ~, <, =, >, ?) • When "Password Complexity" is disabled <ul style="list-style-type: none"> - Number of characters "Minimum password length" to 64 (minimum password length: 4 - 64) - Type of characters Alphanumeric characters and symbols (!, "", #, \$, %, &, ", ' (,), *, +, ,, -, ., /, '@, [, \,], ^, _ , ` , {, , }, ~, ~, ~, <, =, >, ?)
<p>Confirm New Password</p>	<p>Input the same character string as the value entered in the "New Password" field for confirmation.</p>	<p>Same character string as the new password</p>

■ Operating Procedures

Procedure ▶▶▶

- 1 Click [Change User Password] in [Action].
- 2 Specify the parameters, and click the [Modify] button.
→ A confirmation screen appears.

Caution

- An error screen appears in the following conditions:
 - Each parameter is not entered
 - Each parameter fails to satisfy the input conditions
 - The old password is different from the current password
 - "New Password" does not match "Confirm New Password"

- 3 Click the [OK] button.
→ Changing of the user password starts.
 - 4 Click the [Done] button to return to the [System] screen.
-



Set SSH Public Key

- ["■ Overview" \(page 1189\)](#)
- ["■ User Privileges" \(page 1189\)](#)
- ["■ Display Contents" \(page 1190\)](#)
- ["■ Settings" \(page 1190\)](#)
- ["■ Operating Procedures" \(page 1191\)](#)

■ Overview

This function registers, changes, or deletes the current user's (your) SSH client public key.

Caution

- When using the SSH Client Key authentication, create a pair of the SSH client public key and the SSH client secret key in advance, using the creation tool. One public key can be registered per user account. When this function is executed, the public key is registered in the storage system.
- The following types (formats) of public keys can be used:
 - IETF style DSA for SSH v2
 - IETF style RSA for SSH v2The supported maximum encryption strength for the public key is 4096-bit.

■ User Privileges

Availability of Executions in the Default Role

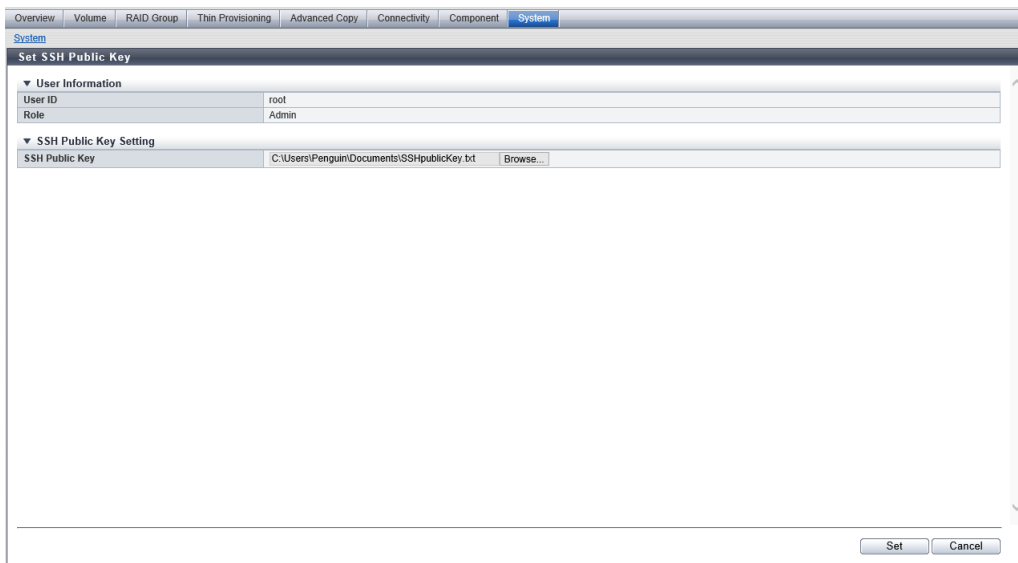
Default role	Availability of executions
Monitor	✓

8. System System

Default role	Availability of executions
Admin	✓
StorageAdmin	✓
AccountAdmin	✓
SecurityAdmin	✓
Maintainer	✓

Refer to ["A. User Roles and Policies" \(page 1580\)](#) for details on the policies and roles.

■ Display Contents



User Information

Current user's (your) information is displayed.

Item	Description
User ID	The ID of the current user is displayed.
Role	Current user's (your) user role is displayed. Monitor Admin StorageAdmin AccountAdmin SecurityAdmin Maintainer Custom role

■ Settings

SSH Public Key Setting

In this screen, register, change, and delete (your) SSH public key.

Item	Description	Setting values
Delete checkbox	To delete the current user's (your) SSH client public key, select the checkbox. The checkbox is displayed only when the SSH client public key has been registered.	Selected: Delete Cleared
SSH Public Key	Register or change the SSH client public key used for login authentication from CLI in the storage system. Click the [Browse...] button and specify the public key to be registered or to be changed. When using the SSH client key authentication, register the SSH public key in the storage system and prepare the SSH secret key, corresponding to the public key in the client PC in advance.	SSH Public Key

■ Operating Procedures

Procedure ▶▶▶

- 1 Click [Set SSH Public Key] in [Action].
- 2 Specify the SSH Public Key, and click the [Set] button.
→ A confirmation screen appears.

Note

- To delete the SSH client public key, select the "Delete" checkbox and click the [Set] button.

- 3 Click the [OK] button.
→ The registration of the SSH public key starts.
- 4 Click the [Done] button to return to the [System] screen.



Register Unified Storage License

- ["■ Overview" \(page 1191\)](#)
- ["■ User Privileges" \(page 1192\)](#)
- ["■ Settings" \(page 1192\)](#)
- ["■ Operating Procedures" \(page 1192\)](#)

■ Overview

This function registers the license key to upgrade the storage system used in a SAN environment to a Unified Storage system so that the storage system can be used in both SAN and NAS environments.

Caution

- The ETERNUS DX60 S5, the ETERNUS DX900 S5, the ETERNUS DX8100 S4/DX8900 S4, and the ETERNUS AF150 S3/AF250 S3/AF650 S3 do not support this function.
- The Unified Storage license cannot be registered if the Deduplication/Compression function for the storage system is enabled. To use the storage system in a Unified Storage environment, disable the Deduplication/Compression function and then register the license. Note that the "Maintenance Operation" policy is required to disable the Deduplication/Compression function. Refer to the [Set Deduplication/Compression Mode] function for details.

Note

- To use the storage system in a Unified Storage environment, the controller firmware with Unified Storage functions must be applied after registering the license key. Prepare the controller firmware with Unified Storage functions in advance before using the [Apply Controller Firmware] function. Unified Storage functions are available after applying the firmware.

■ **User Privileges**

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	
StorageAdmin	
AccountAdmin	
SecurityAdmin	
Maintainer	✓

Refer to "'A. User Roles and Policies" (page 1580)" for details on the policies and roles.

■ **Settings**

License Settings

Item	Description	Setting values
License Key	Input the Unified Storage license key.	16 capital letters and numeric characters

■ **Operating Procedures**

In this screen, register the Unified Storage license key in the storage system.

Procedure ▶▶▶

- 1 Click [Register Unified License] in [Action].
- 2 Input the license key, and click the [Register] button.
→ A confirmation screen appears.

Caution

- An error screen appears in the following conditions:
 - The "License Key" does not satisfy the input conditions
 - The "License Key" is incorrect

- 3 Click the [OK] button.
→ The Unified Storage license registration is executed.
- 4 Click the [Done] button to return to the [System] screen.



Expand System Memory Capacity

- ["■ Overview" \(page 1193\)](#)
- ["■ User Privileges" \(page 1193\)](#)
- ["■ Settings" \(page 1193\)](#)
- ["■ Operating Procedures" \(page 1195\)](#)

■ Overview

This function expands the upper limit of the system memory capacity used in the storage system.

Caution

- This function is supported in the ETERNUS DX8100 S4/DX8900 S4.
- Use this function to register a license (*1) when adding system memory. The added system memory cannot be used until a license is registered.
- If multiple "memory expansion licenses" are required to expand to the intended capacity, all the licenses must be registered.
- To expand the cache capacity, register "memory expansion license" and then specify "Case of cache memory capacity expansion without memory expansion." to expand the memory in hot mode. Refer to the [Add Memory] function for details.

*1: In this manual, "memory expansion license" represents a license for expanding the upper limit of the system memory. A "memory expansion license" is issued for each storage system.

Note

- Multiple "memory expansion licenses" can be registered in a single operation.

■ User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	
StorageAdmin	
AccountAdmin	
SecurityAdmin	
Maintainer	✓

Refer to ["A. User Roles and Policies" \(page 1580\)](#) for details on the policies and roles.

■ Settings

License Key

Note

- For "memory expansion licenses" that are already registered, the license key input field is grayed out and unavailable.

8. System System

Item	Description	Setting values
For System Memory Capacity (64 GB/CE)	Enter a license key "For System Memory Capacity (64 GB/CE)". When a license has already been registered, "Registered" is displayed.	16 alphanumeric characters (0 - 9, A - Z) "Registered"
For System Memory Capacity (128 GB/CE)	Enter a license key "For System Memory Capacity (128 GB/CE)". When a license has already been registered, "Registered" is displayed.	16 alphanumeric characters (0 - 9, A - Z) "Registered"
For System Memory Capacity (256 GB/CE)	Enter a license key "For System Memory Capacity (256 GB/CE)". When a license has already been registered, "Registered" is displayed.	16 alphanumeric characters (0 - 9, A - Z) "Registered"
For System Memory Capacity (512 GB/CE)	Enter a license key "For System Memory Capacity (512 GB/CE)". When a license has already been registered, "Registered" is displayed.	16 alphanumeric characters (0 - 9, A - Z) "Registered"
For System Memory Capacity (544 GB/CE)	Enter a license key "For System Memory Capacity (544 GB/CE)". When a license has already been registered, "Registered" is displayed.	16 alphanumeric characters (0 - 9, A - Z) "Registered"
For System Memory Capacity (576 GB/CE)	Enter a license key "For System Memory Capacity (576 GB/CE)". When a license has already been registered, "Registered" is displayed.	16 alphanumeric characters (0 - 9, A - Z) "Registered"
For System Memory Capacity (640 GB/CE)	Enter a license key "For System Memory Capacity (640 GB/CE)". When a license has already been registered, "Registered" is displayed.	16 alphanumeric characters (0 - 9, A - Z) "Registered"
For System Memory Capacity (704 GB/CE)	Enter a license key "For System Memory Capacity (704 GB/CE)". When a license has already been registered, "Registered" is displayed.	16 alphanumeric characters (0 - 9, A - Z) "Registered"
For System Memory Capacity (896 GB/CE)	Enter a license key "For System Memory Capacity (896 GB/CE)". When a license has already been registered, "Registered" is displayed.	16 alphanumeric characters (0 - 9, A - Z) "Registered"
For System Memory Capacity (1024 GB/CE)	Enter a license key "For System Memory Capacity (1024 GB/CE)". When a license has already been registered, "Registered" is displayed.	16 alphanumeric characters (0 - 9, A - Z) "Registered"
For System Memory Capacity (1280 GB/CE)	Enter a license key "For System Memory Capacity (1280 GB/CE)". When a license has already been registered, "Registered" is displayed.	16 alphanumeric characters (0 - 9, A - Z) "Registered"
For System Memory Capacity (1536 GB/CE)	Enter a license key "For System Memory Capacity (1536 GB/CE)". When a license has already been registered, "Registered" is displayed.	16 alphanumeric characters (0 - 9, A - Z) "Registered"

■ Operating Procedures

Procedure ▶▶▶

- 1 Click [Expand System Memory Capacity] in [Action].
- 2 Enter the license keys required for expanding to the intended capacity and then click the [Register] button.
→ A confirmation screen appears.

Caution

- An error screen appears in the following conditions:
 - License keys are not entered sequentially when multiple license keys are registered
 - The entered license key does not satisfy the input conditions

- 3 Click the [OK] button.
→ Expansion of the system memory capacity starts.
- 4 Click the [Done] button to return to the [System] screen.



Register GS License

- "[■ Overview](#)" (page 1195)
- "[■ User Privileges](#)" (page 1196)
- "[■ Settings](#)" (page 1196)
- "[■ Operating Procedures](#)" (page 1196)

■ Overview

This function registers "GS License" to connect the ETERNUS DX8100 S4/DX8900 S4 to the mainframe systems.

Caution

- The storage system must be rebooted to enable the registered license.
- If no "memory expansion licenses" are registered, the available memory size is "16 GB" per CE regardless of the installed memory size. Refer to the [Expand System Memory Capacity] function for details.
- If "GS License" is registered, the "memory expansion license" for open systems is automatically deleted.

Note

- The memory capacity of each CE that can be used in the storage system can be checked in the "System Memory Capacity" field of the [System] screen. Refer to the [System] function for details.

■ User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	
StorageAdmin	
AccountAdmin	
SecurityAdmin	
Maintainer	✓

Refer to ["A. User Roles and Policies" \(page 1580\)](#) for details on the policies and roles.

■ Settings

GS License

Item	Description	Setting values
Model Name	Enter the model name for the GS License.	9 alphanumeric characters (0 - 9, A - Z)
Serial Number	Enter the serial number for the GS License.	6 numeric characters (0 - 9)
Check Code	Enter the check code for the GS License.	2 alphanumeric characters (0 - 9, A - Z)

■ Operating Procedures

In this screen, the GS License is registered.

Procedure ▶▶▶

- 1 Click [Register GS License] in [Action].

Caution

- [Register GS License] cannot be clicked under the following conditions:
 - RESTful API has been enabled
 - "GS License" has been registered in the storage system

- 2 Specify the parameters, and click the [Register] button.
→ A confirmation screen appears.

Caution

- If the entered GS License does not satisfy the input conditions, an error screen appears.

- 3 Click the [OK] button.
→ The GS License registration is executed.

- 4 Click the [Done] button to return to the [System] screen.

Caution

- Rebooting the storage system is required to enable the registration.

Set Deduplication/Compression Mode

- ["■ Overview" \(page 1197\)](#)
- ["■ User Privileges" \(page 1198\)](#)
- ["■ Settings" \(page 1199\)](#)
- ["■ Operating Procedures" \(page 1199\)](#)

■ Overview

This function enables or disables the Deduplication/Compression function for the storage system. If the Deduplication/Compression function is enabled, the duplicated data blocks in TPP are deleted and compressed to reduce the used area of the drive.

Caution

- This function is supported in the ETERNUS DX200 S5, the ETERNUS DX500 S5/DX600 S5/DX900 S5, the ETERNUS DX8900 S4, and the ETERNUS AF250 S3/AF650 S3. The ETERNUS DX900 S5 or the ETERNUS DX8900 S4 supports Compression only.
- If the storage system is used in a Unified Storage environment, the Deduplication/Compression setting cannot be set for both NAS user volumes (TPVs) and SAN volumes (TPVs).
- If this function is enabled, the performance may be reduced depending on the I/O environment. For notes on using this function, refer to "Design Guide".
- Only Deduplication/Compression Volumes in the same TPP are the targets of Deduplication/Compression. TPVs that are not Deduplication/Compression Volumes, and NAS volumes are not supported.
- Checking for duplications across multiple TPPs is not supported.
- When this function is enabled, the cache mode is temporarily changed to "Write Through Mode". The workload I/O performance of the entire storage system is lowered when the cache mode is transitioning to "Write Through Mode". Therefore, it is recommended to use this function when work I/O is low. This process may take up to several tens of minutes.
- If this function is changed from "Enable" to "Disable", reboot the storage system. Note that rebooting the storage system is not required if this function is changed from "Disable" to "Enable".
- If the Deduplication/Compression Volume is used as a copy source volume, the copy process is performed after the data is decompressed. If the Deduplication/Compression Volume is used as a copy destination volume, the data that is transferred from the copy source is deduplicated and compressed. Because of that, the copy performance is affected.
- This function cannot be enabled when the storage system is used in the Unified Storage environment.
- This function cannot be disabled under the following conditions:
 - TPPs that have either or both of Deduplication and Compression enabled exist
 - The current user does not have the "Maintenance Operation" policy

Note

- Check "Deduplication/Compression" in the [System] screen. If "Enable" is displayed for "Deduplication/Compression", skip this function. Refer to the [System] function for details.

Configuration procedure for the Deduplication/Compression function

Procedure ▶▶▶

- 1 Use this function to enable Deduplication/Compression for the storage system.
- 2 Enable the Thin Provisioning function and then select the maximum pool capacity. Refer to the [Set Thin Provisioning] function for details.
- 3 Create a TPP with "Deduplication", "Compression", or both of them enabled. Refer to the [Create Thin Provisioning Pool] function for details.
(A [Data Container Volume](#) is automatically created in the relevant TPP.)
- 4 Expand the logical capacity of the Data Container Volume.
The logical capacity of the Data Container Volume must be expanded to a size that is the same or larger than the capacity that is to be written. This is because the data for all Deduplication/Compression Volumes in the TPP is written to the Data Container Volume after the Deduplication/Compression.
If the capacity that is to be written cannot be estimated, expand the logical capacity of the Data Container Volume to the same or larger than the total logical capacity of all Deduplication/Compression Volumes in the TPP.
Examples of when creating ten 10 TB Deduplication/Compression Volumes in a TPP are as follows.
 - When the estimated data reduction rate is 2:1, expand the Data Container Volume capacity to 50 TB
 - When the estimated data reduction rate is 4:1, expand the Data Container Volume capacity to 25 TBRefer to the [Expand Thin Provisioning Volume] function for details.
- 5 Create the [Deduplication/Compression Volumes](#) in the TPP that was created in Step 3. Refer to the [Create Volume] function for details.



■ **User Privileges**

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	✓
StorageAdmin	
AccountAdmin	
SecurityAdmin	
Maintainer	✓

Refer to "[A. User Roles and Policies](#)" (page 1580)" for details on the policies and roles.

■ Settings

Deduplication/Compression Mode Settings

Item	Description	Setting values
Deduplication/Compression	<p>Select whether to enable or disable the Deduplication/Compression function for the storage system.</p> <div style="background-color: #f0f0f0; padding: 5px; margin-top: 10px;"> <p>Note</p> <ul style="list-style-type: none"> • If this item is enabled for the ETERNUS DX900 S5 or the ETERNUS DX8900 S4, only the Compression function becomes available. </div>	<p>The display contents vary depending on the current user's policy.</p> <ul style="list-style-type: none"> • When the user has the "Storage Management" policy Enable • When the user has the "Maintenance Operation" policy When the Deduplication/Compression function of the storage system is enabled Enable Disable (Default) When the Deduplication/Compression function of the storage system is disabled Enable (Default) Disable

■ Operating Procedures

Procedure ▶▶▶

- 1 Click [Set Deduplication/Compression Mode] in [Action].
- 2 Select whether to enable or disable Deduplication/Compression and click the [Set] button.
→ A confirmation screen appears.
- 3 Click the [OK] button.
→ The Deduplication/Compression mode setting starts.
- 4 Click the [Done] button to return to the [System] screen.

Caution

- Reboot the storage system if "Disable" is selected for "Deduplication/Compression".

Enable RESTful API

- ["■ Overview" \(page 1199\)](#)
- ["■ User Privileges" \(page 1200\)](#)
- ["■ Operating Procedures" \(page 1200\)](#)

■ Overview

This function enables RESTful API.

If RESTful API is enabled, RESTful API becomes available as a user interface.

Caution

- This function cannot be performed when the SSL certificate is not registered.

Note

- To enable or disable the RESTful API port, use the [Setup Firewall] function.

■ **User Privileges**

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	✓
StorageAdmin	
AccountAdmin	
SecurityAdmin	
Maintainer	✓

Refer to "[A. User Roles and Policies](#)" (page 1580) for details on the policies and roles.

■ **Operating Procedures**

Procedure ▶▶▶

- 1 Click [Enable RESTful API] in [Action].
→ A confirmation screen appears.

Caution

- [Enable RESTful API] cannot be clicked under the following conditions:
 - "GS License" has been registered in the storage system
 - RESTful API has been enabled

- 2 Click the [OK] button.
→ Enabling RESTful API starts.
- 3 Click the [Done] button to return to the [System] screen.



Register RFCF License

- "[Overview](#)" (page 1200)
- "[User Privileges](#)" (page 1202)
- "[Settings](#)" (page 1202)
- "[Operating Procedures](#)" (page 1202)

■ **Overview**

This function registers an RFCF License.

Remote File Copy Facility-Extended (RFCF-EX) is a function that performs remote data backups between the main center (*1) and the backup center (*2) if operations cannot continue due to problems such as disasters. The ETERNUS DX8900 S4 supports "Remote Backup System (RBS) mode" that performs system duplication.

8. System System

To use the Remote File Copy Facility-EXtended management (hereinafter referred to as "RFCF-EX management"), register the RFCF License to all the storage systems (*3) in the main center and in the backup center.

*1 : A source center that transfers data.

*2 : A destination center that receives data.

*3 : The number of RFCF Licenses that must be ordered is the same as the number of storage systems that perform RFCF-EX management.

Caution

- RFCF-EX management is provided with the following conditions.
 - The ETERNUS DX8900 S4 supports this function. RFCF-EX management with the ETERNUS DX8100 S4 or older models is not supported.
 - Only FCLINK is available as a host interface. OCLINK is not supported.
 - F6427G, F6427H, and F6427K type volumes are supported. F6427P, F6427R, and MVV type volumes are not supported.
 - RFCF-EX management is not supported if DVCF management is used in the storage system.
 - RFCF-EX management and REC cannot be used in the same LCU.
 - Eight LCUs can be used for RFCF-EX management in the storage system. The number of remote storage systems per LCU is two.
 - Registering the "GS License" is required.
- The following functions must be performed while the remote transfer with RFCF-EX management is stopped.
 - Apply Controller Firmware
 - Download Controller Firmware
 - Add Controller Enclosure
 - Modify LCU
 - Delete LCU
 - Set IOA Mapping
 - Modify Port Mode
 - Setup RFCF-RA Path
- The RFCF License cannot be deleted.
- The storage system must be rebooted to enable the registered license.
- Once a license has been registered, this function cannot be clicked in the Action menu.

Note

- If RFCF License has been successfully registered, the Action menu and related items for RFCF-EX management are displayed. Refer to [""How to configure RFCF-EX management" \(page 1202\)"](#) for details.
- The registration status of the RFCF License can be checked. Refer to the [System] function for details.

How to configure RFCF-EX management

To perform RFCF-EX related settings and actions, the storage system must be rebooted after registering the license. Perform the following procedure to configure RFCF-EX.

Procedure ▶▶▶

- 1 Change the FC port mode to "RFCF-RA". Refer to the [Modify Port Mode] function for details.
- 2 Select "Fabric" for "Connection" of the FC port that is changed in Step 1. Refer to the [Modify FC Port Parameters] function for details.
- 3 Select "Enable" for "RBS Mode" of the LCU that is used for RFCF-EX management. Refer to the [Add LCU] function or the [Modify LCU] function for details.
- 4 Set the RFCF priority. Refer to the [Setup RFCF Priority] function for details.
- 5 Set the WWN of the remote RFCF-RA port to allow access from the local RFCF-RA port. Refer to the [Setup RFCF-RA WWN] function for details.
- 6 Set an RFCF-RA path between the main center and the backup center. Refer to the [Setup RFCF-RA Path] function for details.
- 7 Check the RFCF-RA path between the main center and the backup center. Refer to the [RFCF Settings] function for details.



■ **User Privileges**

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	✓
StorageAdmin	
AccountAdmin	
SecurityAdmin	
Maintainer	✓

Refer to ""A. User Roles and Policies" (page 1580)" for details on the policies and roles.

■ **Settings**

RFCF License

Item	Description	Setting values
Model Name	Enter the model name for the RFCF License.	9 capital letters and numeric characters (0 - 9, A - Z)
Serial Number	Enter the serial number for the RFCF License.	6 numeric characters (0 - 9)
Check Code	Enter the check code for the RFCF License.	2 capital letters and numeric characters (0 - 9, A - Z)

■ **Operating Procedures**

Register the RFCF License.

Procedure ▶▶▶

- 1 Click [Register RFCF License] in [Action].
- 2 Specify the parameters, and click the [Register] button.
→ A confirmation screen appears.

Caution

- An error screen appears in the following conditions:
 - The "Model Name", "Serial Number", or "Check Code" is not entered
 - The specified RFCF License does not satisfy the input conditions

- 3 Click the [OK] button.
→ The RFCF License registration is executed.
- 4 Click the [Done] button to return to the [System] screen.

Caution

- The storage system must be rebooted to enable the registered license.



Register Non-disruptive Storage Migration License

- ["■ Overview" \(page 1203\)](#)
- ["■ User Privileges" \(page 1206\)](#)
- ["■ Settings" \(page 1207\)](#)
- ["■ Operating Procedures" \(page 1207\)](#)

■ Overview

This function registers the Non-disruptive Storage Migration License.

By registering this license, the Non-disruptive Storage Migration function can be used.

For the Non-disruptive Storage Migration function, the volume information of the [external storage system](#) is inherited by the [local storage system](#) and the data is migrated without stopping operations in the local storage system. This license is registered in the local storage system.

This function is displayed only if the Non-disruptive Storage Migration License has not been registered.

Caution

- By registering this license, the shared area in the cache memory is assigned for controlling the Non-disruptive Storage Migration function.
The shared area in the cache memory is not only used for the Non-disruptive Storage Migration function, but also used for copy tables, [REC Buffers](#), the Thin Provisioning function (*1), the Storage Cluster function (*1), and the Extreme Cache function. Note that depending on the following, there are cases when this license may not be registrable.

- Memory capacity in the storage system
- Copy table size
- REC Buffer size
- Maximum pool capacity
- Total TFOV capacity (*2)
- Extreme Cache setting (enabled) and Extreme Cache capacity

For the ETERNUS DX60 S5, a registration error for this license due to insufficient memory capacity does not occur because the ETERNUS DX60 S5 uses an area other than the shared area in the cache memory.

*1 : The shared area in the cache memory is used for the following conditions.

- The maximum pool capacity is expanded to "1.5 PB" or larger
- The total TFOV capacity (*2) has been expanded from the default capacity
Refer to the descriptions about "Storage Cluster" in the [System] screen for the default capacity of the TFOV for each model.

*2 : The total TFOV capacity indicates the total capacity of the volumes that are used for the Storage Cluster function in a storage system.

- Delete this license immediately after the data migration is completed successfully. Deleting this license releases the shared area in the cache memory that is acquired for controlling the Non-disruptive Storage Migration function. Refer to the [Delete Non-disruptive Storage Migration License] function for details.

Note

- The registration status of this license can be checked. Refer to the [System] function for details.
- Because the RAID Migration function is used for migrating data, the maximum number of simultaneous processes is 32 and the total capacity of the simultaneous processes is 128 TB.

Data migration flow using the Non-disruptive Storage Migration function

The workflow sequence for Non-disruptive Storage Migration is described below.

Procedure ▶▶▶

- 1 Register the Non-disruptive Storage Migration License. Refer to "[Operating Procedures](#)" (page 1207) for details.
- 2 Change the mode of the FC port used for migration in the local storage system to "Initiator". Refer to the [Modify Port Mode] function for details.
- 3 Set port parameters to the FC-Initiator port. Refer to the [Modify FC Port Parameters] function for details.
- 4 Connect the external storage system and the local storage system with either of the following.
 - FC cable
 - Via a switch

Data migration flow using the Non-disruptive Storage Migration function

- 5** Create External Drives. Refer to the [Create External Drive] function for details.
 - (1)** Confirm that the "Inherit" checkbox for "External LU Information" is selected.
 - (2)** Select the external storage system (source storage system) for migrating the data.
 - (3)** Select the migration target volume from the external storage system.
 - (4)** Have the local storage system inherit the volume information of the migration target volume in the external storage system.
The volume that inherits the volume information is called "External Drive" in the local storage system.
- 6** Create External RAID Groups from External Drives. Refer to the [Create External RAID Group] function for details.
- 7** Create a volume in the External RAID Group. Refer to the [Create Volume] function for details.
 - (1)** Select "Standard" for "Type" and select the "Enable" checkbox for "Use External Drive".
 - (2)** Select an External RAID Group to create the volume.
 - (3)** Create a volume in the External RAID Group.
The created volume is called "External Volume" in the local storage system (destination storage system).
- 8** Set host affinity to allow the host to recognize the volume that is created in Step 7. Refer to the [Create Host Affinity] function for details.

Caution

- If a LUN group is created, the host LUN to be allocated to the External Volume must be the same as the host LUN that is allocated to the relevant volume in the external storage system. Refer to the [Add LUN Group] function for details.
- The host response setting for the host group must be the same as the host response setting of the external storage system. Refer to the [Add FC Host Group] function, the [Add iSCSI Host Group] function, or the [Add SAS Host Group] function for details.

- 9** From the host, create a path between the host and the local storage system.
Confirm that a multipath is configured from the host to the migration target volume.
- 10** Disconnect the path between the host and the external storage system.
- 11** Confirm that the multipath from the host to the migration target volume is disconnected.
- 12** Migrate the data in the volume that is created in Step 7 to the destination volume. Refer to the [Start RAID Migration] function for details.
When starting a RAID migration, select one of the following for "Data Sync after Migration".
 - Automatic Stop
The procedure continues to the next step after all the RAID migrations are successfully completed.
 - Manual Stop
Manually stop the data synchronization between the source and destination volumes after all the RAID migrations are successfully completed. Refer to the [Stop External Volume Data Synchronization] function for details.

Data migration flow using the Non-disruptive Storage Migration function

Caution

- Select one of the following depending on whether the data must be synchronized between the source and destination volumes until all data migrations of the Non-disruptive Storage Migration are completed.
 - If the data must be synchronized until all data migrations are completed
Select "Manual Stop" for "Data Sync after Migration"
 - If the data synchronization can be stopped every time a data migration is completed
Select "Automatic Stop" for "Data Sync after Migration"
- Up to 32 RAID migration processes can be performed simultaneously. If "Manual Stop" is selected, the total number of External Volumes to be migrated must be 32 or less.

Progress of migration can be checked on the [Volume] screen. Refer to the [Volume (Basic Information)] function for details.

13 Delete the External RAID Group. Refer to the [Delete External RAID Group] function for details.

14 Delete the External Drive that was used to create the External RAID Group. Refer to the [Delete External Drive] function for details.

Caution

- The number of volumes that can be migrated using the single operation described in Step 5 to Step 14 is 512 per external storage system. Perform the operation again from Step 5 for the following conditions.
 - 513 or more volumes are migrated from a single external storage system
 - Volumes are migrated from multiple external storage systems (if the information can be obtained from the FC-Initiator port)

15 Delete this license. Refer to the [Delete Non-disruptive Storage Migration License] function for details.

Deleting this license releases the shared area in the cache memory that is acquired for controlling the Non-disruptive Storage Migration function.

16 The External LU Information that is inherited by the volume is deleted only for Non-disruptive Storage Migration to this storage system from storage systems other than the ETERNUS storage system. Refer to the [Delete External LU Information] function for details.



■ User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	✓
StorageAdmin	
AccountAdmin	
SecurityAdmin	
Maintainer	✓

Refer to ""A. User Roles and Policies" (page 1580)" for details on the policies and roles.

■ Settings

License Settings

Item	Description	Setting values
License Key	Input the Non-disruptive Storage Migration License key.	16 capital letters and numeric characters (0 - 9, A - Z)

■ Operating Procedures

Procedure ▶▶▶

- 1 Click [Register Non-disruptive Storage Migration License] in [Action].
- 2 Input the license key, and click the [Register] button.
→ A confirmation screen appears.

Caution

- An error screen appears in the following conditions:
 - The memory capacity required to operate the Non-disruptive Storage Migration function cannot be acquired
 - The license key is not entered
 - The entered license key does not satisfy the input conditions

- 3 Click the [OK] button.
→ The Non-disruptive Storage Migration License registration starts.
- 4 Click the [Done] button to return to the [System] screen.

Note

- If this license is successfully registered, the actions and items related to the Non-disruptive Storage Migration function are displayed. Perform a data migration. Refer to "[Data migration flow using the Non-disruptive Storage Migration function](#)" (page 1204) for details.

Delete Non-disruptive Storage Migration License

- "[Overview](#)" (page 1207)
- "[User Privileges](#)" (page 1208)
- "[Operating Procedures](#)" (page 1208)

■ Overview

This function deletes the Non-disruptive Storage Migration License registered in the storage system. This function is available only if the Non-disruptive Storage Migration License has been registered.

Caution

- Delete all the [External Drives](#) before using this function. The registration status of the External Drives can be checked in the [External Drives] screen. Refer to the [External Drives] function for details.
- Delete this license immediately after the data migration completes successfully. Deleting this license releases the shared area in the cache memory that is acquired for controlling the Non-disruptive Storage Migration function.

Note

- The registration status of this license can be checked. Refer to the [System] function for details.

■ **User Privileges**

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	✓
StorageAdmin	
AccountAdmin	
SecurityAdmin	
Maintainer	✓

Refer to "[A. User Roles and Policies](#)" (page 1580) for details on the policies and roles.

■ **Operating Procedures**

Procedure ▶▶▶

- 1 Click [Delete Non-disruptive Storage Migration License] in [Action].
→ A confirmation screen appears.

Caution

- If External Drives are registered in the storage system, an error screen appears.

- 2 Click the [OK] button.
→ The Non-disruptive Storage Migration License deletion starts.
- 3 Click the [Done] button to return to the [System] screen.



Network

- "[Overview](#)" (page 1209)
- "[User Privileges](#)" (page 1209)
- "[Display Contents](#)" (page 1209)

■ Overview

This function displays the network environment of each port in the storage system.

Caution

- If the message "Currently Network Configuration is set to factory default." is displayed, the network environment settings for the MNT port must be performed. Perform the [Setup Network Environment] function in [Action]. Some functions are not available if the network environment settings are incomplete.
- Click the [↻] icon to display the latest screen. Note that after changing the firewall setting and returning to this screen, it takes approximately 10 seconds to update the display contents. Wait at least 10 seconds and click the [↻] icon or click [Network] in category to display the [Network] screen again.

■ User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	✓
Admin	✓
StorageAdmin	✓
AccountAdmin	
SecurityAdmin	✓
Maintainer	✓

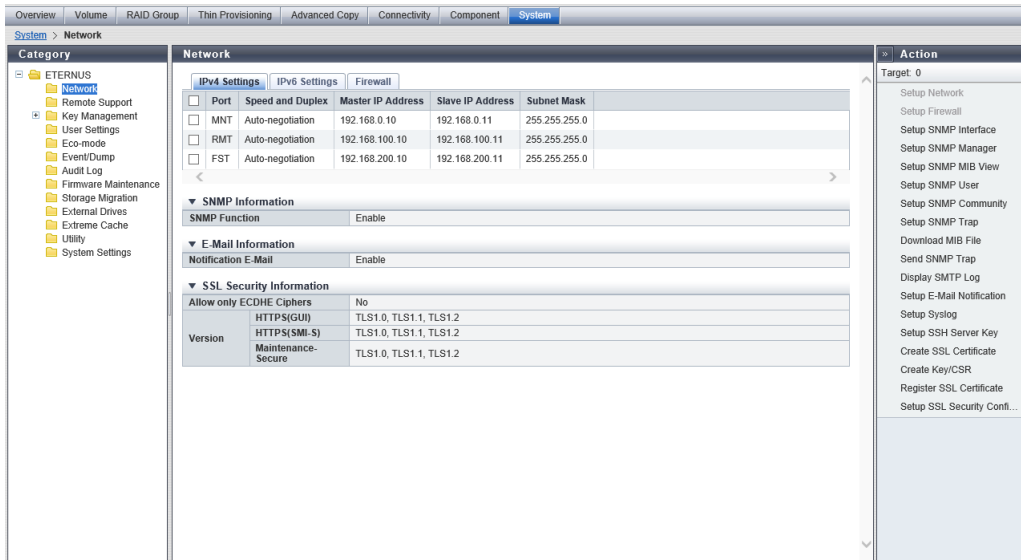
Refer to ""A. User Roles and Policies" (page 1580)" for details on the policies and roles.

■ Display Contents

Click the "[IPv4 Settings] Tab" (page 1210), the "[IPv6 Settings] Tab" (page 1211), or the "[Firewall] Tab" (page 1211) to display the network setting information.

The "SNMP Information" (page 1212), the "E-Mail Information" (page 1212), and the "SSL Security Information" (page 1212) are displayed under the network setting information.

8. System Network



[IPv4 Settings] Tab

Item	Description
Port	The port type is displayed. For the ETERNUS DX60 S5/DX100 S5/DX200 S5 and ETERNUS AF150 S3/AF250 S3 MNT RMT For the other models MNT RMT FST
Speed and Duplex	The transfer speed and the communication method are displayed. Auto-negotiation 1Gbit/s 100Mbit/s Half 100Mbit/s Full 10Mbit/s Half 10Mbit/s Full
Master IP Address	The IP address of the Master CM, which has been specified to the port, is displayed. If not specified, the field is blank.
Slave IP Address	The IP address of the Slave CM, which has been specified to the port, is displayed. This item is not displayed for the 1CM model. If not specified, the field is blank.
Subnet Mask	The Subnet Mask, which has been specified to the port, is displayed. If not specified, the field is blank.

[IPv6 Settings] Tab

Item	Description
Port	The port type is displayed. For the ETERNUS DX60 S5/DX100 S5/DX200 S5 and ETERNUS AF150 S3/AF250 S3 MNT RMT For the other models MNT RMT FST
Speed and Duplex	The transfer speed and the communication method are displayed. Auto-negotiation 1Gbit/s 100Mbit/s Half 100Mbit/s Full 10Mbit/s Half 10Mbit/s Full
Master IP Link Local Address	The link local address of the Master CM, which has been specified to the port, is displayed. If not specified or when the port type is "FST", the field is blank.
Master Connect IP Address	The connect IP address of the Master CM, which has been specified to the port, is displayed. "Master Connect IP Address" corresponds to "Master IP Address" for IPv4. If not specified or when the port type is "FST", the field is blank.
Slave IP Link Local Address	The link local address of the Slave CM, which has been specified to the port, is displayed. This item is not displayed for the 1CM model. If not specified or when the port type is "FST", the field is blank.
Slave Connect IP Address	The connect IP address of the Slave CM, which has been specified to the port, is displayed. Slave Connect IP Address" corresponds to "Slave IP Address" for IPv4. This item is not displayed for the 1CM model. If not specified or when the port type is "FST", the field is blank.
Length of Subnet Prefix	The prefix length (3 to 128) for the connect IP address is displayed (unit: bit). "Length of Subnet Prefix" corresponds to "Subnet Mask" for IPv4. If not specified or when the port type is "FST", the field is blank.

[Firewall] Tab

Item	Description
Port	The port type is displayed. For the ETERNUS DX60 S5/DX100 S5/DX200 S5 and ETERNUS AF150 S3/AF250 S3 MNT RMT For the other models MNT RMT FST

8. System Network

Item		Description
Acceptable Protocol	HTTP	Whether the HTTP connection is enabled or disabled is displayed.
	HTTPS	Whether the HTTPS connection is enabled or disabled is displayed.
	Telnet	Whether the Telnet connection is enabled or disabled is displayed.
	SSH	Whether the SSH connection is enabled or disabled is displayed.
	ICMP	Whether the ICMP connection is enabled or disabled is displayed.
	Maintenance-Secure	Whether the Maintenance-Secure connection is enabled or disabled is displayed.
	RESTful API(HTTPS)	Whether the RESTful API connection is enabled or disabled is displayed.
	SNMP	Whether the SNMP connection is enabled or disabled is displayed.
	RCIL	Whether the RCIL connection is enabled or disabled is displayed. Whether RCIL connection is enabled or disabled is only displayed for the MNT port. The RMT port and the FST port are always disabled.
ECD	Whether the ECD connection is enabled or disabled is displayed. The ECD is used to collect the configuration information from the storage system that is connected to the network using the Remote Installation function. Whether ECD connection is enabled or disabled is only displayed for the MNT port. The RMT port and the FST port are always disabled.	

SNMP Information

Item	Description
SNMP Function	Whether the SNMP function is enabled or disabled is displayed.

E-Mail Information

Item	Description
Notification E-Mail	Whether the E-mail notification is enabled or disabled is displayed.

SSL Security Information

Item		Description
Allow only ECDHE Ciphers		If ECDHE encryption is allowed, "Yes" is displayed, otherwise "No" is displayed.
Version	HTTPS (GUI/REST)	All the versions (TLS1.0/TLS1.1/TLS1.2) that are currently available for the HTTPS (GUI/REST) protocol are displayed. The SSL version setting (enabled or disabled) is applied to all ports (MNT/RMT/FST).
	HTTPS (SMI-S)	All the versions (TLS1.0/TLS1.1/TLS1.2) that are currently available for the HTTPS (SMI-S) protocol are displayed. The SSL version setting (enabled or disabled) is applied to all ports (MNT/RMT/FST).
	Maintenance-Secure	All the versions (TLS1.0/TLS1.1/TLS1.2) that are currently available for the Maintenance-Secure protocol are displayed. The SSL version setting (enabled or disabled) is applied to all ports (MNT/RMT/FST).

Caution

- If "Yes" is displayed for "Allow only ECDHE Ciphers", SSL communication is performed with "TLS1.2" even if "TLS1.0", "TLS1.1" or both are displayed as available versions. This feature is applied to all protocols (HTTPS (GUI/REST)/HTTPS (SMI-S)/Maintenance-Secure).

Setup Network Environment

- ["■ Overview" \(page 1213\)](#)
- ["■ User Privileges" \(page 1215\)](#)
- ["■ Display Contents" \(page 1215\)](#)
- ["■ Settings" \(page 1216\)](#)
- ["■ Operating Procedures" \(page 1222\)](#)

■ Overview

This function sets up an the environment for the storage system to communicate with an external network.

Configuration is required for each MNT, RMT and FST port.

- MNT port
The MNT port is used for general communication between the storage system and the external hosts. For the ETERNUS DX60 S5/DX100 S5/DX200 S5 and the ETERNUS AF150 S3/AF250 S3, this port is also used for maintenance of the storage system.
- RMT port
The RMT port is used when the line must be separated from the MNT port. This port must be configured for the ETERNUS DX500 S5/DX600 S5/DX900 S5, the ETERNUS DX8100 S4/DX8900 S4, and the ETERNUS AF650 S3.
- FST port
The FST port is used for maintenance of the storage system. This port must be configured for the ETERNUS DX500 S5/DX600 S5/DX900 S5, the ETERNUS DX8100 S4/DX8900 S4, and the ETERNUS AF650 S3.

Caution

- If the message "Currently Network Configuration is set to factory default." is displayed in the system message field, the network environment settings must be performed. Some functions are not available if the network environment settings for the MNT port are incomplete. Refer to ["Functions that cannot be performed in a factory default network environment" \(page 1214\)](#) for details.
- Logging in again may be required after the settings are complete.

Note

- MNT ports and RMT ports support both "IPv4" and "IPv6". FST ports only support "IPv4".
- Both or either "IPv4 address" and "IPv6 address" can be set for a port.
- When the network environment settings are the same as the factory default, all the input items in the [IPv4 Settings] tab for the MNT port are cleared. Information that is configured in the storage system is not displayed. Note that in the [IPv6 Settings] tab, the information that is configured in the storage system is displayed.
- When SNMP Manager exists in a different subnetwork from the storage system, specify the IP address or the network address of SNMP Manager in "Allowable IP Address" of this function.
- Available operations vary depending on the models and ports. Refer to ""[Available Port Operations for each Model](#)" (page 1214)" for details.
- To enable or disable each service (such as HTTP and HTTPS), use the [Setup Firewall] function.

Functions that cannot be performed in a factory default network environment

- All of the [Network] navigation functions (except the [Setup Network Environment] and [Setup Firewall] functions)
- All of the [Remote Support] navigation functions (all of the REMCS / AIS Connect functions)
- All of the [Key Management] navigation functions
- Modify RADIUS
- All of the [Audit Log] navigation functions
- Enable RESTful API
- Setup SMI-S Environment
- Modify Date and Time (NTP settings)
- Apply Controller Firmware in hot mode (applying controller firmware in cold mode is also available)
- Add Memory
- Add Channel Adapter and Remove Channel Adapter

Available Port Operations for each Model

Model	MNT port			RMT port			FST port		
	Setting	Modification	Deletion	Setting	Modification	Deletion	Setting	Modification	Deletion
ETERNUS DX60 S5/DX100 S5/ DX200 S5	Available	Available	Available (*1)	Available	Available	Available (*1)	N/A	-	-
ETERNUS DX500 S5/ DX600 S5/ DX900 S5	Available	Available	Available (*1)	Available	Available	Available (*1)	Available	Available	N/A
ETERNUS DX8100 S4/ DX8900 S4	Available	Available	Available (*1)	Available	Available	Available (*1)	Available	Available	N/A
ETERNUS AF150 S3/ AF250 S3	Available	Available	Available (*1)	Available	Available	Available (*1)	N/A	-	-
ETERNUS AF650 S3	Available	Available	Available (*1)	Available	Available	Available (*1)	Available	Available	N/A

*1: If no other ports are available, this cannot be deleted.

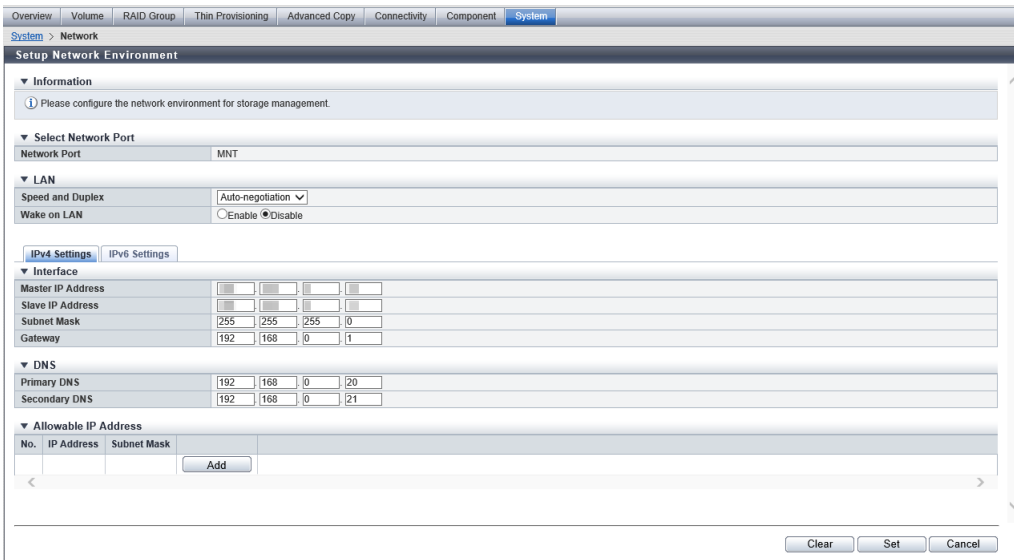
■ User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	✓
StorageAdmin	
AccountAdmin	
SecurityAdmin	
Maintainer	✓

Refer to ["A. User Roles and Policies" \(page 1580\)](#) for details on the policies and roles.

■ Display Contents



Select Network Port

Item	Description
Network Port	The port that is to be set is displayed. For the ETERNUS DX60 S5/DX100 S5/DX200 S5 and ETERNUS AF150 S3/AF250 S3 MNT RMT For the other models MNT RMT FST

■ Settings

LAN

Item	Description	Setting values
Speed and Duplex	Select the communication speed and mode.	Auto-negotiation (Default) 1Gbit/s 100Mbit/s Half 100Mbit/s Full 10Mbit/s Half 10Mbit/s Full
Wake on LAN	Select whether to enable or disable the WOL function (*1). This item is not displayed when an FST port is selected. *1 : The WOL function starts up the storage system, which is connected to LAN, from another server or a PC via network.	Enable Disable (Default)

MNT ports or RMT ports support "IPv4" and "IPv6". Click the "[IPv4 Settings] Tab" (page 1216) or "[IPv6 Settings] Tab" (page 1218) to set the network environment. FST ports only support "IPv4". Specify "Interface" in the "[IPv4 Settings] Tab" (page 1216).

[IPv4 Settings] Tab

In this screen, configure the network environment for IPv4.

Interface

Item	Description	Setting values
Master IP Address	Input the IP address for the Master CM of the storage system.	Numeric characters for all the text boxes (0 - 255) For the ETERNUS DX60 S5/DX100 S5/DX200 S5 and ETERNUS AF150 S3/AF250 S3 <ul style="list-style-type: none"> • MNT port Address that is assigned by the DHCP server (Default) • RMT port 192.168.1.1 (Default) For the other models <ul style="list-style-type: none"> • MNT port Address that is assigned by the DHCP server (Default) • FST port 192.168.1.1 (Default)
Slave IP Address	Input the IP address for the Slave CM of the storage system. The IP address of the Slave CM is used when an error occurs in the Master CM. This item is not displayed for the 1CM model.	Numeric characters for all the text boxes (0 - 255)

8. System Network

Item	Description	Setting values
Subnet Mask	Input the subnet mask of the storage system.	255.0.0.0 - 255.255.255.252 For the ETERNUS DX60 S5/DX100 S5/DX200 S5 and ETERNUS AF150 S3/AF250 S3 <ul style="list-style-type: none"> • MNT port Subnet mask that is assigned by the DHCP server (Default) • RMT port 255.255.255.0 (Default) For the other models <ul style="list-style-type: none"> • MNT port Subnet mask that is assigned by the DHCP server (Default) • FST port 255.255.255.0 (Default)
Gateway	Input the IP address of the gateway. This item is not displayed when an FST port is selected.	Numeric characters for all the text boxes (0 - 255)

DNS

This item is not displayed when an FST port is selected.

Item	Description	Setting values
Primary DNS	Input the IP address of the Primary DNS server.	Numeric characters for all the text boxes (0 - 255)
Secondary DNS	Input the IP address of the Secondary DNS server. The Secondary DNS server must be specified after the Primary DNS server.	Numeric characters for all the text boxes (0 - 255)

Allowable IP Address

This item can be configured when the gateway is specified. This item is not displayed when an FST port is selected.

Up to 16 addresses are displayed.

Item	Description
No.	The number (#1 to #16) of the allowable IP address (or network address) is displayed.
IP Address	The allowable IP address (or network address) is displayed.
Subnet Mask	The subnet mask for the allowable IP address (or network address) is displayed.

Function Button

Button	Description
[Add]	Adds an IP address (or the network address) of the remote storage system to "Allowable IP Address". If the maximum number of addresses has already been registered, the [Add] button cannot be clicked.
[Delete]	Deletes an IP address (or the network address) of the remote storage system from "Allowable IP Address". When no IP address (or network address) of the remote storage system is not added in the list, the [Delete] button is not displayed.

[Add Allowable IP Address] Screen

In this screen, input the information of the remote storage systems for which network access will be allowed.

Allowable IP Address Settings

Item	Description	Setting values
IP Address	Input the IP address (or the network address) for the remote storage system. Make sure to input the IP address (or the network address) and subnet mask in pairs.	Numeric characters for all the text boxes (0 - 255)
Subnet Mask	Input the subnet mask for the IP address (or the network address) of the remote storage system.	255.0.0.0 - 255.255.255.252

[IPv6 Settings] Tab

In this screen, configure the network environment for IPv6.

Click the [Automatic discovery] button to obtain setting information in the "Interface" field.

Interface

Item	Description	Setting values
Master IP Link Local Address	Input the link local address (interface ID) for the Master CM of the storage system. Note that the link local address is only available within the same network and cannot be connected to the Internet. Connection via a router is not available. Refer to "" Available IPv6 Address " (page 1221)" for details. When the current setting is displayed, the IPv6 address is displayed as an abbreviation.	fe80::xxxx:xxxx:xxxx:xxxx xxxx: 0 - ffff (FFFF) (hexadecimal, alphanumeric characters) Refer to "" IPv6 Address Notation " (page 1220)" for details. The link local address that is based on the storage system WWN (Default)
Master Connect IP Address	Input the connect IP address for the Master CM of the storage system. "Master Connect IP Address" corresponds to "Master IP Address" for IPv4. "Global address", "unique local address", or "6to4 address" can be input for the IPv6 address. Refer to "" Available IPv6 Address " (page 1221)" for details. When the current setting is displayed, the IPv6 address is displayed as an abbreviation.	xxxx:xxxx:xxxx:xxxx:xxxx:xxxx:xxxx:xxxx xxxx: 0 - ffff (FFFF) (hexadecimal, alphanumeric characters) Refer to "" IPv6 Address Notation " (page 1220)" for details.
Slave IP Link Local Address	Input the link local address (interface ID) for the Slave CM of the storage system. The link local address of the Slave CM is used when an error occurs in the Master CM. Refer to "" Available IPv6 Address " (page 1221)" for details. When the current setting is displayed, the IPv6 address is displayed as an abbreviation. This item is not displayed for the 1CM model.	fe80::xxxx:xxxx:xxxx:xxxx xxxx: 0 - ffff (FFFF) (hexadecimal, alphanumeric characters) Refer to "" IPv6 Address Notation " (page 1220)" for details.

8. System Network

Item	Description	Setting values
Slave Connect IP Address	<p>Input the connect IP address for the Slave CM of the storage system.</p> <p>The connect IP address of the Slave CM is used when an error occurs in the Master CM.</p> <p>"Slave Connect IP Address" corresponds to "Slave IP Address" for IPv4.</p> <p>"Global address", "unique local address", or "6to4 address" can be input for the IPv6 address. Refer to "Available IPv6 Address" (page 1221) for details. When the current setting is displayed, the IPv6 address is displayed as an abbreviation.</p> <p>This item is not displayed for the 1CM model.</p>	<p>xxxx:xxxx:xxxx:xxxx:xxxx:xxxx:xxxx:xxxx</p> <p>xxxx: 0 - ffff (FFFF) (hexadecimal, alphanumeric characters)</p> <p>Refer to "IPv6 Address Notation" (page 1220) for details.</p>
Length of Subnet Prefix	<p>Input the prefix length of the connect IP address (unit: bit).</p> <p>"Length of Subnet Prefix" corresponds to "Subnet Mask" for IPv4.</p>	<p>3 - 128</p> <p>Refer to "Available IPv6 Address" (page 1221) for details.</p>
Gateway	<p>Input the IP address of the gateway.</p> <p>The following IPv6 addresses can be used; "link local address", "global address", "unique local address", or "6to4 address". Refer to "Available IPv6 Address" (page 1221) for details. When the current setting is displayed, the IPv6 address is displayed as an abbreviation.</p>	<p>xxxx:xxxx:xxxx:xxxx:xxxx:xxxx:xxxx:xxxx</p> <p>xxxx: 0 - ffff (FFFF) (hexadecimal, alphanumeric characters)</p> <p>Refer to "IPv6 Address Notation" (page 1220) for details.</p>

DNS

Item	Description	Setting values
Primary DNS	<p>Input the IP address of the Primary DNS server.</p> <p>"Global address", "unique local address", or "6to4 address" can be input for the IPv6 address. Refer to "Available IPv6 Address" (page 1221) for details.</p> <p>When the current setting is displayed, the IPv6 address is displayed as an abbreviation.</p>	<p>xxxx:xxxx:xxxx:xxxx:xxxx:xxxx:xxxx:xxxx</p> <p>xxxx: 0 - ffff (FFFF) (hexadecimal, alphanumeric characters)</p> <p>Refer to "IPv6 Address Notation" (page 1220) for details.</p>
Secondary DNS	<p>Input the IP address of the Secondary DNS server.</p> <p>The Secondary DNS server must be specified after the Primary DNS server.</p> <p>"Global address", "unique local address", or "6to4 address" can be input for the IPv6 address. Refer to "Available IPv6 Address" (page 1221) for details.</p> <p>When the current setting is displayed, the IPv6 address is displayed as an abbreviation.</p>	<p>xxxx:xxxx:xxxx:xxxx:xxxx:xxxx:xxxx:xxxx</p> <p>xxxx: 0 - ffff (FFFF) (hexadecimal, alphanumeric characters)</p> <p>Refer to "IPv6 Address Notation" (page 1220) for details.</p>

Allowable IP Address

This item can be configured when the gateway is specified.
Up to 16 addresses are displayed.

Item	Description
No.	Number (#1 to #16) for the connect IP address of the remote storage system is displayed.
Connect IP Address	<p>The connect IP address of the remote storage system is displayed.</p> <p>Note that the current setting is displayed by an abbreviation.</p> <p>Refer to "IPv6 Address Notation" (page 1220) for details.</p>

8. System
Network

Item	Description
Length of Subnet Prefix	The prefix length for the connect IP address of the remote storage system (3 to 128) is displayed (unit: bit).

Function Button

Button	Description
[Automatic discovery]	<p>Click this button to obtain the following information:</p> <ul style="list-style-type: none"> • Master IP Link Local Address • Master Connect IP Address • Slave IP Link Local Address • Slave Connect IP Address • Length of Subnet Prefix • Gateway <p>For the "Link Local Address" field, a unique IP address within the same network that is created from the storage system information is specified.</p> <p>For the "Connect IP Address" field, an IP address is created by combining the prefix information that is automatically obtained from the router with the unique identifier (interface ID) of the link local address.</p>
[Add]	<p>Adds the connection IP address for the remote storage system to "Allowable IP Address".</p> <p>If the maximum number of addresses has already been registered, the [Add] button cannot be clicked.</p>
[Delete]	<p>Deletes a connection IP address of the remote storage system from "Allowable IP Address".</p> <p>When a connect IP address of the remote storage system is not added in the list, the [Delete] button is not displayed.</p>

[Add Allowable IP Address] Screen

In this screen, input the information of the remote storage systems for which network access will be allowed.

Allowable IP Address Settings

Item	Description	Setting values
Connect IP Address	<p>Input the connect IP address that is to be displayed.</p> <p>"Global address", "unique local address", or "6to4 address" can be input for the IP address. Refer to "Available IPv6 Address" (page 1221) for details.</p> <p>Make sure to input "Connect IP Address" and "Length of Subnet Prefix" together.</p>	<p>xxxx:xxxx:xxxx:xxxx:xxxx:xxxx:xxxx:xxxx</p> <p>xxxx: 0 - ffff (FFFF) (hexadecimal, alphanumeric characters)</p> <p>Refer to "IPv6 Address Notation" (page 1220) for details.</p>
Length of Subnet Prefix	<p>Input the prefix length of the connect IP address for the remote storage system (unit: bit).</p>	<p>3 - 128</p> <p>Refer to "Available IPv6 Address" (page 1221) for details.</p>

IPv6 Address Notation

Since the IPv6 address is 128-bit and extremely long, this address is displayed using "xxxx", which describes 16-bit in hexadecimals as being one block that is separated by colons (":").

xxxx:xxxx:xxxx:xxxx:xxxx:xxxx:xxxx:xxxx

- Use 0 - ffff (FFFF) (hexadecimal, alphanumeric characters) for inputting an IPv6 address
- The current setting is displayed with 0 - ffff (hexadecimal, "a" - "f" are lowercase letters)
- Up to 128-bit
- The first 64-bit (prefix) of the link local address is fixed to "fe80::"

The following three abbreviation methods are available for IPv6 addresses:

(1) Omission of the first "0" of a block that follows consecutive zeros.

[Example] 2001:1000:0120:0000:0000:0123:0000:0000

↓

2001:1000:120:0000:0000:123:0000:0000

(2) Replacement of "0000" blocks with "0".

[Example] 2001:1000:120:0000:0000:123:0000:0000

↓

2001:1000:120:0:0:123:0:0

(3) Replacement of a block with consecutive zeros by "::" is performed only once.

[Example] 2001:1000:120:0:0:123:0:0

↓

2001:1000:120::123:0:0 is OK

2001:1000:120::123:: is not allowed (Replacement of a block with consecutive zeros by "::" is allowed only once.)

Caution

- The following IP addresses cannot be specified:
 - Link local addresses for which all of the values for the low 64-bit are "0"
 - Connect IP addresses (*1) for which the first 3-bit are not "001" or the first 7-bit are not "1111110"
 - *1: The connect IP address indicates either a "global address", "unique local address", or "6to4 address".
 - The first 64-bit of the gateway is "fe80::" and all of the values for low 64-bit are "0"
 - Network addresses for which the first 3-bit of the gateway are "001"
 - Network addresses for which the first 7-bit of the gateway are "1111110"
 - DNS server IP addresses for which the first 3-bit are not "001" or the first 7-bit are not "1111110"

Available IPv6 Address

No.	Allocated addresses	Settable range for addresses	Length of subnet prefix
1	Global address	2000::1 - 3fff:ffff:ffff:ffff:ffff:ffff:ffff:ffff	3 - 128
2	Unique local address	fc00::1 - fdff:ffff:ffff:ffff:ffff:ffff:ffff:ffff	7 - 128
3	Link local address	fe80::1 - fe80::ffff:ffff:ffff:ffff	64-bit static IP address
4	6to4 address	2002:<IPv4 address in hexadecimal>::1 - 2002:<IPv4 address in hexadecimal>::ffff:ffff:ffff:ffff	48 - 128

Supplementary Information

- When accessing of the storage system from a different subnetwork is not allowed
Specify "IP Address" and "Subnet Mask" of the storage system.
Only accessing from the same subnetwork is allowed.
- When accessing of the storage system from a different subnetwork is allowed
Specify "Gateway" and "Allowable IP Address ("IP Address" (or "Network Address") and "Subnet Mask")".

[Example] Allowable IP Address (for IPv4)

- When accessing of the storage system from a specific client outside the subnetwork is allowed, specify "IP Address" and "Subnet Mask".
IP Address: 10.20.30.40
Subnet Mask: 255.255.255.255

- When accessing of the storage system from a specific subnetwork outside the subnetwork is allowed, specify "Network Address" and "Subnet Mask".

IP Address: 10.20.30.0

Subnet Mask: 255.255.255.0

For IPv6, "IP Address" corresponds to "Connect IP Address", and "Subnet Mask" corresponds to "Length of Subnet Prefix".

■ Operating Procedures

In this screen, configure the network environment for each port.

When Using IPv4

Procedure ▶▶▶

- 1 Select which port that the network environment is to be set for, and click [Setup Network Environment] in [Action].
- 2 Specify the parameters.
- 3 To allow access from a different subnetwork to the storage system, click the [Add] button.
→ The "[Add Allowable IP Address] Screen" (page 1218) appears.
- 4 Input the IP address and the subnet mask, and then click the [OK] button.
→ Returns to the [Setup Network Environment] screen.
- 5 Repeat Step 3 and Step 4 when registering multiple allowable IP addresses.
- 6 After registering the allowable IP address is complete, click the [Set] button.
→ A confirmation screen appears.

Caution

- When specifying the IP address or the subnet mask, note the following:
 - IP addresses must be specified with the IPv4 format.
 - The IP address of the RMT port must be in a different subnetwork from the MNT port.
 - Specify the IP address of the Slave CM when connecting to the Slave CM. The IP address of the Slave CM must be in the same subnetwork as the [Master CM](#).
 - Specify the IP address of "Gateway" when allowing access from outside of the subnetwork. The IP address must be in the same subnetwork as the port.
 - For "Allowable IP Address", specify the IP address or the network address that is allowed to access to the storage system. These settings are not required for access from the network address (same subnetwork) which the storage system belongs to.
 - For "DNS", specify different IP addresses for the MNT port and RMT port.
- Click the [Clear] button to delete setting parameters. Note that the parameters cannot be deleted if no other ports are available.

- 7 Click the [OK] button.
→ The network environment settings starts.

- 8 Click the [Done] button to return to the [Network] screen.

Caution

- Storage system management operation cannot be continued if the IP address of the storage system has been changed. Logging in again with the new IP address is required.



When Using IPv6

Procedure ▶▶▶

- 1 Select which port that the network environment is to be set for, and click [Setup Network Environment] in [Action].
- 2 Specify the parameters.

Note

- Click the [Automatic discovery] button to automatically obtain "Master IP Link Local Address", "Master Connect IP Address", "Slave IP Link Local Address", "Slave Connect IP Address", "Length of Subnet Prefix", and "Gateway". Input the IPv6 address of the DNS server if required.

- 3 To allow access from a different subnetwork to the storage system, click the [Add] button.
→ The "[Add Allowable IP Address] Screen" (page 1220) appears.
- 4 Input "Connect IP Address" and "Length of Subnet Prefix", and click the [OK] button.
→ Returns to the [Setup Network Environment] screen.
- 5 Repeat Step 3 and Step 4 when registering multiple allowable IP addresses.
- 6 After registering the allowable IP address is complete, click the [Set] button.
→ A confirmation screen appears.

Caution

- Note the following points when specifying an IP address:
 - IP addresses must be specified with the IPv6 format. Refer to "'IPv6 Address Notation' (page 1220)" for details.
 - The connect IP address of the RMT port must be in a different subnetwork from the MNT port.
 - Specify the connect IP address of the Slave CM when connecting to the Slave CM. The connect IP address of the Slave CM must be in the same subnetwork as the [Master CM](#).
 - Specify the IP address of "Gateway" when allowing access from outside of the subnetwork. The IP address must be in the same subnetwork as the port.
 - For "Allowable IP Address", specify the IP address or the network address that is allowed to access to the storage system. These settings are not required for access from the network address (same subnetwork) which the storage system belongs to.
 - For "DNS", specify different IP addresses for the MNT port and RMT port.
- Click the [Clear] button to delete setting parameters. Note that the parameters cannot be deleted if no other ports are available.

- 7 Click the [OK] button.
→ The network environment settings starts.
- 8 Click the [Done] button to return to the [Network] screen.

Caution

- Storage system management operation cannot be continued if the IP address of the storage system has been changed. Logging in again with the new IP address is required.



Setup Firewall


- ["■ Overview" \(page 1224\)](#)
- ["■ User Privileges" \(page 1225\)](#)
- ["■ Settings" \(page 1225\)](#)
- ["■ Operating Procedures" \(page 1226\)](#)

■ Overview

This function configures a firewall for each service.
Configuration is required for each MNT, RMT and FST port.

- MNT port
The MNT port is used for general communication between the storage system and the external hosts.
- RMT port
The RMT port is used when the line must be separated from the MNT port.
For the ETERNUS DX60 S5/DX100 S5/DX200 S5 and the ETERNUS AF150 S3/AF250 S3, this port is also used for maintenance of the storage system.
- FST port
The FST port is used for maintenance of the storage system.
This port must be configured for the ETERNUS DX500 S5/DX600 S5/DX900 S5, the ETERNUS DX8100 S4/DX8900 S4, and the ETERNUS AF650 S3.

Caution

- If both HTTP and HTTPS have been disabled, Web GUI cannot access the storage system.
- If both Telnet and SSH have been disabled, CLI cannot access the storage system.
- If ports of all the services are disabled, access to the storage system is not allowed.
- When the firewall setting is changed, it takes approximately 10 seconds to update the storage system information. To display the most recently updated screen, wait at least 10 seconds and click the  icon in the [Network] screen or click [Network] in category.

Note

- To configure the network environment of the storage system, use the [Setup Network Environment] function.

■ User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	✓
StorageAdmin	
AccountAdmin	
SecurityAdmin	
Maintainer	✓

Refer to "[A. User Roles and Policies](#)" (page 1580) for details on the policies and roles.

■ Settings

Firewall Settings

In this screen, configure the firewall of each port for each service.

Item	Description	Setting values
Acceptable Protocol	HTTP	Specify whether to enable or disable the HTTP connection. Select the checkbox to enable the connection. HTTP is used when accessing from Web GUI.
	HTTPS	Specify whether to enable or disable the HTTPS connection. Select the checkbox to enable the connection. HTTPS is used when accessing from Web GUI. This connection uses the data encryption for data transferring.
	Telnet	Specify whether to enable or disable the Telnet connection. Select the checkbox to enable the connection. Telnet is used when accessing from CLI.
	SSH	Specify whether to enable or disable the SSH connection. Select the checkbox to enable the connection. Secure Shell (SSH) is used when accessing from CLI. This connection uses the data encryption for data transferring.
	ICMP	Specify whether to enable or disable the ICMP connection. Select the checkbox to enable the connection. The Internet Control Message Protocol (ICMP) is used when sending the "ping" command from a PC.
		Selected: Enabled (Default) Cleared: Disabled
		Selected: Enabled (Default) Cleared: Disabled
		Selected: Enabled (Default) Cleared: Disabled
		Selected: Enabled (Default) Cleared: Disabled
		Selected: Enabled (Default) Cleared: Disabled

Item	Description	Setting values
Maintenance-Secure	Specify whether to enable or disable the Maintenance-Secure connection. Select the checkbox to enable the connection. Maintenance-Secure is used when connecting with the monitoring software, or performing a firmware update from the peer storage system using the Remote Support function. This connection uses the data encryption for data transferring.	Selected: Enabled (Default) Cleared: Disabled
RESTful API(HTTPS)	Specify whether to enable or disable the RESTful API connection. Select the checkbox to enable the connection. RESTful API is an HTTPS-based call interface of the web system and is implemented according to REpresentational State Transfer (REST).	Selected: Enabled (Default) (*1) Cleared: Disabled
SNMP	Specify whether to enable or disable the SNMP connection. Select the checkbox to enable the connection. The Simple Network Management Protocol (SNMP) is used when accessing from SNMP Agent Manager.	Selected: Enabled (Default) Cleared: Disabled
RCIL	Specify whether to enable or disable the RCIL connection. Select the checkbox to enable the connection. Whether to enable or disable this parameter can only be set for the MNT port. The Remote Cabinet Interface over LAN (RCIL) controls the power of the storage system from a host via Ethernet by using the Intelligent Platform Management Interface (IPMI), which is a general protocol.	Selected: Enabled Cleared: Disabled (Default)
ECD	Specify whether to enable or disable the ECD connection. Select the checkbox to enable the connection. Whether to enable or disable this parameter can only be set for the MNT port. The ECD is a port that is used to collect the configuration information from the storage system that is connected to the network using the Remote Installation function.	Selected: Enabled (Default) Blank: Disabled

*1 : This item is enabled in the factory settings. If a controller firmware version earlier than V11L40 is upgraded to version V11L40 or later, this item is disabled before shipping.

■ Operating Procedures

Procedure ▶▶▶

- 1 Select which port to set the firewall for (multiple selections can be made) and click [Setup Firewall] in [Action].
- 2 Specify whether to enable or disable the connection of each service, and click the [Set] button.
→ A confirmation screen appears.
- 3 Click the [OK] button.
→ Setting of the firewall starts.
- 4 Click the [Done] button to return to the [Network] screen.



Setup SNMP Agent Basic Interface

- ["■ Overview" \(page 1227\)](#)
- ["■ User Privileges" \(page 1227\)](#)

- ["■ Settings" \(page 1228\)](#)
- ["■ Operating Procedures" \(page 1228\)](#)

■ Overview

This function sets up the SNMP Agent basic interface in the storage system. Simple Network Management Protocol (SNMP) is a standard protocol used for network management.

Caution

- When SNMP Manager exists in a different subnetwork from the storage system, specify the IP address or the network address of SNMP Manager in "Allowable IP Address" of the [Setup Network Environment] function.
- Before enabling the SNMP function, use the [Setup Firewall] function to allow the "SNMP" connection for the setting target LAN port.

Note

- By using the [Initial Setup] function, the SNMP Agent environment can be configured with the wizard. When the [Initial Setup] function is not used, configure the SNMP Agent environment in the following order:

Procedure ▶▶▶

- 1 Setup SNMP Agent Basic Interface
- 2 Setup SNMP Manager
- 3 Setup SNMP Agent MIB Access View
- 4 Setup SNMP Agent User (*1)
- 5 Setup SNMP Agent Community (*2)
- 6 Setup SNMP Agent Trap

*1 : This setting is required to use SNMPv3 for SNMP communication.

*2 : This setting is required to use SNMPv1 or SNMPv2c for SNMP communication.

- The parameter settings specified using this function remain even when the "SNMP Function" setting is changed from "Enable" to "Disable".

■ User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	✓
StorageAdmin	
AccountAdmin	
SecurityAdmin	
Maintainer	✓

Refer to ["A. User Roles and Policies" \(page 1580\)](#) for details on the policies and roles.

■ Settings

Basic Interface

In this screen, sets up the SNMP Agent basic interface.

Item	Description	Setting values
SNMP Function	Select whether to enable or disable the SNMP function.	Enable Disable
LAN Port used for Remote Support	When enabling the SNMP function, select the port used for SNMP from "MNT" or "RMT". When sending a SNMPv1 trap, the agent-address of the trap sender is the Master CM IP address of the selected port.	MNT RMT
Authentication Failure	When enabling the SNMP function, select "Send SNMP Trap" or "Do not send SNMP Trap" when authentication fails.	Send SNMP Trap Do not send SNMP Trap
Engine ID	When enabling the SNMP function, input the engine ID of the SNMP. The engine ID is a unique identifier used to distinguish the connection target storage system between the SNMP Agent Manager and the SNMP Agent. It is not necessary to change the default setting for normal use. The default engine ID of the storage system is as follows: Octet 1 - 4: Bitwise OR between the company code (fujitsu=211) and 0x80000000 Octet 5 : 0x80 (fixed) Octet 6 - 13: WWN of the storage system (8 bytes)	Alphanumeric characters (0 - 9, A - F, a - f) Inputting only "0" or "F" for the "Engine ID" field is not allowed 10 - 64 characters (even number) Default
MIB-II RFC Version	When enabling the SNMP function, select either "RFC1213" or "RFC4293" as the MIB-II support RFC version. Although it is not necessary to change the default setting ("RFC1213") for normal use, select the RFC version that is supported by the SNMP manager. <ul style="list-style-type: none"> • RFC1213: This mode is used for MIB-II that supports RFC1213. This RFC supports IPv4 addresses. • RFC4293: This mode is used for MIB-II that supports RFC4293. This RFC supports IPv4 addresses and IPv6 addresses. This RFC is an extended definition for RFC1213. 	RFC1213 RFC4293

■ Operating Procedures

Procedure ▶▶▶

- 1 Click [Setup SNMP Interface] in [Action].
- 2 Specify the parameters, and click the [Set] button.
→ A confirmation screen appears.

Caution

- If the entered engine ID does not satisfy the input conditions, an error screen appears.

- 3 Click the [OK] button.
→ Setting of the SNMP Agent basic starts.

- 4 Click the [Done] button to return to the [Network] screen.



Setup SNMP Manager

- ["■ Overview" \(page 1229\)](#)
- ["■ User Privileges" \(page 1229\)](#)
- ["■ Display Contents" \(page 1229\)](#)
- ["■ Settings" \(page 1230\)](#)
- ["■ Operating Procedures" \(page 1231\)](#)

■ Overview

This function specifies the IP address of the SNMP Manager.

The SNMP Manager is used when accessing the storage system using the community name or the user name, or when sending a trap from the storage system to the SNMP Manager.

Up to ten SNMP Managers can be specified for each storage system.

Caution

- If the "SNMP Function" is disabled, this function cannot be used.
- The IP address of the SNMP Manager that is used in the [Setup SNMP Agent Community] function or the [Setup SNMP Agent Trap] function cannot be changed or deleted.
- When SNMP Manager exists in a different subnetwork from the storage system, specify the IP address or the network address of SNMP Manager in "Allowable IP Address" of the [Setup Network Environment] function.

■ User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	✓
StorageAdmin	
AccountAdmin	
SecurityAdmin	
Maintainer	✓

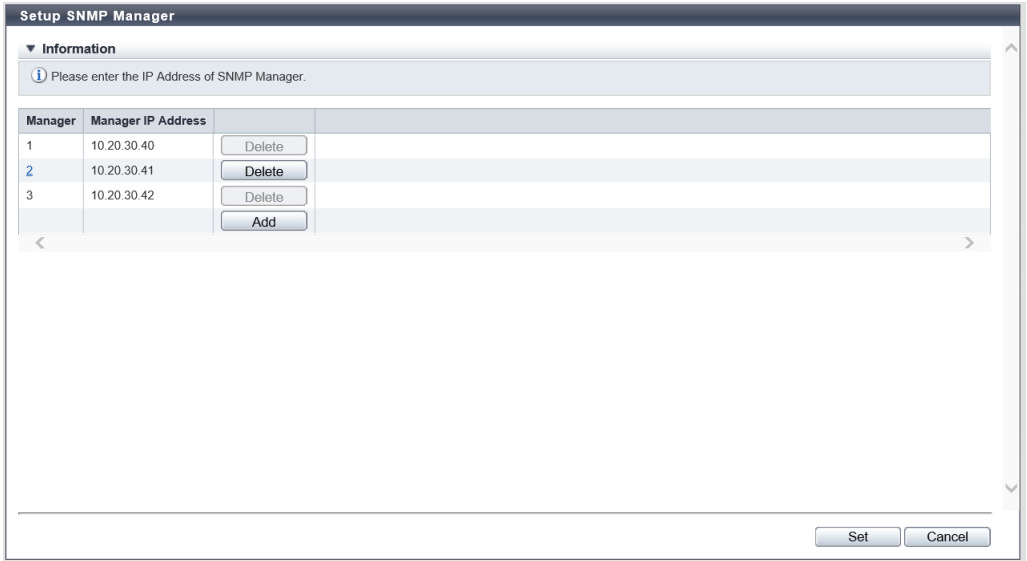
Refer to ["A. User Roles and Policies" \(page 1580\)](#) for details on the policies and roles.

■ Display Contents

The IP addresses of the SNMP Managers that are registered in the storage system are displayed.

Click the [Add] button to display the ["\[Manager\] Screen" \(page 1230\)](#). Specify the IP address in the ["\[Manager\] Screen" \(page 1230\)](#).

8. System
Network



Item	Description
Manager	<p>The management number (1 to 10) of the SNMP Manager is displayed. The management number is acquired from the smallest available number. Click the [Manager] link to display the "[Manager] Screen" (page 1230). IP address of the SNMP Manager can be edited in the [Manager] screen.</p> <div style="background-color: #fff9c4; padding: 5px;"> <p>Caution</p> <ul style="list-style-type: none"> The [Manager] link for the SNMP Manager that is used in the [Setup SNMP Agent Community] function or the [Setup SNMP Agent Trap] function cannot be clicked. </div>
Manager IP Address	<p>The IP address of the SNMP Manager is displayed. Note that the IPv6 address is displayed as an abbreviation. Refer to "[IPv6 Address Notation]" (page 659) for details.</p>

■ Settings

[Manager] Screen

In this screen, register or edit the IP address of the SNMP Manager.

Item	Description	Setting values
IP Version	Select "IPv4" or "IPv6" for the IP version of the SNMP Manager IP address.	IPv4 (Default) IPv6
Manager IP Address (IPv4)	<p>Input the IP address of the SNMP Manager with the IPv4 format. The IP address which has already been used cannot be entered. This setting is enabled when "IPv4" is selected for "IP Version".</p>	<p>xxx.xxx.xxx.xxx xxx: 1 - 255 for the top field (decimal) xxx: 0 - 255 for other fields (decimal) Blank (Default)</p>

Item	Description	Setting values
Manager IP Address (IPv6)	<p>Input the IP address of the SNMP Manager with the IPv6 format.</p> <p>The following IPv6 addresses can be used; "link local address", "global address", "unique local address", or "6to4 address". Refer to ""Available IPv6 Address" (page 1221)" for details.</p> <p>The IP address which has already been used cannot be entered.</p> <p>This setting is enabled when "IPv6" is selected for "IP Version".</p>	<p>xxxx:xxxx:xxxx:xxxx:xxxx:xxxx:xxxx:xxxx</p> <p>xxxx: 0 - ffff (FFFF) (hexadecimal, alphanumeric characters)</p> <p>Refer to ""IPv6 Address Notation" (page 1220)" for details.</p> <p>Blank (Default)</p>

Function Button

Button	Description
[Add]	<p>Adds an IP address.</p> <p>If the maximum number of IP addresses have been registered, the [Add] button cannot be clicked.</p>
[Delete]	<p>Deletes an IP address.</p> <p>The [Delete] button cannot be clicked in the following conditions:</p> <ul style="list-style-type: none"> • The SNMP Manager is used in the [Setup SNMP Agent Community] function or the [Setup SNMP Agent Trap] function • No IP addresses have been registered

■ **Operating Procedures**

Procedure ▶▶▶

- 1 Click [Setup SNMP Manager] in [Action].
- 2 When adding a Manager IP address, click the [Add] button.
Click the [Manager] link to edit the Manager IP address.
→ The [Manager] screen appears.

Note

- To delete the existing Manager IP address, click the [Delete] button for the target IP address.

- 3 Add or edit the Manager IP address, and click the [OK] button.
→ Returns to the original screen.
- 4 Repeat Step 2 and Step 3 when registering multiple Manager IP addresses.
- 5 After adding or editing the Manager IP address, click the [Set] button.
→ A confirmation screen appears.
- 6 Click the [OK] button.
→ The SNMP Manager setting starts.
- 7 Click the [Done] button to return to the [Network] screen.



Setup SNMP Agent MIB Access View

- ["■ Overview" \(page 1232\)](#)
- ["■ User Privileges" \(page 1232\)](#)
- ["■ Display Contents" \(page 1232\)](#)
- ["■ Settings" \(page 1233\)](#)
- ["■ Operating Procedures" \(page 1234\)](#)

■ Overview

This function sets up the SNMP Agent MIB View.

MIB View is used for defining the accessible area in the Management Information Base (MIB) database, with a tree type structure. Use this item when defining the accessible area in the MIB database.

Up to ten MIB Views, including the default view, can be created for each storage system. There are three types of default views: "ViewALL", "View-mib2", and "View-exmib". The default view can be changed or deleted.

Caution

- If the "SNMP Function" is disabled, this function cannot be used.
- The view name that is used in the settings in the [Setup SNMP Agent User] function or the [Setup SNMP Agent Community] function cannot be changed or deleted. However, note that the MIB View (Subtree) can be changed.

■ User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	✓
StorageAdmin	
AccountAdmin	
SecurityAdmin	
Maintainer	✓

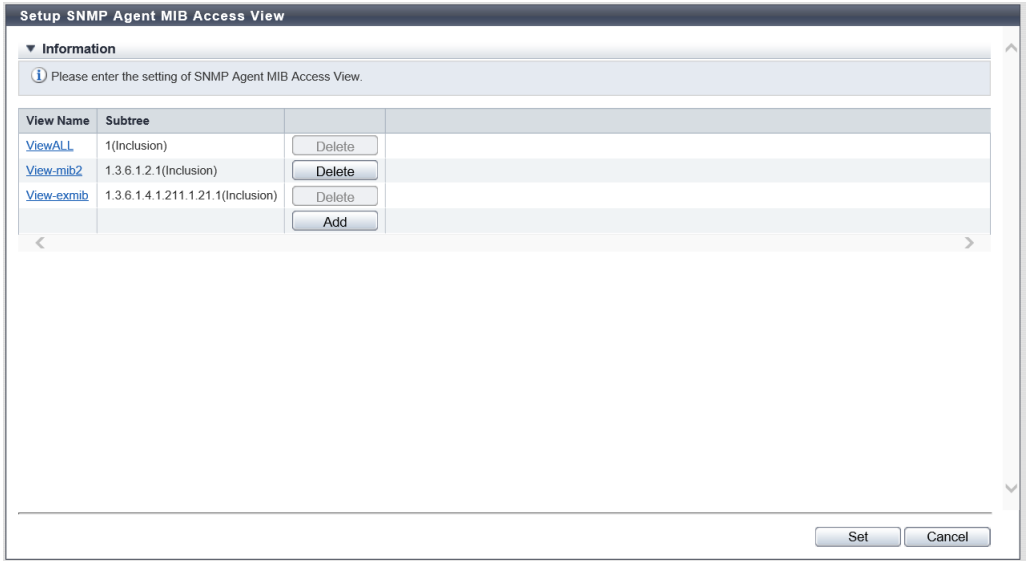
Refer to ["A. User Roles and Policies" \(page 1580\)](#) for details on the policies and roles.

■ Display Contents

The registered MIB Views in the storage system are displayed.

Click the [Add] button to display the ["\[MIB Access View\] Screen" \(page 1233\)](#). Configure the view name and the subtree in the ["\[MIB Access View\] Screen" \(page 1233\)](#).

8. System
Network



Item	Description
View Name	The MIB View name (*1) is displayed. Click the [View] link to display the "[MIB Access View] Screen" (page 1233). The MIB View can be edited in the [MIB Access View] screen.
Subtree	The subtree is displayed in the Object ID format. This item displays whether the Subtree1 - Subtree10, which have been specified in the MIB View, are included as, or excluded from, the MIB access range.

*1 : The default view and the newly registered MIB View(s) are displayed.

The following table shows default views:

View Name	Subtree	Type	MIB access range
ViewALL	1	Inclusion	All MIBs which are supported by the storage system
View-mib2	1.3.6.1.2.1	Inclusion	Standard MIB (MIB-II)
View-exmib	1.3.6.1.4.1.211.1.21.1	Inclusion	Extension MIB

■ Settings

[MIB Access View] Screen

In this screen, register or edit the MIB View.

Item	Description	Setting values
View Name	Input the MIB View name. The view name which has already been used cannot be entered. Caution <ul style="list-style-type: none"> The view name of the MIB View that is used in the [Setup SNMP Agent User] function or the [Setup SNMP Agent Community] function cannot be changed. 	Up to 32 alphanumeric characters, symbols ("!", "#", "&", "_", "+", "-", "*", "/"), and spaces

Item	Description	Setting values
Subtree1 - Subtree10	Specify the MIB access range of the corresponding view in the subtree. Input the subtree in the Object ID format (*1). Select whether to include as or exclude from each subtree as the MIB access range. One or more subtrees are required per view. The same subtree cannot be specified multiple times in a single view. However, the same subtree can be configured to different views.	Alphabetic characters, numeric characters (1 - 65535), and symbols Spaces 1 - 251 characters Inclusion Exclude

*1: The "Object ID" is indicated by using "." (periods) in a format such as "1.3.6.1.2.1.1".

The setting range of each value that is separated using "." (periods) is 1 - 65535.

A total of up to 251 characters can be entered (including periods).

The following values cannot be entered in the storage system:

- (1) Values starting with a period: ".1.3.6.1.2.1.1"
- (2) Value ending with a period: "1.3. 6.1.2.1.1."
- (3) Values with two consecutive periods: "1. . 3. 6. 1. 2. 1. 1"
- (4) Values including "0": "1.3.6.1.2.0.1"

Function Button

Button	Description
[Add]	Adds the MIB View. If the maximum number of MIB Views have been registered, the [Add] button cannot be clicked.
[Delete]	Deletes the MIB View. The [Delete] button cannot be clicked in the following conditions: <ul style="list-style-type: none"> • The MIB View is used in the [Setup SNMP Agent User] function or the [Setup SNMP Agent Community] function • No MIB Views have been registered

■ Operating Procedures

Procedure ▶▶▶

- 1 Click [Setup SNMP MIB View] in [Action].
 - 2 When adding an MIB View, click the [Add] button.
Click the [View Name] link to edit the MIB View.
→ The [MIB Access View] screen appears.
- Note**

 - To delete the existing MIB View, click the [Delete] button for the target MIB View.
- 3 Add or edit the MIB View, and click the [OK] button.
→ Returns to the original screen.
 - 4 Repeat Step 2 and Step 3 to configure multiple MIB Views.
 - 5 After adding or editing the MIB View, click the [Set] button.
→ A confirmation screen appears.
 - 6 Click the [OK] button.
→ Setting of the SNMP Agent MIB Access View starts.
 - 7 Click the [Done] button to return to the [Network] screen.



Setup SNMP Agent User

- ["■ Overview" \(page 1235\)](#)
- ["■ User Privileges" \(page 1235\)](#)
- ["■ Display Contents" \(page 1235\)](#)
- ["■ Settings" \(page 1236\)](#)
- ["■ Operating Procedures" \(page 1237\)](#)

■ Overview

This function sets up the user which accesses the SNMP Agent. The security level and the MIB access range are configured for each user. Up to ten users can be specified for each storage system.

Caution

- If the "SNMP Function" is disabled, this function cannot be used.
- The user name that is used in the "Setup SNMP Agent Trap" cannot be changed or deleted. However, note that some of the user information (MIB View Setting, Authentication, and Encryption) can be changed.
- This function must be used when using SNMPv3 in SNMP communication between the SNMP Agent and the SNMP Manager. This setting is not necessary when SNMPv1 or SNMPv2c is used for SNMP communication.

Note

- The authentication and encryption can be enabled/disabled, and also the MIB access range can be specified, for each user.

■ User Privileges

Availability of Executions in the Default Role

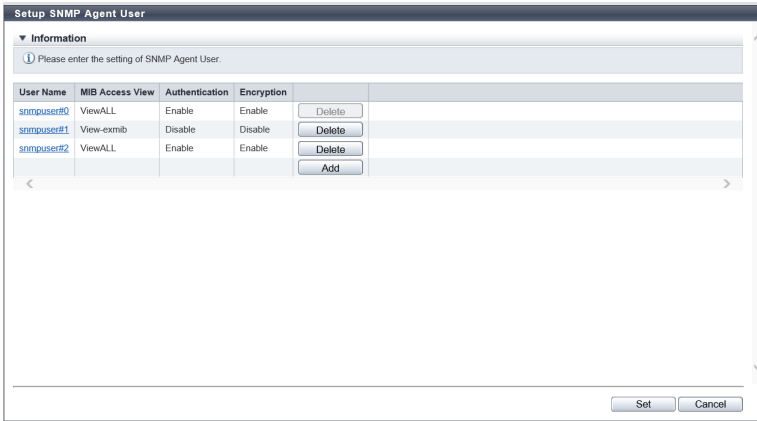
Default role	Availability of executions
Monitor	
Admin	✓
StorageAdmin	
AccountAdmin	
SecurityAdmin	
Maintainer	✓

Refer to ["A. User Roles and Policies" \(page 1580\)](#) for details on the policies and roles.

■ Display Contents

The list of user information that is registered in the storage system is displayed. Click the [Add] button to display the ["\[Setup SNMP Agent User\] Screen" \(page 1236\)](#). Specify the user information in the ["\[Setup SNMP Agent User\] Screen" \(page 1236\)](#).

8. System Network



Item	Description
User Name	The user name is displayed. Click the [User Name] link to display the "[Setup SNMP Agent User] Screen" (page 1236). The user information can be edited in the [Setup SNMP Agent User] screen.
MIB Access View	The view name to indicate the MIB access range for each user is displayed.
Authentication	Whether the authentication is enabled or disabled is displayed.
Encryption	Whether the encryption is enabled or disabled is displayed.

■ Settings

[Setup SNMP Agent User] Screen

In this screen, register or edit the user information.

Item	Description	Setting values
User Name	Input the user name which accesses the SNMP Agent. The user name which has already been used cannot be entered. Caution <ul style="list-style-type: none"> The user name that is used in the [Setup SNMP Agent Trap] function cannot be changed. 	8 - 32 alphanumeric characters, symbols ("!", "#", "&", "_", "+", "-", "*", "/"), and spaces
MIB View Setting	Select the view name to specify the MIB access range for the user. A "blank" means accessing the MIB is not allowed. Note <ul style="list-style-type: none"> If "ViewALL", "View-mib2", or "View-exmib" is deleted by using the [Setup SNMP Agent MIB Access View] function, the deleted options are not displayed for "MIB View Setting". 	ViewALL View-mib2 View-exmib The view name that is registered with the [Setup SNMP Agent MIB Access View] function Blank
Authentication	Select whether to enable or disable the authentication.	Enable Disable
Authentication Method	When enabling authentication, select the authentication method from "MD5" (Message Digest 5) or "SHA" (Secure Hash Algorithm).	MD5 SHA

8. System
Network

Item	Description	Setting values
Authentication Password	When enabling authentication, input the authentication password.	8 - 64 alphanumeric characters, symbols ("!", "#", "&", "_", "+", "-", "*", "/"), and spaces
Retype Authentication Password	When enabling authentication, input the authentication password again.	Input the same password as the "Authentication Password" field
Encryption	Select whether to enable or disable the encryption. If the authentication setting is "Disable", the encryption setting cannot be selected.	Enable Disable
Encryption Method	To enable encryption, select either "DES" (Data Encryption Standard) or "AES" (Advanced Encryption Standard) as the encryption method.	DES AES
Encryption Password	When enabling encryption, input the encryption password.	8 - 64 alphanumeric characters, symbols ("!", "#", "&", "_", "+", "-", "*", "/"), and spaces
Retype Encryption Password	When enabling the encryption, input the encryption password again.	Input the same password as the "Encryption Password" field

Function Button

Button	Description
[Add]	Adds an SNMP agent user. If the maximum number of SNMP agent users have been registered, the [Add] button cannot be clicked.
[Delete]	Deletes an SNMP agent user. The [Delete] button cannot be clicked in the following conditions: <ul style="list-style-type: none"> • The user is used in the [Setup SNMP Agent Trap] function • No users have been registered

■ **Operating Procedures**

Procedure ▶▶▶

- 1 Click [Setup SNMP User] in [Action].
- 2 When adding a user, click the [Add] button.
Click the [User Name] link to edit the user.
→ The [Setup SNMP Agent User] screen appears.

Note

- To delete the existing user, click the [Delete] button for the target user.

- 3 Add or edit the user, and click the [OK] button.
→ Returns to the original screen.
- 4 Repeat Step 2 and Step 3 to configure multiple users.
- 5 After adding or editing the user, click the [Set] button.
→ A confirmation screen appears.
- 6 Click the [OK] button.
→ The SNMP Agent User setting starts.

7 Click the [Done] button to return to the [Network] screen.



Setup SNMP Agent Community

- "[■ Overview](#)" (page 1238)
- "[■ User Privileges](#)" (page 1238)
- "[■ Display Contents](#)" (page 1238)
- "[■ Settings](#)" (page 1239)
- "[■ Operating Procedures](#)" (page 1240)

■ Overview

This function sets up the SNMP Agent Community.

The Community is a range of available networks for SNMP.

The setting value is used as the password for SNMP Manager to access the SNMP Agent of the storage system.

The SNMP Agent only accepts a request from SNMP Manager if the specified community names for SNMP Manager and SNMP Agent are the same.

Up to ten communities can be specified for each storage system.

Caution

- If the "SNMP Function" is disabled, this function cannot be used.
- The community name that is used in the [Setup SNMP Agent Trap] cannot be changed or deleted.
- This function must be used when using SNMPv1 or SNMPv2c in SNMP communication between the SNMP Agent and the SNMP Manager. This setting is not necessary when using SNMPv3 only.

Note

- The SNMP Managers which are allowed to access, and the MIB access range, can be specified for each community.

■ User Privileges

Availability of Executions in the Default Role

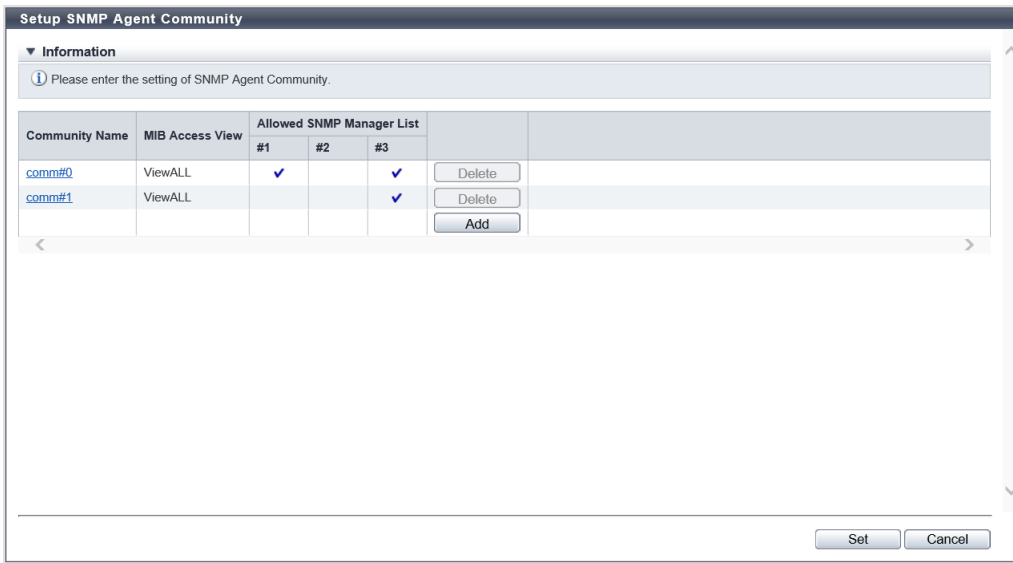
Default role	Availability of executions
Monitor	
Admin	✓
StorageAdmin	
AccountAdmin	
SecurityAdmin	
Maintainer	✓

Refer to "["A. User Roles and Policies" \(page 1580\)](#)" for details on the policies and roles.

■ Display Contents

In this screen, the registered communities in the storage system are displayed.

Click the [Add] button to display the "[Setup SNMP Agent Community] Screen" (page 1239). Specify the community settings in the "[Setup SNMP Agent Community] Screen" (page 1239).



Item	Description
Community Name	The community name is displayed. Click the [Community Name] link to display the "[Setup SNMP Agent Community] Screen" (page 1239). The community information can be edited in the [Setup SNMP Agent Community] screen.
MIB Access View	The view name to indicate the MIB access range for each community is displayed. A "blank" means accessing the MIB is not allowed.
Allowed SNMP Manager List	The management number of the SNMP Manager, "#x" (x: 1 - 10) which has been registered using the [Setup SNMP Manager] function, is displayed. Only the selected SNMP Manager is allowed to access. However, if the Allowed SNMP Agent Manager List has been left blank, all of the SNMP Managers (*1) are allowed to access. *1: Not only the SNMP Manager which has been registered using the [Setup SNMP Manager] function, but also the other SNMP Managers are allowed to access.

■ Settings

[Setup SNMP Agent Community] Screen

In this screen, register or edit a community.

Item	Description	Setting values
Community Name	Input the community name to be used when accessing a MIB or sending a trap. The community name which has already been used cannot be entered. Caution <ul style="list-style-type: none"> The community name that is used in the [Setup SNMP Agent Trap] function cannot be changed. 	Up to 32 alphanumeric characters, symbols ("!", "#", "&", "_", "+", "-", "*", "/"), and spaces

Item	Description	Setting values
View Name	<p>Select the view name to specify the MIB access range for the community. A "blank" means accessing the MIB is not allowed.</p> <p>Note</p> <ul style="list-style-type: none"> If "ViewALL", "View-mib2", or "View-exmib" is deleted by using the [Setup SNMP Agent MIB Access View] function, the deleted options are not displayed for "View Name". 	<p>ViewALL View-mib2 View-exmib The view name that is registered with the [Setup SNMP Agent MIB Access View] function Blank</p>
Allowed SNMP Manager List	<p>Select the IP address of the SNMP Manager which is allowed to access in the community. Only the selected SNMP Manager is allowed to access. However, if the Allowed SNMP Agent Manager List has been left blank, all of the SNMP Managers (*1) are allowed to access.</p> <p>*1 : Not only the SNMP Manager which has been registered using the [Setup SNMP Manager] function, but also the other SNMP Managers are allowed to access.</p>	<p>Checkbox Selected: Allowed Cleared: Not allowed</p>

Function Button

Button	Description
[Add]	<p>Adds a community. If the maximum number of communities have been registered, the [Add] button is not displayed.</p>
[Delete]	<p>Deletes a community. The [Delete] button cannot be clicked in the following conditions:</p> <ul style="list-style-type: none"> The community is used in the [Setup SNMP Agent Trap] function No communities have been registered

■ **Operating Procedures**

Procedure ▶▶▶

- 1 Click [Setup SNMP Community] in [Action].
- 2 When adding a community, click the [Add] button.
Click the [Community Name] link to edit the community.
→ The [Setup SNMP Agent Community] screen appears.

Note

- To delete the existing community, click the [Delete] button for the target community.

- 3 Add or edit the community, and click the [OK] button.
→ Returns to the original screen.
- 4 Repeat Step 2 and Step 3 to configure multiple communities.
- 5 After adding or editing the community, click the [Set] button.
→ A confirmation screen appears.
- 6 Click the [OK] button.
→ The SNMP Agent Community setting starts.

7 Click the [Done] button to return to the [Network] screen.



Setup SNMP Agent Trap

- "[Overview](#)" (page 1241)
- "[User Privileges](#)" (page 1241)
- "[Display Contents](#)" (page 1241)
- "[Settings](#)" (page 1242)
- "[Operating Procedures](#)" (page 1243)

■ Overview

This function notifies events that occur in the storage system to the SNMP Manager by an SNMP Trap. This function configures the trap destination, the trap version, etc. Up to ten traps can be specified for each storage system.

Caution

- If the "SNMP Function" is disabled, this function cannot be used.
- When SNMP Manager exists in a different subnetwork from the storage system, specify the IP address or the network address of SNMP Manager in "Allowable IP Address" of the [Setup Network Environment] function.

■ User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	✓
StorageAdmin	
AccountAdmin	
SecurityAdmin	
Maintainer	✓

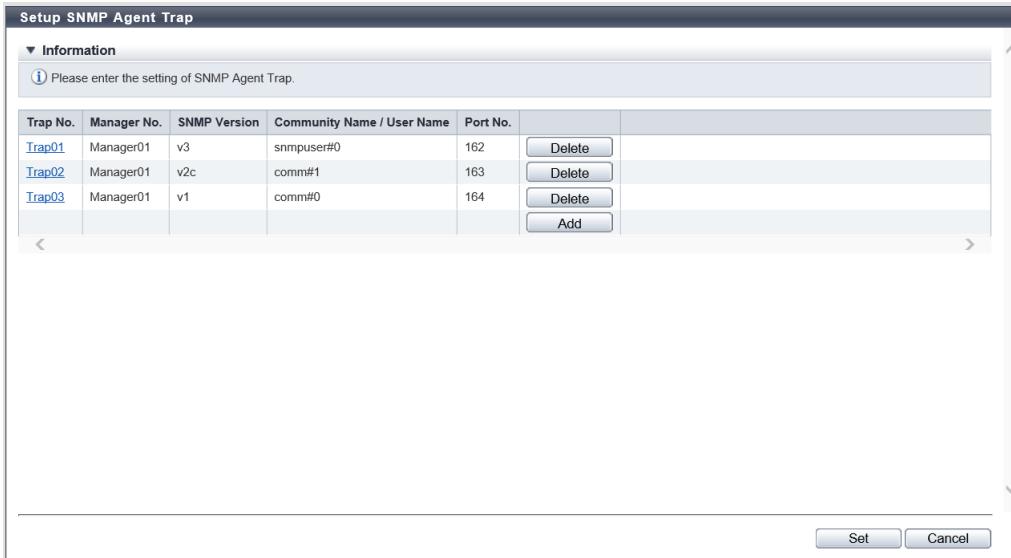
Refer to "[A. User Roles and Policies](#)" (page 1580) for details on the policies and roles.

■ Display Contents

The registered traps in the storage system are displayed.

Click the [Add] button to display the "[\[Setup SNMP Agent Trap\] Screen](#)" (page 1242). Specify the trap settings in the "[\[Setup SNMP Agent Trap\] Screen](#)" (page 1242).

8. System Network



Item	Description
Trap No.	The serial number of the port is displayed. The management number (Trap01 to Trap10) is acquired from the smallest available number. Click the [Trap No.] link to display the "[Setup SNMP Agent Trap] Screen" (page 1242). The trap setting can be edited in the [Setup SNMP Agent Trap] screen.
Manager No.	The management number (Manager01 to Manager10) of the trap destination manager is displayed.
SNMP Version	The trap SNMP version is displayed. v1 v2c v3
Community Name/User Name	If the "SNMP Version" is "v1" or "v2c", the community name used when sending a trap is displayed. If the "SNMP Version" is "v3", the user name used when sending a trap is displayed.
Port No.	The port number of the trap destination is displayed.

■ Settings

[Setup SNMP Agent Trap] Screen

In this screen, register or edit a trap.

Item	Description	Setting values
Manager No.	Select a manager number. The management number of the SNMP Manager, which has been registered using the [Setup SNMP Manager] function, is displayed as an option.	Manager01 (Default) - Manager10
SNMP Version	Select the trap SNMP version.	v1 (Default) v2c v3
Community Name	Select the community name used when sending a trap. The community name which has been registered using the [Setup SNMP Agent Community] function, is displayed as an option. If "v1" or "v2c" is selected as the "SNMP Version", the "Community Name" must be specified.	Community name

Item	Description	Setting values
User Name	Select the user name used when sending a trap. The user name which has been registered using the [Setup SNMP Agent User] function, is displayed as an option. If "v3" has been selected as the "SNMP Version", the "User Name" must be specified.	User name
Port No.	Input the port number of the trap destination. When changing a port number, input a unique port number.	1 - 65535 162 (Default)

Function Button

Button	Description
[Add]	Adds an SNMP Agent Trap. If the maximum number of traps have been registered, the [Add] button is not displayed.
[Delete]	Deletes an SNMP Agent Trap. If no traps have been registered, the [Delete] button is not displayed.

■ Operating Procedures

Procedure ▶▶▶

- 1 Click [Setup SNMP Trap] in [Action].
- 2 When adding a trap, click the [Add] button.
Click the [Trap No.] link to edit the trap.
→ The [Setup SNMP Agent Trap] screen appears.

Note

- To delete the existing trap, click the [Delete] button for the target trap.

- 3 Add or edit the trap information, and click the [OK] button.
→ Returns to the original screen.
- 4 Repeat Step 2 and Step 3 to configure information for multiple traps.
- 5 After adding or editing the trap information, click the [Set] button.
→ A confirmation screen appears.

Caution

- An error screen appears in the following conditions:
 - "Manager No." or "Community Name/User Name" is not entered
 - A trap with the same parameters (except the "Trap No.") exists
 - A trap with the same parameters (except the "Trap No." and the "Port No.") exists

- 6 Click the [OK] button.
→ The SNMP Agent Trap setting starts.
- 7 Click the [Done] button to return to the [Network] screen.



Download MIB File

- ["■ Overview" \(page 1244\)](#)
- ["■ User Privileges" \(page 1244\)](#)
- ["■ Settings" \(page 1244\)](#)
- ["■ Operating Procedures" \(page 1244\)](#)

■ Overview

This function downloads the [MIB](#) definition file in the storage system.
The MIB definition file is used by the application which uses [SNMP](#) (SNMP Manager).

■ User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	✓
StorageAdmin	
AccountAdmin	
SecurityAdmin	
Maintainer	✓

Refer to ["A. User Roles and Policies" \(page 1580\)](#) for details on the policies and roles.

■ Settings

Download MIB File

Item	Description	Setting values
Option	Select the "The ServerView control code is added to the comment line of the MIB definition file" checkbox when downloading the MIB file used for storage system monitoring by ServerView.	Selected Cleared
Version	Select the SNMP version used for storage system monitoring.	v1 v2c/v3

■ Operating Procedures

Procedure ▶▶▶

- 1 Click [Download MIB File] in [Action].
- 2 Specify the parameters, and click the [Download] button.
→ A confirmation screen appears.
- 3 Click the [OK] button.
→ A dialog box to download the file appears.
- 4 Save the downloaded file.
The default file name is "FJDARY-E153.MIB".
→ The files are saved.

- 5 Click the [Done] button to return to the [Network] screen.



Send SNMP Trap Test

- ["■ Overview" \(page 1245\)](#)
- ["■ User Privileges" \(page 1245\)](#)
- ["■ Operating Procedures" \(page 1245\)](#)

■ Overview

This function transmits the test trap from the SNMP Agent to the SNMP Manager. The SNMP Trap is the event information reported by the storage system (SNMP Agent). Perform SNMP Agent and SNMP Manager settings before executing this test.

Caution

- Perform the following settings before executing this test. If the SNMP function is disabled, the trap test cannot be performed.
 - Setup Network Environment
 - Setup SNMP Agent Basic Interface
 - Setup SNMP Manager
 - Setup SNMP Agent MIB Access View
 - Setup SNMP Agent User
 - Setup SNMP Agent Community
 - Setup SNMP Agent Trap
- This function transmits a test trap.
- When SNMP Manager exists in a different subnetwork from the storage system, specify the IP address or the network address of SNMP Manager in "Allowable IP Address" of the [Setup Network Environment] function.

■ User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	✓
StorageAdmin	
AccountAdmin	
SecurityAdmin	
Maintainer	✓

Refer to ["A. User Roles and Policies" \(page 1580\)](#) for details on the policies and roles.

■ Operating Procedures

Procedure ▶▶▶

- 1 Click [Send SNMP Trap] in [Action].

- 2 Click the [Send] button.
→ A confirmation screen appears.
- 3 Click the [OK] button.
→ The SNMP Trap test is performed.
- 4 Click the [Done] button to return to the [Network] screen.

Caution

- Confirm that the trap has been successfully received by SNMP Manager after the SNMP Trap test has been performed.



Display SMTP Log

- ["■ Overview" \(page 1246\)](#)
- ["■ User Privileges" \(page 1246\)](#)
- ["■ Display Contents" \(page 1246\)](#)
- ["■ Operating Procedures" \(page 1247\)](#)

■ Overview

This function displays the E-Mail communication log between the storage system and the E-Mail server. If the E-Mail communication is not operated properly, this function may identify the cause of problem. The E-Mail communication log contains requests from the storage system to the server and responses from the server to the storage system. Only the E-Mail communication log for the last executed event is displayed.

Caution

- Server connection related settings must be complete in advance using the [Display SMTP Log] function.

■ User Privileges

Availability of Executions in the Default Role

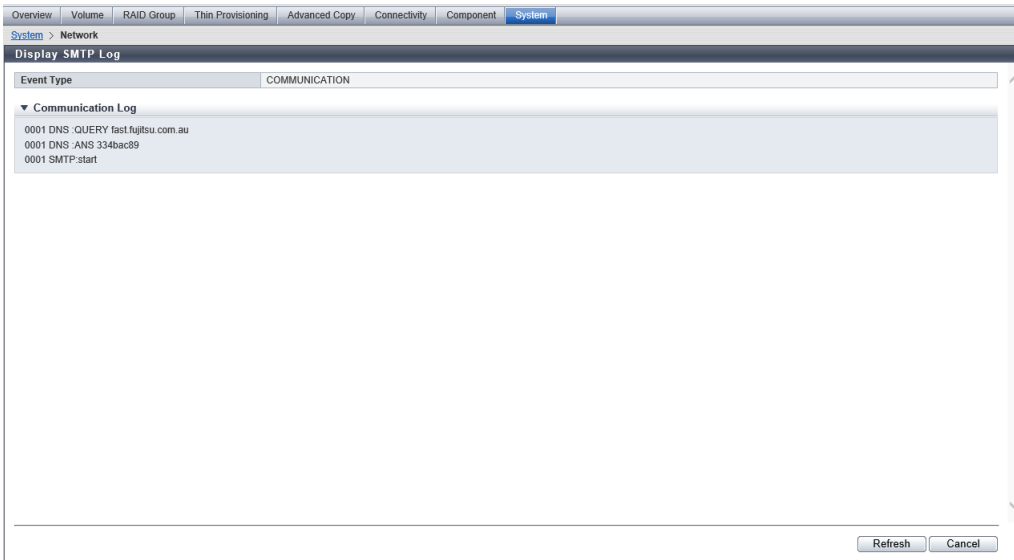
Default role	Availability of executions
Monitor	
Admin	✓
StorageAdmin	
AccountAdmin	
SecurityAdmin	
Maintainer	✓

Refer to "["A. User Roles and Policies" \(page 1580\)](#)" for details on the policies and roles.

■ Display Contents

In this screen, the E-Mail communication log is displayed. Check the displayed event type and the communication log.

8. System Network



Event Type

Item	Description
Event Type	The type of the last executed event is displayed. If this information cannot be obtained, the field is blank.

Communication log

Item	Description
Communication Log	The communication log of the last executed event is displayed. If this information cannot be obtained, the field is blank.

■ Operating Procedures

Procedure ▶▶▶

- 1 Click [Display SMTP Log] in [Action].
- 2 Check the displayed "Event Type" and the "Communication Log".

Note

- Click the [Refresh] button to update the displayed information.

- 3 Click the [Cancel] button to return to the [Network] screen.

Setup E-Mail Notification

- "■ Overview" (page 1248)
- "■ User Privileges" (page 1248)
- "■ Settings" (page 1248)
- "■ Operating Procedures" (page 1250)

■ Overview

This function is used to configure the E-mail Notification settings for the various events detected by the storage system.

Use the [Setup Event Notification] function to specify which events are to be notified.

Caution

- To stop the event notification via E-Mail, perform one of the following procedures.
 - Select "No" for "Notification E-Mail".
 - Clear the "E-Mail" checkbox of the notification method using the [Setup Event Notification] function.

■ User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	✓
StorageAdmin	
AccountAdmin	
SecurityAdmin	
Maintainer	✓

Refer to "'A. User Roles and Policies" (page 1580)" for details on the policies and roles.

■ Settings

[Notification E-Mail] Tab

In this screen, specify the E-mail notification parameters.

Notification E-Mail Settings

Item	Description	Setting values
Notification E-Mail	Select whether to enable ("Yes") or disable ("No") the E-Mail notifications.	Yes No (Default)
Destination E-Mail Address	Specify the E-Mail destination address. At least one address must be specified. Up to five addresses can be specified.	Up to 63 alphanumeric characters and symbols (except space)
Comment	Input the message (comment) to be added to the E-Mail. The comment can be omitted.	Up to 255 characters Within ten lines Alphanumeric characters, symbols, and spaces

[E-Mail Server Settings] Tab

Specify the mail server that is to be used.

Mail Server Settings

Item	Description	Setting values
LAN Port used for SMTP Connection	Select the LAN port connecting to the SMTP server from "MNT" or "RMT".	MNT RMT
SMTP Server	Specify the IP address or domain name of the SMTP server that is to be used. There are two methods to specify an IP address; "IPv4" and "IPv6". The following IPv6 addresses can be used; "link local address", "global address", "unique local address", or "6to4 address". Refer to "Available IPv6 Address" (page 1221) for details. When the current setting is displayed, the IPv6 address is displayed as an abbreviation.	For IPv4 address xxx.xxx.xxx.xxx xxx: 1 - 255 for the top field (decimal) xxx: 0 - 255 for other fields (decimal) For IPv6 address xxxx:xxxx:xxxx:xxxx:xxxx:xxxx:xxxx:xxxx xxxx: 0 - ffff (FFFF) (hexadecimal, alphanumeric characters) Refer to "IPv6 Address Notation" (page 1220) for details. For specifying the domain name Up to 239 alphanumeric characters and symbols
SMTP Port No.	Specify the port number used by the SMTP server.	1 - 65535 25 (Default)
Sender E-Mail Address	Input the E-Mail address of the storage system.	Up to 63 alphanumeric characters and symbols (except space)
SMTP over SSL	Select "None", "STARTTLS", or "SSL/TLS" for the SMTP over SSL method.	None STARTTLS SSL/TLS
SMTP requires authentication	Select the user authorization method to connect to the SMTP server from "None" or "AUTH SMTP".	None AUTH SMTP
Authentication Method	If "AUTH SMTP" is selected for "SMTP Authentication Information", select the authentication method from "Automatic", "CRAM-MD5", "PLAIN", or "LOGIN".	Automatic CRAM-MD5 PLAIN LOGIN
User Name	If "AUTH SMTP" is selected for "SMTP requires authentication", input the sender user name.	Up to 64 alphanumeric characters and symbols
Password	When "AUTH SMTP" is selected for "SMTP requires authentication", input the sender password.	Up to 64 alphanumeric characters and symbols

[Advanced Settings] Tab

In this screen, configure the timer settings.

Timer Settings

Item	Description	Setting values
"Change following Timing Parameter items" checkbox	To change the timing parameters, select the checkbox.	
Connection Timeout	Input the timeout limit for SMTP connection.	Numeric characters 1 - 300 sec. 5 sec. (Default)

Item	Description	Setting values
Response Timeout	Input the timeout limit for SMTP response.	Numeric characters 1 - 300 sec. 5 sec. (Default)
Maximum Retries	Input the maximum retry count.	0 - 5 count
Retry Interval	Input the interval between each retry attempt.	1 - 300 sec.

■ Operating Procedures

Procedure ▶▶▶

- 1 Click [Setup E-Mail Notification] in [Action].
- 2 Specify the parameters, and click the [Set] button.
→ A confirmation screen appears.
- 3 Click the [OK] button.
→ The E-mail notification setting is executed.
- 4 Click the [Done] button to return to the [Network] screen.

Note

- Perform the following operations to confirm that an E-Mail can be sent to the specified address.

Procedure ▶▶▶

- 1 Select "Yes" for "Notification E-Mail", and click the [Set] button to save the changes.
(Even if "Yes" is already selected for "Notification E-Mail", the settings must be saved when settings such as the destination E-Mail address are changed.)
- 2 Restart this function and then click the [Send Test E-Mail] button.

Setup Syslog

- "[■ Overview](#)" (page 1250)
- "[■ User Privileges](#)" (page 1251)
- "[■ Settings](#)" (page 1251)
- "[■ Operating Procedures](#)" (page 1252)

■ Overview

This function sets up external servers (Syslog servers) for sending logs of events that are detected by the storage system.

Up to two Syslog servers can be registered.

The following events are sent as Syslogs:

- All the notification target events that are configured using the [Setup Event Notification] function
- Logins and logouts from Web GUI and CLI

Caution

- Select whether to send ("on") or not send ("off") Syslogs for each storage system.
- Confirm that the Syslog has been successfully sent to the Syslog server by logging in and out from Web GUI or CLI and performing a transmission test to the Syslog server.
- Even if a communication error occurs between the storage system and the Syslog server, the Syslog is not sent again.

Note

- Use the [Setup Event Notification] function for specifying events to be notified as a Syslog.
- Syslogs are sent to both Syslog servers at the same time.
- The parameter settings for Syslog remain even when the "Send Log" setting is changed to "off". If the wrong Syslog settings information is specified, an error message appears during configuration.

■ **User Privileges**

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	✓
StorageAdmin	
AccountAdmin	
SecurityAdmin	
Maintainer	✓

Refer to ["A. User Roles and Policies" \(page 1580\)](#) for details on the policies and roles.

■ **Settings**

Up to two Syslog servers can be configured. Configure the following parameters for each Syslog server.

Syslog Server1, Syslog Server2

Item	Description	Setting values
Send Log	Select from "on (RFC3164)", "on (RFC5424)", or "off" for Syslog sending. Logs are sent in the selected RFC message format.	on (RFC3164) on (RFC5424) off
Domain Name/IP Address	Input the domain name or the IP address of the Syslog server. There are two methods to specify an IP address; "IPv4" and "IPv6". The following IPv6 addresses can be used; "link local address", "global address", "unique local address", or "6to4 address". Refer to "Available IPv6 Address" (page 1221) for details. When the current setting is displayed, the IPv6 address is displayed as an abbreviation.	For domain name specification Up to 63 alphanumeric characters and symbols For IPv4 address xxx.xxx.xxx.xxx xxx: 1 - 255 for the top field (decimal) xxx: 0 - 255 for other fields (decimal) For IPv6 address xxxx:xxxx:xxxx:xxxx:xxxx:xxxx:xxxx:xxxx xxxx: 0 - ffff (FFFF) (hexadecimal, alphanumeric characters) Refer to "IPv6 Address Notation" (page 1220) for details.

8. System
Network

Item	Description	Setting values
Port No.	Input the port number used to send a Syslog.	Numeric characters 1 - 65535 514 (Default)
LAN Port	Select the LAN port from "MNT" or "RMT" that is to be used to send a Syslog.	MNT RMT

■ Operating Procedures

Procedure ▶▶▶

- 1 Click [Setup Syslog] in [Action].
- 2 Specify the parameters, and click the [Set] button.
→ A confirmation screen appears.

Caution

- An error screen appears if the specified IP address of the Syslog server conflicts with the internal IP address of the storage system.

Note

- Up to two Syslog servers can be configured. When configuring a second Syslog server, specify the required parameters in "Syslog Server2".

- 3 Click the [OK] button.
→ Setting of the Syslog starts.
- 4 Click the [Done] button to return to the [Network] screen.



Setup SSH Server Key

- ["■ Overview" \(page 1252\)](#)
- ["■ User Privileges" \(page 1253\)](#)
- ["■ Settings" \(page 1253\)](#)
- ["■ Operating Procedures" \(page 1253\)](#)

■ Overview

This function sets up the SSH server key that is used when encrypting communication using Secure SHell (SSH).

SSH is used when accessing from CLI.

Caution

- After the SSH server key setting has been changed, the information must be updated in the storage system before accessing from CLI via the SSH connection. Log out from CLI and wait a few minutes before logging in again.

Note

- The SSH server key is specified in the factory settings (key length: 2048 bits).
- Even if the SSH server key setting are changed, a setting PC that logs in to CLI via a Telnet connection is not affected.

■ **User Privileges**

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	✓
StorageAdmin	
AccountAdmin	
SecurityAdmin	
Maintainer	✓

Refer to "[A. User Roles and Policies](#)" (page 1580) for details on the policies and roles.

■ **Settings**

SSH Server Key Setting

Item	Description	Setting values
Key Length	Select the SSH server key length. The SSH server key length is equivalent to the encryption level. In general, the longer the key is, the higher the encryption level becomes (meaning that decrypting the encrypted data is difficult).	1024 bit 2048 bit (Default) 4096 bit

■ **Operating Procedures**

Procedure ▶▶▶

- 1 Click [Setup SSH Server Key] in [Action].
- 2 Specify the parameters, and click the [Set] button.
→ A confirmation screen appears.
- 3 Click the [OK] button.
→ Setting of the SSH server key starts.
- 4 Click the [Done] button to return to the [Network] screen.

Caution

- After the SSH server key setting has been changed, the information must be updated in the storage system before being accessed from CLI via the SSH connection. Log out from CLI and wait a few minutes before logging in again.



Create Self-signed SSL Certificate

- "[■ Overview](#)" (page 1254)
- "[■ User Privileges](#)" (page 1255)
- "[■ Settings](#)" (page 1256)
- "[■ Operating Procedures](#)" (page 1256)

■ Overview

This function performs settings for creating the SSL server key and the self-signed SSL certificate to be used when encrypting communication using Secure Socket Layer (SSL).

SSL is used when accessing from Web GUI via the HTTPS connection.

When creating a self-signed SSL certificate, the following operations and confirmations are required. Follow the procedure to perform the required operations.

Procedure ▶▶▶

- 1** Back up the self-signed SSL certificate that is currently registered in the storage system.
- 2** Stop access from the SMI-S client and RESTful API client and log out all the Web GUI users (other than yourself) currently logged in to the storage system.
- 3** Use this function to create an SSL server key and a self-signed SSL certificate, and then log out from Web GUI.
After the creation is instructed, HTTP/HTTPS communications are stopped to apply the certificate. Access from Web GUI or RESTful API via the HTTP/HTTPS connection is not available until the certificate is applied.
- 4** After Step 3 is completed, wait a few minutes and then check the following error log. Refer to "[Display/Delete Event Log](#)" (page 1404) for details.
 - When RESTful API is disabled
Network service startup error. service=GUI <ce# $\$b$ cm# $\$c$ factor= $\$d$ >
 - When RESTful API is enabled
Network service startup error. service=GUI <ce# $\$b$ cm# $\$c$ factor= $\$d$ >
and
Network service startup error. service=Restful API <ce# $\$b$ cm# $\$c$ factor= $\$d$ >
- 5** If an error log is output in Step 4, re-execute the procedure from Step 2. If no error logs are output in Step 4, proceed to Step 6.
- 6** Register the self-signed SSL certificate on the browser. Refer to "Note" for details.
If RESTful API is enabled, apply the self-signed SSL certificate to the RESTful API client and then restart the HTTPS communication.



Caution

- The HTTPS connection from Web GUI is disabled in the factory settings.
- After the SSL server key and the self-signed SSL certificate are created, access from RESTful API and Web GUI via the HTTP/HTTPS connection is not available until they are applied to the storage system.
- The self-signed SSL certificate must be registered on the browser in the setting PC. Until the registration has been completed, a warning message is displayed when accessing from Web GUI via the HTTPS connection.
- If this function is executed while the following conditions are all satisfied, a message requesting the reboot of SMI-S appears in the result screen. Refer to the [Setup SMI-S Environment] function for details.
 - "Enable" is selected for "SMI-S"
 - "Web GUI SSL Certificate" is selected for "SSL Certificate"

Note

- There are two types of SSL certificates: the "self-signed SSL certificate" that is created by this function and the "SSL server certificate". Register either of the certificates in the storage system when using the HTTPS connection. To use the "SSL server certificate", use the [Create Key/CSR] function and the [Register SSL Certificate] function.
- When using the key server to manage the SED authentication key, a trusted SSL certificate (a "self-signed SSL certificate" or an "SSL server certificate") is required to establish communication between the storage system and the key server. When using the key management server linkage function to manage the key, register the SSL certificate for the storage system. The SSL certificate is transferred to the key server from the storage system when the key is updated. Refer to the [Update SED Authentication Key] function for details.
- Refer to "Installing the Security Certificate" in "Configuration Guide (Web GUI)" for procedure to install the self-signed SSL certificate.

■ User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	✓
StorageAdmin	
AccountAdmin	
SecurityAdmin	
Maintainer	✓

Refer to ""A. User Roles and Policies" (page 1580)" for details on the policies and roles.

■ Settings

Create Self-signed SSL Certificate Setting

Item	Description	Setting values
Key Length	Select the SSL server key length. The SSL server key length is equivalent to the encryption level. In general, the longer the key is, the higher the encryption level becomes (meaning that decrypting the encrypted data is difficult).	1024 bit 2048 bit (Default) 4096 bit
Common Name	Enter the main IP address or a Fully Qualified Domain Name (FQDN) of the port (an MNT port, an RMT port, or an FST (*1) port) for using with HTTPS access from Web GUI (required). *1: FST can be used for the ETERNUS DX500 S5/DX600 S5/DX900 S5, the ETERNUS DX8100 S4/DX8900 S4, and the ETERNUS AF650 S3. There are two methods to specify the main IP address; "IPv4" and "IPv6". The following IPv6 addresses can be used; "link local address", "global address", "unique local address", or "6to4 address". Refer to " Available IPv6 Address " (page 1221) for details. When the current setting is displayed, the IPv6 address is displayed as an abbreviation.	<ul style="list-style-type: none"> For IPv4 address <ul style="list-style-type: none"> xxx.xxx.xxx.xxx xxx: 1 - 255 for the top field (decimal) xxx: 0 - 255 for other fields (decimal) Class must be A, B, or C. For IPv6 address xxxx:xxxx:xxxx:xxxx:xxxx:xxxx:xxxx:xxxx xxxx: 0 - ffff (FFFF) (hexadecimal, alphanumeric characters) Refer to "IPv6 Address Notation" (page 1220) for details. For FQDN Up to 63 alphanumeric characters and symbols (except "<", ">", "~", "!", "@", "#", "\$", "%", "^", "\\", "?", "&", and space)
Subject Alt Name	Enter IP addresses or FQDNs of the ports (multiple MNT ports, RMT ports, and FST (*1) ports) to use with HTTPS access from Web GUI. For the IP address or the FQDN, the primary IP address or FQDN that is entered in the "Common Name" field is included. *1: FST can be used for the ETERNUS DX500 S5/DX600 S5/DX900 S5, the ETERNUS DX8100 S4/DX8900 S4, and the ETERNUS AF650 S3. There are two methods to specify an IP address; "IPv4" and "IPv6". The following IPv6 addresses can be used; "link local address", "global address", "unique local address", or "6to4 address". Refer to " Available IPv6 Address " (page 1221) for details. When the current setting is displayed, the IPv6 address is displayed as an abbreviation.	<ul style="list-style-type: none"> For IPv4 address <ul style="list-style-type: none"> xxx.xxx.xxx.xxx xxx: 1 - 255 for the top field (decimal) xxx: 0 - 255 for other fields (decimal) Class must be A, B, or C. For IPv6 address xxxx:xxxx:xxxx:xxxx:xxxx:xxxx:xxxx:xxxx xxxx: 0 - ffff (FFFF) (hexadecimal, alphanumeric characters) Refer to "IPv6 Address Notation" (page 1220) for details. For FQDN Up to 511 alphanumeric characters and symbols (A linefeed code is also counted as one character. Except "<", ">", "~", "!", "@", "#", "\$", "%", "^", "\\", "?", "&", and space.) Multiple IP addresses and FQDNs can be specified. Start a new line for each IP address or FQDN when specifying multiple IP addresses and FQDNs. If IPv4 addresses, IPv6 addresses, and FQDNs exist in the setting field, up to 511 characters that include a "." (dot), a ":" (colon), and a linefeed code can be entered.

■ Operating Procedures

Procedure ▶▶▶

- 1 Click [Create SSL Certificate] in [Action].

- 2 Specify the parameters, and click the [Create] button.
→ A confirmation screen appears.

Caution

- An error screen appears in the following conditions:
 - When items do not satisfy the input conditions
 - When all of the required items are not input

- 3 Click the [OK] button.
→ Creation of the self-signed SSL certificate starts.

- 4 Click the [Done] button to return to the [Network] screen.

Note

- Access from RESTful API and Web GUI via the HTTP/HTTPS connection is not available until the certificate is applied to the storage system.
- If SMI-S is enabled, a message requesting the reboot of SMI-S appears. Refer to the [Setup SMI-S Environment] function for details.



Create Key/CSR

- ["■ Overview" \(page 1257\)](#)
- ["■ User Privileges" \(page 1258\)](#)
- ["■ Settings" \(page 1258\)](#)
- ["■ Operating Procedures" \(page 1259\)](#)

■ **Overview**

This function performs settings for creating and exporting the SSL server key and the Certificate Signing Request (CSR) which are used to acquire a SSL server certificate. CSR is a certificate application form to submit to the certification authority.

Caution

- Check the necessary items for authentication beforehand.
- When using the key server for SED authentication key management, a self-signed SSL certificate or an SSL server certificate is required to establish the communication between the storage system and the key server. These SSL certificates are used as trusted certificates of the storage system. When using the key management server linkage function to manage the key, register the SSL server certificate for the storage system. The registered SSL server certificate is transferred to the key server from the storage system when the key is updated. Refer to the [Update SED Authentication Key] function for details.

Note

- To register the SSL server key and the SSL server certificate in the storage system, use the [Register SSL Certificate] function.

■ User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	✓
StorageAdmin	
AccountAdmin	
SecurityAdmin	
Maintainer	✓

Refer to ""A. User Roles and Policies" (page 1580)" for details on the policies and roles.

■ Settings

Create Key/CSR Setting

Item	Description	Setting values
Key Length	Select the SSL server key length. The SSL server key length is equivalent to the encryption level. In general, the longer the key is, the higher the encryption level becomes (meaning that decrypting the encrypted data is difficult).	1024 bit 2048 bit (Default) 4096 bit
Country Name	Input the country code which conforms to ISO-3166 A2 (required). (Example) Japan: JP	Alphabetic characters (upper case) (A - Z) Two fixed letters
State or Province Name	Input the prefecture where the organization is located (required). (Example) Kanagawa	Up to 63 alphabetic characters (A - Z, a - z) and spaces
Locality Name	Input the municipality where the organization is located (required). (Example) Kawasaki	Up to 63 alphabetic characters (A - Z, a - z) and spaces
Organization Name	Input the organization name (required). (Example) XXX LIMITED	Up to 63 alphabetic characters (A - Z, a - z), numeric characters (0 - 9), and spaces
Organization Unit Name	Input the department/division name of the organization (required). (Example) YYYYYY Division	Up to 63 alphabetic characters (A - Z, a - z), numeric characters (0 - 9), and spaces

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Item	Description	Setting values
Common Name	<p>Enter the main IP address or a Fully Qualified Domain Name (FQDN) of the port (an MNT port, an RMT port, or an FST (*1) port) for using with HTTPS access from Web GUI (required).</p> <p>*1 : FST can be used for the ETERNUS DX500 S5/ DX600 S5/DX900 S5 and the ETERNUS AF650 S3.</p> <p>There are two methods to specify the main IP address; "IPv4" and "IPv6". The following IPv6 addresses can be used; "link local address", "global address", "unique local address", or "6to4 address". Refer to "Available IPv6 Address" (page 1221) for details. When the current setting is displayed, the IPv6 address is displayed as an abbreviation.</p>	<ul style="list-style-type: none"> For IPv4 address <ul style="list-style-type: none"> xxx.xxx.xxx.xxx xxx: 1 - 255 for the top field (decimal) xxx: 0 - 255 for other fields (decimal) Class must be A, B, or C. For IPv6 address <ul style="list-style-type: none"> xxxx:xxxx:xxxx:xxxx:xxxx:xxxx:xxxx:xxxx xxxx: 0 - ffff (FFFF) (hexadecimal, alphanumeric characters) Refer to "IPv6 Address Notation" (page 1220) for details. For FQDN <ul style="list-style-type: none"> Up to 63 alphanumeric characters and symbols (except "<", ">", "~", "!", "@", "#", "\$", "%", "^", "\\", "?", "&", and space)
Subject Alt Name	<p>Enter IP addresses or FQDNs of the ports (multiple MNT ports, RMT ports, and FST (*1) ports) to use with HTTPS access from Web GUI. For the IP address or the FQDN, the primary IP address or FQDN that is entered in the "Common Name" field is included.</p> <p>*1 : FST can be used for the ETERNUS DX500 S5/ DX600 S5/DX900 S5 and the ETERNUS AF650 S3.</p> <p>There are two methods to specify an IP address; "IPv4" and "IPv6". The following IPv6 addresses can be used; "link local address", "global address", "unique local address", or "6to4 address". Refer to "Available IPv6 Address" (page 1221) for details. When the current setting is displayed, the IPv6 address is displayed as an abbreviation.</p>	<ul style="list-style-type: none"> For IPv4 address <ul style="list-style-type: none"> xxx.xxx.xxx.xxx xxx: 1 - 255 for the top field (decimal) xxx: 0 - 255 for other fields (decimal) Class must be A, B, or C. For IPv6 address <ul style="list-style-type: none"> xxxx:xxxx:xxxx:xxxx:xxxx:xxxx:xxxx:xxxx xxxx: 0 - ffff (FFFF) (hexadecimal, alphanumeric characters) Refer to "IPv6 Address Notation" (page 1220) for details. For FQDN <ul style="list-style-type: none"> Up to 511 alphanumeric characters and symbols (A linefeed code is also counted as one character. Except "<", ">", "~", "!", "@", "#", "\$", "%", "^", "\\", "?", "&", and space.) <p>Multiple IP addresses and FQDNs can be specified. Start a new line for each IP address or FQDN when specifying multiple IP addresses and FQDNs. If IPv4 addresses, IPv6 addresses, and FQDNs exist in the setting field, up to 511 characters that include a "." (dot), a ":" (colon), and a linefeed code can be entered.</p>

Select Export File

Item	Description	Setting values
File Name	Select the file that is to be downloaded.	Key File CSR File

Operating Procedures

Procedure ▶▶▶

- 1 Click [Create Key/CSR] in [Action].

- 2 Specify the parameters, and click the [Create] button.
→ A confirmation screen appears.

Caution

- An error screen appears in the following conditions:
 - When items do not satisfy the input conditions
 - When all of the required items are not input

- 3 Click the [OK] button.
→ The creation of the CSR starts. When the creation of the CSR is complete, the screen for downloading the file is displayed.

- 4 Select the file that is to be downloaded, and click the [Export] button.
→ A dialog box to download the file appears.

- 5 Save the downloaded file.
 - The default key file name is "ServerKey_serial number for the storage system_YYYY-MM-DD_hh-mm-ss.txt".
 - The default CSR file name is "ServerCsr_serial number for the storage system_YYYY-MM-DD_hh-mm-ss.txt".
(YYYY-MM-DD_hh-mm-ss: the date and time when the download screen (Step 4) is displayed.)→ The files are saved.

Note

- Perform Step 4 and Step 5 for each key file and CSR file that is to be exported.

- 6 Click the [Done] button to return to the [Network] screen.



Register SSL Certificate

- ["■ Overview" \(page 1260\)](#)
- ["■ User Privileges" \(page 1262\)](#)
- ["■ Settings" \(page 1263\)](#)
- ["■ Operating Procedures" \(page 1263\)](#)

■ Overview

This function registers the SSL server key and the SSL server certificate which was obtained from the certification authority.

The following two methods are available for obtaining an "SSL server key" and an "SSL server certificate".

- Using the [Create Key/CSR] function of this storage system
Create an "SSL server key" and a "Certificate Signing Request (CSR)" using the [Create Key/CSR] function and send them to the certification authority to obtain an "SSL server certificate".
- Using a tool or website other than this storage system
Use a publicly available tool or website to obtain an "SSL server key" and an "SSL server certificate" issued from the certification authority.

When registering an SSL server certificate, the following operations and confirmations are required. Follow the procedure to perform the required operations.

Procedure ▶▶▶

- 1 Back up the SSL server certificate that is currently registered in the storage system.
- 2 Stop access from the SMI-S client and RESTful API client and log out all the Web GUI users (other than yourself) currently logged in to the storage system.
- 3 Use this function to create an SSL server key and an SSL server certificate, and then log out from Web GUI.
After the registration is instructed, HTTP/HTTPS communications are stopped to apply the certificate to the storage system. Access from Web GUI or RESTful API via the HTTP/HTTPS connection is not available until the certificate is applied.
- 4 After Step 3 is completed, wait a few minutes and then check the following error log. Refer to [""Display/Delete Event Log" \(page 1404\)"](#) for details.
 - When RESTful API is disabled
Network service startup error. service=GUI <ce#%b cm#\$c factor=%d>
 - When RESTful API is enabled
Network service startup error. service=GUI <ce#%b cm#\$c factor=%d>
and
Network service startup error. service=Restful API <ce#%b cm#\$c factor=%d>
- 5 If an error log is output in Step 4, re-execute the procedure from Step 2. If no error logs are output in Step 4, proceed to Step 6.
- 6 If RESTful API is enabled, apply the SSL server certificate to the RESTful API client and then restart the HTTPS communication.

Caution

- The HTTPS connection from Web GUI is disabled in the factory settings.
- The "SSL server certificate" in the PFX format must be converted to the Privacy Enhanced Mail (PEM) format in advance. This function does not support "SSL server certificates" in the PFX format. Refer to [""How to convert and register "SSL server certificates" in the PFX format" \(page 1262\)"](#) for details.
- Register the SSL server key and the SSL server certificate as a pair in the storage system. If the combination of the SSL server key and the SSL server certificate is incorrect, access from RESTful API and Web GUI via the HTTPS connection is not possible.
- After the SSL server key and the SSL server certificate are registered, access from RESTful API and Web GUI via the HTTP/HTTPS connection is not available until they are applied to the storage system.
- When the SSL server key and the SSL server certificate are registered in the storage system, the setting PC, which has accessed to Web GUI via the HTTPS connection, will be forced to disconnect.
- If this function is executed while the following conditions are all satisfied, a message requesting the reboot of SMI-S appears in the result screen. Refer to the [Setup SMI-S Environment] function for details.
 - "Enable" is selected for "SMI-S"
 - "Web GUI SSL Certificate" is selected for "SSL Certificate"

Note

- There are two types of SSL certificate: the "SSL server certificate" and the "self-signed SSL certificate". Register either of the certificates in the storage system when using the HTTPS connection. To use the "self-signed SSL certificate", use the [Create Self-signed SSL Certificate] function.

How to convert and register "SSL server certificates" in the PFX format

The storage system supports the registration of certificates in the Privacy Enhanced Mail (PEM) format, but does not support certificates in the PFX format. Use software such as OpenSSL to convert certificates in the PFX format to the PEM format, and then register the "secret key (key file)" and the "SSL server certificate (crt file)" in the storage system.

<Setting Example When OpenSSL Is Used>

customer.pfx: Files in the PFX format before the conversion

customer.key: Files in the PEM format after the conversion (secret keys)

customer.crt: Files in the PEM format after the conversion (SSL server certificates)

Procedure ▶▶▶

- 1 Confirm that the PFX formatted "SSL server certificate" includes the secret key and the SSL server certificate.
openssl pkcs12 -nodes -info -in customer.pfx
- 2 Convert the PFX formatted "SSL server certificate" to the PEM formatted "secret key (key file)".
openssl pkcs12 -in customer.pfx -out customer.key -nodes -nocerts
- 3 Convert the PFX formatted "SSL server certificate" to the PEM formatted "SSL server certificate (crt file)".
openssl pkcs12 -in customer.pfx -out customer.crt -nodes -nokeys
- 4 Register the PEM formatted "secret key (key file)" and "SSL server certificate (crt file)" in the storage system by using this function.

Caution

- Depending on the version of the software that is used for conversions, registration of the converted files may fail. Use the latest version of the software and confirm that the conversion is performed successfully.

■ **User Privileges**

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	✓
StorageAdmin	
AccountAdmin	
SecurityAdmin	
Maintainer	✓

Refer to ""A. User Roles and Policies" (page 1580)" for details on the policies and roles.

■ Settings

Register SSL Certificate Setting

Item	Description	Setting values
SSL Server Key File	Click the [Browse...] button to specify SSL server key file. Click the [Import] button to import the SSL server key file to Web GUI. When importing has been completed, "Imported" is displayed.	SSL server key file
SSL Server Certificate File	Click the [Browse...] button to specify the SSL server certificate file. Click the [Import] button to import the SSL server certificate file to Web GUI. When importing has been completed, "Imported" is displayed.	SSL server certificate file

■ Operating Procedures

Procedure ▶▶▶

- 1 Click [Register SSL Certificate] in [Action].

Caution

- Either of the following items must be obtained in advance:
 - The "SSL server key" downloaded using the [Create Key/CSR] function of the storage system and the "SSL server certificate" obtained from the certification authority
 - An "SSL server certificate" that is created with a tool or website other than the storage system and is obtained from a certification authorityIf the "SSL server certificate" (including the "secret key" and the "SSL server certificate" pair) is in the PFX format, convert it to the PEM format and then register the converted files in the storage system. Refer to [""How to convert and register "SSL server certificates" in the PFX format" \(page 1262\)"](#) for details.

- 2 Click the [Browse...] button to specify the path to the "SSL Server Key File".
- 3 Click the [Import] button.
→ "Imported" is displayed.
- 4 Click the [Browse...] button to specify the path to the "SSL Server Certificate File".
- 5 Click the [Import] button.
→ "Imported" is displayed.
- 6 Confirm that the "SSL Server Key File" and the "SSL Server Certificate File" have been imported, and click the [Register] button.
→ A confirmation screen appears.

Caution

- An error screen appears in the following conditions:
 - The imported file was not the "SSL Server Key File"
 - The imported file was not the "SSL Server Certificate File"
 - The imported "SSL Server Certificate File" was not the certificate which corresponds to the SSL server key

- 7 Click the [OK] button.
→ The registration of the SSL server key and SSL server certificate starts.

- 8 Click the [Done] button to return to the [Network] screen.

Note

- Access from RESTful API and Web GUI via the HTTP/HTTPS connection is not available until the certificate is applied to the storage system.
- If SMI-S is enabled, a message requesting the reboot of SMI-S appears. Refer to the [Setup SMI-S Environment] function for details.



Setup SSL Security Configuration

- ["■ Overview" \(page 1264\)](#)
- ["■ User Privileges" \(page 1264\)](#)
- ["■ Settings" \(page 1265\)](#)
- ["■ Operating Procedures" \(page 1265\)](#)

■ Overview

This function sets the security method of the SSL communication to provide more secure communication.

Caution

- Enable the SSL version for HTTPS (GUI/REST) that is used for communication between the storage system and the setting PC. If the enabled SSL version setting used for communication is different between the storage system and the setting PC (web browser), access to the storage system from Web GUI is not allowed.
- At least one SSL version (TLS1.0/TLS1.1/TLS1.2) must be enabled for "HTTPS (GUI/REST)".

Note

- After the SSL version for "HTTPS (GUI/REST)" is specified, the new SSL session is applied from the next access (screen transition).
- The SSL version that is specified with this function is applied to all LAN ports (MNT/RMT/FST).

■ User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	✓
StorageAdmin	
AccountAdmin	
SecurityAdmin	✓
Maintainer	✓

Refer to ["A. User Roles and Policies" \(page 1580\)](#) for details on the policies and roles.

■ Settings

SSL Cipher Setting

Item	Description	Setting values
Allow only ECDHE Ciphers	If only ECDHE ciphers are allowed, select "Yes". Otherwise, select "No". If "Yes" is selected for this item, select "TLS1.2" for "HTTPS(GUI/REST)", "HTTPS(SMI-S)", and "Maintenance-Secure". Regardless of whether "TLS1.0" or "TLS1.1" is set, "TLS1.2" is used.	Yes No (Default)

SSL Version Settings

Item	Description	Setting values
HTTPS (GUI/REST)	Select the SSL version to enable for the HTTPS (GUI/REST) protocol. Select the checkbox to enable the SSL version.	Selected: Enabled (Default) Cleared: Disabled
HTTPS (SMI-S)	Select the SSL version to enable for the HTTPS (SMI-S) protocol. Select the checkbox to enable the SSL version.	Selected: Enabled (Default) Cleared: Disabled
Maintenance-Secure	Select the SSL version to enable for the Maintenance-Secure protocol. Select the checkbox to enable the SSL version.	Selected: Enabled (Default) Cleared: Disabled

■ Operating Procedures

Procedure ▶▶▶

- 1 Click [Setup SSL Security Configuration] in [Action].
- 2 Specify the parameters, and click the [Set] button.
→ A confirmation screen appears.

Caution

- If "Yes" is selected to allow only the ECDHE ciphers, the [Set] button is available only if "TLS1.2" is selected for all the protocols.

- 3 Click the [OK] button.
→ The SSL security setting starts.
- 4 Click the [Done] button to return to the [Network] screen.



Remote Support

- ["■ Overview" \(page 1265\)](#)
- ["■ User Privileges" \(page 1266\)](#)
- ["■ Display Contents" \(page 1266\)](#)

■ Overview

This function displays the set state for the remote support function ([REMCS](#) or [AIS Connect](#)).
AIS Connect service ended in December 2022.

Caution

- REMCS and AIS Connect cannot be used at the same time. AIS Connect function can only be used when REMCS is not specified or is stopped. When REMCS is used, suspend the REMCS function, and then enable the AIS Connect function. Refer to the [Stop/Restart Remote Support] function for details.
REMCS can be specified or restarted when the AIS Connect function is disabled. Refer to the [Setup AIS Connect Environment] function for details.

Note

- Click [REMCS] in the category and display the [REMCS] screen to perform the REMCS actions.
- Click [AIS Connect] in the category and display the [AIS Connect] screen to perform the AIS Connect actions.

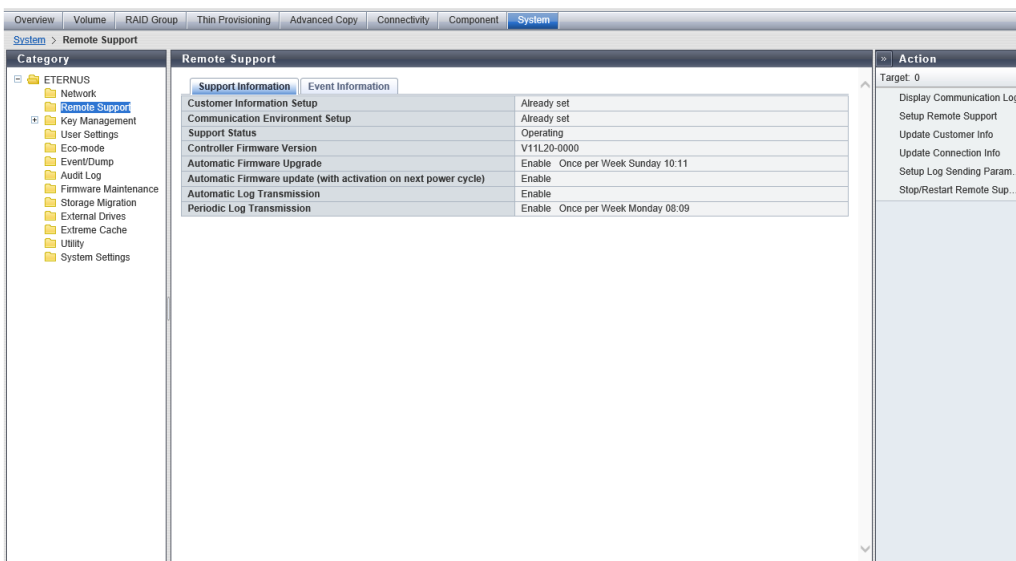
■ User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	✓
Admin	✓
StorageAdmin	✓
AccountAdmin	
SecurityAdmin	✓
Maintainer	✓

Refer to ""A. User Roles and Policies" (page 1580)" for details on the policies and roles.

■ Display Contents



REMCS Information

The items listed below are displayed. Refer to the [REMCS] function for details.

- Customer Information Setup
- Communication Environment Setup
- Support Status
- Automatic Firmware Upgrade
- Automatic Firmware update (with activation on next power cycle)
- Automatic Log Transmission
- Periodic Log Transmission

AIS Connect Environment

The items listed below are displayed. Refer to the [AIS Connect] function for details.

- AIS Connect
- Country of Installation (Country Code : Country Name)
- Service Contract Responsibility (Country Code : Country Name) (*1)
*1: This item is not displayed when "Service Contract Responsibility (Country Code : Country Name)" is not specified from CLI.
- SSL Server Certification
- Automatic Log Transmission

REMCS

- ["■ Overview" \(page 1267\)](#)
- ["■ User Privileges" \(page 1267\)](#)
- ["■ Display Contents" \(page 1267\)](#)

■ Overview

This function displays the REMCS function settings and the operation status in the storage system.

■ User Privileges

Availability of Executions in the Default Role

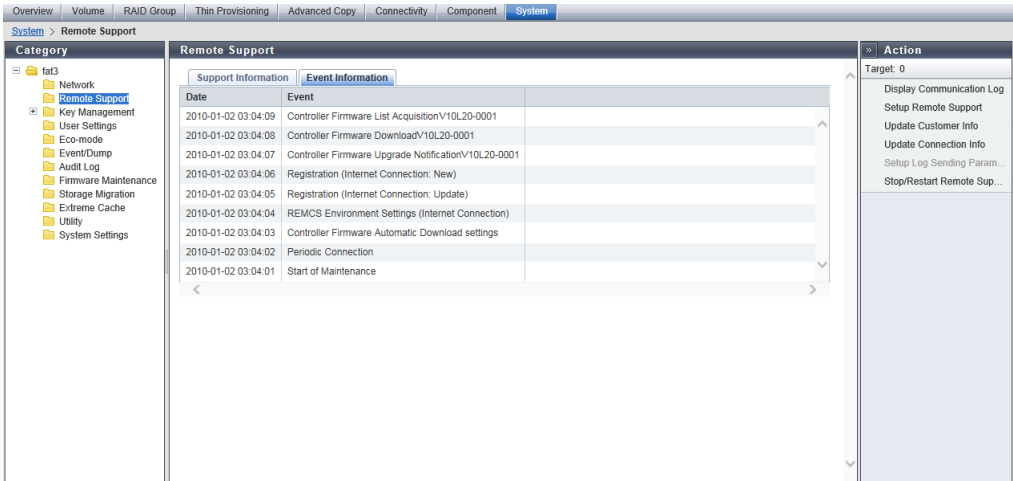
Default role	Availability of executions
Monitor	✓
Admin	✓
StorageAdmin	✓
AccountAdmin	
SecurityAdmin	✓
Maintainer	✓

Refer to ["A. User Roles and Policies" \(page 1580\)](#) for details on the policies and roles.

■ Display Contents

Click the [Event Information] tab to display the ["\[Event Information\] Screen" \(page 1269\)](#).

8. System Remote Support



Support Information

Item	Description
Customer Information Setup	Whether or not the customer information has been specified at the REMCS center is displayed.
Communication Environment Setup	Whether or not the communication environment information has been specified at the REMCS center is displayed.
Support Status	<p>The REMCS status is displayed.</p> <ul style="list-style-type: none"> Operating The REMCS is being operated. Maintenance in Progress The storage system is under maintenance. When the operation to complete maintenance is performed, the status returns to "Operating". Stopped The REMCS has temporarily been stopped. When the [Stop/Restart Remote Support] function is used to restart the operation, the status returns to "Operating". "-" (hyphen) REMCS is not operating. <p>If the support status is "Operating" or "Maintenance in Progress", one of the messages below appears in parentheses based on the REMCS operating status.</p> <ul style="list-style-type: none"> Controller Firmware Download in Progress Termination of Controller Firmware Download in Progress Controller Firmware Upgrade in Progress Log Collection in Progress
Controller Firmware Version	<p>The current controller firmware version is displayed.</p> <p>Firmware version VxxLyy-zzzz</p> <p>Vxx: Version Lyy: Level zzzz: Release number</p>

8. System
Remote Support

Item	Description
Automatic Firmware Upgrade	<p>Whether the automatic firmware upgrade is enabled or disabled is displayed. This item is not displayed in a Unified Storage environment.</p> <ul style="list-style-type: none"> • Enable Download schedule The automatic firmware upgrade is enabled. Receive controller firmware according to the download schedule. • Disable The automatic firmware upgrade is disabled. • "-" (hyphen) REMCS is not operating.
Automatic Firmware update (with activation on next power cycle)	<p>Whether or not to execute the controller firmware application, after controller firmware download has been completed, is displayed. This item is not displayed in a Unified Storage environment.</p> <ul style="list-style-type: none"> • Enable Execute the controller firmware application after controller firmware download is complete. The downloaded controller firmware will be changed to the controller firmware which will be enabled at the next startup. • Disable Do not execute the controller firmware application after controller firmware download is complete. • "-" (hyphen) REMCS is not operating.
Automatic Log Transmission	<p>Whether the automatic log transmission is enabled or disabled when an error occurs is displayed.</p> <ul style="list-style-type: none"> • Enable The automatic log transmission is enabled. The internal log of the storage system is automatically sent to the REMCS center when an error occurs. • Disable The automatic log transmission is disabled. • "-" (hyphen) REMCS is not operating.
Periodic Log Transmission	<p>Whether the periodical log transmission is enabled or disabled is displayed.</p> <ul style="list-style-type: none"> • Enable Transmission schedule The periodical log transmission is enabled. Internal logs of the storage system are automatically sent to the REMCS center according to the transmission schedule. • Disable The periodical log transmission is disabled. • "-" (hyphen) REMCS is not operating.

[Event Information] Screen

In this screen, ten latest pieces of event information are displayed.

Event Information

Item	Description
Date	The date and time (YYYY-MM-DD hh:mm:ss) when the REMCS events occurred, are displayed.
Event	The REMCS event is displayed.

Display Communication Log

- ["■ Overview" \(page 1270\)](#)
- ["■ User Privileges" \(page 1270\)](#)
- ["■ Display Contents" \(page 1270\)](#)
- ["■ Operating Procedures" \(page 1271\)](#)

■ Overview

This function displays the communication log between the storage system and REMCS center using the Remote Support function.

When the Remote Support function cannot be operated properly, for example, cannot be connected to the [REMCS](#) center, use this log to identify the cause of the problem.

The communication log includes requests from the storage system to the server, and responses from the server to the storage system. Only the communication log of the last executed event is displayed.

Caution

- If the [Setup Remote Support] procedure has not been completed in advance, this function cannot be used.

■ User Privileges

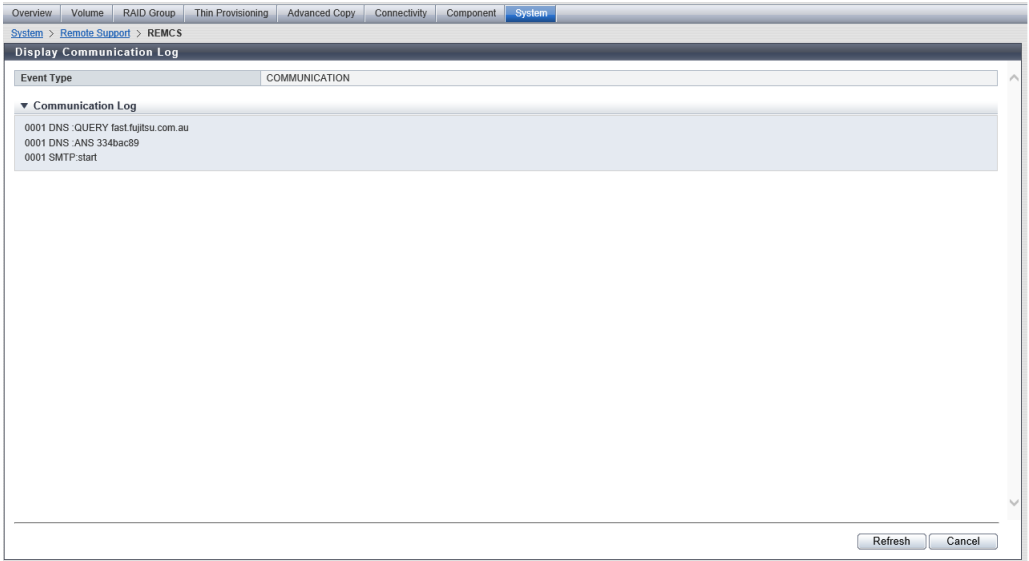
Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	✓
StorageAdmin	
AccountAdmin	
SecurityAdmin	
Maintainer	✓

Refer to ["A. User Roles and Policies" \(page 1580\)](#) for details on the policies and roles.

■ Display Contents

The communication log when the Remote Support (REMCS) function is operating is displayed. Check the displayed event type and the communication log.



Event Type

Item	Description
Event Type	The type of the last executed event is displayed. If this information cannot be obtained, the field is blank.

Communication log

Item	Description
Communication Log	The communication log of the last executed event is displayed. If this information cannot be obtained, the field is blank.

■ **Operating Procedures**

Procedure ▶▶▶

- 1 Click [Display Communication Log] in [Action].
- 2 Check the displayed "Event Type" and the "Communication Log".

Note

- Click the [Refresh] button to update the displayed information.

- 3 Click the [Cancel] button to return to the screen when starting this function in Step 1.



Setup Remote Support

- "■ Overview" (page 1272)
- "■ User Privileges" (page 1272)
- "■ Settings" (page 1272)
- "■ Operating Procedures" (page 1279)

Overview

This function registers the customer information and communication environment information required to receive Remote Support from the REMCS center.

REMCS provides maintenance functions as follows:

- **Failure Notice**
This function reports various failures that occur in the storage system to the REMCS center. The maintenance engineer is notified of a failure immediately.
- **Information Transfer**
This function sends information such as logs and configuration information to be used when checking a failure. It reduces the time required to collect information that is to be transferred to the REMCS center.
- **Firmware Download**
The latest firmware in the REMCS center is automatically registered in the storage system. This function ensures that the latest firmware is registered in the storage system, and prevents known errors from occurring. Firmware can also be registered manually. Note that the "Maintenance Operation" policy is required to use this function.
Note that the unified firmware cannot be downloaded from the REMCS center.

Caution

- REMCS is not available when AIS Connect is being used. Disable "AIS Connect" and then set up the remote support (by REMCS). Refer to the [Setup AIS Connect Environment] function for details.
- Use the IPv4 addresses for the IP addresses of the proxy server, the SMTP server, the POP server, and the HTTP server. IPv6 addresses cannot be used.

Note

- To change the registered information, refer to the [Update Customer Information] function or the [Update Communication Environment Information] function for details.

User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	✓
StorageAdmin	
AccountAdmin	
SecurityAdmin	
Maintainer	✓

Refer to ""A. User Roles and Policies" (page 1580)" for details on the policies and roles.

Settings

There are setting items for Remote Support as follows: ""Customer Information" (page 1273)", ""Communication Environment Information" (page 1274)", ""Detailed Configuration Information" (page 1277)", ""Result Notification Information" (page 1277)", and ""Time Information" (page 1278).

Customer Information

In this field, specify the customer information.

Detailed Settings

Item	Description	Setting values
Checkbox	<p>If the "Delete any Customer Identity information from the storage system after the information is sent to the 'REMCS Center.'" checkbox is selected, customer information saved on the storage system (*1) is deleted after transmitting the information to the REMCS center.</p> <ul style="list-style-type: none"> Selected: Deletes the customer identify information Cleared: Does not delete the customer identify information <p>*1: Customer identity information means "Administrator Name", "Administrator E-Mail Address ", "Phone Number", "FAX Number", and "Connection check operator E-Mail Address".</p>	<p>Selected</p> <p>Cleared</p>
Company Name *	Input the company name that owns the storage system (required).	Up to 60 alphanumeric characters and symbols
Department/Division	Input the department or division that owns the storage system.	Up to 40 alphanumeric characters and symbols
Address *	Input the address of the company that owns the storage system (required).	Up to 60 alphanumeric characters and symbols
Building Name	Input the building name where the company that owns the storage system is located.	Up to 40 alphanumeric characters and symbols
Administrator Name *	Input the system administrator's name that manages the storage system (required).	Up to 40 alphanumeric characters and symbols
Administrator E-Mail Address *	Input the E-mail address of the system administrator who manages the storage system (required).	Up to 60 alphanumeric characters and symbols (except space)
Postal Code (Zip Code)	Input the postal code for the company that owns storage system.	Up to 10 numeric characters and symbols (except space)
Phone Number *	Input the phone number for the company that owns the storage system (required).	Up to 20 numeric characters and symbols (except space)
FAX Number	Input the FAX number for the company that owns the storage system.	Up to 20 numeric characters and symbols (except space)
Storage System Unique Name	Input the nickname for the storage system.	Up to 32 alphanumeric characters and symbols (except space)
Country of Installation (ISO3166 A2) * Example: JP, US, DE, etc.	Input the country code for the country where the storage system is located (required).	<p>Capital letters or "99"</p> <p>Two fixed letters</p> <p>JP (default state when logged in Japanese)</p> <p>Blank (default state when logged in English)</p>

Installation Location

Item	Description	Setting values
Address	Input the address where the storage system is located.	Up to 60 alphanumeric characters and symbols
Building Name	Input the building name where the storage system is located.	Up to 40 alphanumeric characters and symbols

Information filled by Field Engineers

Item	Description	Setting values
Installation Date	Input the date when the storage system is installed.	YYYY-MM YYYY: Year (2001 - 2037) MM: Month (01 - 12) Numeric characters 2001-01 (Default)
Field Engineer E-Mail Address	Input the E-mail address for the field engineer who installed the storage system.	Up to 60 alphanumeric characters and symbols (except space)
Customer Code	Input the customer code.	Up to 8 alphanumeric characters and symbols (except space)

Communication Environment Information

In this field, specify the communication environment information.

Connection

Item	Description	Setting values
Connection Type	Select the connection type when using the REMCS operation.	Internet Connection (Default) Internet Connection (E-Mail only) P-P Connection P-P Connection (E-Mail only) P-P Connection (VPN Connection) P-P Connection (VPN Connection E-Mail only)
LAN Port used for Remote Support	Select the LAN port of the storage system that is used for REMCS operation from "MNT" or "RMT".	MNT (Default) RMT

Service

Item	Description	Setting values
Scheduled Connection Time *	Input the time for scheduled REMCS connection (required).	Numeric characters Time: 00 - 23 Minute: 00 - 59 Undefined (10:00 - 15:00) (*1) (Default)
Scheduled Connection Period *	Select the term for scheduled REMCS connection (required).	Every Day (Default) Every Day (except Sunday) Every Day (except Saturday and Sunday) Once per Week

8. System Remote Support

Item	Description	Setting values
Specify the Day of the Week	When "Once per Week" is selected for "Scheduled Connection Period", select the day of the week to execute scheduled REMCS connection.	Sunday (Default) Monday Tuesday Wednesday Thursday Friday Saturday

*1 : Different times are specified in the factory settings in order to disperse the load on the REMCS center.

Proxy Server

Item	Description	Setting values
Proxy Server	Input the IP address or the domain name of the proxy server that is used for REMCS operation.	Up to 63 alphanumeric characters and symbols (except space)
Port No.	Input the port number of the proxy server.	Numeric characters 0 (Default) - 65535
User Name	Input the user name when using the proxy server.	Up to 32 alphanumeric characters and symbols (except space)
Password	Input the password of the user name when using the proxy server. The password entered is displayed with a series of symbols to hide the specified values.	Up to 64 alphanumeric characters and symbols (except space)

SMTP Server

Item	Description	Setting values
SMTP Server *	Input the IP address or the domain name of the SMTP server that is used for REMCS operation (required).	Up to 239 alphanumeric characters and symbols (except space)
Port No. *	Input the port number of the SMTP server (required).	Numeric characters 0 - 65535 25 (Default)
Sender E-Mail Address *	Input the sender E-Mail address of mails sent by the storage system for REMCS operations (required).	Up to 63 alphanumeric characters and symbols (except space)
SMTP over SSL	Select "None", "STARTTLS", or "SSL/TLS" for the SMTP over SSL method.	None STARTTLS SSL/TLS

SMTP Authentication Information

Item	Description	Setting values
Authentication Type	Select the SMTP authentication type.	No SMTP Authentication POP Before SMTP Authentication AUTH SMTP Authentication

8. System
Remote Support

Item	Description	Setting values
Authentication Method	When "AUTH SMTP Authentication" is selected for "Authentication Type", specify the SMTP authentication method.	Automatic CRAM-MD5 PLAIN LOGIN
POP Server	When "POP Before SMTP Authentication" is selected for "Authentication Type", input the domain name or the IP address of the POP server that is used for SMTP Authentication.	Up to 63 alphanumeric characters and symbols (except space)
Port No.	Input the port number that is used when communicating with the POP server.	Numeric characters 0 - 65535 110 (Default)
User Name	Input the user name that is used when communicating with the POP server. This setting is enabled when selecting "POP Before SMTP Authentication" or "AUTH SMTP Authentication" for the "SMTP Authentication Type".	Up to 64 alphanumeric characters and symbols (except space)
Password	Input the password that is used when communicating with the POP server. The password entered is displayed with a series of symbols to hide the specified values. This setting is enabled when selecting "POP Before SMTP Authentication" or "AUTH SMTP Authentication" for the "SMTP Authentication Type".	Up to 64 alphanumeric characters and symbols (except space)

REMCS Center

Item	Description	Setting values
REMCS Center *	Select the REMCS center (in each country) where the storage system is connected (required). "Direct Input Setting" is only available when logged in using a user account with the "Maintenance Operation" role. If logged in as the system administrator when "Direct Input Setting" has already been specified, "Direct Input Setting" is displayed for the REMCS Center and cannot be changed to a different center.	Blank (Default) Fujitsu America Australia Brazil Hong-Kong China Indonesia Korea Malaysia Philippine Singapore Taiwan Thailand Vietnam Individual support in Hawaii OSC Direct Input Setting
HTTP Server	If "Direct Input Setting" is selected for the REMCS Center, enter the IP address or the domain name of the remote HTTP server.	Up to 63 alphanumeric characters and symbols (except space)
Port No.	If "Direct Input Setting" is selected for the REMCS Center, enter the port number of the HTTP server.	Numeric characters 0 - 65535

Item	Description	Setting values
Receiver E-Mail Address	If "Direct Input Setting" is selected for the REMCS Center, enter the E-mail address of the report destination for the REMCS operation.	Up to 63 alphanumeric characters and symbols (except space)

Detailed Configuration Information

In this field, specify the detailed configuration information when sending E-mail.

Item	Description	Setting values
Data Transmission Method	<p>Select whether to "Split" or "Do not Split" into the specified size.</p> <p>Select "Split large E-Mail into multiple E-Mails" or "Split large data into multiple E-Mails", and specify the segment size, when segmenting outgoing mail.</p> <p>If the mail server does not allow the sending of segmented mail using "Split large E-Mail into multiple E-Mails", select "Split large data into multiple E-Mails" or "Do not Split".</p> <ul style="list-style-type: none"> • Split Outgoing mail is segmented. There are two methods for mail message fragmentation: "Split large E-Mail into multiple E-Mails" and "Split large data into multiple E-Mails". <ul style="list-style-type: none"> - Split large E-Mail into multiple E-Mails Outgoing mail is segmented into the specified size. - Split large data into multiple E-Mails The file attached to the E-mail is segmented into multiple pieces, turned into one E-mail in the specified size, and sent in multiple transmissions. • Do not Split The message is sent as one E-mail without being segmented. 	<p>Split</p> <p>Do not Split</p> <ul style="list-style-type: none"> • Split large E-Mail into multiple E-Mails 64 - 6400 KB • Split large data into multiple E-Mails 64 - 512 KB <p>Split Split large data into multiple E-Mails: 512 KB (Default)</p>
Specify Storage System Name for HELO/EHLO Announcement when Sending E-Mail	<p>Select "Specify" or "Do not specify" for the storage system name for HELO/EHLO announcement when sending mail.</p> <p>When "Specify" is selected, input the domain.</p> <p>The domain of the HELO/EHLO Announcement must be specified in the mail protocol.</p> <p>If "Do not specify" has been selected, E-mails are sent using the strings after the "@" of the sender E-mail addresses as domains.</p> <p>If the mail server does not allow using the section after the "@" of the sender E-mail address as the domain, select "Specify" and input the appropriate domain.</p>	<p>Specify</p> <p>Do not specify (Default)</p> <p>When specifying the domain</p> <p>Up to 63 alphanumeric characters and symbols (except space)</p>
Use S/MIME	<p>Select whether or not to use S/MIME.</p> <p>S/MIME is a standard relating to encryption of E-mails and electronic signatures. Using S/MIME prevents E-mails from being sniffed, spoofed, and falsified.</p> <p>This item is available when one of the following conditions applies:</p> <ul style="list-style-type: none"> • "Do not Split" is selected for the data transmission method • "Split" is selected for the data transmission method and "Split large data into multiple E-Mails" is specified 	<p>Use (Default)</p> <p>Not use</p>

Result Notification Information

In this field, specify the notification destination of the Remote Support setting result.

Detailed Settings

Item	Description	Setting values
Administrator	Select "Notification" or "Not Notification" for your administrator of the setting confirmation result at the REMCS center. Select "Notification" for the "Administrator" or the "Connection check operator" and confirm the result.	Notification (Default) Not Notification
Connection check operator	Select "Notification (Standard E-Mail format)", "Notification (Simple E-Mail format for cell phone)" or "Not Notification" for the connection check operator of the setting confirmation result at the REMCS center. If notifying, input the "Connection check operator E-Mail Address". Specify the "Connection check operator" if there is another person who needs to be notified of the setting confirmation result, other than the administrator.	Notification (Standard E-Mail format) Notification (Simple E-Mail format for cell phone) Not Notification (Default)
Connection check operator E-Mail Address	If notifying the connection check operator of the setting confirmation result at the REMCS center, input the E-mail address.	Up to 60 alphanumeric characters and symbols (except space)

Time Information

Caution

- The time information settings do not normally require modification.
If changing the default value, select the "Change following Timing Parameter items" checkbox.

Detailed Settings

Item	Description	Setting values
Checkbox	If changing the time information, select the "Change following Timing Parameter items" checkbox.	Selected Cleared (Default)
SMTP Connection Timeout	Input the timeout limit when using SMTP connection.	Numeric characters 1 - 600 sec. 60 sec. (Default)
SMTP Response Timeout	Input the timeout limit for SMTP response.	Numeric characters 1 - 3600 sec. 60 sec. (Default)
SMTP Retry Count	Input the retry number of SMTP.	Numeric characters 1 - 60 5 (Default)
SMTP Retry Interval	Input the intervals for retrying SMTP.	Numeric characters 1 - 3600 sec. 30 sec. (Default)
HTTP Timeout	Input the timeout limit when using HTTP connection.	Numeric characters 1 - 3600 sec. 30 sec. (Default)
HTTP Retry Count	Input the retry number of HTTP.	Numeric characters 1 - 60 5 (Default)
HTTP Retry Interval	Input the intervals for retrying HTTP.	Numeric characters 1 - 3600 sec. 5 sec. (Default)

Item	Description	Setting values
Queue Time before Sending E-Mails (only when POP Before SMTP authentication is enabled)	Input the waiting time for sending mail.	Numeric characters 1 - 3600 msec. 1000 msec. (Default)

■ Operating Procedures

Procedure ▶▶▶

- 1 Click [Setup Remote Support] in [Action].
- 2 Specify parameters, and click the [Set] button.
→ A confirmation screen appears.

Caution

- An error screen appears in the following conditions:
 - The required items (items with "*") are not specified
 - Wrong values are entered
 - When "MNT" is specified for the "LAN Port used for Remote Support" and when the IP Address of the Proxy server/SMTP server/POP server/HTTP server is the same as the broadcast address of the MNT port
 - When "RMT" is specified for the "LAN Port used for Remote Support" and when the IP Address of the Proxy server/SMTP server/POP server/HTTP server is the same as the broadcast address of the RMT port
 - The IP address of the Proxy server, SMTP server, POP server, and HTTP server is the same as the local host address

- 3 Click the [OK] button.
→ The Remote Support setting starts.
- 4 Click the [Done] button to return to the screen when starting this function in Step 1.

Caution

- After completing the setting, the REMCS center sends the setting confirmation result to the "Administrator E-Mail Address" or the "Connection check operator E-Mail Address". Make sure to confirm the setting results.

Update Customer Information

- ["■ Overview" \(page 1279\)](#)
- ["■ User Privileges" \(page 1280\)](#)
- ["■ Settings" \(page 1280\)](#)
- ["■ Operating Procedures" \(page 1282\)](#)

■ Overview

This function updates the customer information that is registered for the [REMCS](#) center.

Caution

- When the [Setup Remote Support] function has not been complete in advance, this function cannot be used.
- When Remote Support is "Stopped", customer information cannot be updated.

Note

- Customer information saved in the storage system (*1) can be deleted after transmitting the information to the REMCS center. Select the "Delete any Customer Identity information from the storage system after the information is sent to the 'REMCS Center'." checkbox to delete the information. Note that selecting the checkbox requires entering customer information whenever updating the information.

*1: Customer Identity information means "Administrator Name", "Administrator E-Mail Address", "Phone Number", "FAX Number", and "Connection check operator E-Mail Address".

■ **User Privileges**

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	✓
StorageAdmin	
AccountAdmin	
SecurityAdmin	
Maintainer	✓

Refer to "[A. User Roles and Policies](#)" (page 1580) for details on the policies and roles.

■ **Settings**

Specify customer information.

Customer Information

Customer information saved in the storage system is displayed. Update the customer information. If the "Delete any Customer Identity information from the storage system after the information is sent to the 'REMCS Center'." checkbox is selected, information which identifies customers is not displayed. Input the necessary information again.

Detailed Settings

Item	Description	Setting values
Checkbox	<p>If the "Delete any Customer Identity information from the storage system after the information is sent to the 'REMCS Center'." checkbox is selected, customer information saved on the storage system (*1) is deleted after transmitting the information to the REMCS center.</p> <ul style="list-style-type: none"> Selected: Deletes the customer identify information Cleared: Does not delete the customer identify information <p>*1: Customer identity information means "Administrator Name", "Administrator E-Mail Address ", "Phone Number", "FAX Number", and "Connection check operator E-Mail Address".</p>	<p>Selected</p> <p>Cleared</p>
Company Name *	Input the company name that owns the storage system (required).	Up to 60 alphanumeric characters and symbols
Department/Division	Input the department or division that owns the storage system.	Up to 40 alphanumeric characters and symbols
Address *	Input the address of the company that owns the storage system (required).	Up to 60 alphanumeric characters and symbols
Building Name	Input the building name where the company that owns the storage system is located.	Up to 40 alphanumeric characters and symbols
Administrator Name *	Input the system administrator's name that manages the storage system (required).	Up to 40 alphanumeric characters and symbols
Administrator E-Mail Address *	Input the E-mail address of the system administrator who manages the storage system (required).	Up to 60 alphanumeric characters and symbols (except space)
Postal Code (Zip Code)	Input the postal code for the company that owns storage system.	Up to 10 numeric characters and symbols (except space)
Phone Number *	Input the phone number for the company that owns the storage system (required).	Up to 20 numeric characters and symbols (except space)
FAX Number	Input the FAX number for the company that owns the storage system.	Up to 20 numeric characters and symbols (except space)
Storage System Unique Name	Input the nickname for the storage system.	Up to 32 alphanumeric characters and symbols (except space)
Country of Installation (ISO3166 A2) * Example: JP, US, DE, etc.	Input the country code for the country where the storage system is located (required).	Capital letters or "99" Two fixed letters

Installation Location

Item	Description	Setting values
Address	Input the address where the storage system is located.	Up to 60 alphanumeric characters and symbols
Building Name	Input the building name where the storage system is located.	Up to 40 alphanumeric characters and symbols

Information filled by Field Engineers

Item	Description	Setting values
Installation Date	Input the date when the storage system is installed.	YYYY-MM YYYY: Year (2001 - 2037) MM: Month Numeric characters
Field Engineer E-Mail Address	Input the E-mail address for the field engineer who installed the storage system.	Up to 60 alphanumeric characters and symbols (except space)
Customer Code	Input the customer code.	Up to 8 alphanumeric characters and symbols (except space)

■ Operating Procedures

Procedure ▶▶▶

- 1 Click [Update Customer Info] in [Action].
- 2 Set the customer information again, and click the [Set] button.
→ A confirmation screen appears.

Caution

- An error screen appears in the following conditions:
 - The required items (items with "*") are not specified
 - Wrong values are entered

- 3 Click the [OK] button.
→ The customer information is updated.
- 4 Click the [Done] button to return to the screen when starting this function in Step 1.



Update Communication Environment Information

- "[■ Overview](#)" (page 1282)
- "[■ User Privileges](#)" (page 1283)
- "[■ Settings](#)" (page 1283)
- "[■ Operating Procedures](#)" (page 1287)

■ Overview

This function updates the communication environment information that is registered for the [REMCS](#) center.

Caution

- When the [Setup Remote Support] function has not been complete in advance, this function cannot be used.
- Use the IPv4 addresses for the IP addresses of the proxy server, the SMTP server, the POP server, and the HTTP server. IPv6 addresses cannot be used.

■ User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	✓
StorageAdmin	
AccountAdmin	
SecurityAdmin	
Maintainer	✓

Refer to "[A. User Roles and Policies](#)" (page 1580) for details on the policies and roles.

■ Settings

There are setting items for communication environment information as follows: "[Communication Environment Information](#)" (page 1283)", "[Detailed Configuration Information](#)" (page 1285)", "[Result Notification Information](#)" (page 1286)", and "[Time Information](#)" (page 1287)".

Communication Environment Information

In this field, specify the communication environment information.

Connection

Item	Description	Setting values
Connection Type	Select the connection type when using the REMCS operation.	Internet Connection Internet Connection (E-Mail only) P-P Connection P-P Connection (E-Mail only) P-P Connection (VPN Connection) P-P Connection (VPN Connection E-Mail only)
LAN Port used for Remote Support	Select the LAN port of the storage system that is used for REMCS operation from "MNT" or "RMT".	MNT RMT

Service

Item	Description	Setting values
Scheduled Connection Time *	Input the time for scheduled REMCS connection (required).	Numeric characters Hour: 00 - 23 Minute: 00 - 59
Scheduled Connection Period *	Select the term for scheduled REMCS connection (required).	Every Day Every Day (except Sunday) Every Day (except Saturday and Sunday) Once per Week

8. System Remote Support

Item	Description	Setting values
Specify the Day of the Week	When "Once per Week" is selected for "Scheduled Connection Period", select the day of the week to execute scheduled REMCS connection.	Sunday Monday Tuesday Wednesday Thursday Friday Saturday

Proxy Server

Item	Description	Setting values
Proxy Server	Input the IP address or the domain name of the proxy server that is used for REMCS operation.	Up to 63 alphanumeric characters and symbols (except space)
Port No.	Input the port number of the proxy server.	Numeric characters 0 - 65535
User Name	Input the user name when using the proxy server.	Up to 32 alphanumeric characters and symbols (except space)
Password	Input the password of the user name when using the proxy server. The password entered is displayed with a series of symbols to hide the specified values.	Up to 64 alphanumeric characters and symbols (except space)

SMTP Server

Item	Description	Setting values
SMTP Server *	Input the IP address or the domain name of the SMTP server that is used for REMCS operation (required).	Up to 239 alphanumeric characters and symbols (except space)
Port No. *	Input the port number of the SMTP server (required).	Numeric characters 0 - 65535
Sender E-Mail Address *	Input the sender E-Mail address of mails sent by the storage system for REMCS operations (required).	Up to 63 alphanumeric characters and symbols (except space)
SMTP over SSL	Select "None", "STARTTLS", or "SSL/TLS" for the SMTP over SSL method.	None STARTTLS SSL/TLS

SMTP Authentication Information

Item	Description	Setting values
Authentication Type	Select the SMTP authentication type.	No SMTP Authentication POP Before SMTP Authentication AUTH SMTP Authentication
Authentication Method	When "AUTH SMTP Authentication" is selected for "Authentication Type", specify the SMTP authentication method.	Automatic CRAM-MD5 PLAIN LOGIN

8. System Remote Support

Item	Description	Setting values
POP Server	When the "Authentication Type" is "POP Before SMTP Authentication", input the domain name or the IP address of the POP server that is used for SMTP Authentication.	Up to 63 alphanumeric characters and symbols (except space)
Port No.	Input the port number that is used when communicating with the POP server.	Numeric characters 0 - 65535
User Name	Input the user name that is used when communicating with the POP server. This setting is enabled when selecting "POP Before SMTP Authentication" or "AUTH SMTP Authentication" for the "SMTP Authentication Type".	Up to 64 alphanumeric characters and symbols (except space)
Password	Input the password that is used when communicating with the POP server. The password entered is displayed with a series of symbols to hide the specified values. This setting is enabled when selecting "POP Before SMTP Authentication" or "AUTH SMTP Authentication" for the "SMTP Authentication Type".	Up to 64 alphanumeric characters and symbols (except space)

REMCS Center

Item	Description	Setting values
REMCS Center *	Select the REMCS center (in each country) where the storage system is connected (required). "Direct Input Setting" is only available when logged in using a user account with the "Maintenance Operation" role. If logged in as the system administrator when "Direct Input Setting" has already been specified, "Direct Input Setting" is displayed for the REMCS Center and cannot be changed to a different center.	Blank (Default) Fujitsu America Australia Brazil Hong-Kong China Indonesia Korea Malaysia Philippine Singapore Taiwan Thailand Vietnam Individual support in Hawaii OSC Direct Input Setting
HTTP Server	If "Direct Input Setting" is selected for the REMCS Center, enter the IP address or the domain name of the remote HTTP server.	Up to 63 alphanumeric characters and symbols (except space)
Port No.	If "Direct Input Setting" is selected for the REMCS Center, enter the port number of the HTTP server.	Numeric characters 0 - 65535
Receiver E-Mail Address	If "Direct Input Setting" is selected for the REMCS Center, enter the E-mail address of the report destination for the REMCS operation.	Up to 63 alphanumeric characters and symbols (except space)

Detailed Configuration Information

In this field, specify the detailed configuration information when sending E-mail.

Item	Description	Setting values
Data Transmission Method	<p>Select whether to "Split" or "Do not Split" into the specified size. Select "Split large E-Mail into multiple E-Mails" or "Split large data into multiple E-Mails", and specify the segment size, when segmenting outgoing mail. If the mail server does not allow the sending of segmented mail using "Split large E-Mail into multiple E-Mails", select "Split large data into multiple E-Mails" or "Do not Split".</p> <ul style="list-style-type: none"> • Split Outgoing mail is segmented. There are two methods for mail message fragmentation: "Split large E-Mail into multiple E-Mails" and "Split large data into multiple E-Mails". <ul style="list-style-type: none"> - Split large E-Mail into multiple E-Mails Outgoing mail is segmented into the specified size. - Split large data into multiple E-Mails The file attached to the E-mail is segmented into multiple pieces, turned into one E-mail in the specified size, and sent in multiple transmissions. • Do not Split The message is sent as one E-mail without being segmented. 	<p>Split Do not Split</p> <ul style="list-style-type: none"> • Split large E-Mail into multiple E-Mails 64 - 6400 KB • Split large data into multiple E-Mails 64 - 512 KB
Specify Storage System Name for HELO/EHLO Announcement when Sending E-Mail	<p>Select "Specify" or "Do not specify" for the storage system name for HELO/EHLO announcement when sending mail. When "Specify" is selected, input the domain. The domain of the HELO/EHLO Announcement must be specified in the mail protocol. If "Do not specify" has been selected, E-mails are sent using the strings after the "@" of the sender E-mail addresses as domains. If the mail server does not allow using the section after the "@" of the sender E-mail address as the domain, select "Specify" and input the appropriate domain.</p>	<p>Specify Do not specify</p> <p>When specifying the storage system name Up to 63 alphanumeric characters and symbols (except space)</p>
Use S/MIME	<p>Select whether or not to use S/MIME. S/MIME is a standard relating to encryption of E-mails and electronic signatures. Using S/MIME prevents E-mails from being sniffed, spoofed, and falsified. This item is available when one of the following conditions applies:</p> <ul style="list-style-type: none"> • "Do not Split" is selected for the data transmission method • "Split" is selected for the data transmission method and "Split large data into multiple E-Mails" is specified 	<p>Use Not use</p>

Result Notification Information

In this field, specify the notification destination of the Remote Support setting result.

Detailed Settings

Item	Description	Setting values
Administrator	<p>Select "Notification" or "Not Notification" for your administrator of the setting confirmation result at the REMCS center. Select "Notification" for the "Administrator" or the "Connection check operator" and confirm the result.</p>	<p>Notification Not Notification</p>

8. System Remote Support

Item	Description	Setting values
Connection check operator	Select "Notification (Standard E-Mail format)", "Notification (Simple E-Mail format for cell phone)" or "Not Notification" for the connection check operator of the setting confirmation result at the REMCS center. If notifying, input the "Connection check operator E-Mail Address". Specify the "Connection check operator" if there is another person who needs to be notified of the setting confirmation result, other than the administrator.	Notification (Standard E-Mail format) Notification (Simple E-Mail format for cell phone) Not Notification
Connection check operator E-Mail Address	If notifying the connection check operator of the setting confirmation result at the REMCS center, input the E-mail address.	Up to 60 alphanumeric characters and symbols (except space)

Time Information

Caution

- The time information settings do not normally require modification.
If changing the default value, select the "Change following Timing Parameter items" checkbox.

Detailed Settings

Item	Description	Setting values
Checkbox	If changing the time information, select the "Change following Timing Parameter items" checkbox.	Selected Cleared (Default)
SMTP Connection Timeout	Input the timeout limit when using SMTP connection.	Numeric characters 1 - 600 sec.
SMTP Response Timeout	Input the timeout limit for SMTP response.	Numeric characters 1 - 3600 sec.
SMTP Retry Count	Input the retry number of SMTP.	Numeric characters 1 - 60
SMTP Retry Interval	Input the intervals for retrying SMTP.	Numeric characters 1 - 3600 sec.
HTTP Timeout	Input the timeout limit when using HTTP connection.	Numeric characters 1 - 3600 sec.
HTTP Retry Count	Input the retry number of HTTP.	Numeric characters 1 - 60
HTTP Retry Interval	Input the intervals for retrying HTTP.	Numeric characters 1 - 3600 sec.
Queue Time before Sending E-Mails (only when POP Before SMTP authentication is enabled)	Input the waiting time for sending mail.	Numeric characters 1 - 3600 msec.

■ Operating Procedures

Procedure ▶▶▶

- 1 Click [Update Connection Info] in [Action].
- 2 Specify parameters, and click the [Set] button.
→ A confirmation screen appears.

Caution

- An error screen appears in the following conditions:
 - The required items (items with "*") are not specified
 - Wrong values are entered
 - When "MNT" is specified for the "LAN Port used for Remote Support" and when the IP Address of the Proxy server/SMTP server/POP server/HTTP server is the same as the broadcast address of the MNT port
 - When "RMT" is specified for the "LAN Port used for Remote Support" and when the IP Address of the Proxy server/SMTP server/POP server/HTTP server is the same as the broadcast address of the RMT port
 - The IP address of the Proxy server, SMTP server, POP server, and HTTP server is the same as the local host address

3 Click the [OK] button.
→ Changing of the communication environment information starts.

4 Click the [Done] button to return to the screen when starting this function in Step 1.

Caution

- After completing the setting, the REMCS center sends the setting confirmation result to the "Administrator E-Mail Address" or the "Connection check operator E-Mail Address". Make sure to confirm the setting results.



Setup Log Sending Parameters

- ["■ Overview" \(page 1288\)](#)
- ["■ User Privileges" \(page 1289\)](#)
- ["■ Settings" \(page 1289\)](#)
- ["■ Operating Procedures" \(page 1290\)](#)

■ Overview

This function transfers the internal log of the storage system to the [REMCS](#) center. There are two log sending methods: "Automatic" and "Manual".

- **Configure Automatic Log Transmission**
The storage system sends log periodically or when an event occurs.
- **Immediately Send Log Manually**
The log is sent manually.

Caution

- This function cannot be used in the following conditions:
 - The [Setup Remote Support] function is not performed
 - A problem is detected in the Remote Support settings
 - The "Receiver E-Mail Address" (REMCS center) is not specified for the Remote Support
 - The Remote Support is stopped

■ User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	✓
StorageAdmin	
AccountAdmin	
SecurityAdmin	
Maintainer	✓

Refer to ["A. User Roles and Policies" \(page 1580\)](#) for details on the policies and roles.

■ Settings

In this screen, specify parameters for automatic log transmission, or send logs immediately. The ["\[Configure Automatic Log Transmission\] Screen" \(page 1289\)](#) is displayed when clicking the [Setup Log Sending Parameters] in [Action]. Click the [Immediately Send Log Manually] tab to display the ["\[Immediately Send Log Manually\] Screen" \(page 1290\)](#).

[Configure Automatic Log Transmission] Screen

In this screen, specify the parameters of the automatic log transmission.

Send Log based on Events

Specify the parameters of the automatic log transmission when an event occurs.

Item	Description	Setting values
Send Log when Errors Occur	To send logs automatically in the case of a failure, select the "Send" checkbox. The default state of "Send Log when Errors Occur" setting will be changed to "Send" if the Remote Support setting using the [Setup Remote Support] function has been completed.	Selected: Send Cleared (Default)

Send Log Periodically

Specify the parameters to send logs periodically. To send log periodically, select the "Enable" checkbox in the "Periodical Transmission of Log" field, and specify the time, period, and the day of the week.

Item	Description	Setting values
Periodical Transmission of Log	To send log periodically, select the "Enable" checkbox. The default state of "Periodical Transmission of Log" will be changed to "Enable" if the Remote Support setting using the [Setup Remote Support] function has been completed.	Selected: Enable Cleared (Default)
Time	Specify the time when sending logs periodically.	00:00 - 23:59 Undefined: 10:00 - 15:00 (Default) (*1)
Period	Specify the period when sending logs periodically.	Once per Week (Default) Everyday

Item	Description	Setting values
Day of the Week	Specify the day of the week when sending logs periodically. The day of the week can be specified only when "Once per Week" has been specified as the period when sending logs periodically.	Sunday Monday Tuesday Wednesday Thursday Friday Saturday Undefined: Any day from Monday to Friday (Default) (*1)

*1 : Different days and times are specified in the factory settings in order to disperse the load on the REMCS center.

[Immediately Send Log Manually] Screen

In this screen, specify parameters to send logs immediately.

Manual Transmission

Item	Description	Setting values
Incident Number	Input the incident number that is to be added to the log to be sent.	Up to 15 alphanumeric characters and symbols No blanks
Include I/O Module log	Specify whether to collect the I/O Module log. To collect the I/O Module log, select the "Yes" radio button.	Yes (Default) No
Time Range Specified	Select whether to specify the time range to collect logs. To specify the time to send log, select the "Specify" checkbox, and specify the start and end time. If the time range has been specified, some of the logs just before and after the specified time range may also be collected.	Selected: Specify Cleared
Start Time	When "Specify" has been selected for "Time Range Specified", specify the start time for collecting logs.	YYYY-MM-DD hh:mm:ss YYYY: Year (AD) MM: Month (01 - 12) DD: Date (01 - 31) hh: Hour (00 - 23) mm: Minute (00 - 59) ss: Second (00 - 59)
End Time	When "Specify" has been selected for "Time Range Specified", specify the end time for collecting logs.	YYYY-MM-DD hh:mm:ss YYYY: Year (AD) MM: Month (01 - 12) DD: Date (01 - 31) hh: Hour (00 - 23) mm: Minute (00 - 59) ss: Second (00 - 59)

■ Operating Procedures

Configure Automatic Log Transmission

The storage system sends log periodically or when an event occurs.

Procedure ▶▶▶

- 1 Click [Setup Log Sending Parameters] in [Action].

- 2 Specify the parameters, and click the [Set] button.
→ A confirmation screen appears.
- 3 Click the [OK] button.
→ The parameter settings of log transmission (Automatic Log Transmission) are updated in the storage system.
- 4 Click the [Done] button to return to the screen when starting this function in Step 1.



Immediately Send Log Manually

The storage system manually sends the logs immediately.

Procedure ▶▶▶

- 1 Click [Setup Log Sending Parameters] in [Action].
- 2 Click the [Immediately Send Log Manually] tab to display the setting screen.
- 3 Specify the parameters, and click the [Run] button.
→ A confirmation screen appears.

Caution

- An error screen appears in the following conditions:
 - The incident number has not been entered or is incorrect
 - When "Specify" has been selected for "Time Range Specified", but the start time or the end time has not been entered
 - When "Specify" has been selected for "Time Range Specified", and the date specified for start time is earlier than the specified end time

- 4 Click the [OK] button.
→ Log transmission (Immediately Send Log Manually) is executed.
- 5 Click the [Done] button to return to the screen when starting this function in Step 1.



Stop/Restart Remote Support

- ["■ Overview" \(page 1291\)](#)
- ["■ User Privileges" \(page 1292\)](#)
- ["■ Display Contents" \(page 1292\)](#)
- ["■ Operating Procedures" \(page 1293\)](#)

■ Overview

This function temporarily stops the Remote Support function and starts again.

This function is used when the storage system is stopped for a prolonged period such as for relocation.

This function switches the support status from "Operating" to "Stopped" or from "Stopped" to "Operating". In "Termination in Progress", all the Remote Support functions, such as automatic notification of the storage system errors to the REMCS center, are stopped.

Caution

- REMCS is not available when AIS Connect is being used. Disable "AIS Connect" and then restart the remote support (by REMCS). Refer to the [Setup AIS Connect Environment] function for details.
- If the [Setup Remote Support] procedure has not been completed in advance, this function cannot be used.
- This function is not available when the storage system is in "Maintenance Mode". The "Maintenance Mode" indicates that "Maintenance in Progress" is displayed as the Remote Support status.
- The event of temporary stopping or restarting of the Remote Support function is transferred from the storage system to the REMCS center.

■ **User Privileges**

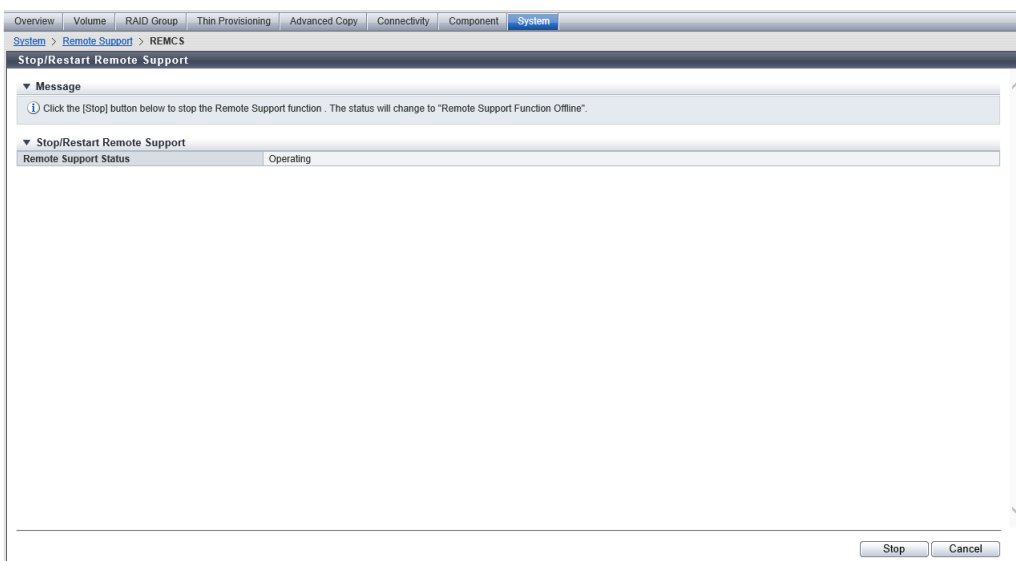
Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	✓
StorageAdmin	
AccountAdmin	
SecurityAdmin	
Maintainer	✓

Refer to "'A. User Roles and Policies" (page 1580)" for details on the policies and roles.

■ **Display Contents**

The Remote Support status is displayed. In this screen, click the [Stop] or the [Restart] button to change the Remote Support status.



Stop/Restart Remote Support

Item	Description
Remote Support Status	The current Remote Support status ("Operating"/"Maintenance in Progress"/"Stopped") is displayed. The [Restart] button is displayed only when the support status is "Stopped". The [Stop] button is displayed when the support status is "Operating".

■ Operating Procedures

Stopping Remote Support

Temporarily stop the Remote Support. The Remote Support can be stopped only when it is "Operating".

Procedure ▶▶▶

- 1 Click [Stop/Restart Remote Support] in [Action].
→ The current Remote Support status is displayed.
- 2 Click the [Stop] button.
→ A confirmation screen appears.
- 3 Click the [OK] button.
→ The Remote Support is stopped.
- 4 Click the [Done] button to return to the screen when starting this function in Step 1.



Restarting Remote Support

Restart the Remote Support. The Remote Support can be stopped only when it is "Stopped".

Procedure ▶▶▶

- 1 Click [Stop/Restart Remote Support] in [Action].
→ The current Remote Support status is displayed.
- 2 Click the [Restart] button.
→ A confirmation screen appears.
- 3 Click the [OK] button.
→ The Remote Support is restarted.
- 4 Click the [Done] button to return to the screen when starting this function in Step 1.



Download Controller Firmware

- ["■ Overview" \(page 1293\)](#)
- ["■ User Privileges" \(page 1295\)](#)
- ["■ Settings" \(page 1295\)](#)
- ["■ Operating Procedures" \(page 1297\)](#)

■ Overview

This function downloads the controller firmware from the REMCS center or another storage system, and saves and registers the obtained controller firmware in the Bootup and Utility Device (BUD) of the CM.

This function selects the download destination when downloading controller firmware, and the downloading method. Note that downloaded controller firmware can be registered automatically in the next storage system power-on.

Caution

- Settings for downloading controller firmware from the REMCS center and the downloading process are not performed in the following conditions: However, settings for downloading controller firmware from another storage system and the downloading process can be performed.
 - The Remote Support is not configured
 - The Remote Support is stopped
 - The Remote Support is under maintenance
 - Remote Support is operating, and the "Connection Type" is "Internet Connection (Mail only)", "P-P Connection (Mail only)", or "P-P Connection (VPN Connection Mail only)"
- The warning screen for downloading is displayed in the following conditions:
 - The controller firmware is already being downloaded
 - Downloading controller firmware is stopped
 - The controller firmware is being applied
- The downloaded controller firmware is stored in the BUD of the CM. Only three generations of controller firmware can be stored in the BUD. If more than three generations of controller firmware have been downloaded, the oldest version will be overwritten, except the running firmware.
- When downloading controller firmware from another storage system, perform "Setup Firmware Update from Peer Storage System" setting in advance to specify the storage system to obtain the controller firmware.
- Controller firmware download may be stopped due to the line status, etc. The suspended controller firmware download will resume from where it was suspended, in the next download, which has been specified in the automatic download schedule. However, if the version of the controller firmware, which is stored in the download destination (the REMCS center or the source storage system), is newer than the version of controller firmware, which was restored after interruption, the newer version will be re-downloaded from the beginning.
- If the download destination (REMCS Center or the source storage system) does not have the latest controller firmware to be received, the download process will not be executed.
- When downloading controller firmware manually, and the download destination (REMCS center or the source storage system) has received connection requests, which exceed the number of simultaneous firmware distribution connections, the connecting destination status will become busy, and a message to that effect will be displayed. Wait a few minutes before resuming manually downloading controller firmware.
- If the [Download Firmware] is selected again while the controller firmware is being downloaded, the [Stop] button can be clicked to stop the download. Note that downloading cannot be stopped under the following conditions:
 - The controller firmware download was suspended, after download had been started
 - The controller firmware is being applied
- The unified firmware cannot be downloaded from the REMCS center.

Note

- Refer to the [Apply Controller Firmware] function for details about how to apply the controller firmware in the following conditions:
 - The downloaded controller firmware is not automatically applied to the storage system
 - Applying manually downloaded controller firmware to the storage system

■ **User Privileges**

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	
StorageAdmin	
AccountAdmin	
SecurityAdmin	
Maintainer	✓

Refer to "[A. User Roles and Policies](#)" (page 1580)" for details on the policies and roles.

■ **Settings**

In this screen, specify the parameters to download controller firmware.

Download Destination

Select the download source of controller firmware.

Item	Description	Setting values
Download Destination	<p>Select the destination to download the controller firmware from "REMCS Center" or "Peer level Storage System as Firmware Source".</p> <p>For "Peer level Storage System as Firmware Source", the IPv4 address of the destination storage system that is specified with the [Setup Firmware Update from Peer Storage System] function, and the LAN port of the local device (MNT/RMT) that is used are also displayed.</p> <p>The default setting is "REMCS Center". Note that if the Remote Support (REMCS) connection method is "Mail only", "Peer level Storage System as Firmware Source" will be the default setting.</p>	<p>REMCS Center (Default)</p> <p>Peer level Storage System as Firmware Source</p>

Download Mode

When downloading controller firmware automatically, select the "Enable" checkbox in the "Automatic Download" field, and specify the following items:

Item	Description	Setting values
Automatic Download	<p>Select the "Enable" checkbox.</p> <p>When enabling the "Automatic Download", the storage system checks whether the latest controller firmware exists in the specified download source. If the latest controller firmware exists, it is downloaded automatically.</p>	<p>Selected: Enabled</p> <p>Cleared: Disabled (Default)</p>

8. System
Remote Support

Item	Description	Setting values
Download Schedule	<p>Select the automatic download schedule from the following:</p> <ul style="list-style-type: none"> • Same as Connection Period The storage system checks whether the latest controller firmware exists in the download source, during the scheduled connection between REMCS center and the storage system. If the latest controller firmware exists, it is downloaded automatically. In the "Download Date" field, the term and the time, which were specified in the [Setup Remote Support] function, are displayed. • Once per Week In accordance with the specified once-per-week schedule, the storage system checks whether the latest controller firmware exists in the download destination. If the latest controller firmware exists, it is downloaded automatically. In the "Download Date" field, specify the day and time. 	<p>Same as Connection Period (Default) Once per Week</p>
Download Date	<p>If "Same as Connection Period" is selected in the "Download Schedule" field, the date and time for downloading firmware is displayed. When "Once per Week" is selected, specify the day and time.</p>	<p>Sunday Monday Tuesday Wednesday Thursday Friday Saturday Hour: 00 - 23 Minute: 00 - 59 Undefined: Any day from Monday to Friday (Default) (*1)</p>
Automatic Controller Firmware Update	<p>When "Firmware will be activated at the next power cycle after download completion", select the checkbox to enable the mode. Use the [Apply Controller Firmware] function if the downloaded controller firmware is not applied automatically or when applying the downloaded controller firmware manually.</p>	<p>Enable: Apply at the next startup Disable: Do not apply (Default)</p>

*1 : Different days and times are specified in the factory settings in order to disperse the load on the REMCS center.

Bandwidth Limit

In this field, specify the bandwidth to download controller firmware.

Item	Description	Setting values
Bandwidth Limit	<p>This setting is only available when "REMCS Center" is selected as the "Download Destination". Select the "Enable" checkbox to specify the bandwidth limit. Select whether to control the transmission speed within the specified value if the transmission speed for downloading controller firmware exceeds the specified value. If the "Bandwidth Limit" is not enabled, the storage system downloads the controller firmware according to the download speed specified in the existing network environment settings.</p>	<p>Selected: Enabled Cleared: Disabled (Default)</p>
Download speed (Kbit/s)	<p>If the bandwidth limit is enabled, enter the maximum speed to download controller firmware.</p>	<p>100 - 999 100 (Default)</p>

Function Button

Button	Description
[Download]	Downloads the controller firmware manually.

Button	Description
[Stop]	Stops downloading controller firmware. The [Stop] button is only available while controller firmware is being downloaded.

■ Operating Procedures

When automatically downloading controller firmware

In this screen, specify the parameters to download controller firmware automatically.

Procedure ▶▶▶

- 1 Click [Download Firmware] in [Action].
- 2 Specify the parameters, and click the [Set] button.
→ A confirmation screen appears.
- 3 Click the [OK] button.
→ The parameters for automatic download of controller firmware is updated.
- 4 Click the [Done] button to return to the screen when starting this function in Step 1.

Note

- When "Automatic Controller Firmware Update" is disabled (select "Disable" for "Automatic Controller Firmware Update"), refer to the [Apply Controller Firmware] function to apply the controller firmware.



When manually downloading controller firmware

In this screen, download the controller firmware manually.

Procedure ▶▶▶

- 1 Click [Download Firmware] in [Action].
- 2 Specify "Download Source" and "Bandwidth Limit", and click the [Download] button.
→ A confirmation screen appears.

Caution

- If the settings have been changed, press the [Set] button, instead of the [Download] button. After the download parameters ("Download Destination" and "Bandwidth Limit") have been changed in the storage system, download controller firmware manually. If the [Download] button was clicked without updating the download parameters, the storage system will follow the old download parameters and commence the download process.

- 3 Click the [OK] button.
→ Manual download of controller firmware starts.

- 4 Click the [Done] button to return to the screen when starting this function in Step 1.

Note

- Refer to the [Apply Controller Firmware] function for details about how to apply the controller firmware.



When stopping a controller firmware download

In this screen, stop downloading controller firmware.

Procedure ▶▶▶

- 1 Click [Download Firmware] in [Action].
→ A message is displayed to inform that controller firmware is being downloaded.
- 2 Click the [Stop] button.
→ A confirmation screen appears.
- 3 Click the [OK] button.
→ The stop operation for downloading of controller firmware starts.
- 4 Click the [Done] button to return to the screen when starting this function in Step 1.

Caution

- It may take a few minutes before downloading of controller firmware is stopped, depending on the download status at the time of stop. Wait for a few minutes.



Setup Firmware Update from Peer Storage System

- ["■ Overview" \(page 1298\)](#)
- ["■ User Privileges" \(page 1299\)](#)
- ["■ Settings" \(page 1299\)](#)
- ["■ Operating Procedures" \(page 1300\)](#)

■ Overview

This function specifies the parameters to download controller firmware from the peer storage system.

Caution

- The following setting must be set in advance:
 - Use the [Setup Network Environment] function on the firmware source storage system (*1) to register the firmware destination storage system (*2) as the remote device.
 - Use the [Setup Firewall] function on the firmware source storage system to enable the LAN port (MNT/RMT) interface (Maintenance-Secure) that is used for the firmware source storage system.
- *1 : The system which downloads the latest version controller firmware from the REMCS center. Firmware source storage system sends the controller firmware to the other storage systems.
- *2 : The storage system which downloads the controller firmware from the firmware source storage system (local device). For firmware destination storage system, set the environment to download the firmware with the [Setup Firmware Update from Peer Storage System] function.
- Up to 10 storage systems can simultaneously download the controller firmware per firmware source storage system. Note that there is no limitation on the number of IP addresses for a firmware source storage system that is specified with the [Setup Firmware Update from Peer Storage System] function.
- Use the IPv4 address for the "IP Address of Firmware source storage system". IPv6 addresses cannot be used.

Note

- Refer to the [Download Controller Firmware] function for details about downloading controller firmware.
- This function does not require communication with the REMCS center. Therefore, downloading controller firmware can be performed even when the Remote Support setting is not configured or Remote Support is under maintenance or has stopped.

■ User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	
StorageAdmin	
AccountAdmin	
SecurityAdmin	
Maintainer	✔

Refer to ""A. User Roles and Policies" (page 1580)" for details on the policies and roles.

■ Settings

In this screen, specify the parameters to download the controller firmware from the peer storage system.

Setup Firmware Update from Peer Storage System

Item	Description	Setting values
IP Address of Firmware source storage system	Input the IP address for the firmware source storage system.	IP address Default: All "0"

Item	Description	Setting values
LAN Port used for firmware download	Select the LAN port used for [Download Controller Firmware] from "MNT" or "RMT".	MNT (Default) RMT

Connection example

No.	Firmware source storage system A (physical port used for connection)	Firmware destination storage system B (physical port used for connection)
Example 1	MNT	MNT or RMT
Example 2	RMT	MNT or RMT

Setting for each connection example

No.	Firmware source storage system A			Firmware destination storage system B	
	LAN port (physical port)	Setup Firewall		Setup Firmware Update from Peer Storage System	
		Setting of the MNT port (Maintenance-Secure)	Setting of the RMT port (Maintenance-Secure)	IP Address of Firmware source storage system	LAN Port used for firmware download
Example 1	MNT	Enabled	-	IP address of the MNT port (storage system A)	MNT or RMT (storage system B)
Example 2	RMT	-	Enabled	IP address of the RMT port (storage system A)	MNT or RMT (storage system B)

■ Operating Procedures

Procedure ▶▶▶

- 1 Click [Setup Firmware Update from Peer Storage System] in [Action].
- 2 Specify the parameters, and click the [Set] button.
→ A confirmation screen appears.

Caution

- An error screen appears in the following conditions:
 - Characters other than numerals (0 - 255) are entered for the "IP Address of Firmware source storage system"
 - "0.0.0.0" or "255.255.255.255" is entered for the "IP Address of Firmware source storage system"
 - If "MNT" is selected for the "LAN Port used for firmware download"
 - The "IP Address of Firmware source storage system" and the broadcast address of the MNT port are the same
 - The "IP Address of Firmware source storage system" and the network address of the MNT port are the same
 - The "IP Address of Firmware source storage system" and the IP address of the Master CM of the MNT port are the same
 - The "IP Address of Firmware source storage system" and the IP address of the Slave CM of the MNT port are the same
 - If "RMT" is selected for the "LAN Port used for firmware download"
 - The "IP Address of Firmware source storage system" and the broadcast address of the RMT port are the same
 - The "IP Address of Firmware source storage system" and the network address of the RMT port are the same
 - The "IP Address of Firmware source storage system" and the IP address of the Master CM of the RMT port are the same
 - The "IP Address of Firmware source storage system" and the IP address of the Slave CM of the RMT port are the same
- If the communication between the local device and the firmware source storage system cannot be established, a message to that effect is displayed. Check the network environment.

Note

- To delete the setting, click the [Set] button after clearing all the text boxes for "IP Address of Firmware source storage system".

- 3** Click the [OK] button.
→ Parameters for the firmware update from the peer storage system are set.
- 4** Click the [Done] button to return to the screen when starting this function in Step 1.



AIS Connect

- ["■ Overview" \(page 1301\)](#)
- ["■ User Privileges" \(page 1302\)](#)
- ["■ Display Contents" \(page 1302\)](#)

■ Overview

This function displays the setting information for AIS Connect.

The AIS Connect function can be used to monitor or control multiple storage systems from a remote server (AIS Connect server).
AIS Connect service ended in December 2022.

Note

- Use CLI to set "Service Contract Responsibility (Country Code : Country Name)". Note that the "Maintenance Operation" policy is required to set this item.

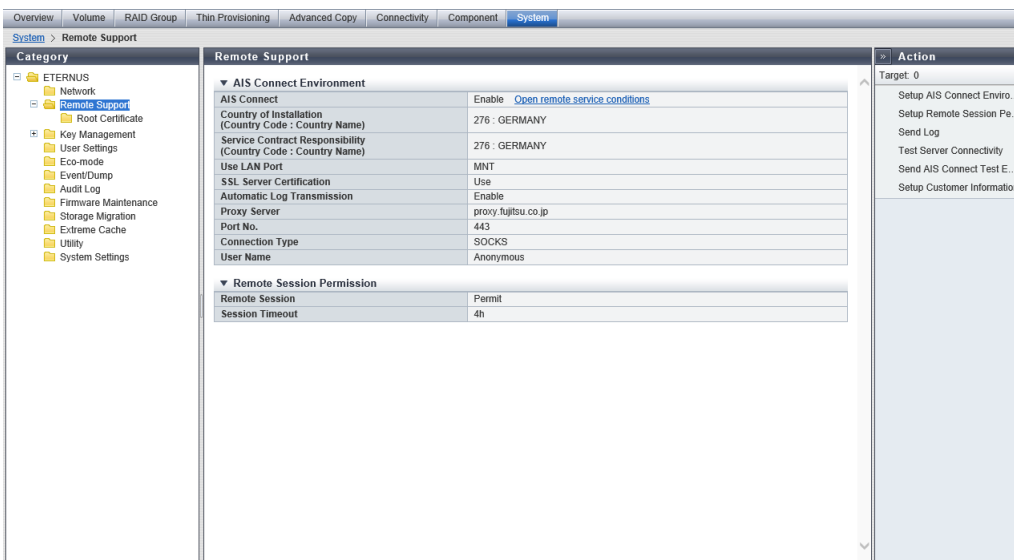
User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	✓
Admin	✓
StorageAdmin	✓
AccountAdmin	
SecurityAdmin	✓
Maintainer	✓

Refer to "'A. User Roles and Policies" (page 1580)" for details on the policies and roles.

Display Contents



AIS Connect Environment

Item	Description
AIS Connect	Whether the AIS Connect function is enabled or disabled is displayed. When "Country of Installation (Country Code : Country Name)" has been set, the [Open remote service conditions] link is displayed. Click this link to display "Conditions for the Fujitsu Remote Support Connect Service", which lists the terms and conditions regarding the handling of personal information.

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Item	Description
Country of Installation (Country Code : Country Name)	The shipment destination (storage system location) is displayed in "Country Code : Country Name" format. If not specified, "Not Selected" is displayed.
Service Contract Responsibility (Country Code : Country Name)	The country in which the support office for the storage system is located is displayed in "Country Code : Country Name" format. Caution <ul style="list-style-type: none"> This item is not displayed when "Service Contract Responsibility (Country Code : Country Name)" is not specified from CLI.
Use LAN Port	The LAN port that is used for communication with the AIS Connect server is displayed. MNT RMT
SSL Server Certification	Whether the SSL server certification is used (Use) or not (Not Use) for communication with the AIS Connect server is displayed.
Automatic Log Transmission	Whether the automatic log transmission is enabled or disabled when an error occurs is displayed. When "Automatic Log Transmission" is enabled, the storage system automatically sends logs to the AIS Connect server when a fail event (error level or warning level) occurs.
Proxy Server	The IPv4 address or the Fully Qualified Domain Name (FQDN) of the proxy server is displayed. If the proxy server is not specified, the field is blank. For IPv4 address xxx.xxx.xxx.xxx xxx: 0 - 255 (decimal) For FQDN Up to 63 alphanumeric characters and symbols
Port No.	The port number (0 to 65535) for the proxy server is displayed. If the proxy server is not specified, the field is blank.
Connection Type	The communication method for the proxy server is displayed. If the proxy server is not specified, the field is blank. HTTP SOCKS
User Name	The user name for proxy server authentication is displayed. If the proxy server is not specified, the field is blank.

Remote Session Permission

Item	Description
Remote Session	Whether to allow or forbid a remote session from the AIS Connect server is displayed.
Session Timeout	The timeout value (1 to 24 hours) for a remote session connection is displayed. If the timeout limit is not specified, "Unlimited" is displayed. If the time exceeds the specified value without a remote session connection, remote session permission is automatically disabled and the set state changes to "Forbid".

Function Button

Button	Description
[Print]	Prints the terms and conditions.

Button	Description
[Close]	Closes the screen that displayed the terms and conditions and returns to the [AIS Connect Environment] screen.

Setup AIS Connect Environment

- "[■ Overview](#)" (page 1304)
- "[■ User Privileges](#)" (page 1304)
- "[■ Settings](#)" (page 1305)
- "[■ Operating Procedures](#)" (page 1306)
- "[■ Appendix](#)" (page 1307)

■ Overview

This function sets up the basic information for AIS Connect.

Caution

- AIS Connect is not available when REMCS is being used. Suspend REMCS and then enable AIS Connect. Refer to the [Stop/Restart Remote Support] function for details.
- Before using AIS Connect, make sure to read the terms and conditions regarding the handling of personal information with extreme caution. To agree with the terms and conditions, click the [I agree] button. Agreement is required only once before setting "Country of Installation (Country Code : Country Name)".
- Note that setting parameters for AIS Connect is applied only when "Enable" is selected for "AIS Connect".

Note

- Even if the "AIS Connect" setting is changed to "Disable", the basic AIS Connect information in the storage system is retained.

■ User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	✓
StorageAdmin	
AccountAdmin	
SecurityAdmin	
Maintainer	✓

Refer to "["A. User Roles and Policies"](#) (page 1580)" for details on the policies and roles.

■ Settings

AIS Connect Environment Setting

Item	Description	Setting values
AIS Connect	Select whether to enable or disable the AIS Connect function.	Enable Disable
Country of Installation (Country Code : Country Name)	Select the country name to which the storage system is shipped (where the storage system locates). Options for this item are displayed in "Country code : Country name" format. The country name is listed in English alphabetical order. "ISO 3166-1 numeric" is used as the country code.	"Country Code : Country Name" (page 1307)
Use LAN Port	Select the LAN port that is to be used for communication with the AIS Connect server.	MNT RMT
SSL Server Certification	To use SSL server certification for communication with the AIS Connect server, select "Use". To not use SSL server certification, select "Not use". When "Use" is selected, server certification is performed with the root certificate that is registered in the storage system for AIS Connect server communication. When there is no appropriate root certificate that authenticates server certification that is received from the AIS Connect server or when the root certificate has expired, communication with the AIS Connect server fails. The expiration date of the root certificate can be checked from the [Root Certificate] screen. Refer to the [Root Certificate] function for details.	Use Not use
Automatic Log Transmission	Select whether to enable or disable the automatic log transmission. When "Automatic Log Transmission" is enabled and notification of Error Severity Level or Warning Level occurs, a log is collected and sent to the AIS Connect server in approximately five minutes. The maximum size of a log is 1.44 MB. Note that I/O Module logs are not included. Send log requests are not performed in the following conditions. <ul style="list-style-type: none"> • A send log request is already performed once log collection is complete. • The customer information is being transferred. 	Enable Disable
Proxy Server	Input the IPv4 address or the Fully Qualified Domain Name (FQDN) of the proxy server. Make sure to input "Proxy Server" and "Port No." together. If a proxy server is not used, this item does not need to be set.	For IPv4 address xxx.xxx.xxx.xxx xxx: 1 - 255 for the top field (decimal) xxx: 0 - 255 for other fields (decimal) For FQDN Up to 63 alphanumeric characters and symbols ("." (dot), ":" (colon), "-" (hyphen), and "_" (underscore) can be used)
Port No.	Input the port number of the proxy server. Make sure to input "Proxy Server" and "Port No." together. If a proxy server is not used, this item does not need to be set.	0 - 65535

Item	Description	Setting values
Connection Type	Select the communication method for the proxy server. <ul style="list-style-type: none"> • HTTP: Basic/NTLM HTTP authentication • SOCKS: SOCKSv5 authentication 	HTTP SOCKS
User Name	Specify the user name for the proxy server authentication. If a proxy server is not used, this item does not need to be set.	Up to 32 alphanumeric characters
Change Password	To change the proxy server authentication password, select the checkbox.	Selected: change the password Cleared
Password	Select the "Change Password" checkbox and then input the password for proxy server authentication. When inputting the password, "*" is displayed to hide the specified value. If a proxy server is not used, this item does not need to be set.	Up to 64 alphanumeric characters and symbols
Confirm Password	Select the "Change Password" checkbox and then input the password for proxy server authentication again. When inputting the password, "*" is displayed to hide the specified value. If a proxy server is not used, this item does not need to be set.	Up to 64 alphanumeric characters and symbols

■ Operating Procedures

Procedure ▶▶▶

- 1 Click [Setup AIS Connect Environment] in [Action].
- 2 Check the terms and conditions regarding the handling of personal information.
 - When the [I agree] button is clicked
→ The [Setup AIS Connect Environment] screen appears. Proceed to Step 3.
 - When the [I decline] button is clicked
→ Returns to the screen when starting this function in Step 1.

Note

- The terms and conditions regarding the handling of personal information are displayed only when "Country of Installation (Country Code : Country Name)" is not specified.
- To print the terms and conditions regarding the handling of personal information, click the [Print] button.

- 3 Specify the parameters, and click the [Set] button.
→ A confirmation screen appears.

Caution

- An error screen appears in the following conditions (when "Enable" is selected for the AIS Connect function and a proxy server is specified):
 - The specified "Proxy Server" does not satisfy the input conditions
 - The same IP address is specified for "Proxy Server" and the MNT port or the RMT port
 - The IP address for "Proxy Server" and the network address for the MNT port or the RMT port are the same
 - The IP address for "Proxy Server" and the broadcast address for the MNT port or the RMT port are the same
 - The same IP address is specified for "Proxy Server" and "AIS Connect Server"
 - Either of the "Proxy Server" or the "Port No." has been specified
 - "Port No." does not satisfy the input conditions
 - "User Name" is not entered
 - "User Name" does not satisfy the input conditions
 - "Password" is not entered (only when "Change Password" checkbox is selected)
 - "Password" does not satisfy the input conditions (only when "Change Password" checkbox is selected)
 - "Confirm Password" is not entered (only when "Change Password" checkbox is selected)
 - "Confirm Password" does not satisfy the input conditions (only when "Change Password" checkbox is selected)
 - "Password" does not match "Confirm Password" (only when "Change Password" checkbox is selected)
- When "Enable" is selected for "AIS Connect" and "Country of Installation (Country Code : Country Name)" is not specified, an error screen appears.

4 Click the [OK] button.
→ AIS Connect setting starts.

5 Click the [Done] button to return to the screen when starting this function in Step 1.



■ Appendix

Country Code : Country Name

Select the storage system location from the following "Country Code : Country Name" list.

Country Code : Country Name

4: AFGHANISTAN
8: ALBANIA
12: ALGERIA
16: AMERICAN SAMOA
20: ANDORRA
24: ANGOLA
660: ANGUILLA
10: ANTARCTICA
28: ANTIGUA AND BARBUDA
32: ARGENTINA

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Remote Support

Country Code : Country Name

51: ARMENIA
533: ARUBA
36: AUSTRALIA
40: AUSTRIA
31: AZERBAIJAN
44: BAHAMAS
48: BAHRAIN
50: BANGLADESH
52: BARBADOS
112: BELARUS
56: BELGIUM
84: BELIZE
204: BENIN
60: BERMUDA
64: BHUTAN
68: BOLIVIA
70: BOSNIA AND HERZEGOWINA
72: BOTSWANA
74: BOUVET ISLAND
76: BRAZIL
86: BRITISH INDIAN OCEAN TERRITORY
96: BRUNEI DARUSSALAM
100: BULGARIA
854: BURKINA FASO
108: BURUNDI
116: CAMBODIA
120: CAMEROON
124: CANADA
132: CAPE VERDE
136: CAYMAN ISLANDS
140: CENTRAL AFRICAN REPUBLIC
148: CHAD
152: CHILE
156: CHINA
162: CHRISTMAS ISLAND
166: COCOS VALUES (KEELING) ISLANDS
170: COLOMBIA
174: COMOROS
178: CONGO
184: COOK ISLANDS
188: COSTA RICA
384: COTE D'IVOIRE
191: CROATIA (local name: Hrvatska)
192: CUBA
196: CYPRUS
203: CZECH REPUBLIC
208: DENMARK
262: DJIBOUTI
212: DOMINICA
214: DOMINICAN REPUBLIC
626: EAST TIMOR
218: ECUADOR
818: EGYPT

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Remote Support

Country Code : Country Name

222: EL SALVADOR
226: EQUATORIAL GUINEA
232: ERITREA
233: ESTONIA
231: ETHIOPIA
238: FALKLAND ISLANDS VALUES (MALVINAS)
234: FAROE ISLANDS
242: FIJI
246: FINLAND
250: FRANCE
254: FRENCH GUIANA
258: FRENCH POLYNESIA
260: FRENCH SOUTHERN TERRITORIES
266: GABON
270: GAMBIA
268: GEORGIA
276: GERMANY
288: GHANA
292: GIBRALTAR
300: GREECE
304: GREENLAND
308: GRENADA
312: GUADELOUPE
316: GUAM
320: GUATEMALA
324: GUINEA
624: GUINEA-BISSAU
328: GUYANA
332: HAITI
334: HEARD AND MC DONALD ISLANDS
340: HONDURAS
344: HONG KONG
348: HUNGARY
352: ICELAND
356: INDIA
360: INDONESIA
364: IRAN VALUES (ISLAMIC REPUBLIC OF)
368: IRAQ
372: IRELAND
376: ISRAEL
380: ITALY
388: JAMAICA
392: JAPAN
400: JORDAN
398: KAZAKHSTAN
404: KENYA
296: KIRIBATI
408: KOREA, DEMOCRATIC PEOPLES REPUBLIC OF
410: KOREA, REPUBLIC OF
414: KUWAIT
417: KYRGYZSTAN
418: LAO PEOPLES DEMOCRATIC REPUBLIC
428: LATVIA

8. System

Remote Support

Country Code : Country Name

422: LEBANON
426: LESOTHO
430: LIBERIA
434: LIBYAN ARAB JAMAHIRIYA
438: LIECHTENSTEIN
440: LITHUANIA
442: LUXEMBOURG
446: MACAU
807: MACEDONIA, THE FORMER YUGOSLAV REPUBLIC OF
450: MADAGASCAR
454: MALAWI
458: MALAYSIA
462: MALDIVES
466: MALI
470: MALTA
584: MARSHALL ISLANDS
474: MARTINIQUE
478: MAURITANIA
480: MAURITIUS
175: MAYOTTE
484: MEXICO
583: MICRONESIA, FEDERATED STATES OF
498: MOLDOVA, REPUBLIC OF
492: MONACO
496: MONGOLIA
500: MONTSERRAT
504: MOROCCO
508: MOZAMBIQUE
104: MYANMAR
516: NAMIBIA
520: NAURU
524: NEPAL
528: NETHERLANDS
530: NETHERLANDS ANTILLES
540: NEW CALEDONIA
554: NEW ZEALAND
558: NICARAGUA
562: NIGER
566: NIGERIA
570: NIUE
574: NORFOLK ISLAND
580: NORTHERN MARIANA ISLANDS
578: NORWAY
512: OMAN
586: PAKISTAN
585: PALAU
275: PALESTINIAN TERRITORY, OCCUPIED
591: PANAMA
598: PAPUA NEW GUINEA
600: PARAGUAY
604: PERU
608: PHILIPPINES
612: PITCAIRN

8. System

Remote Support

Country Code : Country Name

616: POLAND
620: PORTUGAL
630: PUERTO RICO
634: QATAR
638: REUNION
642: ROMANIA
643: RUSSIAN FEDERATION
646: RWANDA
659: SAINT KITTS AND NEVIS
662: SAINT LUCIA
670: SAINT VINCENT AND THE GRENADINES
882: SAMOA
674: SAN MARINO
678: SAO TOME AND PRINCIPE
682: SAUDI ARABIA
686: SENEGAL
688: SERBIA AND MONTENEGRO
690: SEYCHELLES
694: SIERRA LEONE
702: SINGAPORE
703: SLOVAKIA VALUES (Slovak Republic)
705: SLOVENIA
90: SOLOMON ISLANDS
706: SOMALIA
710: SOUTH AFRICA
239: SOUTH GEORGIA AND THE SOUTH SANDWICH ISLANDS
724: SPAIN
144: SRI LANKA
654: ST. HELENA
666: ST. PIERRE AND MIQUELON
736: SUDAN
740: SURINAME
744: SVALBARD AND JAN MAYEN ISLANDS
748: SWAZILAND
752: SWEDEN
756: SWITZERLAND
760: SYRIAN ARAB REPUBLIC
158: TAIWAN
762: TAJIKISTAN
834: TANZANIA, UNITED REPUBLIC OF
764: THAILAND
768: TOGO
772: TOKELAU
776: TONGA
780: TRINIDAD AND TOBAGO
788: TUNISIA
792: TURKEY
795: TURKMENISTAN
796: TURKS AND CAICOS ISLANDS
798: TUVALU
800: UGANDA
804: UKRAINE
784: UNITED ARAB EMIRATES

Country Code : Country Name

826: UNITED KINGDOM
840: UNITED STATES
581: UNITED STATES MINOR OUTLYING ISLANDS
858: URUGUAY
860: UZBEKISTAN
548: VANUATU
336: VATICAN CITY STATE VALUES (HOLY SEE)
862: VENEZUELA
704: VIET NAM
92: VIRGIN ISLANDS VALUES (BRITISH)
850: VIRGIN ISLANDS VALUES (U.S.)
876: WALLIS AND FUTUNA ISLANDS
732: WESTERN SAHARA
887: YEMEN
894: ZAMBIA
716: ZIMBABWE

Setup Remote Session Permission

- ["■ Overview" \(page 1312\)](#)
- ["■ User Privileges" \(page 1313\)](#)
- ["■ Settings" \(page 1313\)](#)
- ["■ Operating Procedures" \(page 1313\)](#)

■ Overview

This function performs permission settings for remote sessions with the AIS Connect function. If a remote session is permitted, remotely controlling the storage system from a remote server (AIS Connect server) becomes available.

Caution

- Settings can be changed when "AIS Connect" is enabled. Refer to the [Setup AIS Connect Environment] function for details.
- The permission setting of a remote session is released if one of the following conditions applies:
 - When a remote session is not detected before the timeout period that is specified for the timeout setting
 - When this function forbids remote sessions
 - When "AIS Connect" is disabled

Note

- The permission settings are retained even if the storage system is rebooted or after recovery from a power failure. Note that the timer that monitors remote session connection is reset to "0" in this case.
- If the setting of this function is changed to forbid while a remote session is being performed, operations for this remote session are permitted until the user logs out. However, once this remote session is logged out from, this remote session cannot be logged into while the remote session is forbid.
- When "AIS Connect" is disabled, all remote sessions that are currently being performed are immediately disconnected.

■ User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	✓
StorageAdmin	
AccountAdmin	
SecurityAdmin	
Maintainer	✓

Refer to ["A. User Roles and Policies" \(page 1580\)](#) for details on the policies and roles.

■ Settings

Remote Session Permission Setting

Item	Description	Setting values
Remote Session	Select whether to allow or forbid a remote session from the AIS Connect server.	Permit Forbid (Default)
Remote Session Timeout	Select the timeout limit for remote session connection. When not setting the timeout limit, select "Unlimited". When "Permit" is selected for "Remote Session", monitoring of the remote sessions starts. If the time exceeds the specified value without a remote session connection, remote session permission is automatically disabled and the set state changes to "Forbid". If a remote session connection is detected while monitoring is being performed, the timer is suspended during connection. After connection is complete, the timer is reset to "0" and monitoring starts again. Selecting the timeout limit is only available when "Permit" is selected for "Remote Session".	1 (Default) - 24 hours Unlimited

■ Operating Procedures

Procedure ▶▶▶

- 1 Click [Setup Remote Session Permission] in [Action].
- 2 Specify the parameters, and click the [Set] button.
→ A confirmation screen appears.
- 3 Click the [OK] button.
→ The permission settings for remote session are applied.
- 4 Click the [Done] button to return to the screen when starting this function in Step 1.



Send Log

- ["■ Overview" \(page 1314\)](#)
- ["■ User Privileges" \(page 1314\)](#)
- ["■ Operating Procedures" \(page 1314\)](#)

■ Overview

This function manually sends a storage system log to the remote server (AIS Connect server) when the AIS Connect function is in operation.

Caution

- Sending logs is only available when the [AIS Connect] function is enabled. Refer to the [Setup AIS Connect Environment] function for details.
- Check the connection to the AIS Connect server in advance. Refer to the [Test Server Connectivity] function for details. If a communication error occurs and a connection to the AIS Connect server cannot be established, logs cannot be sent. A log that fails to be sent is not resent.
- Send log requests are not performed in the following conditions.
 - A send log request is already performed once log collection is complete.
 - The customer information is being transferred.

Note

- This function collects logs (including I/O Module logs) at the time when performing the [Send Log] function. Log files are divided into 640 MB increments and sent to the AIS Connect server.

■ User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	✓
StorageAdmin	
AccountAdmin	
SecurityAdmin	
Maintainer	✓

Refer to "'A. User Roles and Policies" (page 1580)" for details on the policies and roles.

■ Operating Procedures

Procedure ▶▶▶

- 1 Click [Send Log] in [Action].
→ A confirmation screen appears.
- 2 Click the [OK] button.
→ Sending log starts.
- 3 Click the [Done] button to return to the screen when starting this function in Step 1.

Test Server Connectivity

- "■ Overview" (page 1315)
- "■ User Privileges" (page 1315)

- "[Operating Procedures](#)" (page 1315)

■ Overview

This function checks the connection status of the remote server (AIS Connect server) with the storage system.

Caution

- Checking the connection status is only available when the [AIS Connect] function is enabled. Refer to the [Setup AIS Connect Environment] function for details.

Note

- This function checks the connection status of the AIS Connect server by using the AIS Connect information in the storage system. After using the [Setup AIS Connect Environment] function, use the [Test Server Connectivity] function to check the connection status.

■ User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	✓
StorageAdmin	
AccountAdmin	
SecurityAdmin	
Maintainer	✓

Refer to "[A. User Roles and Policies](#)" (page 1580)" for details on the policies and roles.

■ Operating Procedures

Procedure ▶▶▶

- 1 Click [Test Server Connectivity] in [Action].
→ A confirmation screen appears.
- 2 Click the [OK] button.
→ Checking of the server connection status starts.
- 3 Click the [Done] button to return to the screen when starting this function in Step 1.

Note

- The check result of the server connection status is displayed in the [Test Server Connectivity Result] screen. If server connection fails, the cause of the error is displayed.

Send AIS Connect Test Event

- "[Overview](#)" (page 1316)
- "[User Privileges](#)" (page 1316)
- "[Operating Procedures](#)" (page 1316)

■ Overview

This function sends a test event to the remote server (AIS Connect server).

Caution

- Sending a test event is only available when "AIS Connect" is enabled. Refer to the [Setup AIS Connect Environment] function for details.
- The [Send AIS Connect Test Event] function only sends an event. Note that this function cannot be used to check the network connection status between the storage system and the AIS Connect server. Use the [Test Server Connectivity] function to check the connection status. After checking the connection status, use the [Send AIS Connect Test Event] function to send a test event. Check the AIS Connect server to confirm that the event is successfully received.

■ User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	✓
StorageAdmin	
AccountAdmin	
SecurityAdmin	
Maintainer	✓

Refer to "'A. User Roles and Policies" (page 1580)" for details on the policies and roles.

■ Operating Procedures

Procedure ▶▶▶

- 1 Click [Send AIS Connect Test Event] in [Action].
→ A confirmation screen appears.
- 2 Click the [OK] button.
→ Sending of the AIS Connect test event starts.
- 3 Click the [Done] button to return to the screen when starting this function in Step 1.



Setup Customer Information

- "■ Overview" (page 1316)
- "■ User Privileges" (page 1317)
- "■ Settings" (page 1317)
- "■ Operating Procedures" (page 1318)

■ Overview

This function transfers the customer information to the AIS Connect server.

Caution

- The customer information can only be transferred if the [AIS Connect] function is enabled. Refer to the [Setup AIS Connect Environment] function for details.
- Check the connection to the AIS Connect server in advance. Refer to the [Test Server Connectivity] function for details. If a communication error occurs and a connection to the AIS Connect server cannot be established, the customer information cannot be sent. If the transfer fails, the customer information is not resent.
- If a send log request is already performed while transferring the customer information, the customer information is not transferred.

■ **User Privileges**

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	✓
StorageAdmin	
AccountAdmin	
SecurityAdmin	
Maintainer	✓

Refer to ["A. User Roles and Policies" \(page 1580\)](#) for details on the policies and roles.

■ **Settings**

Location Information

Item	Description	Setting values
Location Name *	Specify the installation site of the storage system (required).	Up to 20 alphanumeric characters, symbols, and spaces.
Company *	Input the company name that owns the storage system (required).	Up to 60 alphanumeric characters, symbols, and spaces.
Street *	Input the address where the storage system is located (required).	Up to 60 alphanumeric characters, symbols, and spaces.
Postal Code	Input the postal code for the location of the storage system.	Up to 20 alphanumeric characters, symbols, and spaces.
City *	Input the address where the storage system is located (required).	Up to 40 alphanumeric characters, symbols, and spaces.
State *	Input the address where the storage system is located (required).	Up to 40 alphanumeric characters, symbols, and spaces.

Contact Information

Item	Description	Setting values
Contact Type *	Specify a contact type (required).	Manager Operator (Default) Other Owner System Administrator Technician User
Title	Specify a title for the customer.	Up to 20 alphanumeric characters, symbols, and spaces.
Last Name *	Specify a last name (required).	Up to 40 alphanumeric characters, symbols, and spaces.
First Name	Specify a first name.	Up to 40 alphanumeric characters, symbols, and spaces.
Phone Number *	Input the phone number for the company that owns the storage system (required).	Up to 20 alphanumeric characters, symbols, and spaces.
E-Mail Address *	Input the E-mail address of the system administrator who manages the storage system (required).	Up to 60 alphanumeric characters, symbols, and spaces.
Mobile Phone Number	Input the mobile phone number for the company that owns the storage system.	Up to 20 alphanumeric characters, symbols, and spaces.
Description	Specify the description.	Up to 60 alphanumeric characters, symbols, and spaces.

■ Operating Procedures

Procedure ▶▶▶

- 1 Click [Setup Customer Information] in [Action].
- 2 Configure the customer information, and click the [Set] button.
→ A confirmation screen appears.

Caution

- An error screen appears in the following conditions:
 - The required items (items with "*") are not specified
 - Wrong values are entered

- 3 Click the [OK] button.
→ The customer information is registered.
- 4 Click the [Done] button to return to the screen when starting this function in Step 1.

Root Certificate

- ["■ Overview" \(page 1319\)](#)
- ["■ User Privileges" \(page 1319\)](#)
- ["■ Display Contents" \(page 1319\)](#)

■ Overview

This function displays the root certificate that is used for SSL communication with the AIS Connect server.

Caution

- If multiple certificates are included in the root certificate file, up to 6 issuer names and their validity periods are displayed.

Note

- The root certificate that is registered in the storage system is displayed by default. When the root certificate is updated, only the latest certificate is displayed. For details on how to update the root certificate, refer to the [Import Root Certificate] function.
- The root certificate is only used for authentication with the AIS Connect server.

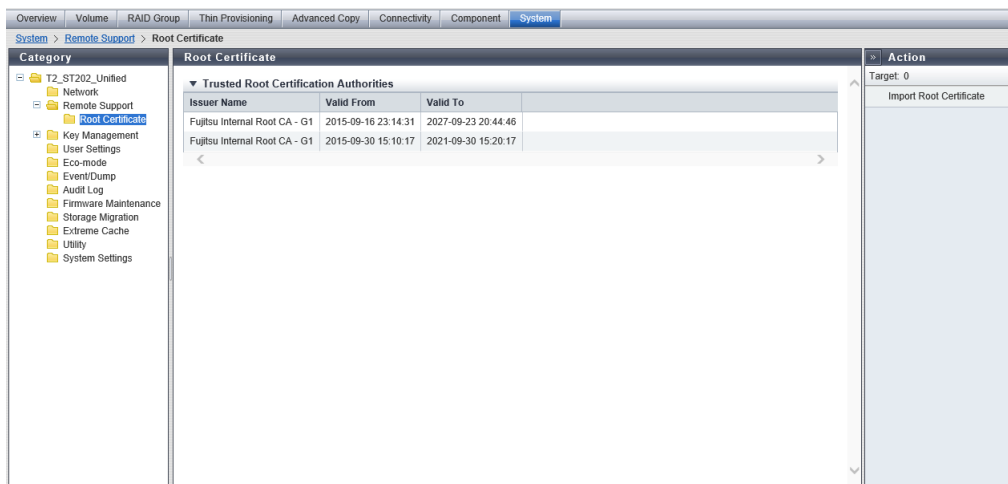
■ User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	✓
Admin	✓
StorageAdmin	✓
AccountAdmin	
SecurityAdmin	✓
Maintainer	✓

Refer to "[A. User Roles and Policies](#)" (page 1580) for details on the policies and roles.

■ Display Contents



Trusted Root Certification Authorities

Item	Description
Issuer Name	The issuer name for the root certificate is displayed.
Valid From	The start date and time (YYYY-MM-DD hh:mm:ss) of the root certificate validity period is displayed.
Valid To	The end date and time (YYYY-MM-DD hh:mm:ss) of the root certificate validity period is displayed.

Import Root Certificate

- ["■ Overview" \(page 1320\)](#)
- ["■ User Privileges" \(page 1320\)](#)
- ["■ Settings" \(page 1321\)](#)
- ["■ Operating Procedures" \(page 1321\)](#)

■ Overview

This function updates the root certificate that is used for SSL communication with the AIS Connect server.

A one root certificate includes multiple certificates. The maximum file size of a root certificate is 12288 byte.

Caution

- A default root certificate is already registered in the storage system. Check the expiration date of the default root certificate from the [Root Certificate] screen. The root certificate must be updated before the expiration date. This function overwrites the root certificate. Only the latest root certificate is saved in the storage system.
- The root certificate cannot be updated when both the "AIS Connect" setting and the "SSL Server Certification" setting are enabled. To update the root certificate while the AIS Connect function is being used, temporarily disable the "AIS Connect" setting and then update the certificate. The current settings for "AIS Connect" and "SSL Server Certification" can be checked from the [AIS Connect] screen. Refer to the [AIS Connect] function for details.

Note

- The root certificate is only used for authentication with the AIS Connect server.
- The expiration date of the updated root certificate can be checked from the [Root Certificate] screen. Refer to the [Root Certificate] function for details.

■ User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	✓
StorageAdmin	
AccountAdmin	
SecurityAdmin	
Maintainer	✓

Refer to "[A. User Roles and Policies](#)" (page 1580) for details on the policies and roles.

■ Settings

Root Certificate Setting

Item	Description	Setting values
Root Certificate File	Click the [Browse...] button to specify the root certificate file.	Root certificate file

■ Operating Procedures

Procedure ▶▶▶

- 1 Click [Import Root Certificate] in [Action].
- 2 Specify the root certificate file, and click the [Import] button.
→ A confirmation screen appears.

Caution

- An error screen appears in the following conditions:
 - The imported file is not "root certificate file"
 - The imported file size exceeds 12288 bytes
 - Both the "AIS Connect" setting and "SSL Server Certification" setting are enabled

- 3 Click the [OK] button.
→ Updating of the root certificate starts.
- 4 Click the [Done] button to return to the [Root Certificate] screen.



Key Management

- "[Overview](#)" (page 1321)
- "[User Privileges](#)" (page 1321)
- "[Display Contents](#)" (page 1322)

■ Overview

This function displays the setting parameters for the key server.

■ User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	✓
Admin	✓
StorageAdmin	✓
AccountAdmin	

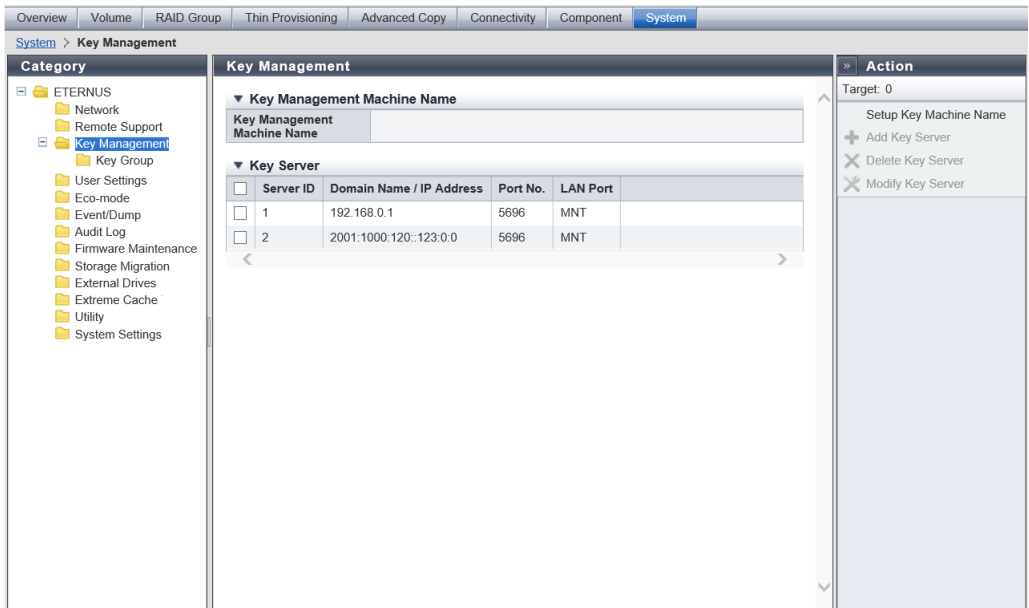
8. System
Key Management

Default role	Availability of executions
SecurityAdmin	✓
Maintainer	✓

Refer to ["A. User Roles and Policies" \(page 1580\)](#) for details on the policies and roles.

■ Display Contents

In this screen, the key management device (Key Management Machine) name and the setting parameters for the key server are displayed.



Key Management Machine Name

Item	Description
Key Management Machine Name	The name of the device that is connected to the key server is displayed. If the key management device name is not specified, the field is blank.

Key Server

In this screen, the setting parameters for the key server is displayed. If the key server is not specified, only the item name is displayed.

Item	Description
Server ID	The key server ID (1 or 2) is displayed.
Domain Name / IP Address	The domain name (Fully Qualified Domain Name: FQDN) or the IP address for the key server is displayed. Note that the IPv6 address is displayed as an abbreviation. Refer to "IPv6 Address Notation" (page 1220) for details.
Port No.	The port number (1 to 65535) that is used to communicate with the key server is displayed.
LAN Port	The LAN port that is used to communicate with the key server is displayed. MNT RMT

Setup Key Management Machine Name

- ["■ Overview" \(page 1323\)](#)
- ["■ User Privileges" \(page 1323\)](#)
- ["■ Settings" \(page 1323\)](#)
- ["■ Operating Procedures" \(page 1323\)](#)

■ Overview

This function specifies the name of the key management device (Key Management Machine).
The key management device name is used for the device that is to be used to connect to the key server.

■ User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	✓
StorageAdmin	
AccountAdmin	
SecurityAdmin	✓
Maintainer	

Refer to ["A. User Roles and Policies" \(page 1580\)](#) for details on the policies and roles.

■ Settings

Key Management Machine Name Setting

Item	Description	Setting values
Key Management Machine Name	<p>Input the name of the device that is to be used to connect to the key server. The key management device name corresponds to "Machine ID" in the key server. If a key management device name is not used or if the current setting is deleted, leave this item blank.</p> <div style="background-color: #fff9c4; padding: 10px;"><p>Caution</p><ul style="list-style-type: none">• Do not change the key management device name after the key status changes to "Normal". The key status can be checked on the [Key Group] screen. Refer to the [Key Group] function for details.</div>	<p>0 - 48 alphanumeric characters and symbols (underscore "_") The first letter must be an alphabetic character</p>

■ Operating Procedures

Procedure ▶▶▶

- 1 Click [Setup Key Machine Name] in [Action].
- 2 Specify the key management device name, and click the [Set] button.
→ A confirmation screen appears.

Caution

- If the entered "Key Management Machine Name" does not satisfy the input conditions, an error screen appears.

- 3 Click the [OK] button.
→ Setting of the key management server name starts.
- 4 Click the [Done] button to return to the [Key Management] screen.



Add Key Server

- ["■ Overview" \(page 1324\)](#)
- ["■ User Privileges" \(page 1324\)](#)
- ["■ Settings" \(page 1325\)](#)
- ["■ Operating Procedures" \(page 1325\)](#)

■ Overview

This function adds a key server.

A key server is an external server that manages the SED authentication key (hereinafter, referred to as "key"). By using the key server to obtain and update the key via SSL to establish secure communication with the storage system, an environment in which the key can be managed more safely can be created. Up to two key servers can be registered.

For the key server, use a server in which the key management software "ETERNUS SF KM" is installed. Note that "IBM Security Key Lifecycle Manager" is also available as the key management software.

Caution

- By using a key server to manage the key, the storage system obtains the key from the key server when required. For example, the key is obtained when RAID groups are added to the key group or when maintenance is performed for SEDs that configure a RAID group in the key group. Make sure that communication is always maintained between the storage system and the key server. To obtain the key from a key server, the key server must respond to the storage system within 30 seconds. Do not use the key server function in an environment in which a network timeout may occur.

■ User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	✓
StorageAdmin	
AccountAdmin	
SecurityAdmin	✓
Maintainer	

Refer to ["A. User Roles and Policies" \(page 1580\)](#) for details on the policies and roles.

■ Settings

Key Server Setting

Item	Description	Setting values
Server ID	"1" or "2" is displayed as the ID for unregistered servers. When a key server is registered for "1", "2" is displayed. The server ID for the master or the slave server is specified when creating the key group. Refer to the [Create Key Group] function for details.	
Domain Name / IP Address	Input the domain name (FQDN) or the IP address of the key server. There are two methods to specify an IP address; "IPv4" and "IPv6". The following IPv6 addresses can be used; "link local address", "global address", "unique local address", or "6to4 address". Refer to "" Available IPv6 Address " (page 1221)" for details. When the current setting is displayed, the IPv6 address is displayed as an abbreviation.	For domain name specification Up to 63 alphanumeric characters and symbols For IPv4 address xxx.xxx.xxx.xxx xxx: 1 - 255 for the top field (decimal) xxx: 0 - 255 for other fields (decimal) For IPv6 address xxxx:xxxx:xxxx:xxxx:xxxx:xxxx:xxxx:xxxx xxxx: 0 - ffff (FFFF) (hexadecimal, alphanumeric characters) Refer to "" IPv6 Address Notation " (page 1220)" for details.
Port No.	Input the port number used to communicate with the key server.	Numeric characters 1 - 65535 5696 (Default)
LAN Port	Select "MNT" or "RMT" for the LAN port that is to be used to communicate with the key server.	MNT (Default) RMT

■ Operating Procedures

Procedure ▶▶▶

- 1 Click [Add Key Server] in [Action].
- 2 Specify the parameters, and click the [Add] button.
→ A confirmation screen appears.

Caution

- An error screen appears in the following conditions:
 - When each parameter fails to satisfy the input conditions
 - When inputting a domain name or an IP address that is already used for another key server
 - When the IP address that was input and the IP address of the LAN port (MNT or RMT) are the same
 - When the IP address that was input and the network address of the LAN port (MNT or RMT) are the same

- 3 Click the [OK] button.
→ Adding of the key server starts.
- 4 Click the [Done] button to return to the [Key Management] screen.



Delete Key Server

- ["■ Overview" \(page 1326\)](#)
- ["■ User Privileges" \(page 1326\)](#)
- ["■ Operating Procedures" \(page 1326\)](#)

■ Overview

This function deletes key servers.

Caution

- A key server that is allocated to a key group cannot be deleted. Refer to the "Master Server" field and the "Slave Server" field in the [Key Group] screen to check whether the key server is allocated to the key group. Refer to the [Key Group] function for details.

■ User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	✓
StorageAdmin	
AccountAdmin	
SecurityAdmin	✓
Maintainer	

Refer to ["A. User Roles and Policies" \(page 1580\)](#) for details on the policies and roles.

■ Operating Procedures

Procedure ▶▶▶

- 1 Select the key server that is to be deleted (multiple selections can be made) and click [Delete Key Server] in [Action].
→ A confirmation screen appears.
- 2 Click the [OK] button.
→ Deleting of the key server starts.
- 3 Click the [Done] button to return to the [Key Management] screen.



Modify Key Server

- ["■ Overview" \(page 1327\)](#)
- ["■ User Privileges" \(page 1327\)](#)
- ["■ Settings" \(page 1327\)](#)
- ["■ Operating Procedures" \(page 1328\)](#)

■ Overview

This function changes the key server settings.

Note

- Key server settings that are allocated to a key group can be changed.
- This function can be used to change "Domain Name / IP Address", "Port No.", and "LAN Port".
- This function can be used even when operations are being performed for the volumes that configures a key management target RAID group.

■ User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	✓
StorageAdmin	
AccountAdmin	
SecurityAdmin	✓
Maintainer	

Refer to "[A. User Roles and Policies](#)" (page 1580) for details on the policies and roles.

■ Settings

Key Server Setting

Item	Description	Setting values
Server ID	The selected key server ID (1 or 2) is displayed.	
Domain Name / IP Address	The domain name or the IP address of the target key server is displayed. Input the domain name (FQDN) or the IP address of the key server. There are two methods to specify an IP address; "IPv4" and "IPv6". The following IPv6 addresses can be used; "link local address", "global address", "unique local address", or "6to4 address". Refer to " Available IPv6 Address " (page 1221) for details. When the current setting is displayed, the IPv6 address is displayed as an abbreviation.	For domain name specification Up to 63 alphanumeric characters and symbols For IPv4 address xxx.xxx.xxx.xxx xxx: 1 - 255 for the top field (decimal) xxx: 0 - 255 for other fields (decimal) For IPv6 address xxxx:xxxx:xxxx:xxxx:xxxx:xxxx:xxxx:xxxx xxxx: 0 - ffff (FFFF) (hexadecimal, alphanumeric characters) Refer to " IPv6 Address Notation " (page 1220) for details.
Port No.	The current port number setting is displayed. Input the port number used to communicate with the key server.	Numeric characters 1 - 65535 5696 (Default)
LAN Port	The current LAN port setting is displayed. Select "MNT" or "RMT" for the LAN port that is to be used to communicate with the key server.	MNT RMT

■ Operating Procedures

Procedure ▶▶▶

- 1 Select the key server that is to be changed and click [Modify Key Server] in [Action].
- 2 Specify the parameters, and click the [Modify] button.
→ A confirmation screen appears.

Caution

- An error screen appears in the following conditions:
 - Each parameter fails to satisfy the input conditions
 - Inputting a domain name or an IP address that is already used for another key server
 - The IP address that was input and the IP address of the LAN port (MNT or RMT) are the same
 - The IP address that was input and the network address of the LAN port (MNT or RMT) are the same

- 3 Click the [OK] button.
→ Changing of the key server settings starts.
- 4 Click the [Done] button to return to the [Key Management] screen.



Key Group

- ["■ Overview" \(page 1328\)](#)
- ["■ User Privileges" \(page 1328\)](#)
- ["■ Display Contents" \(page 1329\)](#)

■ Overview

This function displays the SED authentication key (hereinafter, referred to as "key") information that is used for a key group and the SSL/KMIP certificate information.
The key group combines all of the RAID groups that use the same key.

Note

- The RAID groups that are registered in the key group can be checked by using the [SED Key Group] screen. Refer to the [SED Key Group] function for details.

■ User Privileges

Availability of Executions in the Default Role

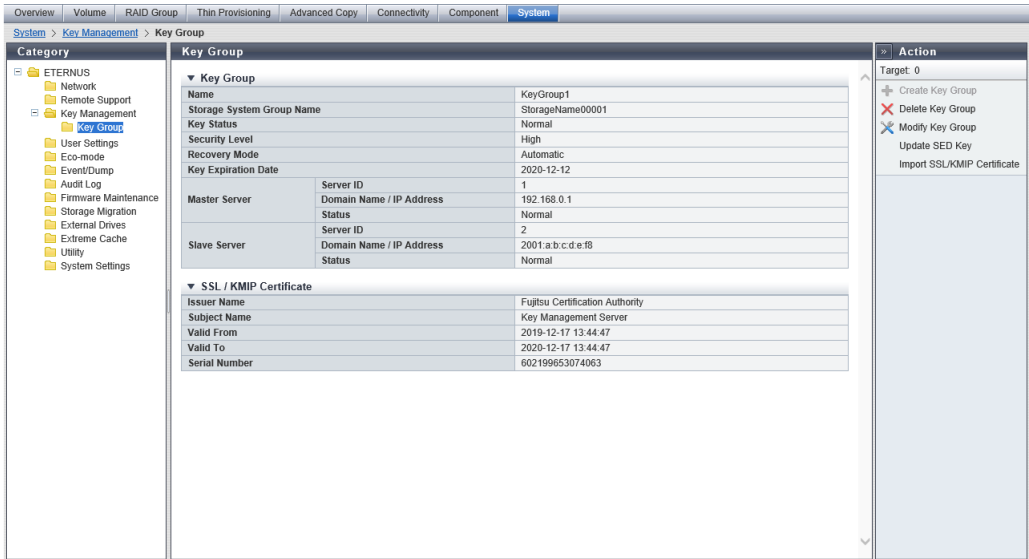
Default role	Availability of executions
Monitor	✓
Admin	✓
StorageAdmin	✓
AccountAdmin	

8. System
Key Management

Default role	Availability of executions
SecurityAdmin	✓
Maintainer	✓

Refer to ["A. User Roles and Policies" \(page 1580\)](#) for details on the policies and roles.

■ Display Contents



Key Group

Item	Description
Name	The key group name is displayed. If no key groups are created, the field is blank. The key group name corresponds to "Serial Number", which is managed in the key server.
Storage System Group Name	The storage system group name is displayed. If no key groups are created, the field is blank. The storage system group combines the key management device (Key Management Machine) name that is managed by the user with the key group. The storage system group name corresponds to "Device Group Name", which is managed in the key server. Note that "ETERNUS_DX" is specified as the factory default storage system group name when "ETERNUS SF KM" (key management software) is shipped.
Key Status	The key status is displayed. If no key groups are created, the field is blank. Refer to "Key Status" (page 1608) for details.

8. System
Key Management

Item	Description
Security Level	<p>The security level for the key group is displayed. If no key groups are created, the field is blank.</p> <p>"Security Level" indicates the handling level when application of the SED key to the target RAID group fails. If the key for the relevant RAID group cannot be obtained from the key server due to a communication error and the SEDs that configure the RAID group are changed to hot spares or changed to new SEDs due to failure or maintenance, the storage system performs operations according to the selected security level.</p> <ul style="list-style-type: none"> • High <p>Rebuilding to hot spares for which the key cannot be changed after SED failure is not performed. The RAID group loses its redundancy if the RAID group status is "⚠Exposed", "⚠Partially Exposed" (for RAID6), "⚠Exposed (Fast)" (for RAID6-FR), or "⚠Partially Exposed (Fast)" (for RAID6-FR).</p> <p>When SED maintenance is being performed, replacing an SED with a new SED for which the key cannot be changed does not complete successfully. If this action is performed, the status of the new SED changes to "❌Not Exist".</p> <p>When communication between the key server and the storage system returns to normal and the key can be obtained, the SED status changes to normal. Rebuilding to the SED for which the status changed to normal is performed after the key is changed. Note that "Modifying" may be displayed for the key status for few minutes even though the SED key has already changed. After changing the key, maintenance of the SEDs is complete.</p> • Low <p>Rebuilding or maintenance is performed by using the common key if changing of the key in the key server fails due to a network error.</p> <p>Even if the security level is changed from "High" to "Low", the rebuilding process does not start immediately after the level is changed. Rebuilding processes start after the storage system recognizes that changing of the security level and key is complete.</p>
Recovery Mode	<p>The recovery mode for the key group is displayed. If no key groups are created, the field is blank.</p> <p>The recovery mode is a method to recover locked (*1) RAID groups or SEDs after communication with the key server is resolved. For RAID groups in locked status, "❌SED Locked" is displayed. For SEDs in locked status, "❌Not Exist" is displayed.</p> <p>*1 : A blocked status that occurs when the key of the RAID groups cannot be obtained.</p> <ul style="list-style-type: none"> • Automatic <p>This mode recovers locked RAID groups or SEDs when the communication error with the key server is resolved.</p> • Manual <p>Use the [Recovery SED] function of Web GUI to recover the locked RAID groups or SEDs when the communication error with the key server is resolved.</p>
Key Expiration Date	<p>The following information is displayed depending on the key status.</p> <ul style="list-style-type: none"> • When the status is "Modifying", the expiration date (YYYY-MM-DD) before the key was replaced is displayed. • When the status is "Unregistered Server Certificate", "Expired Server Certificate", "No SSL Certificate", "Network Error", "Not Acquired", or "Key Server Error", a "-" (hyphen) is displayed. • For the other statuses, the key expiration date (YYYY-MM-DD) is displayed. <p>If no key groups are created, the field is blank.</p> <p>When the key has expired, a new key is obtained from the key server and automatically applied in place of the expired key.</p>

8. System Key Management

Item		Description
Master Server	Server ID	The key server ID (1 or 2) for the master server is displayed. If no key group is created or if no master server is specified, the field is blank.
	Domain Name / IP Address	The domain name (FQDN) or the IP address of the master server is displayed. If no key group is created or if no master server is specified, the field is blank. Note that the IPv6 address is displayed as an abbreviation. Refer to "IPv6 Address Notation" (page 1220) for details.
	Status	The master server status is displayed. If no key group is created or if no master server is specified, the field is blank. Refer to "Key Server Status" (page 1609) for details.
Slave Server	Server ID	The key server ID (1 or 2) of the slave server is displayed. If no key group is created or if no slave server is specified, the field is blank.
	Domain Name / IP Address	The domain name (FQDN) or the IP address of the slave server is displayed. If no key group is created or if no slave server is specified, the field is blank. Note that the IPv6 address is displayed as an abbreviation. Refer to "IPv6 Address Notation" (page 1220) for details.
	Status	The slave server status is displayed. If no key group is created or if no slave server is specified, the field is blank. Refer to "Key Server Status" (page 1609) for details.

SSL / KMIP Certificate

Item	Description
Issuer Name	The certificate authority name that issues the SSL/KMIP certificate is displayed. If the certificate is not imported, the field is blank.
Subject Name	The name of the destination to which the SSL/KMIP certificate is issued is displayed. If the certificate is not imported, the field is blank.
Valid From	The start date and time (YYYY-MM-DD hh:mm:ss) of the SSL/KMIP certificate validity period is displayed. If the certificate is not imported, the field is blank.
Valid To	The end date and time (YYYY-MM-DD hh:mm:ss) of the SSL/KMIP certificate validity period is displayed. If the certificate is not imported, the field is blank.
Serial Number	The serial number for the SSL/KMIP certificate is displayed. If the certificate is not imported, the field is blank. When created, the serial number is combined with the issuer name, which is a unique number in the certificate authority.

Create Key Group

- ["■ Overview" \(page 1331\)](#)
- ["■ User Privileges" \(page 1332\)](#)
- ["■ Settings" \(page 1332\)](#)
- ["■ Operating Procedures" \(page 1334\)](#)

■ Overview

This function creates a key group.

The key group combines all of the RAID groups that use the same SED authentication key (hereinafter referred to as "key"). One key group can be created in the storage system.

Note

- The key group can be created even when the key server is not registered.
- The key group can be created even when communication with the key server is not available.
- Register RAID groups that use the same key in the key group. Refer to the [Set Key Group (RAID Group)] function for details.
- The RAID groups that are registered in the key group can be checked by using the [SED Key Group] screen. Refer to the [SED Key Group] function for details.
- There are two types of SED keys: a common key and a key that is managed in the key server. RAID groups that use the common key and RAID groups that use the key managed in the key server (RAID groups that are registered in the key group) can be created in the same storage system.

■ User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	✓
StorageAdmin	
AccountAdmin	
SecurityAdmin	✓
Maintainer	

Refer to "[A. User Roles and Policies](#)" (page 1580)" for details on the policies and roles.

■ Settings

Key Group Setting

Item	Description	Setting values
Name	<p>Input a key group name.</p> <p>The key group name corresponds to "Serial Number", which is managed in the key server.</p> <p>Caution</p> <ul style="list-style-type: none"> • Specify a unique key group name that is different from the other storage systems that use the same key server. • Do not change the key group name after the key status changes to "Normal". The key status can be checked on the [Key Group] screen. Refer to the [Key Group] function for details. 	<p>Up to 32 alphanumeric characters and symbols (underscore "_")</p> <p>The first letter must be an alphabetic character</p>

8. System
Key Management

Item	Description	Setting values
Storage System Group Name	<p>Input the storage system group name.</p> <p>The storage system group combines the key management device (Key Management Machine) name that is managed by the user with the key group. The storage system group name corresponds to "Device Group Name", which is managed in the key server. If the default setting is used, input "ETERNUS_DX". The "default setting" uses the factory default storage system group name for "ETERNUS SF KM" (key management software).</p> <div style="background-color: #fff9c4; padding: 10px; border: 1px solid #ccc;"> <p>Caution</p> <ul style="list-style-type: none"> For the storage system group name, specify the same name as "Device Group Name", which is registered in the key server. Do not change the storage system group name after the key status changes to "Normal". The key status can be checked on the [Key Group] screen. Refer to the [Key Group] function for details. </div>	<p>Up to 16 alphanumeric characters and symbols (underscore "_")</p> <p>The first letter must be an alphabetic character</p>
Security Level	<p>Select the security level of the key group from "High" or "Low".</p> <p>"Security Level" indicates the handling level when application of the SED key to the target RAID group fails. If the key for the relevant RAID group cannot be obtained from the key server due to a communication error and the SEDs that configure the RAID group are changed to hot spares or changed to new SEDs due to failure or maintenance, the storage system performs operations according to the selected security level.</p> <ul style="list-style-type: none"> High Rebuilding to hot spares for which the key cannot be changed after SED failure is not performed. The RAID group is in a state in which redundancy is lost ("⚠️Exposed", "⚠️Partially Exposed" (for RAID6), "⚠️Exposed (Fast)" (for RAID6-FR), or "⚠️Partially Exposed (Fast)" (for RAID6-FR)). When SED maintenance is being performed, replacing an SED with a new SED for which the key cannot be changed does not complete successfully. If this action is performed, the status of the new SED changes to "❌Not Exist". When communication between the key server and the storage system returns to normal and the key can be obtained, the SED status changes to normal. Rebuilding to the SED for which the status changed to normal is performed after the key is changed. Note that "Modifying" may be displayed for the key status for few minutes even though the SED key has already changed. After changing the key, maintenance of the SEDs is complete. Low Rebuilding or maintenance is performed by using the common key if changing of the key in the key server fails due to a network error. <p>Even if the security level is changed from "High" to "Low", the rebuilding process does not start immediately after the level is changed. Rebuilding processes start after the storage system recognizes that changing of the security level and key is complete.</p>	<p>High (Default)</p> <p>Low</p>

8. System
Key Management

Item	Description	Setting values			
Recovery Mode	<p>Select the recovery mode of the key group from "Automatic" or "Manual". The recovery mode is a method to recover locked (*1) RAID groups or SEDs after communication with the key server is resolved. For RAID groups in locked status, "⊗SED Locked" is displayed. For SEDs in locked status, "⊗Not Exist" is displayed.</p> <p>*1: A blocked status that occurs when the key of the RAID groups cannot be obtained.</p> <ul style="list-style-type: none"> • Automatic This mode recovers locked RAID groups or SEDs when the communication error with the key server is resolved. • Manual Use the [Recovery SED] function of Web GUI to recover the locked RAID groups or SEDs when the communication error with the key server is resolved. 	Automatic (Default) Manual			
Key Valid Period	<p>Select a key expiration period that is based on the date when the key from the server is obtained for the first time (beginning of use). When the key expires, a new key is obtained from the key server and the expired key is automatically replaced. The key expiration period is checked every eight hours.</p> <ul style="list-style-type: none"> • Unlimited The same key is used until exactly 20 years elapses since the key was first used. • 1 month - 12 month The same key is used until the date and time in the specified month elapses since the key was first used. If the same date does not exist in the specified month (such as April 31st), the expiration date of the key becomes the last date of the specified month. 	Unlimited (Default) 1 month - 12 month			
Key Server	<table border="1"> <tr> <td>Master</td> <td rowspan="2"> <p>Select the key server ID that is assigned for the master or slave server. "None" and the registered key server ID are displayed as options.</p> <div style="background-color: #fff9c4; padding: 5px;"> <p>Caution</p> <ul style="list-style-type: none"> • The same server ID (except for "None") cannot be selected for both the master and slave servers. • Note that if "None" is selected for both master and slave servers, the key cannot be managed by the key server. • The key can only be updated when the master server is specified. Refer to the [Update SED Authentication Key] function for details. </div> <div style="background-color: #e0e0e0; padding: 5px; margin-top: 5px;"> <p>Note</p> <ul style="list-style-type: none"> • To assign a key server ID to the key group, key servers must be registered in advance. Refer to the [Add Key Server] function for details. </div> </td> </tr> <tr> <td>Slave</td> </tr> </table>	Master	<p>Select the key server ID that is assigned for the master or slave server. "None" and the registered key server ID are displayed as options.</p> <div style="background-color: #fff9c4; padding: 5px;"> <p>Caution</p> <ul style="list-style-type: none"> • The same server ID (except for "None") cannot be selected for both the master and slave servers. • Note that if "None" is selected for both master and slave servers, the key cannot be managed by the key server. • The key can only be updated when the master server is specified. Refer to the [Update SED Authentication Key] function for details. </div> <div style="background-color: #e0e0e0; padding: 5px; margin-top: 5px;"> <p>Note</p> <ul style="list-style-type: none"> • To assign a key server ID to the key group, key servers must be registered in advance. Refer to the [Add Key Server] function for details. </div>	Slave	None (Default) 1 2
Master	<p>Select the key server ID that is assigned for the master or slave server. "None" and the registered key server ID are displayed as options.</p> <div style="background-color: #fff9c4; padding: 5px;"> <p>Caution</p> <ul style="list-style-type: none"> • The same server ID (except for "None") cannot be selected for both the master and slave servers. • Note that if "None" is selected for both master and slave servers, the key cannot be managed by the key server. • The key can only be updated when the master server is specified. Refer to the [Update SED Authentication Key] function for details. </div> <div style="background-color: #e0e0e0; padding: 5px; margin-top: 5px;"> <p>Note</p> <ul style="list-style-type: none"> • To assign a key server ID to the key group, key servers must be registered in advance. Refer to the [Add Key Server] function for details. </div>				
Slave					

■ Operating Procedures

Procedure ▶▶▶

- 1 Click [Create Key Group] in [Action].
- 2 Specify the parameters, and click the [Create] button.
→ A confirmation screen appears.

Caution

- An error screen appears in the following conditions:
 - The "Name" is not entered
 - The "Storage System Group Name" is not entered
 - Each parameter fails to satisfy the input conditions
 - The same server ID is specified for both the master and slave servers

- 3 Click the [OK] button.
→ Key group creation starts.
- 4 Click the [Done] button to return to the [Key Group] screen.



Delete Key Group

- ["■ Overview" \(page 1335\)](#)
- ["■ User Privileges" \(page 1335\)](#)
- ["■ Operating Procedures" \(page 1335\)](#)

■ Overview

This function deletes the key group.

Caution

- One key group can be created in the storage system. A key group cannot be deleted if RAID groups are registered in that key group. Use the [SED Key Group] screen to check whether RAID groups are registered in the key group. Refer to the [SED Key Group] function for details.

■ User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	✓
StorageAdmin	
AccountAdmin	
SecurityAdmin	✓
Maintainer	

Refer to ["A. User Roles and Policies" \(page 1580\)](#) for details on the policies and roles.

■ Operating Procedures

Procedure ▶▶▶

- 1 Click [Delete Key Group] in [Action].
→ A confirmation screen appears.

- 2 Click the [OK] button.
→ Deleting of the key group starts.
- 3 Click the [Done] button to return to the [Key Group] screen.



Modify Key Group

- ["■ Overview" \(page 1336\)](#)
- ["■ User Privileges" \(page 1336\)](#)
- ["■ Settings" \(page 1336\)](#)
- ["■ Operating Procedures" \(page 1338\)](#)

■ Overview

This function changes the key group settings.

The key group combines all of the RAID groups that use the same SED authentication key (hereinafter referred to as "key"). One key group can be created in the storage system.

■ User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	✓
StorageAdmin	
AccountAdmin	
SecurityAdmin	✓
Maintainer	

Refer to ["A. User Roles and Policies" \(page 1580\)](#) for details on the policies and roles.

■ Settings

Key Group Setting

Item	Description	Setting values
Name	<p>Input a key group name. The key group name corresponds to "Serial Number", which is managed in the key server.</p> <div style="background-color: #fff9c4; padding: 5px;"> <p>Caution</p> <ul style="list-style-type: none"> • Do not change the key group name after the key status changes to "Normal". The key status can be checked on the [Key Group] screen. Refer to the [Key Group] function for details. </div>	<p>Up to 32 alphanumeric characters and symbols (underscore "_") The first letter must be an alphabetic character</p>

8. System
Key Management

Item	Description	Setting values
Storage System Group Name	<p>Input the storage system group name.</p> <p>The storage system group combines the key management device (Key Management Machine) name that is managed by the user with the key group. The storage system group name corresponds to "Device Group Name", which is managed in the key server.</p> <div style="background-color: #fff9c4; padding: 10px; margin-top: 10px;"> <p>Caution</p> <ul style="list-style-type: none"> Do not change the storage system group name after the key status changes to "Normal". The key status can be checked on the [Key Group] screen. Refer to the [Key Group] function for details. </div>	<p>Up to 16 alphanumeric characters and symbols (underscore "_")</p> <p>The first letter must be an alphabetic character</p>
Security Level	<p>Select the security level of the key group from "High" or "Low".</p> <p>"Security Level" indicates the handling level when application of the SED key to the target RAID group fails. If the key for the relevant RAID group cannot be obtained from the key server due to a communication error and the SEDs that configure the RAID group are changed to hot spares or changed to new SEDs due to failure or maintenance, the storage system performs operations according to the selected security level.</p> <ul style="list-style-type: none"> High <p>Rebuilding to hot spares for which the key cannot be changed after SED failure is not performed. The RAID group loses its redundancy if the RAID group status is "⚠️ Exposed", "⚠️ Partially Exposed" (for RAID6), "⚠️ Exposed (Fast)" (for RAID6-FR), or "⚠️ Partially Exposed (Fast)" (for RAID6-FR).</p> <p>When SED maintenance is being performed, replacing an SED with a new SED for which the key cannot be changed does not complete successfully. If this action is performed, the status of the new SED changes to "❌ Not Exist".</p> <p>When communication between the key server and the storage system returns to normal and the key can be obtained, the SED status changes to normal. Rebuilding to the SED for which the status changed to normal is performed after the key is changed. Note that "Modifying" may be displayed for the key status for few minutes even though the SED key has already changed. After changing the key, maintenance of the SEDs is complete.</p> Low <p>Rebuilding or maintenance is performed by using the common key if changing of the key in the key server fails due to a network error.</p> <p>Even if the security level is changed from "High" to "Low", the rebuilding process does not start immediately after the level is changed. Rebuilding processes start after the storage system recognizes that changing of the security level and key is complete.</p>	<p>High</p> <p>Low</p>
Recovery Mode	<p>Select the recovery mode of the key group from "Automatic" or "Manual".</p> <p>The recovery mode is a method to recover locked (*1) RAID groups or SEDs after communication with the key server is resolved. For RAID groups in locked status, "❌ SED Locked" is displayed. For SEDs in locked status, "❌ Not Exist" is displayed.</p> <p>*1 : A blocked status that occurs when the key of the RAID groups cannot be obtained.</p> <ul style="list-style-type: none"> Automatic <p>This mode recovers locked RAID groups or SEDs when the communication error with the key server is resolved.</p> Manual <p>Use the [Recovery SED] function of Web GUI to recover the locked RAID groups or SEDs when the communication error with the key server is resolved.</p> 	<p>Automatic</p> <p>Manual</p>

8. System
Key Management

Item	Description	Setting values			
Key Valid Period	<p>Select a key expiration period that is based on the date when the key from the key server is obtained for the first time (beginning of use).</p> <p>When the key expires, a new key is obtained from the key server and the expired key is automatically replaced. If the key expiration period is changed, the same key is used from the first date of use until the key expired. Note that the "first date" indicates the first day of use instead of the first day of the key changed.</p> <ul style="list-style-type: none"> • Unlimited The same key is used until exactly 20 years elapses since the key was first used. • 1 month - 12 month The same key is used until the date and time in the specified month elapses since the key was first used. If the same date does not exist in the specified month (such as April 31st), the expiration date of the key becomes the last date of the specified month. 	Unlimited 1 month - 12 month			
Key Server	<table border="1"> <tr> <td>Master</td> <td rowspan="2"> <p>Select the key server ID that is assigned for the master or slave server. "None" and the registered key server ID are displayed as options.</p> <div style="background-color: #fff9c4; padding: 10px;"> <p>Caution</p> <ul style="list-style-type: none"> • The same server ID (except for "None") cannot be selected for both the master and slave servers. Note that "None" cannot be selected for both of the servers when RAID groups are registered in the key group. • Note that if "None" is selected for both master and slave servers, the key cannot be managed by the key server. • The key can only be updated when the master server is specified. Refer to the [Update SED Authentication Key] function for details. • To perform maintenance of the key server, the key server setting parameters must be released temporarily. Select "None" for the target key server before starting maintenance. After maintenance is complete, set the key server parameters again. </div> </td> </tr> <tr> <td>Slave</td> </tr> </table>	Master	<p>Select the key server ID that is assigned for the master or slave server. "None" and the registered key server ID are displayed as options.</p> <div style="background-color: #fff9c4; padding: 10px;"> <p>Caution</p> <ul style="list-style-type: none"> • The same server ID (except for "None") cannot be selected for both the master and slave servers. Note that "None" cannot be selected for both of the servers when RAID groups are registered in the key group. • Note that if "None" is selected for both master and slave servers, the key cannot be managed by the key server. • The key can only be updated when the master server is specified. Refer to the [Update SED Authentication Key] function for details. • To perform maintenance of the key server, the key server setting parameters must be released temporarily. Select "None" for the target key server before starting maintenance. After maintenance is complete, set the key server parameters again. </div>	Slave	None 1 2
Master	<p>Select the key server ID that is assigned for the master or slave server. "None" and the registered key server ID are displayed as options.</p> <div style="background-color: #fff9c4; padding: 10px;"> <p>Caution</p> <ul style="list-style-type: none"> • The same server ID (except for "None") cannot be selected for both the master and slave servers. Note that "None" cannot be selected for both of the servers when RAID groups are registered in the key group. • Note that if "None" is selected for both master and slave servers, the key cannot be managed by the key server. • The key can only be updated when the master server is specified. Refer to the [Update SED Authentication Key] function for details. • To perform maintenance of the key server, the key server setting parameters must be released temporarily. Select "None" for the target key server before starting maintenance. After maintenance is complete, set the key server parameters again. </div>				
Slave					

■ Operating Procedures

Procedure ▶▶▶

- 1 Click [Modify Key Group] in [Action].
- 2 Specify the parameters, and click the [Modify] button.
→ A confirmation screen appears.

Caution

- An error screen appears in the following conditions:
 - The "Name" is not entered
 - The "Storage System Group Name" is not entered
 - Each parameter fails to satisfy the input conditions
 - The same server ID is specified for both the master and slave servers
 - When "None" is selected for both of the servers (master and slave) while RAID groups are registered in the key group

- 3 Click the [OK] button.
→ Changing of the key group settings starts.

- 4 Click the [Done] button to return to the [Key Group] screen.



Update SED Authentication Key

- "[■ Overview](#)" (page 1339)
- "[■ User Privileges](#)" (page 1340)
- "[■ Settings](#)" (page 1340)
- "[■ Display Contents](#)" (page 1340)
- "[■ Operating Procedures](#)" (page 1341)

■ Overview

This function updates SED authentication key (hereinafter referred to as "key") in the key group. Updating of the key is performed in the following ways:

- When no key is registered in the key group, a key that has not expired is obtained from the key server.
- When the key is valid and has not expired, this key is replaced with a new key from the key server.

The storage system monitors the key on a regular basis and automatically replaces an expired key with a new key. This function is used when a new key is required before the key expiration date has been reached because the user loses the SEDs that were disconnected for maintenance. This function asks whether to use the current key again when replacing the key.

Caution

- Replacing a key is only available when the master server is registered. Check the registration status of the master server in the [Key Group] screen. To replace the key, register the master server in advance. Refer to the [Modify Key Group] function for details.
- The key is updated only when communication with the master server is normal.
- If no key is registered in the key group, an error occurs when the first update of the key is performed. If this occurs, register the SSL certificate of the storage system in the key server, accept access from the storage system, and then update the key again. The key status changes to "Normal". An SSL certificate of the storage system indicates a "Self-signed SSL certificate" or an "SSL server certificate".
- The key can only be updated when the SEDs that configure the RAID groups in the key group are in the normal state. If there are SEDs without normal status in the RAID group, make sure to perform maintenance for these SEDs in advance. If the key is updated before required maintenance is performed for the SEDs, the RAID group status changes to "⚠Exposed" and updating of the key for the RAID group is not complete (the key status of the key group is not changed from "Modifying"). Updating of the key is complete after performing the SED maintenance and the status of all the RAID groups has returned to "✅Available" (the key status of the key group has changed to "Normal").
- If the RAID groups in the key group are blocked (the status is "❌SED Locked"), the RAID group status is not changed to "✅Available" even after the key is updated. Make sure to recover SEDs before updating the key. Refer to the [Recovery SED] function for details.
- When the key that is currently used is disabled, make sure to compromise the key in the key server by using CLI for the key server.

Note

- This function can be used to replace a key when the expiration date of the key is set to "Unlimited".
- This function can also be used to update the key in a key group in which no RAID groups are registered.

User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	✓
StorageAdmin	
AccountAdmin	
SecurityAdmin	✓
Maintainer	

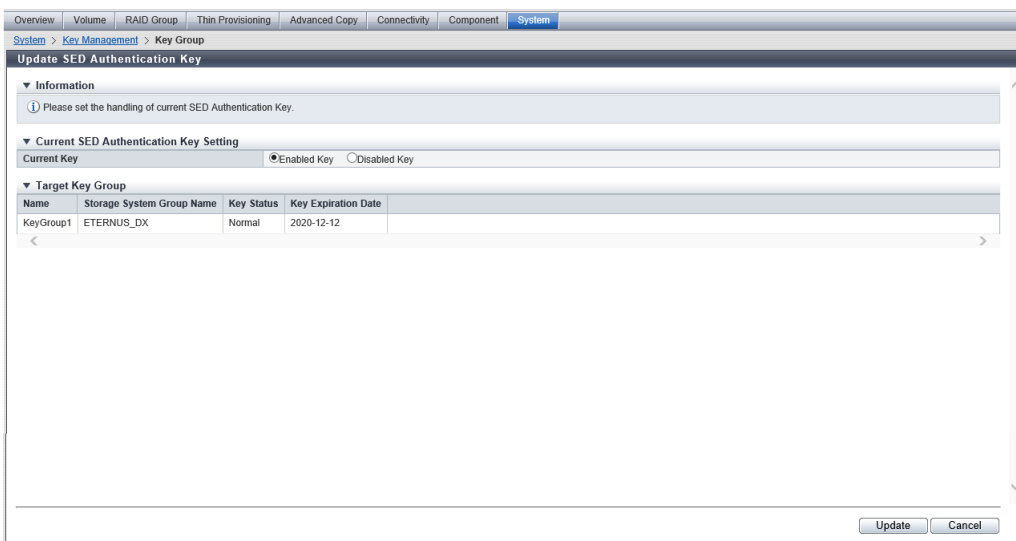
Refer to "[A. User Roles and Policies](#)" (page 1580) for details on the policies and roles.

Settings

Current SED Authentication Key Setting

Item	Description	Setting values
Current Key	Select whether to enable ("Enabled Key") or disable ("Disabled Key") the current key.	Enabled Key (Default) Disabled Key

Display Contents



Target Key Group

Item	Description
Name	The key group name is displayed.
Storage System Group Name	The storage system group name is displayed.
Key Status	The key status is displayed. Refer to " Key Status (page 1608) " for details.
Key Expiration Date	The following information is displayed depending on the key status. <ul style="list-style-type: none">• When the status is "Modifying", the expiration date (YYYY-MM-DD) before the key was replaced is displayed.• When the status is "Unregistered Server Certificate", "Expired Server Certificate", "No SSL Certificate", "Network Error", "Not Acquired", or "Key Server Error", a "-" (hyphen) is displayed.• For the other statuses, the key expiration date (YYYY-MM-DD) is displayed.

■ Operating Procedures

Procedure ▶▶▶

- 1 Click [Update SED Key] in [Action].
- 2 Select whether to use the current key again, and then click the [Update] button.
→ A confirmation screen appears.
- 3 Click the [OK] button.
→ Updating of the SED Authentication Key starts.

Caution

- An error screen appears in the following conditions:
 - When the master server for the key group is not registered
 - When one of the following statuses applies to the key in the key group:
 - Unregistered Server Certificate
 - Expired Server Certificate
 - No SSL Certificate
 - Network Error
 - Key Server Error

- 4 Click the [Done] button to return to the [Key Group] screen.

Import SSL/KMIP Certificate

- "[Overview](#)" (page 1341)
- "[User Privileges](#)" (page 1342)
- "[Settings](#)" (page 1342)
- "[Operating Procedures](#)" (page 1342)

■ Overview

This function registers the SSL/KMIP certificate in the storage system. The SSL/KMIP certificate is used for communication with the key server.

When performing management of the SED authentication key (hereinafter referred to as "key") in the key server, communication between the key server and the storage system is required. To establish communication, register the "SSL/KMIP Certificate" (a trusted certificate of the key server) in the storage system.

Note

- Export the SSL/KMIP certificate from the key server and register this certificate in the storage system.
- To establish communication between the key server and the storage system, the SSL certificate of the storage system is also required. Refer to the [Create Self-signed SSL Certificate] function or the [Create Key/CSR] function for details.
- The SSL/KMIP certificate can be registered even when the key server is not specified.
- The SSL/KMIP certificate can be registered even when the key group is not created.

■ **User Privileges**

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	✓
StorageAdmin	
AccountAdmin	
SecurityAdmin	✓
Maintainer	

Refer to "[A. User Roles and Policies](#)" (page 1580) for details on the policies and roles.

■ **Settings**

SSL/KMIP Certificate Setting

Item	Description	Setting values
SSL/KMIP Certificate File	Click the [Browse...] button to specify the SSL/KMIP certificate file.	SSL/KMIP certificate file

■ **Operating Procedures**

Procedure ▶▶▶

- 1 Click [Import SSL/KMIP Certificate] in [Action].
- 2 Click the [Browse...] button to specify the path to the "SSL/KMIP Certificate File".
- 3 Click the [Import] button.
→ A confirmation screen appears.

Caution

- An error screen appears in the following conditions:
 - Reading of the "SSL/KMIP Certificate" failed
 - The "SSL/KMIP Certificate" file is larger than 4096 bytes

- 4 Click the [OK] button.
→ Importing of the SSL/KMIP certificate starts.

Caution

- When the imported file was not the "SSL/KMIP Certificate File", an error screen appears.

- 5 Click the [Done] button to return to the [Key Group] screen.



Define Role

- ["■ Overview" \(page 1343\)](#)
- ["■ User Privileges" \(page 1343\)](#)
- ["■ Display Contents" \(page 1344\)](#)

■ Overview

This function displays the custom roles registered in the storage system.

A custom role is a role created by the user in combination of policies, in addition to the default roles.

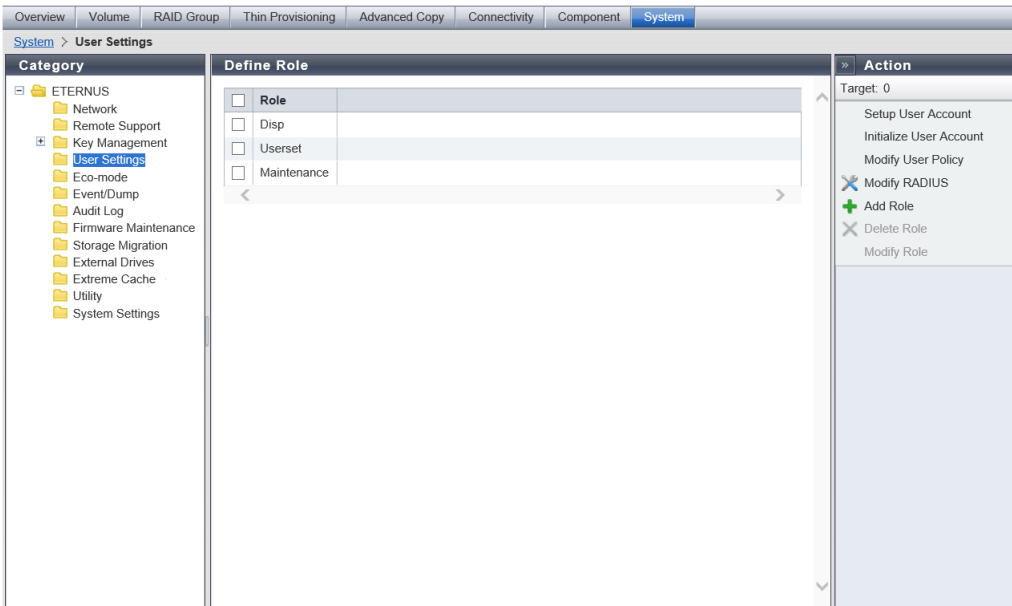
■ User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	✓
StorageAdmin	
AccountAdmin	✓
SecurityAdmin	
Maintainer	

Refer to ["A. User Roles and Policies" \(page 1580\)](#) for details on the policies and roles.

■ Display Contents



Define Role

Item	Description
Role	The custom role name is displayed.

Setup User Account

- "[■ Overview](#)" (page 1344)
- "[■ User Privileges](#)" (page 1345)
- "[■ Display Contents](#)" (page 1345)
- "[■ Settings](#)" (page 1347)
- "[■ Operating Procedures](#)" (page 1353)

■ Overview

This function adds, edits, and deletes the user account.
Up to 60 user accounts can be set.

Caution

- The current user's (your) account cannot be changed or deleted.
- When using the SSH Client Key authentication, create a pair of the SSH client public key and the SSH client secret key in advance, using the creation tool. One public key can be registered per user account. When this function is executed, the public key is registered in the storage system.
- The following types (formats) of public keys can be used:
 - IETF style DSA for SSH v2
 - IETF style RSA for SSH v2The supported maximum encryption strength for the public key is 4096-bit.

Note

- To improve the security level of the password, specify a user policy (password policy and lockout policy). Refer to the [Modify User Policy] function for details. Use this function to set whether to enable or disable a user policy for each user account.
- When a user account is deleted, the SSH client public key registered in the storage system is also deleted.
- When a user account is initialized, the following settings are initialized. Refer to the [Initialize User Account] function for details.
 - The password for the default account is restored to the default password.
 - The user policy for the default account is disabled.
- To change the current user's (your) password, use the [Change User Password] function.
- To change the current user's (your) SSH public key, use the [Set SSH Public Key] function.

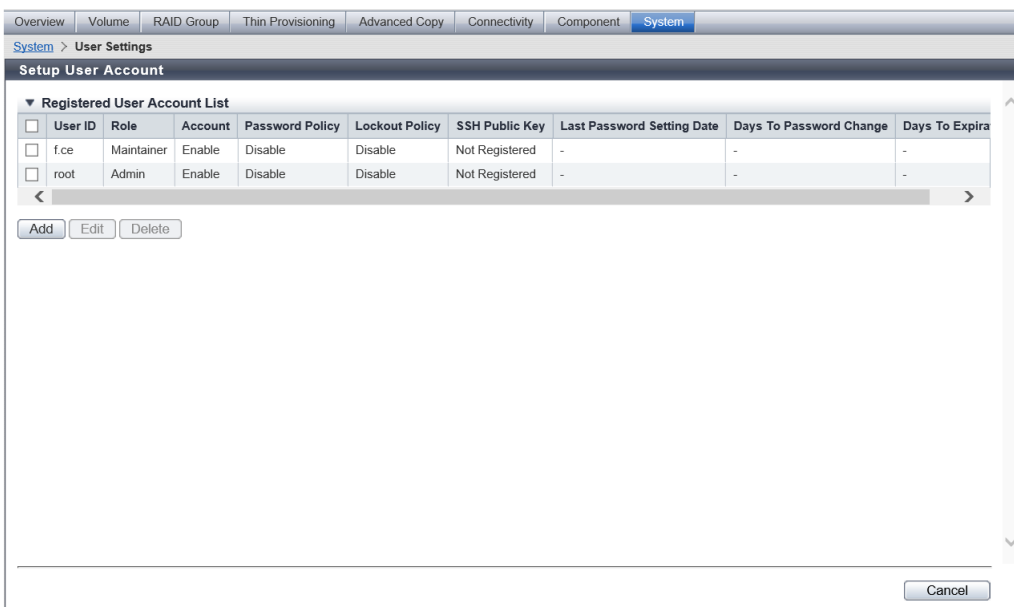
■ User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	✓
StorageAdmin	
AccountAdmin	✓
SecurityAdmin	
Maintainer	

Refer to "'A. User Roles and Policies" (page 1580)" for details on the policies and roles.

■ Display Contents



Registered User Account List

Item	Description
User ID	The user ID is displayed.
Role	The user's role is displayed. Monitor Admin StorageAdmin AccountAdmin SecurityAdmin Maintainer Software Custom role
Account	Whether the user account is enabled or disabled is displayed. Disabled user accounts cannot be used.
Password Policy	Whether the password policy is enabled or disabled is displayed.
Lockout Policy	Whether the lockout policy is enabled or disabled is displayed.
SSH Public Key	Whether the SSH client public key used for login authentication from CLI is registered or not registered is displayed.
Last Password Setting Date	The date and time (YYYY-MM-DD hh:mm:ss) when the password was last changed is displayed. For user accounts with any of the following conditions, a "-" (hyphen) is displayed. <ul style="list-style-type: none"> User accounts with the "Password Policy" setting disabled User accounts with the "Password Policy" setting enabled, but "0 (Unrestricted)" is specified for the "Minimum Password Age" and the "Maximum Password Age" settings with the [Modify User Policy] function. User accounts registered with the "Password Policy" setting disabled. The setting is enabled later on but the password has not been changed yet.
Days To Password Change	The period in which the password becomes changeable from the current time is displayed with the "number of days", "Less than 24 hours", or "Changeable". This item displays the current state determined according to the "Minimum Password Age" (which can be configured in the "Password Policy" field of the [Modify User Policy] function) from "Last Password Setting Date". For example, if "Last Password Setting Date" is "2019-01-10 12:00:00" and the "Minimum Password Age" setting is "10", the following values are displayed. <ul style="list-style-type: none"> When the current date is January 15th, "5" is displayed (five days left until the password becomes changeable). When the current date is January 20th, "Less than 24 hours" is displayed (the password becomes changeable within 24 hours). When the current date is January 25th, "Changeable" is displayed. If a "-" (hyphen) is displayed for "Last Password Setting Date", a "-" (hyphen) is also displayed for this item.
Days To Expiration	The available period of the password from the current time is displayed with the "number of days", "Less than 24 hours", or "Expired". This item displays the current state determined according to the "Maximum Password Age" (which can be configured in the "Password Policy" field of the [Modify User Policy] function) from "Last Password Setting Date". For example, if "Last Password Setting Date" is "2019-01-10 12:00:00" and the "Maximum Password Age" setting is "30", the following values are displayed. <ul style="list-style-type: none"> When the current date is January 15th, "25" is displayed (the password is available for 25 days). When the current date is February 9th, "Less than 24 hours" is displayed (the password expires within 24 hours). When the current date is February 10th, "Expired" is displayed. If a "-" (hyphen) is displayed for "Last Password Setting Date", a "-" (hyphen) is also displayed for this item.

■ Settings

Add New User Account

In this screen, add a user account.

Item	Description	Setting values
User ID	<p>Input a user ID. An existing user ID cannot be used. Entered letters are case-sensitive.</p> <div><p>Note</p><ul style="list-style-type: none"><li>• The number of characters that can be used for the user ID is displayed to the right of the input field.</div>	<p>Up to 32 alphanumeric characters and symbols (!, '-', '_', '!')</p>

8. System
Define Role

Item	Description	Setting values
New Password	<p>Input a password. Entered letters are case-sensitive. If "Enable" is selected for "Password Policy", the following input conditions are added according to the configuration with the [Modify User Policy] function.</p> <ul style="list-style-type: none"> • Minimum Password Length • Password Complexity • Password History <div style="background-color: #fff9c4; padding: 10px; margin: 10px 0;"> <p>Caution</p> <ul style="list-style-type: none"> • An error screen appears if the password does not satisfy the input conditions. The following shows procedures corresponding to each error. <ul style="list-style-type: none"> - If "Minimum Password Length" is not satisfied The entered password is less than the required number of characters. Check the minimum length ("x") displayed in the "x - 64" format to the right of the password input field. - If "Password Complexity" is not satisfied The required character types have not been used in the entered password. At least three of the following character types must be used; "uppercase letters", "lowercase letters", "numeric characters", and "symbols". - If "Password History" is not satisfied The entered password does not meet the reuse condition. The same password that was previously set (between the latest and the specified number of generations) cannot be used. Set a different password. </div> <div style="background-color: #e0e0e0; padding: 10px; margin: 10px 0;"> <p>Note</p> <ul style="list-style-type: none"> • Refer to the "Password Policy" settings in advance for details about "Password Complexity" and "Password History". Refer to the [Modify User Policy] function for details. </div>	<p>If "Disable" is selected for "Password Policy"</p> <ul style="list-style-type: none"> • Number of characters 4 - 64 • Type of characters Alphanumeric characters and symbols (!, "", '#', '\$', '%', '&', "", '(, ')', '*', '+', ,, '-', ':', '/', '@', '[', '\',]', '^', _', `', '{', ' ', '}', '~', '!', '!', '<', '=, '>', '?') <p>If "Enable" is selected for "Password Policy"</p> <ul style="list-style-type: none"> • When "Password Complexity" is enabled <ul style="list-style-type: none"> - Number of characters "Minimum password length" to 64 (minimum password length: 4 - 64) - Type of characters At least three of the following character types must be used. <ul style="list-style-type: none"> • Uppercase letters (A - Z) • Lowercase letters (a - z) • Numeric characters (0 - 9) • Symbols (!, "", '#', '\$', '%', '&', "", '(, ')', '*', '+', ,, '-', ':', '/', '@', '[', '\',]', '^', _', `', '{', ' ', '}', '~', '!', '!', '<', '=, '>', '?') • When "Password Complexity" is disabled <ul style="list-style-type: none"> - Number of characters "Minimum password length" to 64 (minimum password length: 4 - 64) - Type of characters Alphanumeric characters and symbols (!, "", '#', '\$', '%', '&', "", '(, ')', '*', '+', ,, '-', ':', '/', '@', '[', '\',]', '^', _', `', '{', ' ', '}', '~', '!', '!', '<', '=, '>', '?')
Confirm New Password	<p>Input the same character string as the value entered in the "New Password" field for confirmation.</p>	<p>Same character string as the "New Password" field</p>

8. System
Define Role

Item	Description	Setting values
Role	<p>Select the user role that is to be assigned to the user ID. The default and custom roles registered in the storage system are displayed as the options.</p> <p>Caution</p> <ul style="list-style-type: none"> • "Software" is the role that is used for external software. A user account with the "Software" role cannot log in to Web GUI. • For tenant users, only the "Monitor" and "StorageAdmin" roles can be assigned. Use CLI to check whether the user account of the modification target is a tenant user. 	<p>Monitor Admin StorageAdmin AccountAdmin SecurityAdmin Maintainer Software Custom role</p>
Account	<p>Select whether to "Enable" or "Disable" the user account. If the user account is disabled, that user account is registered but cannot be used.</p>	<p>Enable (Default) Disable</p>
SSH Public Key	<p>Register the SSH client public key used for login authentication from CLI in the storage system. Click the [Browse...] button and specify the public key to be registered. When using the SSH client key authentication, register the SSH public key in the storage system and prepare the SSH secret key, corresponding to the public key in the client PC in advance.</p>	<p>SSH Public Key Blank (Default)</p>
Password Policy	<p>Select whether to "Enable" or "Disable" the password policy. If "Enable" is selected, the following input conditions are added according to the "Password Policy" setting that is specified with the [Modify User Policy] function.</p> <ul style="list-style-type: none"> • Minimum Password Length • Password Complexity • Password History <p>Caution</p> <ul style="list-style-type: none"> • The "Password Policy" is not applied to a user account with the "Software" role because it is used for external software. Note that "Enable" cannot be selected in this case. <p>Note</p> <ul style="list-style-type: none"> • Check the "Password Policy" setting before selecting "Enable" for this item. Refer to the [Modify User Policy] function for details. 	<p>Enable Disable (Default)</p>

8. System
Define Role

Item	Description	Setting values
Lockout Policy	<p>Select whether to "Enable" or "Disable" the lockout policy.</p> <p>If "Enable" is selected, the following items are applied to a user account according to the "Lockout Policy" setting that is specified with the [Modify User Policy] function.</p> <ul style="list-style-type: none"> • Lockout Threshold • Lockout Duration <p>Caution</p> <ul style="list-style-type: none"> • The "Lockout Policy" is not applied to a user account with the "Software" role because it is used for external software. Note that "Enable" cannot be selected in this case. <p>Note</p> <ul style="list-style-type: none"> • Check the "Lockout Policy" setting before selecting "Enable" for this item. Refer to the [Modify User Policy] function for details. 	<p>Enable</p> <p>Disable (Default)</p>

Edit User Account

In this screen, modify the registered settings of a user account.

Caution

- Any user account information other than the following parameters can be changed.
 - User ID
 - The "Password Policy" and "Lockout Policy" that are applied to a user account set with the "Software" role
- Changed user accounts become available at the next login.

Item	Description
Checkbox	Select the checkbox for the user account that is to be modified.

Edit User Account

Item	Description	Setting values
User ID	The user ID is displayed.	
Change Password	<p>Only when changing the password, select the "Change Password" checkbox.</p> <p>When the "Change Password" checkbox is selected, enter a new password in "New Password" and "Confirm New Password".</p>	<p>Selected: Change password</p> <p>Cleared</p>

8. System
Define Role

Item	Description	Setting values
New Password	<p>Input a new password.</p> <p>Entered letters are case-sensitive.</p> <p>If "Enable" is selected for "Password Policy", the following input conditions are added according to the configuration with the [Modify User Policy] function.</p> <ul style="list-style-type: none"> • Minimum Password Length • Password Complexity • Password History 	<p>If "Disable" is selected for "Password Policy"</p> <ul style="list-style-type: none"> • Number of characters 4 - 64 • Type of characters Alphanumeric characters and symbols (!, "", #, \$, %, &, ", (,), *, +, ;, ', /, @, [, \,], ^, _ , ` , {, , }, ~, ;, <, =, >, ?)
	<p>Caution</p> <ul style="list-style-type: none"> • Passwords must be changed for user IDs with "Expired" displayed in the "Days To Expiration" field of "Registered User Account List". • Passwords can be changed for user IDs with "Changeable" displayed in the "Days To Password Change" field of "Registered User Account List". • An error screen appears if the password does not satisfy the input conditions for changing passwords. The following shows procedures corresponding to each error. <ul style="list-style-type: none"> - If "Minimum Password Length" is not satisfied The entered password is less than the required number of characters. Check the minimum length ("x") displayed in the "x - 64" format to the right of the password input field. - If "Password Complexity" is not satisfied The required character types have not been used in the entered password. At least three of the following character types must be used; "uppercase letters", "lowercase letters", "numeric characters", and "symbols". - If "Password History" is not satisfied The entered password does not meet the reuse condition. The same password that was previously set (between the latest and the specified number of generations) cannot be used. Set a different password. 	<p>If "Enable" is selected for "Password Policy"</p> <ul style="list-style-type: none"> • When "Password Complexity" is enabled <ul style="list-style-type: none"> - Number of characters "Minimum password length" to 64 (minimum password length: 4 - 64) - Type of characters At least three of the following character types must be used. <ul style="list-style-type: none"> • Uppercase letters (A - Z) • Lowercase letters (a - z) • Numeric characters (0 - 9) • Symbols (!, "", #, \$, %, &, ", (,), *, +, ;, ', /, @, [, \,], ^, _ , ` , {, , }, ~, ;, <, =, >, ?) • When "Password Complexity" is disabled <ul style="list-style-type: none"> - Number of characters "Minimum password length" to 64 (minimum password length: 4 - 64) - Type of characters Alphanumeric characters and symbols (!, "", #, \$, %, &, ", (,), *, +, ;, ', /, @, [, \,], ^, _ , ` , {, , }, ~, ;, <, =, >, ?)
	<p>Note</p> <ul style="list-style-type: none"> • Refer to the "Password Policy" settings in advance for details about "Password Complexity" and "Password History". Refer to the [Modify User Policy] function for details. 	
Confirm New Password	<p>Input the same character string as the value entered in the "New Password" field for confirmation.</p>	<p>Same character string as the new password</p>

8. System
Define Role

Item	Description	Setting values
Role	<p>Select the user role that is to be assigned to the user ID. The default and custom roles registered in the storage system are displayed as the options.</p> <p>Caution</p> <ul style="list-style-type: none"> • "Software" is the role that is used for external software. A user account with the "Software" role cannot log in to Web GUI. • For tenant users, only the "Monitor" and "StorageAdmin" roles can be assigned. Use CLI to check whether the user account of the modification target is a tenant user. 	<p>Monitor Admin StorageAdmin AccountAdmin SecurityAdmin Maintainer Software Custom role</p>
Account	<p>Select whether to "Enable" or "Disable" the user account. If the user account is disabled, that user account is registered but cannot be used.</p>	<p>Enable Disable</p>
SSH Public Key	<p>Register the SSH client public key used for login authentication from CLI in the storage system. Click the [Browse...] button and specify the public key to be registered. When using the SSH client key authentication, register the SSH public key in the storage system and prepare the SSH secret key, corresponding to the public key in the client PC in advance.</p>	<p>SSH Public Key</p>
Password Policy	<p>Select whether to "Enable" or "Disable" the password policy. If "Enable" is selected, the following input conditions are added according to the "Password Policy" setting that is specified with the [Modify User Policy] function.</p> <ul style="list-style-type: none"> • Minimum Password Length • Password Complexity • Password History <p>Caution</p> <ul style="list-style-type: none"> • The "Password Policy" is not applied to a user account with the "Software" role because it is used for external software. Note that "Enable" cannot be selected in this case. <p>Note</p> <ul style="list-style-type: none"> • Check the "Password Policy" setting before selecting "Enable" for this item. Refer to the [Modify User Policy] function for details. 	<p>Enable Disable</p>

8. System
Define Role

Item	Description	Setting values
Lockout Policy	<p>Select whether to "Enable" or "Disable" the lockout policy.</p> <p>If "Enable" is selected, the following items are applied to a user account according to the "Lockout Policy" setting that is specified with the [Modify User Policy] function.</p> <ul style="list-style-type: none"> • Lockout Threshold • Lockout Duration <div style="background-color: #fff9c4; padding: 5px; margin-top: 10px;"> <p>Caution</p> <ul style="list-style-type: none"> • The "Lockout Policy" is not applied to a user account with the "Software" role because it is used for external software. Note that "Enable" cannot be selected in this case. </div> <div style="background-color: #e0e0e0; padding: 5px; margin-top: 10px;"> <p>Note</p> <ul style="list-style-type: none"> • Check the "Lockout Policy" setting before selecting "Enable" for this item. Refer to the [Modify User Policy] function for details. </div>	<p>Enable</p> <p>Disable</p>

Delete User Account

In this screen, delete a user account.

Caution

- The last user account with administrator privileges (role of "Admin") assigned cannot be deleted.
- Deleted user accounts will be unavailable from the next login.

Item	Description
Checkbox	Select the checkbox for the user account that is to be deleted.

■ **Operating Procedures**

Add User Account

Procedure ▶▶▶

- 1 Click [Setup User Account] in [Action].
- 2 Click the [Add] button.
- 3 Specify the parameters, and click the [Apply] button.
→ A confirmation screen appears.

Caution

- An error screen appears in the following conditions:
 - Each parameter fails to satisfy the input conditions
 - The user ID is already registered
 - "User ID", "New Password" and/or "Confirm New Password" is not entered
 - "New Password" does not match "Confirm New Password"

- 4 Click the [OK] button.
→ Addition of the user account starts.
- 5 Click the [Done] button to return to the [Define Role] screen.



Edit User Account

Procedure ▶▶▶

- 1 Click [Setup User Account] in [Action].
- 2 Select the user account that is to be modified and click the [Edit] button.
- 3 Change the parameters, and click the [Apply] button.
→ A confirmation screen appears.

Note

- To change the password, select the "Change Password" checkbox.
- To delete an SSH public key, select the "Delete" checkbox and click the [Apply] button. The "Delete" checkbox appears only if the SSH public key has already been registered.

Caution

- An error screen appears in the following conditions:
 - Each parameter fails to satisfy the input conditions
 - The "Change Password" checkbox is selected and "New Password" and/or "Confirm New Password" is not entered
 - The "Change Password" checkbox is selected and "New Password" does not match "Confirm New Password"

- 4 Click the [OK] button.
→ The user account setup starts.
- 5 Click the [Done] button to return to the [Define Role] screen.



Delete User Account

Procedure ▶▶▶

- 1 Click [Setup User Account] in [Action].
- 2 Select the deletion target user accounts (multiple selections can be made), and click the [Delete] button.
→ A confirmation screen appears.
- 3 Click the [OK] button.
→ The user account deletion starts.
- 4 Click the [Done] button to return to the [Define Role] screen.



Initialize User Account

- ["■ Overview" \(page 1355\)](#)
- ["■ User Privileges" \(page 1355\)](#)
- ["■ Display Contents" \(page 1356\)](#)
- ["■ Operating Procedures" \(page 1356\)](#)

■ Overview

This function initializes the user accounts to the factory default status.

Caution

- By using this function, all the registered user accounts are deleted and only the factory default account remains.
- The password for the default account is restored to the default password.
- The user accounts deleted by this function will be unavailable for the next login.

Note

- When user accounts are initialized, the SSH client public keys for all the users registered in the storage system are also deleted.
- When user accounts are initialized, the user policy (Password Policy and Lockout Policy) for the default account is disabled.

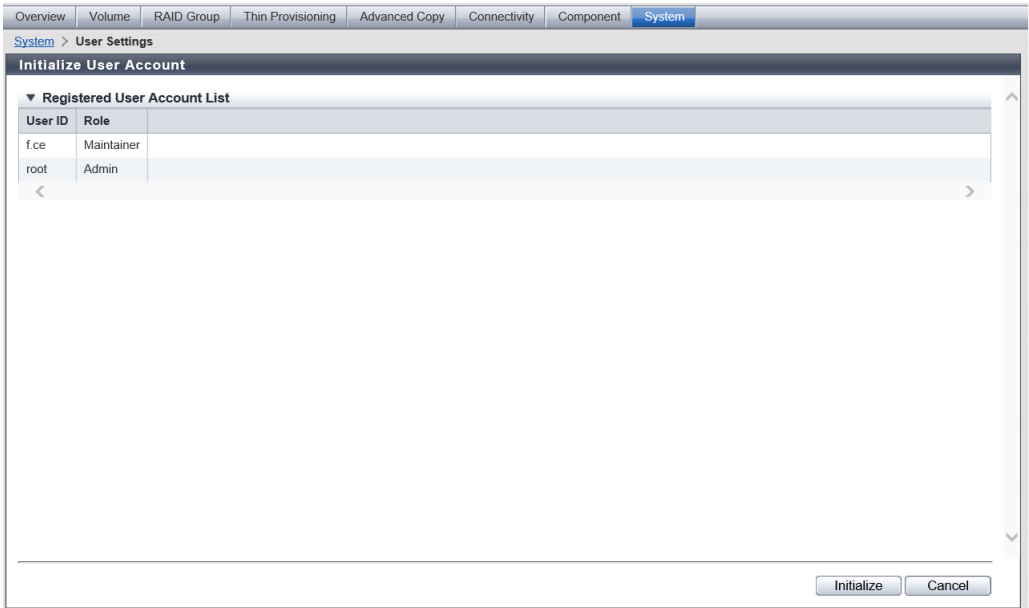
■ User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	✓
StorageAdmin	
AccountAdmin	✓
SecurityAdmin	
Maintainer	

Refer to ["A. User Roles and Policies" \(page 1580\)](#) for details on the policies and roles.

■ Display Contents



Registered User Account List

Item	Description
User ID	All of the user IDs that are registered in the storage system are displayed.
Role	All of the user roles that are registered in the storage system are displayed. Monitor Admin StorageAdmin AccountAdmin SecurityAdmin Maintainer Custom role

■ Operating Procedures

Procedure ▶▶▶

- 1 Click [Initialize User Account] in [Action].
- 2 Click the [Initialize] button.
→ A confirmation screen appears.
- 3 Click the [OK] button.
→ The user account initialization starts.
- 4 Click the [Done] button to return to the [Define Role] screen.



Modify User Policy

- ["■ Overview" \(page 1357\)](#)
- ["■ User Privileges" \(page 1357\)](#)
- ["■ Settings" \(page 1358\)](#)
- ["■ Operating Procedures" \(page 1359\)](#)

■ Overview

This function specifies a user policy (Password Policy and Lockout Policy) for user accounts to be registered in the storage system.

"Password Policy" indicates the creation guidelines for a password such as the complexity and lifetime. This setting is applied when the password for the new user account is registered or when the password for an existing user account is changed. "Lockout Policy" indicates the guidelines for a lockout when the authentication fails. This setting is used when users log in to the storage system.

Use this function to improve the Internal Authentication (*1) security. Set whether to enable or disable a user policy for each user account.

*1: This is the standard authentication type. Internal Authentication uses user account information stored in the storage system to verify the input user account.

Caution

- A user policy cannot be applied for the following user accounts.
 - User accounts with the "Software" role that is used for external software
 - User accounts used for RADIUS authentications
- The specified contents of this function are applied to the storage system immediately after the settings are complete. Note that the "Lockout Policy" is applied the next time the relevant user logs in.
- If a user account with the "Password Policy" setting enabled is used to log in and the "Maximum Password Age" of the relevant user account has expired, the [Change Password] screen appears. Users cannot log in until the password is changed.
- If a user account with the "Lockout Policy" setting enabled is used to log in and the number of failed authentications exceeds the "Lockout Threshold", the relevant user account is locked out. The lockout is not released until the specified "Lockout Duration" passes.

Note

- One user policy can be specified in the storage system. Select whether to enable or disable the user policy for each user account when creating new user accounts or when editing existing user accounts. A user policy can also be set for the default user IDs ("root" and "f.ce"). Refer to the [Setup User Account] function for details.
- When a user account is initialized, the user policy for the default account is changed to "Disable". Refer to the [Initialize User Account] function for details.

■ User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	✓

8. System
Define Role

Default role	Availability of executions
StorageAdmin	
AccountAdmin	✓
SecurityAdmin	
Maintainer	

Refer to ["A. User Roles and Policies" \(page 1580\)](#) for details on the policies and roles.

■ Settings

Password Policy

Item	Description	Setting values
Minimum Password Length	<p>Specify the minimum length of the password.</p> <p>Note</p> <ul style="list-style-type: none"> If "Password Policy" is enabled, "Minimum Password Length" is displayed in the [Setup User Account] screen and the [Change User Password] screen. Refer to the [Setup User Account] function or the [Change User Password] function for details. 	<p>4 - 64</p> <p>4 (Default)</p>
Password Complexity	<p>Select whether to "Enable" or "Disable" the complexity setting for the password.</p> <p>If "Enable" is selected, at least three of the following character types must be used for the password.</p> <ul style="list-style-type: none"> Uppercase letters (A - Z) Lowercase letters (a - z) Numeric characters (0 - 9) Symbols (!, ", #, \$, %, &, ", (,), *, +, ,, -, ., /, @, [, \,], ^, _ , ` , {, , }, ~, ;, : , <, =, >, ?) 	<p>Enable</p> <p>Disable (Default)</p>
Password History	<p>Specify the number of password generations to save in the storage system.</p> <p>If the number of generations is specified, the previously set password is stored to prevent reuse.</p> <p>If "0" is specified, a history of the passwords used is not managed. This means that the same password that was used in the previous generation can be reused.</p>	<p>1 - 16</p> <p>0: Unrestricted (Default)</p>
Minimum Password Age	<p>Specify the minimum number of days before the password can be changed from the last time the password was specified.</p> <p>The password cannot be changed during the specified days.</p> <p>If "0" is specified, the password can be changed at anytime.</p> <p>Caution</p> <ul style="list-style-type: none"> The value of this item must be smaller than the value of the "Maximum Password Age". <p>Note</p> <ul style="list-style-type: none"> If "Password Policy" is enabled, "Days To Password Change" is displayed in the [Setup User Account] screen and the [Change User Password] screen. Refer to the [Setup User Account] function or the [Change User Password] function for details. 	<p>1 - 999</p> <p>0: Unrestricted (Default)</p>

8. System
Define Role

Item	Description	Setting values
Maximum Password Age	<p>Specify the maximum number of days the password can be used.</p> <p>The relevant password becomes unavailable when the specified number of days has been exceeded.</p> <p>If "0" is specified, the password can be used indefinitely.</p> <p>Note</p> <ul style="list-style-type: none"> If "Password Policy" is enabled, "Days To Expiration" is displayed in the [Setup User Account] screen and the [Change User Password] screen. Refer to the [Setup User Account] function or the [Change User Password] function for details. If "Password Policy" is enabled, a system message appears in the [Overview] screen when the password will expire in 14 days. Refer to the [Overview] function for details. 	<p>1 - 999</p> <p>0: Unrestricted (Default)</p>

Lockout Policy

Item	Description	Setting values
Lockout Threshold	<p>Specify the number of consecutive failed logins before the user account is locked out.</p> <p>If "0" is specified, the lockout function for the user account is disabled.</p> <p>Note</p> <ul style="list-style-type: none"> If "0" is specified for this item, "30" minutes is set for the "Lockout Duration" setting. 	<p>1 - 999</p> <p>0: Unrestricted (Default)</p>
Lockout Duration	<p>Specify the time (minutes) before the user account that was locked out due to failed logins is automatically released.</p> <p>After the specified time has passed, the lockout is released automatically.</p> <p>If "0" is specified, lockouts are not automatically released.</p> <p>Caution</p> <ul style="list-style-type: none"> If the lockout state of the user account cannot be released automatically, release the lockout state using one of the following operations. <ul style="list-style-type: none"> - Ask the administrator who manages the user account to disable the "Lockout Policy" for the locked out user account. Refer to the [Setup User Account] function for details. - Reboot the storage system to initialize the lockout state. 	<p>1 - 99999</p> <p>30 (Default)</p> <p>0: Unrestricted</p>

■ Operating Procedures

Procedure ▶▶▶

- 1 Click [Modify User Policy] in [Action].
- 2 Specify the parameters, and click the [Modify] button.
→ A confirmation screen appears.
- 3 Click the [OK] button.
→ The user policy setting starts.
- 4 Click the [Done] button to return to the [Define Role] screen.



Modify RADIUS

- ["■ Overview" \(page 1360\)](#)
- ["■ User Privileges" \(page 1360\)](#)
- ["■ Settings" \(page 1360\)](#)
- ["■ Operating Procedures" \(page 1362\)](#)

■ Overview

This function specifies the external server (RADIUS server) that is used for authentication when logging in.

Up to two RADIUS Authentication servers can be registered.

Caution

- Select "Enable" or "Disable" for RADIUS Authentication of each storage system.
- If RADIUS Authentication fails when "No" has been selected for "Recovery Mode" in the RADIUS Setting field, logging in to Web GUI will not be available.
- RADIUS Authentication cannot be used when logging in to the Slave CM.
- When "Yes (Communication error)" has been selected for "Recovery Mode" in the RADIUS Setting field, Internal Authentication (*1) is performed if authentication fails in both the primary and the secondary servers due to a network error in either or both of the servers.

*1: This is the standard authentication type. Internal Authentication uses user account information stored in the storage system to verify the input user account.

Note

- When using RADIUS Authentication, registering user account information (user ID, password, and role) in RADIUS server is required. For details, refer to the manuals provided with the server.
- Even if the RADIUS Authentication function has been changed to "Disable", RADIUS setting information in the storage system is maintained.

■ User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	✓
StorageAdmin	
AccountAdmin	✓
SecurityAdmin	
Maintainer	

Refer to ["A. User Roles and Policies" \(page 1580\)](#) for details on the policies and roles.

■ Settings

In this screen, select enable or disable for RADIUS Authentication, specify the recovery mode, and perform the RADIUS Authentication server settings.

RADIUS Setting

Item	Description	Setting values
RADIUS Authentication	Select whether to "Enable" or "Disable" RADIUS Authentication. <ul style="list-style-type: none"> • Enable Use RADIUS Authentication. • Disable Use Internal Authentication. 	Enable Disable (Default)
Recovery Mode	When "Enable" has been specified in the "RADIUS Authentication" field, select the desired operation if RADIUS Authentication fails. If RADIUS Authentication fails when "No" has been selected for "Recovery Mode", logging in to Web GUI will not be available. Selecting "Yes" is recommended. <ul style="list-style-type: none"> • Yes (Communication error / Authentication error) When communication with the RADIUS server fails or communication with the RADIUS server succeeds but authentication fails, internal authentication is performed. • Yes (Communication error) When communication with the RADIUS server fails, internal authentication is performed. • No Even when communication with the RADIUS server fails, or communication with the RADIUS server succeeds but authentication fails, internal authentication is not performed. 	Yes (Communication error / Authentication error) (Default) Yes (Communication error) No

Primary Server (required) / Secondary Server

Item	Description	Setting values
Domain Name/IP Address	Input the domain name or the IP address of the RADIUS server. There are two methods to specify an IP address; "IPv4" and "IPv6". The following IPv6 addresses can be used; "link local address", "global address", "unique local address", or "6to4 address". Refer to "Available IPv6 Address" (page 1221) for details. When the current setting is displayed, the IPv6 address is displayed as an abbreviation.	For domain name specification Up to 64 alphanumeric characters and symbols For IPv4 address xxx.xxx.xxx.xxx xxx: 1 - 255 for the top field (decimal) xxx: 0 - 255 for other fields (decimal) For IPv6 address xxxx:xxxx:xxxx:xxxx:xxxx:xxxx:xxxx:xxxx xxxx: 0 - ffff (FFFF) (hexadecimal, alphanumeric characters) Refer to "IPv6 Address Notation" (page 1220) for details.
Port No.	Input the port number that is used for RADIUS Authentication.	Numeric characters 1 - 65535 1812 (Default)
LAN Port	Select the LAN port from "MNT" or "RMT" that is to be used for RADIUS Authentication.	MNT (Default) RMT
Authentication Mode	Select the authentication method for RADIUS Authentication from "CHAP" and "PAP".	CHAP (Default) PAP
Shared Secret	Input the same Shared Secret as the RADIUS server.	Up to 64 alphanumeric characters and symbols

Item	Description	Setting values
Retry Out Time	Select the total time (seconds) for waiting for a response from the RADIUS server. The storage system retries authentication during the specified time (seconds), and if there is no response in the specific time, regards the situation as a network error.	10 20 30 (Default) 40 50 60

■ Operating Procedures

Procedure ▶▶▶

- 1 Click [Modify RADIUS] in [Action].
- 2 Specify parameters, and click the [Modify] button.
→ A confirmation screen appears.

Caution

- An error screen appears in the following conditions:
 - Each parameter fails to satisfy the input conditions
 - The primary server is not specified
 - There is an unspecified parameter for the server
 - The "Domain Name/IP Address" of the Primary server overlaps with that of the Secondary server

- 3 Click the [OK] button.
→ The RADIUS setting starts.

Caution

- An error screen appears if the specified IP address of the RADIUS server conflicts with the internal IP address of the storage system.

- 4 Click the [Done] button to return to the [Define Role] screen.



Add Role

- ["■ Overview" \(page 1362\)](#)
- ["■ User Privileges" \(page 1363\)](#)
- ["■ Settings" \(page 1364\)](#)
- ["■ Operating Procedures" \(page 1365\)](#)

■ Overview

This function combines several user policies and creates a user-specific role (custom role). Up to 20 roles can be created per storage system.

Policy

The 16 types of access privileges shown below are available.

8. System
Define Role

Policies	Description
Status Display	Status display functions (storage system status, RAID group list, volume list, copy session list, etc.)
RAID Group Management	RAID group, Thin Provisioning Pool, Eco-mode, hot spare disk setting functions, etc.
Volume - Create / Modify	Volume setting functions (register/modify/expand), etc.
Volume - Delete / Format	Volume setting functions (delete/format), etc.
Host Interface Management	Host interface management functions (host group settings, port group settings, LUN group settings, host affinity settings), etc.
NAS Management (*1)	NAS setting functions (create NAS interface, create NAS shared folders), etc.
Advanced Copy Management	Local Advanced Copy setting functions, Remote Advanced Copy setting functions, etc.
Copy Session Management	Advanced Copy session management functions (start/stop/delete), etc.
Storage Migration Management	Storage Migration setting functions (start/suspend/stop/restart/delete path), etc.
Storage Management	Configuration setting functions of the storage system (date and time, network, remote support), etc.
User Management	User account setting functions (create/change/delete), etc.
Authentication / Role	External authentication and role setting functions (create/change/delete), etc.
Security Setting	Security setting functions of drives, etc.
Maintenance Information	Exporting and deleting functions of maintenance information (performance information, configuration information, events, storage system logs, panic dumps), etc.
Firmware Management	Firmware management functions (for users without the "Maintenance Operation" policy who need to set the controller firmware)
Maintenance Operation	Maintenance operation/preventive maintenance operation of hardware and firmware

*1: This policy is displayed in a Unified Storage environment.

Caution

- A role without any policies cannot be created.

Note

- The storage system has "Default Roles" (page 1364).
- Multiple policies can be allocated to one role.
- A role that is created can be allocated to a user account by using the [Setup User Account] function.

■ User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	✓
StorageAdmin	
AccountAdmin	✓
SecurityAdmin	
Maintainer	

Refer to ["A. User Roles and Policies" \(page 1580\)](#) for details on the policies and roles.

■ Settings

In this screen, create the role and select its policies.

Role Setting

Item	Description	Setting values
Name	Input a role name. (Required) The role name, which has previously been used (including the default role name), cannot be used.	Up to 16 alphanumeric characters and symbols (except ",", (comma) and "?")

Target Policy

Policies

Select the checkbox of the policies that are to be allocated to the created role.

- Status Display
- RAID Group Management
- Volume - Create / Modify
- Volume - Delete / Format
- Host Interface Management
- NAS Management
- Advanced Copy Management
- Copy Session Management
- Storage Migration Management
- Storage Management
- User Management
- Authentication / Role
- Security Setting
- Maintenance Information
- Firmware Management
- Maintenance Operation

Default Roles

The policies for the default role is as follows:

Policies	Default role						
	Monitor	Admin	StorageAdmin	AccountAdmin	SecurityAdmin	Maintainer	Software (*1)
Status Display	✓	✓	✓		✓	✓	
RAID Group Management		✓	✓			✓	
Volume - Create / Modify		✓	✓			✓	
Volume - Delete / Format		✓	✓			✓	
Host Interface Management		✓	✓			✓	

8. System
Define Role

Policies	Default role						
	Monitor	Admin	StorageAdmin	AccountAdmin	SecurityAdmin	Maintainer	Software (*1)
NAS Management		✓	✓			✓	
Advanced Copy Management		✓	✓			✓	
Copy Session Management		✓	✓			✓	
Storage Migration Management		✓	✓			✓	
Storage Management		✓				✓	
User Management		✓		✓			
Authentication / Role		✓		✓			
Security Setting		✓			✓		
Maintenance Information		✓			✓	✓	
Firmware Management		✓				✓	
Maintenance Operation						✓	

*1 : "Software" is the role that is used for external software. A user account with the "Software" role cannot log in to Web GUI.

■ Operating Procedures

Procedure ▶▶▶

- 1 Click [Add Role] in [Action].
- 2 Input the role name, select the policies for the role, and click the [Create] button.
→ A confirmation screen appears.

Caution

- An error screen appears in the following conditions:
 - The "Name" does not satisfy the input conditions
 - The "Name" has already been used

- 3 Click the [OK] button.
→ Addition of the user role starts.
- 4 Click the [Done] button to return to the [Define Role] screen.



Delete Role

- ["■ Overview" \(page 1365\)](#)
- ["■ User Privileges" \(page 1366\)](#)
- ["■ Operating Procedures" \(page 1366\)](#)

■ Overview

This function deletes the user role (custom role) which was registered by a user.

Caution

- The default role cannot be deleted.
- A role that is allocated to a user account cannot be deleted.

■ **User Privileges**

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	✓
StorageAdmin	
AccountAdmin	✓
SecurityAdmin	
Maintainer	

Refer to "[A. User Roles and Policies](#)" (page 1580) for details on the policies and roles.

■ **Operating Procedures**

Procedure ▶▶▶

- 1 Select the user role to be deleted (multiple selections can be made) and click [Delete Role] in [Action].
→ A confirmation screen appears.
- 2 Click the [OK] button.
→ The user role is deleted.
- 3 Click the [Done] button to return to the [Define Role] screen.



Modify Role

- "[■ Overview](#)" (page 1366)
- "[■ User Privileges](#)" (page 1367)
- "[■ Display Contents](#)" (page 1368)
- "[■ Settings](#)" (page 1368)
- "[■ Operating Procedures](#)" (page 1369)

■ **Overview**

This function modifies the policies of the user-specific role (custom role). The [Modify Role] function can be used when a custom role is created.

Policy

The 16 types of access privileges shown below are available.

8. System
Define Role

Policies	Description
Status Display	Status display functions (storage system status, RAID group list, volume list, copy session list, etc.)
RAID Group Management	RAID group, Thin Provisioning Pool, Eco-mode, hot spare disk setting functions, etc.
Volume - Create / Modify	Volume setting functions (register/modify/expand), etc.
Volume - Delete / Format	Volume setting functions (delete/format), etc.
Host Interface Management	Host interface management functions (host group settings, port group settings, LUN group settings, host affinity settings), etc.
NAS Management (*1)	NAS setting functions (create NAS interface, create NAS shared folders), etc.
Advanced Copy Management	Local Advanced Copy setting functions, Remote Advanced Copy setting functions, etc.
Copy Session Management	Advanced Copy session management functions (start/stop/delete), etc.
Storage Migration Management	Storage Migration setting functions (start/suspend/stop/restart/delete path), etc.
Storage Management	Configuration setting functions of the storage system (date and time, network, remote support), etc.
User Management	User account setting functions (create/change/delete), etc.
Authentication / Role	External authentication and role setting functions (create/change/delete), etc.
Security Setting	Security setting functions of drives, etc.
Maintenance Information	Exporting and deleting functions of maintenance information (performance information, configuration information, events, storage system logs, panic dumps), etc.
Firmware Management	Firmware management functions (for users without the "Maintenance Operation" policy who need to set the controller firmware)
Maintenance Operation	Maintenance operation/preventive maintenance operation of hardware and firmware

*1: This policy is displayed in a Unified Storage environment.

Caution

- Policies of the default role cannot be changed.
- A role without any policies cannot be created.

Note

- Multiple policies can be allocated to one role.
- Policies which have been allocated to the user account while logged in, can also be modified. Note that the modifications become valid only after the next login.
- A role that is changed can be allocated to a user account by using the [Setup User Account] function.

■ User Privileges

Availability of Executions in the Default Role

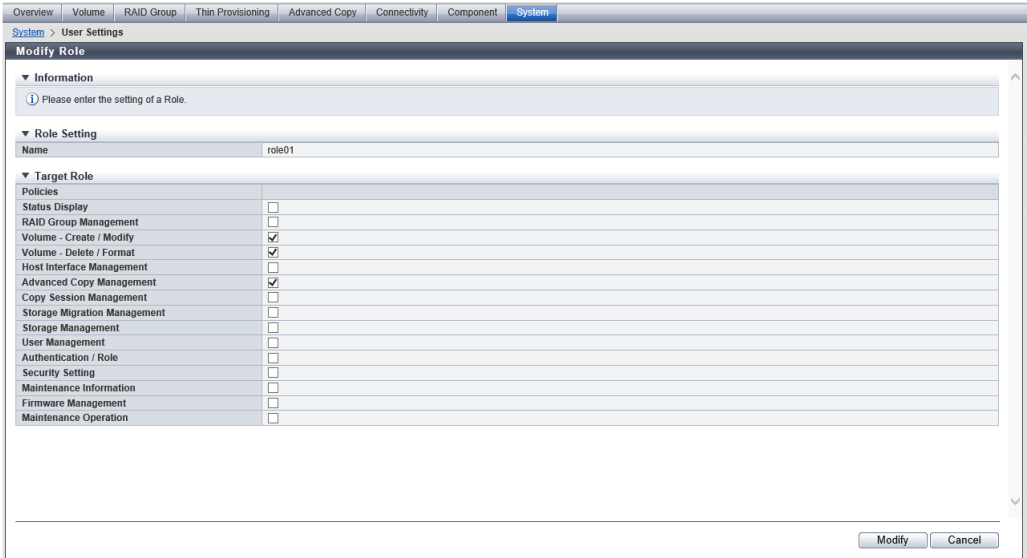
Default role	Availability of executions
Monitor	
Admin	✓
StorageAdmin	
AccountAdmin	✓
SecurityAdmin	

8. System
Define Role

Default role	Availability of executions
Maintainer	

Refer to ["A. User Roles and Policies" \(page 1580\)](#) for details on the policies and roles.

■ Display Contents



Role Setting

Item	Description
Name	The role name is displayed.

■ Settings

In this screen, change the policies of user-specific roles (custom roles).

Target Policy

Policies

Checkboxes of the current user policies are selected. Set the new policies that are to be added.

- Status Display
- RAID Group Management
- Volume - Create / Modify
- Volume - Delete / Format
- Host Interface Management
- NAS Management
- Advanced Copy Management
- Copy Session Management
- Storage Migration Management
- Storage Management
- User Management
- Authentication / Role

- Security Setting
- Maintenance Information
- Firmware Management
- Maintenance Operation

■ Operating Procedures

Procedure ▶▶▶

- 1 Select the role that is to be modified, and click [Modify Role] in [Action].
 - 2 Change the role settings, and click the [Modify] button.
→ A confirmation screen appears.
 - 3 Click the [OK] button.
→ Modification of the role settings starts.
 - 4 Click the [Done] button to return to the [Define Role] screen.
-



Eco-mode

- "[■ Overview](#)" (page 1369)
- "[■ User Privileges](#)" (page 1369)
- "[■ Display Contents](#)" (page 1370)

■ Overview

A list of the Eco-mode set state and the Eco-mode schedule that is registered in the storage system is displayed.

The Eco-mode function schedules the drive operating time in compliance with Massive Arrays of Idle Disks (MAID). This function saves power by stopping the drive motors or turning off the drives power outside of the scheduled operating time period.

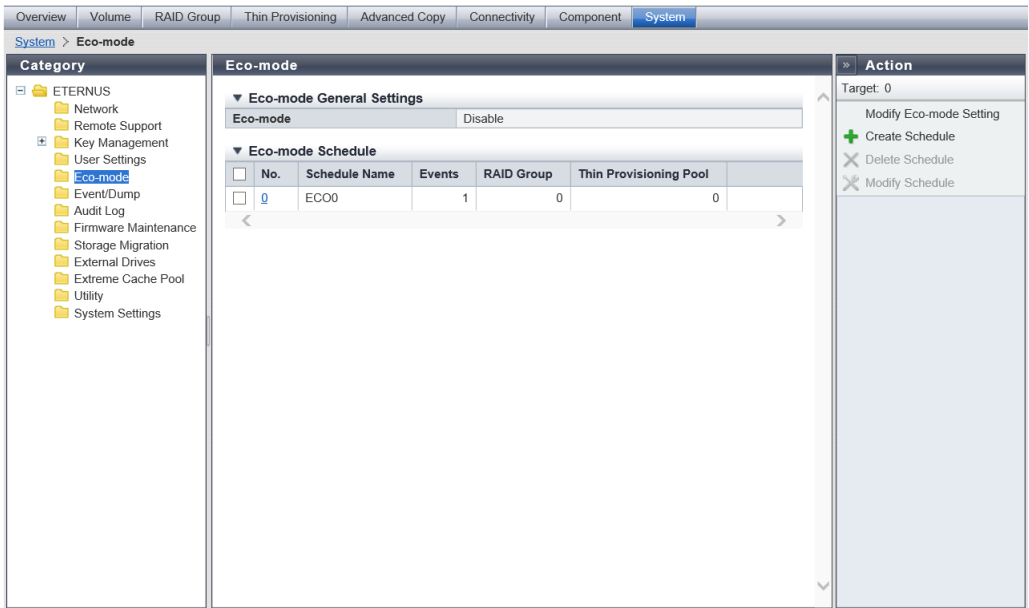
■ User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	✓
Admin	✓
StorageAdmin	✓
AccountAdmin	
SecurityAdmin	✓
Maintainer	✓

Refer to "["A. User Roles and Policies"](#) (page 1580)" for details on the policies and roles.

■ Display Contents



Eco-mode General Settings

The Eco-mode setting (enabled or disabled) in the storage system is displayed.

Item	Description
Eco-mode	The Eco-mode setting (enabled or disabled) for the storage system is displayed.
Host I/O Monitoring Interval	<p>When "Eco-mode" is "Enable", the I/O monitoring time interval between the last time that the drive is accessed and the time that the drive motor is stopped is displayed.</p> <p>If drive access is detected during the monitoring time, the monitoring time is extended for the specified minutes after access to the relevant drive is complete. If drive access is not detected during the monitoring time, the drive motor is stopped.</p> <p>Drive access is monitored for each RAID group or each Thin Provisioning Pool.</p> <p>This item is available when logged in using a user account with the "Maintenance Operation" policy.</p> <p>10 min 20 min 30 min 40 min 50 min 60 min</p>
Disk Motor Spin-down Limit Count	<p>When "Eco-mode" is "Enable", the maximum number (1 to 25) of drive motor spin-downs per day is displayed.</p> <p>The number of drive motor spin-downs is monitored over the duration of the day. If the number reaches the specified maximum, the drive motors are not stopped.</p> <p>Disk Motor Spin-down is monitored for each RAID group or each Thin Provisioning Pool.</p> <p>The Disk Motor Spin-down Count is reset to "0" at 0:00 every day.</p> <p>This item is available when logged in using a user account with the "Maintenance Operation" policy.</p>

Eco-mode Schedule

The Eco-mode schedule that is registered in the storage system is displayed. The drive motors are activated during the scheduled times that are specified.

8. System Eco-mode

Item	Description
No.	The Eco-mode schedule number (0 to 63) is displayed. Click the [No.] link to display the "[Eco-mode Schedule] Screen" (page 1371). If the Eco-mode is controlled with FUJITSU ETERNUS SF Storage Management Software, a "-" (hyphen) is displayed.
Schedule Name	The Eco-mode schedule name is displayed. If the Eco-mode is controlled with FUJITSU ETERNUS SF Storage Management Software, "External" is displayed.
Events	The number of events that are registered in the Eco-mode schedule is displayed. If the Eco-mode is controlled with FUJITSU ETERNUS SF Storage Management Software, a "-" (hyphen) is displayed.
RAID Group	The number of RAID groups for which the Eco-mode schedule is allocated to is displayed.
Thin Provisioning Pool	The number of Thin Provisioning Pools for which the Eco-mode schedule is allocated to is displayed.

[Eco-mode Schedule] Screen

In this screen, detailed information for the Eco-mode schedule (schedule number, schedule name, and event list) is displayed.

Schedule

Item	Description
No.	The Eco-mode schedule number (0 to 63) is displayed.
Schedule Name	The Eco-mode schedule name is displayed.

Event List

Item	Description
Event	The event contents is displayed. An Eco-mode schedule is composed of "Event", "From Time", and "To Time". The drive motors are activated during this Eco-mode schedule period. Refer to "[Event Setting Example] (page 1371)" for details.
From Time	The time at which the event application is started is displayed.
To Time	The time at which the event application is stopped is displayed.

Event Setting Example

No.	Event	Display example (Event, From Time, To Time)	Description
1	everyday	everyday 08:00 17:00	Activate the drive motor from "08:00" to "17:00" everyday.
2	Every week [Start day]	Every week Monday 08:00 17:00	Activate the drive motor from "08:00" to "17:00" every Monday.
3	Every week [Start day] to [End day]	Every week Monday to Friday 08:00 17:00	Activate the drive motor from "08:00" to "17:00" between Monday and Friday every week.

8. System
Eco-mode

No.	Event	Display example (Event, From Time, To Time)	Description
4	[Month] [Start day] [Term]	Specific days 10 One day only 08:00 17:00	Activate the drive motor from "08:00" to "17:00" on the 10th of every month.
5		Specific days 10 3 days 08:00 17:00	Activate the drive motor from "08:00" to "17:00" for 3 days between the 10th and 12th of every month.
6		03 20 7 days 08:00 17:00	Activate the drive motor from "08:00" to "17:00" for 7 days between the 20th and 26th of March.
7	[Month] [Start week] [Start day]	Every Month 1st Monday 08:00 17:00	Activate the drive motor from "08:00" to "17:00" on the first Monday of every month.
8	[Month] [Start week] [Start day] to [End day]	Every Month 1st Monday to Tuesday 08:00 17:00	Activate the drive motor from "08:00" to "17:00" for 2 days between the first Monday and the first Tuesday of every month.
9		08 1st Monday to Tuesday 08:00 17:00	Activate the drive motor from "08:00" to "17:00" for 2 days between the first Monday and the first Tuesday of August.
10		08 Last Monday to Sunday 08:00 17:00	Activate the drive motor from "08:00" to "17:00" for 3 days between the last Friday of August and the following Sunday.

Modify Eco-mode General Setting

- ["■ Overview" \(page 1372\)](#)
- ["■ User Privileges" \(page 1372\)](#)
- ["■ Settings" \(page 1373\)](#)
- ["■ Operating Procedures" \(page 1373\)](#)

■ Overview

This function enables or disables the Eco-mode setting for storage system.

Note

- To create a new Eco-mode schedule, use the [Create Eco-mode Schedule] function.

■ User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	✓
StorageAdmin	✓
AccountAdmin	
SecurityAdmin	
Maintainer	✓

Refer to ["A. User Roles and Policies" \(page 1580\)](#) for details on the policies and roles.

■ Settings

Eco-mode General Settings

In this screen, enable or disable the Eco-mode setting for the storage system.

Item	Description	Setting values
Eco-mode	Select whether to "Enable" or "Disable" the Eco-mode for the storage system.	Enable Disable (Default)
Host I/O Monitoring Interval	When "Enable" is selected for "Eco-mode", select the host I/O monitoring time interval between the last time that the drive is accessed and the time that the drive motor is stopped. If drive access is detected during the monitoring time, the monitoring time is extended for the specified minutes after access to the relevant drive is complete. If drive access is not detected during the monitoring time, the drive motor is stopped. Drive access is monitored for each RAID group or each Thin Provisioning Pool. This item is available when logged in using a user account with the "Maintenance Operation" policy.	10 min 20 min 30 min. (Default) 40 min 50 min 60 min
Disk Motor Spin-down Limit Count	When the Eco-mode is enabled, select the maximum number of drive motor spin-downs per day. The number of drive motor spin-downs is monitored over the duration of the day. If the number reaches the specified maximum, the drive motors are not stopped. Disk Motor Spin-down is monitored for each RAID group or each Thin Provisioning Pool. The Disk Motor Spin-down Count is reset to "0" at 0:00 every day. This item is available when logged in using a user account with the "Maintenance Operation" policy.	1 - 25 times/day 25 (Default)

■ Operating Procedures

Procedure ▶▶▶

- 1 Click [Modify Eco-mode General Setting] in [Action].
- 2 Specify the parameters, and click the [Set] button.
→ A confirmation screen appears.
- 3 Click the [OK] button.
→ The application of the Eco-mode general settings starts.
- 4 Click the [Done] button to return to the [Eco-mode] screen.



Create Eco-mode Schedule

- ["■ Overview" \(page 1374\)](#)
- ["■ User Privileges" \(page 1374\)](#)
- ["■ Settings" \(page 1374\)](#)
- ["■ Operating Procedures" \(page 1377\)](#)

■ Overview

This function specifies the disk operating time (term for activating disk motor constantly) as an Eco-mode schedule.

- Up to 64 Eco-mode schedules can be created for each storage system.
- Up to eight events can be specified for a single Eco-mode schedule.

Caution

- To perform schedule operations using this function, Eco-mode for the storage system must be enabled. Refer to the [Modify Eco-mode General Setting] function for details.
- Disk operation time varies depending on the Eco-mode schedule settings and disk access. A disk is spun up even if it is outside of disk operation time in the following conditions:
 - If disk access occurs while the disk motor is stopped:
The disk is immediately spun up and can be accessed within 1 - 5 minutes.
 - If a disk is activated more than a set amount of times in a day:
A state of increased access frequency is assumed and the Eco-mode will cease stopping the disk motor.

Note

- To apply the created Eco-mode schedule to each RAID group, use the [Assign Eco-mode Schedule (RAID Group)] function.
- To apply the created Eco-mode schedule to each Thin Provisioning Pool, use the [Assign Eco-mode Schedule (Thin Provisioning Pool)] function.

■ User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	✓
StorageAdmin	✓
AccountAdmin	
SecurityAdmin	
Maintainer	✓

Refer to "[A. User Roles and Policies](#)" (page 1580) for details on the policies and roles.

■ Settings

Schedule

Item	Description	Setting values
No.	The Eco-mode schedule number (0 to 63) is displayed. An Eco-mode schedule number is allocated from the smallest unused number.	

8. System Eco-mode

Item	Description	Setting values
Schedule Name	Input the Eco-mode schedule name. An existing Eco-mode schedule name cannot be used.	Up to 16 alphanumeric characters, symbols (except ",", (comma) and "?"), and spaces

Click the [Add] button to open ["Set Event" (page 1375)]. After selecting an event type, specify the disk operating period and set the Eco-mode schedule.

Click the [Apply] button to confirm and add the event to the "Event List".

Event List

Item	Description
Checkbox to select an event	Select an event that is to be edited. Select an event that is to be deleted (multiple selections can be made).
Event	The event added in [Add Event] is displayed.
From Time	The time at which the event application is started is displayed.
To Time	The time at which the event application is stopped is displayed.

Set Event

Item	Description	Setting values
Event Type	Select the event type. The settings vary depending on the event type.	everyday Every week Specific days Specific week

8. System
Eco-mode

Item		Description	Setting values
Event Type [Setting items]	everyday [From Time] [To Time]	Select this to add or edit the daily Eco-mode schedule. If "everyday" is selected, enter a value for [From Time] (start time) and [To Time] (end time). If the [From Time] is later than the [To Time], the end time is treated as the next day.	From Time: 00:00 - 23:30 To Time: 00:00 - 23:30 (Can be specified at intervals of 30 minutes) 00:00 (Default)
	Every week [Period] [From Time] [To Time]	Select this to add or edit the weekly Eco-mode schedule. If "Every week" is selected, enter a value for [Period] (term), [From Time] (start time), and [To Time] (end time). If the [From Time] is later than the [To Time], the end time is treated as the next day.	Period (start day): Monday - Sunday Monday (Default) Period (end day): Monday - Sunday Monday (Default) From Time: 00:00 - 23:30 To Time: 00:00 - 23:30 (Can be specified at intervals of 30 minutes) 00:00 (Default)
	Specific days [Month] [Period] [From Time] [To Time]	Select this to add or edit the Eco-mode schedule based on specific days. If "Specific days" is selected, enter a value for [Month] (month), [Period] (term), [From Time] (start time), and [To Time] (end time). If the [From Time] is later than the [To Time], the end time is treated as the next day.	Month: Every Month, January - December Every Month (Default) Period (start date): 01 - 31 01 (Default) Period (term): One day only, 2 days - 7 days One day only (Default) From Time: 00:00 - 23:30 To Time: 00:00 - 23:30 (Can be specified at intervals of 30 minutes) 00:00 (Default)
	Specific week [Month] [Period] [From Time] [To Time]	Select this to add or edit the Eco-mode schedule based on specific week. If "Specific week" is selected, enter a value for [Month] (month), [Period] (term), [From Time] (start time), and [To Time] (end time). If the [From Time] is later than the [To Time], the end time is treated as the next day.	Month: Every Month, January - December Every Month (Default) Period (nth week): 1st - 4th, Last 1st (Default) Period (start day): Monday - Sunday Monday (Default) Period (end day): Monday - Sunday Monday (Default) From Time: 00:00 - 23:30 To Time: 00:00 - 23:30 (Can be specified at intervals of 30 minutes) 00:00 (Default)

Event Setting Example

No.	Setting example	Event Type	Month	Period	From Time	To Time
1	Activate the disk motor from "08:00" to "17:00" everyday.	everyday	-	-	08:00	17:00
2	Activate the disk motor from "08:00" to "17:00" every Monday.	Every week	-	Start day: Monday End day: Monday	08:00	17:00
3	Activate the disk motor from "08:00" to "17:00" between Monday and Friday every week.	Every week	-	Start day: Monday End day: Friday	08:00	17:00
4	Activate the disk motor from "08:00" to "17:00" on the 10th of every month.	Specific days	Every Month	Start date: 10 Term: One day only	08:00	17:00
5	Activate the disk motor from "08:00" to "17:00" for 3 days between the 10th and 12th of every month.	Specific days	Every Month	Start date: 10 Term: 3 days	08:00	17:00

8. System
Eco-mode

No.	Setting example	Event Type	Month	Period	From Time	To Time
6	Activate the disk motor from "08:00" to "17:00" for 7 days between the 20th and 26th of March.	Specific days	March	Start date: 20 Term: 7 days	08:00	17:00
7	Activate the disk motor from "08:00" to "17:00" on the first Monday of every month.	Specific week	Every Month	nth week: 1st Start day: Monday End day: Monday	08:00	17:00
8	Activate the disk motor from "08:00" to "17:00" for 2 days between the first Monday and the first Tuesday of every month.	Specific week	Every Month	nth week: 1st Start day: Monday End day: Tuesday	08:00	17:00
9	Activate the disk motor from "08:00" to "17:00" for 2 days between the first Monday and the first Tuesday of August.	Specific week	August	nth week: 1st Start day: Monday End day: Tuesday	08:00	17:00
10	Activate the disk motor from "08:00" to "17:00" for 3 days between the last Friday of August and the following Sunday.	Specific week	August	nth week: Last Start day: Friday End day: Sunday	08:00	17:00

■ Operating Procedures

Procedure ▶▶▶

- 1 Click [Create Schedule] in [Action].
- 2 Specify the "Schedule Name", and click the [Add Event] button.
- 3 Select an event type, set the event details, and then click the [Apply] button.
→ The event is added to the "Event List".

Caution

- An error screen appears in the following conditions:
 - "everyday" is selected for the event type when the start time and end time are the same
 - When "Every week" is selected for the event type
 - The start day is later than the end day
 - The start day and the end day are the same, and the start time and the end time are also the same
 - The start day and the end day are the same, and the start time is later than the end time
 - When "Specific days" is selected for the event type
 - A non-existent date (for example, February 30) is set
 - "One day only" is selected for the period and the start time and end time are the same
 - "One day only" is selected for the period and the start time is later than the end time
 - When "Specific week" is selected for the event type
 - The start day is later than the end day
 - The start day and the end day are the same, and the start time and the end time are also the same
 - The start day and the end day are the same, and the start time is later than the end time
 - The period is set to include Sunday
 - The period is one week or longer (the end date is set to "7 days" when the end time is later than the start time)

Note

- When editing the added event, select an event and click the [Edit Event] button.
- When deleting an added event, select an event (multiple selections can be made) and click the [Delete Event] button.

- 4 Repeat Step 2 and Step 3 to add multiple events.
- 5 After adding all the events, click the [Set] button.
→ A confirmation screen appears.

Caution

- An error screen appears in the following conditions:
 - "Schedule Name" has not been entered
 - "Schedule Name" matches with an existing Eco-mode schedule name

- 6 Click the [OK] button.
→ Creation of the Eco-mode schedule starts.
- 7 Click the [Done] button to return to the [Eco-mode] screen.



Delete Eco-mode Schedule

- ["■ Overview" \(page 1378\)](#)
- ["■ User Privileges" \(page 1378\)](#)
- ["■ Operating Procedures" \(page 1379\)](#)

■ Overview

This function deletes the Eco-mode schedule.

■ User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	✓
StorageAdmin	✓
AccountAdmin	
SecurityAdmin	
Maintainer	✓

Refer to ["A. User Roles and Policies" \(page 1580\)](#) for details on the policies and roles.

■ Operating Procedures

Procedure ▶▶▶

- 1 Select the Eco-mode schedule that is to be deleted (multiple selections can be made) and click [Delete Schedule] in [Action].
→ A confirmation screen appears.

Caution

- [Delete Schedule] cannot be clicked under the following conditions:
 - Eco-mode schedule is allocated to a RAID group.
 - Eco-mode schedule is allocated to a Thin Provisioning Pool.

- 2 Click the [OK] button.
→ Deletion of the Eco-mode schedule starts.
 - 3 Click the [Done] button to return to the [Eco-mode] screen.
-



Modify Eco-mode Schedule

- "[■ Overview](#)" (page 1379)
- "[■ User Privileges](#)" (page 1380)
- "[■ Settings](#)" (page 1380)
- "[■ Operating Procedures](#)" (page 1381)

■ Overview

This function modifies the Eco-mode schedule.

Up to eight events can be specified for a single Eco-mode schedule.

Caution

- Disk operation time varies depending on the Eco-mode schedule settings and disk access. A disk is spun up even if it is outside of disk operation time in the following conditions:
 - If disk access occurs while the disk motor is stopped:
The disk is immediately spun up and can be accessed within 1 - 5 minutes.
 - If a disk is activated more than a set amount of times in a day:
A state of increased access frequency is assumed and the Eco-mode will cease stopping the disk motor.

Note

- To apply the modified Eco-mode schedule to RAID groups, use the [Assign Eco-mode Schedule (RAID Group)] function.
- To apply the modified Eco-mode schedule to Thin Provisioning Pools, use the [Assign Eco-mode Schedule (Thin Provisioning Pool)] function.

■ User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	✓
StorageAdmin	✓
AccountAdmin	
SecurityAdmin	
Maintainer	✓

Refer to ["A. User Roles and Policies" \(page 1580\)](#) for details on the policies and roles.

■ Settings

Schedule

Item	Description	Setting values
No.	The Eco-mode schedule number (0 to 63) is displayed.	
Schedule Name	<p>Edit the Eco-mode schedule name.</p> <p>The existing Eco-mode schedule name is displayed. An existing Eco-mode schedule name cannot be used.</p> <p>The Eco-mode schedule name that is assigned to the RAID group or TPP can be changed.</p>	<p>Up to 16 alphanumeric characters, symbols (except ";" (comma) and "?"), and spaces</p>

Select an event that is to be modified and click the [Edit Event] button. [["Set Event" \(page 1380\)](#)] opens. Modify the event.

To add an event, click the [Add Event] button. [["Set Event" \(page 1380\)](#)] opens. Add the event.

When deleting an event, select a target event (multiple selections can be made) and click the [Delete Event] button.

Event List

Item	Description
Checkbox to select an event	<p>Select an event that is to be edited.</p> <p>Select an event that is to be deleted (multiple selections can be made).</p>
Event	The event that is added or edited in [Set Event] is displayed.
From Time	The time at which the event application is started is displayed.
To Time	The time at which the event application is stopped is displayed.

Set Event

Item	Description	Setting values
Event Type	<p>Select the event type.</p> <p>The settings vary depending on the event type.</p>	<p>everyday</p> <p>Every week</p> <p>Specific days</p> <p>Specific week</p>

8. System
Eco-mode

Item		Description	Setting values
Event Type [Setting items]	everyday [From Time] [To Time]	Select this to add or edit the daily Eco-mode schedule. If "everyday" is selected, enter a value for [From Time] (start time) and [To Time] (end time). If the [From Time] is later than the [To Time], the end time is treated as the next day.	From Time: 00:00 - 23:30 To Time: 00:00 - 23:30 (Can be specified at intervals of 30 minutes) 00:00 (Default)
	Every week [Period] [From Time] [To Time]	Select this to add or edit the weekly Eco-mode schedule. If "Every week" is selected, enter a value for [Period] (term), [From Time] (start time), and [To Time] (end time). If the [From Time] is later than the [To Time], the end time is treated as the next day.	Period (start day): Monday - Sunday Monday (Default) Period (end day): Monday - Sunday Monday (Default) From Time: 00:00 - 23:30 To Time: 00:00 - 23:30 (Can be specified at intervals of 30 minutes) 00:00 (Default)
	Specific days [Month] [Period] [From Time] [To Time]	Select this to add or edit the Eco-mode schedule based on specific days. If "Specific days" is selected, enter a value for [Month] (month), [Period] (term), [From Time] (start time), and [To Time] (end time). If the [From Time] is later than the [To Time], the end time is treated as the next day.	Month: Every Month, January - December Every Month (Default) Period (start date): 01 - 31 01 (Default) Period (term): One day only, 2 days - 7 days One day only (Default) From Time: 00:00 - 23:30 To Time: 00:00 - 23:30 (Can be specified at intervals of 30 minutes) 00:00 (Default)
	Specific week [Month] [Period] [From Time] [To Time]	Select this to add or edit the Eco-mode schedule based on specific week. If "Specific week" is selected, enter a value for [Month] (month), [Period] (term), [From Time] (start time), and [To Time] (end time). If the [From Time] is later than the [To Time], the end time is treated as the next day.	Month: Every Month, January - December Every Month (Default) Period (nth week): 1st - 4th, Last 1st (Default) Period (start day): Monday - Sunday Monday (Default) Period (end day): Monday - Sunday Monday (Default) From Time: 00:00 - 23:30 To Time: 00:00 - 23:30 (Can be specified at intervals of 30 minutes) 00:00 (Default)

Refer to "[Event Setting Example](#)" (page 1376) for details about the settings for each event type.

■ Operating Procedures

Procedure ▶▶▶

- 1 Select the Eco-mode schedule that is to be edited and click [Modify Eco-mode Schedule] in [Action].
- 2 Select the event that is to be modified and click the [Edit Event] button.
- 3 After the event content is modified, click the [Apply] button.
→ The "Event List" is updated.

Caution

- An error screen appears in the following conditions:
 - "everyday" is selected for the event type when the start time and end time are the same
 - When "Every week" is selected for the event type
 - The start day is later than the end day
 - The start day and the end day are the same, and the start time and the end time are also the same
 - The start day and the end day are the same, and the start time is later than the end time
 - When "Specific days" is selected for the event type
 - A non-existent date (for example, February 30) is set
 - "One day only" is selected for the period and the start time and end time are the same
 - "One day only" is selected for the period and the start time is later than the end time
 - When "Specific week" is selected for the event type
 - The start day is later than the end day
 - The start day and the end day are the same, and the start time and the end time are also the same
 - The start day and the end day are the same, and the start time is later than the end time
 - The period is set to include Sunday
 - The period is one week or longer (the end date is set to "7 days" when the end time is later than the start time)

Note

- When adding an event, click the [Add Event] button.
- When deleting an event, select an event (multiple selections can be made) and click the [Delete Event] button.

4 Repeat Step 2 and Step 3 to edit multiple events.

5 After editing all the events, click the [Set] button.
→ A confirmation screen appears.

Caution

- An error screen appears in the following conditions:
 - "Schedule Name" has not been entered
 - "Schedule Name" matches with an existing Eco-mode schedule name

6 Click the [OK] button.
→ Modification of the Eco-mode schedule starts.

7 Click the [Done] button to return to the [Eco-mode] screen.



Event/Dump

- ["■ Overview" \(page 1383\)](#)
- ["■ User Privileges" \(page 1383\)](#)
- ["■ Actions" \(page 1383\)](#)

■ Overview

The description on the actions that can be started from the [Event/Dump] screen is displayed.

■ User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	✓
Admin	✓
StorageAdmin	✓
AccountAdmin	
SecurityAdmin	✓
Maintainer	✓

Refer to ["A. User Roles and Policies" \(page 1580\)](#) for details on the policies and roles.

■ Actions

The following functions can be used from the "Event/Dump" screen:

- ["Setup Event Notification" \(page 1383\)](#)
- ["Display/Delete Event Log" \(page 1404\)](#)
- ["Export/Delete Log" \(page 1407\)](#)
- ["Export/Delete Panic Dump" \(page 1411\)](#)
- ["Get G-List" \(page 1415\)](#)

Setup Event Notification

- ["■ Overview" \(page 1383\)](#)
- ["■ User Privileges" \(page 1384\)](#)
- ["■ Settings" \(page 1384\)](#)
- ["■ Operating Procedures" \(page 1395\)](#)

■ Overview

This function specifies whether to report events that are detected in the storage system. There are six methods for event notification: Host Sense Key Code Qualifier, SNMP Trap, E-Mail, syslog, REMCS, and AIS Connect.

A notification setting can be selected for each type of event.

Caution

- For the SNMP Trap notification, performing the following functions is required.
 - [Setup SNMP Agent Basic Interface]
 - [Setup SNMP Manager]
 - [Setup SNMP Agent MIB Access View]
 - [Setup SNMP Agent User]
 - [Setup SNMP Agent Community]
 - [Setup SNMP Agent Trap]
- For E-Mail notification, performing [Setup E-Mail Notification] is required.
- For syslog notification, performing [Setup Syslog] is required.
- For REMCS notification, performing [Setup Remote Support] is required.
- For AIS Connect notification, performing [Setup AIS Connect Environment] is required.
- If ETERNUS SF Storage Cruiser is used and configured to automatically obtain the component status of the storage system, event notifications by SNMP traps for the following events are automatically enabled (notified).
 - Remote Path Error of no Data Transfer
 - Recovery module
 - Temperature restoration
 - FC CA Port Link Status Changed
 - iSCSI CA Port Link Status Changed
 - Remote Path Recovery
 - Events whose notification is enabled by default, but is disabled manually
- If the storage system is deleted from ETERNUS SF Storage Cruiser, event notifications of the SNMP traps revert to the default value. However, if the event notifications of the SNMP traps are changed from a storage system after being automatically changed, the event notifications do not revert to the default value even if the storage system is deleted.

■ **User Privileges**

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	✓
StorageAdmin	
AccountAdmin	
SecurityAdmin	
Maintainer	✓

Refer to ["A. User Roles and Policies" \(page 1580\)](#) for details on the policies and roles.

■ **Settings**

The events are classified into three levels: "Error Severity Level", "Warning Level", and "Informational Level".




Click the [\[Setting based on Severity\] tab](#), ["\[Error Severity Level\] Tab" \(page 1386\)](#), ["\[Warning Level\] Tab" \(page 1390\)](#), or ["\[Informational Level\] Tab" \(page 1391\)](#) to display the setting fields for each level.

Setting based on Severity

Select whether to notify of an event by levels. Checkboxes are displayed for selectable notification methods.

When enabling the notification, select the method from "Host Sense Key Code Qualifier", "SNMP Trap", "E-Mail", "syslog", "REMCS", or "AIS Connect" (multiple selections can be made).

When setting the notification method for each event, move on to the setting fields for each level.

Item	Description	Setting values
 All Error Events	<p>Select whether to notify when an error level event occurs. When notifying, select the notification method.</p> <p>By selecting or clearing the checkbox, the same setting can be applied for all the events displayed in the "[Error Severity Level] Tab" (page 1386).</p> <p>Display contents:</p> <ul style="list-style-type: none"> Selected (normal checkbox): Notify all events Selected (lighter colored checkbox): Some events are notified and some events are not notified Cleared: No events are notified 	<p>Selected: Notify all the events</p> <p>Cleared: No events are notified</p>
 All Warning Events	<p>Select whether to notify when a warning level event occurs. When notifying, select the notification method.</p> <p>By selecting or clearing the checkbox, the same setting can be applied for all the events displayed in the "[Warning Level] Tab" (page 1390).</p> <p>Display contents:</p> <ul style="list-style-type: none"> Selected (normal checkbox): Notify all events Selected (lighter colored checkbox): Some events are notified and some events are not notified Cleared: No events are notified 	<p>Selected: Notify all the events</p> <p>Cleared: No events are notified</p>
 All Informational Events	<p>Select whether to notify when an informational level event occurs. When notifying, select the notification method.</p> <p>By selecting or clearing the checkbox, the same setting can be applied for all the events displayed in the "[Informational Level] Tab" (page 1391).</p> <p>Display contents:</p> <ul style="list-style-type: none"> Selected (normal checkbox): Notify all events Selected (lighter colored checkbox): Some events are notified and some events are not notified Cleared: No events are notified 	<p>Selected: Notify all the events</p> <p>Cleared: No events are notified</p>
Individual Settings within Severity Level	"Yes" is displayed when the target notification method ("Host Sense Key Code Qualifier", "SNMP Trap", "E-Mail", "syslog", "REMCS" or "AIS Connect") is specified for any event in "Error Severity Level", "Warning Level", or "Informational Level", if not, "No" is displayed.	
Blink Fault LED at warning	Select "Enable" when setting the Fault LED in the front panel to blink while a warning level event occurs, or select "Disable" when setting the Fault LED not to blink.	<p>Enable (Default)</p> <p>Disable</p>

8. System
Event/Dump

Item	Description	Setting values	
Turn on Fault LED when redundant copy is completed	Select "Enable" when setting the Fault LED of the drive to turn on when a redundant copy is complete, or select "Disable" when setting the Fault LED not to turn on. Caution <ul style="list-style-type: none"> If the Copybackless function is enabled, Fault LED for the failed drive is turned on regardless of this setting after the redundant copy is complete. 	Enable Disable (Default)	
Display parts (except drive) with error status on LCD	Select "Enable" when displaying the part (other than drive) error message on the LCD, or select "Disable" not to display the message on the LCD. This item is displayed only for the ETERNUS DX900 S5 or the ETERNUS DX8900 S4.	Enable (Default) Disable	
Display parts (except drive) with warning status on LCD	Select "Enable" when displaying the part (other than drive) warning message on the LCD, or select "Disable" not to display the message on the LCD. This item is displayed only for the ETERNUS DX900 S5 or the ETERNUS DX8900 S4.	Enable (Default) Disable	
Display drives with error status on LCD	Any Time	Select "Enable" when displaying the drive error message on the LCD at any time regardless of whether the hot spare disk exists, or select "Disable" if the message should not be displayed. This item is displayed only for the ETERNUS DX900 S5 or the ETERNUS DX8900 S4.	Enable (Default) Disable
	when HS<0	Select "Enable" when displaying the drive error message only if a drive error occurs when the available hot spare disk is "0", or select "Disable" if the message should not be displayed. This item can be selected only when the "Display drives with error status on LCD (Any Time)" is disabled. This item is displayed only for the ETERNUS DX900 S5 or the ETERNUS DX8900 S4.	Enable Disable (Default)
Display drives with warning status on LCD	Any Time	Select "Enable" when displaying the drive warning message on the LCD at any time regardless of whether the hot spare disk exists, or select "Disable" if the message should not be displayed. This item is displayed only for the ETERNUS DX900 S5 or the ETERNUS DX8900 S4.	Enable (Default) Disable
	when HS<0	Select "Enable" when displaying the drive warning message only if a drive warning occurs when the available hot spare disk is "0", or select "Disable" if the message should not be displayed. This item can be selected only when the "Display drives with warning status on LCD (Any Time)" is disabled. This item is displayed only for the ETERNUS DX900 S5 or the ETERNUS DX8900 S4.	Enable Disable (Default)

Note

- For the ETERNUS DX900 S5 or the ETERNUS DX8900 S4, the notification methods that are specified in this function determine whether to display the LCD message on the Overview screen and the Operation Panel.

Function Button

Button	Description
[System Defaults]	Returns the event notification to the "Initial Setting List" (page 1396) .
[REMCS Defaults]	Specifies the event notification of the "REMCS Recommended Setting List" (page 1400) .

[Error Severity Level] Tab

Select whether to notify of the error event for each event type.

8. System
Event/Dump

When enabling the notification, select the method from "Host Sense Key Code Qualifier", "SNMP Trap", "E-Mail", "syslog", "REMCS", or "AIS Connect" (multiple selections can be made).

Item	Description	Setting values
✖Parts Error	Select whether to notify when a failure occurs in a part other than the drive. When notifying, select the notification method.	Selected: Notify Cleared
✖Drive Error	Select whether to notify when a failure occurs in a non-protected (non-shielded) drive for each condition that is described below. When notifying, select the notification method. <ul style="list-style-type: none"> Any Time Notifies always when a drive failure occurs. when HS<0 Notifies only when a drive failure occurs while available hot spare disk is "0" (*1). <p>*1 : When rebuilding cannot be performed because there are no hot spares that can be used as a substitute for the failed drive.</p>	Selected: Notify Cleared
✖Drive Error of HDD Shield	Select whether to notify when a failure occurs in a protected (shielded) drive for each condition that is described below. When notifying, select the notification method. <ul style="list-style-type: none"> Any Time Notifies always when a failure occurs in a protected (shielded) drive. when HS<0 Notifies only when a failure occurs in a protected (shielded) drive while available hot spare disk is "0" (*1). <p>*1 : When rebuilding cannot be performed because there are no hot spares that can be used as a substitute for the failed drive.</p> <p>Note</p> <ul style="list-style-type: none"> This item is notified when "HDD Shield" in the subsystem parameter is enabled. Refer to the [Setup Subsystem Parameters] function for details. When the SNMP trap setting is changed from "OFF" to "ON", a message is displayed in the ETERNUS SF event log. 	Selected: Notify Cleared
✖Succeeded HDD Shield	Select whether to notify when a failed drive is diagnosed as being available by the protect (shield) function and is activated in the storage system. When notifying, select the notification method. <p>Note</p> <ul style="list-style-type: none"> This item is notified when "HDD Shield" in the subsystem parameter is enabled. Refer to the [Setup Subsystem Parameters] function for details. When the SNMP trap setting is changed from "OFF" to "ON", a message is displayed in the ETERNUS SF event log. 	Selected: Notify Cleared
✖Temperature Error	Select whether to notify when a temperature error status is detected by the sensor. When notifying, select the notification method.	Selected: Notify Cleared
✖End of battery life	Select whether to notify when a battery expires. When notifying, select the notification method.	Selected: Notify Cleared



8. System
Event/Dump

Item	Description	Setting values
✘ Rebuild/Copyback w/ redundant	Select whether to notify when rebuilding or copy backing (with redundancy) (*1) is performed. When notifying, select the notification method. *1: "Rebuilding to hot spare disk is complete", "Copyback starts" and "Copyback complete" are equivalent to "Redundancy".	Selected: Notify Cleared
✘ Rebuild/Copyback w/o redundant	Select whether to notify when rebuilding or copy backing (without redundancy) (*1) occurs for each condition shown below. When notifying, select the notification method. <ul style="list-style-type: none"> Any Time Notifies always when rebuilding or copy backing (without redundancy) occurs. when HS<0 Notifies only when rebuilding or copy backing (without redundancy) occurs while available hot spare disk is "0". *1: "Rebuild to hot spare disk is started", "Rebuild to hot spare disk failed" and "Copyback failed" are equivalent to "Without redundancy".	Selected: Notify Cleared
✘ Redundant	Select whether to notify when a redundant copy starts or ends abnormally for each condition shown below. When notifying, select the notification method. <ul style="list-style-type: none"> Any Time Notifies always when a redundant copy starts or ends abnormally. when HS<0 Notifies only when a redundant copy starts or ends abnormally while available hot spare disk is "0". 	Selected: Notify Cleared
✘ Complete Redundant Copy	Select whether to notify when a redundant copy and isolation of the non-protected (non-shielded) drive from the storage system are complete. When notifying, select the notification method.	Selected: Notify Cleared
✘ Complete Redundant Copy of HDD Shield	Select whether to notify when a redundant copy and isolation of the protected (shielded) drive from the storage system are complete. When notifying, select the notification method. Note <ul style="list-style-type: none"> This item is notified when "HDD Shield" in the subsystem parameter is enabled. Refer to the [Setup Subsystem Parameters] function for details. When the SNMP trap setting is changed from "OFF" to "ON", a message is displayed in the ETERNUS SF event log. 	Selected: Notify Cleared
✘ Complete rebuild	Select whether to notify when a bad sector (*1) is detected in the hot spare where rebuilding is completed. When notifying, select the notification method. *1: A bad sector is the location information (address and length) where an error such as data reading error occurs during rebuild, copyback, or redundant copy.	Selected: Notify Cleared
✘ Bad data	Select whether to notify when a bad sector is detected in the drive. When notifying, select the notification method.	Selected: Notify Cleared
✘ Pinned data	Select whether to notify when pinned data (*1) is detected or disappears. When notifying, select the notification method. *1: "Pinned data" is the data left in the cache due to unsuccessful write-back to the drive from the cache area.	Selected: Notify Cleared
✘ Not Ready	Select whether to notify when the storage system is in the "Not Ready" state (*1). When notifying, select the notification method. *1: "Not Ready" is the state in which the storage system cannot operate properly due to a cause such as failures in multiple parts.	Selected: Notify Cleared

8. System
Event/Dump

Item	Description	Setting values
✘ Remote Path Error during Data Transfer	Select whether to notify when an error occurs in a copy path and an REC session that is not suspended exists. When notifying, select the notification method.	Selected: Notify Cleared
✘ Remote Path Error of no Data Transfer	Select whether to notify when an error occurs in a copy path and an REC session that is in one of the following conditions exists. When notifying, select the notification method. <ul style="list-style-type: none"> No REC sessions exist All of the REC sessions are suspended 	Selected: Notify Cleared
✘ REC Buffer Halt (Path Error)	Select whether to notify when an REC buffer halt caused by copy path error occurs. When notifying, select the notification method.	Selected: Notify Cleared
✘ REC Buffer Halt (Overload)	Select whether to notify when an REC buffer halt caused by overload occurs. When notifying, select the notification method.	Selected: Notify Cleared
✘ REC Buffer Halt (Other Error)	Select whether to notify when an REC buffer halt caused by an error occurs. When notifying, select the notification method.	Selected: Notify Cleared
✘ Copy Session Error	Select whether to notify when an error is detected in the Advanced Copy session or when a failed Advanced Copy session is recovered. When notifying, select the notification method.	Selected: Notify Cleared
✘ Thin Provisioning Pool Rate	Select whether to notify when the TPP usage changes (*1). When notifying, select the notification method. <p>*1 : Notifications are sent if the TPP usage changes as follows:</p> <ul style="list-style-type: none"> From "Normal" to "Attention" From "Normal" or "Attention" to "Warning" The TPP capacity is exhausted <p>Notifications for the following events are sent only for TPPs where the Deduplication/Compression function is enabled.</p> <ul style="list-style-type: none"> The Data Container Volume usage rate is changed to 80 % or larger The Data Container Volume is exhausted <p>Note</p> <ul style="list-style-type: none"> The ETERNUS DX8100 S4 does not support this item. 	Selected: Notify Cleared
✘ SED Network Error	Select whether to notify when the communication between the storage system and the key server is disconnected. When notifying, select the notification method.	Selected: Notify Cleared
✘ NAS I/O Error	Select whether to notify when an I/O error is detected in the NAS system. When notifying, select the notification method. This item is only displayed in a Unified Storage environment.	Selected: Notify Cleared
✘ NAS Snapshot Error	Select whether to notify when a snapshot acquisition error is detected in the NAS system. When notifying, select the notification method. This item is only displayed in a Unified Storage environment.	Selected: Notify Cleared
✘ Extended System Volume Error	Select whether to notify the error status of the NAS expanded system volume (such as the unmount state, access error, or out of capacity) for the NAS system. When notifying, select the notification method. This item is only displayed in a Unified Storage environment.	Selected: Notify Cleared





8. System
Event/Dump

Item	Description	Setting values
 Disconnect Storage Cluster Controller	Select whether to notify when the Storage Cluster controller has been specified and a communication error with the paired storage system is detected. When notifying, select the notification method. This item is only displayed when "Enable" is selected for the Storage Cluster function.	Selected: Notify Cleared
 Data Access Failed During RAID Group Redundancy Loss	Select whether to notify of data access failure when the RAID group redundancy is lost. When notifying, select the notification method.	Selected: Notify Cleared

[Warning Level] Tab

Select whether to notify of a warning event for each event type.

When enabling the notification, select the method from "Host Sense Key Code Qualifier", "SNMP Trap", "E-Mail", "syslog", or "AIS Connect" (multiple selections can be made).

Item	Description	Setting values
 Parts Warning	Select whether to notify when a warning level event occurs in a part other than the drive. When notifying, select the notification method.	Selected: Notify Cleared
 Drive Warning	Select whether to notify when a warning level event occurs in a non-protected (non-shielded) drive for each condition that is described below. When notifying, select the notification method. <ul style="list-style-type: none"> Any Time Notifies always when a warning level event occurs in the drive. when HS<0 Notifies only when a warning level event occurs in the drive while available hot spare disk is "0" (*1). <p>*1 : When rebuilding cannot be performed because there are no hot spares that can be used as a substitute for the failed drive.</p>	Selected: Notify Cleared
 Drive Warning of HDD Shield	Select whether to notify when a warning level event occurs in a protected (shielded) drive for each condition that is described below. When notifying, select the notification method. <ul style="list-style-type: none"> Any Time Notifies always when a warning level event occurs in a protected (shielded) drive. when HS<0 Notifies only when a warning level event occurs in a protected (shielded) drive failure while available hot spare disk is "0" (*1). <p>*1 : When rebuilding cannot be performed because there are no hot spares that can be used as a substitute for the failed drive.</p> <div style="background-color: #f0f0f0; padding: 5px; margin-top: 10px;"> <p>Note</p> <ul style="list-style-type: none"> This item is notified when "HDD Shield" in the subsystem parameter is enabled. Refer to the [Setup Subsystem Parameters] function for details. When the SNMP trap setting is changed from "OFF" to "ON", a message is displayed in the ETERNUS SF event log. </div>	Selected: Notify Cleared
 Temperature Warning	Select whether to notify when a temperature warning status is detected by the sensor. When notifying, select the notification method.	Selected: Notify Cleared

8. System
Event/Dump

Item	Description	Setting values
⚠ Battery life Warning	Select whether to notify of a battery expiration in advance (*1). When notifying, select the notification method. *1 : Advance notice of battery expiration is issued once "6 months before", once "a week before", and once a day during the period from "6 days before" to "the expiration date".	Selected: Notify Cleared
⚠ NAS I/O Warning	Select whether to notify when a warning level I/O error (read error from or write error to the metadata area or the bitmap area) is detected in the NAS system. When notifying, select the notification method. This item is only displayed in a Unified Storage environment.	Selected: Notify Cleared
⚠ NAS Connection Error	Select whether to notify when a NAS connection error (receiving incorrect message or blocked file system) is detected in the NAS system. When notifying, select the notification method. This item is only displayed in a Unified Storage environment.	Selected: Notify Cleared
⚠ Out of NAS Capacity	Select whether to notify when one of the events described below occurs. When notifying, select the notification method. <ul style="list-style-type: none"> The capacity in the file system (or data area) that is assigned in NAS is insufficient The used capacity of the NAS user volume exceeds 95% or 98% This item is only displayed in a Unified Storage environment.	Selected: Notify Cleared
⚠ NAS Quota Limit Exceeded	Select whether to notify when the quota setting information (such as Drive Used Size or File Count) for NAS user volumes or shared folders exceeds the threshold in the NAS system. When notifying, select the notification method. This item is only displayed in a Unified Storage environment. Note <ul style="list-style-type: none"> The relevant event is notified when both the warning and limit values are specified and the status changes as described below. <ul style="list-style-type: none"> Less than the warning value → Exceeds the warning value Less than the warning value → Exceeds the limit value More than the warning value and less than the limit value → Exceeds the limit value The relevant event is notified when only the limit value is specified and the status changes as described below. <ul style="list-style-type: none"> Less than the limit value → Exceeds the limit value The relevant event is notified when only the warning value is specified and the status changes as described below. <ul style="list-style-type: none"> Less than the warning value → Exceeds the warning value 	Selected: Notify Cleared
⚠ Extended System Volume Warning	Select whether to notify when used capacity of the NAS expanded system volume in the NAS system exceeds 90%. When notifying, select the notification method. This item is only displayed in a Unified Storage environment.	Selected: Notify Cleared
⚠ RAID Group Redundancy Lost or Recovered	Select whether to notify when the RAID group redundancy is lost or when the RAID group redundancy is recovered. When notifying, select the notification method.	Selected: Notify Cleared

[Informational Level] Tab

Select whether to notify of an informational event for each event type.
When enabling the notification, select the method from "SNMP Trap", "E-Mail", "syslog", or "AIS Connect" (multiple selections can be made).

8. System
Event/Dump

Item	Description	Setting values
①Recovery module	Select whether to notify when the failed part is recovered by taking actions such as replacement. When notifying, select the notification method.	Selected: Notify Cleared
①Temperature restoration	Select whether to notify when a temperature error or warning status is recovered to the normal status. When notifying, select the notification method.	Selected: Notify Cleared
①User login/logout	Select whether to notify when a user login/logout is detected. When notifying, select the notification method.	Selected: Notify Cleared
①Operated RAID Group	Select whether to notify when the RAID group is created or deleted. When notifying, select the notification method.	Selected: Notify Cleared
①Added/Released Hot Spare	Select whether to notify when the hot spare disk is registered or released. When notifying, select the notification method.	Selected: Notify Cleared
①Operated Volume	Select whether to notify when the volume is created or deleted. When notifying, select the notification method.	Selected: Notify Cleared
①Power off/on Apply Firmware	Select whether to notify when the storage system is turned off/on or when the hot controller firmware upgrade is performed. When notifying, select the notification method.	Selected: Notify Cleared
①SDP Usage Rate Over Lv1	Select whether to notify when an SDP Policy Level 1 (Informational) event occurs. When notifying, select the notification method.	Selected: Notify Cleared
①SDP Usage Rate Over Lv2	Select whether to notify when an SDP Policy Level 2 (Warning) event occurs. When notifying, select the notification method.	Selected: Notify Cleared
①SDP Usage Rate Over Lv3	Select whether to notify when an SDP Policy Level 3 (Error) event occurs. When notifying, select the notification method.	Selected: Notify Cleared
①Copy Table Size Usage Rate Over	Select whether to notify when the copy table usage exceeds the threshold. When notifying, select the notification method.	Selected: Notify Cleared
①Trial copy license expired	Select whether to notify when a copy trial license expiration event occurs. When notifying, select the notification method.	Selected: Notify Cleared
①Remote Path Recovery	Select whether to notify when a remote path is recovered after a remote path error (*1) is notified. When notifying, select the notification method. *1: The remote path error indicates "Remote Path Error during Data Transfer" or "Remote Path Error of no Data Transfer".	Selected: Notify Cleared
①No Free Space on ODX Buffer Volume	Select whether to notify when an insufficient free space event for an ODX Buffer volume occurs. When notifying, select the notification method.	Selected: Notify Cleared
①SED Network Error Recovered	Select whether to notify when the communication between the storage system and the key server is recovered. When notifying, select the notification method.	Selected: Notify Cleared

8. System
Event/Dump

Item	Description	Setting values
<p>① FC CA Port Link Status Changed</p>	<p>Select whether to notify when a link down occurs after an FC link is established and the link status is changed. When notifying, select the notification method. Note that a change in the link status due to user operation is not notified. A change in the link status for all FC ports is notified. The notification is reported regardless of the type (FC), the port mode (CA, RA, CA/RA, Initiator), and the transfer rate. The following FC link status types can be detected and notified:</p> <ul style="list-style-type: none"> • The link status between the storage system and a directly connected server • The link status between the storage system and switches <p>The FC link status can be checked in the [Port Detail] screen. Refer to the [Channel Adapter] function for details.</p> <div style="background-color: #f0f0f0; padding: 10px; margin-top: 10px;"> <p>Note</p> <ul style="list-style-type: none"> • Link up and link down that occur due to the following user operations are not notified. <ul style="list-style-type: none"> - Rebooting of the storage system - Hot maintenance of a CA or a CM in which a CA is installed - Preventive maintenance of a CA or a CM in which a CA is installed - Chip reset due to a change in the FC port parameters • If the occurrence of link down and link up repeats within a 10 second interval, the first two sets of link down and link up are notified. Notification of this event is suspended for 20 minutes after the notification. • Note that the link status between a server and a switch cannot be detected. </div>	<p>Selected: Notify Cleared</p>
<p>① iSCSI CA Port Link Status Changed</p>	<p>Select whether to notify when a link down occurs after an iSCSI link is established and the link status is changed. When notifying, select the notification method. Note that a change in the link status due to user operation is not notified. A change in the link status for all iSCSI ports is notified. The notification is reported regardless of the port mode (CA, RA, CA/RA) and transfer rate. The following iSCSI link status types can be detected and notified:</p> <ul style="list-style-type: none"> • The link status between the storage system and a directly connected server • The link status between the storage system and switches <p>The iSCSI link status can be checked in the [Port Detail] screen. Refer to the [Channel Adapter] function for details.</p> <div style="background-color: #f0f0f0; padding: 10px; margin-top: 10px;"> <p>Note</p> <ul style="list-style-type: none"> • Link up and link down that occur due to the following user operations are not notified. <ul style="list-style-type: none"> - Rebooting of the storage system - Hot maintenance of a CA or a CM in which a CA is installed - Preventive maintenance of a CA or a CM in which a CA is installed - Chip reset due to a change in the iSCSI port parameters • If the occurrence of link down and link up repeats within a 10 second interval, the first two sets of link down and link up are notified. Notification of this event is suspended for 20 minutes after the notification. • Note that the link status between a server and a switch cannot be detected. </div>	<p>Selected: Notify Cleared</p>
<p>① Host Login Over</p>	<p>Select whether to notify when the number of connected hosts for each CA port exceeds the maximum value (256 hosts). When notifying, select the notification method. This item is notified regardless of the CA type (FC, iSCSI, and SAS).</p>	<p>Selected: Notify Cleared</p>

8. System
Event/Dump

Item	Description	Setting values
①NAS Connection Status	Select whether to notify when the link status for a NAS connection is changed (such as mount, unmount, or recovery of the file system) in the NAS system. When notifying, select the notification method. This item is only displayed in a Unified Storage environment.	Selected: Notify Cleared
①Out of NAS Capacity	Select whether to notify when insufficient capacity in the file system (data area) that is allocated by the NAS is detected in the NAS system. When notifying, select the notification method. This item is only displayed in a Unified Storage environment.	Selected: Notify Cleared
①Out of NAS File Management Domain	Select whether to notify when insufficient capacity in the management area for the files and the directories of the NAS function is detected in the NAS system. When notifying, select the notification method. This item is only displayed in a Unified Storage environment.	Selected: Notify Cleared
①Succeed NAS Snapshot	Select whether to notify when a snapshot acquisition has succeeded in the NAS system. When notifying, select the notification method. This item is only displayed in a Unified Storage environment.	Selected: Notify Cleared
①Fall below NAS Quota Limit	Select whether to notify when the quota setting information (such as Drive Used Size or File Count) for NAS user volumes or shared folders becomes less than the threshold in the NAS system. When notifying, select the notification method. This item is only displayed in a Unified Storage environment. Note <ul style="list-style-type: none"> • The relevant event is notified when both the warning and limit values are specified and the status changes as described below. <ul style="list-style-type: none"> - Exceeds the warning value → Less than the warning value - Exceeds the limit value → Less than the warning value • The relevant event is notified when only the limit value is specified and the status changes as described below. <ul style="list-style-type: none"> - Exceeds the limit value → Less than the limit value • The relevant event is notified when only the warning value is specified and the status changes as described below. <ul style="list-style-type: none"> - Exceeds the warning value → Less than the warning value 	Selected: Notify Cleared
①NAS CPU Warning	Select whether to notify when the used rate of the whole CPU in the NAS system exceeds 90%. When notifying, select the notification method. This item is only displayed in a Unified Storage environment.	Selected: Notify Cleared
①NAS CPU Recovered	Select whether to notify when the used rate of the whole CPU in the NAS system goes from 90% or more to 80% or less. When notifying, select the notification method. This item is only displayed in a Unified Storage environment.	Selected: Notify Cleared
①Extended System Volume Recovered	Select whether to notify when the used capacity of the NAS expanded system volume in the NAS system goes from 90% or more to 80% or less. When notifying, select the notification method. This item is only displayed in a Unified Storage environment.	Selected: Notify Cleared
①Multipath Status	Select whether to notify when the NAS port status in the multipath configuration has changed. When notifying, select the notification method. This item is only displayed in a Unified Storage environment.	Selected: Notify Cleared
①Automatic Change Storage Cluster Active/Standby State	Select whether to notify when the Storage Cluster status is changed from "Standby" to "Active" or from "Active" to "Standby" with automatic failover or failback. When notifying, select the notification method. This item is only displayed when "Enable" is selected for the Storage Cluster function.	Selected: Notify Cleared

8. System
Event/Dump

Item	Description	Setting values
① Manual Change Storage Cluster Active/ Standby State	Select whether to notify when the Storage Cluster status is changed from "Standby" to "Active" or from "Active" to "Standby" with manual failover or failback. When notifying, select the notification method. This item is only displayed when "Enable" is selected for the Storage Cluster function.	Selected: Notify Cleared
① Connect Storage Cluster Controller	Select whether to notify when communication with the paired storage system is recovered if the Storage Cluster controller has been specified. When notifying, select the notification method. This item is only displayed when "Enable" is selected for the Storage Cluster function.	Selected: Notify Cleared

Note

- Threshold of SDP usage can be specified with the [Modify Copy Parameters] function.
- Threshold of copy table size usage can be specified with the [Modify Copy Table Size] function.
- If free space of an ODX Buffer volume is insufficient, expand the volume capacity as required. Refer to the [Expand Volume], [Start RAID Migration], or [Expand Thin Provisioning Volume] function for details.

■ Operating Procedures

Procedure ▶▶▶

- 1 Click [Setup Event Notification] in [Action].
- 2 Specify whether to notify each event, and click the [Set] button.
→ A confirmation screen appears.

Note

- Event notifications can be reset to the default state. Click the [System Defaults] button to display the default state and click the [Set] button. For the settings, refer to ""[Initial Setting List](#)" (page 1396)".
- When setting the REMCS recommended pattern, click the [REMCS Defaults] button to display the REMCS recommended pattern and click the [Set] button. For the settings, refer to ""[REMCS Recommended Setting List](#)" (page 1400)".

- 3 Click the [OK] button.
→ The event notification setting starts.
- 4 Click the [Done] button to return to the [Event/Dump] screen.



Initial Setting List

The initial setting of event notification is described below.

Setting based on Severity

Item	Notification method					
	Host Sense Key Code Qualifier	SNMP Trap	E-Mail	syslog	REMCS	AIS Connect
All Error Events	Selected/Cleared	Selected/Cleared	Selected/Cleared	Cleared	Selected/Cleared	Selected/Cleared
All Warning Events	Selected	Selected	Selected	Cleared	Cleared	Selected
All Informational Events	-	Selected/Cleared	Selected/Cleared	Cleared	Cleared	Selected/Cleared
Individual Settings within Severity Level	Yes	Yes	Yes	No	Yes	Yes

Selected: Notify

Cleared: Not notify

Selected/Cleared: Some events are notified and other events are not notified

-: Not applicable to notification

Event	Notification	Remarks	
Blink Fault LED at warning	Enable	-	
Turn on Fault LED when redundant copy is completed	Disable	-	
Display parts (except drive) with error status on LCD	Enable	This is displayed only for the ETERNUS DX900 S5 or the ETERNUS DX8900 S4.	
Display parts (except drive) with warning status on LCD	Enable		
Display drives with error status on LCD	Any Time		Enable
	when HS<0		Disable
Display drives with warning status on LCD	Any Time		Enable
	when HS<0		Disable

[Error Severity Level], [Warning Level], and [Informational Level]

Level	Event	Notification method						
		Host Sense Key Code Qualifier	SNMP Trap	E-Mail	syslog	REMCS	AIS Connect	
Error	Parts Error	Selected	Selected	Selected	Cleared	Selected (fixed)	Selected	
	Drive Error	Any Time	Selected	Selected	Selected	Cleared	Selected (fixed)	Selected
		when HS<0	Cleared	Cleared	Cleared	Cleared	-	Cleared
	Drive Error of HDD Shield	Any Time	Cleared	Cleared	Cleared	Cleared	Cleared	Cleared
		when HS<0	Cleared	Cleared	Cleared	Cleared	-	Cleared
	Succeeded HDD Shield	-	Cleared	Cleared	Cleared	Cleared	Cleared	Cleared
Temperature Error		Selected	Selected	Selected	Cleared	Selected (fixed)	Selected	

8. System
Event/Dump

Level	Event	Notification method					
		Host Sense Key Code Qualifier	SNMP Trap	E-Mail	syslog	REMCS	AIS Connect
	End of battery life	Selected	Selected	Selected	Cleared	Selected (fixed)	Selected
	Rebuild/Copyback w/ redundant	Selected	Cleared	Cleared	Cleared	Cleared	Cleared
	Rebuild/Copyback w/o redundant	Any Time	Selected	Cleared	Cleared	Cleared	Cleared
		when HS<0	Cleared	Cleared	Cleared	Cleared	-
	Redundant	Any Time	Cleared	Cleared	Cleared	Cleared	Cleared
		when HS<0	Cleared	Cleared	Cleared	Cleared	-
	Complete Redundant Copy	Cleared	Cleared	Cleared	Cleared	Selected	Selected
	Complete Redundant Copy of HDD Shield	Cleared	Cleared	Cleared	Cleared	Cleared	Cleared
	Complete rebuild	Selected	Selected	Selected	Cleared	Selected (fixed)	Selected
	Bad data	Selected	Selected	Selected	Cleared	Selected (fixed)	Selected
	Pinned data	Selected (*1)	Selected	Selected	Cleared	Selected (fixed)	Selected
	Not Ready	Selected	Selected	Selected	Cleared	Selected (fixed)	Selected
	Remote Path Error during Data Transfer	Selected	Selected	Selected	Cleared	Selected	Selected
	Remote Path Error of no Data Transfer	Cleared	Cleared	Cleared	Cleared	Cleared	Cleared
	REC Buffer Halt (Path Error)	-	Selected	Selected	Cleared	Selected	Selected
	REC Buffer Halt (Overload)	-	Selected	Selected	Cleared	Selected	Selected
	REC Buffer Halt (Other Error)	-	Selected	Selected	Cleared	Selected	Selected
	Copy Session Error	-	Cleared	Cleared	Cleared	Cleared	Cleared
	Thin Provisioning Pool Rate	-	Selected	Selected	Cleared	-	Cleared
	SED Network Error	-	Selected	Selected	Cleared	Cleared	Cleared
	NAS I/O Error	-	Selected	Selected	Cleared	Selected (fixed)	Selected
	NAS Snapshot Error	-	Selected	Selected	Cleared	Cleared	Cleared
	Extended System Volume Error	-	Selected	Selected	Cleared	Selected (fixed)	Selected
	Disconnect Storage Cluster Controller	-	Selected	Cleared	Cleared	Cleared	Cleared
	Data Access Failed During RAID Group Redundancy Loss	-	Selected	Selected	Cleared	Selected	Selected

8. System
Event/Dump

Level	Event		Notification method					AIS Connect
			Host Sense Key Code Qualifier	SNMP Trap	E-Mail	syslog	REMCS	
Warning	Parts Warning		Selected	Selected	Selected	Cleared	Selected (fixed)	Selected
	Drive Warning	Any Time	Selected	Selected	Selected	Cleared	Selected (fixed)	Selected
		when HS<0	Cleared	Cleared	Cleared	Cleared	-	Cleared
	Drive Warning of HDD Shield	Any Time	Cleared	Cleared	Cleared	Cleared	Cleared	Cleared
		when HS<0	Cleared	Cleared	Cleared	Cleared	-	Cleared
	Temperature Warning		Selected	Selected	Selected	Cleared	Selected (fixed)	Selected
	Battery life Warning		Selected	Selected	Selected	Cleared	Selected (fixed)	Selected
	NAS I/O Warning		-	Selected	Selected	Cleared	Selected (fixed)	Selected
	NAS Connection Error		-	Selected	Selected	Cleared	Selected (fixed)	Selected
	Out of NAS Capacity		-	Selected	Selected	Cleared	Selected (fixed)	Selected
	NAS Quota Limit Exceeded		-	Selected	Selected	Cleared	Cleared (fixed)	Cleared
	Extended System Volume Warning		-	Selected	Selected	Cleared	-	-
RAID Group Redundancy Lost or Recovered		-	Cleared	Cleared	Cleared	Cleared	Cleared	

8. System
Event/Dump

Level	Event	Notification method					
		Host Sense Key Code Qualifier	SNMP Trap	E-Mail	syslog	REMCS	AIS Connect
Informational	Recovery module	-	Cleared	Cleared	Cleared	-	Cleared
	Temperature restoration	-	Cleared	Cleared	Cleared	-	Cleared
	User login/logout	-	Cleared	Cleared	Cleared	-	Cleared
	Operated RAID Group	-	Cleared	Cleared	Cleared	-	Cleared
	Added/Released Hot Spare	-	Cleared	Cleared	Cleared	-	Cleared
	Operated Volume	-	Cleared	Cleared	Cleared	-	Cleared
	Power off/on Apply Firmware	-	Cleared	Cleared	Cleared	-	Cleared
	SDP Usage Rate Over Lv1	-	Cleared	Cleared	Cleared	-	Cleared
	SDP Usage Rate Over Lv2	-	Cleared	Cleared	Cleared	-	Cleared
	SDP Usage Rate Over Lv3	-	Cleared	Cleared	Cleared	-	Cleared
	Copy Table Size Usage Rate Over	-	Cleared	Cleared	Cleared	-	Cleared
	Trial copy license expired	-	Selected	Selected	Cleared	-	Cleared
	Remote Path Recovery	-	Cleared	Cleared	Cleared	Cleared	Cleared
	No Free Space on ODX Buffer Volume	-	Cleared	Cleared	Cleared	-	Cleared
	SED Network Error Recovered	-	Selected	Selected	Cleared	-	-
	FC CA Port Link Status Changed	-	Cleared	Cleared	Cleared	-	Cleared
	iSCSI CA Port Link Status Changed	-	Cleared	Cleared	Cleared	-	Cleared
	Host Login Over	-	Cleared	Cleared	Cleared	-	Cleared
	NAS Connection Status	-	Cleared	Cleared	Cleared	-	Cleared
	Out of NAS Capacity	-	Cleared	Cleared	Cleared	-	Cleared
	Out of NAS File Management Domain	-	Cleared	Cleared	Cleared	-	Cleared
	Succeed NAS Snapshot	-	Selected	Cleared	Cleared	-	Cleared
	Fall below NAS Quota Limit	-	Selected	Cleared	Cleared	-	Cleared
	NAS CPU Warning	-	Cleared	Cleared	Cleared	-	-
	NAS CPU Recovered	-	Cleared	Cleared	Cleared	-	-
	Extended System Volume Recovered	-	Selected	Selected	Cleared	-	-
	Multipath Status	-	Cleared	Cleared	Cleared	-	-
	Automatic Change Storage Cluster Active/ Standby State	-	Selected	Selected	Cleared	Selected	Selected
	Manual Change Storage Cluster Active/ Standby State	-	Selected	Cleared	Cleared	Cleared	Cleared
	Connect Storage Cluster Controller	-	Selected	Cleared	Cleared	Cleared	Cleared

Selected: Notify

Cleared: Not notify

Selected (fixed): Always notify (This setting cannot be changed with this function.)

-: Not applicable to notification

*1: Host Sense Key Code Qualifier is not notified when pinned data disappears.

REMCS Recommended Setting List

The REMCS recommended setting of event notification is described below. For the notification methods indicated with "*", notification setting has been changed from the system default.

Setting based on Severity

Item	Notification method					
	Host Sense Key Code Qualifier	SNMP Trap	E-Mail	syslog	REMCS	AIS Connect
All Error Events	Selected/Cleared	Selected/Cleared	Selected/Cleared	Cleared	Selected/Cleared	Selected/Cleared
All Warning Events	Cleared *	Cleared *	Cleared *	Cleared	Cleared	Cleared *
All Informational Events	-	Selected/Cleared	Selected/Cleared	Cleared	Cleared	Selected/Cleared
Individual Settings within Severity Level	Yes	Yes	Yes	No	Yes	Yes

Selected: Notify

Cleared: Not notify

Selected/Cleared: Some events are notified and other events are not notified

-: Not applicable to notification

Event	Notification	Remarks	
Blink Fault LED at warning	Disable *	-	
Turn on Fault LED when redundant copy is completed	Disable	-	
Display parts (except drive) with error status on LCD	Enable	This is displayed only for the ETERNUS DX900 S5 or the ETERNUS DX8900 S4.	
Display parts (except drive) with warning status on LCD	Disable *		
Display drives with error status on LCD	Any Time		Disable *
	when HS<0		Enable *
Display drives with warning status on LCD	Any Time		Disable *
	when HS<0		Disable

[Error Severity Level], [Warning Level], and [Informational Level]

Level	Event	Notification method						
		Host Sense Key Code Qualifier	SNMP Trap	E-Mail	syslog	REMCS	AIS Connect	
Error	Parts Error	Selected	Selected	Selected	Cleared	Selected (fixed)	Selected	
	Drive Error	Any Time	Cleared *	Cleared *	Cleared *	Cleared	Selected (fixed)	Cleared *
		when HS<0	Cleared	Selected *	Selected *	Cleared	-	Selected *
	Drive Error of HDD Shield	Any Time	Cleared	Cleared	Cleared	Cleared	Cleared	Cleared
		when HS<0	Cleared	Cleared	Cleared	Cleared	-	Cleared
	Succeeded HDD Shield	-	Cleared	Cleared	Cleared	Cleared	Cleared	Cleared
Temperature Error	-	Selected	Selected	Selected	Cleared	Selected (fixed)	Selected	

8. System
Event/Dump

Level	Event	Notification method					
		Host Sense Key Code Qualifier	SNMP Trap	E-Mail	syslog	REMCS	AIS Connect
	End of battery life	Selected	Selected	Selected	Cleared	Selected (fixed)	Selected
	Rebuild/Copyback w/ redundant	Cleared *	Cleared	Cleared	Cleared	Cleared	Cleared
	Rebuild/Copyback w/o redundant	Any Time	Cleared *	Cleared	Cleared	Cleared	Cleared
		when HS<0	Selected *	Cleared	Cleared	Cleared	-
	Redundant	Any Time	Cleared	Cleared	Cleared	Cleared	Cleared
		when HS<0	Cleared	Cleared	Cleared	Cleared	-
	Complete Redundant Copy	Cleared	Cleared	Cleared	Cleared	Selected	Selected
	Complete Redundant Copy of HDD Shield	Cleared	Cleared	Cleared	Cleared	Cleared	Cleared
	Complete rebuild	Selected	Selected	Selected	Cleared	Selected (fixed)	Selected
	Bad data	Selected	Selected	Selected	Cleared	Selected (fixed)	Selected
	Pinned data	Selected (*1)	Selected	Selected	Cleared	Selected (fixed)	Selected
	Not Ready	Selected	Selected	Selected	Cleared	Selected (fixed)	Selected
	Remote Path Error during Data Transfer	Selected	Selected	Selected	Cleared	Selected	Selected
	Remote Path Error of no Data Transfer	Cleared	Cleared	Cleared	Cleared	Cleared	Cleared
	REC Buffer Halt (Path Error)	-	Selected	Selected	Cleared	Selected	Selected
	REC Buffer Halt (Overload)	-	Selected	Selected	Cleared	Selected	Selected
	REC Buffer Halt (Other Error)	-	Selected	Selected	Cleared	Selected	Selected
	Copy Session Error	-	Cleared	Cleared	Cleared	Cleared	Cleared
	Thin Provisioning Pool Rate	-	Selected	Selected	Cleared	-	Cleared
	SED Network Error	-	Selected	Selected	Cleared	Cleared	Cleared
	NAS I/O Error	-	Selected	Selected	Cleared	Selected (fixed)	Selected
	NAS Snapshot Error	-	Selected	Selected	Cleared	Cleared	Cleared
	Extended System Volume Error	-	Selected	Selected	Cleared	Selected (fixed)	Selected
	Disconnect Storage Cluster Controller	-	Selected	Cleared	Cleared	Cleared	Cleared
	Data Access Failed During RAID Group Redundancy Loss	-	Selected	Selected	Cleared	Selected	Selected

8. System
Event/Dump

Level	Event		Notification method					AIS Connect
			Host Sense Key Code Qualifier	SNMP Trap	E-Mail	syslog	REMCS	
Warning	Parts Warning		Cleared *	Cleared *	Cleared *	Cleared	Selected (fixed)	Cleared *
	Drive Warning	Any Time	Cleared *	Cleared *	Cleared *	Cleared	Selected (fixed)	Cleared *
		when HS<0	Cleared	Cleared	Cleared	Cleared	-	Cleared
	Drive Warning of HDD Shield	Any Time	Cleared	Cleared	Cleared	Cleared	Cleared	Cleared
		when HS<0	Cleared	Cleared	Cleared	Cleared	-	Cleared
	Temperature Warning		Cleared *	Cleared *	Cleared *	Cleared	Selected (fixed)	Cleared *
	Battery life Warning		Cleared *	Cleared *	Cleared *	Cleared	Selected (fixed)	Cleared *
	NAS I/O Warning		-	Cleared *	Cleared *	Cleared	Selected (fixed)	Cleared *
	NAS Connection Error		-	Cleared *	Cleared *	Cleared	Selected (fixed)	Cleared *
	Out of NAS Capacity		-	Cleared *	Cleared *	Cleared	Selected (fixed)	Cleared *
	NAS Quota Limit Exceeded		-	Selected	Cleared *	Cleared	Cleared (fixed)	Cleared
	Extended System Volume Warning		-	Selected	Selected	Cleared	-	-
RAID Group Redundancy Lost or Recovered		-	Cleared	Cleared	Cleared	Cleared	Cleared	

8. System
Event/Dump

Level	Event	Notification method					
		Host Sense Key Code Qualifier	SNMP Trap	E-Mail	syslog	REMCS	AIS Connect
Informational	Recovery module	-	Cleared	Cleared	Cleared	-	Cleared
	Temperature restoration	-	Cleared	Cleared	Cleared	-	Cleared
	User login/logout	-	Cleared	Cleared	Cleared	-	Cleared
	Operated RAID Group	-	Cleared	Cleared	Cleared	-	Cleared
	Added/Released Hot Spare	-	Cleared	Cleared	Cleared	-	Cleared
	Operated Volume	-	Cleared	Cleared	Cleared	-	Cleared
	Power off/on Apply Firmware	-	Cleared	Cleared	Cleared	-	Cleared
	SDP Usage Rate Over Lv1	-	Cleared	Cleared	Cleared	-	Cleared
	SDP Usage Rate Over Lv2	-	Cleared	Cleared	Cleared	-	Cleared
	SDP Usage Rate Over Lv3	-	Cleared	Cleared	Cleared	-	Cleared
	Copy Table Size Usage Rate Over	-	Cleared	Cleared	Cleared	-	Cleared
	Trial copy license expired	-	Selected	Selected	Cleared	-	Cleared
	Remote Path Recovery	-	Cleared	Cleared	Cleared	Cleared	Cleared
	No Free Space on ODX Buffer Volume	-	Cleared	Cleared	Cleared	-	Cleared
	SED Network Error Recovered	-	Selected	Selected	Cleared	-	-
	FC CA Port Link Status Changed	-	Cleared	Cleared	Cleared	-	Cleared
	iSCSI CA Port Link Status Changed	-	Cleared	Cleared	Cleared	-	Cleared
	Host Login Over	-	Cleared	Cleared	Cleared	-	Cleared
	NAS Connection Status	-	Cleared	Cleared	Cleared	-	Cleared
	Out of NAS Capacity	-	Cleared	Cleared	Cleared	-	Cleared
	Out of NAS File Management Domain	-	Cleared	Cleared	Cleared	-	Cleared
	Succeed NAS Snapshot	-	Selected	Cleared	Cleared	-	Cleared
	Fall below NAS Quota Limit	-	Selected	Cleared	Cleared	-	Cleared
	NAS CPU Warning	-	Cleared	Cleared	Cleared	-	-
	NAS CPU Recovered	-	Cleared	Cleared	Cleared	-	-
	Extended System Volume Recovered	-	Selected	Selected	Cleared	-	-
	Multipath Status	-	Cleared	Cleared	Cleared	-	-
	Automatic Change Storage Cluster Active/Standby State	-	Selected	Selected	Cleared	Selected	Selected
	Manual Change Storage Cluster Active/ Standby State	-	Selected	Cleared	Cleared	Cleared	Cleared
	Connect Storage Cluster Controller	-	Selected	Cleared	Cleared	Cleared	Cleared

Selected: Notify

Cleared: Not notify

Selected (fixed): Always notify (This setting cannot be changed with this function.)

-: Not applicable to notification

*1: Host Sense Key Code Qualifier is not notified when pinned data disappears.

Display/Delete Event Log

- ["■ Overview" \(page 1404\)](#)
- ["■ User Privileges" \(page 1404\)](#)
- ["■ Display Contents" \(page 1404\)](#)
- ["■ Operating Procedures" \(page 1406\)](#)

■ Overview

This function displays the event history of the storage system.

The event log is one of the internal logs stored in the storage system. The event log contains a history of events that are related to configuration information changes, such as module failures and volume creation.

Up to 400 per CM event logs can be displayed. If the number of event logs exceeds the maximum number, the oldest event log is overwritten. The recorded "Error" level event logs and "Warning" level event logs can be exported. In addition, all the event logs that are no longer required can be deleted.

Caution

- Even after deleting the event log using this function, the maintenance information log remains stored in the storage system. Use the [Export/Delete Log] function to delete the maintenance information logs of the storage system.

Note

- Note that "Information" level event logs cannot be exported.
- Event logs ("Error" and "Warning" level) can also be exported on the [Overview] screen. Refer to the [Overview] function for details.
- All event logs are deleted in a single operation.

■ User Privileges

Availability of Executions in the Default Role

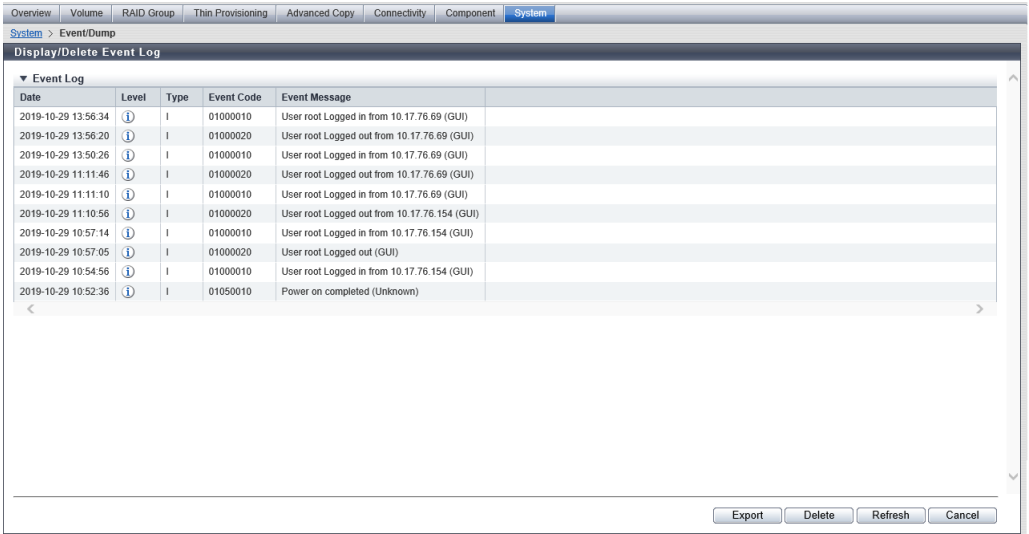
Default role	Availability of executions
Monitor	
Admin	✓
StorageAdmin	
AccountAdmin	
SecurityAdmin	✓
Maintainer	✓

Refer to ["A. User Roles and Policies" \(page 1580\)](#) for details on the policies and roles.

■ Display Contents

The event logs, which have been saved in the storage system, are displayed.

8. System Event/Dump



Event Log

Item	Description
Date	The date and time (YYYY-MM-DD hh:mm:ss) when the event occurs are displayed.
Level	<p>The event level is displayed with an icon.</p> <ul style="list-style-type: none"> (Information) This icon indicates that the level of importance of the log is "Information". (Warning) This icon indicates that the level of importance of the log is "Warning". (Error) This icon indicates that the level of importance of the log is "Error".
Type	<p>The event type is displayed using symbols.</p> <ul style="list-style-type: none"> Error level <ul style="list-style-type: none"> Messages that start with "P" are displayed when components fail or degrade, or when a temperature error is detected. Messages that start with "M" are displayed when an event that requires maintenance occurs. Messages that start with "E" are displayed when an error-level event occurs. Warning level <ul style="list-style-type: none"> Messages that start with "J" are displayed when components require maintenance or preventive maintenance, or unusual temperatures occur. Messages that start with "W" are displayed when a warning-level event occurs. Informational level <ul style="list-style-type: none"> Messages that start with "I" are displayed when an information-level event occurs. Messages that start with "R" are displayed when error or warning level events are restored to a normal state. Messages that start with "O" are displayed when any other events that are not described above occur.
Event Code	The event code is displayed.
Event Message	The detailed event information is displayed.

Download Settings

When the [Export] button is clicked on the [Display/Delete Event Log] screen, the [Export Event Log] screen appears.

Item	Description
Target Level	The target levels of the event logs that are to be downloaded are displayed. The target levels are "Error" and "Warning" (checkboxes are selected). The target levels cannot be modified.
Output Format	"CSV" is displayed.

■ Operating Procedures

Display Event Logs

Procedure ▶▶▶

- 1 Click [Display/Delete Event Log] in [Action].
- 2 Check the displayed event logs.

Note

- Click the [🔄] icon or the [Refresh] button to display the latest screen.

- 3 Click the [Cancel] button to return to the [Event/Dump] screen.



Downloading Event Logs ("Error" and "Warning" level)

Procedure ▶▶▶

- 1 Click [Display/Delete Event Log] in [Action].
- 2 Click the [Export] button.
→ The [Export Event Log] screen appears.
- 3 Click the [Export] button.
→ Event log export starts. The progress screen is displayed.
After the event log export is finished, a screen to execute downloading the file is displayed.
- 4 Click the [Download] button to save the exported event log.
→ A dialog box to download the file appears.
- 5 Save the event log file.
The default file name is "EventLog_serial number for the storage system_YYYY-MM-DD_hh-mm-ss.csv".
(YYYY-MM-DD_hh-mm-ss: the date and time when the download screen (Step 4) is displayed.)
- 6 Click the [Done] button to return to the [Event/Dump] screen.



Delete Event Logs

Procedure ▶▶▶

- 1 Click [Display/Delete Event Log] in [Action].
 - 2 Click the [Delete] button.
→ A confirmation screen appears.
 - 3 Click the [OK] button.
→ Deletion of event logs starts.
 - 4 Click the [Done] button to return to the [Event/Dump] screen.
-



Export/Delete Log

- ["■ Overview" \(page 1407\)](#)
- ["■ User Privileges" \(page 1408\)](#)
- ["■ Settings" \(page 1408\)](#)
- ["■ Operating Procedures" \(page 1410\)](#)

■ Overview

This function exports and saves the storage system maintenance information (log) in accordance with user-specified time settings.

An exported log can be stored on a floppy disk or hard disk, or sent by E-mail.

Also, users can select a log segment size to suit the destination it is to be saved.

Exported Maintenance Information

- The storage system log includes "internal log" and "configuration information".
 - Internal log
Detected errors, warnings, and traces
 - Configuration information
Configuration information exported from the storage system

Caution

- If a storage system is used in a Unified Storage environment, the storage system log and the NAS Engine log (CM#0/CM#1) are stored in the same file.
- The internal log and configuration information cannot be exported separately.
- When exporting of the log is complete, save the log file immediately.
- The various pieces of maintenance information are combined together, compressed, and then segmented into the user specified segment size before being exported. Special tools to read these logs are required.
- In a Unified Storage environment, when log files are exported while the storage system is in a high-load state, an error may occur due to a timeout. If an error occurs and exporting fails, perform the log export again in a low-load state.
- If logs saved in the storage system are no longer required, click the [Delete] button to delete the logs. Make sure to backup any necessary data before proceeding.
- Even after using this function to delete a log, the event log remains in the storage system. To delete the event log, use the [Display Event Log] function.
- When logged in with Admin or SecurityAdmin role, the [Delete] button is not displayed. Only exporting is executable.

■ **User Privileges**

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	✓
StorageAdmin	
AccountAdmin	
SecurityAdmin	✓
Maintainer	✓

Refer to "[A. User Roles and Policies](#)" (page 1580) for details on the policies and roles.

■ **Settings**

Specify the time to export a log, from the logs saved in the storage system, with "Start Time" and "End Time". Select a predefined log file size (segment size) depending on the destination where the logs will be saved.

Option

Item	Description	Setting values
Export Mode	Specify the collection target of the CM log from "All" or "Only Disk Drive Log".	All (Default) Only Disk Drive Log

8. System
Event/Dump

Item	Description	Setting values
Specify Time Range	<p>Specify a time range for exporting logs.</p> <ul style="list-style-type: none"> • Yes Specify a time range for exporting logs. • No Do not specify a time range for exporting logs. • Last 24 hours Export logs from the last 24 hours. • Last week Export logs from the last one week. • Last month Export logs from the last one month. <p>Caution</p> <ul style="list-style-type: none"> • Even if a time range is specified for NAS Engine logs, all of the NAS Engine logs in the storage system are exported. 	<p>Yes</p> <p>No (Default)</p> <p>Last 24 hours</p> <p>Last week</p> <p>Last month</p>
Start Time	When a time range is to be specified, specify the date and time to start exporting logs.	<p>YYYY-MM-DD hh:mm:ss</p> <p>YYYY: Year</p> <p>MM: Month (01 - 12)</p> <p>DD: Date (01 - 31)</p> <p>hh: Hour (00 - 23)</p> <p>mm: Minute (00 - 59)</p> <p>ss: Second (00 - 59)</p>
End Time	When a time range is to be specified, specify the date and time to finish exporting logs.	<p>YYYY-MM-DD hh:mm:ss</p> <p>YYYY: Year</p> <p>MM: Month (01 - 12)</p> <p>DD: Date (01 - 31)</p> <p>hh: Hour (00 - 23)</p> <p>mm: Minute (00 - 59)</p> <p>ss: Second (00 - 59)</p>
Include I/O Module log	Specify whether to collect ("Yes" or "No") the I/O Module log.	<p>Yes (Default)</p> <p>No</p>
Include NAS Engine log	<p>Specify whether to collect ("Yes" or "No") the NAS Engine log.</p> <p>If "Yes" is selected for "Delete of Customer Information", this item is fixed to "No".</p> <p>This item is only displayed in a Unified Storage environment.</p> <p>Caution</p> <ul style="list-style-type: none"> • If the NAS Engine logs are exported, it may take a long time to export the logs. 	<p>Yes (Default)</p> <p>No</p>
Log File Size	<p>Select the log file size (segment size) when saving the exported log from the following.</p> <ul style="list-style-type: none"> • Non-segmentation • 4.27MB • 1.44 MB (Floppy Disk) • 640 KB (E-Mail) 	<p>Non-segmentation (Default)</p> <p>4.27MB</p> <p>1.44 MB (Floppy Disk)</p> <p>640 KB (E-Mail)</p>

8. System Event/Dump

Item	Description	Setting values
Delete of Customer Information	<p>When deleting the customer information (information to identify the customer such as user name, box ID, and IP address) from the exported log, select "Yes". When not deleting, select "No".</p> <div style="background-color: #fff9c4; padding: 10px; border: 1px solid #ccc;"> <p>Caution</p> <ul style="list-style-type: none"> The customer information in the NAS Engine logs cannot be deleted. If "Yes" is selected for this item, the NAS Engine logs are not exported. </div>	<p>Yes No (Default)</p>

Function Button

Button	Description
[Delete]	<p>Deletes logs saved in the storage system. Entire logs are deleted with one operation. The [Delete] button is displayed only when a user account that has a "Maintainer" default role was used to log in.</p>

■ Operating Procedures

Export Log

Export the log file.

Procedure ▶▶▶

- 1 Click [Export/Delete Log] in [Action].
- 2 Set the detailed information for exporting a log, and click the [Export] button.
→ A confirmation screen appears.

Caution

- An error screen appears in the following conditions:
 - The input date and/or time are not valid (For example: February 31st)
 - The end time is earlier than the start time

- 3 Click the [OK] button.
→ Log export starts. The progress screen is displayed.
After the log export is finished, a screen to execute downloading the file is displayed.
- 4 Click the [Download] button to save the exported log.
→ A dialog box to download the file appears.

Caution

- Download the log within five minutes of being exported.

Note

- If "Non-segmentation" is selected in the "Log File Size" field, the [Download] button becomes inactive after the log file is saved. Proceed to Step 5.

- 5 Save the log file.
The default file name is "Log_serial number for the storage system_YYYY-MM-DD_hh-mm-ss_serial number for log file.zlg".

(YYYY-MM-DD_hh-mm-ss: the date and time when the download screen (Step 4) is displayed. When a log file is segmented, the segmented log files are given the same name and numbered serially (01 -).)

→ If the log file is segmented, download and save the next segment (save all the segmented files).

Caution

- When saving segmented log files, make sure to save the segment within five minutes. If five minutes passes before saving the next segment, the log export fails. After finishing saving each segment, save the following segment immediately.

- 6 Click the [Finish] button to return to the [Event/Dump] screen.
→ Exporting log is complete.

Note

- When exporting the log has been completed, make sure to export a panic dump.



Delete Log

Delete the log file. Log files can be deleted only when a user account that has a "Maintainer" default role was used to log in.

Procedure ▶▶▶

- 1 Click [Export/Delete Log] in [Action].
- 2 Click the [Delete] button.
→ A confirmation screen appears.
- 3 Click the [OK] button.
→ The log is deleted.
- 4 Click the [Done] button to return to the [Event/Dump] screen.



Export/Delete Panic Dump

- ["■ Overview" \(page 1411\)](#)
- ["■ User Privileges" \(page 1412\)](#)
- ["■ Settings" \(page 1412\)](#)
- ["■ Display Contents" \(page 1412\)](#)
- ["■ Operating Procedures" \(page 1413\)](#)

■ Overview

"Panic Dump" is the action of outputting (dump) memory information when an error (panic) occurs, and also the name of the output information itself. This function exports and saves the memory information of the Controller Module that is stored in the panic dump data, in a segment size specified by the user. An exported panic dump can be stored on a floppy disk or hard disk, or sent by E-mail. Panic dump is used to analyze the cause of a firmware abnormality or hardware error.

Caution

- This function cannot be used when there is no panic dump to be exported in the storage system.
- If one user performs the setting operation while another user is downloading a panic dump, a timeout occurs and the setting operation may be stopped due to an error.
- Up to two panic dumps can be stored in a single CM.
- If panic dumps saved in the storage system are no longer required, click the [Delete] button to delete the panic dumps. Make sure to backup any necessary data before proceeding.
- When logged in with Admin or SecurityAdmin role, the [Delete] button is not displayed. Only exporting is executable.

■ **User Privileges**

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	✓
StorageAdmin	
AccountAdmin	
SecurityAdmin	✓
Maintainer	✓

Refer to "[A. User Roles and Policies](#)" (page 1580) for details on the policies and roles.

■ **Settings**

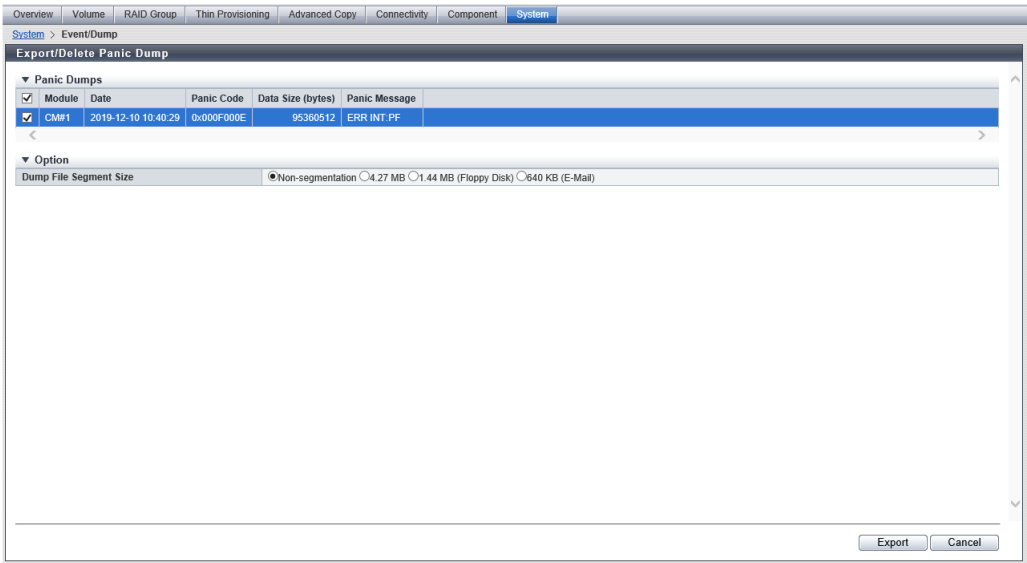
Select the panic dump that is to be exported from the list displayed in the screen and specify the file size (segment size), or select the panic dump that is to be deleted from the list displayed in the screen.

Item	Description	Setting values
Panic Dumps	Select the checkbox for the panic dump that is to be exported or deleted. Select only one panic dump that is to be exported. Select panic dumps that are to be deleted. Multiple selections can be made for deletion.	Selected Cleared (Default)
Dump File Segment Size	Select the file size (segment size) when saving the exported panic dump from the following: <ul style="list-style-type: none"> • Non-segmentation • 4.27MB • 1.44 MB (Floppy Disk) • 640 KB (E-Mail) 	Non-segmentation (Default) 4.27MB 1.44 MB (Floppy Disk) 640 KB (E-Mail)

■ **Display Contents**

The details of the panic dump to be exported are displayed.

8. System Event/Dump



Panic Dumps

Item	Description
Module	The Controller Module name where a panic dump occurred is displayed. For the ETERNUS DX900 S5 or the ETERNUS DX8900 S4 CE#x CM#y For the other models CM#y x: CE number y: CM number
Date	The date and time, when the panic dump has occurred, are displayed.
Panic Code	The panic code is displayed.
Data Size (bytes)	The file size (byte) of the occurred panic dump is displayed.
Panic Message	The panic message is displayed.

Function Button

Button	Description
[Delete]	Deletes logs saved in the storage system. Multiple panic dumps can be deleted in a single operation. The [Delete] button is displayed only when a user account that has a "Maintainer" default role was used to log in.

■ Operating Procedures

Export Panic Dump

Export the panic dump.

Procedure ▶▶▶

- 1 Click [Export/Delete Panic Dump] in [Action].
- 2 Specify the panic dump that is to be exported and the segment file size, and click the [Export] button.
→ A confirmation screen appears.

- 3** Click the [OK] button.
→ Exporting of the panic dump starts. The progress screen is displayed.
After the panic dump export is finished, a screen to execute downloading the file is displayed.
- 4** Click the [Download] button to save the exported panic dump.
→ A dialog box to download the file appears.

Caution

- When exporting of the panic dump has been completed, save the panic dump immediately.

Note

- If "Non-segmentation" is selected in the "Dump File Segment Size" field, the [Download] button becomes inactive after the panic dump is saved. Proceed to Step 5.

- 5** Save the panic dump.
The default file name depends on the model as follows.
 - For the ETERNUS DX900 S5 or the ETERNUS DX8900 S4: "Panic_serial number for the storage system_YYYY-MM-DD_hh-mm-ss_CExCMy_serial number for panic dump file.zlg"
(YYYY-MM-DD_hh-mm-ss: the date and time when the panic has occurred. x: CE number in which the panic has occurred. y: CM number in which the panic has occurred. When a panic dump file is segmented, the segmented panic dump files are given the same name and numbered serially (01 -).)
 - For the other models: "Panic_serial number for the storage system_YYYY-MM-DD_hh-mm-ss_CMy_serial number for panic dump file.zlg"
(YYYY-MM-DD_hh-mm-ss: the date and time when the panic has occurred. y: CM number in which the panic has occurred. When a panic dump file is segmented, the segmented panic dump files are given the same name and numbered serially (01 -).)→ If the panic dump file is segmented, download and save the next segment (save all the segmented files).

Caution

- When saving segmented panic dump files, make sure to save the segment within five minutes. If five minutes passes before saving the next segment, the panic dump export fails. After finishing saving each segment, save the following segment immediately.

- 6** Click the [Finish] button.
→ A confirmation screen appears.
- 7** Click the [OK] button to return to the [Event/Dump] screen.



Delete Panic Dump

Delete the panic dumps. Panic dumps can be deleted only when a user account that has a "Maintainer" default role was used to log in.

Procedure ▶▶▶

- 1** Click [Export/Delete Panic Dump] in [Action].
- 2** Select the deletion target panic dumps (multiple selections can be made), and click the [Delete] button.
→ A confirmation screen appears.

- 3 Click the [OK] button.
→ Deleting of the panic dump starts.
- 4 Click the [Done] button to return to the [Event/Dump] screen.



Get G-List

- ["■ Overview" \(page 1415\)](#)
- ["■ User Privileges" \(page 1415\)](#)
- ["■ Operating Procedures" \(page 1417\)](#)

■ Overview

This function exports and saves the Grown Defect List (G-List) recorded in the disk management area (the area that cannot usually be accessed).

The drive has a function to automatically replace detected failed blocks with alternative blocks. When failed blocks are replaced, G-List information shows the location and number of replaced blocks that are recorded in the management area.

Caution

- Execute this function only when directed by our engineer to do so.
- Before starting this function, stop the host access.
- Do not export the G-List while using the functions to access the drive, such as formatting, RAID migration, or Advanced Copy.
- When exporting of the G-List is complete, save the exported G-List file immediately.

■ User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	
StorageAdmin	
AccountAdmin	
SecurityAdmin	
Maintainer	✓

Refer to "[A. User Roles and Policies" \(page 1580\)](#)" for details on the policies and roles.

Format of a G-List Text File

The file name is "G-List_serial number for the storage system_YYYY-MM-DD_hh-mm-ss.txt". (YYYY-MM-DD_hh-mm-ss: the date and time when the download screen is displayed.)

Item	Description
Serial Number	The serial number of the storage system is exported.

8. System Event/Dump

Item	Description
G-List (DE#) Information Date YYYY-MM-DD	The DE number and the date, on which the G-List information is exported, are displayed in the following format. G-List (DE#x) Information Date YYYY-MM-DD x: DE number YYYY-MM-DD: Year-Month-Date

A G-List for each DE is exported in a table format.

Item	Description
Drive	Drive numbers are displayed.
Type/Usage	The drive capacity and the intended use (Data/HS/Dedicated) are exported. <ul style="list-style-type: none"> • Data: Drive for user data • HS: Global Hot Spare (A HS which can be used in any RAID group) • Dedicated: Dedicated Hot Spare (A HS which can be used only in a specific RAID group) <div style="background-color: #fff9c4; padding: 10px; margin-top: 10px;"> <p>Caution</p> <ul style="list-style-type: none"> • The displayed drive capacity in the exported G-List may differ from the product's actual capacity. For example, the drive capacity of a "1.92 TB SSD" is displayed as "2.00 TB" and the capacity of an "18 TB Nearline SAS disk" is displayed as "17.9 TB". </div>
Firmware	The disk firmware version is exported.
Kind	The drive type is exported. <ul style="list-style-type: none"> • 2.5" SAS: 2.5-inch SAS Disk • 3.5" SAS: 3.5-inch SAS Disk • 3.5" NL-SAS: 3.5-inch Nearline SAS Disk • 2.5" SSD: 2.5-inch SSD • 3.5" SSD: 3.5-inch SSD • 2.5" SED: 2.5-inch Online SED • 3.5" NL-SED: 3.5-inch Nearline SED • 2.5" SSD-SED: 2.5-inch SSD SED • 3.5" SSD-SED: 3.5-inch SSD SED
Vendor ID	The drive manufacturer name is exported.
Product ID	The product name of the drive is exported.
Serial Number	The serial number of the drive is exported.

Item	Description
G-List Information	<p>G-List information for each drive is exported.</p> <ul style="list-style-type: none"> • Target drive: For SAS and NL-SAS 10 pieces of alternative source block information per drive (Cylinder (CY), Head (HD), Sector (SC)) are exported. TOTAL: number of reassigned blocks CY: Cylinder information of the alternative source block HD: Header information of the alternative source block SC: Sector information of alternative source block • Target drive: SSD 10 pieces of alternative block information per drive (Channel Number (CN), NAND Block Number (NN)) are exported. TOTAL: Number of reassigned blocks CN: Channel number NN: NAND block number • For 11 or more pieces of G-List information, "..more.." is exported. • If the TOTAL is 0, other information is not exported. • If the G-List information for the corresponding drive cannot be acquired, "Error" is exported. • If the G-List information for the corresponding drive cannot be acquired for a status cause, "-" (character string to represent the status)" is exported. • If the corresponding drive is being encrypted, "Encrypt Executing" is exported.

■ Operating Procedures

Procedure ▶▶▶

- 1 Click [Get G-List] in [Action].
- 2 Click the [Export] button.
→ The G-List data is created.
- 3 Click the [Download] button.
→ A dialog box to download the file appears.

Caution

- When exporting of the G-List has been completed, save the file immediately.

- 4 Save the G-List.
The default file name is "G-List_serial number for the _YYYY-MM-DD_hh-mm-ss.txt".
(YYYY-MM-DD_hh-mm-ss: the date and time when the download screen (Step 2) is displayed.)
- 5 Click the [Done] button to return to the [Event/Dump] screen.



Audit Log

- ["■ Overview" \(page 1418\)](#)
- ["■ User Privileges" \(page 1418\)](#)
- ["■ Display Contents" \(page 1419\)](#)

■ Overview

This function displays the audit log information.

An audit log records not only operations that are performed by a user, but also how the storage system operates for these operations. The audit log function that is provided with the storage system transfers the following information to external servers: when an operation was performed, who performed the operation, where the operation was performed, the details of the operation, and the results of the operation.

Caution

- When the [Enable Audit Log] function is executed, "Enable" is displayed for "Audit Log" in the "Audit Log Information" field even if an external server is not specified. Specify the external server to which the audit log is sent. Refer to the [Setup Audit Log] function for details.

Note

- Except for the functions that are listed below, the audit log collects all of the information for operations (including logging in and logging out) that are performed via Web GUI and CLI (including when the interface is "SOFT" (*1)).
 - Export Cache Parameters
 - Export Performance Information
 - Send SNMP Trap Test
 - Create Key/CSR
 - Download Template File for Storage Migration Settings
 - Backup Configuration
 - Get G-List (*2)
 - All of the display functions (e.g. displaying the volume list or displaying of the RAID group list)

*1 : Refer to the [System] function for details.

*2 : Operations that can be performed when logged in using a user account with the "Maintenance Operation" policy.

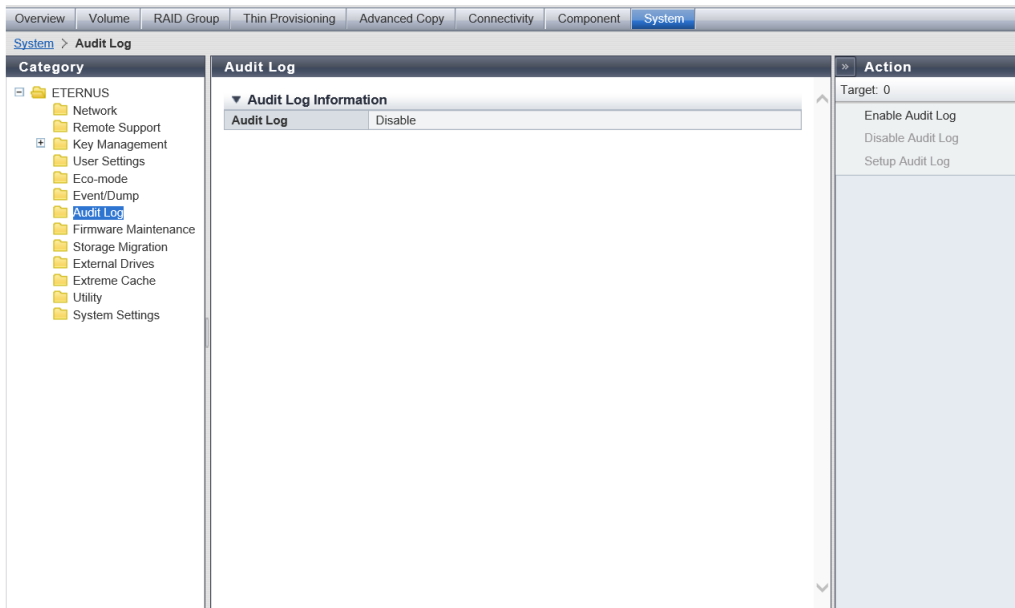
■ User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	✓
StorageAdmin	
AccountAdmin	
SecurityAdmin	✓
Maintainer	

Refer to ""[A. User Roles and Policies](#)" (page 1580)" for details on the policies and roles.

■ Display Contents



Audit Log Information

Item	Description
Audit Log	Whether the audit log function is enabled or disabled is displayed.

Enable Audit Log

- ["■ Overview" \(page 1419\)](#)
- ["■ User Privileges" \(page 1420\)](#)
- ["■ Operating Procedures" \(page 1420\)](#)

■ Overview

This function enables the audit log function.

Caution

- Enable the "Audit Log" setting, and then specify the destination external server. Refer to the [Setup Audit Log] function for details. Audit logs are sent after the external server is specified.
- Note that the storage system does not save the audit log. The audit log is only sent to the specified external server.

Note

- The conditions for collecting audit logs are as follows:
 - The interface must be Web GUI, CLI, or software that accesses the storage system via CLI or SMI-S
 - The user who logs in or is newly logged in when the external server is set after the "Audit Log" is enabled
 - Audit log collection target operations (*1)
- *1: Refer to the [Audit Log] function for details about log collection target operations.

■ **User Privileges**

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	✓
StorageAdmin	
AccountAdmin	
SecurityAdmin	✓
Maintainer	

Refer to "'A. User Roles and Policies" (page 1580)" for details on the policies and roles.

■ **Operating Procedures**

Procedure ▶▶▶

- 1 Click [Enable Audit Log] in [Action].
→ A confirmation screen appears.

Caution

- If the audit log function has already been enabled, [Enable Audit Log] cannot be clicked.

- 2 Click the [OK] button.
→ Enabling of the audit log starts.
- 3 Click the [Done] button to return to the [Audit Log] screen.



Disable Audit Log

- "■ Overview" (page 1420)
- "■ User Privileges" (page 1421)
- "■ Operating Procedures" (page 1421)

■ **Overview**

This function disables the audit log function.

■ User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	✓
StorageAdmin	
AccountAdmin	
SecurityAdmin	✓
Maintainer	

Refer to "[A. User Roles and Policies](#)" (page 1580) for details on the policies and roles.

■ Operating Procedures

Procedure ▶▶▶

- 1 Click [Disable Audit Log] in [Action].
→ A confirmation screen appears.

Caution

- If the audit log function has already been disabled, [Disable Audit Log] cannot be clicked.

- 2 Click the [OK] button.
→ Disabling of the audit log starts.
- 3 Click the [Done] button to return to the [Audit Log] screen.



Setup Audit Log

- "[Overview](#)" (page 1421)
- "[User Privileges](#)" (page 1422)
- "[Settings](#)" (page 1422)
- "[Operating Procedures](#)" (page 1423)

■ Overview

This function sets up external servers (Syslog servers) for sending audit logs that are detected by the storage system.

Up to two Syslog servers can be registered.

Caution

- Enable the "Audit Log" setting, and then configure the destination Syslog server. Audit logs are sent after the Syslog server is specified.
- Confirm that the audit log has been successfully sent to the Syslog server by logging in and out from Web GUI or CLI and performing a transmission test to the Syslog server.
- Even if a communication error occurs between the storage system and the Syslog server, the audit log is not sent again.
- Changing the Syslog server setting is only available when the "Audit Log" setting is "Enable". Note that once "on" is selected for the "Send Audit Log" setting, the "Send Audit Log" setting cannot be changed to "off" for both of the Syslog servers (at least one Syslog server must be "on").

Note

- The audit log function uses the destination server that has the same interface as the Syslog server. The same server as the Syslog server is also available.
- The audit logs are sent to both Syslog servers at the same time.
- Even if the "Audit Log" setting changed to "Disable", the audit log setting information in the storage system is maintained.

■ **User Privileges**

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	✓
StorageAdmin	
AccountAdmin	
SecurityAdmin	✓
Maintainer	

Refer to "[A. User Roles and Policies](#)" (page 1580) for details on the policies and roles.

■ **Settings**

Up to two Syslog servers can be configured. Configure the following parameters for each Syslog server.

Syslog Server1, Syslog Server2

Item	Description	Setting values
Send Audit Log	Select from "on (RFC3164)", "on (RFC5424)", or "off" for the audit log sending. Logs are sent in the selected RFC message format.	on (RFC3164) on (RFC5424) off (Default)

Item	Description	Setting values
Domain Name/IP Address	Input the domain name or the IP address of the Syslog server. There are two methods to specify an IP address; "IPv4" and "IPv6". "Link local address", "global address", "unique local address", or "6to4 address" can be input for the IPv6 address. Refer to " Available IPv6 Address " (page 1221) for details. When the current setting is displayed, the IPv6 address is displayed as an abbreviation.	For domain name specification Up to 63 alphanumeric characters and symbols For IPv4 address xxx.xxx.xxx.xxx xxx: 1 - 255 for the top field (decimal) xxx: 0 - 255 for other fields (decimal) For IPv6 address xxxx:xxxx:xxxx:xxxx:xxxx:xxxx:xxxx:xxxx xxxx: 0 - ffff (FFFF) (hexadecimal, alphanumeric characters) Refer to " IPv6 Address Notation " (page 1220) for details.
Port No.	Input the port number used to send an audit log.	Numeric characters 1 - 65535 514 (Default)
LAN Port	Select the LAN port from "MNT" or "RMT" that is to be used to send an audit log.	MNT (Default) RMT

■ Operating Procedures

Procedure ▶▶▶

- 1 Click [Setup Audit Log] in [Action].
- 2 Specify the parameters, and click the [Set] button.
→ A confirmation screen appears.

Note

- Up to two Syslog servers can be configured. When configuring a second Syslog server, specify the required parameters in "Syslog Server2".

- 3 Click the [OK] button.
→ Setting of the audit log starts.

Caution

- An error screen appears in the following conditions:
 - When the "Audit Log" setting is "Disable"
 - When the specified IP address of the Syslog server conflicts with the internal IP address of the storage system.

- 4 Click the [Done] button to return to the [Audit Log] screen.



Firmware Maintenance

- "[Overview](#)" (page 1424)
- "[User Privileges](#)" (page 1424)
- "[Display Contents](#)" (page 1425)

Overview

This function performs the maintenance operation for the firmware that is managed in the storage system.

Firmware maintenance is performed to update the firmware version. The firmware can be applied after being registered in the Bootup and Utility Device (BUD).

There are two types of firmware; "controller firmware" and "disk firmware".

Refer to the following table to determine whether to stop the host I/O when applying firmware.

Firmware	Stop Host I/O
Controller Firmware	Not required (*1)
Disk Firmware	Required

*1 : Switching the path in the multipath configuration may be required.

Caution

- When the application schedule for the controller firmware is being reserved, the following occurs.
 - The warning message "'Apply Controller Firmware" is scheduled." is displayed.
 - The [Apply Controller Firmware] function is automatically started at the date and time that are displayed in the information field according to the application mode that is used. When the application mode is "Update & Reboot", the storage system is automatically rebooted after the controller firmware is applied.
 - [Apply Firmware] is not displayed in [Action].
- If an application schedule for the controller firmware is not reserved, [Delete Firmware Schedule] is not displayed in [Action].
- If the message which indicates that the controller firmware application has been reserved disappears before the reserved application date, the reservation may be canceled automatically. In this case, reserve the application schedule for the controller firmware again. Refer to the [Apply Controller Firmware] function for details.

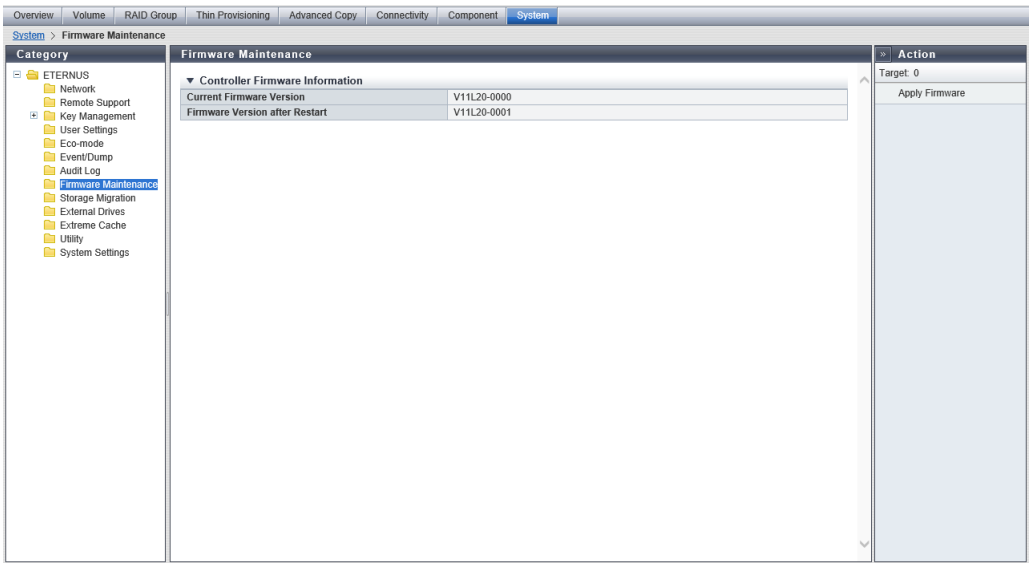
User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	✓
StorageAdmin	
AccountAdmin	
SecurityAdmin	
Maintainer	✓

Refer to "'A. User Roles and Policies" (page 1580)" for details on the policies and roles.

■ Display Contents



Controller Firmware Information

Item	Description
Current Firmware Version	The current controller firmware version is displayed. VxxLyy-zzzz Vxx: Version Lyy: Level zzzz: Release number
Firmware Version after Restart	The controller firmware version after the next power on is displayed. VxxLyy-zzzz Vxx: Version Lyy: Level zzzz: Release number

Apply Controller Firmware

- ["■ Overview" \(page 1425\)](#)
- ["■ User Privileges" \(page 1429\)](#)
- Display Contents ([Simple Mode](#), [Expert Mode](#))
- ["■ Settings" \(page 1430\) \(Simple Mode, Expert Mode\)](#)
- ["■ Operating Procedures" \(page 1437\) \(Simple Mode, Expert Mode\)](#)

■ Overview

This function registers and applies the controller firmware. There are two modes for applying controller firmware; "Simple Mode" and "Expert Mode".

Simple Mode

This mode enables the [Apply Controller Firmware] function to be used by system administrators without the "Maintenance Operation" policy.

The applicable specifications are as follows:

- "Start/End Maintenance" operations are not required.
- Registration of the controller firmware is not required.
- Users can select whether to apply the controller firmware immediately or on a specific date.
- If the specific date option is selected, the date and time to apply the controller firmware can be selected.
- An online update or an offline update cannot be selected. If both of these update modes can be performed, an online update is performed.
- When an offline update is performed, the storage system is automatically rebooted.

Expert Mode

This mode enables the [Apply Controller Firmware] function to be used by maintenance engineers with the "Maintenance Operation" policy.

The applicable specifications are as follows:

- "Start/End Maintenance" operations are required.
- Detailed settings can be configured during registration of the controller firmware.
- An online update or an offline update can be selected.
- Firmware can be applied in the Operator Intervention mode, which includes path switching.

Detailed specifications for "Register Controller Firmware" and "Apply Controller Firmware" are as follows:

- Register Controller Firmware
Transfer (register) the controller firmware archive to the firmware management area in the Bootup and Utility Device (BUD) of the storage system.
To replace the active controller firmware, "Apply" the registered controller firmware. Up to three generations of controller firmware archives can be registered in the BUD.
- Apply Controller Firmware
Extract the controller firmware into the flash memory of the storage system (download controller firmware) and apply it as the active firmware.
Controller firmware can be applied online or offline for the storage system.
 - For online application
The controller firmware is enabled as the active firmware without stopping the storage system operation.
The storage system does not have to be rebooted after this operation is complete.
 - For offline application
The controller firmware is enabled as the active firmware at the next startup.
The storage system must be rebooted after this operation is complete.

When "Operator Intervention mode" is selected as the online update mode, switch the host access paths and CMs manually.

Caution

- For the Simple Mode
 - If the current controller firmware is not registered in the BUD, this function cannot be used.
 - Application of the controller firmware in the online mode may not be possible if the storage system status does not allow the firmware to be applied. Check the storage system status or contact a maintenance engineer.

- The storage system may be rebooted after the controller firmware is applied. Access from hosts is not possible while rebooting is in progress. Make sure to stop any access from hosts before applying controller firmware.
- If one of the following events occurs while the controller firmware application is being reserved or during in the specified application date, the reservation schedule is canceled automatically.
 - The storage system is rebooted when the controller firmware application is reserved
 - A power failure occurs when the controller firmware application is reserved
 - A system setting or a maintenance operation is performed on the specified application date
- If the reservation schedule for applying the controller firmware is canceled, the message that indicates that the controller firmware application has been reserved disappears from the system message field in the [Overview] screen and from the information field in the [Firmware Maintenance] screen. Refer to the [Overview] function and the [Firmware Maintenance] function for details.
- For the Expert Mode
 - Perform the start maintenance operation by using the [Start/End Maintenance] function before starting this function. After the firmware is applied, perform the end maintenance operation by using the [Start/End Maintenance] function. If the Remote Support status is "Operating", Remote Support is restarted automatically after the end maintenance operation is performed.
 - This function cannot be used while downloading the controller firmware.
 - If the target controller firmware is already registered in the BUD, it cannot be registered as a different generation.
 - A different version of controller firmware cannot be registered for a generation in which the firmware is already registered in the Flash memory (EC#1/EC#2).
 - Before performing the online application of the controller firmware, make sure that the storage system is in the normal state. If component maintenance is required, perform maintenance before executing this function.
 - When performing the online update of controller firmware, operator intervention may be required, depending on the configuration or the connecting host environment of the storage system.
- When the controller firmware is being applied or registered, a message to that effect and whether to continue the process appears as a system message. If the user selects to continue the process, the application or registration proceeds. To continue the process, confirm that the application is not being performed by another user.
- This function cannot be used under the following conditions:
 - The disk firmware is being registered
 - The disk firmware is being applied
 - Under maintenance works (firmware maintenance or hardware maintenance)
 - Encryption is being performed (online update is not available)
 - RAID Group Expansion (LDE) is being performed (online update is not available)
 - A RAID group diagnosis or a disk diagnosis is being performed (online update is not available)
 - Storage Migration is being performed (online update is not available)
 - Pinned data exists in the storage system (online update is not available)
 - The battery status is not "Full Charge" (online update is not available)

- The system message "Currently Network Configuration is set to factory default." is displayed in the system message field (online update is not available) (*1)
 - *1: The network environment settings must be performed. Use the [Setup Network Environment] function in the [Network] screen under the [System] navigation.
- REC sessions in the following conditions exist (online update is not available)
 - The blocked copy path is used and the session status is not "✔Suspend" or "✘Error Suspend" (*2)
 - *2: If "Operator Intervention mode" is specified for the Online Update mode, online update is available. (Only for the Expert Mode)
 - The mirror status of the REC Buffer that is being used is "Recovering" and the session status is not "✔Suspend" or "✘Error Suspend"
- REC sessions in the following conditions exist (offline update is not available)
 - The session status is not "✔Suspend" or "✘Error Suspend"
- A controller firmware that is older than the current one can be applied. An older controller firmware is only applied to restore the controller firmware back to the previous version after applying the new one. Do not apply an older controller firmware for normal operation.
- The following conditions must be satisfied when applying an older controller firmware (for the ETERNUS DX8900 S4).
 - The functions that were provided by the newer controller firmware must not be used. If these functions are used, delete all the related data.
 - For SAN systems, firmware downgrades are supported only for SAN dedicated controller firmware.
 - For Unified Storage systems, firmware downgrades are supported only for the unified firmware.
- Application of an older controller firmware may not be possible depending on the customer's environment that does not allow the controller firmware to be applied.

Note

- This function can also apply the controller firmware downloaded from the REMCS center or other storage system. Refer to the [Download Controller Firmware] function for details.
- When the start maintenance operation is executed, "Maintenance Mode" is displayed on the screen. The Expert Mode for this function can be performed only when the storage system is in "Maintenance Mode". When the end maintenance operation is executed, "Maintenance Mode" disappears from the screen.
- If the application date is specified in the Simple Mode, the application schedule for the controller firmware can be deleted. Refer to the [Delete Controller Firmware Schedule] function for details.

Upgrading the SAN system to a Unified Storage system

The following list shows the main operations that are required to upgrade the SAN system to a Unified Storage system. For details, refer to the manuals for the Unified Upgrade function.

Procedure ▶▶▶

- 1 After registering the Unified Storage license, apply the unified firmware to the storage system under the following conditions.
 - The setting mode must be set to "Expert Mode"
 - The apply mode must be set to "Offline Update"
- 2 The same unified firmware must be applied not only to the active controller but also to the inactive controller.
- 3 Confirm that the same version of the unified firmware is applied to both ECs (EC#1 and EC#2).
- 4 Confirm that "Enable" is displayed for the "Unified Storage" field in the [Overview] screen or the [System] screen. Refer to the [Overview] function or the [System] function for details.
- 5 Delete all the dedicated controller firmware for SAN. Refer to the [Delete Controller Firmware] function for details.

Caution

- Once the SAN system has been upgraded to a Unified Storage system, the storage system cannot be reverted back to a SAN system.

■ User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	✓
StorageAdmin	
AccountAdmin	
SecurityAdmin	
Maintainer	✓

Refer to ["A. User Roles and Policies" \(page 1580\)](#) for details on the policies and roles.

Note

- The displayed screen depends on the current user's policy and the storage system status when this function is started. Refer to ["Setting Mode for Each Policy" \(page 1430\)](#) for details.

Setting Mode for Each Policy

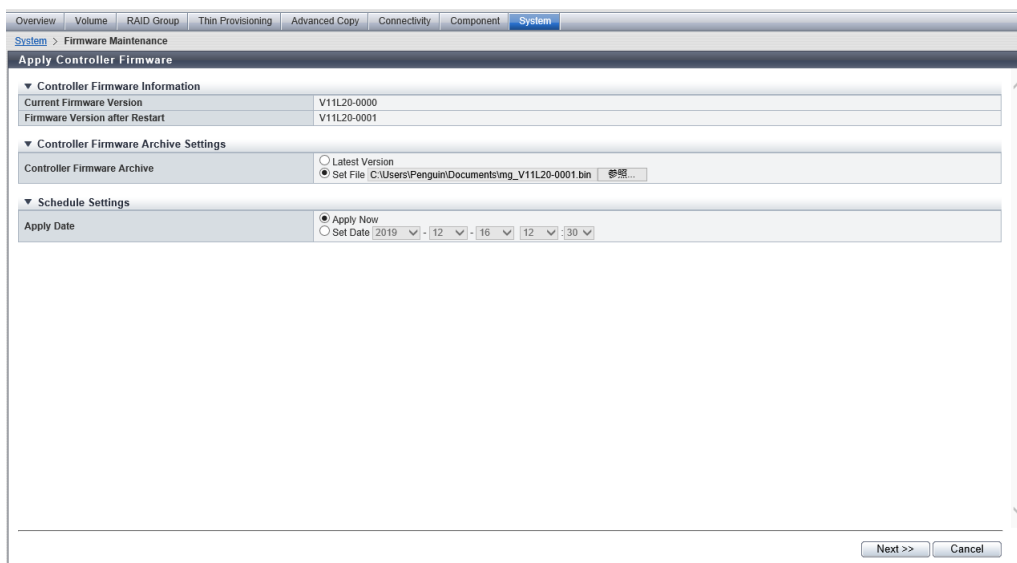
Policies	The current controller firmware	Setting mode	
		Maintenance Mode	Other than Maintenance Mode
Maintenance Operation	Already registered in BUD	Mode selection (Simple Mode or Expert Mode)	Simple Mode
	Not registered in BUD	Expert Mode	(This action is not available)
Firmware Management	Already registered in BUD	Simple Mode	
	Not registered in BUD	(This action is not available)	

■ Settings

Select Setting Mode

Item	Description	Setting values
Setting Mode	Select the application mode of the controller firmware. <ul style="list-style-type: none"> Simple Mode The controller firmware is applied with simple settings. Expert Mode The controller firmware is applied with detailed settings. 	Simple Mode (Default) Expert Mode

■ Display Contents (Simple Mode)



Controller Firmware Information

Item	Description
Current Firmware Version	The active controller firmware version is displayed. VxxLyy-zzzz Vxx: Version Lyy: Level zzzz: Release number

8. System
Firmware Maintenance

Item	Description
Firmware Version after Restart	The firmware version of the controller firmware that is to be used at the next startup is displayed. VxxLyy-zzzz Vxx: Version Lyy: Level zzzz: Release number

■ Settings (Simple Mode)

Controller Firmware Archive Settings

Item	Description	Setting values
Controller Firmware Archive	Select the controller firmware archive. <ul style="list-style-type: none"> Latest Version Select the latest controller firmware archive. This item is displayed only when the controller firmware archive newer than the currently active firmware exists in BUD. Set File Select the controller firmware archive that is stored in the setting PC. Click the [Browse...] button to specify the location of the archive. The specified controller firmware archive is stored in the BUD. 	Latest Version (Default) Set File

Schedule Settings

Item	Description	Setting values
Apply Date	Select which application method is used for the controller firmware archive. <ul style="list-style-type: none"> Apply Now Start application of the controller firmware immediately. Set Date Set the date and time to start application of the controller firmware. <div style="background-color: #fff9c4; padding: 5px; margin-top: 10px;"> <p>Caution</p> <ul style="list-style-type: none"> When "Set Date" is selected, the reservation may be canceled automatically if the storage system status before or at the specified time does not allow the application to be performed. Refer to the [Delete Controller Firmware Schedule] function for details. </div>	Apply Now (Default) Set Date When "Set Date" is selected YYYY-MM-DD hh:mm YYYY: 2001 - 2037 MM: 01 - 12 DD: 01 - 31 hh: 00 - 23 mm: 00 or 30 The current time, which is rounded up to the nearest hour or half-hour, is displayed (Default)

[Apply (Immediate Apply)] Screen

Controller Firmware Update Information

Item	Description
Firmware Version	The version of the following controller firmware is displayed. <ul style="list-style-type: none"> The controller firmware that is currently running The controller firmware version after the firmware is successfully applied (The controller firmware version that is specified in the [Simple Mode Initial] screen)
Apply Date	The application date that is specified in the [Simple Mode Initial] screen ("Apply Now") is displayed.

Apply Mode Check

Item	Description
Apply Mode	<p>The application mode of the controller firmware is displayed. Clicking the [Rediscovery] button updates the application mode.</p> <ul style="list-style-type: none"> • Update Apply the controller firmware in the online mode. Stopping operation of the storage system is not required. After performing this function, the storage system operates with the applied controller firmware. • Update & Reboot Apply the controller firmware in the offline mode. The storage system automatically reboots after the controller firmware is applied. <div style="background-color: #fff9c4; padding: 10px; margin-top: 10px;"> <p>Caution</p> <ul style="list-style-type: none"> • If the storage system status allows both options ("Update" and "Update & Reboot"), "Update" is displayed. • When the 1CM model is used or when the controller firmware does not allow updating in the online mode, "Update & Reboot" is displayed regardless of the storage system status. • If "Update & Reboot" is displayed, check the storage system status or contact a maintenance engineer. Fix the problem that is related to the storage system status and click the [Rediscovery] button. The application mode changes to "Update". </div>
"Permit firmware downgrade" checkbox	<p>Select whether to allow the application of a controller firmware that is older than the current one in the online mode.</p> <p>To allow the application of an older controller firmware in the online mode, select the checkbox and then click the [Apply] button.</p> <p>This checkbox is only displayed when applying an older controller firmware.</p>
Status Check	<p>The factor why application of the controller firmware in "Update" mode was interrupted is displayed. Clicking the [Rediscovery] button to check the latest storage system status.</p> <p>This item is displayed only when the application mode is "Update & Reboot".</p>

[Apply (Specific Date)] Screen

Scheduled Information

Item	Description
Firmware Version	<p>The version of the following controller firmware is displayed.</p> <ul style="list-style-type: none"> • The controller firmware that is currently running • The controller firmware version after the firmware is successfully applied (The controller firmware version that is specified in the [Simple Mode Initial] screen)
Apply Date	<p>The date and time (YYYY-MM-DD hh:mm) when application of the controller firmware starts is displayed.</p> <p>YYYY: 2001 - 2037 MM: 01 - 12 DD: 01 - 31 hh: 00 - 23 mm: 00 or 30</p>

8. System
Firmware Maintenance

Item	Description
Apply Mode	<p>The application mode of the controller firmware is displayed.</p> <ul style="list-style-type: none"> • Update Apply the controller firmware in the online mode. Stopping operation of the storage system is not required. After performing this function, the storage system operates with the applied controller firmware. • Update & Reboot Apply the controller firmware in the offline mode. The storage system automatically reboots after the controller firmware is applied. <div style="background-color: #fff9c4; padding: 10px; margin-top: 10px;"> <p>Caution</p> <ul style="list-style-type: none"> • If the storage system status allows both options ("Update" and "Update & Reboot"), "Update" is displayed. • When the controller firmware does not allow updating in the online mode, "Update & Reboot" is displayed regardless of the storage system status. </div>

Function Button

Button	Description
[Rediscover]	Displays the latest information, the application mode, and the status check result.

■ Display Contents (Expert Mode)

Controller Firmware Information

Item	Description
Registration status of the Active Firmware	<p>The registration status of the active controller firmware is displayed.</p> <p>Registered Not Registered</p>
Current Firmware Version	<p>The active controller firmware version is displayed.</p> <p>VxxLyy-zzzz Vxx: Version Lyy: Level zzzz: Release number</p>
Firmware Version after Restart	<p>The firmware version of the controller firmware that is to be used at the next startup is displayed.</p> <p>VxxLyy-zzzz Vxx: Version Lyy: Level zzzz: Release number</p>

■ Settings (Expert Mode)

Select Controller Firmware Update Mode

Item	Description	Setting values
Update Mode	Select the update mode of the controller firmware.	<p>Registration and Update only Update only Registration</p>

8. System
Firmware Maintenance

Item	Description	Setting values
Controller Firmware Archive	When "Registration and Update" or "only Registration" is selected in "Update Mode", click the [Browse...] button to select the controller firmware archive that is to be registered.	Controller firmware archive
Radio button	Select the target generation according to the "Update Mode". <ul style="list-style-type: none"> When "Registration and Update" or "only Registration" is selected: Select the generation in which the controller firmware is to be registered. When "only Update" is selected: Select the generation in which the controller firmware is to be updated. 	
Generation	The generation (1 to 3) of the controller firmware is displayed.	
Firmware Version	The controller firmware version is displayed. When the controller firmware is not registered, a "-" (hyphen) is displayed. VxxLyy-zzzz Vxx: Version Lyy: Level zzzz: Release number	
Created	The registration date (YYYY-MM-DD) of the controller firmware is displayed. When the controller firmware is not registered, a "-" (hyphen) is displayed.	
Active	If the controller firmware is registered in the Flash memory, EC information where the firmware is stored is displayed. When the controller firmware is not registered, a "-" (hyphen) is displayed. <ul style="list-style-type: none"> EC#1 Stored in the firmware area (EC#1). EC#2 Stored in the firmware area (EC#2). Other Information <ul style="list-style-type: none"> Active The controller firmware that is currently used. Next The controller firmware that is to be used at the next power cycle. 	
Status	The status of the controller firmware is displayed. <ul style="list-style-type: none"> Valid The controller firmware can be applied. Firmware Registering (Receiving) Controller firmware is being downloaded from Remote Support. Firmware Registering (Suspending) The download of controller firmware from Remote Support is being suspended. Not Registered The controller firmware is not registered. 	



Controller Firmware Update Information

Item	Description	Setting values
Firmware Version	The controller firmware version before updating and the controller firmware version after updating are displayed. Active firmware version → Next firmware version When the controller firmware is not registered, a "-" (hyphen) is displayed. VxxLyy-zzzz Vxx: Version Lyy: Level zzzz: Release number	
Apply Slot	The firmware area in the Flash memory (EC#1/EC#2) in which the controller firmware is to be stored when applying is displayed.	
Apply Mode	Select application mode for the controller firmware from "Offline Update (require storage system power cycle)" or "Online Update (firmware update is concurrent and non-disruptive)". "Online Update (firmware update is concurrent and non-disruptive)" is displayed only when the online update is available.	Offline Update (require storage system power cycle) (Default) Online Update (firmware update is concurrent and non-disruptive)
Online Update mode	When "Online Update (firmware update is concurrent and non-disruptive)" is selected as the application mode, specify "Operator Intervention mode" or "Automatic mode". When "Operator Intervention mode" is selected, the operator can update the firmware while disconnecting and connecting (confirming) paths.	Operator Intervention mode Automatic mode

[Advanced Copy Status Check] Screen

Item	Description
Force Continue	To continue the forcible apply of the controller firmware in the online mode, select the checkbox. This item is displayed when the status of a controller firmware update in the online mode is "Not Available".



Advanced Copy Path Status

Item	Description
Remote Box ID	The Box ID for the remote storage system is displayed.
Connection Type	The connection type between the source and the remote storage systems is displayed. Direct Remote
Online Firmware Update	Whether a controller firmware update in the online mode is available is displayed. The session status and the storage system status determines whether the online firmware update is available or not available. <ul style="list-style-type: none"> •  Available The online firmware update can be continued. •  Not Available The online firmware update cannot be continued.

8. System
Firmware Maintenance

Item	Description
Session Status	<p>The REC session status is displayed.</p> <ul style="list-style-type: none"> • No There are no REC sessions. • Active All of the REC sessions are being processed. • All Suspend All of the REC sessions are in the "Suspend" or "Error Suspend" state.
Status	<p>The copy path status is displayed.</p> <ul style="list-style-type: none"> • Normal All of the copy paths are normal or no copy paths are configured. • Error At least one copy path is not in the normal state.

REC Buffer Status

Item	Description
Group	<p>The management group number (0 to 7) of the REC Buffer is displayed.</p> <p>ETERNUS DX100 S5: 0 ETERNUS DX200 S5: 0 - 3 ETERNUS DX500 S5/DX600 S5/DX900 S5: 0 - 7 ETERNUS DX8100 S4/DX8900 S4: 0 - 7 ETERNUS AF150 S3: 0 ETERNUS AF250 S3: 0 - 3 ETERNUS AF650 S3: 0 - 7</p>
Usage	<p>The REC Buffer usage is displayed. This item is not displayed when the usage is "Inactive".</p> <p>Send Receive</p>
Remote Box ID	<p>The Box ID for the remote storage system is displayed.</p>
Online Firmware Update	<p>Whether a controller firmware update in the online mode is available is displayed.</p> <p>The session status and the mirror status determines whether the online firmware update is available or not available.</p> <ul style="list-style-type: none"> •  Available The online firmware update can be continued. •  Not Available The online firmware update cannot be continued.
Session Status	<p>The REC session status is displayed.</p> <ul style="list-style-type: none"> • No There are no REC sessions. • Active All of the REC sessions are being processed. • All Suspend All of the REC sessions are in the "Suspend" or "Error Suspend" state.

Item	Description
Mirror Status	<p>The mirror status (redundant status) of the REC Buffer is displayed.</p> <p>The REC Buffer is duplicated with 2CMs to prevent copied data from being lost if the storage system fails or while maintenance operations are being performed.</p> <ul style="list-style-type: none"> • Normal The REC Buffer is redundant. • Recovering The REC Buffer has lost redundancy.

Hot firmware upgrade when REC is being processed

The Remote Advanced Copy (REC) may be halted when an online update of the controller firmware is executed while an REC is being performed. If "❌Not Available" is displayed for the hot firmware update, perform the following procedure.

Procedure ▶▶▶

- 1 Issue a request to isolate all of the REC sessions (Suspend) from the host or stop the sessions (Stop).
- 2 In the "Copy Session" or "Advanced Copy", make sure that the status for all of the REC sessions is "✅Suspend" or that REC sessions do not exist.
- 3 Apply the controller firmware.
- 4 When the application of controller firmware is complete successfully, request all of the REC sessions from the host to be resumed (RESUME) or start REC.
- 5 In the "Copy Session", confirm that the status of the REC session is "✅Active".



■ Operating Procedures

Procedure ▶▶▶

- 1 Click [Apply Firmware] in [Action].
- 2 Select the setting mode and click the [Next >>] button.
The displayed screen varies depending on the selected setting mode.
 - When "Simple Mode" is selected
→ The [Simple Mode Initial] screen appears. Proceed to Step 2 in ""■ Operating Procedures (Simple Mode)" (page 1437)".
 - When "Expert Mode" is selected
→ The [Expert Mode Initial] screen appears. Proceed to Step 2 in ""■ Operating Procedures (Expert Mode)" (page 1439)".



■ Operating Procedures (Simple Mode)

Procedure ▶▶▶

- 1 Click [Apply Firmware] in [Action].
- 2 Select the controller firmware archive that is to be applied and the application date, and then click the [Next >>] button.
→ A confirmation screen appears.

Caution

- An error screen appears in the following conditions:
 - "Controller Firmware Archive" is not specified (when "Set File" is selected)
 - "Apply Date" does not satisfy the input conditions (when "Set Date" is selected)
 - A date that is earlier than the current date is entered in "Apply Date" (when "Set Date" is selected)

3 Click the [OK] button.

The screen that is displayed varies depending on the current controller firmware and the controller firmware that is to be applied.

- When applying a controller firmware that is newer than the current controller firmware
The displayed screen varies depending on the selected apply date.
 - When "Apply Now" is selected
→ The "[Apply (Immediate Apply)] Screen" (page 1431) appears. Proceed to Step 5.
 - When "Set Date" is selected
→ The "[Apply (Specific Date)] Screen" (page 1432) appears. Proceed to Step 7.
- When applying a controller firmware that is older than the current controller firmware
→ A confirmation screen to apply the older controller firmware appears.

4 Click the [OK] button.

The displayed screen varies depending on the selected apply date.

- When "Apply Now" is selected
→ The "[Apply (Immediate Apply)] Screen" (page 1431) appears. Proceed to Step 5.
- When "Set Date" is selected
→ The "[Apply (Specific Date)] Screen" (page 1432) appears. Proceed to Step 7.

5 Check the controller firmware application information and the application mode, and then click the [Apply] button.

→ A confirmation screen appears.

Caution

- "Update" or "Update & Reboot" is displayed as the application mode. Which one is displayed depends on the storage system status. If "Update & Reboot" is displayed and the [Apply] button is clicked, the storage system automatically reboots after the controller firmware is applied.

Note

- Click the [Rediscovery] button to display the latest information, the application mode, and the status check result.

6 Click the [OK] button.

→ Application of the controller firmware starts.

Caution

- Never turn off the storage system while controller firmware is being applied. Wait until the application of the controller firmware is complete.

7 Click the [Done] button to return to the [Firmware Maintenance] screen.



■ Operating Procedures (Expert Mode)

When "only Registration" Is Selected for "Update Mode"

Procedure ▶▶▶

- 1 Click [Apply Firmware] in [Action].
- 2 Select "only Registration" for the update mode, specify the firmware that is to be registered, select the generation, and click the [Next >>] button.
→ A confirmation screen appears.
- 3 Click the [OK] button.
→ Registration of the controller firmware starts.
- 4 Click the [Done] button to return to the [Firmware Maintenance] screen.

Note

- To change the active controller firmware, perform "only Update".



When "Registration and Update" or "only Update" Is Selected for "Update Mode"

Procedure ▶▶▶

- 1 Click [Apply Firmware] in [Action].
- 2 Specify the parameters, and click the [Next >>] button.
→ A confirmation screen appears.
- 3 Click the [OK] button.
→ Registration or application of the controller firmware starts.
- 4 Select the required parameters and click the [Next >>] button.
→ A confirmation screen appears.
- 5 Click the [OK] button.
→ Application of the controller firmware starts. The progress rate is displayed.
 - When "Offline Update (require storage system power cycle)" is selected for the application mode: Update of the controller firmware in the Flash memory is complete when the process has finished successfully.

Note

- When the process is complete successfully, reboot the storage system.
- When "Online Update (firmware update is concurrent and non-disruptive)" is selected for the application mode:
The controller firmware in the Flash memory is replaced when the process has finished successfully.
When "Operator Intervention mode" is selected as the online update mode in Step 4, proceed to Step 6.

Caution

- When an Advanced Copy path is not normal, the controller firmware update in the online mode is canceled. Follow the on-screen instructions to perform the required operations.
- While an REC Buffer is being recovered, application of the controller firmware update in the online mode is canceled. Follow the on-screen instructions to perform the required operations.

- 6** Click the [Next >>] button.
→ Online update of the controller firmware starts. The progress rate is displayed.

Note

- When applying a controller firmware for the storage system with a configuration of 4CMs or more, the order of the operation procedures such as checking the status of Advanced Copy is changed. Follow the screen wizard to operate this function.
- Click the [Save] button to save the list of CA modules (path information saved file) before and after CA modules are switched offline.
The default file name is "CflPathCmList_serial number for the storage system_YYYY-MM-DD_hh-mm-ss.txt". (YYYY-MM-DD_hh-mm-ss: the date and time when the download screen (Step 6) is displayed.)

- 7** Disable all of the paths that are connected to the displayed controller module and click the [Next >>] button.
→ The confirmation of the path connection status starts.
Online update of the controller firmware starts. The progress rate is displayed.

Caution

- When the controller firmware is applied in the Unified Storage environment, NAS-CA is not displayed as the destination of the path that is to be disabled. Stop all access to the shared folders and then continue the controller firmware application. If the controller firmware is applied without stopping access to the shared folders, the paths may be disconnected. If the paths are disconnected, perform the following actions.
 - For NFS, no actions is required. File operation is automatically re-tried.
 - For CIFS, file operation must be re-tried by the user (or other methods such as by using an application).

- 8** Enable all of the paths that are connected to the displayed controller module and click the [Next >>] button.
→ Online update of the controller firmware starts. The progress rate is displayed.
The Advanced Copy status check starts. The progress rate is displayed.

- 9** Check the displayed status of the Advanced Copy path and the REC Buffer.
→ The "[Advanced Copy Status Check] Screen" (page 1435) appears. The next step that needs to be performed depends on the display contents.
- When all of the firmware updates in the online mode are "Available"
→ Click the [Next >>] button to continue the process. Proceed to Step 10.
 - When at least one firmware update in the online mode is "Not Available"
→ Perform one of the following operations.
 - Click the [Cancel] button to stop the application of the controller firmware in the online mode.
 - Select "Enable" for "Force Continue" and then click the [Next >>] button. Proceed to Step 10.

Caution

- If application of the controller firmware in the online mode is continued when "Not Available" is displayed, the REC may be halted.

Note

- To check the Advanced Copy path status again, click the [Refresh] button.
- If application of the controller firmware in the online mode is canceled, suspend the REC and then perform this function again. Refer to ""Hot firmware upgrade when REC is being processed" (page 1437)" for details.

- 10 Connect the displayed controller modules to the LAN and click the [Test Connection] button.
- 11 Click the [Next >>] button.
→ Online update of the controller firmware starts. The progress rate is displayed.
- 12 Disable all of the paths that are connected to the displayed controller module and click the [Next >>] button.
→ The confirmation of the path connection status starts.
Online update of the controller firmware starts. The progress rate is displayed.

Caution

- When the controller firmware is applied in the Unified Storage environment, NAS-CA is not displayed as the destination of the path that is to be disabled. Stop all access to the shared folders and then continue the controller firmware application. If the controller firmware is applied without stopping access to the shared folders, the paths may be disconnected. If the paths are disconnected, perform the following actions.
 - For NFS, no actions is required. File operation is automatically re-tried.
 - For CIFS, file operation must be re-tried by the user (or other methods such as by using an application).

- 13 Enable all of the paths that are connected to the displayed controller module and click the [Next >>] button.
→ Online update of the controller firmware starts. The progress rate is displayed.
When the process is finished successfully, the controller firmware application is complete.
- 14 Click the [Done] button to return to the [Firmware Maintenance] screen.



Delete Controller Firmware

- ["■ Overview" \(page 1441\)](#)
- ["■ User Privileges" \(page 1442\)](#)
- ["■ Display Contents" \(page 1442\)](#)
- ["■ Operating Procedures" \(page 1444\)](#)

■ Overview

This function deletes the controller firmware registered in the Bootup and Utility Device (BUD) of the CM.

Caution

- This function cannot be used under the following conditions:
 - The operation mode for the storage system is not in "Maintenance Mode"
 - The controller firmware is being received from the REMCS center or another storage system
 - The controller firmware is registered for the current generation only

Note

- This function can be used to delete both controller firmwares (dedicated controller firmware for a SAN system, and a unified firmware (*1)).
 - *1: A controller firmware with built-in Unified Storage functions.
- After the upgrade of the SAN system to a Unified Storage system has been successfully completed, a dedicated controller firmware for SAN becomes unnecessary. To delete the dedicated controller firmware for SAN, the following confirmations and operations are required.
 - Perform an offline update of the unified firmware twice. Confirm that the unified firmware is registered in both ECs (EC#1 and EC#2).
 - Use this function to delete the dedicated controller firmware for SAN (up to two generations). Note that the unified firmware and the dedicated controller firmware for SAN cannot be distinguished by the firmware version. Select the controller firmware generation that is not displayed as "EC#1" or "EC#2" in the Active field.

■ **User Privileges**

Availability of Executions in the Default Role

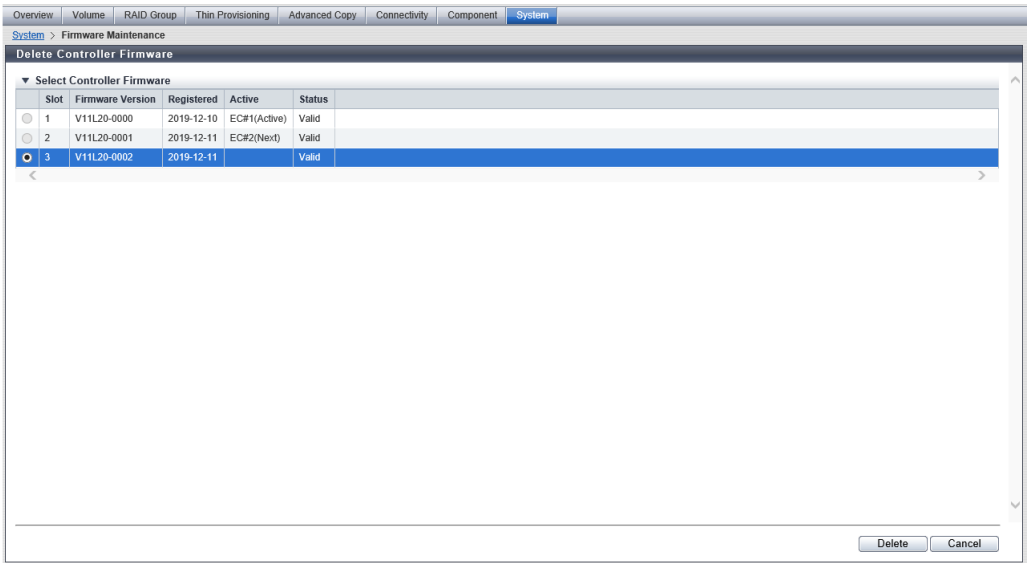
Default role	Availability of executions
Monitor	
Admin	
StorageAdmin	
AccountAdmin	
SecurityAdmin	
Maintainer	✓

Refer to "[A. User Roles and Policies](#)" (page 1580) for details on the policies and roles.

■ **Display Contents**

In this screen, registered controller firmwares are displayed.

8. System
Firmware Maintenance



Select Controller Firmware

Item	Description
Slot	The generation (1 to 3) of the controller firmware is displayed.
Firmware Version	The controller firmware version is displayed. If the controller firmware is not registered, the field is blank. VxxLyy-zzzz Vxx: Version Lyy: Level zzzz: Release number
Registered	The registration date (YYYY-MM-DD) of the controller firmware is displayed. When the controller firmware is not registered, a "-" (hyphen) is displayed.
Active	If the controller firmware is registered in the Flash memory, EC information where the firmware is stored is displayed. If the controller firmware is not registered, the field is blank. <ul style="list-style-type: none"> • EC#1 Stored in the firmware area (EC#1). • EC#2 Stored in the firmware area (EC#2). Other Information <ul style="list-style-type: none"> • Active The controller firmware that is currently used. • Next The controller firmware that is to be used at the next power cycle. <div style="background-color: #fff9c4; padding: 10px; margin-top: 10px;"> <p>Caution</p> <ul style="list-style-type: none"> • Confirm that the unified firmware has been registered in both ECs (EC#1 and EC#2) before executing this function. </div>

Item	Description
Status	<p>The status of the controller firmware is displayed.</p> <ul style="list-style-type: none">• Valid The controller firmware is registered.• Firmware Registering (Receiving) Controller firmware is being downloaded from Remote Support.• Firmware Registering (Suspending) The download of controller firmware from Remote Support is being suspended.• Not Registered The controller firmware is not registered.

■ Operating Procedures

Procedure ▶▶▶

- 1 Click [Delete Firmware] in [Action].
- 2 Select the controller firmware that is to be deleted and click the [Delete] button.
→ A confirmation screen appears.
- 3 Click the [OK] button.
→ Deletion of the controller firmware starts.
- 4 Click the [Done] button to return to the [Firmware Maintenance] screen.



Delete Controller Firmware Schedule

- ["■ Overview" \(page 1444\)](#)
- ["■ User Privileges" \(page 1445\)](#)
- ["■ Operating Procedures" \(page 1446\)](#)

■ Overview

This function deletes the application schedule for the controller firmware.

Caution

- If any of the following conditions occur, the reservation for deleting the schedule is automatically canceled.
 - The application schedule for the controller firmware is reserved
 - Rebooting of the storage system
 - Power failure or power recovery
 - Machine down recovery
 - The system time in the storage system is changed to a time that is later than the reserved time
 - Start time to apply the controller firmware
 - Other users perform system settings
 - [Pinned data](#) exists in the storage system
 - The start time to apply controller firmware (when the application mode is "Update")
 - The storage system is not in normal status
 - The battery status is not "Full Charge"
 - [REC](#) sessions with the following conditions appear
 - A blocked copy path is being used and the session status is not "✔Suspend" or "✘Error Suspend"
 - The mirror status of the REC buffer that is being used is "Recovering" and the session status is not "✔Suspend" or "✘Error Suspend"
 - A storage migration path exists
 - RAID Group Expansion (LDE) is being used
 - A volume is being encrypted

Note

- When the application schedule for the controller firmware is specified, the start time is displayed in the information field. Refer to the [Firmware Maintenance] function for details.
- When controller firmware is applied in simple mode, the application schedule can be set. Refer to the [Apply Controller Firmware] function for details.

■ **User Privileges**

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	✔
StorageAdmin	
AccountAdmin	
SecurityAdmin	
Maintainer	✔

Refer to ""[A. User Roles and Policies](#)" (page 1580)" for details on the policies and roles.

■ Operating Procedures

Procedure ▶▶▶

- 1 Click [Delete Firmware Schedule] in [Action].
→ A confirmation screen appears.
- 2 Click the [OK] button.
Deletion of the application schedule for the controller firmware starts.
- 3 Click the [Done] button to return to the [Firmware Maintenance] screen.



Register Disk Firmware

- "[■ Overview](#)" (page 1446)
- "[■ User Privileges](#)" (page 1446)
- "[■ Display Contents](#)" (page 1447)
- "[■ Settings](#)" (page 1447)
- "[■ Operating Procedures](#)" (page 1448)

■ Overview

This function registers the disk firmware archive in the Bootup and Utility Device (BUD) of the CM. Available disk firmware varies according to the product ID of the disk. All disk firmware archives for each product ID are registered in the BUD of the CM. Up to two generations of disk firmware archives can be registered per product ID.

Caution

- Perform the start maintenance operation by using the [Start/End Maintenance] function before registering the disk firmware. After the firmware is registered, perform the end maintenance operation. If the Remote Support (or REMCS) status is "Operating", Remote Support by REMCS is restarted automatically after the end maintenance operation is performed.
- Up to two generations of disk firmware can be registered per product ID. When registering a third generation, the oldest generation will be overwritten.
- Available disk firmware varies depending on the disk type.
- When eight product IDs have been registered in the storage system, a disk firmware archive with a new product ID cannot be registered.

Note

- After registering a disk firmware archive to the storage system, the disk firmware can then be applied. Refer to the [Apply Disk Firmware] function for details on applying the disk firmware.
- Unnecessary disk firmware archives can be deleted from the storage system. Refer to the [Delete Disk Firmware] function for details on deleting the disk firmware.

■ User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	

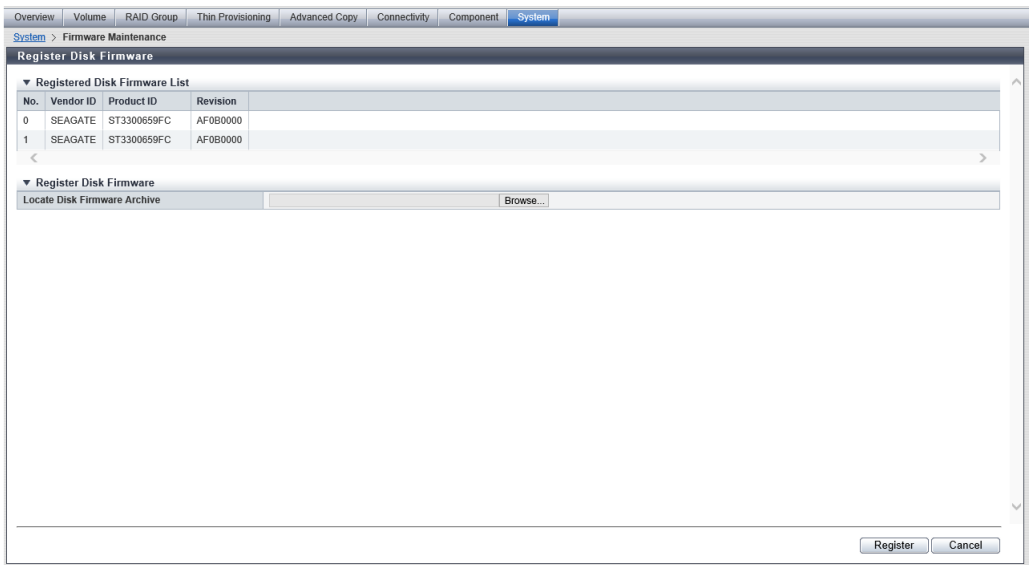
8. System
Firmware Maintenance

Default role	Availability of executions
Admin	
StorageAdmin	
AccountAdmin	
SecurityAdmin	
Maintainer	✓

Refer to ["A. User Roles and Policies" \(page 1580\)](#) for details on the policies and roles.

■ Display Contents

A list of registered disk firmware is displayed.



Registered Disk Firmware List

Item	Description
No.	The number (0 to 15) for disk firmware registered in the storage system is displayed.
Vendor ID	The disk manufacturer name is displayed.
Product ID	The product name of the disk is displayed. A list of registered disk firmware is sorted according to the Product ID. Up to two generations are displayed for each Product ID.
Revision	The disk firmware version is displayed.

■ Settings

Select the disk firmware archive to be registered in the storage system.

Register Disk Firmware

Item	Description	Setting values
Locate Disk Firmware Archive	Click the [Browse...] button and specify the file location of the disk firmware archive. Up to two generations of disk firmware archives can be registered per product ID. Up to eight disk Product IDs can be registered.	Disk firmware archive location

■ Operating Procedures

Procedure ▶▶▶

- 1 Click [Register Disk Firmware] in [Action].
- 2 Click the [Browse...] button and specify the file location of the disk firmware archive.
- 3 Click the [Register] button.
→ A confirmation screen appears.

Caution

- If a file other than a disk firmware archive is selected, and the [Register] button is clicked, an error screen appears.

- 4 Click the [OK] button.
→ Disk firmware registration starts.
 - 5 Click the [OK] button to return to the [Firmware Maintenance] screen.
-



Apply Disk Firmware

- "[■ Overview](#)" (page 1448)
- "[■ User Privileges](#)" (page 1449)
- "[■ Settings](#)" (page 1449)
- "[■ Operating Procedures](#)" (page 1451)

■ Overview

This function switches the currently running disk firmware to a different disk firmware stored on the BUD and applies to the disk.

Caution

- This function cannot be performed when there is no disk firmware in the storage system.
- Perform the start maintenance operation by using the [Start/End Maintenance] function before applying the disk firmware. After the firmware is applied, perform the end maintenance operation. If the Remote Support status is "Operating", Remote Support with REMCS is automatically restarted after the end maintenance operation is performed.
- There are two modes for applying disk firmware; "Online Update" and "Offline Update". Note that the application mode cannot be selected for disk firmware that does not support an online update.
- Before using this function with an online update, reduce the workload of the storage system.
- When using this function with offline update, stop the disk access (host access and internal processing) in advance.
- The host response performance is reduced while performing an online update.
- Available disk firmware varies depending on the disk type.

■ User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	
StorageAdmin	
AccountAdmin	
SecurityAdmin	
Maintainer	✓

Refer to ["A. User Roles and Policies" \(page 1580\)](#) for details on the policies and roles.

■ Settings

A list of registered disk firmware is displayed. Select the disk firmware that is to be applied to a disk.

Select Disk Firmware

Item	Description	Setting values
Radio button	Turn on the disk firmware that is to be applied.	
No.	The number (0 to 15) for disk firmware registered in the storage system is displayed.	
Vendor ID	The drive manufacturer name is displayed.	
Product ID	The drive product name is displayed. A list of registered disk firmware is sorted according to the Product ID. Up to two generations are displayed for each Product ID.	
Revision	The disk firmware version is displayed.	
Apply Mode	Select "Online Update" or "Offline Update" as the mode to apply the disk firmware. If an online update of the disk firmware is unavailable, "Offline Update" is displayed. Availability for an online update of the disk firmware depends on the drive manufacturer and the drive type.	Online Update (Default) Offline Update

[Select Drives] Screen

Specifies the drive to apply the disk firmware from a list.

Disk Firmware Information

Item	Description
Vendor ID	The drive manufacturer name is displayed.
Product ID	The drive product name is displayed.
Firmware Revision	The disk firmware version is displayed.
Apply Mode	The application mode for the disk firmware is displayed. Online Update Offline Update

Select Disks

A list of the drives with the same product ID as the disk firmware that is to be applied is displayed.

Item	Description
Checkbox to select drives	<p>Select the checkbox for the drive to apply the disk firmware.</p> <div style="background-color: #fff9c4; padding: 10px; border: 1px solid #ccc;"> <p>Caution</p> <ul style="list-style-type: none"> • Checkboxes are not displayed for the following drives: <ul style="list-style-type: none"> - Drives with a status other than "✔Available", "ⓘPresent", "✔Spare" - Drives in a RAID group with a status other than "✔Available" </div>
Enclosure	<p>The enclosure where the drive is installed is displayed.</p> <p>CE: Controller Enclosure (2.5" and 3.5") DE: Drive Enclosure (2.5", 3.5", and 3.5" high density DEs)</p> <p>CE CE#x DE#yy x: CE number y: DE number</p>
Slot No.	<p>The slot number of the enclosure where the drive is installed is displayed.</p> <p>2.5" CE/DE: 0 - 23 3.5" CE/DE: 0 - 11 3.5" high density DE: 0 - 59</p>
Status	<p>The drive status is displayed.</p> <p>Refer to ""Drive Status" (page 1607)" for details.</p>
Capacity	<p>The drive capacity (TB/GB) is displayed.</p>
Speed	<p>The drive speed is displayed.</p> <p>For SSD or SSD SED, a "-" (hyphen) is displayed.</p> <p>15000 rpm 10000 rpm 7200 rpm</p>
Type	<p>The drive type displayed for this item is a combination of the following.</p> <ul style="list-style-type: none"> • Drive size <ul style="list-style-type: none"> - For 2.5-inch drives: 2.5" - For 3.5-inch drives: 3.5" • Drive type <ul style="list-style-type: none"> - For SAS disks: Online - For Nearline SAS disks: Nearline - For SSDs: SSD <p>Note that "SED" is also displayed for self encrypting drives.</p>
Usage	<p>The usage of the drive is displayed.</p> <ul style="list-style-type: none"> • Data A drive that is used for user data or an unused drive • Global Hot Spare A drive that is registered as a Global Hot Spare • Dedicated Hot Spare A drive that is registered as a Dedicated Hot Spare
Product ID	<p>The drive product name is displayed.</p>

Item	Description
Firmware Revision	The disk firmware version is displayed.

■ Operating Procedures

Procedure ▶▶▶

- 1 Click [Apply Disk Firmware] in [Action].
- 2 Specify the target disk firmware and click the [Select] button.
→ The "[Select Drives] Screen" (page 1449) appears.
- 3 Select the drive to apply the disk firmware and click the [Apply] button.
→ A confirmation screen appears.
- 4 Click the [OK] button.
→ Application of the disk firmware starts.
- 5 Click the [Done] button to return to the [Firmware Maintenance] screen.



Delete Disk Firmware

- "■ Overview" (page 1451)
- "■ User Privileges" (page 1451)
- "■ Display Contents" (page 1451)
- "■ Operating Procedures" (page 1452)

■ Overview

This function deletes the disk firmware archive registered in the Bootup and Utility Device (BUD) of the CM.

■ User Privileges

Availability of Executions in the Default Role

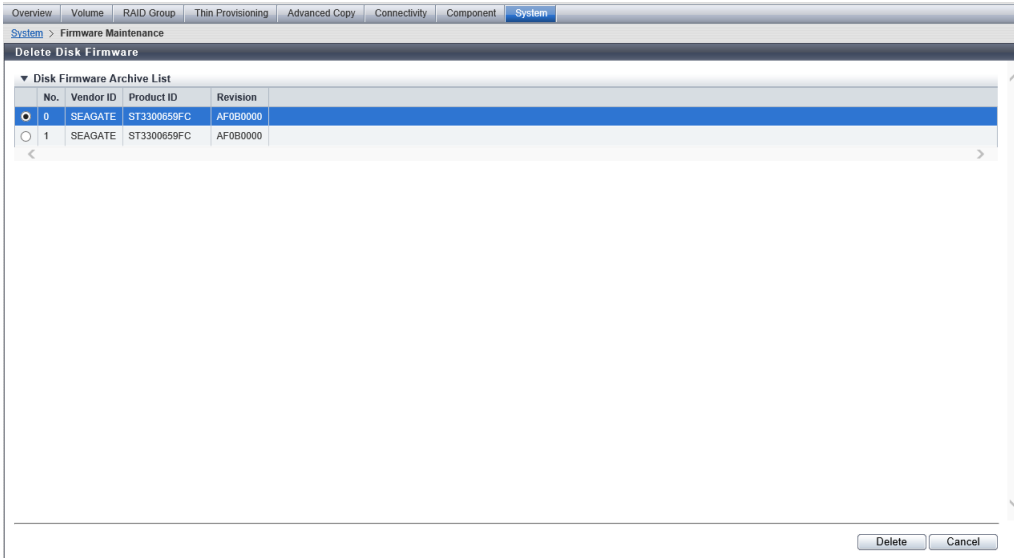
Default role	Availability of executions
Monitor	
Admin	
StorageAdmin	
AccountAdmin	
SecurityAdmin	
Maintainer	✓

Refer to "'A. User Roles and Policies" (page 1580)" for details on the policies and roles.

■ Display Contents

A list of registered disk firmware is displayed. Select the disk firmware that is to be deleted.

8. System Storage Migration



Disk Firmware Archive List

Item	Description
Radio button	Turn on the disk firmware to be deleted.
No.	The number (0 to 15) for disk firmware registered in the storage system is displayed.
Vendor ID	The disk manufacturer name is displayed.
Product ID	The product name of the disk is displayed. A list of registered disk firmware is sorted according to the Product ID. Up to two generations are displayed for each Product ID.
Revision	The disk firmware version is displayed.

■ Operating Procedures

Procedure ▶▶▶

- 1 Click [Delete Disk Firmware] in [Action].
- 2 Select the radio button of the disk firmware archive to be deleted, and click the [Delete] button.
→ A confirmation screen appears.
- 3 Click the [OK] button.
→ The disk firmware is deleted.
- 4 Click the [Done] button to return to the [Firmware Maintenance] screen.



Storage Migration

- "■ Overview" (page 1453)
- "■ User Privileges" (page 1454)
- "■ Display Contents" (page 1454)

■ Overview

This function displays the setting and progress of Storage Migration.

Storage Migration is the function for migrating data by connecting other storage systems (migration source) and the storage system (migration destination). Data migration is possible regardless of the server and the OS, and without using server resources.

Caution

- When performing a Storage Migration, confirm that there is no access from the host to the migration source volume.
- The requirements for access from the host to the destination volume vary depending on the operation mode.
 - For "Migration & Host IO", Storage Migration can be performed even if host access exists in the destination volume after a migration is started.
 - For "Migration", "Migration + Quick Compare", or "Quick Compare", perform a Storage Migration without access from the host to the destination volume.
 - For "Migration + Full Compare" or "Full Compare", perform a Storage Migration without access from the host to any volume in the destination storage system.
- The path groups must be deleted after the data migration is complete. If the operation mode is "Migration & Host IO", host I/O response is reduced until the path groups are deleted. In addition, if the migration path is blocked, the host I/O may stop.
- Do not perform the following operations when there are Storage Migration paths ("path group" hereafter) established.
 - Configuration of an Advanced Copy destination to the destination volume
 - Configuration of an Advanced Copy destination to the migration source volume
 - Formatting of the destination volume
 - RAID diagnosis in the RAID group to which the destination volume belongs
 - Disk diagnosis of the disk drives in the RAID group to which the destination volume belongs
 - CM hot expansion on the destination storage system
 - Memory hot expansion on the destination storage system
- The path groups must be deleted after the data migration is complete. The following operations are not available before path groups are deleted:
 - Hot controller firmware upgrade at the destination storage system
 - Eco-mode schedule setting of the RAID group to which the destination volume belongs
 - Eco-mode schedule setting of the Thin Provisioning Pool (TPP) to which the destination volume belongs
 - Capacity expansion of the RAID group to which the destination volume belongs
 - RAID migration of the destination volume
 - Encryption of the destination volume
 - Capacity expansion of the destination volume
 - Deletion of the destination volume
 - Port mode modification of the destination FC-Initiator port
 - Port parameter setting of the destination FC-Initiator port
 - Reduction of the CA to which the destination FC-Initiator port belongs

Note

- Click the [↺] icon to display the latest screen.
- Use the [Start Storage Migration] function to start Storage Migration.
- A started Storage Migration can be suspended, stopped, and restarted in volume units on the [Path Group Detail Information] screen. Refer to the [Suspend Storage Migration] function, the [Stop Storage Migration] function, or the [Restart Storage Migration] function for details.

■ User Privileges

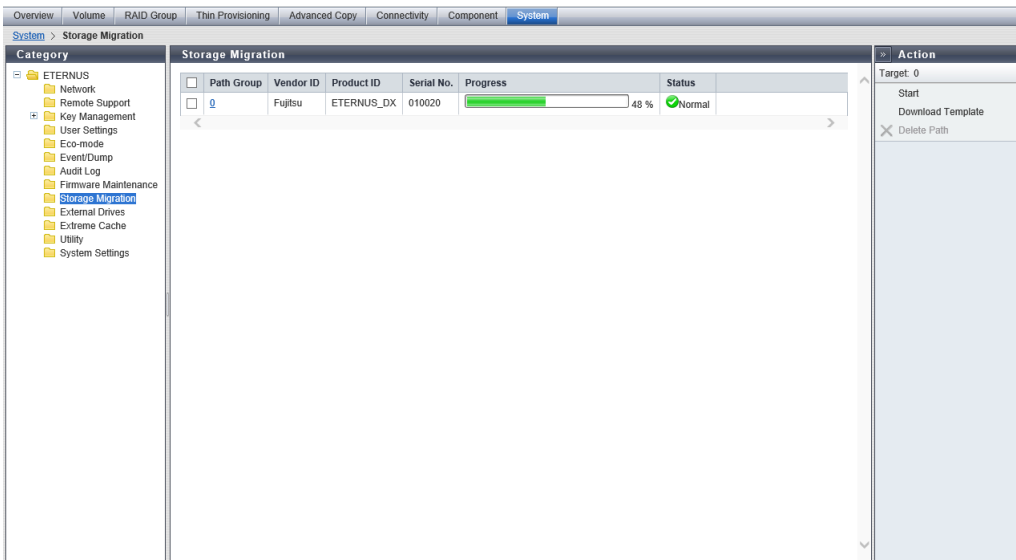
Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	✓
Admin	✓
StorageAdmin	✓
AccountAdmin	
SecurityAdmin	✓
Maintainer	✓

Refer to "'A. User Roles and Policies" (page 1580)" for details on the policies and roles.





■ Display Contents

A list of Storage Migration instances that have paths are displayed.



Item	Description
Path Group	The path group number (0 to 15) is displayed in decimal number. Click this item to display the "[Path Group Detail Information] Screen" (page 1455). A path group combines the paths for data migration into a group for each source storage system. The paths from a single source storage system to the local (destination) storage system constitute a path group.
Vendor ID	The manufacturer name of the source storage system to which the path is created is displayed. An inconvertible code is displayed as "*".

8. System Storage Migration

Item	Description
Product ID	The product name of the source storage system to which the path is created is displayed. An inconvertible code is displayed as "**".
Serial number	The serial number of the source storage system to which the path is established is displayed. An inconvertible code is displayed as "**".
Progress	The progress (%) of Storage Migration for the path group is displayed.
Status	<p>The general status of Storage Migration for the path group is displayed.</p> <ul style="list-style-type: none"> •  Complete All Storage Migration operations have completed normally. •  Error There are one or more LUNs that do not exist in the migration source volume, or there are one or more volumes for which Storage Migration failed due to error. •  Stop Storage Migration has been stopped or suspended for one or more volumes (all other volumes have completed Storage Migration normally), or Storage Migration of all the volumes has been stopped or suspended. •  Normal Other than above.





















[Path Group Detail Information] Screen

Storage Migration Path Information

In this screen, information of the selected path group is displayed.

Item	Description
Path Group	The path group number (0 to 15) is displayed.
Vendor ID	The manufacturer name of the source storage system to which the path is created is displayed. An inconvertible code is displayed as "**".
Product ID	The product name of the source storage system to which the path is created is displayed. An inconvertible code is displayed as "**".
Serial number	The serial number of the source storage system to which the path is established is displayed. An inconvertible code is displayed as "**".

8. System
Storage Migration

Item	Description										
<p>Operation Mode</p>	<p>The operation mode for the path group is displayed.</p> <p>If the operation mode setting has been omitted, "Migration" is displayed.</p> <ul style="list-style-type: none"> • Migration Data migration from the source storage system to the destination storage system is performed. • Migration + Quick Compare Data migration from the source storage system to the destination storage system and a data comparison of source LUNs and destination volumes are performed. "Quick Compare" compares data in a part of the volume area. "Migration + Quick Compare" consecutively executes "data migration" and "data comparison" for each volume. • Migration + Full Compare Data migration from the source storage system to the destination storage system and a data comparison of source LUNs and destination volumes are performed. "Full Compare" compares data in entire volume area. "Migration + Full Compare" consecutively executes "data migration" and "data comparison" for each volume. • Quick Compare A data comparison of source LUNs and destination volumes is performed. "Quick Compare" compares data in a part of the volume area. • Full Compare A data comparison of source LUNs and destination volumes is performed. "Full Compare" compares data in entire volume area. • Migration & Host IO Data migration from the source storage system to the destination storage system is performed. Stop the operation only when switching the host connection to the destination storage system. This enables continued access from the host to the destination volume during the data migration. 										
<p>Status</p>	<p>The general status of Storage Migration for the path group is displayed.</p> <ul style="list-style-type: none"> •  Complete All Storage Migration operations have completed normally. •  Error There are one or more LUNs that do not exist in the migration source volume, or there are one or more volumes for which Storage Migration failed due to error (displayed in red characters). •  Stop Storage Migration has been stopped or suspended for one or more volumes (all other volumes have completed Storage Migration normally), or Storage Migration of all the volumes has been stopped or suspended. •  Normal Other than above. <p>The status display priority order is  Error" >  Normal" >  Stop" >  Complete".</p> <p>The following table shows the relationship between the general status of Storage Migration and the volume status.</p> <table border="1"> <thead> <tr> <th>Storage Migration general status</th> <th>Volume status ("Migration Status" in the Storage Migration Volume List)</th> </tr> </thead> <tbody> <tr> <td> Complete</td> <td>Migration status is "Normal End" for all paths.</td> </tr> <tr> <td> Error</td> <td>Some source LUNs are in "Not Exist" state, or some paths have migration status of "Error".</td> </tr> <tr> <td> Stop</td> <td>The migration status of one or more volumes is "Stop" or "Suspend" (all other migration statuses are "Normal End"), or the migration status of all the volumes is "Stop" or "Suspend".</td> </tr> <tr> <td> Normal</td> <td>Other than above.</td> </tr> </tbody> </table>	Storage Migration general status	Volume status ("Migration Status" in the Storage Migration Volume List)	 Complete	Migration status is "Normal End" for all paths.	 Error	Some source LUNs are in "Not Exist" state, or some paths have migration status of "Error".	 Stop	The migration status of one or more volumes is "Stop" or "Suspend" (all other migration statuses are "Normal End"), or the migration status of all the volumes is "Stop" or "Suspend".	 Normal	Other than above.
Storage Migration general status	Volume status ("Migration Status" in the Storage Migration Volume List)										
 Complete	Migration status is "Normal End" for all paths.										
 Error	Some source LUNs are in "Not Exist" state, or some paths have migration status of "Error".										
 Stop	The migration status of one or more volumes is "Stop" or "Suspend" (all other migration statuses are "Normal End"), or the migration status of all the volumes is "Stop" or "Suspend".										
 Normal	Other than above.										

8. System Storage Migration

Item	Description
Progress	The progress (%) of Storage Migration for the path group is displayed.




Migration Connection Path

In this screen, information of the migration connection paths are displayed.

Item	Description
Source WWN	The WWN for the source FC-CA port is displayed.
CA Port	The location information of the destination FC-Initiator is displayed. For the ETERNUS DX900 S5 or the ETERNUS DX8900 S4 CE#x CM#y CA#z Port#w For the other models CM#y CA#z Port#w x: CE number y: CM number z: CA number w: Port number

Storage Migration Volume List

In this screen, the list of migration volumes of Storage Migration is displayed. This list shows the migration status, progress, start time, and end time for each migration volume.

Item	Description
Source LUN	The source LUN is displayed in decimal number. Source LUNs are displayed with decimal numbers if the source LUNs are specified with decimal numbers when Storage Migration setting files are created. Source LUNs are also displayed with decimal numbers if the source LUNs satisfy the conditions for being specified with decimal numbers. If the source LUNs do not satisfy the conditions for being specified with decimal numbers, a "-" (hyphen) is displayed. Refer to the [Download Template File for Storage Migration Settings] function for details.
Source LUN (Hex)	The source LUN is displayed in hexadecimal number (16-digit or 4-digit).
Source LUN Status	The source LUN status is displayed.  Available: The source LUN can be used  Not Available: The source LUN cannot be used  Not Exist: The source LUN does not exist
Destination Volume No.	The destination volume number is displayed in decimal number.
Destination Volume No. (Hex)	The destination volume number is displayed in hexadecimal number. "0x" (2-digit) + Capital letters and numeric characters (4-digit)
Destination Volume Name	The destination volume name is displayed.
Capacity	The destination volume capacity [TB/GB/MB] is displayed.

8. System Storage Migration

Item	Description																								
Migration Status	<p>The data migration status is displayed.</p> <p>Initial: initial state Waiting: awaiting migration Running: migrating Normal End: normally completed Suspend: in suspension Stop: stopped Error (xxx): (xxx) indicates the error factor. "-" (hyphen): does not exist in the source LUN (the LUN status is "Not Exist").</p> <div style="background-color: #fff9c4; padding: 10px;"> <p>Caution</p> <ul style="list-style-type: none"> If "Waiting" is displayed, the data migration does not start automatically. Restart the data migration manually. </div>																								
Progress	The data transfer progress (%) is displayed.																								
Start Time	The start and end times of data migration are displayed.																								
End Time	<p>The start and end times (YYYY-MM-DD hh:mm:ss) are displayed as shown below depending on the migration status.</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>Migration status</th> <th>Start time</th> <th>End time</th> </tr> </thead> <tbody> <tr> <td>Initial</td> <td>Blank</td> <td>Blank</td> </tr> <tr> <td>Waiting</td> <td></td> <td></td> </tr> <tr> <td>Running</td> <td>The migration start time is displayed.</td> <td>Blank</td> </tr> <tr> <td>Normal End</td> <td>The migration start time is displayed.</td> <td>The migration end time is displayed.</td> </tr> <tr> <td>Suspend</td> <td>The migration start time is displayed.</td> <td>The time when migration suspends is displayed.</td> </tr> <tr> <td>Stop</td> <td>The migration start time is displayed.</td> <td>The time when migration stops is displayed.</td> </tr> <tr> <td>Error (xxx)</td> <td>The migration start time is displayed.</td> <td>The time when migration stops due to an error is displayed.</td> </tr> </tbody> </table> <div style="background-color: #fff9c4; padding: 10px; margin-top: 10px;"> <p>Caution</p> <ul style="list-style-type: none"> When Storage Migration is restarted when its migration status is "Suspend" or "Error", data migration restarts from the point of suspension. In this case, the start time is not changed. When Storage Migration is restarted when its migration status is "Stop", data migration of the LUN is started over from scratch. The start time is changed to the migration restart time. </div>	Migration status	Start time	End time	Initial	Blank	Blank	Waiting			Running	The migration start time is displayed.	Blank	Normal End	The migration start time is displayed.	The migration end time is displayed.	Suspend	The migration start time is displayed.	The time when migration suspends is displayed.	Stop	The migration start time is displayed.	The time when migration stops is displayed.	Error (xxx)	The migration start time is displayed.	The time when migration stops due to an error is displayed.
Migration status	Start time	End time																							
Initial	Blank	Blank																							
Waiting																									
Running	The migration start time is displayed.	Blank																							
Normal End	The migration start time is displayed.	The migration end time is displayed.																							
Suspend	The migration start time is displayed.	The time when migration suspends is displayed.																							
Stop	The migration start time is displayed.	The time when migration stops is displayed.																							
Error (xxx)	The migration start time is displayed.	The time when migration stops due to an error is displayed.																							
Error Location	<p>The storage system in which a data migration error occurs is displayed.</p> <p>If no error occurs, a "-" (hyphen) is displayed.</p> <p>Source: Migration source storage system Destination: Local (migration destination) storage system</p>																								

Start Storage Migration

- ["■ Overview" \(page 1459\)](#)
- ["■ User Privileges" \(page 1461\)](#)
- ["■ Settings" \(page 1462\)](#)
- ["■ Display Contents" \(page 1463\)](#)
- ["■ Operating Procedures" \(page 1465\)](#)

■ Overview

This function loads the Storage Migration setting file and starts migration.

Storage Migration is the function for migrating data by connecting other storage systems (migration source) and the storage system (migration destination). Data migration is possible regardless of the server and the OS, and without using server resources.

- Data migration is performed in volume units.
- Up to 16 storage systems can be specified as source storage systems.
- Up to 8 migration paths can be specified per source storage system.
- Up to 512 data migration LUNs can be specified per migration path.
- There are two methods for migrating the data: "offline Storage Migration" and "online Storage Migration".

Both the online Storage Migration and the offline Storage Migration (hereinafter collectively referred to as "Storage Migration") require temporarily stopping the operation. To perform a Storage Migration without stopping operations, use the Non-disruptive Storage Migration function. Refer to the [Register Non-disruptive Storage Migration License] function for details.

To perform Storage Migration, the source storage systems, the destination storage systems, and the destination volumes must satisfy the conditions below.

Requirements for a Source Storage System and a Source LUN:

- An FC interface is available as the host interface
- The storage system is in normal status
- The source LUN is a type that is accessible from the host (Standard, TPV, SDV, etc.)
- Storage Migration is not yet started

Requirements for a Destination Storage System and a Destination Volume:

- An FC interface is available as the host interface
- The storage system is in normal status
- The CA port used for migration is in normal status
- The destination volume is in normal status
(The status of the destination volume is not "🟡Readying", "⚠Partially Exposed", "⚠Exposed", "🔴Not Ready", "🔴Broken", "🔴Data Lost", or "🔴Unknown")
- The type of the destination volume is "Standard", "WSV", "TPV", or "FTV"
- A storage system or volume cannot be specified as the destination in the following cases:
 - Hot controller firmware upgrade is being performed in the destination storage system
 - An ODX Buffer volume is selected as a destination volume
 - A NAS volume (NAS user volume and NAS backup volume) is selected as a destination volume
 - A NAS system volume is selected as a migration destination volume
 - A [Data Container Volume](#) is selected as a destination volume
 - An [External Volume](#) is selected as a destination volume
 - The RAID group to which the destination volume belongs to has an Eco-mode schedule configured
 - The Thin Provisioning Pool (TPP) to which the destination volume belongs has an Eco-mode schedule configured
 - The destination volume is specified as a RAID migration source or destination (*1)

- The capacity of the RAID group to which the destination volume belongs is being expanded
- Encryption is in progress for the destination volume
- The capacity of the destination volume is being expanded
- The destination volume is specified as the destination for another Storage Migration operation
- The mirroring reservation attribute (*2) is added to the destination volume
- The destination volume is used for the Virtual Volume function
- An Advanced Copy or an XCOPY session is configured for a destination volume (*3)
- A migration using the Flexible Tier is being performed for a destination volume (*1)
- Capacity optimization is being performed for a destination volume (*1)

*1 : If "Operation Mode" is "Migration & Host IO", "Migration Status" is changed to "Stop". After the process has been completed, manually restart the migration.

*2 : An attribute to be set to a volume being created as the REC copy destination by the Dynamic LUN Mirroring function. The volumes with this attribute may have been left in the storage system due to unsuccessful creation. Volumes that have the mirroring reservation attribute can be checked in the "Forbid Advanced Copy" field on the [Volume] screen. Refer to the [Volume (Basic Information)] function for details.

*3 : If "Operation Mode" is "Migration & Host IO", "Migration Status" is changed to "Stop". After the copy sessions are deleted, manually restart the migration.

Requirements for a Destination Volume and a Source LUN:

- The destination volume has the same or larger capacity than the source LUN
Note that if "Operation Mode" is "Migration & Host IO", the destination volume must be the same size as the source LUN.

Caution

- To perform a Storage Migration, stop access from the host to the source LUN.
- The requirements for stopping access from the host vary depending on the operation mode.
 - For "Migration & Host IO", access from the host to the destination volume does not need to be stopped after the migration is started.
 - For "Migration", "Migration + Quick Compare", or "Quick Compare", stop access from the host to the destination volume.
 - For "Migration + Full Compare" or "Full Compare", stop access from the host to all the volumes in the destination storage system.
- Do not specify a volume that has copy sessions as a source or destination.
- Do not specify a volume as the source when formatting is in progress.
- Do not execute the [Start RAID Group Diagnosis] function or the [Start Disk Diagnosis] function on the destination storage system.
- If the operation mode is "Migration + Full Compare" or "Full Compare", the process takes several times longer than the data migration.

Note

- Refer to ["Template File for Storage Migration Settings" \(page 1468\)](#) and ["Coding Conventions for the Storage Migration Setting File" \(page 1471\)](#) for details about the Storage Migration setting files.
- A started Storage Migration can be suspended, restarted, and stopped in volume units. Refer to the [Suspend Storage Migration] function, the [Restart Storage Migration] function, or the [Stop Storage Migration] function for details.

■ User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	✓
StorageAdmin	✓
AccountAdmin	
SecurityAdmin	
Maintainer	✓

Refer to "[A. User Roles and Policies](#)" (page 1580) for details on the policies and roles.

Data migration flow using the Storage Migration function

The workflow sequence for Storage Migration is described below.

The host environment must be confirmed and saved before performing the Storage Migration. Ask the system administrator to do it.

Procedure ▶▶▶

1 Preparation

- (1) Check and save the host environment so that the storage system can be used in the same environment after migration.
- (2) Check the status of the source and destination storage systems and clear any sense information that has not been reported (*1).
- (3) When migrating data with multipath, make the configuration so that the same affinity group (LUN group) can be accessed from the multiple FC ports used for migration at the source storage system.
- (4) Create a destination volume in the destination storage system, or format an existing volume for use as the destination volume.

2 Download a template for the Storage Migration setting file (using the [Download Template File for Storage Migration Settings] function).

3 Create the Storage Migration setting file. Refer to "[Template File for Storage Migration Settings](#)" (page 1468) for details.

4 Stop access from the host to the source LUN.

5 Stop access from the host to the destination volume.

If the operation mode is "Migration + Full Compare" or "Full Compare", stop the access from the host to all the volumes in the destination storage system.

6 Change the mode of the FC port used for migration in the destination storage system to "Initiator" (using the [Modify Port Mode] function).

7 Set port parameters to the FC-Initiator port (using the [Modify FC Port Parameters] function).

8 Connect the source and destination storage systems using an FC cable, or use a switch to connect the source and destination storage system.

9 Load "Storage Migration setting file" that was created in Step 3 in the destination storage system to start Storage Migration (using the [Start Storage Migration] function).

Data migration flow using the Storage Migration function

- 10** The following procedure varies depending on the operation mode.
- If the operation mode is "Migration & Host IO"
 - (1)** Perform the following procedure with an FC port that is not used for migrations in the destination storage system.
 - (i)** Set port parameters to the FC-CA port (using the [Modify FC Port Parameters] function).
 - (ii)** Set host affinity to the FC-CA port (using the [Create Host Affinity] or [Modify Host Affinity] function).
 - (iii)** Use the FC-CA port to confirm that the destination storage system and the destination volumes can be accessed correctly from the host.
 - (iv)** Use the FC-CA port to resume access from the host to the destination volume.
 - (2)** Check the progress of Storage Migration.
 - (3)** After the Storage Migration is successfully completed, perform the following procedure in the destination storage system.
 - (i)** Delete the migration path (using the [Delete Storage Migration Path] function).
 - (ii)** Change the FC-Initiator port mode that was used for the migration from "Initiator" to "CA" (using the [Modify Port Mode] function).
 - If the operation mode is not "Migration & Host IO"
 - (1)** Check the progress of Storage Migration.
 - (2)** After the Storage Migration is successfully completed, perform the following procedure in the destination storage system.
 - (i)** Delete the migration path (using the [Delete Storage Migration Path] function).
 - (ii)** Change the FC-Initiator port mode that was used for the migration from "Initiator" to "CA" (using the [Modify Port Mode] function).
 - (iii)** Set port parameters to the FC-CA port (using the [Modify FC Port Parameters] function).
 - (iv)** Set host affinity to the FC-CA port (using the [Create Host Affinity] or [Modify Host Affinity] function).
 - (v)** Use the FC-CA port to confirm that the destination storage system and the destination volumes can be accessed correctly from the host.
 - (vi)** Use the FC-CA port to resume access from the host to the destination volume (if the operation mode is "Migration + Full Compare" or "Full Compare", resume access from the host to the destination storage system).

*1: Operations that can be performed when logged in using a user account with the "Maintenance Operation" policy.

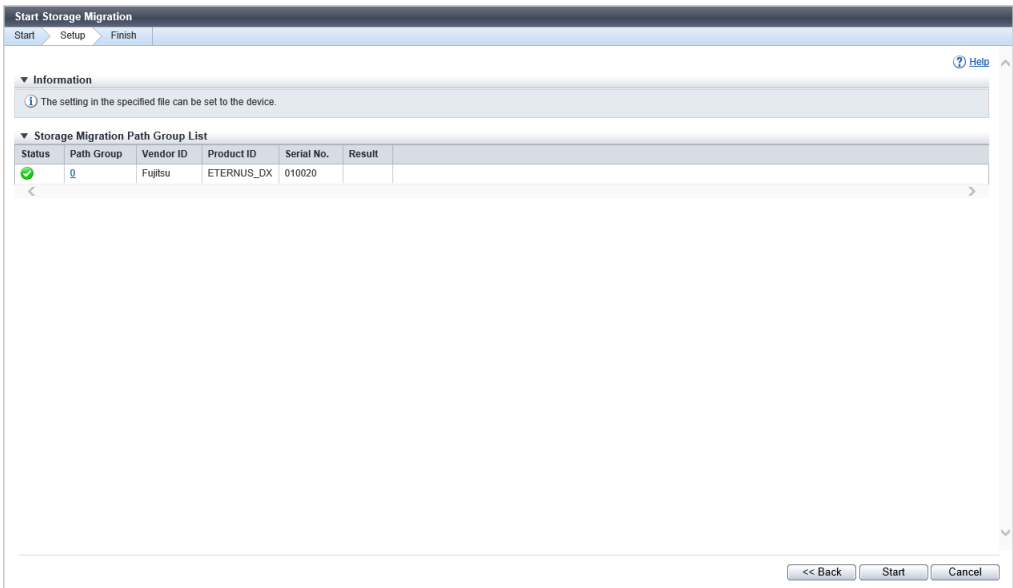
■ Settings

Storage Migration

In this screen, load the Storage Migration setting file.

Item	Description	Setting values
Storage migration setting file	Input the location where the Storage Migration setting file is stored. Click the [Browse...] button to specify the storage location.	Path to the location where the Storage Migration setting file is stored

■ Display Contents



Storage Migration Path Group List

In this screen, the list of Storage Migration path groups is displayed.

Item	Description
Status	<p>The path group status is displayed.</p> <p>✔: The path group is in normal status.</p> <p>✘: The path group is in error status.</p>
Path Group	<p>The path group number (0 to 15) is displayed. Click this item to display the "[Path Group Detail Information] Screen" (page 1463).</p> <p>A path group combines the paths for data migration into a group for each source storage system. The paths from a single source storage system to the local (destination) storage system constitute a path group.</p>
Vendor ID	<p>The manufacturer name of the source storage system to which the path is created is displayed.</p> <p>An inconvertible code is displayed as "*".</p>
Product ID	<p>The product name of the source storage system to which the path is created is displayed.</p> <p>An inconvertible code is displayed as "*".</p>
Serial number	<p>The serial number of the source storage system to which the path is established is displayed.</p> <p>An inconvertible code is displayed as "*".</p>
Result	<p>When the path group is in normal status, the "Result" field is blank.</p> <p>An error message is displayed when the source storage system information cannot be obtained or an error is detected in the path group.</p> <p>When an error is detected in a source LUN or destination volume, "✘" is displayed in the "Status" field, but the "Result" field remains blank. Error messages of the source LUN and the destination volume are displayed in [Storage Migration Volume List] of the [Path Group Detail Information] screen.</p>

[Path Group Detail Information] Screen

Storage Migration Path Information

In this screen, information of the selected path group is displayed.

8. System Storage Migration

Item	Description
Path Group	The path group number (0 to 15) is displayed.
Vendor ID	The manufacturer name of the source storage system to which the path is created is displayed. An inconvertible code is displayed as "**".
Product ID	The product name of the source storage system to which the path is created is displayed. An inconvertible code is displayed as "**".
Serial number	The serial number of the source storage system to which the path is established is displayed. An inconvertible code is displayed as "**".
Operation Mode	<p>The operation mode for the path group is displayed.</p> <p>If the operation mode setting has been omitted in the Storage Migration setting file, "Migration" is displayed.</p> <ul style="list-style-type: none"> • Migration Data migration from the source storage system to the destination storage system is performed (offline Storage Migration). • Migration + Quick Compare Data migration from the source storage system to the destination storage system and a data comparison of source LUNs and destination volumes are performed. "Quick Compare" compares data in a part of the volume area. "Migration + Quick Compare" consecutively executes "data migration" and "data comparison" for each volume (offline Storage Migration). • Migration + Full Compare Data migration from the source storage system to the destination storage system and a data comparison of source LUNs and destination volumes are performed. "Full Compare" compares data in entire volume area. "Migration + Full Compare" consecutively executes "data migration" and "data comparison" for each volume (offline Storage Migration). • Quick Compare A data comparison of source LUNs and destination volumes is performed. "Quick Compare" compares data in a part of the volume area (offline Storage Migration). • Full Compare A data comparison of source LUNs and destination volumes is performed. "Full Compare" compares data in entire volume area (offline Storage Migration). • Migration & Host IO Data migration from the source storage system to the destination storage system is performed. Stop the operation only when switching the host connection to the destination storage system. This enables continued access from the host to the destination volume during the data migration (online Storage Migration).

Migration Connection Path

In this screen, information of the migration connection paths are displayed.

Item	Description
Source WWN	The WWN for the source FC-CA port is displayed.
CA Port	<p>The location information of the destination FC-Initiator is displayed.</p> <p>For the ETERNUS DX900 S5 or the ETERNUS DX8900 S4 CE#x CM#y CA#z Port#w</p> <p>For the other models CM#y CA#z Port#w</p> <p>x: CE number y: CM number z: CA number w: Port number</p>

Storage Migration Volume List

In this screen, the list of migration volumes of Storage Migration is displayed.

Item	Description
Source LUN	The source LUN is displayed in decimal number. Source LUNs are displayed with decimal numbers if the source LUNs are specified with decimal numbers when Storage Migration setting files are created. Source LUNs are also displayed with decimal numbers if the source LUNs satisfy the conditions for being specified with decimal numbers. If the source LUNs do not satisfy the conditions for being specified with decimal numbers, a "-" (hyphen) is displayed. Refer to the [Download Template File for Storage Migration Settings] function for details.
Source LUN (Hex)	The source LUN is displayed in hexadecimal number. "0x" (2-digit) + Capital letters and numeric characters (16-digit or 4-digit)
Source LUN Status	The status of the source LUN is displayed. <ul style="list-style-type: none"> ✔ Available: The source LUN can be used ✘ Not Available: The source LUN cannot be used ✘ Not Exist: The source LUN does not exist
Destination Volume No.	The destination volume number is displayed in decimal number.
Destination Volume No. (Hex)	The destination volume number is displayed in hexadecimal number. "0x" (2-digit) + Capital letters and numeric characters (4-digit)
Destination Volume Name	The destination volume name is displayed.
Capacity	The destination volume capacity ([TB/GB/MB]) is displayed.
Result	When both the source LUN and the destination volume are in normal status, the "Result" field is blank. An error message is displayed when an error is detected in the source LUN or the destination volume.

■ Operating Procedures

Procedure ▶▶▶

- 1 Click [Start] in [Action].
- 2 Click the [Browse...] button to select a Storage Migration setting file, and click the [Next] button.

Caution

- An error screen is displayed when a timeout occurs during the retrieval of source storage system information.
- An error screen is displayed when the Storage Migration setting file is in the following conditions:
 - The Storage Migration setting file is not specified
 - A character code other than the space or tab is placed before the keyword on the left of "="
 - The number of the parameters on the right of "=" does not coincided with the specified number of parameters of the keyword
 - The identification code is invalid
 - "Type" is not "Open"

- The "GROUP" is in the following conditions
 - Invalid characters are input
 - A value other than a 1-digit hexadecimal number is input after the "0x" prefix
 - Out of range (not in the 0 - F range)
 - The same value is duplicated in the Storage Migration setting file
- The Operation mode is not one of the following items: "M", "M+QC", "M+FC", "QC", "FC", or "M & IO"
- The operation mode "M & IO" is used together with other modes in the Storage Migration setting file.
- The destination CA port being set for "PATH" is in the following conditions:
 - The setting is not correct
 - The mode is not "Initiator"
 - The status is abnormal
 - The same value is duplicated in the Storage Migration setting file
 - The value is already used in a Storage Migration in execution
 - A CE number other than "CE0" is specified (for models other than the ETERNUS DX900 S5 or the ETERNUS DX8900 S4)
- The source WWN being set for "PATH" is in the following conditions:
 - The number of characters is not 16
 - The value is out of range
 - The first character is "0" or all characters are "F"
 - The same value is duplicated in the Storage Migration setting file
- The source LUN is in the following conditions:
 - Invalid characters are input
 - The value is not a decimal or hexadecimal number
 - The value is a decimal number that exceeds 256
 - The value is not a 4-digit or 16-digit hexadecimal number
 - The same value is duplicated in the GROUP
- The destination volume is in the following conditions:
 - Invalid characters are input
 - The value is not a decimal or 4-digit hexadecimal number
 - The volume number is out of range
 - Not specified
 - The volume is in the error state (a state other than "🟢Available", "🟡Copyback", "🟡Rebuild", or "🟡Partially Exposed Rebuild")
 - The volume type is not "Standard", "WSV", "TPV", or "FTV"
 - The same value is duplicated in the Storage Migration setting file
 - The value is already used in a Storage Migration in execution
- When an error is detected in the script analysis

- An error screen is displayed when the obtained source storage system information is in the following conditions:
 - Two or more source storage systems are specified in single "GROUP"
 - The source storage system has other Storage Migration instance already started
 - The source storage system status is not normal
 - The source WWN being set for "PATH" does not exist
 - The source LUN is in the following conditions:
 - The source storage system information does not exist
 - An unusable status is detected
 - The capacity exceeds that of the destination volume

- 3** Check the path group, and click the [Start] button.
→ A confirmation screen appears.

Note

- Click the [Path Group] link to display the "[Path Group Detail Information] Screen" (page 1463).
- If a CE number is not specified for the migration path in the ETERNUS DX900 S5 or the ETERNUS DX8900 S4, "CE#0" is assumed as specified. To change the CE number, cancel the process, edit the Storage Migration setting file, and then restart this function.

- 4** Click the [OK] button.
→ Storage Migration starts.

- 5** Click the [Done] button to return to the [Storage Migration] screen.

Note

- Refer to the [Storage Migration] screen for progress status of Storage Migration.
- Click the [Path Group] link to display the "[Path Group Detail Information] Screen" (page 1463).



Download Template File for Storage Migration Settings

- "[■ Overview](#)" (page 1467)
- "[■ User Privileges](#)" (page 1468)
- "[■ Settings](#)" (page 1468)
- "[■ Operating Procedures](#)" (page 1474)

■ Overview

This function downloads the template of the Storage Migration setting file.

In the Storage Migration setting file, specify the destination CA port, source WWN, source LUN, and destination volumes.

Note

- Refer to ["Template File for Storage Migration Settings" \(page 1468\)](#) and ["Coding Conventions for the Storage Migration Setting File" \(page 1471\)](#) for details about the Storage Migration setting files.

■ **User Privileges**

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	✓
StorageAdmin	✓
AccountAdmin	
SecurityAdmin	
Maintainer	✓

Refer to ["A. User Roles and Policies" \(page 1580\)](#) for details on the policies and roles.

■ **Settings**

Template File for Storage Migration Settings

Keyword		Number of settings	Allowed input
Type	Specify the type of Storage Migration. (Example) Type=Open	1	Open
GROUP	Specify a path group for each source storage system. Up to 16 path groups can be specified. Specify "0x" (2-digit) + 0 - F (1-digit) with hexadecimal numbers. (Example) GROUP=0x0	1	0x0 - 0xF ("0x" + 1-digit hexadecimal)
OPEMODE	Specify one of the operation modes (M/M+QC/M+FC/QC/FC/M & IO) for the Storage Migration. The following symbols are used for the operation modes: M: Migration M+QC: Migration + Quick Compare M+FC: Migration + Full Compare QC: Quick Compare FC: Full Compare M & IO: Migration & Host IO OPEMODE can be omitted. When this parameter is not specified, "Migration" is used. Refer to "Operation Mode" (page 1470) for details. (Example) OPEMODE=M+QC	1	M M+QC M+FC QC FC M & IO

8. System
Storage Migration

Keyword		Number of settings	Allowed input						
PATH	<p>Specify the path information of the destination and source storage systems.</p> <p>Up to 8 paths per path group can be specified.</p> <p>(Example)</p> <p>For the ETERNUS DX900 S5 or the ETERNUS DX8900 S4 PATH=CEx,CMy,CAz,Pw,xxxxxxxxxxxxx</p> <p>For the other models PATH=CMy,CAz,Pw,xxxxxxxxxxxxx</p> <p>x: CE number, y: CM number, z: CA number, w: Port number</p> <p>xxxxxxxxxxxxx: WWN</p>	4 or 5	-						
	<table border="1"> <tr> <td>CE</td> <td rowspan="4">Specify the location information (CEx, CMy, CAz, Pw) of the destination FC-Initiator port to which the path is configured.</td> </tr> <tr> <td>CM</td> </tr> <tr> <td>CA</td> </tr> <tr> <td>P</td> </tr> </table>			CE	Specify the location information (CEx, CMy, CAz, Pw) of the destination FC-Initiator port to which the path is configured.	CM	CA	P	<p>For the ETERNUS DX900 S5 or the ETERNUS DX8900 S4 CEx CMy CAz Pw</p> <p>For the other models CMy CAz Pw</p> <p>x: CE number (1-digit hexadecimal)</p> <p>y: CM number (1-digit decimal)</p> <p>z: CA number (1-digit decimal)</p> <p>w: Port number (1-digit decimal)</p>
	CE			Specify the location information (CEx, CMy, CAz, Pw) of the destination FC-Initiator port to which the path is configured.					
	CM								
CA									
P									
WWN	Specify the World Wide Name (WWN) of the source FC-CA port to which the path is configured.	16-digit hexadecimal (using "0" as the first digit or using an "F (f)" for all 16 digits is not allowed)							

8. System
Storage Migration

Keyword		Number of settings	Allowed input								
VOL	Specify the source LUN (Y) and the destination volume (Z). The maximum number of source LUNs for each migration path (PATH) is 512. (Example) VOL=Y, Z	2	Source LUN: 0 - 255 (decimal) 0xYYYY (4-digit hexadecimal) 0xYYYYYYYYYYYYYYYY (16-digit hexadecimal)								
	Example of specifying source LUNs and destination volumes										
	<table border="1"> <thead> <tr> <th>Source LUN</th> <th>Destination volume</th> </tr> </thead> <tbody> <tr> <td>Input a decimal number Specification method: "0x" is not added on top of the value. Decimal numbers can be used only when the source LUN is from "0" to "255".</td> <td>Input a decimal number Specification method: "0x" is not added on top of the value.</td> </tr> <tr> <td>Input a hexadecimal number (4-digit) Specification method: Add "0x" on top of the value. Input in the "0xYYYY" format.</td> <td>Input a hexadecimal number (4-digit) Specification method: Add "0x" on top of the value.</td> </tr> <tr> <td>Input a hexadecimal number (16-digit) Specification method: Add "0x" on top of the value. Input in the "0xYYYYYYYYYYYYYYYY" format.</td> <td>Input in the "0xZZZZ" format.</td> </tr> </tbody> </table>			Source LUN	Destination volume	Input a decimal number Specification method: "0x" is not added on top of the value. Decimal numbers can be used only when the source LUN is from "0" to "255".	Input a decimal number Specification method: "0x" is not added on top of the value.	Input a hexadecimal number (4-digit) Specification method: Add "0x" on top of the value. Input in the "0xYYYY" format.	Input a hexadecimal number (4-digit) Specification method: Add "0x" on top of the value.	Input a hexadecimal number (16-digit) Specification method: Add "0x" on top of the value. Input in the "0xYYYYYYYYYYYYYYYY" format.	Input in the "0xZZZZ" format.
	Source LUN			Destination volume							
Input a decimal number Specification method: "0x" is not added on top of the value. Decimal numbers can be used only when the source LUN is from "0" to "255".	Input a decimal number Specification method: "0x" is not added on top of the value.										
Input a hexadecimal number (4-digit) Specification method: Add "0x" on top of the value. Input in the "0xYYYY" format.	Input a hexadecimal number (4-digit) Specification method: Add "0x" on top of the value.										
Input a hexadecimal number (16-digit) Specification method: Add "0x" on top of the value. Input in the "0xYYYYYYYYYYYYYYYY" format.	Input in the "0xZZZZ" format.										
Destination volume: Z (decimal) 0xZZZZ (4-digit hexadecimal)											

Operation Mode

OPEMODE		Description
Specification code	Meaning	
M	Migration	Data migration from the source storage system to the destination storage system is performed (offline Storage Migration).
M+QC	Migration + Quick Compare	Data migration from the source storage system to the destination storage system and a data comparison of source LUNs and destination volumes are performed. "Quick Compare" compares data in a part of the volume area. "Migration + Quick Compare" consecutively executes "data migration" and "data comparison" for each volume (offline Storage Migration).
M+FC	Migration + Full Compare	Data migration from the source storage system to the destination storage system and a data comparison of source LUNs and destination volumes are performed. "Full Compare" compares data in entire volume area. "Migration + Full Compare" consecutively executes "data migration" and "data comparison" for each volume (offline Storage Migration). <div style="background-color: #fff9c4; padding: 10px; margin-top: 10px;"> <p>Caution</p> <ul style="list-style-type: none"> Host access to the destination storage system must be stopped when "Migration + Full Compare" is specified. When "Migration + Full Compare" is specified for the operation mode, the time to complete the operation after data migration is increased significantly. </div>

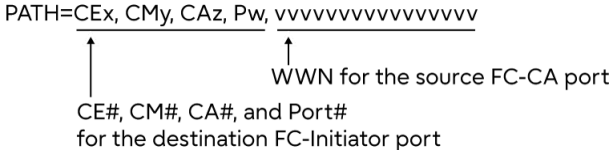
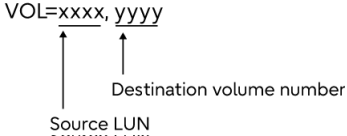
8. System Storage Migration

OPEMODE		Description
Specification code	Meaning	
QC	Quick Compare	A data comparison of source LUNs and destination volumes is performed. "Quick Compare" compares data in a part of the volume area (offline Storage Migration).
FC	Full Compare	A data comparison of source LUNs and destination volumes is performed. "Full Compare" compares data in entire volume area (offline Storage Migration). <div style="background-color: #fff9c4; padding: 10px; margin-top: 10px;"> <p>Caution</p> <ul style="list-style-type: none"> • Host access to the destination storage system must be stopped when "Full Compare" is specified. • When "Full Compare" is specified for the operation mode, the time to complete the operation after data migration is increased significantly. </div>
M & IO	Migration & Host IO	Data migration from the source storage system to the destination storage system is performed. Stop the operation only when switching the host connection to the destination storage system. This enables continued access from the host to the destination volume during the data migration (online Storage Migration).

Coding Conventions for the Storage Migration Setting File

Keyword	Coding conventions
Common	<ul style="list-style-type: none"> • The Storage Migration setting file must be saved in the text format. • Contents of the file must be described in alphanumeric characters. • A keyword (Type, GROUP, OPEMODE, PATH, VOL) and its setting value must be connected with "=" (equal). • Only a tab or space can be placed before a keyword (Type, GROUP, OPEMODE, PATH, VOL). • The number of setting values assigned to a keyword (Type, GROUP, OPEMODE, PATH, VOL) with "=" must coincide with the number specified for each keyword. For more information on the number of setting values for each keyword, refer to ""Template File for Storage Migration Settings" (page 1468). • Add the following information for each GROUP. <ul style="list-style-type: none"> - For the ETERNUS DX900 S5 or the ETERNUS DX8900 S4 PATH (CEx, CMy, CAz, Pw, WWN), VOL - For the other models PATH (CMy, CAz, Pw, WWN), VOL • There must not be an overlap with the content of the Storage Migration setting file or the migration information (GROUP, destination CA port, source WWN, source LUN, or destination volume) of the path already configured.
GROUP	<ul style="list-style-type: none"> • Up to 16 GROUPs can be specified. • For the setting range for each GROUP, refer to ""Template File for Storage Migration Settings" (page 1468).
OPEMODE	<ul style="list-style-type: none"> • Specify "M", "M+QC", "M+FC", "QC", "FC", or "M & IO" for each GROUP (when OPEMODE is omitted, it is regarded as though "M" is specified and only migration is performed). • OPEMODE in the Storage Migration setting file must be only "M & IO" or options other than "M & IO" • For the setting range for each OPEMODE, refer to ""Template File for Storage Migration Settings" (page 1468).

8. System
Storage Migration

Keyword	Coding conventions
PATH	<ul style="list-style-type: none"> Enclose the PATH and VOL for each GROUP with "{ }" (bracket symbols). Describe all "PATHs" and then all "VOLs" for each GROUP. Up to 8 PATHs per GROUP can be specified. Separate the PATH setting values with "," (comma). For the setting range of PATH, refer to "Template File for Storage Migration Settings" (page 1468). Describe the PATH in the following order. <p style="text-align: center;"> <code>PATH=CEx, CMy, CAz, Pw, vvvvvvvvvvvvvvvv</code>  </p> <ul style="list-style-type: none"> If the migration destination is the ETERNUS DX900 S5 or the ETERNUS DX8900 S4, "CEx" must be specified when specifying a CE other than "CE0". If "CEx" is omitted, "CE0" is assumed. For the other models, omit the "CEx" setting or specify "CE0". Start a new line for each PATH. Multiple PATHs cannot be described without breaking.
VOL	<ul style="list-style-type: none"> Keep the number of VOLs to 512 or less, so they can be accessed from the source FC-CA port. Separate the VOL setting values with "," (comma). For the setting range of VOL, refer to "Template File for Storage Migration Settings" (page 1468). Describe the VOL in the following order. <p style="text-align: center;"> <code>VOL=xxxx, yyyy</code>  </p> <ul style="list-style-type: none"> Start a new line for each VOL. Multiple VOLs cannot be described without breaking. There must be no overlaps within the same GROUP for the source LUN.
Other Information	<ul style="list-style-type: none"> Entered letters are not case-sensitive. A line that starts with "#" is a comment. A file name can be any text string. Spaces and tabs at the end of the line are not recognized as characters.

A setting example of the Storage Migration setting file is shown below:

8. System Storage Migration

Setting example (for the ETERNUS DX8900 S4)

```
# Setting Example
eternus-storage-migration-0101
Type=Open

GROUP=0x0
OPEMODE=M+QC

{

  PATH=CE0,CM0,CA0,P0,0000000011111111
  PATH=CE0,CM1,CA0,P1,2222222233333333
  VOL=0x0000,0x0040
  VOL=0x0001,0x0041
  VOL=0x00FF,0x013F

}

GROUP=0x1
OPEMODE=M+QC

{

  PATH=CE1,CM0,CA1,P0,8888888888888888
  VOL=4,10

}

GROUP=0x2
OPEMODE=M

{

  PATH=CE1,CM0,CA1,P1,9999999999999999
  VOL=0x0000011000000000,0x0141

}
```

8. System
Storage Migration

Setting example (for the ETERNUS DX8900 S4)

Explanation

The above example describes the case where the following paths and migration volumes are configured for three source storage systems (GROUP#0, 1, 2).

Path group (OPEMODE)	Migration information		
GROUP=0 (M+QC)	Path	Location information of the destination FC-Initiator port	WWN for the source FC-CA port
		CE0,CM0,CA0,P0	- 0000000011111111
		CE0,CM1,CA0,P1	- 2222222233333333
	Migration volume	Source LUN	Destination volume number
		0x0000	→ 0x0040
		0x0001	→ 0x0041
	0x00FF	→ 0x013F	
GROUP=1 (M+QC)	Path	Location information of the destination FC-Initiator port	WWN for the source FC-CA port
		CE1,CM0,CA1,P0	- 8888888888888888
	Migration volume	Source LUN	Destination volume number
		4	→ 10
GROUP=2 (M)	Path	Location information of the destination FC-Initiator port	WWN for the source FC-CA port
		CE1,CM0,CA1,P1	- 9999999999999999
	Migration volume	Source LUN	Destination volume number
		0x0000011000000000	→ 0x0141

■ Operating Procedures

Procedure ▶▶▶

- 1 Click [Download Template] in [Action].
- 2 Click the [Download] button.
→ A confirmation screen appears.
- 3 Click the [OK] button.
→ A dialog box to download the file appears.
- 4 Save the template file.
The default file name is "StMigTemplate.txt".
→ Downloading of the template file starts.
- 5 Click the [Close] button to return to the [Storage Migration] screen.



Delete Storage Migration Path

- "■ Overview" (page 1475)
- "■ User Privileges" (page 1475)
- "■ Operating Procedures" (page 1475)

Overview

This function deletes path groups for the Storage Migration.

Caution

- The path groups must be deleted after the data migration is complete. The following operations are not available before path groups are deleted:
 - Hot controller firmware upgrade at the destination storage system
 - Eco-mode schedule setting of the RAID group to which the destination volume belongs
 - Eco-mode schedule setting of the Thin Provisioning Pool (TPP) to which the destination volume belongs
 - Capacity expansion of the RAID group to which the destination volume belongs
 - RAID migration of the destination volume
 - Encryption of the destination volume
 - Capacity expansion of the destination volume
 - Deletion of the destination volume
 - Port mode modification of the destination FC-Initiator port
 - Port parameter setting of the destination FC-Initiator port
 - Reduction of the CA to which the destination FC-Initiator port belongs

Note

- The path group can be deleted if all configured paths are in any of the following state:
 - "Source LUN Status" of the Storage Migration Volume List is "❌Not Exist".
 - "Migration Status" of the Storage Migration is "Normal End", "Stop", "Initial", or "Waiting".

User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	✓
StorageAdmin	✓
AccountAdmin	
SecurityAdmin	
Maintainer	✓

Refer to ""[A. User Roles and Policies](#)" (page 1580)" for details on the policies and roles.

Operating Procedures

Procedure ▶▶▶

- 1 Select the path group that is to be deleted (multiple selections can be made) and click [Delete Path] in [Action].
→ A confirmation screen appears.

- 2 Click the [OK] button.
→ Deletion of the Storage Migration path starts.
- 3 Click the [Done] button to return to the [Storage Migration] screen.



Download Storage Migration Result

- "[■ Overview](#)" (page 1476)
- "[■ User Privileges](#)" (page 1476)
- "[■ Operating Procedures](#)" (page 1476)

■ Overview

This function downloads the execution result of the Storage Migration.

Note

- Download of Storage Migration results is made in path group units.
- Storage Migration results can be downloaded not only after completion of data migration but also during data migration.
- The Storage Migration results are text files. The format is the same as the "[\[Path Group Detail Information\] Screen](#)" (page 1455).

■ User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	✓
StorageAdmin	✓
AccountAdmin	
SecurityAdmin	
Maintainer	✓

Refer to "["A. User Roles and Policies"](#) (page 1580)" for details on the policies and roles.

■ Operating Procedures

Procedure ▶▶▶

- 1 Click [Download Result] in [Action].
- 2 Click the [Download] button.
→ A confirmation screen appears.
- 3 Click the [OK] button.
→ A dialog box to download the file appears.
- 4 Save the Storage Migration result file.
The default file name is "StMigResult_serial number for the storage system_YYYY-MM-DD_hh-mm-ss.txt".

(YYYY-MM-DD_hh-mm-ss: the date and time when the download screen (Step 2) is displayed.)
→ Downloading of the Storage Migration result file starts.

5 Click the [Close] button to return to the [Path Group Detail Information] screen.



Restart Storage Migration

- ["■ Overview" \(page 1477\)](#)
- ["■ User Privileges" \(page 1477\)](#)
- ["■ Operating Procedures" \(page 1477\)](#)

■ Overview

This function restarts Storage Migration when it is waiting, suspended, stopped, or error-stopped.

Note

- Storage Migration is restarted in volume units.
- Storage Migration can be restarted when its "Migration Status" is "Waiting", "Suspend", "Stop" or "Error".
- If Storage Migration is restarted when its "Migration Status" is "Suspend" or "Error", data migration is started from the point of LUN suspension.
- If Storage Migration is restarted when its "Migration Status" is "Waiting" or "Stop", data migration of the LUN is started over from scratch.

■ User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	✓
StorageAdmin	✓
AccountAdmin	
SecurityAdmin	
Maintainer	✓

Refer to ["A. User Roles and Policies" \(page 1580\)](#) for details on the policies and roles.

■ Operating Procedures

Procedure ▶▶▶

- 1 Select the source LUNs for which Storage Migration is to be restarted (multiple selections can be made), and click [Restart] in [Action].
→ A confirmation screen appears.
- 2 Click the [OK] button.
→ Storage Migration restarts.

Note

- [Restart] cannot be clicked if one or more source LUNs are selected for which the migration status is unavailable for restarting. Note that if the migration status of some LUNs changes to unavailable status after clicking [Restart], only the available LUNs among the selected LUNs are restarted. If LUNs for which the migration status is not unavailable for restarting exist, a message that indicates that the restarting process for these LUNs failed is displayed.

3 Click the [Done] button to return to the [Path Group Detail Information] screen.



Suspend Storage Migration

- "[Overview](#)" (page 1478)
- "[User Privileges](#)" (page 1478)
- "[Operating Procedures](#)" (page 1479)

■ Overview

This function suspends Storage Migration that is running.

Caution

- If the Storage Migration is suspended when the operation mode is "Migration & Host IO", the host IO stops. Check the host IO status before suspending the Storage Migration.

Note

- Storage Migration is suspended in volume units.
- Storage Migration can be suspended when its "Migration Status" is "Running".
- A suspended Storage Migration can be restarted. Refer to the [Restart Storage Migration] function for details about how to restart the Storage Migration.

■ User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	✓
StorageAdmin	✓
AccountAdmin	
SecurityAdmin	
Maintainer	✓

Refer to "[A. User Roles and Policies](#)" (page 1580) for details on the policies and roles.

■ Operating Procedures

Procedure ▶▶▶

- 1 Select the source LUNs for which Storage Migration is to be suspended (multiple selections can be made), and click [Suspend] in [Action].
→ A confirmation screen appears.
- 2 Click the [OK] button.
→ Storage Migration suspends.

Note

- [Suspend] cannot be clicked if one or more source LUNs are selected for which the migration status is unavailable for suspending. Note that if the migration status of some LUNs changes to unavailable status after clicking [Suspend], only the available LUNs among the selected LUNs are suspended. If LUNs for which the migration status is not unavailable for suspending exist, a message that indicates that the suspending process for these LUNs failed is displayed.

- 3 Click the [Done] button to return to the [Path Group Detail Information] screen.



Stop Storage Migration

- ["■ Overview" \(page 1479\)](#)
- ["■ User Privileges" \(page 1479\)](#)
- ["■ Operating Procedures" \(page 1480\)](#)

■ Overview

This function stops Storage Migration when it is migrating, suspended, or error-stopped.

Caution

- If the Storage Migration is stopped when the operation mode is "Migration & Host IO", the host IO stops. Check the host IO status before stopping the Storage Migration.

Note

- Storage Migration is stopped in volume units.
- Storage Migration can be stopped when its "Migration Status" is "Running", "Suspend" or "Error".
- A stopped Storage Migration can be restarted. Refer to the [Restart Storage Migration] function for details about how to restart the Storage Migration.

■ User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	✓
StorageAdmin	✓

Default role	Availability of executions
AccountAdmin	
SecurityAdmin	
Maintainer	✓

Refer to "[A. User Roles and Policies](#)" (page 1580) for details on the policies and roles.

■ Operating Procedures

Procedure ▶▶▶

- 1 Select the source LUNs for which Storage Migration is to be stopped (multiple selections can be made), and click [Stop] in [Action].
→ A confirmation screen appears.
- 2 Click the [OK] button.
→ Storage Migration stops.

Note

- [Stop] cannot be clicked if one or more source LUNs are selected for which the migration status is unavailable for stopping. Note that if the migration status of some LUNs changes to unavailable status after clicking [Stop], only the available LUNs among the selected LUNs are stopped. If LUNs for which the migration status is not unavailable for stopping exist, a message that indicates that the stopping process for these LUNs failed is displayed.

- 3 Click the [Done] button to return to the [Path Group Detail Information] screen.



External Drives

- "[Overview](#)" (page 1480)
- "[User Privileges](#)" (page 1480)
- "[Display Contents](#)" (page 1481)
- "[Filter Setting](#)" (page 1483)

■ Overview

This function displays the [External Drive](#) list.

This function is displayed only if the Non-disruptive Storage Migration License has been registered.

Caution

- Creating an External Drive is required in advance. Refer to the [Create External Drive] function for details.

■ User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	✓

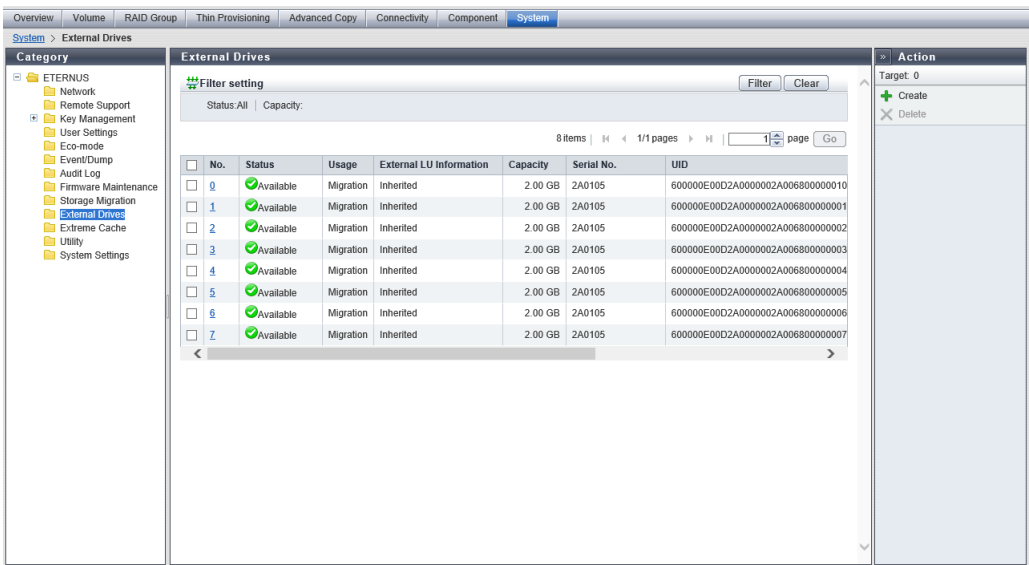
8. System
External Drives

Default role	Availability of executions
Admin	✓
StorageAdmin	✓
AccountAdmin	
SecurityAdmin	✓
Maintainer	✓

Refer to "[A. User Roles and Policies](#)" (page 1580) for details on the policies and roles.

■ Display Contents

The External Drive information is displayed.



External Drive List

Item	Description
No.	The External Drive number is displayed. The External Drive number is allocated when an External Drive is created from the smallest unused decimal number in ascending order. Click this item to display the " [External Drive Detail] Screen " (page 1482).
Status	The External Drive status is displayed. When the status is normal, "✓Available" or "ⓘAvailable" is displayed. Refer to " External Drive Status " (page 1608) for details.
Usage	The usage of the External Drive is displayed. <ul style="list-style-type: none"> Migration An External Drive that is used for data migrations.
External LU Information	Whether the External Drive inherits the " External LU Information " is displayed. If "External LU Information" is inherited, "Inherited" is displayed. If "External LU Information" is not inherited, a "-" (hyphen) is displayed.
Capacity	The capacity of the External Drive [TB/GB/MB] is displayed.
Serial No.	The serial number of the external storage system is displayed.

8. System

External Drives

Item	Description
UID	The identifier (storage system name) that identifies the External Drive from the host is displayed. 32-digit capital letters and numeric characters (hexadecimal)
Vendor ID	The manufacturer name of the external storage system is displayed.
Product ID	The product name of the external storage system is displayed.
LUN Addressing	The format type of the LUN Addressing that is set for the External Drive is displayed. If LUN Addressing is not "PRHL (Peripheral device addressing)" or "FLAT (Flat space addressing)", a "-" (hyphen) is displayed.
LUN	The volume number (host LUN) of the External Drive is displayed. If the LUN Addressing is "PRHL" or "FLAT" 0 - 4095 (decimal) For the other conditions Volume number (16-digit hexadecimal)

[External Drive Detail] Screen

The detailed information of the External Drive is displayed.

External Drive#x Information (x: External Drive number)

Item	Description
Status	The External Drive status is displayed. When the status is normal, "✔Available" or "🔵Available" is displayed. Refer to ""External Drive Status" (page 1608)" for details.
Usage	The usage (Migration) of the External Drive is displayed.
External LU Information	Whether the External Drive inherits the "External LU Information" is displayed. If "External LU Information" is inherited, "Inherited" is displayed. If "External LU Information" is not inherited, a "-" (hyphen) is displayed.
Capacity	The capacity of the External Drive is displayed. In addition, the capacity is displayed in "bytes" within parentheses. Capacity [TB/GB/MB] (Capacity [bytes])
Serial No.	The serial number of the external storage system is displayed.
UID	The identifier (storage system name) that identifies the External Drive from the host is displayed. 32-digit capital letters and numeric characters (hexadecimal)
Vendor ID	The manufacturer name of the external storage system is displayed.
Product ID	The product name of the external storage system is displayed.
LUN Addressing	The format type of the LUN Addressing that is set for the External Drive is displayed. If LUN Addressing is not "PRHL" or "FLAT", a "-" (hyphen) is displayed.
LUN	The volume number (host LUN) of the External Drive is displayed. If the LUN Addressing is "PRHL" or "FLAT" 0 - 4095 (decimal) For the other conditions Volume number (16-digit hexadecimal)

8. System
External Drives

Item	Description
Connection Path Target WWN : Initiator Port	<p>The connection path information between the external storage system and the local storage system is separated with a ":" (colon) and displayed in the "xx:yy" format.</p> <p>For "xx", the WWN for the FC port in the external storage system is displayed. For "yy", the location information of the FC-Initiator port in the local storage system is displayed. If storage systems are connected with multiple paths, multiple connection path information is displayed.</p> <p>For the ETERNUS DX900 S5 or the ETERNUS DX8900 S4 CE#x CM#y CA#z Port#w</p> <p>For the other models CM#y CA#z Port#w</p> <p>x: CE number y: CM number z: CA number w: Port number</p>

■ Filter Setting

Function Description

Filter setting is a function used to display only the External Drives matching all the specified conditions. No filtering is set by default. The following table shows conditions that can be specified.

Item	Description	Setting values
Status	Select the status of the External Drive that is to be displayed. Refer to "External Drive Status" (page 1608) for details.	All
Capacity	Input the capacity of the External Drives that are to be displayed and select the units of capacity. If the capacity of the External Drive is not used for filtering, leave this item blank or specify "0".	Capacity [TB/GB/MB]

Create External Drive

- ["Overview" \(page 1483\)](#)
- ["User Privileges" \(page 1484\)](#)
- ["Settings" \(page 1485\)](#)
- ["Display Contents" \(page 1485\)](#)
- ["Operating Procedures" \(page 1488\)](#)

■ Overview

This function creates External Drives by transferring the volume information (External LU Information) in the [external storage system](#) to the [local storage system](#).

This function is available only if the Non-disruptive Storage Migration License has been registered.

The following list shows the maximum number of External Drives (*1) that can be created for each model.

- ETERNUS DX60 S5: 512
- ETERNUS DX100 S5: 2048
- ETERNUS DX200 S5: 4096
- ETERNUS DX500 S5: 8192
- ETERNUS DX600 S5: 8192
- ETERNUS DX900 S5: 16384

- ETERNUS DX8900 S4: 16384
- ETERNUS AF150 S3: 2048
- ETERNUS AF250 S3: 4096
- ETERNUS AF650 S3: 8192

*1: Up to 512 volumes can be migrated per external storage system in a single operation.

Caution

- **External Drives** that inherit the "**External LU Information**" cannot be used for the Storage Cluster function.
- The following operations are not available for the created External Drives:
 - Using External Drives as hot spare disks (Global Hot Spares or Dedicated Hot Spares)
 - Creating REC Disk Buffers with the External Drives
 - Setting disk patrol for the External Drives
 - Diagnosing the External Drives
 - Performing the External Drive maintenance operations (or using the [Hot Preventive Maintenance] function, the [Force Enable Module] function, the [Force Disable Module] function, and the [Remove Disk Drive] function)

Note

- External Drives that inherit volume information are displayed in the [External Drives] screen. Refer to the [External Drives] function for details.
- External Drives can be deleted. Refer to the [Delete External Drive] function for details.

■ User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	✓
StorageAdmin	✓
AccountAdmin	
SecurityAdmin	
Maintainer	✓

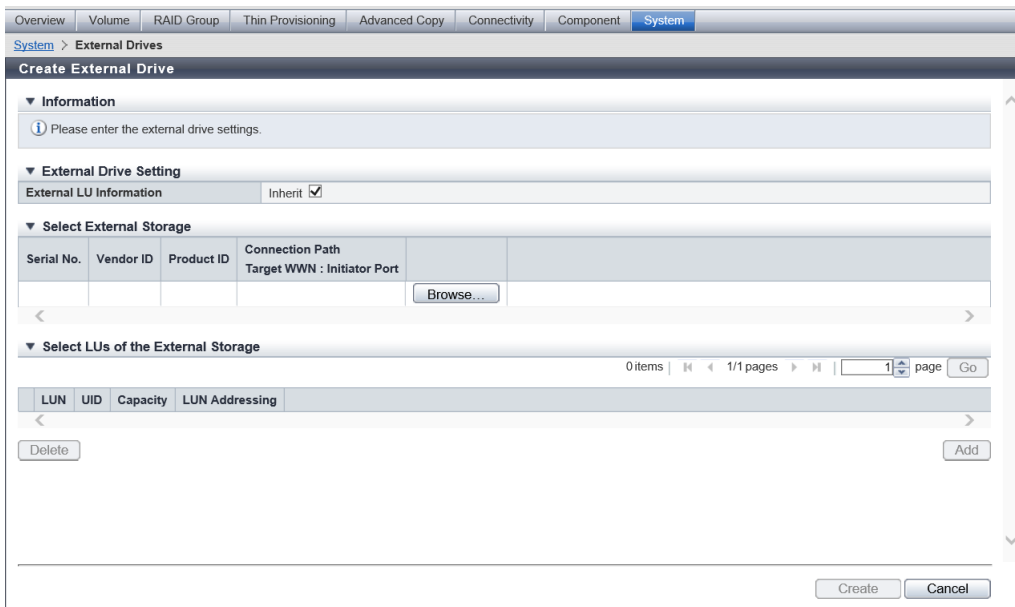
Refer to "[A. User Roles and Policies](#)" (page 1580) for details on the policies and roles.

■ Settings

External Drive Setting

Item	Description
External LU Information	<p>To inherit the volume information (External LU Information) from the external storage system when External Drives are created, select the "Inherit" checkbox.</p> <p>If the "Inherit" checkbox is selected (default), all External Drives that are created by this operation inherit the volume information.</p> <div style="background-color: #fff9c4; padding: 10px; border: 1px solid #ccc;"> <p>Caution</p> <ul style="list-style-type: none"> To use the data migration destination volume for the Storage Cluster function, clear the "Inherit" checkbox. </div>

■ Display Contents



Select External Storage

The external storage system information that is selected in the "[[Select External Storage](#)] Screen" (page 1487) is displayed. The item name and the [Browse...] button are displayed if no external storage system is selected.

Item	Description
Serial No.	The serial number of the external storage system is displayed.
Vendor ID	The manufacturer name of the external storage system is displayed.
Product ID	The product name of the external storage system is displayed.

8. System

External Drives

Item	Description
Connection Path Target WWN : Initiator Port	<p>The connection path information between the external storage system and the local storage system is separated with a ":" (colon) and displayed in the "xx:yy" format.</p> <p>For "xx", the WWN for the FC port in the external storage system is displayed. For "yy", the location information of the FC-Initiator port in the local storage system is displayed. If storage systems are connected with multiple paths, multiple connection path information is displayed.</p> <p>For the ETERNUS DX900 S5 or the ETERNUS DX8900 S4 CE#x CM#y CA#z Port#w</p> <p>For the other models CM#y CA#z Port#w</p> <p>x: CE number y: CM number z: CA number w: Port number</p>

Function Button

Item	Description
[Browse...]	<p>Selects the external storage system for the migration source.</p> <p>This button is available when no volumes are selected in the "[Select LUs of the External Storage] Screen" (page 1487).</p> <p>Click this button to display the "[Select External Storage] Screen" (page 1487).</p>

Select LUs of the External Storage

The list of volumes in the external storage system that are selected in the "[Select LUs of the External Storage] Screen" (page 1487) is displayed. If no volumes are selected, the item name and the [Add] button are displayed.

Item	Description
Checkbox to select the deletion target LUN	Select the checkbox for the volume that is to be deleted.
LUN	<p>The volume number (host LUN) of the external storage system is displayed.</p> <p>If the LUN Addressing is "PRHL" or "FLAT" 0 - 4095 (decimal)</p> <p>For the other conditions Volume number (16-digit hexadecimal)</p>
UID	<p>The identifier (storage system name) that uniquely identifies the volume in the external storage system from the host is displayed.</p> <p>32-digit capital letters and numeric characters (hexadecimal)</p>
Capacity	The volume capacity (TB/GB/MB) of the external storage system is displayed.
LUN Addressing	<p>The format type of the LUN Addressing that is set for the volumes in the external storage system is displayed.</p> <p>If LUN Addressing is not "PRHL (Peripheral device addressing)" or "FLAT (Flat space addressing)", a "-" (hyphen) is displayed.</p>

Function Button

Item	Description
[Add]	Adds volumes that transfer the External LU Information to the local storage system. Click this button to display the "[Select LUs of the External Storage] Screen" (page 1487). If no external storage system is selected in the [Select External Storage] screen, the [Add] button cannot be clicked. Note that at this point, the list of External Drives to be created is not applied to the storage system.
[Delete]	Deletes the volume that is selected with the checkbox from the list. If no volumes are selected, the [Delete] button cannot be clicked. Note that at this point, the list of External Drives to be created is not applied to the storage system.

[Select External Storage] Screen

The list of external storage systems that are connected to the local storage system is displayed.
Select an external storage system for the migration source.

Item	Description
Radio button to select an external storage system	Selects the external storage system for the migration source.
Serial No.	The serial number of the external storage system is displayed.
Vendor ID	The manufacturer name of the external storage system is displayed.
Product ID	The product name of the external storage system is displayed.
Connection Path Target WWN : Initiator Port	The connection path information between the external storage system and the local storage system is separated with a ":" (colon) and displayed in the "xx:yy" format. For "xx", the WWN for the FC port in the external storage system is displayed. For "yy", the location information of the FC-Initiator port in the local storage system is displayed. If storage systems are connected with multiple paths, multiple connection path information is displayed. For the ETERNUS DX900 S5 or the ETERNUS DX8900 S4 CE#x CM#y CA#z Port#w For the other models CM#y CA#z Port#w x: CE number y: CM number z: CA number w: Port number

[Select LUs of the External Storage] Screen

The External Storage Information that is selected in the [Select External Storage] screen and the list of volumes are displayed.
Select volumes that transfer the External LU Information to the local storage system.

External Storage Information

Item	Description
Serial No.	The serial number of the external storage system is displayed.
Vendor ID	The manufacturer name of the external storage system is displayed.
Product ID	The product name of the external storage system is displayed.

Select LUs of the External Storage

Item	Description
Checkbox to select External LUs	Select a checkbox for a volume that transfers the External LU Information to the local storage system. To select all the displayed volumes, select the checkbox to the left of "LUN". Note <ul style="list-style-type: none">LUNs with the same UID as the External Drives that are already created in the local storage system are not displayed in this list.
LUN	The volume number (host LUN) of the external storage system is displayed. If the LUN Addressing is "PRHL" or "FLAT" 0 - 4095 (decimal) For the other conditions Volume number (16-digit hexadecimal)
UID	The identifier (storage system name) that uniquely identifies the volume in the external storage system from the host is displayed. 32-digit capital letters and numeric characters (hexadecimal)
Capacity	The volume capacity (TB/GB/MB) of the external storage system is displayed.
LUN Addressing	The format type of the LUN Addressing that is set for the volumes in the external storage system is displayed. If LUN Addressing is not "PRHL" or "FLAT", a "-" (hyphen) is displayed.

■ Operating Procedures

Procedure ▶▶▶

- 1 Click [Create] in [Action].
- 2 Select whether the volume information (External LU Information) of the external storage system is inherited.

Note

- To inherit the External LU Information when External Drives are created, select the "Inherit" checkbox.
- For volumes to be used for the Storage Cluster function, clear the "Inherit" checkbox.

- 3 Click the [Browse...] button for the "Select External Storage" field.
→ The "[Select External Storage] Screen" (page 1487) appears.
- 4 Select the external storage system for the migration source and click the [OK] button.
→ Returns to the original screen. The information for the selected external storage system is displayed.
- 5 When selecting the "Inherit" checkbox, add volumes of the external storage system for transferring the External LU Information to the local storage system.
 - (1) Click the [Add] button on the bottom right of the "Select LUs of the External Storage" field.
→ The "[Select LUs of the External Storage] Screen" (page 1487) appears.
 - (2) Select the volume for transferring the External LU Information to the local storage system (multiple selections can be made) and click the [OK] button.
→ Returns to the original screen. The information of the selected volumes is displayed.

Note

- Select the checkbox to the left of "LUN" in the [Select LUs of the External Storage] screen to select all the displayed volumes.

(3) Repeat Step a and Step b when adding multiple volumes.

Note

- Up to 512 volumes are displayed in the "Select LUs of the External Storage" field.

6 Click the [Create] button.
→ A confirmation screen appears.

Caution

- An error screen appears in the following conditions:
 - The External LU Information failed to be inherited
 - The created External Drive is not in the normal state
 - The number of External Drives that can be created for each model has exceeded the maximum number

7 Click the [OK] button.
→ External Drive creation starts.

8 Click the [Done] button to return to the [External Drives] screen.



Delete External Drive

- ["■ Overview" \(page 1489\)](#)
- ["■ User Privileges" \(page 1490\)](#)
- ["■ Operating Procedures" \(page 1490\)](#)

■ **Overview**

This function deletes the registered External Drives.

This function is available only if the Non-disruptive Storage Migration License has been registered.

Caution

- The [External Drives](#) that configure the [External RAID Groups](#) cannot be deleted. Delete the External RAID Groups before starting this function. Refer to the [Delete External RAID Group] function for details.

Note

- External Drives are displayed in the [External Drives] screen. Refer to the [External Drives] function for details.
- The External Drives that configure the External RAID Groups can be checked in the "Status" field of the [External Drives] screen. External Drives in the "✔Available" or "ⓘAvailable" state are used for the External RAID Groups. External Drives in the "ⓘPresent" state are not used (can be deleted). Refer to the [External Drives] function for details.
- Refer to the [External RAID Group] screen ([External Drives] tab) to check which External RAID Group is using the relevant External Drive. Refer to the [External RAID Group] function for details.

■ User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	✔
StorageAdmin	✔
AccountAdmin	
SecurityAdmin	
Maintainer	✔

Refer to "'A. User Roles and Policies" (page 1580)" for details on the policies and roles.

■ Operating Procedures

Procedure ▶▶▶

- 1 Select the External Drive that is to be deleted (multiple selections can be made) and click [Delete] in [Action].
→ A confirmation screen appears.

Caution

- If the External Drives that configure the External RAID Group are selected, an error screen appears.

- 2 Click the [OK] button.
→ The External Drive deletion starts.
- 3 Click the [Done] button to return to the [External Drives] screen.



Extreme Cache

- "■ Overview" (page 1491)
- "■ User Privileges" (page 1491)
- "■ Display Contents" (page 1491)

Overview

This function displays the following Extreme Cache information.

- The Extreme Cache setting (enabled or disabled)
- Extreme Cache capacity of each CE
- Setting contents of the tuning parameters

Caution

- This function is supported in the ETERNUS DX500 S5/DX600 S5/DX900 S5 and the ETERNUS DX8900 S4.

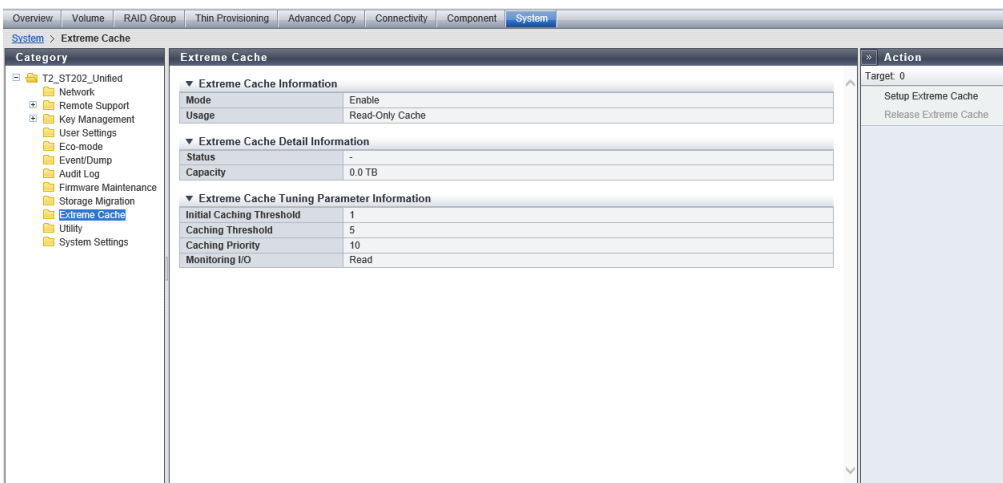
User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	✓
Admin	✓
StorageAdmin	✓
AccountAdmin	
SecurityAdmin	✓
Maintainer	✓

Refer to "A. User Roles and Policies" (page 1580) for details on the policies and roles.

Display Contents





Extreme Cache Information

Item	Description
Mode	Whether the Extreme Cache for the storage system is enabled or disabled is displayed.
Usage	The usage of the Extreme Cache (Read-Only Cache) is displayed. This item is not displayed if "Mode" is "Disable".

Extreme Cache Detail Information

The following items are only displayed when "Mode" is "Enable".

Item	Description
Owner	All the CEs in the storage system are displayed.
Status	<p>The status of the PFM in the relevant CE is displayed.</p> <p>After PFMs are installed, if the Extreme Cache capacity is not specified, a "-" (hyphen) is displayed.</p> <ul style="list-style-type: none"> •  Available All PFMs are in the normal state. •  Broken Some PFMs are in the broken state.
Capacity	<p>The total capacity (TB) that can be used as Extreme Cache in the PFM installed in the relevant CE is displayed.</p> <p>After PFMs are installed, if the Extreme Cache capacity is not specified, "0.0 TB" is displayed.</p>

Extreme Cache Tuning Parameter Information

The following items are only displayed when "Mode" is "Enable".

Item	Description
Initial Caching Threshold	<p>The threshold (1 to 16) that affects how frequently data is stored in Extreme Cache is displayed.</p> <p>If the set value is exceeded, it is assumed that the relevant data is read frequently and the data is stored in Extreme Cache.</p> <p>This parameter specifies the threshold value that is used until the Extreme Cache memory is full after Extreme Cache is enabled.</p>
Caching Threshold	<p>The display contents vary depending on whether the cache data is relocated.</p> <p>If the cache data is relocated, "Caching Threshold" (1 to 16) is displayed as the threshold after the Extreme Cache memory is full.</p> <p>If "Caching Threshold" is exceeded, it is assumed that the relevant data is read frequently and the data is stored in Extreme Cache.</p> <p>If the cache data is not relocated, "Not relocate Cache Data" is displayed.</p>
Caching Priority	The concurrency (1 to 9 or 10 (Fastest)) of the staging process when data is stored in Extreme Cache is displayed.
Monitoring I/O	<p>The I/O type for storing data in Extreme Cache is displayed.</p> <p>Read</p> <p>Read / Write</p>

Setup Extreme Cache

- ["■ Overview" \(page 1493\)](#)
- ["■ User Privileges" \(page 1494\)](#)
- ["■ Settings \(Extreme Cache Settings\)" \(page 1494\)](#)
- ["■ Display Contents" \(page 1496\)](#)
- ["■ Settings \(Tuning Parameter Settings\)" \(page 1497\)](#)
- ["■ Operating Procedures" \(page 1498\)](#)

■ Overview

This function is used to perform the following settings for Extreme Cache.

- The Extreme Cache setting (enabled or disabled)
- Extreme Cache capacity
- Tuning parameters

To use an Extreme Cache, PCIe Flash Modules (PFMs) installed in the CE are required.

After installing PFMs in the storage system, use this function to set the Extreme Cache capacity.

Extreme Cache stores data in the RAID group that is controlled by the CM within the CE where PFMs are installed.

Caution

- PFMs can be installed in the ETERNUS DX500 S5/DX600 S5/DX900 S5 and the ETERNUS DX8900 S4.
- Extreme Cache cannot be enabled under the following conditions:
 - Pinned data exists in the storage system
 - A CM that is not in the "✔Normal" state exists in the CE where PFMs are installed
 - A PFM that is not in the "✔Normal" or "⚠Warning" state exists
 - All of the following conditions are satisfied.
 - The ETERNUS DX8900 S4 is used
 - "GS License" has been registered in the storage system (*1)
 - The usable capacity is 16 GB/CE (or "memory expansion license" has not been registered (*1))

*1: The registration state of the "GS License" and the system memory capacity of each CE can be checked from the [System] screen. Refer to the [System] function for details.
- Extreme Cache uses cache memory to store the control information. Cache memory is not only used for Extreme Cache, but also used for REC Buffers, copy tables, the Thin Provisioning function (*1), the Storage Cluster function (*1), and the Non-disruptive Storage Migration function. Therefore, Extreme Cache may not be enabled or the Extreme Cache capacity cannot be configured depending on the followings.
 - Memory capacity in the storage system
 - REC Buffer size
 - Copy table size
 - Maximum pool capacity
 - Total TFOV capacity (*2)
 - License registration for the Non-disruptive Storage Migration function

*1: When the maximum pool capacity is expanded to "1.5 PB" or larger, the shared area in the cache memory is used. Refer to the descriptions about "Storage Cluster" in the [System] screen for the default capacity of the TFOV for each model.

*2: The total TFOV capacity indicates the total capacity of the volumes that are used for the Storage Cluster function in a storage system.
- If Extreme Cache exists in the storage system, it cannot be disabled. Use this function to confirm that "Current" is all "0.0 TB". Refer to the [Release Extreme Cache] function for details.

Note

- The Extreme Cache setting (enabled or disabled), the memory size, and the tuning parameters can be changed during business operations.
- The Extreme Cache mode (enabled or disabled) of the storage system and the set states of the Extreme Cache mode for each volume are not linked. Regardless of the mode of the Extreme Cache for the storage system, the default state of Extreme Cache for each volume is "Enable".
- Regardless of whether the Extreme Cache is enabled (or disabled) for each volume, [External Volumes](#) do not use the Extreme Cache.
- The cache hit rate of Extreme Cache for each volume can be checked in the [Performance Information] screen. Refer to the [Performance (Host I/O)] function or the [Performance (Advanced Copy)] function for details.
- Installing the same number of PFMs for each CE is not required. By clicking the [Set] button, the PFM capacity that is installed in each CE is set as the available Extreme Cache capacity.
- When the performance monitoring process is started, the current PFM busy rate can be checked. Refer to the [Performance (PCIe Flash Module)] function for details.
- Enabling or disabling Extreme Cache for each volume can be performed. Refer to the [Modify Cache Parameters] function for details.
- Extreme Cache can be used when Extreme Cache for the storage system and Extreme Cache for the relevant volume are both enabled.
- To stop using Extreme Cache in a specific CE, release Extreme Cache for the relevant CE. Refer to the [Release Extreme Cache] function for details.

■ **User Privileges**

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	✓
StorageAdmin	
AccountAdmin	
SecurityAdmin	
Maintainer	✓

Refer to "[A. User Roles and Policies](#)" (page 1580) for details on the policies and roles.

■ **Settings (Extreme Cache Settings)**

Extreme Cache Settings

Item	Description	Setting values
Mode	Select whether to enable or disable the Extreme Cache for the storage system. Refer to " Procedure to Enable or Disable Extreme Cache " (page 1495) for details about the Extreme Cache settings.	Enable Disable (Default)
Usage	The usage of the Extreme Cache (Read-Only Cache) is displayed. A "-" (hyphen) is displayed when the mode is "Disable".	

Procedure to Enable or Disable Extreme Cache

- Using Extreme Cache (Mode: disable → enable)

Procedure ▶▶▶

- 1 Add a PFM to a CE in hot mode.
 - 2 Use this function to enable Extreme Cache.
→ The Extreme Cache capacity is set.
-



- Expanding the Extreme Cache capacity in a specific CE (Mode: enable → enable)

Procedure ▶▶▶

- 1 Add a PFM to the relevant CE in hot mode.
 - 2 Click the [Set] button of this function.
→ The Extreme Cache capacity is set again.
-



- Stopping the use of Extreme Cache memory in a specific CE (Mode: enable → enable)

Procedure ▶▶▶

- 1 Release Extreme Cache from the relevant CE. Refer to the [Release Extreme Cache] function for details.
→ The Extreme Cache capacity of the relevant CE is changed to "0.0 TB".
 - 2 Remove a PFM from the relevant CE in hot mode.
-



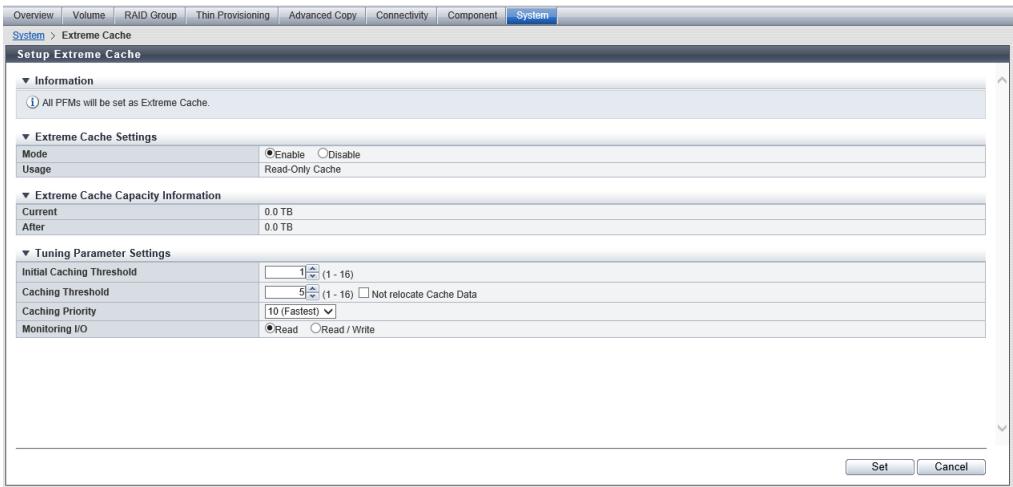
- Stopping the use of Extreme Cache memory in all the CEs (Mode: enable → disable)

Procedure ▶▶▶

- 1 Release Extreme Cache from all the CEs. Refer to the [Release Extreme Cache] function for details.
→ The Extreme Cache capacity of all the CEs is changed to "0.0 TB".
 - 2 Use this function to disable Extreme Cache.
 - 3 Remove the PFMs from all the CEs in hot mode.
-



■ Display Contents



Caution

- If the Extreme Cache capacity is not set after adding the PFM in hot mode, the "Current" (or Extreme Cache capacity) of the relevant CE (*1) is not updated. If "Current" and "After" do not match, use this function to set the Extreme Cache capacity.

*1: For the ETERNUS DX500 S5/DX600 S5, "relevant CE" refers to CE#0.

Extreme Cache Capacity Information

Item	Description
Owner	All the CEs in the storage system are displayed. This item is displayed for the ETERNUS DX900 S5 or the ETERNUS DX8900 S4. CE#x x: CE number
Current	The total capacity that can be used as Extreme Cache in the PFM installed in the relevant CE is displayed. After PFMs are installed, if the Extreme Cache capacity is not specified, "0.0 TB" is displayed.
After	The total of the following values are displayed: the capacity to be newly added and the total capacity that can be used as Extreme Cache in the PFM installed in the relevant CE.

■ Settings (Tuning Parameter Settings)

Tuning Parameter Settings

Item	Description	Setting values
Initial Caching Threshold	<p>Specify the threshold that affects how frequently data is stored in Extreme Cache. The greater the value is, the less frequently data is stored in Extreme Cache. The smaller the value is, the more frequently data is stored in Extreme Cache. If the set value is exceeded, it is assumed that the relevant data is read frequently and the data is stored in Extreme Cache. This parameter specifies the threshold value that is used until the Extreme Cache memory is full after Extreme Cache is enabled.</p> <p>Caution</p> <ul style="list-style-type: none"> This parameter is used for performance tuning. It is not necessary to change the default setting (1) for normal use. 	1 (Default) -16
Caching Threshold	<p>Similar to "Initial Caching Threshold", this parameter specifies the threshold that affects how frequently data is stored in Extreme Cache. If the set value is exceeded, it is assumed that the relevant data is read frequently and the data is stored in Extreme Cache. This threshold value is used after the Extreme Cache memory is full.</p> <p>Caution</p> <ul style="list-style-type: none"> This parameter is used for performance tuning. It is not necessary to change the default setting (5) for normal use. This item is available only when the "Not relocate Cache Data" checkbox is cleared (cache data is relocated). 	1 - 16 5 (Default)
"Not relocate Cache Data" checkbox	<p>Select or clear the "Not relocate Cache Data" checkbox. If the checkbox is selected, new data is not stored (relocated) after the Extreme Cache memory is full. If the checkbox is cleared, the storage system chronologically deletes the stored data from Extreme Cache beginning with the oldest and stores (relocates) new data.</p>	If the data is not relocated, select the checkbox If the data is relocated, clear the checkbox (Default)
Caching Priority	<p>Specify the concurrency of the staging process when data is stored in Extreme Cache. The greater the value is, the higher the concurrency is set for storing data in Extreme Cache. The smaller the value is, the lower the concurrency is set for storing data in Extreme Cache.</p> <p>Caution</p> <ul style="list-style-type: none"> This parameter is used for performance tuning. It is not necessary to change the default value ("10 (Fastest)") for normal use. 	10 (Fastest) (Default) 9 8 7 6 5 4 3 2 1
Monitoring I/O	Select the I/O type for storing data in Extreme Cache.	Read (Default) Read / Write

■ Operating Procedures

Procedure ▶▶▶

- 1 Click [Setup Extreme Cache] in [Action].
- 2 If required, set each item and then click the [Set] button.
→ A confirmation screen appears.

Note

- If the "Current" value and the "After" value do not match (for each CE when the ETERNUS DX900 S5 or the ETERNUS DX8900 S4 is used), the Extreme Cache capacity must be set. When this function is successfully completed after the [Set] button is clicked, the "Current" value is automatically changed to the same size as the "After" value.
- To change the Extreme Cache capacity, the other parameters do not need to be changed. The [Set] button can be clicked even if "Mode" is "Enable".

- 3 Click the [OK] button.
→ The setting of Extreme Cache starts.
- 4 Click the [Done] button to return to the [Extreme Cache] screen.



Release Extreme Cache

- ["■ Overview" \(page 1498\)](#)
- ["■ User Privileges" \(page 1498\)](#)
- ["■ Display Contents" \(page 1499\)](#)
- ["■ Operating Procedures" \(page 1500\)](#)

■ Overview

This function releases the Extreme Cache for each CE.
After the Extreme Cache is released, PFM cannot be used as an Extreme Cache.

Caution

- This function is supported in the ETERNUS DX500 S5/DX600 S5/DX900 S5 and the ETERNUS DX8900 S4.

Note

- If the use of Extreme Cache is to be stopped in a CE, use this function to release the Extreme Cache. PFMs cannot be removed if Extreme Cache is not released.
- Extreme Cache can be released even if a failed PFM is installed in the CE.

■ User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	

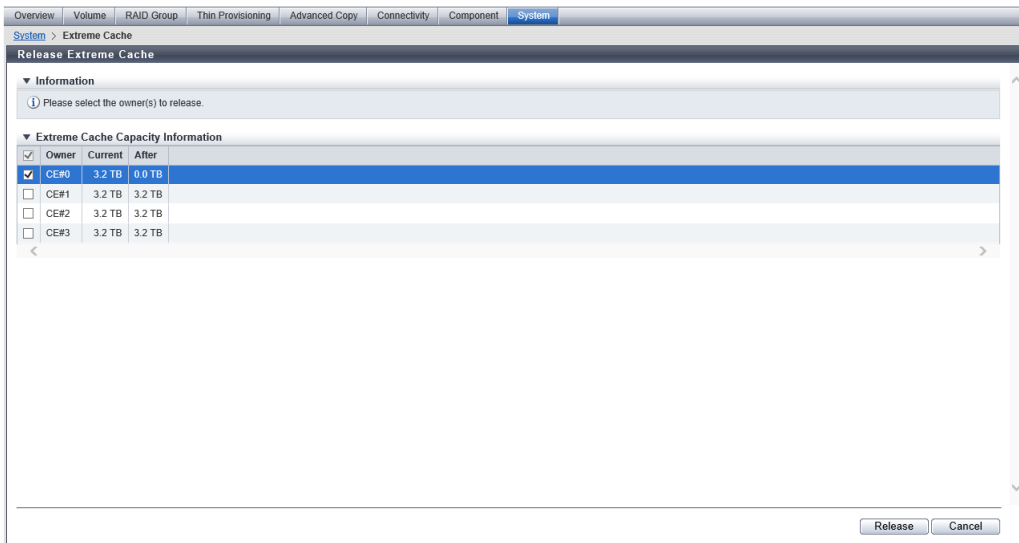
8. System

Extreme Cache

Default role	Availability of executions
Admin	✓
StorageAdmin	
AccountAdmin	
SecurityAdmin	
Maintainer	✓

Refer to ["A. User Roles and Policies" \(page 1580\)](#) for details on the policies and roles.

■ Display Contents



Extreme Cache Capacity Information

Item	Description
Checkbox to select Owners of the Extreme Cache to be released	Select the Owner (CE#x) of the Extreme Cache that is to be released. For CEs without the Extreme Cache capacity setting, the checkbox is disabled. This item is displayed for the ETERNUS DX900 S5 or the ETERNUS DX8900 S4.
Owner	All the CEs in the storage system are displayed. This item is displayed for the ETERNUS DX900 S5 or the ETERNUS DX8900 S4.
Current	The total capacity (TB) that can be used as Extreme Cache in the PFM installed in the target CE is displayed. After PFMs are installed, if the Extreme Cache capacity is not specified, "0.0 TB" is displayed.
After	The total capacity (TB) in the target CE after Extreme Cache is released is displayed. For the ETERNUS DX900 S5 or the ETERNUS DX8900 S4, "0.0 TB" is displayed for the following CEs. <ul style="list-style-type: none"> • CEs where Extreme Cache is to be released (CEs of which "Checkbox to select Owners of the Extreme Cache to be released" is selected.) • CEs where PFMs without the Extreme Cache capacity setting are installed.

■ Operating Procedures

For the ETERNUS DX900 S5 or the ETERNUS DX8900 S4

Procedure ▶▶▶

- 1 Click [Release Extreme Cache] in [Action].

Caution

- If the capacity that can be used as Extreme Cache is "0.0 TB" for all CEs where PFM's are installed, [Release Extreme Cache] cannot be clicked.

- 2 Select the Owner (CE#x) that is to be released (multiple selections can be made) and click the [Release] button.
→ A confirmation screen appears.
- 3 Click the [OK] button.
→ Releasing Extreme Cache starts.
- 4 Click the [Done] button to return to the [Extreme Cache] screen.



For the Other Models

Procedure ▶▶▶

- 1 Click [Release Extreme Cache] in [Action].
→ A confirmation screen appears.

Caution

- [Release Extreme Cache] cannot be clicked if the Extreme Cache capacity is not set.

- 2 Click the [OK] button.
→ Releasing Extreme Cache starts.
- 3 Click the [Done] button to return to the [Extreme Cache] screen.



Extreme Cache Pool

- "[■ Overview](#)" (page 1500)
- "[■ User Privileges](#)" (page 1501)
- "[■ Display Contents](#)" (page 1501)

■ Overview

This function displays the following Extreme Cache Pool information.

- The Extreme Cache Pool setting (enabled or disabled)
- Extreme Cache Pool capacity of each CM
- Setting contents of the tuning parameters

Caution

- This function is supported in the ETERNUS DX100 S5/DX200 S5.

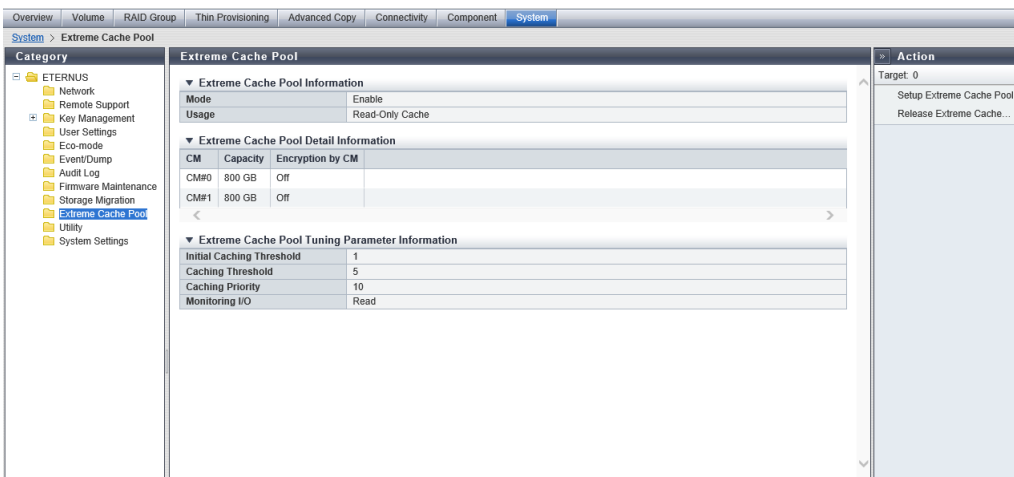
■ User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	✓
Admin	✓
StorageAdmin	✓
AccountAdmin	
SecurityAdmin	✓
Maintainer	✓

Refer to ["A. User Roles and Policies" \(page 1580\)](#) for details on the policies and roles.

■ Display Contents



Extreme Cache Pool Information

Item	Description
Mode	Whether the Extreme Cache Pool for the storage system is enabled or disabled is displayed.
Usage	The usage of the Extreme Cache Pool (Read-Only Cache) is displayed. This item is not displayed if "Mode" is "Disable".

Extreme Cache Pool Detail Information

The following items are only displayed when "Mode" is "Enable".

8. System

Extreme Cache Pool

Item	Description
CM	All the CMs in the storage system are displayed. CM#x x: CM number
Capacity	The Extreme Cache Pool capacity (GB) that is set to the relevant CM is displayed. If the Extreme Cache Pool capacity is not specified, "0 GB" is displayed.
Encryption by CM	The encryption status of the Extreme Cache Pool area is displayed. <ul style="list-style-type: none"> • On The Extreme Cache Pool area is encrypted by CM. • On (SED) The Extreme Cache Pool area is encrypted by using SSD SEDs. • Off The Extreme Cache Pool area is not encrypted.

Extreme Cache Pool Tuning Parameter Information

The following items are only displayed when "Mode" is "Enable".

Item	Description
Initial Caching Threshold	The threshold (1 to 16) that affects how frequently data is stored in Extreme Cache Pool is displayed. If the set value is exceeded, it is assumed that the relevant data is read frequently and the data is stored in Extreme Cache Pool. This parameter specifies the threshold value that is used until the Extreme Cache Pool memory is full after Extreme Cache Pool is enabled.
Caching Threshold	The display contents vary depending on whether the cache data is relocated. If the cache data is relocated, "Caching Threshold" (1 to 16) is displayed as the threshold after the Extreme Cache Pool memory is full. If "Caching Threshold" is exceeded, it is assumed that the relevant data is read frequently and the data is stored in Extreme Cache Pool. If the cache data is not relocated, "Not relocate Cache Data" is displayed.
Caching Priority	The concurrency (1 to 9 or 10 (Fastest)) of the staging process when data is stored in Extreme Cache Pool is displayed.
Monitoring I/O	The I/O type for storing data in Extreme Cache Pool is displayed. Read Read / Write

Setup Extreme Cache Pool

- ["■ Overview" \(page 1503\)](#)
- ["■ User Privileges" \(page 1504\)](#)
- ["■ Display Contents" \(page 1504\)](#)
- ["■ Settings \(Extreme Cache Pool Settings\)" \(page 1504\)](#)
- ["■ Settings \(Extreme Cache Pool Capacity Settings\)" \(page 1505\)](#)
- ["■ Settings \(Tuning Parameter Settings\)" \(page 1507\)](#)
- ["■ Operating Procedures" \(page 1508\)](#)

■ Overview

This function is used to perform the following settings for Extreme Cache Pool.

- The Extreme Cache Pool setting (enabled or disabled)
- The Extreme Cache Pool capacity setting
- Tuning parameters

To use Extreme Cache Pools, 800GB SSDs must be installed in each of the CMs in the CE or DE are required.

Extreme Cache Pool stores data in the RAID group that is controlled by the CM.

Caution

- The ETERNUS DX100 S5/DX200 S5 supports Extreme Cache Pools.
- Extreme Cache Pool does not work when operating in an environment with a high cache hit rate.
- Extreme Cache Pool cannot be enabled under the following conditions:
 - Pinned data exists in the storage system
 - A CM that is not in the "✔Normal" state exists
- If an Extreme Cache Pool includes a RAID group without an "✔Available" state, the setting values and mode of the tuning parameter cannot be changed.
- Value SSDs cannot be used for Extreme Cache Pools.

Note

- The Extreme Cache Pool setting (enabled or disabled), the memory size, and the tuning parameters can be changed during business operations.
- The Extreme Cache Pool mode (enabled or disabled) of the storage system and the set states of Extreme Cache Pool for each volume are not linked. Regardless of the mode of the Extreme Cache Pool for the storage system, the default state of Extreme Cache Pool for each volume is "Enable".
- Regardless of whether the Extreme Cache Pool is enabled (or disabled) for each volume, [External Volumes](#) do not use the Extreme Cache Pool.
- The cache hit rate of Extreme Cache Pool for each volume can be checked in the [Performance Information] screen. Refer to the [Performance (Host I/O)] function or the [Performance (Advanced Copy)] function for details.
- RAID groups that are used as Extreme Cache Pools are configured with RAID0 that has a single drive.
- If multiple CMs are installed in the storage system, setting the same Extreme Cache Pool capacity for each CM is recommended.
- Enabling or disabling Extreme Cache Pool for each volume can be performed. Refer to the [Modify Cache Parameters] function for details.
- Extreme Cache Pool for the relevant volume can be used when the Extreme Cache Pool for the storage system and the Extreme Cache Pool for the volume are both enabled.
- To stop using Extreme Cache Pools, release Extreme Cache Pool. Refer to the [Release Extreme Cache Pool] function for details.

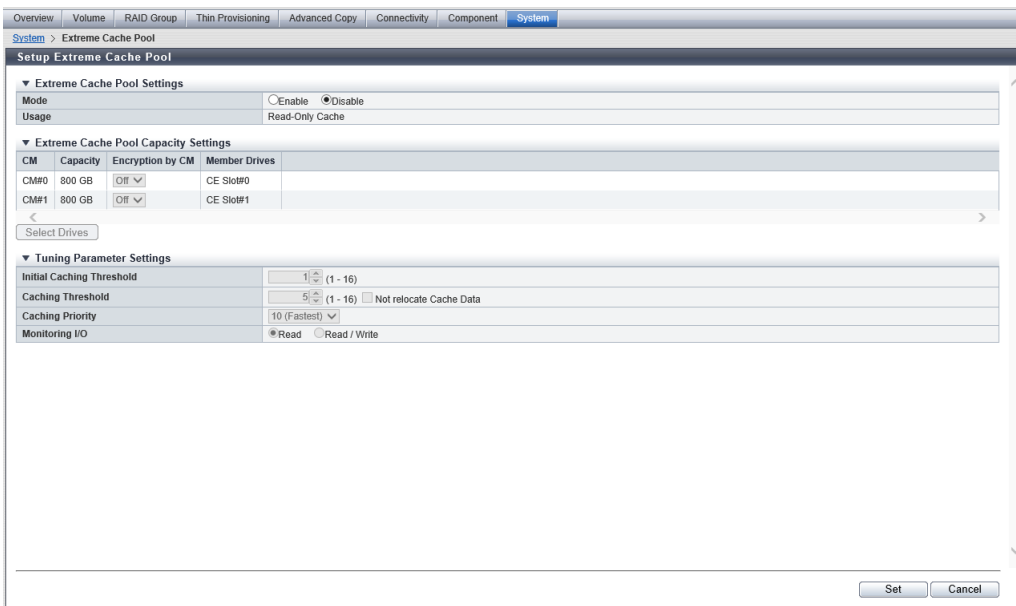
■ User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	✓
StorageAdmin	
AccountAdmin	
SecurityAdmin	
Maintainer	✓

Refer to ["A. User Roles and Policies" \(page 1580\)](#) for details on the policies and roles.

■ Display Contents



■ Settings (Extreme Cache Pool Settings)

Extreme Cache Pool Settings

Item	Description	Setting values
Mode	Select whether to enable or disable the Extreme Cache Pool for the storage system.	Enable Disable (Default)
Usage	The usage of the Extreme Cache Pool (Read-Only Cache) is displayed. A "-" (hyphen) is displayed when the mode is "Disable".	

■ Settings (Extreme Cache Pool Capacity Settings)

Extreme Cache Pool Capacity Settings

Item	Description	Setting values
CM	All the CMs in the storage system are displayed. CM#x x: CM number	
Capacity	The Extreme Cache Pool capacity that is to be set to the relevant CM is displayed. If the Extreme Cache Pool capacity is not specified, "0 GB" is displayed.	
Encryption by CM	Select the encryption status of the Extreme Cache Pool area in the relevant CM. <ul style="list-style-type: none"> On Create an Extreme Cache Pool area that is encrypted by CM. Off Create an Extreme Cache Pool area that is not encrypted by CM. <p>To use an Extreme Cache Pool as secondary cache memory for encrypted volumes, select "On" for this item. This mode is available only when the encryption mode is enabled.</p> <div style="background-color: #fff9c4; padding: 5px; margin: 5px 0;"> <p>Caution</p> <ul style="list-style-type: none"> If the Extreme Cache Pool areas are not encrypted even when encrypted volumes are included in the volumes that are controlled by the relevant CM, Extreme Cache Pools cannot be used as secondary cache memory for I/O to the encrypted volumes. If the volumes controlled by the relevant CM are all unencrypted, encrypting the Extreme Cache Pool area is not required. </div> <div style="background-color: #e0e0e0; padding: 5px; margin: 5px 0;"> <p>Note</p> <ul style="list-style-type: none"> If "SSD SED" is selected for drives that are used as Extreme Cache Pool areas, "On (SED)" is displayed for this item. This item is grayed out and then becomes unselectable. </div>	On Off (Default)
Member Drives	The location information of the drives that are used as Extreme Cache Pool areas to be set in the relevant CM is displayed. If no drives are selected, a "-" (hyphen) is displayed. CE Slot#x DE#yy Slot#x x: Slot number yy: DE number	

Select Drives

Drives can be selected from the list or the installation image. To switch between the list and the installation image, click the tab.

Extreme Cache Pool Capacity Settings

Item	Description
CM	All the CMs in the storage system are displayed. CM#x x: CM number

8. System
Extreme Cache Pool

Item	Description
Capacity	The Extreme Cache Pool capacity that is to be set to the relevant CM is displayed. If no drives are set, "0 GB" is displayed.

[Tabular] Tab

Click the [Tabular] tab to select drives from the list. Unused drives (SSDs or SSD SEDs) are displayed on the list.

Item	Description
Checkbox to select drives	<p>Select the same number of checkboxes as the number of CMs for the drives (800 GB SSDs) used in the RAID groups that configure the Extreme Cache Pools.</p> <p>The initially selected drive is set as the Extreme Cache Pool area for CM#0.</p> <p>The second selected drive is set as the Extreme Cache Pool area for CM#1.</p> <p>The checkbox is selected for a drive that has already been selected as the Extreme Cache Pool area.</p> <div style="background-color: #fff9c4; padding: 10px; margin-top: 10px;"> <p>Caution</p> <ul style="list-style-type: none"> Note that CMs cannot be specified when selecting drives that are to be used as the Extreme Cache Pool areas. </div>

Refer to "Drive Selection" ([Tabular] Tab) in the [Create RAID Group] function for display items.

[Graphic] Tab

Click the [Graphic] tab to select drives from the drive installation image. The installation images of all the drives installed in the storage system are displayed. Checkboxes are displayed for unused drives (SSDs or SSD SEDs).

Item	Description	Setting values
DE selection list box	Select the DE group. DE groups are displayed as options in the list box when at least one CE or DE in the DE group is installed in the storage system.	DE#0x
Checkbox to select drives	<p>Select the same number of checkboxes as the number of CMs for the drives (800 GB SSDs) used in the RAID groups that configure the Extreme Cache Pools.</p> <p>The initially selected drive is set as the Extreme Cache Pool area for CM#0.</p> <p>The second selected drive is set as the Extreme Cache Pool area for CM#1.</p> <p>The checkbox is selected for a drive that has already been selected as the Extreme Cache Pool area.</p> <div style="background-color: #fff9c4; padding: 10px; margin-top: 10px;"> <p>Caution</p> <ul style="list-style-type: none"> Note that CMs cannot be specified when selecting drives that are to be used as the Extreme Cache Pool areas. </div>	

Refer to "Drive Selection" ([Graphic] Tab) in the [Create RAID Group] function for display items.

■ Settings (Tuning Parameter Settings)

Tuning Parameter Settings

Item	Description	Setting values
Initial Caching Threshold	<p>Specify the threshold that affects how frequently data is stored in Extreme Cache Pool. The greater the value is, the less frequently data is stored in Extreme Cache Pool. The smaller the value is, the more frequently data is stored in Extreme Cache Pool. If the set value is exceeded, it is assumed that the relevant data is read frequently and the data is stored in Extreme Cache Pool. This parameter specifies the threshold value that is used until the Extreme Cache Pool memory is full after Extreme Cache Pool is enabled.</p> <p>Caution</p> <ul style="list-style-type: none"> This parameter is used for performance tuning. It is not necessary to change the default setting (1) for normal use. 	1 (Default) -16
Caching Threshold	<p>Similar to "Initial Caching Threshold", this parameter specifies the threshold that affects how frequently data is stored in Extreme Cache Pool. If the set value is exceeded, it is assumed that the relevant data is read frequently and the data is stored in Extreme Cache Pool. This threshold value is used after the Extreme Cache Pool memory is full.</p> <p>Caution</p> <ul style="list-style-type: none"> This parameter is used for performance tuning. It is not necessary to change the default setting (5) for normal use. This item is available only when the "Not relocate Cache Data" checkbox is cleared (cache data is relocated). 	1 - 16 5 (Default)
"Not relocate Cache Data" checkbox	<p>Select or clear the "Not relocate Cache Data" checkbox. If the checkbox is selected, new data is not stored (relocated) after the Extreme Cache Pool memory is full. If the checkbox is cleared, the storage system chronologically deletes the stored data from Extreme Cache Pool beginning with the oldest and stores (relocates) new data.</p>	If the data is not relocated, select the checkbox If the data is relocated, clear the checkbox (Default)
Caching Priority	<p>Specify the concurrency of the staging process when data is stored in Extreme Cache Pool. The greater the value is, the higher the concurrency is set for storing data in Extreme Cache Pool. The smaller the value is, the lower the concurrency is set for storing data in Extreme Cache Pool.</p> <p>Caution</p> <ul style="list-style-type: none"> This parameter is used for performance tuning. It is not necessary to change the default value ("10 (Fastest)") for normal use. 	10 (Fastest) (Default) 9 8 7 6 5 4 3 2 1
Monitoring I/O	Select the I/O type for storing data in Extreme Cache Pool.	Read (Default) Read / Write

■ Operating Procedures

When Enabling Extreme Cache Pool

Procedure ▶▶▶

- 1 Click [Setup Extreme Cache Pool] in [Action].

Note

- To change the tuning parameters only, proceed to Step 4. The [Set] button can be clicked even if "Mode" is "Enable".

- 2 Select "Enable" for "Mode".
- 3 Click the [Select Drives] button.
Select SSDs from the list or the installation image to configure an Extreme Cache Pool as the number of CMs, and click the [OK] button.
→ Returns to the [Extreme Cache Pool Settings] screen.

Caution

- If the number of selected drives differs from the number of CMs, the [OK] button cannot be clicked.

- 4 If required, specify the tuning parameters and then click the [Set] button.
→ A confirmation screen appears.
- 5 Click the [OK] button.
→ The setting of Extreme Cache Pool starts.
- 6 Click the [Done] button to return to the [Extreme Cache Pool] screen.



When Disabling the Extreme Cache Pool

Note

- To disable the Extreme Cache Pool, set the Extreme Cache Pool capacity to "0 GB" in advance. Refer to the [Release Extreme Cache Pool] function for details.

Procedure ▶▶▶

- 1 Click [Setup Extreme Cache Pool] in [Action].
- 2 Select "Disable" for "Mode" and click the [Set] button.
→ A confirmation screen appears.

Note

- The tuning parameters remain even when the Extreme Cache Pool mode is changed from "Enable" to "Disable".

- 3 Click the [OK] button.
→ The setting of Extreme Cache Pool starts.

- 4 Click the [Done] button to return to the [Extreme Cache Pool] screen.



Release Extreme Cache Pool

- "[Overview](#)" (page 1509)
- "[User Privileges](#)" (page 1509)
- "[Operating Procedures](#)" (page 1510)

■ Overview

This function releases the Extreme Cache Pools for all the CMs.
The Extreme Cache Pool cannot be used as secondary cache after it is released.

Caution

- The ETERNUS DX100 S5/DX200 S5 supports Extreme Cache Pools
- Extreme Cache Pool cannot be released under the following conditions:
 - Pinned data exists in the storage system
 - A CM that is not in the "✔Normal" state exists

Note

- To stop using Extreme Cache Pool, perform the following operations.

Procedure ▶▶▶

- 1 Use this function to release the Extreme Cache Pool.
- 2 Disable the Extreme Cache Pool. Refer to the [Setup Extreme Cache Pool] function for details.



■ User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	✔
StorageAdmin	
AccountAdmin	
SecurityAdmin	
Maintainer	✔

Refer to "[A. User Roles and Policies](#)" (page 1580) for details on the policies and roles.

■ Operating Procedures

Procedure ▶▶▶

- 1 Click [Release Extreme Cache Pool] in [Action].
→ A confirmation screen appears.

Caution

- [Release Extreme Cache Pool] cannot be clicked under the following conditions:
 - The Extreme Cache Pool mode is "Disable"
 - The Extreme Cache Pool capacity is "0 GB"

- 2 Click the [OK] button.
→ Releasing Extreme Cache Pool starts.
- 3 Click the [Done] button to return to the [Extreme Cache Pool] screen.



Utility

- ["■ Overview" \(page 1510\)](#)
- ["■ User Privileges" \(page 1510\)](#)
- ["■ Action" \(page 1510\)](#)

■ Overview

Descriptions on the actions that can be started from the [Utility] screen are displayed.

■ User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	✓
StorageAdmin	
AccountAdmin	
SecurityAdmin	✓
Maintainer	✓

Refer to ["A. User Roles and Policies" \(page 1580\)](#) for details on the policies and roles.

■ Action

The following functions can be used from the "Utility" screen:

- ["Reset Backup/Restore Fail" \(page 1511\)](#)
- ["Reset Machine Down Recovery Fail" \(page 1513\)](#)
- ["Force Write Back" \(page 1514\)](#)
- ["Clear Sense Data" \(page 1515\)](#)

- ["Initialize BUD" \(page 1516\)](#)
- ["Force Restore" \(page 1517\)](#)
- ["Force Restore Thin Provisioning" \(page 1519\)](#)
- ["Change Master CM" \(page 1520\)](#)
- ["Reboot All CMs" \(page 1523\)](#)
- ["Shutdown/Restart Storage System" \(page 1524\)](#)
- ["Apply Configuration" \(page 1525\)](#)
- ["Backup Configuration" \(page 1529\)](#)
- ["Export Configuration" \(page 1531\)](#)
- ["Setup Drive Monitor Parameters" \(page 1532\)](#)
- ["Export Drive Monitor Parameters" \(page 1534\)](#)
- ["Start/Stop Performance Monitoring" \(page 1535\)](#)
- ["Clear Cache" \(page 1537\)](#)

Reset Backup/Restore Fail

- ["■ Overview" \(page 1511\)](#)
- ["■ User Privileges" \(page 1512\)](#)
- ["■ Display Contents" \(page 1512\)](#)
- ["■ Operating Procedures" \(page 1512\)](#)

■ Overview

This function resets the "Backup Fail" or "Restore Fail" storage system status.

"Backup Fail" is the status indicating that the storage system cannot start after an error occurs due to power failure, or at a power off. "Restore Fail" is the status that occurs when the restructuring of the operating environment, which is executed at a power-on, fails due to an error. If one of these states occurs, the storage system status may not change even if the cause of the problem is resolved.

This function resets the "Backup Fail" or "Restore Fail" state, if the storage system falls into one of these states.

Caution

- Rebooting the storage system is required to reset "Backup Fail" or "Restore Fail" state. After the resetting "Backup Fail" or "Restore Fail" is complete successfully, reboot the storage system.
- Resetting "Backup Fail" or "Restore Fail" status is performed once the storage system is powered off and on after this operation. If "Backup Fail" or "Restore Fail" is displayed again for the storage system status, execute the [Reset Backup/Restore Fail] function again and then power off and on the storage system to clear the status.
- Do not use this function unless the storage system status is "Backup Fail", "Restore Fail", or "Not Ready".
- If the Thin Provisioning function is used, the forcible restoration is required for Thin Provisioning after the storage system is rebooted.
- When the Advanced Copy function is used, all of the copy sessions are deleted after the storage system is rebooted.

Note

- The "Backup Fail" state of the storage system is displayed as "Not Ready (12)" in the "Storage System Status" field. The "Restore Fail" state is displayed as "Not Ready (4)".

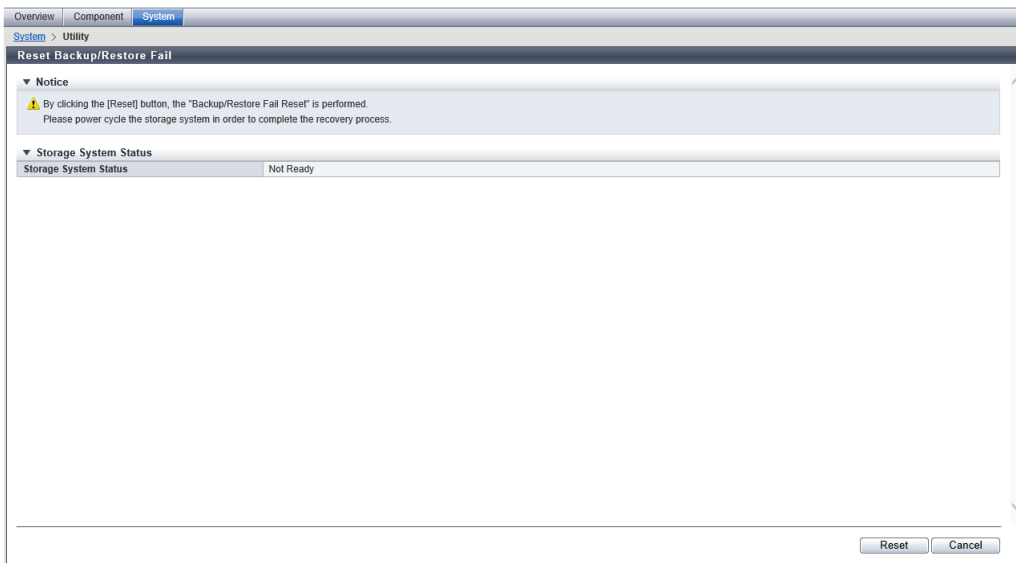
■ **User Privileges**

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	
StorageAdmin	
AccountAdmin	
SecurityAdmin	
Maintainer	✓

Refer to "[A. User Roles and Policies](#)" (page 1580) for details on the policies and roles.

■ **Display Contents**



Storage System Status

Item	Description
Storage System Status	The general status (detail) of the storage system is displayed. Refer to " Storage System General Status (Detail) " (page 1603) for details.

■ **Operating Procedures**

In this screen, reset "Backup Fail" or "Restore Fail" status.

Procedure ▶▶▶

- 1 Click [Reset Backup/Restore Fail] in [Action].

- 2 Check the storage system status, and click the [Reset] button.
→ A confirmation screen appears.

Caution

- Do not use this function unless the storage system status is "Backup Fail", "Restore Fail", or "Not Ready".

- 3 Click the [OK] button.
→ Resetting "Backup Fail" or "Restore Fail" is performed.

- 4 Click the [Done] button to return to the [Utility] screen.

Caution

- After this operation is complete successfully, log out Web GUI and reboot the storage system.
- If the Thin Provisioning function is used, perform the forcible restoration for Thin Provisioning after the storage system is rebooted.



Reset Machine Down Recovery Fail

- ["■ Overview" \(page 1513\)](#)
- ["■ User Privileges" \(page 1513\)](#)
- ["■ Operating Procedures" \(page 1514\)](#)

■ Overview

If two CMs in the storage system fail simultaneously, all port paths are closed in order to protect unwritten data. This condition is called "Machine Down" status.

Normally, the storage system runs a recovery process when the Machine Down status is detected to restore normal operation. However, if the recovery process fails, the storage system's power supply cannot be turned off to prevent the loss of unwritten data. This function is used to resolve this status and restore the storage system.

Caution

- This function can only be used when the status of storage system is "Not Ready 15" (machine down recovery failed) or when the maintenance of the failed CM has been completed.

■ User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	
StorageAdmin	
AccountAdmin	
SecurityAdmin	
Maintainer	✓

Refer to "[A. User Roles and Policies](#)" (page 1580)" for details on the policies and roles.

■ Operating Procedures

Performs a Machine Down recovery reset.

Procedure ▶▶▶

- 1 Click [Reset Machine Down Recovery Fail] in [Action].
- 2 Click the [Reset] button if the storage system status is "Not Ready 15".
→ A confirmation screen appears.
- 3 Click the [OK] button.
→ The Reset Machine Down Recovery Fail process starts.
- 4 Click the [Done] button to return to the [Utility] screen.



Force Write Back

- "[Overview](#)" (page 1514)
- "[User Privileges](#)" (page 1514)
- "[Operating Procedures](#)" (page 1514)

■ Overview

This function forcibly writes back unwritten-data, which has remained in the cache memory of the storage system, to the data drive.

■ User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	
StorageAdmin	
AccountAdmin	
SecurityAdmin	
Maintainer	✓

Refer to "[A. User Roles and Policies](#)" (page 1580)" for details on the policies and roles.

■ Operating Procedures

This function executes forcible write-back.

Procedure ▶▶▶

- 1 Click [Force Write Back] in [Action].
- 2 Click the [Write Back] button.
→ A confirmation screen appears.
- 3 Click the [OK] button.
→ The forcible write-back is executed.

- 4 Click the [Done] button to return to the [Utility] screen.

Note

- When the process is completed successfully, the unwritten-data is written back to the drive.



Clear Sense Data

- ["■ Overview" \(page 1515\)](#)
- ["■ User Privileges" \(page 1515\)](#)
- ["■ Operating Procedures" \(page 1515\)](#)

■ Overview

This function deletes the sense data that is not notified to the host.

Note

- After the operation mode is changed from "Maintenance Mode" to "Normal", the [Clear Sense Data] function is automatically started.

■ User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	
StorageAdmin	
AccountAdmin	
SecurityAdmin	
Maintainer	✓

Refer to ["A. User Roles and Policies" \(page 1580\)](#) for details on the policies and roles.

■ Operating Procedures

Procedure ▶▶▶

- 1 Click [Clear Sense Data] in [Action].
- 2 Click the [Delete] button.
→ A confirmation screen appears.
- 3 Click the [OK] button.
→ Deletion of the sense data starts.
- 4 Click the [Done] button. Returns to the [Utility] screen.



Initialize BUD

- ["■ Overview" \(page 1516\)](#)
- ["■ User Privileges" \(page 1516\)](#)
- ["■ Operating Procedures" \(page 1516\)](#)

■ Overview

This function initializes the Bootup and Utility Device (BUD) of the entire CM.

Caution

- Perform BUD initialization only when directed by Fujitsu's engineer to do so.
- If the BUD is initialized, information stored in the BUD such as logs, panic dumps, and controller firmware archives, is deleted.
After completing initialization, make sure to re-register the controller firmware that is currently used in the storage system.

■ User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	
StorageAdmin	
AccountAdmin	
SecurityAdmin	
Maintainer	✓

Refer to ["A. User Roles and Policies" \(page 1580\)](#) for details on the policies and roles.

■ Operating Procedures

In this screen, initialize the BUD.

Procedure ▶▶▶

- 1 Click [Initialize BUD] in [Action].
- 2 Click the [Initialize] button.
→ A confirmation screen appears.
- 3 Click the [OK] button.
→ Initialization of the BUD is executed.
- 4 Click the [Done] button to return to the [Utility] screen.

Caution

- After completing initialization, make sure to re-register the controller firmware that is currently used in the storage system.



Force Restore

- ["■ Overview" \(page 1517\)](#)
- ["■ User Privileges" \(page 1517\)](#)
- ["■ Display Contents" \(page 1518\)](#)
- ["■ Operating Procedures" \(page 1518\)](#)

■ Overview

This function forcibly restores unwritten data that was stored in the Bootup and Utility Device (BUD) of the CM to cache memory.

The unwritten-data, which has been stored in the BUD, is normally restored in the cache memory at the next power-on. If an error, such as a path error to the BUD, occurs, the status of storage system changes to "Not Ready" and the data will not be restored. "Not Ready" is a status where an abnormality is detected at a power-off, and I/O access from the host cannot be received.

If the storage system status is "Not Ready" after a power-on, after solving the problem, execute the [Force Restore] function and reboot the storage system. By using this function, loss of user data may be avoided.

Caution

- Check the cause of the "Not Ready" status and take necessary steps, such as maintenance, before using this function.
- To restore the unwritten-data stored in the BUD, it is necessary to reboot the storage system. After completing this operation successfully, reboot the storage system.
- The unwritten-data can be restored only once when the storage system is rebooted after executing the [Force Restore] function. If "Not Ready" is displayed as the storage system status, execute the [Force Restore] function again to recover from the "Not Ready" state, and reboot the storage system.
- Do not use this function unless the storage system status is "Restore Fail", or "Not Ready".

Note

- By using this [Force Restore] function when the storage system status is "Restore Fail", loss of user data may be avoided.
- The "Restore Fail" status of the storage system is displayed as "Not Ready (4)" in the "Storage System Status" field.

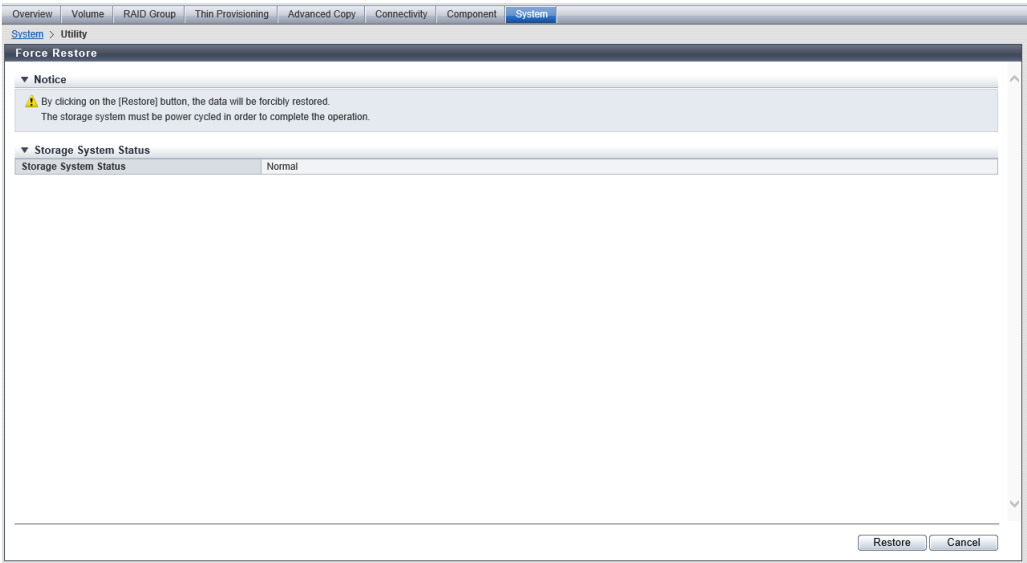
■ User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	
StorageAdmin	
AccountAdmin	
SecurityAdmin	
Maintainer	✓

Refer to ["A. User Roles and Policies" \(page 1580\)](#) for details on the policies and roles.

■ Display Contents



Storage System Status

Item	Description
Storage System Status	The general status (detail) of the storage system is displayed. Refer to ""Storage System General Status (Detail)" (page 1603)" for details.

■ Operating Procedures

This function executes forcible restoration.

Procedure ▶▶▶

- 1 Click [Force Restore] in [Action].
- 2 Check the storage system status, and click the [Restore] button.
→ A confirmation screen appears.

Caution

- Do not use this function unless the storage system status is "Restore Fail", or "Not Ready".

- 3 Click the [OK] button.
→ The forcible restoration is executed.
- 4 Click the [Done] button to return to the [Utility] screen.

Caution

- After this operation is complete successfully, log out of Web GUI and reboot the storage system.



Force Restore Thin Provisioning

- ["■ Overview" \(page 1519\)](#)
- ["■ User Privileges" \(page 1519\)](#)
- ["■ Display Contents" \(page 1519\)](#)
- ["■ Operating Procedures" \(page 1520\)](#)

■ Overview

This function forcibly restores the Thin Provisioning control table that is backed up in the Bootup and Utility Device (BUD) of the CM to the memory.

If this function is used when data cannot be read because the Thin Provisioning control table information in the memory is lost, access to the physical area in TPV/FTV may be enabled with the backed up control table.

Caution

- Do not use this function when the Thin Provisioning function is operating normally. If this function is used while operating, operation, the Thin Provisioning control table in the memory is overwritten with the backed up control table.
- The storage system must be rebooted to complete the restoration.
- This function cannot be used under the following conditions:
 - The Thin Provisioning function is disabled
 - The storage system status is "Not Ready 24"

■ User Privileges

Availability of Executions in the Default Role

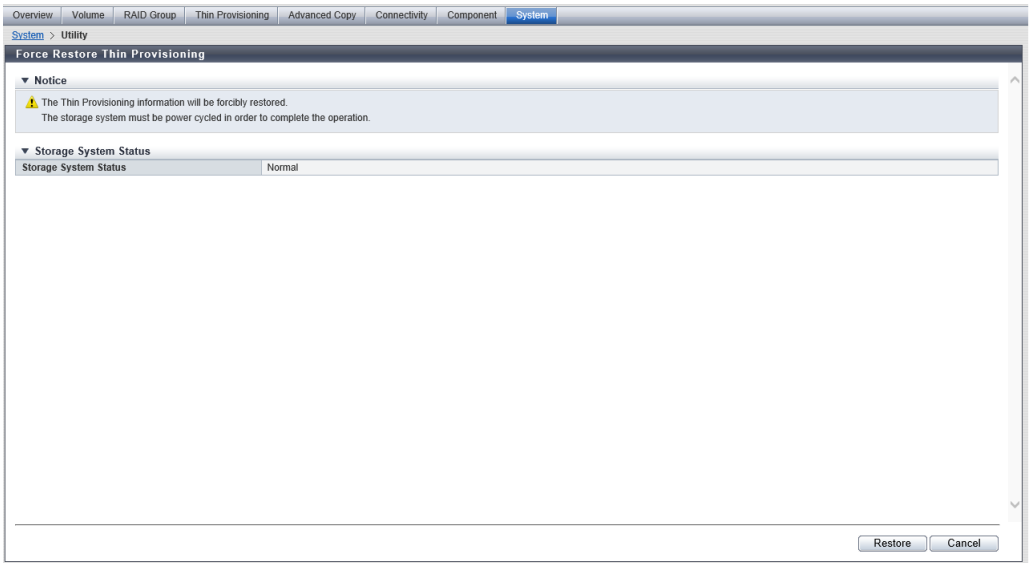
Default role	Availability of executions
Monitor	
Admin	
StorageAdmin	
AccountAdmin	
SecurityAdmin	
Maintainer	✓

Refer to ["A. User Roles and Policies" \(page 1580\)](#) for details on the policies and roles.

■ Display Contents

The storage system information is displayed.

8. System Utility



Storage System Status

Item	Description
Storage System Status	The general status (detail) of the storage system is displayed. Refer to "Storage System General Status (Detail)" (page 1603) for details.

■ Operating Procedures

Procedure ▶▶▶

- 1 Click [Force Restore TPP] in [Action].
- 2 Check the storage system status, and click the [Restore] button.
→ A confirmation screen appears.
- 3 Click the [OK] button.
→ The forcible restoration for the Thin Provisioning is executed.
- 4 Click the [Done] button to return to the [Utility] screen.

Caution

- After this operation is complete successfully, log out of Web GUI and reboot the storage system.

Change Master CM

- ["■ Overview" \(page 1521\)](#)
- ["■ User Privileges" \(page 1521\)](#)
- ["■ Display Contents" \(page 1521\)](#)
- ["■ Operating Procedures" \(page 1522\)](#)

■ Overview

This function switches the Master CM. The Master CM is the Controller Module with the currently enabled LAN port used for device management.

Caution

- This function can only be used when a Web GUI is connected to a slave CM.
- Log in again from Web GUI after switching the Master CM.

Note

- When multiple controllers are present, the CM with access privileges to manage the storage system is called the Master CM. All others are called Slave CMs. When an error occurs in a CM or a LAN, the Master CM is automatically switched, and the IP address of the old Master CM is passed to the new Master CM. By specifying the IP address of the Slave CM, the Master CM can be forcibly switched to the Slave CM when an error occurs and the Master CM cannot be connected.
- Device configuration cannot be continued if the IP address to connect to the CM is changed. Logging in again with the new IP address is required.

■ User Privileges

Availability of Executions in the Default Role

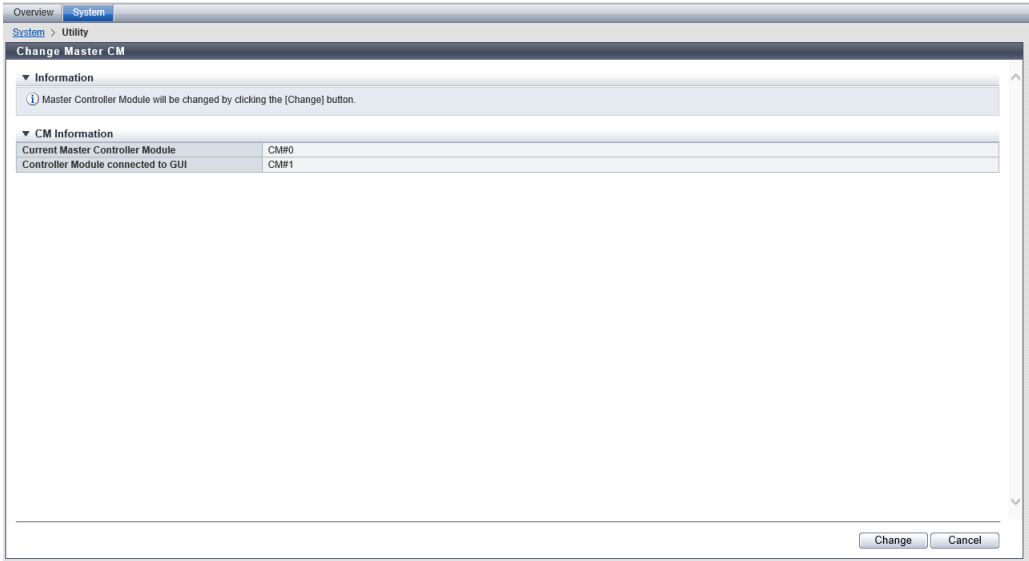
Default role	Availability of executions
Monitor	
Admin	
StorageAdmin	
AccountAdmin	
SecurityAdmin	
Maintainer	✓

Refer to "[A. User Roles and Policies](#)" (page 1580) for details on the policies and roles.

■ Display Contents

This function switches the Master CM.

8. System
Utility



CM Information

Item	Description
Current Master Controller Module	The current Master CM is displayed. For the ETERNUS DX900 S5 or the ETERNUS DX8900 S4 CE#x CM#y For the other models CM#y x: CE number y: CM number
Controller Module connected to GUI	The CM that is logged in with Web GUI (Slave CM) is displayed. The displayed CM changes to the Master CM. For the ETERNUS DX900 S5 or the ETERNUS DX8900 S4 CE#x CM#y For the other models CM#y x: CE number y: CM number

■ **Operating Procedures**

Switch the Master CM.

Procedure ▶▶▶

- 1 Click [Change Master CM] in [Action].
- 2 Click the [Change] button.
→ A confirmation screen appears.
- 3 Click the [OK] button.
→ The Master CM is switched.
- 4 Click the [Done] button to return to the [Utility] screen.



Caution

- After the process is completed successfully, log in again using Web GUI.

Reboot All CMs

- "[Overview](#)" (page 1523)
- "[User Privileges](#)" (page 1523)
- "[Operating Procedures](#)" (page 1523)

■ Overview

This function forcibly reboots (restarts) all the Controller Modules to recover from machine down status.

Caution

- After performing this function, the storage system will automatically log out. After rebooting, log in to Web GUI again.

■ User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	
StorageAdmin	
AccountAdmin	
SecurityAdmin	
Maintainer	✓

Refer to "[A. User Roles and Policies](#)" (page 1580)" for details on the policies and roles.

■ Operating Procedures

This function reboots all CMs.

Procedure ▶▶▶

- 1 Click [Reboot All CMs] in [Action].
- 2 Click the [Reboot] button.
→ A confirmation screen appears.
- 3 Click the [OK] button.
→ All CMs are rebooted.
- 4 Click the [Done] button to return to the [Utility] screen.

Caution

- When the process is complete successfully, Web GUI is logged out automatically. Log in to Web GUI again.

Shutdown/Restart Storage System

- ["■ Overview" \(page 1524\)](#)
- ["■ User Privileges" \(page 1524\)](#)
- ["■ Operating Procedures" \(page 1524\)](#)

■ Overview

When the storage system cannot be shut down directly, perform the shutdown or restart on the screen.

Caution

- This function can be used regardless of whether the "Setup Power Management" is enabled or disabled.
- Note that the storage system may reboot automatically when "Setup Power Management" is enabled. For example, a storage system that is turned off reboots when receiving a power on request from a server during turning off the power.
- This function cannot be used when the storage system is in the machine down status. Restart the browser after completion of the process, and then access the login screen after rebooting of the storage system is complete.

■ User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	✓
StorageAdmin	
AccountAdmin	
SecurityAdmin	
Maintainer	✓

Refer to ["A. User Roles and Policies" \(page 1580\)](#) for details on the policies and roles.

■ Operating Procedures

Shutdown Storage System

This function performs shutdown of the storage system.

Procedure ▶▶▶

- 1 Click [Shutdown/Restart] in [Action].
- 2 Click the [Shutdown] button.
→ A confirmation screen appears.
- 3 Click the [OK] button.
→ The storage system shuts down after 30 seconds.

Caution

- Note that the storage system may reboot automatically when "Setup Power Management" is enabled.

Restart Storage System

In this screen, restart the storage system.

Procedure ▶▶▶

- 1 Click [Shutdown/Restart] in [Action].
- 2 Click the [Restart] button.
→ A confirmation screen appears.
- 3 Click the [OK] button.
→ The storage system shuts down after 30 seconds. After shutdown, the storage system restarts.

Apply Configuration

- ["■ Overview" \(page 1525\)](#)
- ["■ User Privileges" \(page 1527\)](#)
- ["■ Settings" \(page 1527\)](#)
- ["■ Operating Procedures" \(page 1528\)](#)

■ Overview

This function applies the configuration information to the storage system. The following configuration information can be applied.

- The configuration file that is obtained by the [Export Configuration] function
- "1 time before", "2 times before", or the "Latest" configuration information stored in the storage system
- The backup file stored in the Bootup and Utility Device (BUD) of the CM using the [Backup Configuration] function.

"Configuration (1 time before)" and "Configuration (2 times before)" are updated when applying the configuration information using this function. "Configuration (Latest)" is updated when this function is executed and then applied to the storage system.

Caution

- Do not use this function during host access.
- The storage system must be rebooted after this function is executed. Any setting processes cannot be performed until the applied configuration information is enabled by rebooting the storage system.
- If this function is used while the Advanced Copy function is used, the copy session information is deleted after a reboot even if the copy session is in the "Active" or "Suspend" state. In this case, ask your system administrator to recreate the copy sessions and perform the initial copy process of REC.
- Do not use this function when using functions that modify the configuration (e.g. RAID migration) or functions that change data (e.g. format).

- Do not use this function during rebuild, copy back, or redundant copy operation.
 - This function cannot be used under the following conditions:
 - No configuration file is selected
 - No data exists in the configuration file
 - An error exists with the configuration file size
 - An error exists in the configuration file
 - The configuration information cannot be applied in the following conditions:
 - The storage system model does not match the model in the configuration information
 - Snap Data Volume (SDV), Snap Data Pool Volume (SDPV), or REC Disk Buffer is specified in the configuration information even though the Advanced Copy function license has not been registered in the storage system
 - Thin Provisioning Pool (TPP) or Thin Provisioning Volume (TPV) is specified in the configuration information even though the Thin Provisioning function has been disabled for the storage system
 - Encrypted volume or encrypted TPP is specified in the configuration information even though the "Encryption Mode" has been disabled for the storage system
 - The REC disk buffer information for the associated REC buffer in the configuration information does not match the actual storage system configuration
 - The volume encryption status (encryption by CM/unencrypted) in the configuration information does not match the actual storage system configuration (Restore mode selected)
 - The Thin Provisioning configuration in the configuration information does not match the actual storage system configuration (Restore mode selected)
- [Example]
- TPP (Thin Provisioning Pool): The drive type or number of drives does not match
 - TPV (Thin Provisioning Volume): The TPP number does not match
 - FTRP (Flexible Tier Pool): The drive type or number of drives does not match
 - FTSP (Flexible Tier Sub Pool): The drive type or number of drives does not match
 - FTV (Flexible Tier Volume): The FTRP number does not match
- The SDP capacity in the configuration information exceeds the maximum SDP capacity of the storage system
 - The TPP capacity in the configuration information exceeds the maximum TPP capacity of the storage system
 - The configuration information contains a CM that is failed in the actual storage system
 - The configuration information includes unknown parameters
- If "Initialize" is selected for the Apply Mode, formatting of all the volumes is required after rebooting the storage system.
 - If "Initialize" is selected for the Apply Mode, formatting of all TPP and all TPV is required after rebooting the storage system.
 - Do not use this function if different RAID groups are registered in the key group of the storage system and the configuration information. If the configuration information is applied under these circumstances, the status of the SEDs that configure the relevant RAID group changes to "✖ Broken". The RAID groups that are registered in the key group can be checked by using the "SED Key Group" screen.

Note

- When an incorrect apply mode is selected or the wrong configuration information is specified, use the [Cancel Applying Configuration] function to cancel the [Apply Configuration] process before rebooting the storage system. The [Cancel Applying Configuration] function is only available when the [Apply Configuration] function has been executed but the storage system has not been rebooted yet.

User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	
StorageAdmin	
AccountAdmin	
SecurityAdmin	
Maintainer	✓

Refer to "[A. User Roles and Policies](#)" (page 1580) for details on the policies and roles.

Settings

Specify the configuration information to be applied to the storage system.

Select Apply Mode

Item	Description	Setting values
Apply Mode	<p>Select "Restore" or "Initialize" for the application mode of the storage system configuration.</p> <ul style="list-style-type: none"> • Restore Apply the selected configuration information to the storage system, restoring a previous configuration. Select the previous configuration information. • Initialize Apply the selected configuration information to the storage system, setting up a new system configuration. Select a new configuration information or modified configuration information. 	<p>Restore (Default)</p> <p>Initialize</p>

Select Configuration

Item	Description	Setting values
Configuration	<p>Select the configuration to be applied from the following:</p> <ul style="list-style-type: none"> • Configuration (Latest) • Configuration (1 time before) • Configuration (2 times before) • Backup Specify the configuration file (#1 to #4) backed up in the BUD of the CM. • Configuration File Select configuration file stored in a local PC. Click the [Browse...] button to specify the file location. 	<p>Configuration (Latest) (Default)</p> <p>Configuration (1 time before)</p> <p>Configuration (2 times before)</p> <p>Backup</p> <p>Configuration File</p>

8. System Utility

Item	Description	Setting values
Date	If "Configuration (Latest)" is selected, a "-" (hyphen) is displayed. If "Configuration (1 time before)", or "Configuration (2 times before)" is selected, the date and time (YYYY-MM-DD hh:mm:ss) when the configuration was applied to the storage system is displayed. If "Backup" is selected, the date and time (YYYY-MM-DD hh:mm:ss) when the backup was created using the [Backup Configuration] function is displayed.	
Note	Remarks are displayed. If no remarks exist, this field is blank.	

Function Button

Button	Description
[Browse...]	Specifies the location of the configuration file.

■ Operating Procedures

Procedure ▶▶▶

- 1 Click [Apply Configuration] in [Action].
- 2 Specify the parameters, and click the [Apply] button.
→ A confirmation screen appears.
- 3 Click the [OK] button.
→ The configuration file is applied.
- 4 Click the [Done] button to return to the [Utility] screen.

Caution

- Reboot the storage system to enable the configuration.
- If "Initialize" is selected for the Apply Mode, formatting of all the volumes is required after rebooting the storage system. Unformatted volumes cannot be used.
- If "Initialize" is selected for the Apply Mode, formatting of all TPP and all TPV is required after rebooting the storage system. Unformatted TPP and TPV cannot be used.

Cancel Applying Configuration

- ["■ Overview" \(page 1528\)](#)
- ["■ User Privileges" \(page 1529\)](#)
- ["■ Operating Procedures" \(page 1529\)](#)

■ Overview

This function cancels the configuration information that is applied by the [Apply Configuration] function. This function is only available when the [Apply Configuration] has been executed but the storage system has not been rebooted yet.

Note

- When an incorrect apply mode is selected or the wrong configuration information is specified, use this function to cancel the [Apply Configuration] process before rebooting the storage system.

■ **User Privileges**

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	
StorageAdmin	
AccountAdmin	
SecurityAdmin	
Maintainer	✓

Refer to "[A. User Roles and Policies](#)" (page 1580) for details on the policies and roles.

■ **Operating Procedures**

Cancel the application of the configuration information.

Procedure ▶▶▶

- 1 Click [Cancel Applying Configuration] in [Action].
→ A confirmation screen appears.
- 2 Click the [OK] button.
→ Canceling the application of the configuration information starts.
- 3 Click the [Done] button to return to the [Utility] screen.



Backup Configuration

- "[User Privileges](#)" (page 1530)
- "[Settings](#)" (page 1530)
- "[Operating Procedures](#)" (page 1531)

■ **Overview**

This function backs up the configuration definition data to the Bootup and Utility Device (BUD) in the CM. Up to four generations of configuration definition data can be stored.

Caution

- This function cannot be used in the following conditions;
 - When no configuration file is selected
 - When no data exists in the configuration file
 - When an error exists with the configuration file size
 - When an error exists in the configuration file

■ **User Privileges**

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	✓
StorageAdmin	
AccountAdmin	
SecurityAdmin	✓
Maintainer	✓

Refer to "[A. User Roles and Policies](#)" (page 1580) for details on the policies and roles.

■ **Settings**

This function specifies the configuration definition data to be backed up, and its backup destination.

Select Configuration Definition

Item	Description	Setting values
Configuration Definition Data	Select configuration definition data to be backed up from "Configuration (Latest)", "Configuration (1 time before)", or "Configuration (2 times before)". If "Configuration (1 time before)", or "Configuration (2 times before)" do not exist, the radio button for the corresponding configuration definition data cannot be specified.	Configuration (Latest) (Default) Configuration (1 time before) Configuration (2 times before)
Date	The date and time (YYYY-MM-DD hh:mm:ss), on which the configuration definition data has been applied to the device, are displayed.	
Note	The remarks which have been added to the selected configuration definition data are displayed. If no remarks exist, this field is blank.	
Note (text box)	In the "Note" field, remarks which have been added to the selected configuration definition data to be backed up are displayed. If no remarks exist, this field is blank. The "Note" field can be edited (input). Up to 16 alphanumeric characters and symbols (except ",", (comma) and "?")	

Select Backup Slot

Item	Description	Setting values
Configuration Definition Data	Select backup destination of the configuration definition data from "Backup #1", "Backup #2", "Backup #3", or "Backup #4". If a backup destination, on which configuration definition data has already been stored, is selected, the old configuration definition data will be overwritten.	Backup #1 (Default) Backup #2 Backup #3 Backup #4
Date	Date and time (YYYY-MM-DD hh:mm:ss), when the configuration definition data was stored on the backup destination, are displayed.	
Note	Remarks about the configuration definition data, which has been stored on the backup destination, are displayed.	

■ Operating Procedures

Procedure ▶▶▶

- 1 Click [Backup Configuration] in [Action].
- 2 Specify the parameters, and click the [Backup] button.
→ A confirmation screen appears.
- 3 Click the [OK] button.
→ The configuration definition data is backed up.
- 4 Click the [Done] button to return to the [Utility] screen.



Export Configuration

- ["■ Overview" \(page 1531\)](#)
- ["■ User Privileges" \(page 1531\)](#)
- ["■ Operating Procedures" \(page 1532\)](#)

■ Overview

This function exports the configuration data from the storage system as a configuration file and stores it in the local PC, or other medium.

Caution

- The obtained configuration files may be required to restore the storage system if an error occurs. When altering the storage system configuration information, it is recommended to backup the configuration file before making any changes.
- When exporting of the configuration information has been completed, save the file immediately. The extension of the file to be saved must be ".cfg".

■ User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	

8. System Utility

Default role	Availability of executions
Admin	✓
StorageAdmin	
AccountAdmin	
SecurityAdmin	✓
Maintainer	✓

Refer to "[A. User Roles and Policies](#)" (page 1580) for details on the policies and roles.

■ Operating Procedures

Procedure ▶▶▶

- 1 Click [Export Configuration] in [Action].
- 2 Click the [Download] button to save the configuration file.
→ A confirmation screen appears.
- 3 Click the [OK] button.
The extension of the file to be saved must be ".cfg".
The default file name is "Conf_serial number for the storage system_YYYY-MM-DD_hh-mm-ss.cfg".
(YYYY-MM-DD_hh-mm-ss: the date and time when the download screen (Step 2) is displayed.)
→ The configuration information is exported.
- 4 Click the [Cancel] button to return to the [Utility] screen.

Caution

- When exporting of the configuration information has been completed, save the file immediately.



Setup Drive Monitor Parameters

- "[■ Overview](#)" (page 1532)
- "[■ User Privileges](#)" (page 1533)
- "[■ Display Contents](#)" (page 1533)
- "[■ Settings](#)" (page 1533)
- "[■ Operating Procedures](#)" (page 1534)

■ Overview

This function updates the drive monitor parameters.

The "drive monitor parameter" is a threshold for the number of errors to detect for a drive failure.

Caution

- Follow the Support Department instructions when this function is required.

Note

- The updated drive monitor parameter is applied immediately to the storage system.

■ User Privileges

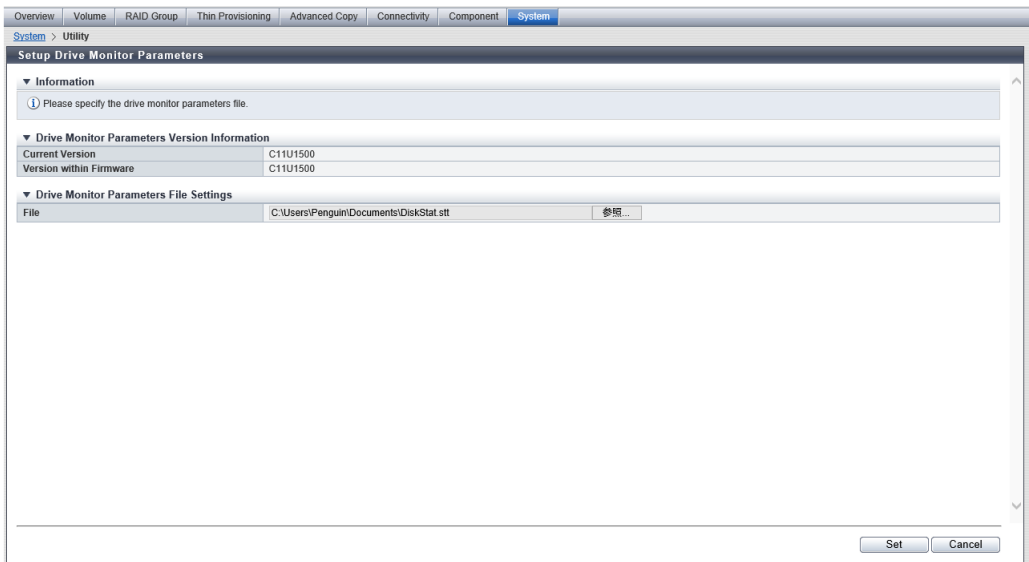
Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	
StorageAdmin	
AccountAdmin	
SecurityAdmin	
Maintainer	✓

Refer to "'A. User Roles and Policies" (page 1580)" for details on the policies and roles.

■ Display Contents

The drive monitor parameters version information is displayed.



Drive Monitor Parameters Version Information

Item	Description
Current Version	The current drive monitor parameter version is displayed. CxxUxxxx x: hexadecimal (0 - f)
Version within Firmware	The drive monitor parameter version in the controller firmware is displayed. CxxUxxxx x: hexadecimal (0 - f)

■ Settings

In this screen, set the drive monitor parameters file.

Drive Monitor Parameters File Settings

Item	Description	Setting values
File	Select the drive monitor parameter file to set.	Drive monitor parameters file

■ Operating Procedures

Procedure ▶▶▶

- 1 Click [Setup Drive Monitor Parameters] in [Action].
- 2 Specify the drive monitor parameters file, and click the [Set] button.
→ A confirmation screen appears.

Caution

- If the drive monitor parameters file version is incorrect, an error occurs.

- 3 Click the [OK] button.
→ The drive monitor parameters file is updated.
- 4 Click the [Done] button to return to the [Utility] screen.

Export Drive Monitor Parameters

- ["■ Overview" \(page 1534\)](#)
- ["■ User Privileges" \(page 1534\)](#)
- ["■ Display Contents" \(page 1534\)](#)
- ["■ Operating Procedures" \(page 1535\)](#)

■ Overview

This function exports the latest drive monitor parameters file that was applied to the storage system and saves it in the settings PC.

■ User Privileges

Availability of Executions in the Default Role

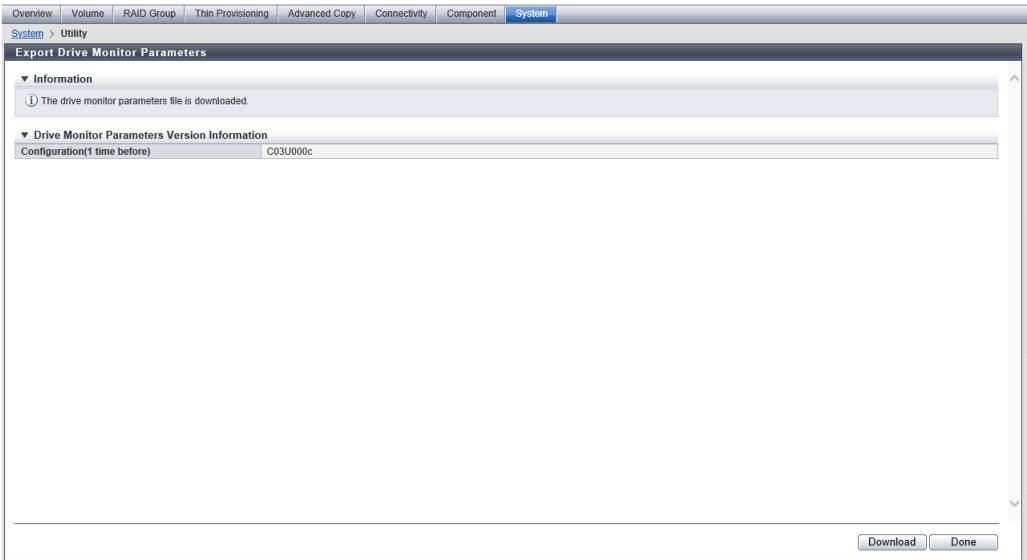
Default role	Availability of executions
Monitor	
Admin	
StorageAdmin	
AccountAdmin	
SecurityAdmin	
Maintainer	✓

Refer to ["A. User Roles and Policies" \(page 1580\)](#) for details on the policies and roles.

■ Display Contents

The drive monitor parameters version information is displayed.

8. System Utility



Drive Monitor Parameters Version Information

Item	Description
Configuration (1 time before)	The previous drive monitor parameters file version that was applied to the storage system is displayed. CxxUxxxx x: hexadecimal (0 - f)

■ Operating Procedures

Procedure ▶▶▶

- 1 Click [Export Drive Monitor Parameters] in [Action].
- 2 Confirm the drive monitor parameters file version, and click the [Download] button.
→ A dialog box to download the file appears.
- 3 Save the file according to the procedure for each web browser.
The default file name is "DiskStat_serial number for the storage system_YYYY-MM-DD_hh-mm-ss.stt".
(YYYY-MM-DD_hh-mm-ss: the date and time when the download screen (Step 2) is displayed.)
→ Download drive monitor parameters file is started.
- 4 Click the [Done] button to return to the [Utility] screen.

Start/Stop Performance Monitoring

- "■ Overview" (page 1536)
- "■ User Privileges" (page 1536)
- "■ Settings" (page 1536)
- "■ Operating Procedures" (page 1536)

■ Overview

This function acquires performance information and displays the result.

The Start/Stop Performance Monitoring function is used to start or stop acquiring the storage system performance information. Acquired information can be checked using the [Performance] function.

Caution

- When the storage system is rebooted, the performance monitoring process is stopped.

Note

- If performance monitoring is started from a monitoring software other than CLI, the process cannot be stopped by Web GUI.
- If performance monitoring is started from Web GUI, the process can be stopped from other monitoring software.

■ User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	✓
StorageAdmin	
AccountAdmin	
SecurityAdmin	
Maintainer	✓

Refer to "[A. User Roles and Policies](#)" (page 1580) for details on the policies and roles.

■ Settings

Performance Monitoring

Item	Description	Setting values
Monitoring State	The current status of performance monitoring is displayed. <ul style="list-style-type: none">• Stopped• Active If the "Monitoring State" is "Stopped", the performance monitoring can be started. If the "Monitoring State" is "Active", the process can be stopped.	
Interval (sec.)	When performance monitoring starts, specify the interval for acquiring the performance information here (sec.). During the performance monitoring, the interval for performance monitoring is displayed (sec.).	30 - 300 (in the unit of 30 seconds) 30 sec. (Default)

■ Operating Procedures

Starts or stops performance monitoring.

Starting Performance Monitoring

The [Start] button is displayed when the "Monitoring State" is "Stopped".

Procedure ▶▶▶

- 1 Click [Start/Stop Perfmon] in [Action].
- 2 Specify the interval, and click the [Start] button.
→ A confirmation screen appears.
- 3 Click the [OK] button.
→ Performance monitoring is started.
- 4 Click the [Done] button to return to the [Utility] screen.



Stopping performance monitoring

The [Stop] button is displayed when "Monitoring State" is "Active".

Procedure ▶▶▶

- 1 Click [Start/Stop Perfmon] in [Action].
- 2 Click the [Stop] button.
→ A confirmation screen appears.

Caution

- If the [Stop] button is clicked after starting performance monitoring from other monitoring software, an error screen is displayed.

- 3 Click the [OK] button.
→ Performance monitoring is stopped.
- 4 Click the [Done] button to return to the [Utility] screen.



Clear Cache

- ["■ Overview" \(page 1537\)](#)
- ["■ User Privileges" \(page 1538\)](#)
- ["■ Settings" \(page 1539\)](#)
- ["■ Operating Procedures" \(page 1539\)](#)

■ Overview

This function clears all of the data on the CM cache memory, data on the Extreme Cache, and data on the Extreme Cache Pool (hereinafter collectively referred to as "cache data").

This function is used when monitoring the system performance.

Cache Data to be Cleared

- Read data on the CM, Extreme Cache (*1), and Extreme Cache Pool (*2)
- Multiple cache data to be cleared can be selected from "CM", "Extreme Cache (*1)", and "Extreme Cache Pool (*2)".

*1 : This can be cleared when "Extreme Cache" is enabled for the storage system.

*2 : This can be cleared when "Extreme Cache Pool" is enabled for the storage system.

Caution

- Stopping all host access is recommended before using this function.
- If this function is used during operation, system performance may be temporarily reduced due to clearing the cache data. Make sure to check the access status to the storage system before using this function.
- Stop the performance monitoring before using this function. If this function is used during a performance monitoring, the system performance (IOPS, throughput, response time, and cache hit rate) may temporarily and significantly be increased or decreased.
- This function is not available in a Unified Storage environment.
- If Dirty data (cache data that is not written back to the drive) exists in the cache memory, this function cannot be used. Stop the host access, and after waiting for the Dirty data to be written back to the drive (the Cache LED turns off), execute this function.
- This function cannot be used under the following conditions:
 - The CM status is not "✔Normal"
 - The PFM status is not "✔Normal" (when selecting "Extreme Cache")
 - The status of RAID groups registered as Extreme Cache Pools is not "✔Available" (when selecting Extreme Cache Pool)

Note

- This function deletes the cache data for Read, however the same data is stored in the drive so there is no data loss.
- Cache data in the Extreme Cache can only be cleared when all of the following conditions are satisfied:
 - The ETERNUS DX500 S5/DX600 S5/DX900 S5 or the ETERNUS DX8900 S4 is used
 - PFMs are installed in CEs
 - The Extreme Cache is enabled
 - The Extreme Cache capacity has been specified (other than "0.0 TB")
- Cache data in the Extreme Cache Pool can only be cleared when all of the following conditions are satisfied:
 - The ETERNUS DX100 S5/DX200 S5 is used
 - The Extreme Cache Pool is enabled
 - The Extreme Cache Pool memory size has been specified (other than "0 GB")

■ User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	✔
StorageAdmin	
AccountAdmin	
SecurityAdmin	

Default role	Availability of executions
Maintainer	✓

Refer to ""A. User Roles and Policies" (page 1580)" for details on the policies and roles.

■ Settings

Target Cache Settings

Item	Description	Setting values
Target Cache	Select the cache to clear. <ul style="list-style-type: none"> • CM • Extreme Cache (*1) • Extreme Cache Pool (*2) *1 : This item is only displayed when Extreme Cache is enabled. *2 : This item is only displayed when Extreme Cache Pool is enabled.	CM Selected: Clear the cache (Default) Cleared: Does not clear the cache <hr/> Extreme Cache Selected: Clear the cache (Default) Cleared: Does not clear the cache <hr/> Extreme Cache Pool Selected: Clear the cache (Default) Cleared: Does not clear the cache

■ Operating Procedures

Procedure ▶▶▶

- 1 Click [Clear Cache] in [Action].
- 2 Select the cache to clear and click the [Clear] button.
→ A confirmation screen appears.

Caution

- When an Extreme Cache or an Extreme Cache Pool is selected and the clear conditions are not satisfied, an error occurs.

- 3 Click the [OK] button.
→ The cache data is cleared.

Caution

- An error occurs in the following conditions:
 - The system or CM status is not normal
 - The PFM status is not normal (when selecting "Extreme Cache")
 - The status of RAID groups registered as Extreme Cache Pools is not normal (when selecting "Extreme Cache Pool")
 - Dirty data exists in the cache memory

- 4 Click the [Done] button to return to the [Utility] screen.



System Settings

- "[Overview](#)" (page 1540)
- "[User Privileges](#)" (page 1540)
- "[Display Contents](#)" (page 1540)

■ Overview

This function displays the system setting information.

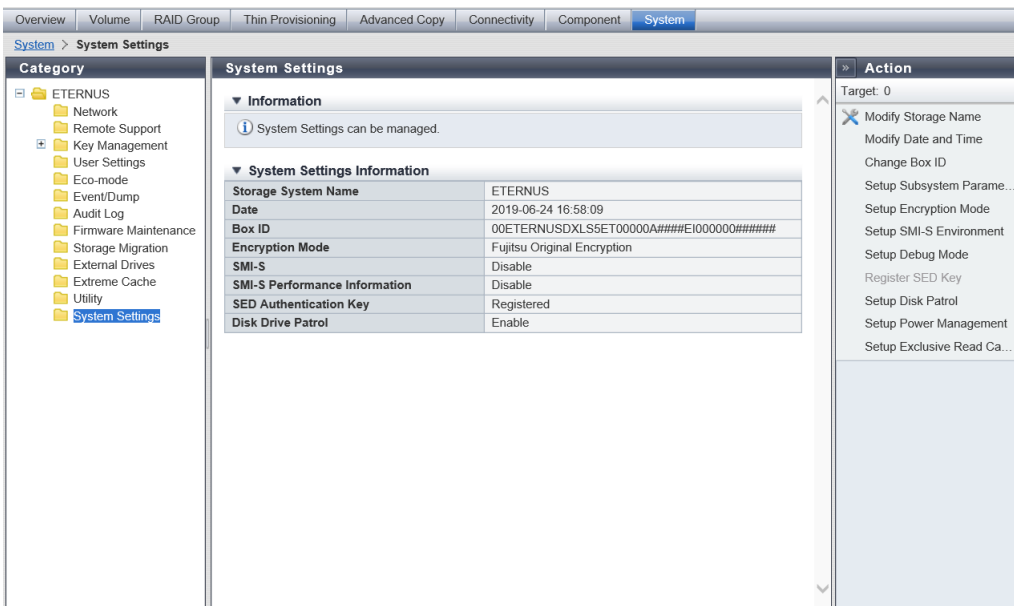
■ User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	✓
Admin	✓
StorageAdmin	✓
AccountAdmin	
SecurityAdmin	✓
Maintainer	✓

Refer to "[A. User Roles and Policies](#)" (page 1580)" for details on the policies and roles.

■ Display Contents



System Settings Information

Item	Description
Storage System Name	The name of the storage system is displayed.
Date	The current date and time (YYYY-MM-DD hh:mm:ss) is displayed.

8. System System Settings

Item	Description
Box ID	The Box ID is displayed.
Encryption Mode	The encryption mode setting is displayed. Fujitsu Original Encryption AES-128 AES-256 Disable
SMI-S	The current Storage Management Initiative - Specification (SMI-S) setting is displayed. If the SMI-S stops due to an error, "Error" is displayed for this item. Enable Disable Error Caution <ul style="list-style-type: none">When enabling or disabling of the SMI-S is being performed, the [Setup SMI-S Environment] action cannot be clicked.
SMI-S Performance Information	The setting status for the SMI-S performance information response is displayed. If the SMI-S stops due to an error, a "-" (hyphen) is displayed for this item. Enable Disable "-" (hyphen)
SED Authentication Key	The registration status of the SED authentication key is displayed. Registered Not Registered
Disk Drive Patrol	The set state of the disk drive patrol function is displayed. Enable Disable

Modify Storage System Name

- ["■ Overview" \(page 1541\)](#)
- ["■ User Privileges" \(page 1542\)](#)
- ["■ Settings" \(page 1542\)](#)
- ["■ Operating Procedures" \(page 1542\)](#)

■ Overview

This function registers the name, administrator, and the installation site of the storage system. Information registered in this screen is used for the following functions and screens:

- Network management using SNMP
- Storage system name displayed in the login screen and the operation screens

Caution

- Once the storage system name has been specified, it cannot be deleted (it can be changed).

■ User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	✓
StorageAdmin	
AccountAdmin	
SecurityAdmin	
Maintainer	✓

Refer to "[A. User Roles and Policies](#)" (page 1580) for details on the policies and roles.

■ Settings

Set the Name of this Storage System

In this screen, specify the storage system name, the installation site, and the administrator of the storage system.

Item	Description	Setting values
Name	Specify the storage system name (required).	Up to 16 alphanumeric characters, symbols (except ", (comma)" and "?"), and spaces
Installation Location	Specify the installation site of the storage system.	0 - 50 alphanumeric characters, symbols (except ", (comma)" and "?"), and spaces
Administrator	Specify the administrator information (the administrator name, contact information, etc) of the storage system.	0 - 50 alphanumeric characters, symbols (except ", (comma)" and "?"), and spaces
Description	Specify the description of the storage system.	0 - 50 alphanumeric characters, symbols (except ", (comma)" and "?"), and spaces

■ Operating Procedures

Procedure ▶▶▶

- 1 Click [Modify Storage Name] in [Action].
- 2 Specify parameters, and click the [Set] button.
→ A confirmation screen appears.

Caution

- An error screen appears in the following conditions:
 - The "Name" is not entered
 - A parameter that does not satisfy the input conditions exists

- 3 Click the [OK] button.
→ Setting of the storage system name starts.
- 4 Click the [Done] button to return to the [System Settings] screen.



Modify Date and Time

- "[■ Overview](#)" (page 1543)
- "[■ User Privileges](#)" (page 1543)
- "[■ Display Contents](#)" (page 1544)
- "[■ Settings](#)" (page 1544)
- "[■ Operating Procedures](#)" (page 1547)
- "[■ Appendix](#)" (page 1548)

■ Overview

This function specifies the date/time and time zone (storage system location) of the internal clock in the storage system.

The clock is used for checking the internal log of the storage system and in the Eco-mode, etc. The time zone setting is used for the Remote Support function.

This function is used when moving the storage system to a new installation site, and/or changing the storage system date/time.

It is possible to setup the NTP server to automatically set the time. If the NTP server cannot be used, resetting the time once a month is recommended.

Caution

- When the network environment is set to the factory default, the NTP function cannot be used. Perform the [Setup Network Environment] function.
- When using Eco-mode, make sure to set the date/time correctly. If the date/time of the storage system is wrong, processes for stopping and starting the disk motor cannot be performed in accordance with the Eco-mode schedule.
- The [Modify Date and Time] function cannot be used while time synchronization with the NTP server is being performed.

Note

- When using the NTP server, the time modification method is the step mode (modify immediately).
- When using the NTP server, the storage system is synchronized with the NTP server every three hours.

■ User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	✓
StorageAdmin	

8. System
System Settings

Default role	Availability of executions
AccountAdmin	
SecurityAdmin	
Maintainer	✓

Refer to "[A. User Roles and Policies](#)" (page 1580) for details on the policies and roles.

■ Display Contents

In this screen, the access status for the NTP is displayed.

NTP Settings

Item	Description
Access Status	<p>The latest access status to the NTP server is displayed.</p> <p>If the time correction by NTP server has been performed, the correction status is displayed.</p> <ul style="list-style-type: none"> When "Enable" is selected for "Synchronize with NTP Server" <ul style="list-style-type: none"> no access records The synchronization result for the NTP server does not exist. YYYY-MM-DD hh:mm:ss succeeded to synchronize with Primary NTP Server Time synchronization with the primary NTP server is performed in YYYY-MM-DD hh:mm:ss. Time synchronization is successfully performed. YYYY-MM-DD hh:mm:ss succeeded to synchronize with Secondary NTP Server Time synchronization with the secondary NTP server is performed in YYYY-MM-DD hh:mm:ss. Time synchronization is successfully performed. YYYY-MM-DD hh:mm:ss failed to synchronize Time synchronization with the NTP server is performed in YYYY-MM-DD hh:mm:ss but fails. When "Disable" is selected for "Synchronize with NTP Server" <ul style="list-style-type: none"> Not yet set The NTP server is not specified.

■ Settings

In this screen, specify the date/time and time zone (storage system location) of the internal clock in the storage system.

Date/Time Settings

Item	Description	Setting values
Date	Change the current date and time settings.	YYYY-MM-DD hh:mm:ss YYYY: Year (2001 - 2037) MM: Month (01 - 12) DD: Date (01 - 31) hh: Hour (00 - 23) mm: Minute (00 - 59) ss: Second (00 - 59) Current date and time (Default)

Time Zone Settings

Item	Description	Setting values
Time Zone	Select the Time Zone from the list box. If the appropriate Time Zone does not exist, select "Manually".	"Time Zone" (page 1548)
Time Zone (time difference setting)	When selecting "Manually" in the time zone field, specify the time difference from GMT using [+]/[-] in hours and minutes.	Time difference: +/- Hour: 00 - 12 Minute: 00, 15, 30, and 45

Daylight Saving Time Settings

Item	Description	Setting values
Daylight Saving Time	Select whether to "Enable" or "Disable" the daylight saving time.	Enable Disable (Default)
Range	When daylight saving time is enabled, select either "By day of the week" or "By Date".	By day of the week (Default) By Date
Start (When "By day of the week" is selected for "Range")	When daylight saving time is enabled, set the start day and the start time.	Start day Month: 01 - 12 Week: 1st - 4th week, last (last week of month) Day: Monday - Sunday Start time Hour: 00 - 23 Month: 01 1st Sunday 00:00 (Default)
End (When "By day of the week" is selected for "Range")	When daylight saving time is enabled, set the end day and the end time.	End day Month: 01 - 12 Week: 1st - 4th week, last (last week of month) Day: Monday - Sunday End time Hour: 00 - 23 Month: 01 1st Sunday 00:00 (Default)
Start (When "By Date" is selected for "Range")	When daylight saving time is enabled, set the start date and the start time.	Start date Month: 01 - 12 Date: 01 - 31, Last Day (last date of the month) Start time Hour: 00 - 23 Month: 01 Date: 01 00:00 (Default)

8. System System Settings

Item	Description	Setting values
End (When "By Date" is selected for "Range")	When daylight saving time is enabled, set the end date and the end time.	End date Month: 01 - 12 Date: 01 - 31, Last Day (last date of the month) End time Hour: 00 - 23 Month: 01 Date: 01 00:00 (Default)

NTP Settings

Item	Description	Setting values
Synchronize with NTP Server	When performing the time synchronization with the NTP server, select "Enable". If the time synchronization is not used, select "Disable".	Enable Disable (Default)
Primary NTP Server	Domain Name / IP Address Input the domain name or the IP address of the primary NTP server. There are two methods to specify an IP address; "IPv4" and "IPv6". The following IPv6 addresses can be used; "link local address", "global address", "unique local address", or "6to4 address". Refer to "Available IPv6 Address" (page 1221) for details. This item is only available when "Yes" is selected for "Synchronize with NTP Server".	Domain name or IP address For domain name specification Up to 63 alphanumeric characters and symbols For IPv4 address xxx.xxx.xxx.xxx xxx: 1 - 255 for the top field (decimal) xxx: 0 - 255 for other fields (decimal) For IPv6 address xxxx:xxxx:xxxx:xxxx:xxxx:xxxx:xxxx:xxxx xxxx: 0 - ffff (FFFF) (hexadecimal, alphanumeric characters) Refer to "IPv6 Address Notation" (page 1220) for details.
	LAN Port used for NTP Select which port is used to connect to the primary NTP server. This item is only available when "Yes" is selected for "Synchronize with NTP Server".	MNT (Default) RMT
Secondary NTP Server	Domain Name / IP Address Input the domain name or the IP address of the secondary NTP server. There are two methods to specify an IP address; "IPv4" and "IPv6". The following IPv6 addresses can be used; "link local address", "global address", "unique local address", or "6to4 address". Refer to "Available IPv6 Address" (page 1221) for details. This item is only available when "Yes" is selected for "Synchronize with NTP Server".	Domain name or IP address For domain name specification Up to 63 alphanumeric characters and symbols For IPv4 address xxx.xxx.xxx.xxx xxx: 1 - 255 for the top field (decimal) xxx: 0 - 255 for other fields (decimal) For IPv6 address xxxx:xxxx:xxxx:xxxx:xxxx:xxxx:xxxx:xxxx xxxx: 0 - ffff (FFFF) (hexadecimal, alphanumeric characters) Refer to "IPv6 Address Notation" (page 1220) for details.
	LAN Port used for NTP Select which port is used to connect to the secondary NTP server. This item is only available when "Yes" is selected for "Synchronize with NTP Server".	MNT (Default) RMT

■ Operating Procedures

Procedure ▶▶▶

- 1 Click [Modify Date and Time] in [Action].
- 2 Specify the parameters, and click the [Set] button.
→ A confirmation screen appears.

Caution

- An error screen appears in the following conditions:
 - A non-existent date has been specified in the date/time settings
 - "By day of the week" is selected for the range of daylight saving time and the same day and time is entered for both the start day/time and the end day/time
 - "By Date" is selected for the range of daylight saving time and the same date and time is entered for both the start date/time and the end date/time
 - "By Date" is selected for the range of daylight saving time and a non-existent date is specified as the start date
 - "By Date" is selected for the range of daylight saving time and a non-existent date is specified as the end date
 - "Yes" is selected for "Synchronize with NTP Server" and the domain or the IP address is not entered for the primary NTP server
 - "Yes" is selected for "Synchronize with NTP Server" and the same domain or IP address is specified for the primary NTP server and the secondary NTP server
 - "Yes" is selected for "Synchronize with NTP Server", the LAN port that is used for the NTP server is "MNT", and the IPv4 address of the NTP server and the broadcast address of the MNT port are the same
 - "Yes" is selected for "Synchronize with NTP Server", the LAN port that is used for the NTP server is "RMT", and the IPv4 address of the NTP server and the broadcast address of the RMT port are the same
 - "Yes" is selected for "Synchronize with NTP Server" and one of the following conditions applies:
 - The IPv4 address for the NTP server and the local host address are the same
 - The IP address (IPv4 address or IPv6 address) for the NTP server and the network address are the same
 - The IP address (IPv4 address or IPv6 address) for the NTP server and the IP address for the MNT port are the same
 - The IP address (IPv4 address or IPv6 address) for the NTP server and the IP address for the RMT port are the same
 - The IP address (IPv4 address) for the NTP server and the IP address for the FST port are the same (for the ETERNUS DX500 S5/DX600 S5/DX900 S5, the ETERNUS DX8100 S4/DX8900 S4, and the ETERNUS AF650 S3)

Note

- When "By day of the week" is selected for the range of daylight saving time, "Last" can be selected to specify the start or end week.
- When "By Date" is selected for the range of daylight saving time, "Last Day" can be selected to specify the start or end date.

- 3** Click the [OK] button.
→ Setting of the date/time starts.

Caution

- If "Yes" is selected for "Synchronize with NTP Server" when there is no NTP server connection or when communication with the NTP server is unstable, the required time for the date and time setting may take longer. Wait until the screen is updated. Even if connection to the NTP server fails, the date and time setting appear as though they have completed. To confirm that the storage system is successfully connected to the NTP server, start the [Modify Date and Time] function and check "Access Status" in the "NTP Settings" field.

- 4** Click the [Done] button to return to the [System Settings] screen.



■ **Appendix**

Time Zone

Select the time zone from the following;

Time Zone
(GMT-12:00) Eniwetok, Kwajalein
(GMT-11:00) Samoa
(GMT-10:00) Honolulu
(GMT-09:00) Alaska
(GMT-08:00) Los Angeles, San Francisco, San Diego
(GMT-07:00) Phoenix, Calgary, Denver
(GMT-06:00) Chicago, Mexico City
(GMT-05:00) New York, Bogota
(GMT-04:00) Caracas
(GMT-03:30) Newfoundland
(GMT-03:00) Sao Paulo, Brasilia
(GMT-02:00) Mid-Atlantic
(GMT-01:00) Azores Island, Cape Verde
(GMT+00:00) Dublin, London, Manchester, Lisbon
(GMT+01:00) Paris, Madrid, Stockholm
(GMT+01:00) Rome, Vienna, Berlin
(GMT+01:00) Milan, Amsterdam
(GMT+02:00) Athens, Helsinki, Cairo
(GMT+02:00) Beirut, Cape Town
(GMT+03:00) Nairobi, Moscow
(GMT+04:00) Abu Dhabi
(GMT+05:00) Islamabad, Karachi
(GMT+05:30) New Delhi
(GMT+06:00) Dhaka
(GMT+07:00) Bangkok, Jakarta

8. System System Settings

Time Zone
(GMT+08:00) Hong Kong, Manila, Singapore
(GMT+08:00) Beijing, Taipei, Kuala Lumpur, Perth
(GMT+09:00) Tokyo, Osaka, Kyoto, Fukuoka, Sapporo
(GMT+09:00) Seoul
(GMT+09:30) Adelaide
(GMT+10:00) Guam, Sydney, Melbourne
(GMT+11:00) Solomon Islands, New Caledonia
(GMT+12:00) Wellington, Auckland, Fiji
Manually

Change Box ID

- ["■ Overview" \(page 1549\)](#)
- ["■ User Privileges" \(page 1549\)](#)
- ["■ Settings" \(page 1550\)](#)
- ["■ Operating Procedures" \(page 1550\)](#)

■ Overview

This function changes the Box ID that identifies a storage system in the user system.

Box ID is used as information to identify the storage system from applications connected to the storage system. The initial Box ID is a device ID that is created by combining storage system information (series name, model, serial number, etc.).

If upgrading or replacing the storage system, the existing Box ID will change with the storage system change. Therefore, there is a risk that the backup data saved in the previous storage system cannot be used, so it is necessary to reconfigure the user system after the storage system is upgraded or replaced. This function changes the device BOX ID to the same ID as that of the previous storage system in order to avoid any problems and also use the same backup data in the new storage system.

Caution

- A Box ID is a unique name in the user system. Make the Box ID different from that of other storage systems in the user system. If the Box ID is not changed, the Device ID is used as a Box ID.
- If the storage system Box ID is changed after setting the Advanced Copy path information, Remote Advanced Copy (REC) will no longer run. After recreating the Advanced Copy path information with the new Box ID, reconfigure the Advanced Copy path information on all storage systems that are set with a path to the storage system that had the Box ID changed.
- This function cannot be used under the following conditions:
 - An Advanced Copy session (except for an ODX session, an XCOPY session, or a Virtual Volume session) exists
 - A volume that is used for the Storage Cluster function exists

■ User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	

8. System
System Settings

Default role	Availability of executions
Admin	✓
StorageAdmin	✓
AccountAdmin	
SecurityAdmin	
Maintainer	✓

Refer to ["A. User Roles and Policies" \(page 1580\)](#) for details on the policies and roles.

■ **Settings**

Change the Box ID of the storage system.

Item	Description	Setting values
Box ID	<p>The Box ID setting of the storage system is displayed.</p> <p>If the storage system is changed, correct the Box ID. The initial Box ID displayed is a 40-digit code (device ID) that is created by combining storage system information (series name, model, serial number, etc.).</p> <p>If the Box ID entered is less than 40 characters, a "#" (hash key) is appended to the Box ID for each character short.</p> <div style="background-color: #fff9c4; padding: 10px; margin-top: 10px;"> <p>Caution</p> <ul style="list-style-type: none"> When spaces are input for the Box ID, the spaces are changed to "#" (hash keys). </div>	<p>The following characters can be used to specify the Box ID:</p> <ul style="list-style-type: none"> Capital letters Numeric characters Spaces "#" (hash keys) <p>A combination of 1 to 40 of the above characters.</p>

■ **Operating Procedures**

Change the Box ID.

Procedure ▶▶▶

- 1 Click [Change Box ID] in [Action].
- 2 The current Box ID setting appears. To change the value, input a new Box ID and click the [Modify] button.
→ A confirmation screen appears.

Caution

- An error screen appears in the following conditions:
 - A Box ID is not input
 - The entered value of a Box ID contains a character other than alphabetic characters (upper case), numeric characters, hash key characters (#), or spaces

- 3 Click the [OK] button.
→ The specified Box ID is registered.

- 4 Click the [Done] button to return to the [System Settings] screen.

Note

- If the Box ID entered is less than 40 characters, a "#" (hash key) is appended to the Box ID for each character short. Then, the 40-digit Box ID is registered in the storage system.



Setup Subsystem Parameters

- ["■ Overview" \(page 1551\)](#)
- ["■ User Privileges" \(page 1553\)](#)
- ["■ Display Contents" \(page 1553\)](#)
- ["■ Settings" \(page 1554\)](#)
- ["■ Operating Procedures" \(page 1563\)](#)

■ Overview

This function specifies the subsystem parameters.

Subsystem parameters are the information which controls the storage system operation when it is connected to hosts. The storage system operates according to the specified subsystem parameters, for all the hosts to be connected.

Caution

- If a change to subsystem parameters is required, the recommended time is when the load is low in the storage system.
- Some subsystem parameters may require rebooting of the server or the storage system after changes have been made. Refer to "[Conditions for Changing Subsystem Parameters](#)" for details.

8. System
System Settings

Conditions for Changing Subsystem Parameters (Parameters Can Be Changed while Accessing the Host: ✓, Not Available: -, Storage System Reboot Is Required: ✓, Storage System Reboot Is Not Required: -)

Category	Subsystem parameter	Changing parameters while accessing the host	Rebooting	
			Storage System	Server
Setup Subsystem Parameters	1CM Write Through	✓	-	-
	Highland Mode	-	✓	-
	Thin Provisioning Allocation Mode	✓	-	-
	Flexible Write Through	✓	-	-
	Ignore CM-CM Communication Error	✓	-	-
	Read Sequential	✓	-	-
	Write Sequential	✓	-	-
	Turbo Mode	✓	-	-
	Writeback Limit Count	✓	-	-
	Slow Format	✓	-	-
Setup Host	Load Balance	✓	-	-
	Reject INQUIRY from Unauthorized Host	✓	-	✓
	Optimize for Advanced Format SSD	✓	-	✓
Setup Disk Drive	Critical Disk Mode	✓	-	-
	Disk Media Error Check	✓	-	-
	Check BID after Write Command	✓	-	-
	Checkcode Enforcement	✓	-	-
	Reduce the Timeout Period for Nearline Disks	✓	-	-
	Skip Retry when Failed to Access	✓	-	-
	Early Isolate Drive when Read Error	✓	-	-
	HDD Shield	✓	-	-
	Copybackless	✓	-	-
Setup Read Compare Mode	Read Compare Mode for Online Disks	✓	-	-
	Read Compare LBAs for Online Disks	✓	-	-
	Read Compare Mode for Nearline Disks	✓	-	-
Web GUI Settings	Function to Add Host	✓	-	-
	Session Time-out	✓	-	-
	Use Cookies for Session Confirmation	✓	-	-

8. System
System Settings

Category	Subsystem parameter	Changing parameters while accessing the host	Rebooting	
			Storage System	Server
Deduplication/Compression Settings	Data Compare when hash collision occurs	✓	-	-

■ User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	✓
StorageAdmin	
AccountAdmin	
SecurityAdmin	
Maintainer	✓

Refer to "A. User Roles and Policies" (page 1580) for details on the policies and roles.

■ Display Contents

Display Critical System Mode

Item	Description
Multipath CSM Order	<p>Whether or not the storage system received the instruction to enable/disable the Critical System Mode (CSM) from the host is displayed.</p> <ul style="list-style-type: none"> • -- (Not Received) The storage system has not received the instruction. • On (Received) The storage system received the instruction to enable the CSM. • Off (Received) The storage system received the instruction to disable the CSM. <p>This item is available when logged in using a user account with the "Maintenance Operation" policy.</p>

■ Settings

Setup Subsystem Parameters

Item	Description	Setting values
1CM Write Through	<p>Set whether to shift mode of the storage system from Write Back to Write Through if only 1CM is available in the storage system because of a CM error.</p> <p>This item is available when logged in using a user account with the "Maintenance Operation" policy.</p>	<p>Enable</p> <p>Disable (Default)</p>
Highland Mode	<p>Set this mode when the storage system is used at a high altitude (1800m or higher). Select whether to enable or disable the Highland mode.</p> <p>When Highland mode is enabled, the fan is run at high speed to preserve the fan's cooling effect.</p> <p>This item is available when logged in using a user account with the "Maintenance Operation" policy.</p>	<p>Enable</p> <p>Disable (Default)</p>
Thin Provisioning Allocation Mode	<p>Select "TPP balancing" or "TPV balancing" for the allocation mode of Thin Provisioning.</p> <p>This mode is applied only for Thin Provisioning pools. Note that this setting is not applied for pools that are created by the Flexible Tier (Automated Storage Tiering) function.</p> <ul style="list-style-type: none"> • TPP balancing Physical area is allocated almost evenly from the RAID groups that configure a TPP. Allocation is performed in order of writing to the TPV. This is a conventional method. • TPV balancing Physical area is allocated almost evenly from the RAID groups that configure a TPP. Allocation is performed by distributing RAID groups evenly for each TPV. <p>(Example)</p> <p>Three TPVs (TPV#0, TPV#1, and TPV#2) are registered in a single TPP.</p> <p>A single TPP is configured with four RAID groups (RAID group#0, RAID group#1, RAID group#2, and RAID group#3).</p> <ul style="list-style-type: none"> • TPP balancing Physical area is allocated in the following order regardless of the TPV in which the data is written. RAID group#0 → RAID group#1 → RAID group#2 → RAID group#3 → RAID group#0 → ... • TPV balancing When data is written in TPVs that are registered in the TPP, the physical area is allocated in the following order. 	<p>TPP balancing (Default)</p> <p>TPV balancing</p>

8. System
System Settings

Item	Description	Setting values
	<p>TPV#0: RAID group#0 → RAID group#1 → RAID group#2 → RAID group#3 → RAID group#0 → ...</p> <p>TPV#1: RAID group#1 → RAID group #2 → RAID group#3 → RAID group#0 → RAID group#1 → ...</p> <p>TPV#2: RAID group#2 → RAID group#3 → RAID group#0 → RAID group#1 → RAID group#2 → ...</p> <p>Caution</p> <ul style="list-style-type: none"> The "Thin Provisioning Allocation Mode" is available only when the Thin Provisioning function is enabled. 	
Flexible Write Through	<p>Select whether to enable or disable the Flexible Write Through.</p> <p>If "Enable" is selected, the cache action is changed only for specific conditions.</p> <ul style="list-style-type: none"> Enable <p>For the Flexible Write Through target I/O, by performing a special Write Through action, data is written to the drive in high speed. Therefore, duplication of the cache memory and parity is not performed.</p> <p>By enabling this function in the ETERNUS AF S3 series, CPU load reduction can be expected.</p> <p>Sequential write performance may improve if I/O size tuning is available from the host (such as with High Performance Computing) for the other models.</p> Disable <p>Changes the cache action according to the cache mode of the storage system.</p> <p>Caution</p> <ul style="list-style-type: none"> Do not change the default setting for normal use. If "Enable" is selected for storage systems other than the ETERNUS AF S3 series, performance for the host I/O may improve only if all of the following conditions are satisfied. The target is the Write I/O for "Standard (including concatenation volumes by means of LUN Concatenation)" and "WSV". <ul style="list-style-type: none"> Sequential write The I/O size from the host is an integral multiple of the basic size (stripe size) for each RAID level <p>Refer to "Basic Size and MWC Input Condition for RAID Levels" for details.</p> If any of the following RAID level is used: <ul style="list-style-type: none"> RAID5 (2D+1P - 8D+1P) RAID6 (3D+2P - 8D+2P) RAID6-FR <ul style="list-style-type: none"> (3D+2P)x2+1HS (4D+2P)x2+1HS (6D+2P)x2+1HS (5D+2P)x4+1HS (8D+2P)x3+1HS (4D+2P)x5+1HS (3D+2P)x6+1HS If "Enable" is selected for the ETERNUS AF S3 series, performance for the host I/O may improve if any of the following conditions are satisfied. <ul style="list-style-type: none"> When the RAID level is "RAID0", "RAID1+0", or "RAID1" <p>The Write I/O for "Standard (including concatenation volumes by means of LUN Concatenation)" and "WSV"</p> 	<p>For the ETERNUS DX S5 series</p> <p>Enable</p> <p>Disable (Default)</p> <p>For the ETERNUS AF S3 series</p> <p>Enable (Default)</p> <p>Disable</p>

8. System
System Settings

Item	Description	Setting values
	<p>- When the RAID level is "RAID5", "RAID5+0", "RAID6", or "RAID6-FR" The Write I/O for "Standard (including concatenation volumes by means of LUN Concatenation)" and "WSV" where the I/O size from the host is an integral multiple of the basic size (stripe size) for each RAID group</p> <ul style="list-style-type: none"> • If the cache mode of the storage system is in "Write Through Mode", regardless of whether "Flexible Write Through" is set, all I/Os will be operated with the Write Through mode. <p>Note</p> <ul style="list-style-type: none"> • The cache modes for the storage system are "Write Back Mode" and "Write Through Mode". Refer to the [System] function for details. 	
Ignore CM-CM Communication Error	<p>When communication is to be continued even when an error occurs in the paths between the CMs, select "Enable". To suspend communication between the CMs, select "Disable".</p> <p>This item is available when logged in using a user account with the "Maintenance Operation" policy.</p> <ul style="list-style-type: none"> • Enable Communication between the CMs is not suppressed even when an error occurs in the paths between the CMs. • Disable Communication between the CMs is suppressed when an error occurs in the paths between the CMs. This is the normal mode that is used. <p>Caution</p> <ul style="list-style-type: none"> • Do not change the default setting ("Disable") for normal use. • If "Enable" is selected, the following problems may occur. <ul style="list-style-type: none"> - Machine down - Blocked host path - Disabled CM - Performance reduction • Change this item only when an online update of the CM fails. Try performing offline CM maintenance by following the instructions of a maintenance engineer. 	Enable Disable (Default)
Read Sequential	<p>Select whether to enable or disable detection of the sequentiality when reading the data.</p> <p>This item is available when logged in using a user account with the "Maintenance Operation" policy.</p> <p>Caution</p> <ul style="list-style-type: none"> • "Read Sequential" is an exclusive parameter for performance monitoring. Do not change the setting after installing the storage system. 	Enable (Default) Disable

8. System
System Settings

Item	Description	Setting values
Write Sequential	<p>Select whether to enable or disable detection of the sequentiality when writing the data.</p> <p>This item is available when logged in using a user account with the "Maintenance Operation" policy.</p> <p>Caution</p> <ul style="list-style-type: none"> "Write Sequential" is an exclusive parameter for performance monitoring. Do not change the setting after installing the storage system. 	<p>Enable (Default)</p> <p>Disable</p>
Turbo Mode	<p>Select whether to enable or disable the Turbo Mode.</p> <p>The Turbo Mode is a function to improve performance by using processors in the CMs with an operating frequency that is higher than the specified rated value. This function is also referred to as "Intel® Turbo Boost Technology".</p> <p>This item is displayed for the storage system other than the ETERNUS DX60 S5.</p> <ul style="list-style-type: none"> Enable Enable the Turbo Mode. Disable Disable the Turbo Mode. <p>Caution</p> <ul style="list-style-type: none"> Do not change the default setting for normal use. 	<p>For the ETERNUS DX100 S5/DX200 S5 and the ETERNUS DX8100 S4</p> <p>Enable</p> <p>Disable (Default)</p> <p>For the ETERNUS DX500 S5/DX600 S5/DX900 S5, the ETERNUS DX8900 S4, and the ETERNUS AF150 S3/AF250 S3/AF650 S3</p> <p>Enable (Default)</p> <p>Disable</p>
Writeback Limit Count	<p>Specify the maximum limit for the Writeback Limit Count (WLC).</p> <p>The WLC is the number of commands that are issued when writing data back to the drive. When specifying a larger WLC, data writeback speed is increased. However, resources are used for data writeback so I/O performance may be affected.</p> <p>Caution</p> <ul style="list-style-type: none"> Do not change the default setting (512) for normal use. 	<p>For the ETERNUS DX60 S5: 128, 256, 512, 1024</p> <p>For the ETERNUS DX100 S5/DX200 S5 and the ETERNUS AF150 S3/AF250 S3: 128, 256, 512, 1024, 2048</p> <p>For the ETERNUS DX500 S5 and the ETERNUS DX8100 S4 128, 256, 512, 1024, 2048, 3072</p> <p>For the ETERNUS DX600 S5/DX900 S5, the ETERNUS DX8900 S4, and the ETERNUS AF650 S3 128, 256, 512, 1024, 2048, 3072, 6144</p> <p>Default: 512</p>

8. System System Settings

Item	Description	Setting values
Slow Format	Select whether to enable or disable the slow format. If the format function for this storage system starts, the performance of the volumes in operation may be influenced more than when the format function is used in older storage systems. Select "Enable" to revert the speed of the format process to the speed for older storage systems. This may reduce the performance impact to volumes in operation.	Enable Disable (Default)

Setup Host

Item	Description	Setting values
Load Balance	Select whether to enable or disable the load balance for the storage system. The Load Balance function delays execution for newly received commands when the command execution time in the storage system exceeds the specific value. Select "Enable" to respond with the sense that is specified in the "Load Balance Response" field of the host response setting. Caution <ul style="list-style-type: none"> When connecting the storage system and HP-UX hosts, disable the Load Balance setting. If the Load Balance setting is enabled, incorrect logs may be recorded in the host. Load balancing by Multipath Driver is operated regardless of whether the Load Balance setting of this function is enabled/disabled. 	Enable (Default) Disable
Reject INQUIRY from Unauthorized Host	Select whether to reject the "Inquiry" command from an unauthorized host. Select the "Enable" checkbox to reject. When the "Inquiry" command is rejected, storage system returns an Affinity Error (5/25/81) for the "Inquiry" command from the unauthorized host. When the command is not rejected, the storage system responds normally. Caution <ul style="list-style-type: none"> When using the Veritas Volume Manager Dynamic Multipathing (VxVM DMP), select "Enable". When VxVM DMP is not used, the setting of this parameter does not affect the state of the storage system. 	Enable Disable (Default)
Optimize for Advanced Format SSD	Select whether to perform a 4K byte alignment access from the host (host access that is aligned to 4K byte) to the volumes in RAID groups or TPPs configured with SSDs or SSD SEDs. Select "Enable" to perform a 4K byte alignment access.	Enable (Default) Disable

Setup Disk Drive

Item	Description	Setting values
Critical Disk Mode	Select whether or not to shorten the monitoring time of the disk access. Select the "Enable" checkbox to shorten the monitoring time. This item is available when logged in using a user account with the "Maintenance Operation" policy.	Enable (Default) Disable
Disk Media Error Check	Select the checking method of disk medium errors from "Mode 1" and "Mode 2". This item is available when logged in using a user account with the "Maintenance Operation" policy.	Mode1 (Default) Mode2

8. System System Settings

Item	Description	Setting values
Check BID after Write Command	<p>Select whether to enable or disable the Block ID (BID) check after responding to a write command.</p> <p>This item is available when logged in using a user account with the "Maintenance Operation" policy.</p>	Enable Disable (Default)
Checkcode Enforcement	<p>Select whether to enable or disable the Checkcode Enforcement mode.</p> <ul style="list-style-type: none"> • Enable Error detection function in the storage system is enhanced. When data is duplicated, the check codes of all the data blocks are checked. • Disable Error detection in the storage system is performed with the normal procedure. <div style="background-color: #fff9c4; padding: 10px; margin-top: 10px;"> <p>Caution</p> <ul style="list-style-type: none"> • Do not change the default setting ("Enable") for normal use. • If "Disable" is selected, the detection performance when errors occur is reduced. </div>	Enable (Default) Disable
Reduce the Timeout Period for Nearline Disks	<p>Select whether to enable or disable for the timeout period reduction of Nearline disks.</p> <p>This item is available when logged in using a user account with the "Maintenance Operation" policy.</p> <ul style="list-style-type: none"> • Enable This mode gives priority to I/O response. Adds error counts more frequently to disks for signs of failure that cause delays with host responses. • Disable This mode gives priority to internal retry processes for a disk when an error occurs. Errors that occur intermittently such as a medium error can be solved. <div style="background-color: #fff9c4; padding: 10px; margin-top: 10px;"> <p>Caution</p> <ul style="list-style-type: none"> • Do not change the default setting ("Disable") for normal use. This mode works when an error occurs in a Nearline disk. If a Nearline disk is in normal status, both modes have no effect on the I/O response. <p>A disk is regarded as having failed when the error count exceeds the threshold. When "Enable" is selected, error counts are added frequently. In this case, a disk error may be detected even when a slight failure or an error that occurs intermittently is detected.</p> <p>When "Disable" is selected, the I/O response to a disk that shows signs of failure may be reduced on a temporary basis.</p> </div>	Enable Disable (Default)

8. System
System Settings

Item	Description	Setting values
Skip Retry when Failed to Access	<p>Select whether to skip or not skip retrying when drive access fails.</p> <p>This item is available when logged in using a user account with the "Maintenance Operation" policy.</p> <ul style="list-style-type: none"> • Enable This mode gives priority to recovering drive performance when drive access fails. This mode is available when the storage system has 1 CE, 1 CM, 1 CA, and no DEs. • Disable This mode gives priority to retry processes when drive access fails. This mode prevents a component from being disconnected by false-positive error detection. <p>Caution</p> <ul style="list-style-type: none"> • Do not change the default setting ("Disable") for normal use. • If "Enable" is selected, retry processes are suppressed when drive access fails. If the storage system has DEs or 2 or more CMs, do not select "Enable". 	Enable Disable (Default)
Early Isolate Drive when Read Error	<p>Select whether to give priority to isolate a drive in which a drive read error is detected.</p> <p>This item is available when logged in using a user account with the "Maintenance Operation" policy.</p> <ul style="list-style-type: none"> • Enable This mode gives priority to isolate a drive in which a drive read error is detected. This reduces the response delay when a drive error occurs. • Disable This mode gives priority to the internal retry process for a drive in which a drive read error is detected. Errors that occur intermittently such as a medium error can be solved. <p>Caution</p> <ul style="list-style-type: none"> • Do not change the default setting ("Disable") for normal use. This mode is performed when a medium error is detected while the drives are being read. This mode is applied for Online and Nearline disks. A drive is regarded as having failed when the error count exceeds the threshold. When "Enable" is selected, error counts are added frequently. In this case, a drive error may be detected even when a slight failure or an error that occurs intermittently is detected. When "Disable" is selected, the I/O response to a drive that shows signs of failure may be reduced on a temporary basis. 	Enable Disable (Default)
HDD Shield	<p>Select whether to enable or disable the protect (shield) function for the drive.</p> <p>The HDD Shield function temporarily isolates (protects) a drive in which an error is detected from the storage system and performs a diagnosis. If the drive is diagnosed as being normal, the drive is reactivated in the storage system. However, if disk errors other than HDD Shield occur or the error count exceeds the threshold, the drive is not reactivated.</p> <p>This item is available when logged in using a user account with the "Maintenance Operation" policy.</p> <p>Caution</p> <ul style="list-style-type: none"> • The target drives for HDD Shield are the drives that are registered in RAID groups or as hot spares. The HDD Shield function is not applied to any unused drives. 	Enable (Default) Disable

8. System
System Settings

Item	Description	Setting values
Copybackless	<p>Select whether to enable or disable the Copybackless function.</p> <p>The Copybackless function registers the rebuilding destination hot spare in the RAID group after rebuilding is complete instead of performing a copyback operation. The failed drive in the RAID group is changed to a hot spare after the rebuilding is complete. If the failed drive is replaced with a normal drive, the replacement drive can be used as a hot spare. After the redundant copy is complete, this function is performed in the same way as the rebuilding function. Both types of hot spares (Global Hot Spares and Dedicated Hot Spares) can be the target hot spares for this function.</p> <p>The Copybackless function is performed when the following hot spares are selected.</p> <ul style="list-style-type: none"> • Hot spares that are the same type as the target drive (Online/Nearline/SSD/Online SED/Nearline SED/SSD SED) • Hot spares that are the same SSD type as the target drive (SSD-H/SSD-M/SSD-L/SSD-H SED/SSD-M SED/SSD-L SED) • Hot spares with the same capacity as the target drive • Hot spares with the same speed as the target drive • Hot spares with the same sector format as the target drive (AF-compliant/non-AF-compliant) <div style="background-color: #fff9c4; padding: 10px;"> <p>Caution</p> <ul style="list-style-type: none"> • If the Copybackless function is enabled, a normal drive that replaces the failed drive cannot return to the original RAID group configuration. This should be taken into consideration when determining whether to enable or disable the Copybackless function. </div> <div style="background-color: #e0e0e0; padding: 10px;"> <p>Note</p> <ul style="list-style-type: none"> • The Copybackless function is not performed when the first drive fails in a "RAID6-FR" type RAID group. A high-speed rebuild is performed in a hot spare area within the RAID group, and when the failed drive is exchanged for a normal drive, copyback is performed. The Copybackless setting is applied when the second drive fails. </div>	Enable (Default) Disable

Setup Read Compare Mode

Item	Description	Setting values
Read Compare Mode for Online Disks	<p>Set the interval for read and compare operations in the data disk (online disk).</p> <p>When "0" is specified in this item, the read and compare operations are not performed.</p> <p>This item is available when logged in using a user account with the "Maintenance Operation" policy.</p> <p>When the host requests data writing, the storage system reads and/or compares the data in the specified interval.</p> <p>If an "Error" is detected during the reading/comparing process, the error is processed in the same way as when detecting a normal disk error.</p> <div style="background-color: #fff9c4; padding: 10px;"> <p>Caution</p> <ul style="list-style-type: none"> • Do not change this setting unless a maintenance engineer instructs otherwise. </div>	0 - 255 16 (Default)

8. System System Settings

Item	Description	Setting values
Read Compare LBAs for Online Disks	<p>Set whether or not to compare the written volumes to all the Logical Block Addresses (LBAs) in the read and compare operations in data disks (online disks). This item is available when logged in using a user account with the "Maintenance Operation" policy.</p> <p>Caution</p> <ul style="list-style-type: none"> Do not change this setting unless a maintenance engineer instructs otherwise. 	<p>Compare all LBAs (Default)</p> <p>Compare only initial LBA</p>
Read Compare Mode for Nearline Disks	<p>Set the interval for read and compare operations in the data disk (Nearline disk). When "0" is specified in this item, the read and compare operations are not performed. This item is available when logged in using a user account with the "Maintenance Operation" policy.</p> <p>When the host requests data writing, the storage system reads and/or compares the data in the specified interval.</p> <p>If an "Error" is detected during the reading/comparing process, the error is processed in the same way as when detecting a normal disk error.</p> <p>Caution</p> <ul style="list-style-type: none"> Do not change this setting unless a maintenance engineer instructs otherwise. 	<p>0 - 255</p> <p>16 (Default)</p>

Web GUI Settings

Item	Description	Setting values
Function to Add Host	<p>Select which function for adding hosts is to be used.</p> <ul style="list-style-type: none"> Use "Add Host Group" Create a host group and register the hosts as members. When the "Use "Add Host Group"" checkbox is selected, the actions for creating host groups are displayed. Use "Add Host" Register hosts without creating host groups. When the "Use "Add Host"" checkbox is selected, the actions for adding hosts are displayed. <p>Caution</p> <ul style="list-style-type: none"> Selecting either "Use "Add Host Group"" or "Use "Add Host"" is recommended. If both of these checkboxes are not selected, the [Set] button cannot be clicked. <p>Note</p> <ul style="list-style-type: none"> Select "Use "Add Host"" only when using the previous procedure for registering hosts as the older storage systems (such as ETERNUS DX410/ DX440 and ETERNUS DX8100/DX8400/DX8700). This checkbox is not selected by default. Both checkboxes can be selected at the same time. 	<p>Selected: Select</p> <p>Cleared: Not select</p> <p>Default: Use "Add Host Group": selected Use "Add Host": cleared</p>
Session Time-out	<p>Specify the time (in minutes) before Web GUI is automatically logged out. The changed session timeout is applied for the Web GUI operations that are performed after this item is changed.</p>	<p>5 - 60</p> <p>60 (Default)</p>

8. System
System Settings

Item	Description	Setting values
Use Cookies for Session Confirmation	<p>Select whether to use Cookies for session confirmations when accessing the storage system from Web GUI.</p> <ul style="list-style-type: none"> • Enable In addition to a conventional session confirmation, perform a session confirmation using Cookies. • Disable Perform a conventional session confirmation. <p>Caution</p> <ul style="list-style-type: none"> • For improved security over the conventional method for Web GUI access, select "Enable". If "Enable" is selected for this item, session confirmations using cookies are performed not only for users who log in to Web GUI after this parameter is changed, but also for users who are already logged in. If an authentication error occurs, an error message is displayed and the login state is lost. 	<p>Enable Disable</p> <p>Default:</p> <ul style="list-style-type: none"> • When the storage system is newly shipped Enable • When the existing controller firmware is updated to V11L50 or later Disable

Deduplication/Compression Settings

Item	Description	Setting values
Data Compare when hash collision occurs	<p>Select whether to compare the entire size of the data if the same hash value is detected when using the Deduplication/Compression function.</p> <p>"Hash collision" indicates that the same hash value is generated from different data. By selecting "Enable" for this setting, if the hash value matches, the entire size of the data is compared with the existing data to determine whether it is duplicated.</p> <p>This item is only displayed when the Deduplication/Compression function is enabled in the storage system.</p> <p>Caution</p> <ul style="list-style-type: none"> • Do not change the default setting ("Disable") for normal use. • Delete all the Deduplication/Compression Volumes in the storage system in advance. If Deduplication/Compression Volumes exist in the storage system, the current setting cannot be changed. • If "Enable" is selected, the performance is reduced. 	<p>Enable Disable (Default)</p>

■ Operating Procedures

Procedure ▶▶▶

- 1 Click [Setup Subsystem Parameters] in [Action].
- 2 Specify the parameters, and click the [Set] button.
→ A confirmation screen appears.
- 3 Click the [OK] button.
→ Setting of the subsystem parameter starts.
- 4 Click the [Done] button to return to the [System Settings] screen.



Setup Encryption Mode

- ["■ Overview" \(page 1564\)](#)
- ["■ User Privileges" \(page 1565\)](#)
- ["■ Settings" \(page 1565\)](#)
- ["■ Operating Procedures" \(page 1566\)](#)

■ Overview

This function sets the [encryption mode](#) to encrypt volumes by using the CM. There are two methods to encrypt a volume.

- **Encryption by firmware (CM)**
To encrypt volumes by the CM, use this function to enable the encryption mode (*1). After the encryption mode is enabled, create volumes of which "Encryption by CM" is set to "On". Refer to the [Create Volume] function for details.

*1: The encryption mode is enabled by selecting "Fujitsu Original Encryption", "AES-128", or "AES-256".

- **Encryption by drive (SED)**
To encrypt volumes by the SED, create volumes in RAID groups or TPPs that are configured with SEDs. Refer to the [Create Volume] function for details. In this case, encrypted volumes can be created even when "Encryption Mode" is set to "Disable".
Note that Web GUI cannot be used to create volumes in FTRPs. To create volumes in FTRPs, use CLI or ETERNUS SF Storage Cruiser.

Use either "Encryption by CM" or "Encryption by SED" for each volume. Note that because "Encryption by CM" reduces the volume access performance, using "Encryption by SED" is recommended.

Caution

- The ETERNUS DX60 S5 does not support this function.
- Encryption related functions are only available after the encryption mode is enabled.
- When disabling the encryption mode, reboot the storage system.
- Once a volume has been encrypted, it cannot be changed back to a non-encrypted volume.
- The encryption mode cannot be disabled for volumes or pools with the following conditions.
 - Volumes that are already encrypted by CM
 - Pools (or TPPs and FTRPs) that are already encrypted by CM
 - Volumes that are being encrypted by CM
 - Extreme Cache Pools that are already encrypted by CM
- When using the encryption function in a Unified Storage environment, set the "Encryption Mode" as described below.
 - For the ETERNUS DX100 S5
Select "Fujitsu Original Encryption" for the encryption mode. If "AES-128" or "AES-256" is selected, the performance of the NAS function is reduced.
 - For the other models
Selecting "Fujitsu Original Encryption" for the encryption mode is recommended.

Note

- The encryption mode can be changed even when volumes or pools (TPPs or FTRPs) in the storage system are already encrypted by the SED.
- If the encryption mode is enabled with this function (*1), existing unencrypted volumes (or "Standard", "WSV", and "SDV" type volumes) can be encrypted. Refer to the [Encrypt Volume] function for details.
- The encryption mode setting can be checked. Refer to the [System Settings] function for details.

*1: The encryption mode is enabled by selecting "Fujitsu Original Encryption", "AES-128", or "AES-256".

■ **User Privileges**

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	✓
StorageAdmin	
AccountAdmin	
SecurityAdmin	✓
Maintainer	

Refer to ""[A. User Roles and Policies](#)" (page 1580)" for details on the policies and roles.

■ **Settings**

In this screen, set the encryption mode.

Encryption Mode Setting

Item	Description	Setting values
Encryption Mode	<p>Select the encryption mode to encrypt volumes by using the CM.</p> <p>This item is displayed when no encrypted volume and no encrypted pool (or TPP and FTRP) exist in the storage system. To enable encryption by the CM, select "Fujitsu Original Encryption", "AES-128", or "AES-256".</p> <ul style="list-style-type: none"> • Disable The encryption function by the CM is not used. When the encryption mode is changed to "Disable" from one of the following options, reboot the storage system. <ul style="list-style-type: none"> - Fujitsu Original Encryption - AES-128 - AES-256 • Fujitsu Original Encryption "Fujitsu Original Encryption" is an encryption method which uses a Fujitsu proprietary algorithm. Compared to the AES-128bit method, its practical security level is almost equal while it allows faster processing than the AES-128bit method. • AES-128 "AES-128" is an encryption method that uses the AES 128bit method. "Advanced Encryption Standard (AES)" (standard encryption used for information processing by the US federal government) is a standardized encryption method. • AES-256 "AES-256" is an encryption method that uses the AES 256bit method. Compared to the AES-128bit method, the encryption strength is higher (meaning that decrypting the encrypted data is difficult), but the Read/Write access performance for the volumes is reduced. 	Disable (Default) Fujitsu Original Encryption AES-128 AES-256

■ Operating Procedures

In this screen, set the encryption mode.

Procedure ▶▶▶

- 1 Click [Setup Encryption Mode] in [Action].
- 2 Select the encryption mode and click the [Set] button.
→ A confirmation screen appears.
- 3 Click the [OK] button.
→ The encryption mode setting is performed.
- 4 Click the [Done] button to return to the [System Settings] screen.

Caution

- When disabling the encryption mode, reboot the storage system.

Setup SMI-S Environment

- ["■ Overview" \(page 1567\)](#)
- ["■ User Privileges" \(page 1567\)](#)

- ["■ Settings" \(page 1568\)](#)
- ["■ Operating Procedures" \(page 1568\)](#)

■ Overview

This function enables or disables the Storage Management Initiative - Specification (SMI-S). SMI-S is a standard specification concerning storage management technologies by Storage Networking Industry Association (SNIA).

When enabling the SMI-S setting, the storage system can be managed from general storage management applications that support the SMI-S.

Caution

- To continue using SMI-S when a warning message related to the change of the SSL certificate appears, disable SMI-S and then enable it again.
- When enabling or disabling of the SMI-S is being performed, the [Setup SMI-S Environment] action cannot be clicked.
- The SMI-S settings and performance information settings cannot be changed if a CM that is not in the "Normal" state exists.

Note

- The current SMI-S setting can be checked. Refer to the [System Settings] function for details.
- The parameter settings for "SSL Certificate" and "Performance Information" are retained even when the "SMI-S" setting is changed from "Enable" to "Disable".
- To enable the performance information response, start the performance monitoring. Refer to the [Start/Stop Performance Monitoring] function for details.

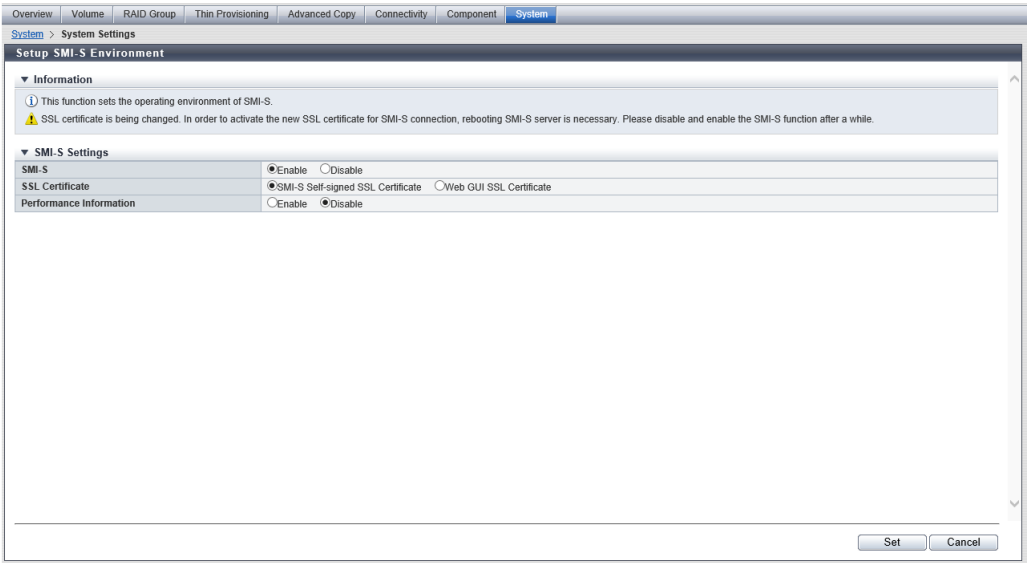
■ User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	✓
StorageAdmin	
AccountAdmin	
SecurityAdmin	
Maintainer	✓

Refer to ["A. User Roles and Policies" \(page 1580\)](#) for details on the policies and roles.

■ Settings



SMI-S Settings

Item	Description	Setting values
SMI-S	Select whether to enable or disable the SMI-S settings.	Enable Disable (Default)
SSL Certificate	Select the SSL certificate that is used for access from SMI-S via HTTPS. This item is only available if "Enable" is selected for "SMI-S". Note that "Web GUI SSL Certificate" cannot be selected if both SSL certificates ("self-signed SSL certificate" and "SSL server certificate") for Web GUI are not registered. <ul style="list-style-type: none"> SMI-S Self-signed SSL Certificate An SSL certificate (self-signed SSL certificate) that is registered from SMI-S. Web GUI SSL Certificate An SSL certificate ("self-signed SSL certificate" or "SSL server certificate") that is registered from Web GUI. <div style="background-color: #fff9c4; padding: 5px; margin-top: 10px;"> <p>Caution</p> <ul style="list-style-type: none"> To change the "SSL Certificate" setting, disable "SMI-S" and then enable it again. </div>	SMI-S Self-signed SSL Certificate (Default) Web GUI SSL Certificate
Performance Information	Select whether to enable or disable the SMI-S performance information response. This item is only available if "Enable" is selected for "SMI-S".	Enable Disable (Default)

■ Operating Procedures

Procedure ▶▶▶

- 1 Click [Setup SMI-S Environment] in [Action].
- 2 Select the parameters, and click the [Set] button.
→ A confirmation screen appears.
- 3 Click the [OK] button.
→ SMI-S setting starts.

- 4 Click the [Done] button to return to the [System Settings] screen.



Setup Debug Mode

- ["■ Overview" \(page 1569\)](#)
- ["■ User Privileges" \(page 1569\)](#)
- ["■ Settings" \(page 1569\)](#)
- ["■ Operating Procedures" \(page 1570\)](#)

■ Overview

This function sets the trace level to store the storage system information and the collection mode for panic dumps when errors occur.

Caution

- If you need to change the debug mode settings, follow the Support Department instructions.

Note

- Trace information is included in the panic dump.
- To collect a panic dump, use the [Export/Delete Panic Dump] function.

■ User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	✓
StorageAdmin	
AccountAdmin	
SecurityAdmin	
Maintainer	✓

Refer to ["A. User Roles and Policies" \(page 1580\)](#) for details on the policies and roles.

■ Settings

In this screen, specify the conditions for collecting the storage system information.

Master Trace Level Settings

Item	Description	Setting values
Master Trace Level	Set the master trace level. <ul style="list-style-type: none"> • Off Does not save a trace. Equivalent to level "0xFF". • Standard The firmware trace information is saved. Equivalent to level "0x06". • Detail All the firmware trace are saved. Equivalent to level "0x00". • Specification The firmware traces according to the user specified level are saved. 	Off Standard (Default) Detail Specification
Level	When selecting "Specification" for the master trace level, input the trace level.	2-digit hexadecimal 0x00 - 0xFF 0x06 (Default)

Level by Group

Item	Description	Setting values
Group ID	The group ID (0x00 to 0xFF) is displayed.	
Level	Input the trace level for each group ID.	2-digit hexadecimal 0x00 - 0xFF 0x06 (Default)

Panic

Item	Description	Setting values
Collection Mode	Select the collection mode for panic dump. <ul style="list-style-type: none"> • Nose and Tail Mode The latest and oldest panic dumps are saved. • Fortnight Mode The first and second panic dumps are saved. • Off Does not save panic dumps. 	Nose and Tail Mode (Default) Fortnight Mode Off

■ Operating Procedures

Procedure ▶▶▶

- 1 Click [Setup Debug Mode] in [Action].
- 2 Specify the parameters, and click the [Set] button.
→ A confirmation screen appears.
- 3 Click the [OK] button.
→ The debug mode is set.
- 4 Click the [Done] button to return to the [System Settings] screen.



Register SED Authentication Key

- ["■ Overview" \(page 1571\)](#)
- ["■ User Privileges" \(page 1571\)](#)
- ["■ Operating Procedures" \(page 1571\)](#)

■ Overview

This function registers the SED authentication key (common key) that is managed in the storage system. SEDs are used to prevent the leakage of the stored data when physically removed disks are stolen or lost.

Caution

- Register the SED authentication key before installing SEDs in the storage system. If an SED is installed without registering the SED authentication key, data leakage in an SED that is removed may occur.
- If an SED is installed before registering the SED authentication key, register the SED authentication key and reboot the storage system.
- The SED authentication key can only be set once in the storage system. The SED authentication key cannot be changed or deleted after being set.
- Registering a common key is also required when the SED authentication key that is managed in the key server is used.

Note

- After this function is executed, the SED authentication key is automatically generated and registered in the SED.
- The registration status of the SED authentication key can be checked. Refer to the [System Settings] function for details.

■ User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	✓
StorageAdmin	
AccountAdmin	
SecurityAdmin	✓
Maintainer	

Refer to ["A. User Roles and Policies" \(page 1580\)](#) for details on the policies and roles.

■ Operating Procedures

Procedure ▶▶▶

- 1 Click [Register SED Key] in [Action].
- 2 Click the [Register] button.
→ A confirmation screen appears.

- 3 Click the [OK] button.
→ The SED authentication key registration starts.
- 4 Click the [Done] button to return to the [System Settings] screen.



Setup Disk Drive Patrol

- ["■ Overview" \(page 1572\)](#)
- ["■ User Privileges" \(page 1572\)](#)
- ["■ Settings" \(page 1573\)](#)
- ["■ Operating Procedures" \(page 1573\)](#)

■ Overview

This function periodically monitors the operating condition of each drive that is installed in the storage system. By performing disk drive patrol, abnormal status can be detected at an early stage and potential drive failures can be averted.

This function is effective for diagnosing the state of drives and hot spares that are not often used. Set this function to detect any drive failures at an early stage.

Caution

- When drive "Error" is detected by this function, the error is dealt in the same way as usual drive failure.

Note

- This function is performed without any relation to Host I/O.
- The current setting for the disk drive patrol can be checked from the [System Settings] screen. Refer to the [System Settings] function for details.
- The progress of the disk drive patrol can be checked from the [Drive Detail] screen. Refer to the [Drives] function for details.

■ User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	✓
StorageAdmin	
AccountAdmin	
SecurityAdmin	
Maintainer	✓

Refer to ["A. User Roles and Policies" \(page 1580\)](#) for details on the policies and roles.

■ Settings

Disk Drive Patrol Settings

Item	Description	Setting values
Disk Drive Patrol	Select whether to "Enable" or "Disable" the disk drive patrol function.	Enable (Default) Disable
Target Disk Drive	Select the checkbox for the target drives (multiple selections can be made). This item is available when logged in using a user account with the "Maintenance Operation" policy. <ul style="list-style-type: none"> • Data Disk Drive • Hot Spare Disk Drive • Unused Disk Drive 	Selected: Patrol is enabled Not selected All selected (Default)
Media Check for Free Area of RAID Groups	Select whether ("Check") or not ("Do not Check") to check the unused area (the area in which no volumes are created) in the data drive. This item is available when logged in using a user account with the "Maintenance Operation" policy.	Check (Default) Do not Check
Check Code Check	Select whether ("Check") or not ("Do not Check") to check if the data is normally being read from the specified area of the drives. It is possible to check disk medium error by checking the check code. This item is available when logged in using a user account with the "Maintenance Operation" policy.	Check Do not Check (Default)
Disk Drive Port Check	Select whether ("Check") or not ("Do not Check") to check the non-active ports. This item is available when logged in using a user account with the "Maintenance Operation" policy.	Check (Default) Do not Check
Interval between each test increment	Specify the interval between patrols (0.1 to 1.0) in units of seconds. This item is available when logged in using a user account with the "Maintenance Operation" policy.	0.1 - 1.0 (in the unit of 0.1 seconds) 1.0 sec. (Default)
Operation Size	Select the data size between 0.5 MB and 16.0 MB to be checked in one patrol. This item is available when logged in using a user account with the "Maintenance Operation" policy.	0.5 MB 1.0 MB 2.0 MB (Default) 4.0 MB 8.0 MB 16.0 MB

■ Operating Procedures

When the User has the "Storage Management" Policy

Procedure ▶▶▶

- 1 Click [Setup Disk Patrol] in [Action].
- 2 Specify whether to enable or disable the disk patrol function, and click the [Set] button.
→ A confirmation screen appears.
- 3 Click the [OK] button.
→ The disk drive patrol starts.
- 4 Click the [Done] button to return to the [System Settings] screen.



When the User has the "Maintenance Operation" Policy

Procedure ▶▶▶

- 1 Click [Setup Disk Patrol] in [Action].
- 2 Specify the parameters, and click the [Set] button.
→ A confirmation screen appears.
- 3 Click the [OK] button.
→ Setting of the disk drive patrol starts.
- 4 Click the [Done] button to return to the [System Settings] screen.

Modify Disk Performance Monitor

- ["■ Overview" \(page 1574\)](#)
- ["■ User Privileges" \(page 1574\)](#)
- ["■ Settings" \(page 1575\)](#)
- ["■ Operating Procedures" \(page 1575\)](#)

■ Overview

This function monitors the disk performance. If a potential performance error is detected in a disk, this function notifies the event and isolates the disk. By isolating a disk which has a performance error at an early stage, performance degradation of the entire storage system can be prevented.

This function enables/disables performance monitoring and configures monitoring parameters, etc. The target disks that can be monitored using this function are Online disks, Nearline disks, Online SEDs, and Nearline SEDs.

The status of the monitoring target disks are as follows:

- Data disks that configure a normal RAID group
- Hot spare disks that are registered in a RAID group

Caution

- SSDs and SSD SEDs cannot be monitored.
- RAID groups that are registered as REC Disk Buffers cannot be monitored.

Note

- The monitoring setting parameters specified using this function remain even when the monitoring function has been changed from "Enable" to "Disable".

■ User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	
StorageAdmin	
AccountAdmin	

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Default role	Availability of executions
SecurityAdmin	
Maintainer	✓

Refer to "[A. User Roles and Policies](#)" (page 1580) for details on the policies and roles.

■ Settings

Monitor Setting

Item	Description	Setting values
Monitoring	Select whether to "Enable" or "Disable" the disk performance monitoring function.	Enable Disable (Default)

Disk Performance Setting

Item	Description	Setting values
Event notification	Select "Enable" to notify when a disk with a performance error is detected. Select "Disable" if no notification is necessary. If "Enable" is selected, the storage system notifies when a disk with a performance error is detected as an event according to the "Disk Warning" notification setting. Refer to the [Setup Event Notification] function for details.	Enable Disable (Default)
Disk isolation	If a disk with a performance error has been detected, select "ON" to isolate the disk, and "OFF" not to isolate the disk. The disk with the performance error requires preventive maintenance, and redundant copy is performed.	ON OFF (Default)
Error monitoring factor	Select the error monitoring factor. "Error monitoring factor" is a standard value for detecting a disk with a performance error. The disk with a performance error is assessed with "Error monitoring factor", "Threshold of allowable error", and "Monitoring interval". If the occurrence ratio (%) of the Non-medium Error in the host I/O during the "Monitoring interval" exceeds the "Error monitoring factor", the disk becomes a candidate as a disk with a performance error.	0.1 - 10.0 (interval: 0.1) 0.5 (Default)
Threshold of allowable error	Select the allowed error threshold. "Threshold of allowable error" is a standard value for detecting a disk with a performance error. The disk with a performance error is assessed with "Error monitoring factor", "Threshold of allowable error", and "Monitoring interval". If the occurrence ratio (%) of the Non-medium Error in the candidate disks during the "Monitoring interval" exceeds the "Threshold of allowable error", the disk is regarded as having a performance error.	7.2 - 720.0 (interval: 7.2) 72.0 (Default)
Monitoring interval	Select the interval (collecting time) to perform disk performance monitoring.	1 - 24 hours (interval: 1 hour) 1 hour (Default)

■ Operating Procedures

Procedure ▶▶▶

- 1 Click [Setup Disk Performance] in [Action].
- 2 Select the parameters, and click the [Set] button.
→ A confirmation screen appears.

- 3 Click the [OK] button.
→ The disk performance monitoring setting starts.
- 4 Click the [Done] button. Returns to the [System Settings] screen.



Setup Power Management

- "[■ Overview](#)" (page 1576)
- "[■ User Privileges](#)" (page 1576)
- "[■ Settings](#)" (page 1576)
- "[■ Operating Procedures](#)" (page 1578)

■ Overview

This function connects the external input device and controls (shuts down) the storage system power.

Caution

- If this function is enabled by mistake, the storage system may shut down unexpectedly. Make sure to check setting contents before performing settings.

■ User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	✓
StorageAdmin	
AccountAdmin	
SecurityAdmin	
Maintainer	✓

Refer to "["A. User Roles and Policies" \(page 1580\)](#)" for details on the policies and roles.

■ Settings

In this screen, specify the settings to shut down the storage system power by connecting it to the external input device.

Power Control by External Device

Item	Description	Setting values
RCIL	Select whether to "Enable" or "Disable" the RCIL connection.	Enable Disable (Default)
Auto Power	Select whether to "Enable" or "Disable" the power interlock mode (the function to automatically power on when the power is supplied). When PMAN is connected, enable the "Auto Power". When the power synchronized unit is connected, disable the "Auto Power".	Enable Disable (Default)
Power Resume	Select whether to "Enable" or "Disable" the auto power recovery mode (the function to automatically power on at power recovery after a power failure).	Enable Disable (Default)

Connection Module Settings

Item	Description
PWC	<p>Select the checkbox for each module to enable power management by an external input device. This checkbox is not selected by default.</p> <ul style="list-style-type: none"> • For the ETERNUS DX8100 S4, checkboxes for "CM#0" and "CM#1" • For the ETERNUS DX900 S5 or the ETERNUS DX8900 S4, checkboxes for "SVC#0" and "SVC#1" <p>If any checkbox is selected, set "Delay until Shutdown", "Set management unit interface", "Power Failure Signal", "Low Battery Signal" and "UPS Shutdown Signal".</p> <p>This item is displayed for the ETERNUS DX900 S5 and the ETERNUS DX8100 S4/DX8900 S4.</p>

PWC Connection Settings

Item	Description	Setting values
Connection CM	<p>Select the checkbox for the controller module (CM) to enable power management by an external input device (multiple selections can be made).</p> <p>When this item is selected, set "Delay until Shutdown", "Set management unit interface", "Power Failure Signal", "Low Battery Signal" and "UPS Shutdown Signal".</p> <p>This item is displayed for the storage system other than the ETERNUS DX900 S5 or the ETERNUS DX8100 S4/DX8900 S4.</p>	
Delay until Shutdown	<p>Specify the delay time (minutes) before starting shutdown after receiving a shutdown notification signal from the external input device.</p> <p>When PMAN is connected, specify the delay time before starting shutdown after receiving a low battery signal. Specify a delay time longer than the time required for the server shutdown process so that the storage system is turned off after the server shutdown is complete.</p>	0 (Default) - 15 min.
Set management unit interface	<p>Select the external input device connected via RS232C interface.</p> <p>For the ETERNUS DX900 S5 or the storage system other than the ETERNUS DX8100 S4/DX8900 S4, the "Manual" setting is for particular use, thus should not be used during normal operation.</p>	<p>For the ETERNUS DX60 S5/DX100 S5/DX200 S5 and ETERNUS AF150 S3/AF250 S3</p> <ul style="list-style-type: none"> • Power Synchronized Unit • PMAN • Manual <p>For the other models</p> <ul style="list-style-type: none"> • Power Synchronized Unit • Manual
Power Failure Signal	<p>Select the signal logic for power failure signal when the power failure occurs from "Positive" or "Negative" (Positive: positive logic, Negative: negative logic).</p> <p>For the ETERNUS DX900 S5 or the ETERNUS DX8100 S4/DX8900 S4, this setting is available when "Manual" is selected for the "Set management unit interface" field.</p> <p>For the other models, this item is automatically set when "Power Synchronized Unit" or "PMAN" is selected for the "Set management unit interface" field.</p>	Positive (Default) Negative
Low Battery Signal	<p>Select the signal logic for a low battery signal when a low battery charge occurs from "Positive" or "Negative" (Positive: positive logic, Negative: negative logic).</p> <p>For the ETERNUS DX900 S5 or the ETERNUS DX8100 S4/DX8900 S4, this setting is available when "Manual" is selected for the "Set management unit interface" field.</p> <p>For the other models, this item is automatically set when "Power Synchronized Unit" is selected for the "Set management unit interface" field.</p>	Positive (Default) Negative

Item	Description	Setting values
UPS Shutdown Signal	When enabling the UPS shutdown signal, select the "Enable" checkbox. Also, select the signal logic for UPS shutdown signal from "Positive" or "Negative" (Positive: positive logic, Negative: negative logic). To disable this item, clear the "Enable" checkbox.	"Enable" checkbox Selected Cleared (Default) Positive (Default) Negative

■ Operating Procedures

Procedure ▶▶▶

- 1 Click [Setup Power Management] in [Action].
- 2 Specify the parameters, and click the [Set] button.
→ A confirmation screen appears.
- 3 Click the [OK] button.
→ Setting of the power management starts.
- 4 Click the [Done] button to return to the [System Settings] screen.



Setup Exclusive Read Cache

- ["■ Overview" \(page 1578\)](#)
- ["■ User Privileges" \(page 1579\)](#)
- ["■ Settings" \(page 1579\)](#)
- ["■ Operating Procedures" \(page 1579\)](#)

■ Overview

This function sets the ratio for an exclusive read cache area in the CM cache memory. By setting the exclusive read cache area, the read I/O performance may be maintained regardless of the write I/O when the storage system is in a high-load state.

Caution

- If exclusive read cache is specified, the I/O performance may be reduced depending on the operating environment. Do not change the default setting ("0 %") for normal use.
- Using this function when the storage system load is low is recommended. This function can be used during system operations, but the cache mode is temporarily changed to "Write Through Mode" during a configuration.

Note

- The same exclusive read cache area size is secured in all CMs.
- If "0 %" is set for "Exclusive Read Cache" or if the calculated value is less than "64MB", "64MB" is secured for each CM.

■ User Privileges

Availability of Executions in the Default Role

Default role	Availability of executions
Monitor	
Admin	✓
StorageAdmin	
AccountAdmin	
SecurityAdmin	
Maintainer	✓

Refer to ""A. User Roles and Policies" (page 1580)" for details on the policies and roles.

■ Settings

Cache Size Settings

Item	Description	Setting values
Exclusive Read Cache	Select the exclusive read cache ratio for the CM cache memory. The actual capacity of the exclusive read cache varies depending on the memory size installed in the storage system. Exclusive read cache capacity = Cache area for user data (*1) × Exclusive read cache (%) *1 : Cache area for user data = (Memory size per CM - Active table area (such as copy table size)) ÷ 2 (*2) *2 : To mirror the user data, divide the calculated value in half.	0 % (Default) 5 % 10 % 15 % 20 % 25 % 30 %

■ Operating Procedures

Procedure ▶▶▶

- 1 Click [Setup Exclusive Read Cache] in [Action].
- 2 Select the exclusive read cache, and click the [Set] button.
→ A confirmation screen appears.
- 3 Click the [OK] button.
→ The exclusive read cache setting starts.
- 4 Click the [Done] button to return to the [System Settings] screen.



A. User Roles and Policies

This appendix describes user roles and policies.

■ Roles

When creating a user account, at least one role must be applied.

There are two types of roles: a default role and a custom role. The default role is already prepared in the storage system and the custom role can be managed by the user.

Default role

Use the default roles for normal operation. Default roles cannot be deleted. The default role settings cannot be changed.

The following shows the default roles and policies that are applied to each default role.

Policies	Default roles						
	Monitor	Admin	Storage Admin	Account Admin	Security Admin	Maintainer	Software (*1)
Status Display	OK	OK	OK	NG	OK	OK	NG
RAID Group Management	NG	OK	OK	NG	NG	OK	NG
Volume - Create / Modify	NG	OK	OK	NG	NG	OK	NG
Volume - Delete / Format	NG	OK	OK	NG	NG	OK	NG
Host Interface Management	NG	OK	OK	NG	NG	OK	NG
NAS Management	NG	OK	OK	NG	NG	OK	NG
Advanced Copy Management	NG	OK	OK	NG	NG	OK	NG
Copy Session Management	NG	OK	OK	NG	NG	OK	NG
Storage Migration Management	NG	OK	OK	NG	NG	OK	NG
Storage Management	NG	OK	NG	NG	NG	OK	NG
User Management	NG	OK	NG	OK	NG	NG	NG
Authentication / Role	NG	OK	NG	OK	NG	NG	NG
Security Setting	NG	OK	NG	NG	OK	NG	NG
Maintenance Information	NG	OK	NG	NG	OK	OK	NG
Firmware Management	NG	OK	NG	NG	NG	OK	NG
Maintenance Operation	NG	NG	NG	NG	NG	OK	NG

OK: Available NG: Not available

*1: "Software" is the role that is used for external software. A user account with the "Software" role cannot log in to Web GUI.

Custom role

Create custom roles when the operating environment cannot be configured by default roles.

Custom roles have unique names that do not match the existing roles. Policies are applied for custom roles.

Multiple policies can be applied to one custom role.

Refer to the following for the procedure on setting custom roles.

- ["Add Role" \(page 1362\)](#)
This function creates custom roles.
- ["Delete Role" \(page 1365\)](#)
This function deletes custom roles.

- ["Modify Role" \(page 1366\)](#)

This function changes custom role settings.

■ Availability of Functions for Each Policy

Functions that can be used vary depending on the policy.

The available functions for each policy are described below.

"Software" is the default role that is used for external software. A user account with the "Software" role cannot log in to Web GUI. Therefore, "Software" is omitted in the following tables.

Overview (Display)

Function	Required policy for this function	Availability of executions in the default role					
		Monitor	Admin	Storage Admin	Account Admin	Security Admin	Maintainer
Overview	Any policy	OK	OK	OK	OK	OK	OK

Volume Management (Display)

Function	Required policy for this function	Availability of executions in the default role					
		Monitor	Admin	Storage Admin	Account Admin	Security Admin	Maintainer
Volume (Basic Information)	One of the following policies is required: <ul style="list-style-type: none"> • Status Display • Volume - Create / Modify • Volume - Delete / Format • Host Interface Management • Maintenance Operation 	OK	OK	OK	NG	OK	OK
Performance (Host I/O)	Volume - Create / Modify	NG	OK	OK	NG	NG	OK
Performance (QoS)	One of the following policies is required: <ul style="list-style-type: none"> • Status Display • Volume - Create / Modify 	OK	OK	OK	NG	OK	OK
Performance (Advanced Copy)	Status Display	OK	OK	OK	NG	OK	OK
LUN Group	One of the following policies is required:	OK	OK	OK	NG	OK	OK
Reservation	<ul style="list-style-type: none"> • Status Display • Host Interface Management 	OK	OK	OK	NG	OK	OK
Pinned Data	One of the following policies is required:	OK	OK	OK	NG	OK	OK
Bad Sector	<ul style="list-style-type: none"> • Status Display • Maintenance Operation 	OK	OK	OK	NG	OK	OK
Balancing Thin Provisioning Volume	One of the following policies is required: <ul style="list-style-type: none"> • Status Display • Volume - Create / Modify 	OK	OK	OK	NG	OK	OK

A. User Roles and Policies

Function	Required policy for this function	Availability of executions in the default role					
		Monitor	Admin	Storage Admin	Account Admin	Security Admin	Maintainer
Snapshot	One of the following policies is required: <ul style="list-style-type: none"> Status Display NAS Management 	OK	OK	OK	NG	OK	OK

Volume Management (Action)

Function	Required policy for this function	Availability of executions in the default role					
		Monitor	Admin	Storage Admin	Account Admin	Security Admin	Maintainer
Create Volume	Volume - Create / Modify	NG	OK	OK	NG	NG	OK
Delete Volume	Volume - Delete / Format	NG	OK	OK	NG	NG	OK
Rename Volume	Volume - Create / Modify	NG	OK	OK	NG	NG	OK
Format Volume	Volume - Delete / Format	NG	OK	OK	NG	NG	OK
Expand Volume	Volume - Create / Modify	NG	OK	OK	NG	NG	OK
Encrypt Volume		NG	OK	OK	NG	NG	OK
Expand Thin Provisioning Volume		NG	OK	OK	NG	NG	OK
Modify Thin Provisioning Volume Threshold		NG	OK	OK	NG	NG	OK
Optimize TPV/FTV Capacity		NG	OK	OK	NG	NG	OK
Cancel Optimizing TPV/FTV Capacity		NG	OK	OK	NG	NG	OK
Start Balancing Thin Provisioning Volume		NG	OK	OK	NG	NG	OK
Stop Balancing Thin Provisioning Volume		NG	OK	OK	NG	NG	OK
Reconfigure NAS Volume		NG	OK	OK	NG	NG	OK
Set Allocation		NG	OK	OK	NG	NG	OK
Delete Snap Data Pool Volume	Volume - Delete / Format	NG	OK	OK	NG	NG	OK
Force Delete Snap Data Pool Volume		NG	OK	OK	NG	NG	OK
Initialize Snap Data Volume		NG	OK	OK	NG	NG	OK
Start RAID Migration (*1)	Volume - Create / Modify	NG	OK	OK	NG	NG	OK
Stop RAID Migration		NG	OK	OK	NG	NG	OK
Stop External Volume Data Synchronization		NG	OK	OK	NG	NG	OK
Forbid Advanced Copy		NG	OK	OK	NG	NG	OK
Permit Advanced Copy		NG	OK	OK	NG	NG	OK
Release Reservation	Host Interface Management	NG	OK	OK	NG	NG	OK
Pinned Data	Maintenance Operation	NG	NG	NG	NG	NG	OK
Destage Pinned Data		NG	NG	NG	NG	NG	OK
Delete Pinned Data		NG	NG	NG	NG	NG	OK
Export Pinned Data		NG	NG	NG	NG	NG	OK
Data Container Volume Diagnosis		NG	NG	NG	NG	NG	OK

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Function	Required policy for this function	Availability of executions in the default role					
		Monitor	Admin	Storage Admin	Account Admin	Security Admin	Maintainer
Modify Cache Parameters	One of the following policies is required: <ul style="list-style-type: none"> Volume - Create / Modify Maintenance Operation 	NG	OK	OK	NG	NG	OK
Export Cache Parameters	Volume - Create / Modify	NG	OK	OK	NG	NG	OK
Export Performance Information	Status Display	OK	OK	OK	NG	OK	OK
Set ALUA (*2)	Host Interface Management	NG	OK	OK	NG	NG	OK
Set Volume QoS	Volume - Create / Modify	NG	OK	OK	NG	NG	OK
Set Volume QoS Pattern	Volume - Create / Modify	NG	OK	OK	NG	NG	OK
Set Snapshot	NAS Management	NG	OK	OK	NG	NG	OK
Delete Snapshot		NG	OK	OK	NG	NG	OK
Start Snapshot		NG	OK	OK	NG	NG	OK
Stop Snapshot		NG	OK	OK	NG	NG	OK
Delete External LU Information	Volume - Create / Modify	NG	OK	OK	NG	NG	OK
Change Data Reduction Processing CM		NG	OK	OK	NG	NG	OK

*1 : To execute a RAID migration from an encrypted volume to an unencrypted volume, the "Security Setting" policy is required.

*2 : When this function is used, the "Volume - Create / Modify" or "Maintenance Operation" policy is also required to display the status screen.

RAID Group Management (Display)

Function	Required policy for this function	Availability of executions in the default role					
		Monitor	Admin	Storage Admin	Account Admin	Security Admin	Maintainer
RAID Group (Basic Information)	One of the following policies is required: <ul style="list-style-type: none"> Status Display RAID Group Management Volume - Create / Modify Maintenance Operation 	OK	OK	OK	NG	OK	OK
Tuning	One of the following policies is required: <ul style="list-style-type: none"> Status Display RAID Group Management 	OK	OK	OK	NG	OK	OK
Eco-mode Schedule (RAID Group)		OK	OK	OK	NG	OK	OK
SED Key Group		OK	OK	OK	NG	OK	OK
External RAID Group	One of the following policies is required: <ul style="list-style-type: none"> Status Display RAID Group Management Maintenance Operation 	OK	OK	OK	NG	OK	OK

RAID Group Management (Action)

Function	Required policy for this function	Availability of executions in the default role					
		Monitor	Admin	Storage Admin	Account Admin	Security Admin	Maintainer
Create RAID Group	RAID Group Management	NG	OK	OK	NG	NG	OK
Delete RAID Group		NG	OK	OK	NG	NG	OK
Rename RAID Group		NG	OK	OK	NG	NG	OK
Change Controlling CM		NG	OK	OK	NG	NG	OK
Expand RAID Group		NG	OK	OK	NG	NG	OK
Modify RAID Group Parameters		NG	OK	OK	NG	NG	OK
Assign Eco-mode Schedule (RAID Group)		NG	OK	OK	NG	NG	OK
Set Key Group (RAID Group)	All of the following policies are required: <ul style="list-style-type: none"> RAID Group Management Security Setting 	NG	OK	NG	NG	NG	NG
Recovery SED		NG	OK	NG	NG	NG	NG

External RAID Group Management

Function	Required policy for this function	Availability of executions in the default role					
		Monitor	Admin	Storage Admin	Account Admin	Security Admin	Maintainer
Create External RAID Group	RAID Group Management	NG	OK	OK	NG	NG	OK
Delete External RAID Group		NG	OK	OK	NG	NG	OK
Recover External RAID Group		NG	OK	OK	NG	NG	OK

Thin Provisioning Management (Display)

Function	Required policy for this function	Availability of executions in the default role					
		Monitor	Admin	Storage Admin	Account Admin	Security Admin	Maintainer
Thin Provisioning Pool (Basic Information)	One of the following policies is required: <ul style="list-style-type: none"> Status Display RAID Group Management Volume - Create / Modify Volume - Delete / Format 	OK	OK	OK	NG	OK	OK
Threshold (Thin Provisioning Pool)	One of the following policies is required: <ul style="list-style-type: none"> Status Display RAID Group Management 	OK	OK	OK	NG	OK	OK
Eco-mode Schedule (Thin Provisioning Pool)		OK	OK	OK	NG	OK	OK
Flexible Tier Pool (Basic Information)	One of the following policies is required: <ul style="list-style-type: none"> Status Display RAID Group Management Volume - Delete / Format 	OK	OK	OK	NG	OK	OK

A. User Roles and Policies

Function	Required policy for this function	Availability of executions in the default role					
		Monitor	Admin	Storage Admin	Account Admin	Security Admin	Maintainer
Settings (Thin Provisioning)	RAID Group Management	NG	OK	OK	NG	NG	OK

Thin Provisioning Management (Action)

Function	Required policy for this function	Availability of executions in the default role					
		Monitor	Admin	Storage Admin	Account Admin	Security Admin	Maintainer
Set Thin Provisioning (*1)	Storage Management	NG	OK	NG	NG	NG	OK
Create Thin Provisioning Pool	RAID Group Management	NG	OK	OK	NG	NG	OK
Delete Thin Provisioning Pool		NG	OK	OK	NG	NG	OK
Rename Thin Provisioning Pool		NG	OK	OK	NG	NG	OK
Expand Thin Provisioning Pool		NG	OK	OK	NG	NG	OK
Format Thin Provisioning Pool (All Area)		NG	OK	OK	NG	NG	OK
Format Thin Provisioning Pool (Unformatted Area)		NG	OK	OK	NG	NG	OK
Set Deduplication/Compression		NG	OK	OK	NG	NG	OK
Modify Threshold Thin Provisioning Pool		NG	OK	OK	NG	NG	OK
Modify Cache Parameters (TPP)		NG	OK	OK	NG	NG	OK
Assign Eco-mode Schedule (Thin Provisioning Pool)		NG	OK	OK	NG	NG	OK
Start Balancing Flexible Tier Pool (*2)	Volume - Create / Modify	NG	OK	OK	NG	NG	OK
Stop Balancing Flexible Tier Pool (*2)		NG	OK	OK	NG	NG	OK

*1 : When this function is used, one of the following policies is also required to display the status screen: "Status Display", "RAID Group Management", "Volume - Create / Modify", or "Volume - Delete / Format".

*2 : When this function is used, one of the following policies is also required to display the status screen: "Status Display", "RAID Group Management", or "Volume - Delete / Format".

Advanced Copy Management (Display)

Function	Required policy for this function	Availability of executions in the default role					
		Monitor	Admin	Storage Admin	Account Admin	Security Admin	Maintainer
Advanced Copy (Basic Information)	One of the following policies is required: <ul style="list-style-type: none"> • Status Display • Advanced Copy Management • Copy Session Management • Storage Management 	OK	OK	OK	NG	OK	OK

A. User Roles and Policies

Function	Required policy for this function	Availability of executions in the default role					
		Monitor	Admin	Storage Admin	Account Admin	Security Admin	Maintainer
Advanced Copy (All Local Sessions)	One of the following policies is required: <ul style="list-style-type: none"> • Status Display • Copy Session Management 	OK	OK	OK	NG	OK	OK
EC		OK	OK	OK	NG	OK	OK
OPC		OK	OK	OK	NG	OK	OK
QuickOPC		OK	OK	OK	NG	OK	OK
SnapOPC		OK	OK	OK	NG	OK	OK
SnapOPC+		OK	OK	OK	NG	OK	OK
Monitor		OK	OK	OK	NG	OK	OK
Advanced Copy (All Remote Sessions)		OK	OK	OK	NG	OK	OK
REC		OK	OK	OK	NG	OK	OK
ODX Sessions		OK	OK	OK	NG	OK	OK
XCOPY Sessions		OK	OK	OK	NG	OK	OK
Virtual Volume Sessions		OK	OK	OK	NG	OK	OK
Settings (Advanced Copy)		One of the following policies is required: <ul style="list-style-type: none"> • Status Display • Advanced Copy Management • Copy Session Management • Storage Management (*1) 	OK	OK	OK	NG	OK
Snap Data Pool	One of the following policies is required: <ul style="list-style-type: none"> • Status Display • Advanced Copy Management 	OK	OK	OK	NG	OK	OK
Copy Path		OK	OK	OK	NG	OK	OK
REC Buffer		OK	OK	OK	NG	OK	OK
REC Disk Buffer		OK	OK	OK	NG	OK	OK

*1: When displaying the set state for the Advanced Copy license, the "Storage Management" policy is also required.

Advanced Copy Management (Action)

Function	Required policy for this function	Availability of executions in the default role					
		Monitor	Admin	Storage Admin	Account Admin	Security Admin	Maintainer
Start SnapOPC+	Copy Session Management	NG	OK	OK	NG	NG	OK
Stop Copy Session		NG	OK	OK	NG	NG	OK
Register Advanced Copy License	Storage Management	NG	OK	NG	NG	NG	OK
Delete Advanced Copy License		NG	OK	NG	NG	NG	OK
Register Veeam Storage Integration License		NG	OK	NG	NG	NG	OK
Delete Veeam Storage Integration License		NG	OK	NG	NG	NG	OK
Register License		NG	OK	NG	NG	NG	OK

A. User Roles and Policies

Function	Required policy for this function	Availability of executions in the default role					
		Monitor	Admin	Storage Admin	Account Admin	Security Admin	Maintainer
Modify EC/OPC Priority	Advanced Copy Management	NG	OK	OK	NG	NG	OK
Modify Copy Table Size		NG	OK	OK	NG	NG	OK
Modify Copy Parameters		NG	OK	OK	NG	NG	OK
Export Storage Information		NG	OK	OK	NG	NG	OK
Set Copy Path		NG	OK	OK	NG	NG	OK
Delete All Copy Path		NG	OK	OK	NG	NG	OK
Export All Copy Path		NG	OK	OK	NG	NG	OK
Measure Round Trip Time		NG	OK	OK	NG	NG	OK
Modify REC Buffer		NG	OK	OK	NG	NG	OK
Create REC Disk Buffer		NG	OK	OK	NG	NG	OK
Assign REC Disk Buffer		NG	OK	OK	NG	NG	OK
Delete REC Disk Buffer		NG	OK	OK	NG	NG	OK
Format REC Disk Buffer		NG	OK	OK	NG	NG	OK
Modify REC Multiplicity		NG	OK	OK	NG	NG	OK
Set REC Bandwidth Limit		NG	OK	OK	NG	NG	OK
Set REC Line Speed		NG	OK	OK	NG	NG	OK
Enable ODX (*1)	One of the following policies is required: <ul style="list-style-type: none"> • Volume - Create / Modify • Volume - Delete / Format • Advanced Copy Management 	NG	OK	OK	NG	NG	OK
Disable ODX (*1)		NG	OK	OK	NG	NG	OK
Create ODX Buffer Volume (*1)		NG	OK	OK	NG	NG	OK

*1: When this function is used with the "Volume - Create / Modify" or "Volume - Delete / Format" policy, one of the following policies is also required to display the status screen: "Status Display", "Advanced Copy Management", "Copy Session Management", or "Storage Management".

Connectivity Management (Display)

Function	Required policy for this function	Availability of executions in the default role						
		Monitor	Admin	Storage Admin	Account Admin	Security Admin	Maintainer	
Connectivity (Basic Information)	One of the following policies is required: <ul style="list-style-type: none"> • Status Display • Host Interface Management 	OK	OK	OK	NG	OK	OK	
Host Group		OK	OK	OK	NG	OK	OK	
FC Host		OK	OK	OK	NG	OK	OK	
iSCSI Host		OK	OK	OK	NG	OK	OK	
SAS Host		OK	OK	OK	NG	OK	OK	
CA Port Group		OK	OK	OK	NG	OK	OK	
FC Port		OK	OK	OK	NG	OK	OK	
iSCSI Port		OK	OK	OK	NG	OK	OK	
SAS Port		OK	OK	OK	NG	OK	OK	
LUN Group		OK	OK	OK	NG	OK	OK	
Host Response		OK	OK	OK	NG	OK	OK	
CA Reset Group		OK	OK	OK	NG	OK	OK	
Host-LU QoS		Host Interface Management	NG	OK	OK	NG	NG	OK
Host QoS (Basic)			NG	OK	OK	NG	NG	OK
FC Host QoS	NG		OK	OK	NG	NG	OK	
iSCSI Host QoS	NG		OK	OK	NG	NG	OK	
SAS Host QoS	NG		OK	OK	NG	NG	OK	
Port QoS (Basic)	NG		OK	OK	NG	NG	OK	
FC Port QoS	NG		OK	OK	NG	NG	OK	
iSCSI Port QoS	NG		OK	OK	NG	NG	OK	
SAS Port QoS	NG		OK	OK	NG	NG	OK	
LU QoS Group	NG		OK	OK	NG	NG	OK	
NAS	Status Display		OK	OK	OK	NG	OK	OK
NAS Interface			OK	OK	OK	NG	OK	OK
Environment Settings		One of the following policies is required: <ul style="list-style-type: none"> • Status Display • NAS Management 	OK	OK	OK	NG	OK	OK
Quota Management			OK	OK	OK	NG	OK	OK
Meta Cache Distribution			OK	OK	OK	NG	OK	OK

Connectivity Management (Action)

Host Affinity Management

Function	Required policy for this function	Availability of executions in the default role					
		Monitor	Admin	Storage Admin	Account Admin	Security Admin	Maintainer
Create Host Affinity	Host Interface Management	NG	OK	OK	NG	NG	OK
Delete Host Affinity		NG	OK	OK	NG	NG	OK
Modify Host Affinity		NG	OK	OK	NG	NG	OK

Host Group Management

Function	Required policy for this function	Availability of executions in the default role					
		Monitor	Admin	Storage Admin	Account Admin	Security Admin	Maintainer
Add FC Host Group	Host Interface Management	NG	OK	OK	NG	NG	OK
Add iSCSI Host Group		NG	OK	OK	NG	NG	OK
Add SAS Host Group		NG	OK	OK	NG	NG	OK
Delete Host Group		NG	OK	OK	NG	NG	OK
Modify Host Group		NG	OK	OK	NG	NG	OK
Add FC Host		NG	OK	OK	NG	NG	OK
Add iSCSI Host		NG	OK	OK	NG	NG	OK
Add SAS Host		NG	OK	OK	NG	NG	OK
Delete FC Host		NG	OK	OK	NG	NG	OK
Delete iSCSI Host		NG	OK	OK	NG	NG	OK
Delete SAS Host		NG	OK	OK	NG	NG	OK
Modify FC Host		NG	OK	OK	NG	NG	OK
Modify iSCSI Host		NG	OK	OK	NG	NG	OK
Modify SAS Host		NG	OK	OK	NG	NG	OK

CA Port Group Management

Function	Required policy for this function	Availability of executions in the default role					
		Monitor	Admin	Storage Admin	Account Admin	Security Admin	Maintainer
Create FC Port Group	Host Interface Management	NG	OK	OK	NG	NG	OK
Create iSCSI Port Group		NG	OK	OK	NG	NG	OK
Create SAS Port Group		NG	OK	OK	NG	NG	OK
Delete CA Port Group		NG	OK	OK	NG	NG	OK
Modify CA Port Group		NG	OK	OK	NG	NG	OK
Modify FC Port Parameters		NG	OK	OK	NG	NG	OK
Modify iSCSI Port Parameters		NG	OK	OK	NG	NG	OK
Modify SAS Port Parameters		NG	OK	OK	NG	NG	OK
Modify Port Mode		NG	OK	OK	NG	NG	OK

LUN Group Management

Function	Required policy for this function	Availability of executions in the default role					
		Monitor	Admin	Storage Admin	Account Admin	Security Admin	Maintainer
Add LUN Group	Host Interface Management	NG	OK	OK	NG	NG	OK
Delete LUN Group		NG	OK	OK	NG	NG	OK
Modify LUN Group		NG	OK	OK	NG	NG	OK

Host Response Management

Function	Required policy for this function	Availability of executions in the default role					
		Monitor	Admin	Storage Admin	Account Admin	Security Admin	Maintainer
Add Host Response	Host Interface Management	NG	OK	OK	NG	NG	OK
Delete Host Response		NG	OK	OK	NG	NG	OK
Modify Host Response		NG	OK	OK	NG	NG	OK

Modify CA Reset Group

Function	Required policy for this function	Availability of executions in the default role					
		Monitor	Admin	Storage Admin	Account Admin	Security Admin	Maintainer
Modify CA Reset Group	Host Interface Management	NG	OK	OK	NG	NG	OK

Host-LU QoS Management

Function	Required policy for this function	Availability of executions in the default role					
		Monitor	Admin	Storage Admin	Account Admin	Security Admin	Maintainer
Enable/Disable QoS	Host Interface Management	NG	OK	OK	NG	NG	OK
Initialize QoS	One of the following policies is required: <ul style="list-style-type: none"> • Volume - Create / Modify • Host Interface Management 	NG	OK	OK	NG	NG	OK
Set Host-LU QoS	Host Interface Management	NG	OK	OK	NG	NG	OK
Release Host-LU QoS		NG	OK	OK	NG	NG	OK
Start Host-LU QoS Performance Monitoring		NG	OK	OK	NG	NG	OK
Stop Host-LU QoS Performance Monitoring		NG	OK	OK	NG	NG	OK
Set Host QoS Pattern		NG	OK	OK	NG	NG	OK
Set Port QoS Pattern		NG	OK	OK	NG	NG	OK
Set LU QoS Pattern		NG	OK	OK	NG	NG	OK
Set FC Host QoS		NG	OK	OK	NG	NG	OK
Set iSCSI Host QoS		NG	OK	OK	NG	NG	OK
Set SAS Host QoS		NG	OK	OK	NG	NG	OK
Set FC Port QoS		NG	OK	OK	NG	NG	OK
Set iSCSI Port QoS		NG	OK	OK	NG	NG	OK
Set SAS Port QoS		NG	OK	OK	NG	NG	OK
Add LU QoS Group		NG	OK	OK	NG	NG	OK
Delete LU QoS Group		NG	OK	OK	NG	NG	OK
Modify LU QoS Group		NG	OK	OK	NG	NG	OK

NAS Management

Function	Required policy for this function	Availability of executions in the default role					
		Monitor	Admin	Storage Admin	Account Admin	Security Admin	Maintainer
Create Shared Folder	NAS Management	NG	OK	OK	NG	NG	OK
Delete Shared Folder		NG	OK	OK	NG	NG	OK
Modify Shared Folder		NG	OK	OK	NG	NG	OK
Clear NAS Data		NG	OK	OK	NG	NG	OK
Create NAS Interface		NG	OK	OK	NG	NG	OK
Delete NAS Interface		NG	OK	OK	NG	NG	OK
Modify NAS Interface		NG	OK	OK	NG	NG	OK
Change NAS Server Name		NG	OK	OK	NG	NG	OK
Set DNS Server		NG	OK	OK	NG	NG	OK
Set Authentication Server		NG	OK	OK	NG	NG	OK
Add Local User		NG	OK	OK	NG	NG	OK
Delete Local User		NG	OK	OK	NG	NG	OK
Modify Local User		NG	OK	OK	NG	NG	OK
Add Local Group		NG	OK	OK	NG	NG	OK
Delete Local Group		NG	OK	OK	NG	NG	OK
Add Quota Setting		NG	OK	OK	NG	NG	OK
Delete Quota Setting		NG	OK	OK	NG	NG	OK
Modify Quota Setting		NG	OK	OK	NG	NG	OK
Initialize Meta Cache Distribution		NG	OK	OK	NG	NG	OK
Enable Automatic Meta Cache Distribution		NG	OK	OK	NG	NG	OK
Disable Automatic Meta Cache Distribution	NG	OK	OK	NG	NG	OK	

Component Management (Display)

Function	Required policy for this function	Availability of executions in the default role						
		Monitor	Admin	Storage Admin	Account Admin	Security Admin	Maintainer	
Storage (Basic Information)	One of the following policies is required: <ul style="list-style-type: none"> • Status Display • Maintenance Operation 	OK	OK	OK	NG	OK	OK	
Controller Enclosure		OK	OK	OK	NG	OK	OK	
Controller Module		OK	OK	OK	NG	OK	OK	
Performance (CM)		OK	OK	OK	NG	OK	OK	
Channel Adapter		OK	OK	OK	NG	OK	OK	
Performance (CA)		OK	OK	OK	NG	OK	OK	
Login Host		OK	OK	OK	NG	OK	OK	
PCIe Flash Module		Status Display	OK	OK	OK	NG	OK	OK
Performance (PCIe Flash Module)			OK	OK	OK	NG	OK	OK
Bootup and Utility Device		One of the following policies is required: <ul style="list-style-type: none"> • Status Display • Maintenance Operation 	OK	OK	OK	NG	OK	OK
Power Supply Unit (CE)	OK		OK	OK	NG	OK	OK	
Battery (BBU) (*1)	OK		OK	OK	NG	OK	OK	
Battery (BTU/BCU) (*2)	OK		OK	OK	NG	OK	OK	
Frontend Enclosure	One of the following policies is required: <ul style="list-style-type: none"> • Status Display • Maintenance Operation 	OK	OK	OK	NG	OK	OK	
Frontend Router		OK	OK	OK	NG	OK	OK	
Service Controller		OK	OK	OK	NG	OK	OK	
Power Supply Unit (FE)		OK	OK	OK	NG	OK	OK	
FAN Unit		OK	OK	OK	NG	OK	OK	
Operation Panel		OK	OK	OK	NG	OK	OK	
Drive Enclosure	One of the following policies is required: <ul style="list-style-type: none"> • Status Display • Maintenance Operation 	OK	OK	OK	NG	OK	OK	
I/O Module		OK	OK	OK	NG	OK	OK	
Port Error Statistics		Maintenance Information	NG	OK	NG	NG	OK	OK
Power Supply Unit (DE)	One of the following policies is required: <ul style="list-style-type: none"> • Status Display • Maintenance Operation 	NG	OK	NG	NG	OK	OK	
Fan Expander Module	One of the following policies is required: <ul style="list-style-type: none"> • Status Display • Maintenance Operation 	OK	OK	OK	NG	OK	OK	
Drives	One of the following policies is required: <ul style="list-style-type: none"> • Status Display • RAID Group Management • Maintenance Operation 	OK	OK	OK	NG	OK	OK	
Performance (Drives)	One of the following policies is required: <ul style="list-style-type: none"> • Status Display • Maintenance Information 	OK	OK	OK	NG	OK	OK	
Drive Error Statistics	Maintenance Information	NG	OK	NG	NG	OK	OK	

*1 : This item is displayed for the ETERNUS DX60 S5/DX100 S5/DX200 S5 and the ETERNUS AF150 S3/AF250 S3.

*2 : This item is displayed for the ETERNUS DX500 S5/DX600 S5/DX900 S5, the ETERNUS DX8100 S4/DX8900 S4, and the ETERNUS AF650 S3.

Component Management (Action)

Function	Required policy for this function	Availability of executions in the default role					
		Monitor	Admin	Storage Admin	Account Admin	Security Admin	Maintainer
Turn on Locator Beacon/Turn off Locator Beacon	Status Display	OK	OK	OK	NG	OK	OK
Model Upgrade	Maintenance Operation	NG	NG	NG	NG	NG	OK
Hot Preventive Maintenance		NG	NG	NG	NG	NG	OK
Assign Global Hot Spare	RAID Group Management	NG	OK	OK	NG	NG	OK
Release Global Hot Spare		NG	OK	OK	NG	NG	OK
Assign Dedicated Hot Spare		NG	OK	OK	NG	NG	OK
Release Dedicated Hot Spare		NG	OK	OK	NG	NG	OK
Force Enable Module	One of the following policies is required: <ul style="list-style-type: none"> Storage Management (*1) Maintenance Operation 	NG	OK	NG	NG	NG	OK
Force Disable Module	Maintenance Operation	NG	NG	NG	NG	NG	OK
Sanitize Drive		NG	NG	NG	NG	NG	OK
Recover NAS System Volume	One of the following policies is required: <ul style="list-style-type: none"> Storage Management Maintenance Operation 	NG	OK	NG	NG	NG	OK
Add Controller Enclosure	Maintenance Operation	NG	NG	NG	NG	NG	OK
Add Controller Module		NG	NG	NG	NG	NG	OK
Add Memory		NG	NG	NG	NG	NG	OK
Add Channel Adapter		NG	NG	NG	NG	NG	OK
Add Channel Adapter Port (*2)	One of the following policies is required: <ul style="list-style-type: none"> Storage Management Maintenance Operation 	NG	NG	NG	NG	NG	OK
Add PCIe Flash Module	Maintenance Operation	NG	NG	NG	NG	NG	OK
Remove PCIe Flash Module		NG	NG	NG	NG	NG	OK
Add Drive Enclosure	One of the following policies is required: <ul style="list-style-type: none"> Storage Management (*3) Maintenance Operation 	NG	OK	NG	NG	NG	OK
Remove Disk Drive	Maintenance Operation	NG	NG	NG	NG	NG	OK
Remove Channel Adapter		NG	NG	NG	NG	NG	OK
Remove Drive Enclosure		NG	NG	NG	NG	NG	OK
Export Performance Information	One of the following policies is required: <ul style="list-style-type: none"> Status Display Maintenance Operation 	OK	OK	OK	NG	OK	OK
Start Disk Diagnosis	Maintenance Operation	NG	NG	NG	NG	NG	OK

A. User Roles and Policies

Function	Required policy for this function	Availability of executions in the default role					
		Monitor	Admin	Storage Admin	Account Admin	Security Admin	Maintainer
Clear Drive Error Statistics (All Drives)	Maintenance Information	NG	OK	NG	NG	OK	OK
Clear Drive Error Statistics (Selected Drives)		NG	OK	NG	NG	OK	OK

*1 : If the user has "Storage Management" policy, the NAS Engine can only be enabled by force.

*2 : This function is available for the ETERNUS DX60 S5/DX100 S5.

*3 : This function is available for the ETERNUS DX60 S5/DX100 S5/DX200 S5 and the ETERNUS AF150 S3/AF250 S3.

System Management (Display)

Function	Required policy for this function	Availability of executions in the default role					
		Monitor	Admin	Storage Admin	Account Admin	Security Admin	Maintainer
System (Basic Information)	One of the following policies is required: <ul style="list-style-type: none"> • Status Display • Storage Management • User Management • Authentication / Role • Security Setting • Maintenance Information • Firmware Management • Maintenance Operation 	OK	OK	OK	OK	OK	OK
Network	One of the following policies is required: <ul style="list-style-type: none"> • Status Display • Storage Management 	OK	OK	OK	NG	OK	OK
Remote Support (REMCS)	One of the following policies is required: <ul style="list-style-type: none"> • Status Display • Storage Management • Maintenance Operation 	OK	OK	OK	NG	OK	OK
Remote Support (AIS Connect) (*1)		OK	OK	OK	NG	OK	OK
Root Certificate	Status Display	OK	OK	OK	NG	OK	OK
Key Management		OK	OK	OK	NG	OK	OK
Key Group		OK	OK	OK	NG	OK	OK
Define Role	One of the following policies is required: <ul style="list-style-type: none"> • User Management • Authentication / Role 	NG	OK	NG	OK	NG	NG
Eco-mode	One of the following policies is required: <ul style="list-style-type: none"> • Status Display • RAID Group Management • Maintenance Operation 	OK	OK	OK	NG	OK	OK

A. User Roles and Policies

Function	Required policy for this function	Availability of executions in the default role					
		Monitor	Admin	Storage Admin	Account Admin	Security Admin	Maintainer
Event/Dump	One of the following policies is required: <ul style="list-style-type: none"> • Status Display • Storage Management • Maintenance Information • Maintenance Operation 	OK	OK	OK	NG	OK	OK
Audit Log	Security Setting	NG	OK	NG	NG	OK	NG
Firmware Maintenance	One of the following policies is required: <ul style="list-style-type: none"> • Firmware Management • Maintenance Operation 	NG	OK	NG	NG	NG	OK
Storage Migration	One of the following policies is required: <ul style="list-style-type: none"> • Status Display • Storage Migration Management 	OK	OK	OK	NG	OK	OK
External Drives	One of the following policies is required: <ul style="list-style-type: none"> • Status Display • RAID Group Management 	OK	OK	OK	NG	OK	OK
Extreme Cache	One of the following policies is required: <ul style="list-style-type: none"> • Status Display • Storage Management 	OK	OK	OK	NG	OK	OK
Extreme Cache Pool		OK	OK	OK	NG	OK	OK
Utility	One of the following policies is required: <ul style="list-style-type: none"> • Storage Management • Maintenance Information • Maintenance Operation 	NG	OK	NG	NG	OK	OK
System Settings	One of the following policies is required: <ul style="list-style-type: none"> • Status Display • Advanced Copy Management • Storage Management • Security Setting • Maintenance Operation 	OK	OK	OK	NG	OK	OK

*1: AIS Connect service ended in December 2022.

System Management (Action)

Function	Required policy for this function	Availability of executions in the default role					
		Monitor	Admin	Storage Admin	Account Admin	Security Admin	Maintainer
Initial Setup	One of the following policies is required: <ul style="list-style-type: none"> Storage Management Security Setting 	NG	OK	NG	NG	OK	OK
Smart Setup Wizard		NG	OK	NG	NG	OK	OK
Start/End Maintenance	Maintenance Operation	NG	NG	NG	NG	NG	OK
Register Unified Storage License		NG	NG	NG	NG	NG	OK
Change User Password	One of the following policies is required: <ul style="list-style-type: none"> Status Display Storage Management User Management Authentication / Role Security Setting Maintenance Information Maintenance Operation 	OK	OK	OK	OK	OK	OK
Set SSH Public Key		OK	OK	OK	OK	OK	OK
Expand System Memory Capacity	Maintenance Operation	NG	NG	NG	NG	NG	OK
Set Deduplication/Compression Mode	One of the following policies is required: <ul style="list-style-type: none"> Storage Management Maintenance Operation 	NG	OK	NG	NG	NG	OK
Enable RESTful API	Storage Management	NG	OK	NG	NG	NG	NG
Register Non-disruptive Storage Migration License	One of the following policies is required: <ul style="list-style-type: none"> Storage Management Maintenance Operation 	NG	OK	NG	NG	NG	OK
Delete Non-disruptive Storage Migration License		NG	OK	NG	NG	NG	OK

System Management

Function	Required policy for this function	Availability of executions in the default role					
		Monitor	Admin	Storage Admin	Account Admin	Security Admin	Maintainer
Modify Storage System Name	Storage Management	NG	OK	NG	NG	NG	OK
Modify Date and Time		NG	OK	NG	NG	NG	OK
Change Box ID	Advanced Copy Management	NG	OK	OK	NG	NG	OK
Setup Subsystem Parameters	One of the following policies is required: <ul style="list-style-type: none"> Storage Management Maintenance Operation 	NG	OK	NG	NG	NG	OK
Setup Encryption Mode	Security Setting	NG	OK	NG	NG	OK	NG
Setup SMI-S Environment	Storage Management	NG	OK	NG	NG	NG	OK
Register SED Authentication Key	Security Setting	NG	OK	NG	NG	OK	NG

A. User Roles and Policies

Function	Required policy for this function	Availability of executions in the default role					
		Monitor	Admin	Storage Admin	Account Admin	Security Admin	Maintainer
Setup Power Management	Storage Management	NG	OK	NG	NG	NG	OK
Setup Exclusive Read Cache	One of the following policies is required: <ul style="list-style-type: none"> Storage Management Maintenance Operation 	NG	OK	NG	NG	NG	OK
Setup Disk Drive Patrol	One of the following policies is required: <ul style="list-style-type: none"> Storage Management Maintenance Operation 	NG	OK	NG	NG	NG	OK
Setup Debug Mode	One of the following policies is required: <ul style="list-style-type: none"> Storage Management Maintenance Operation 	NG	OK	NG	NG	NG	OK
Modify Disk Performance Monitor	Maintenance Operation	NG	NG	NG	NG	NG	OK

Extreme Cache Management

Function	Required policy for this function	Availability of executions in the default role					
		Monitor	Admin	Storage Admin	Account Admin	Security Admin	Maintainer
Setup Extreme Cache	Storage Management	NG	OK	NG	NG	NG	OK
Release Extreme Cache		NG	OK	NG	NG	NG	OK

Extreme Cache Pool Management

Function	Required policy for this function	Availability of executions in the default role					
		Monitor	Admin	Storage Admin	Account Admin	Security Admin	Maintainer
Setup Extreme Cache Pool	Storage Management	NG	OK	NG	NG	NG	OK
Release Extreme Cache Pool		NG	OK	NG	NG	NG	OK

Utility Management

Function	Required policy for this function	Availability of executions in the default role					
		Monitor	Admin	Storage Admin	Account Admin	Security Admin	Maintainer
Reset Backup/Restore Fail	Maintenance Operation	NG	NG	NG	NG	NG	OK
Reset Machine Down Recovery Fail		NG	NG	NG	NG	NG	OK
Force Write Back		NG	NG	NG	NG	NG	OK
Clear Sense Data		NG	NG	NG	NG	NG	OK
Initialize BUD		NG	NG	NG	NG	NG	OK
Force Restore		NG	NG	NG	NG	NG	OK
Force Restore Thin Provisioning		NG	NG	NG	NG	NG	OK
Change Master CM		NG	NG	NG	NG	NG	OK
Reboot All CMs		NG	NG	NG	NG	NG	OK
Shutdown/Restart Storage System	Storage Management	NG	OK	NG	NG	NG	OK

A. User Roles and Policies

Function	Required policy for this function	Availability of executions in the default role					
		Monitor	Admin	Storage Admin	Account Admin	Security Admin	Maintainer
Apply Configuration	Maintenance Operation	NG	NG	NG	NG	NG	OK
Cancel Applying Configuration		NG	NG	NG	NG	NG	OK
Backup Configuration	Maintenance Information	NG	OK	NG	NG	OK	OK
Export Configuration		NG	OK	NG	NG	OK	OK
Setup Drive Monitor Parameters	Maintenance Operation	NG	NG	NG	NG	NG	OK
Export Drive Monitor Parameters		NG	NG	NG	NG	NG	OK
Start/Stop Performance Monitoring	Storage Management	NG	OK	NG	NG	NG	OK
Clear Cache		NG	OK	NG	NG	NG	OK

Eco-mode Management

Function	Required policy for this function	Availability of executions in the default role					
		Monitor	Admin	Storage Admin	Account Admin	Security Admin	Maintainer
Modify Eco-mode General Setting	One of the following policies is required: <ul style="list-style-type: none"> RAID Group Management Maintenance Operation 	NG	OK	OK	NG	NG	OK
Create Eco-mode Schedule	RAID Group Management	NG	OK	OK	NG	NG	OK
Delete Eco-mode Schedule		NG	OK	OK	NG	NG	OK
Modify Eco-mode Schedule		NG	OK	OK	NG	NG	OK

User Management

Function	Required policy for this function	Availability of executions in the default role					
		Monitor	Admin	Storage Admin	Account Admin	Security Admin	Maintainer
Setup User Account	User Management	NG	OK	NG	OK	NG	NG
Initialize User Account		NG	OK	NG	OK	NG	NG
Modify User Policy		NG	OK	NG	OK	NG	NG
Modify RADIUS	Authentication / Role	NG	OK	NG	OK	NG	NG
Add Role		NG	OK	NG	OK	NG	NG
Delete Role		NG	OK	NG	OK	NG	NG
Modify Role		NG	OK	NG	OK	NG	NG

Network Management

Function	Required policy for this function	Availability of executions in the default role					
		Monitor	Admin	Storage Admin	Account Admin	Security Admin	Maintainer
Setup Network Environment	Storage Management	NG	OK	NG	NG	NG	OK
Setup Firewall		NG	OK	NG	NG	NG	OK
Setup SNMP Agent Basic Interface		NG	OK	NG	NG	NG	OK
Setup SNMP Manager		NG	OK	NG	NG	NG	OK
Setup SNMP Agent MIB Access View		NG	OK	NG	NG	NG	OK
Setup SNMP Agent User		NG	OK	NG	NG	NG	OK
Setup SNMP Agent Community		NG	OK	NG	NG	NG	OK
Setup SNMP Agent Trap		NG	OK	NG	NG	NG	OK
Download MIB File		NG	OK	NG	NG	NG	OK
Send SNMP Trap Test		NG	OK	NG	NG	NG	OK
Display SMTP Log		NG	OK	NG	NG	NG	OK
Setup E-Mail Notification		NG	OK	NG	NG	NG	OK
Setup Syslog		NG	OK	NG	NG	NG	OK
Setup SSH Server Key		NG	OK	NG	NG	NG	OK
Create Self-signed SSL Certificate		NG	OK	NG	NG	NG	OK
Create Key/CSR		NG	OK	NG	NG	NG	OK
Register SSL Certificate		NG	OK	NG	NG	NG	OK
Setup SSL Security Configuration	One of the following policies is required: <ul style="list-style-type: none"> Storage Management Security Setting (*1) 	NG	OK	NG	NG	OK	OK

*1 : When this function is used with the "Security Setting" policy, the "Status Display" policy or the "Storage Management" policy is also required to display the status screen.

Event/Dump Management

Function	Required policy for this function	Availability of executions in the default role					
		Monitor	Admin	Storage Admin	Account Admin	Security Admin	Maintainer
Setup Event Notification	Storage Management	NG	OK	NG	NG	NG	OK
Display/Delete Event Log	Maintenance Information	NG	OK	NG	NG	OK	OK
Export/Delete Log (*1)		NG	OK	NG	NG	OK	OK
Export/Delete Panic Dump (*2)		NG	OK	NG	NG	OK	OK

*1 : The "Maintenance Operation" policy is also required to delete logs.

*2 : The "Maintenance Operation" policy is also required to delete panic dumps.

Audit Log Management

Function	Required policy for this function	Availability of executions in the default role					
		Monitor	Admin	Storage Admin	Account Admin	Security Admin	Maintainer
Enable Audit Log	Security Setting	NG	OK	NG	NG	OK	NG
Disable Audit Log		NG	OK	NG	NG	OK	NG
Setup Audit Log		NG	OK	NG	NG	OK	NG

Key Management (*1)

Function	Required policy for this function	Availability of executions in the default role					
		Monitor	Admin	Storage Admin	Account Admin	Security Admin	Maintainer
Setup Key Management Machine Name	Security Setting	NG	OK	NG	NG	OK	NG
Add Key Server		NG	OK	NG	NG	OK	NG
Delete Key Server		NG	OK	NG	NG	OK	NG
Modify Key Server		NG	OK	NG	NG	OK	NG
Create Key Group		NG	OK	NG	NG	OK	NG
Delete Key Group		NG	OK	NG	NG	OK	NG
Modify Key Group		NG	OK	NG	NG	OK	NG
Update SED Authentication Key		NG	OK	NG	NG	OK	NG
Import SSL/KMIP Certificate		NG	OK	NG	NG	OK	NG

*1: When the key management functions are used, the "Status Display" policy is also required to display the status screen.

Storage Migration Management

Function	Required policy for this function	Availability of executions in the default role					
		Monitor	Admin	Storage Admin	Account Admin	Security Admin	Maintainer
Start Storage Migration	Storage Migration Management	NG	OK	OK	NG	NG	OK
Download Template File for Storage Migration Settings		NG	OK	OK	NG	NG	OK
Delete Storage Migration Path		NG	OK	OK	NG	NG	OK
Download Storage Migration Result		NG	OK	OK	NG	NG	OK
Restart Storage Migration		NG	OK	OK	NG	NG	OK
Suspend Storage Migration		NG	OK	OK	NG	NG	OK
Stop Storage Migration		NG	OK	OK	NG	NG	OK

External Drive Management

Function	Required policy for this function	Availability of executions in the default role					
		Monitor	Admin	Storage Admin	Account Admin	Security Admin	Maintainer
Create External Drive	RAID Group Management	NG	OK	OK	NG	NG	OK
Delete External Drive		NG	OK	OK	NG	NG	OK

Remote Support Management (REMCS)

Function	Required policy for this function	Availability of executions in the default role					
		Monitor	Admin	Storage Admin	Account Admin	Security Admin	Maintainer
Display Communication Log	Storage Management	NG	OK	NG	NG	NG	OK
Setup Remote Support		NG	OK	NG	NG	NG	OK
Update Customer Information		NG	OK	NG	NG	NG	OK
Update Communication Environment Information		NG	OK	NG	NG	NG	OK
Setup Log Sending Parameters		NG	OK	NG	NG	NG	OK
Stop/Restart Remote Support		NG	OK	NG	NG	NG	OK

Remote Support Management (AIS Connect) (*1)

Function	Required policy for this function	Availability of executions in the default role					
		Monitor	Admin	Storage Admin	Account Admin	Security Admin	Maintainer
Setup AIS Connect Environment	One of the following policies is required: <ul style="list-style-type: none"> • Storage Management • Maintenance Operation 	NG	OK	NG	NG	NG	OK
Setup Remote Session Permission		NG	OK	NG	NG	NG	OK
Send Log		NG	OK	NG	NG	NG	OK
Test Server Connectivity		NG	OK	NG	NG	NG	OK
Send AIS Connect Test Event		NG	OK	NG	NG	NG	OK
Customer Information Setup		NG	OK	NG	NG	NG	OK
Import Root Certificate (*2)	Storage Management	NG	OK	NG	NG	NG	OK

*1 : AIS Connect service ended in December 2022.

*2 : When this function is used, the "Status Display" policy is also required to display the status screen.

Firmware Management

Function	Required policy for this function	Availability of executions in the default role					
		Monitor	Admin	Storage Admin	Account Admin	Security Admin	Maintainer
Apply Controller Firmware	One of the following policies is required: <ul style="list-style-type: none"> • Firmware Management • Maintenance Operation 	NG	OK	NG	NG	NG	OK
Delete Controller Firmware Schedule		NG	OK	NG	NG	NG	OK

A. User Roles and Policies

Function	Required policy for this function	Availability of executions in the default role					
		Monitor	Admin	Storage Admin	Account Admin	Security Admin	Maintainer
Delete Controller Firmware	Maintenance Operation	NG	NG	NG	NG	NG	OK
Register Disk Firmware		NG	NG	NG	NG	NG	OK
Apply Disk Firmware		NG	NG	NG	NG	NG	OK
Delete Disk Firmware		NG	NG	NG	NG	NG	OK

OK: Available NG: Not available

B. Status List

■ Overview






The status of the storage system, volumes, RAID groups, External RAID Groups, Thin Provisioning Pools, components, an SED authentication key (hereinafter, referred to as "key"), and key servers that are displayed in the operation screens is described below.

- ["Storage System General Status" \(page 1603\)](#)
- ["Storage System General Status \(Detail\)" \(page 1603\)](#)
- ["Volume Status" \(page 1604\)](#)
- ["RAID Group Status" \(page 1605\)](#)
- ["External RAID Group Status" \(page 1606\)](#)
- ["Thin Provisioning Pool Status" \(page 1606\)](#)
- ["Component Status" \(page 1607\)](#)
 - ["Drive Status" \(page 1607\)](#)
 - ["External Drive Status" \(page 1608\)](#)
- ["Key Status" \(page 1608\)](#)
- ["Key Server Status" \(page 1609\)](#)

Storage System General Status

The general status of the storage system is displayed as an icon with character strings. A "Normal (green)" general status icon indicates normal status, while other color images indicate a failure.


The meaning of each general status icon is described below.

Status	Description
 (Green)	The storage system is in the normal state.
 (Orange)	The storage system is under maintenance.
 (Yellow)	The storage system is in the warning state.
 (Red)	The storage system is in the failed state.
 (Red)	"Not Ready" is a status where an abnormality is detected at a power-off, and I/O access from the host cannot be received.

















Storage System General Status (Detail)

The general status of the storage system (detail) is displayed with an icon and character string, or only character string.

The meaning of each general status (detail) is described below.










Storage System General Status (Detail)	Storage system general status	Description
✔ Normal	 (Green)	The storage system is in the normal state.

B. Status List







Storage System General Status (Detail)	Storage system general status	Description
 Maintenance	 (Orange)	Components that are undergoing maintenance exist in the storage system. Rebuild or copyback is being performed.
 Change Controlling CM	 (Orange)	Changing of the Controlling CM is required.
 Pinned Data	 (Yellow)	Pinned data is detected.
 Warning	 (Yellow)	A component requires preventive maintenance. A bad sector is detected.
 Error	 (Red)	A component has an error.
 Not Ready (*1)	 (Red)	A failure is detected when starting or turning off the storage system. I/O from the host cannot be received normally. *1 : The number, which indicates the factor of being "Not Ready", is displayed.
 Subsystem Down	 (Red)	The storage system is in the failed state. I/O from the host cannot be received normally.
 Unknown	 (Red)	A status other than the ones listed above.

Volume Status

Volume status is displayed with an icon and the status name. The volume status is described below.













Status	Description
 Available	The volume is operating normally.
 Spare in Use	The RAID group to which the volume belongs maintains redundancy by using the hot spare.
 Readying	The volume is not formatted.
 Rebuild	Rebuilding from a failed data drive to the hot spare or to the replaced drive is being performed for the RAID group to which the volume belongs.
 Copyback	Copyback for the RAID group to which the volume belongs is being performed from the hot spare to the new data drive.
 Redundant Copy	Redundant copy to the hot spare for the RAID group to which the volume belongs is being performed.
 Partially Exposed Rebuild	Rebuilding from the first failed data drive to the hot spare or to the replaced drive is being performed for the RAID group to which the volume belongs. This status is displayed only when the RAID level of the RAID group to which the volume belongs is "High Reliability (RAID6)" or "High Reliability (RAID6-FR)".
 Exposed Rebuild	Two of the data drives for the RAID group to which the volume belongs have failed. Rebuilding from the first failed data drive to the hot spare or to the replaced drive is being performed. In addition, all the hot spares have already been used. As a result, the second failed data drive is waiting for the hot spare to become available. This status is displayed only when the RAID level of the RAID group to which the volume belongs is "High Reliability (RAID6)" or "High Reliability (RAID6-FR)".
 Exposed	The RAID group to which the volume belongs has lost redundancy due to drive failure.

B. Status List










Status	Description
 Partially Exposed	One of the drives that configures the RAID group to which the volume belongs has failed. This status is displayed only when the RAID level of the RAID group to which the volume belongs is "High Reliability (RAID6)" or "High Reliability (RAID6-FR)".
 Not Available	The volume cannot be used.
 Not Ready	The RAID group to which the volume belongs is blocked.
 Broken	The volume is broken.
 Data Lost	Data in the volume is lost. Reading or writing of data cannot be performed.
 Unknown	A status other than the ones listed above.

RAID Group Status

RAID group status is displayed with an icon and the status name. The RAID group status is described below.





Status	Description
 Available	The RAID group is operating normally.
 Spare in Use	Rebuilding to the hot spare is complete. The RAID group maintains redundancy by using the hot spare.
 Spare in Use (Fast)	Rebuilding to the Fast Recovery hot spare is complete. The RAID group maintains redundancy by using the Fast Recovery hot spare. This status is displayed only when the RAID level is "High Reliability (RAID6-FR)".
 Readying	The RAID group that is registered as an REC Disk Buffer is not formatted. This status is displayed only for a RAID group that is registered as an REC Disk Buffer.
 Rebuild	Rebuilding from a failed data drive to the hot spare or to the replaced drive is being performed for the RAID group.
 Copyback	Copyback from the hot spare to the new data drive for the RAID group is being performed.
 Copyback (Fast)	Copyback from the Fast Recovery hot spare (*1) to the new data drive for the RAID group is being performed. *1: "Fast Recovery hot spare" indicates hot spare areas that are distributed within the Fast Recovery RAID group.
 Redundant Copy	Redundant copy to the hot spare is being performed in the RAID group.
 Partially Exposed Rebuild	Rebuilding from the first failed data drive to the hot spare or to the replaced drive is being performed in the RAID group. This status is displayed only when the RAID level is "High Reliability (RAID6)".
 Partially Exposed Rebuild (Fast)	Rebuilding from the first failed data drive to the Fast Recovery hot spare is being performed in the RAID group. This status is displayed only when the RAID level is "High Reliability (RAID6-FR)".
 Exposed Rebuild	Two of the data drives for the RAID group have failed. Rebuilding from the first failed data drive to the hot spare or to the replaced drive is being performed. In addition, all the hot spares have already been used. As a result, the second failed data drive is waiting for the hot spare to become available. This status is displayed only when the RAID level is "High Reliability (RAID6)".
 Exposed Rebuild (Fast)	Two of the data drives for the RAID group have failed. Rebuilding from the first failed data drive to the Fast Recovery hot spare is being performed. In addition, all the hot spares have already been used. As a result, the second failed data drive is waiting for the hot spare to become available. This status is displayed only when the RAID level is "High Reliability (RAID6-FR)".

B. Status List

Status	Description
 Exposed	The RAID group has lost redundancy due to drive failure.
 Exposed (Fast)	The RAID group has lost redundancy due to drive failure. The RAID group uses the Fast Recovery hot spare. This status is displayed only when the RAID level is "High Reliability (RAID6-FR)".
 Partially Exposed	One of the drives that configures the RAID group has failed. This status is displayed only when the RAID level is "High Reliability (RAID6)".
 Partially Exposed (Fast)	One of the drives that configures the RAID group has failed. The RAID group uses the Fast Recovery hot spare. This status is displayed only when the RAID level is "High Reliability (RAID6-FR)".
 No Drive Path	The RAID group is blocked.
 SED Locked	The RAID group is blocked. If an SED authentication key cannot be obtained from the key server, "SED Locked" is displayed.
 Broken	The RAID group is broken.
 Broken (Fast)	The RAID group is broken. The RAID group uses the Fast Recovery hot spare. This status is displayed only when the RAID level is "High Reliability (RAID6-FR)".
 Unknown	A status other than the ones listed above.






External RAID Group Status

External RAID Group status is displayed with an icon and the status name. The External RAID Group status is described below.





Status	Description
 Available	The External RAID Group is operating normally.
 Broken	The External RAID Group is broken.
 Not Accessible	The External RAID Group cannot be accessed.
 Unknown	A status other than the ones listed above.

Thin Provisioning Pool Status

Thin Provisioning Pool (TPP) status is displayed with an icon and the status name. The TPP status is described below.







Status	Description
 Available	The TPP is operating normally.
 Maintenance	Forcible recovery of the TPP is being performed.
 Readying	All the physical allocation area in the TPP is not formatted.
 Partially Readying	Some parts of the physical allocation area in the TPP is not formatted.
 Exposed	The TPP is available. The "Exposed" state of the TPP is displayed not only when the RAID group that configures the TPP has lost redundancy and is in the "Exposed" state, but also when the RAID group maintains redundancy in the "Spare in Use" state. The "Exposed" state of the TPP indicates that the RAID group in the TPP is not in the normal state because of any causes such as the drive failure.

B. Status List











Status	Description
 Blockade	The TPP is blocked.
 Broken	The TPP is broken.
 Data Lost	Data in the TPP is lost. Reading or writing of data cannot be performed.
 Unknown	A status other than the ones listed above.

Component Status

This section explains the component status. The component status is described below.


Status	Description
	The component is operating normally.
	The component is installed, but not used.
	The component is under maintenance.
	The component requires preventive maintenance.
	An error has occurred in the component.
	A status other than the ones listed above.

The status of the components is displayed with an icon for each storage system image in the view screen. The component status is described below.












Status	Description
 Normal	The component is operating normally.
 Unconnected	A faulty component exists in the storage system.
 Undefined	The component is installed, but not used.
 Undefined (Error)	The component, which is not being used, is in the error state.
 Normal (Unused parts inside)	There is an unused component that is installed in the storage system.
 Check1	The component is being rebooted.
 Maintenance	The component is under maintenance.
 Warning	The component requires preventive maintenance.
 Error	An error has occurred in the component.
 Unknown	A status other than the ones listed above.

Drive Status

Drive status is displayed with an icon and the status name. The drive status is described below.








Status	Description
 Available	The drive is in the normal state. The drive is used in the RAID group. Volumes are created in the RAID group.

B. Status List

Status	Description
 Spare	The drive is an unused hot spare.
 Available	The drive is in the normal state. The drive is used in the RAID group. No volumes are created in the RAID group.
 Present	The drive is not used (not registered as a RAID group or hot spare), or is waiting for rebuild/copyback.
 Readying	The drive is starting up.
 Rebuild/Copyback	A rebuild or copyback is being performed in the drive.
 Redundant Copy	A redundant copy is being performed in the drive.
 Not Supported	The drive is not supported. [Example] Drive capacity is insufficient.
 Not Exist	The drive cannot be recognized.
 Failed Usable	An error involving RAID group failure has occurred in the drive.
 Broken	An error has occurred in the drive.
 Unknown	A status other than the ones listed above.

External Drive Status

External Drive status is displayed with an icon and the status name. The External Drive status is described below.

Status	Description
 Available	The External Drive is in the normal state. The External Drive is used in the External RAID Group. External Volumes are created in the External RAID Group.
 Available	The External Drive is in the normal state. The External Drive is used in the External RAID Group. No External Volumes are created in the External RAID Group.
 Present	The External Drive is unused (or not registered in the External RAID Group).
 Rebuild	A mirror configuration is being established in the External Drive.
 Not Exist	The External Drive cannot be recognized.
 Failed Usable	An error involving External RAID Group failure has occurred in the External Drive.
 Unknown	A status other than the ones listed above.

Key Status

Key status is displayed with the status name. The key status is described below.

Status	Description
Normal	A valid key is registered for the SEDs. The key is in the normal state.
Unregistered Server Certificate	The "SSL / KMIP Certificate" (key server certification) is not registered in the storage system. Communication between the storage system and the key server cannot be performed.
Expired Server Certificate	The "SSL / KMIP Certificate" (key server certification) has expired. Communication between the storage system and the key server cannot be performed.

B. Status List

Status	Description
No SSL Certificate	An SSL certificate (*1) for the storage system has not been created. Communication between the storage system and the key server cannot be performed. *1: "Self-signed SSL certificate" or "SSL server certificate"
Network Error	The key cannot be obtained due to a network error between the storage system and the key server.
Not Acquired	The key is not obtained or in one of the following states. <ul style="list-style-type: none"> • The required key for starting key server management is not obtained • The allocations of the Master server and the Slave server to the key group have all been deleted
Expiration	An expired key is registered in the SED. The key has expired, but a new key can be obtained from the server.
Key Server Error	The network between the storage system and the key server is in the normal state, but no SED key is stored in the key server.
Modifying	A RAID group in which the key is being modified exists in the key group. "RAID group of which key is modifying" indicates the following conditions: <ul style="list-style-type: none"> • The key is being updated manually from Web GUI or CLI • The key is automatically being updated because it expired • Updating of the key stopped due to an error • SEDs are maintained while a network error occurs when the security level is "Low"

Key Server Status

Key server status is displayed with the status name. The key server status is described below.

Status	Description
Normal	The communication between the storage system and the key server is normal. The key can be obtained successfully. The key server is in the normal state.
Setting	"Setting" indicates the following conditions: <ul style="list-style-type: none"> • The "SSL / KMIP Certificate" (key server certification) or SSL certificate (*1) is not registered. *1: "Self-signed SSL certificate" or "SSL server certificate" <ul style="list-style-type: none"> • The network between the storage system and the key server is normal, but connection to the key server is forbidden.
Network Error	The network between the storage system and the key server is not connected normally.
Key Acquisition Failure	The key that is requested from the storage system does not exist in the key server.
Key Server Error	An error due to a failure other than key acquisition failure is detected.
Internal Error	Communication to the key server could not be performed due to an internal failure of the storage system.

C. Glossary (A - Z)

[\[A\]](#) [\[B\]](#) [\[C\]](#) [\[D\]](#) [\[E\]](#) [\[F\]](#) [\[G\]](#) [\[H\]](#) [\[I\]](#) [\[J\]](#) [\[K\]](#) [\[L\]](#) [\[M\]](#) [\[N\]](#) [\[O\]](#) [\[P\]](#) [\[Q\]](#) [\[R\]](#) [\[S\]](#) [\[T\]](#) [\[U\]](#) [\[V\]](#) [\[W\]](#) [\[X\]](#) [\[Y\]](#) [\[Z\]](#)

[A]

Advanced Copy

The Advanced Copy function enables data backup (data replication) at any point without stopping the operations of the storage system.

For the backup operation of the storage system, data can be replicated without taking server resources. The replication process for large amounts of data and business access can be performed by controlling the timing so that data protection is considered to be separate from operation processes.

There are two types of Advanced Copy: a local copy that is performed within a single storage system and a remote copy that is performed between multiple storage systems. The methods that are available for the local copy function are "OPC", "QuickOPC", "SnapOPC", "SnapOPC+", and "EC". "REC" is available for the remote copy function.

AIS Connect

AIS Connect is a remote maintenance service function that is provided by Fujitsu Technology Solutions GmbH (FTS).

AIS Connect service ended in December 2022.

[B]

Bad Sector

Bad sector is data that is not read normally while a rebuild, a copyback, or a redundant copy is being performed. The start position of the bad sector information and the number of LBAs are displayed in Web GUI.

Bootup and Utility Device (BUD)

BUD is non-volatile memory that is installed in the CM. BUD is used as a system area to store backup data when a power failure occurs and to store the firmware.

Box ID

The Box ID is an identifier used to identify storage systems. This ID is a unique name in the user system and consists of a 40-digit code. The initial Box ID is a storage system ID consisting of storage system information (such as series name, model name, and serial number).

[C]

Channel Adapter (CA)

A CA is a host interface adapter that is used to connect a controller to a server. Two types of CAs are available; [FC](#) and [iSCSI](#).

Chunk Size

Chunk size is a physical capacity that is assigned to virtual logical volumes created in TPPs and FTRPs when a write occurs from the host. There are five chunk sizes, 21 MB, 42 MB, 84 MB, 168 MB, and 336 MB. The chunk size is automatically set as 21 MB or 336 MB depending on the "Maximum Pool Capacity" of the storage system when a new TPP is created. If "Maximum Pool Capacity" is "128 PB" and "Advanced Setting" is used when a new TPP is created, the chunk size can be set as 21 MB, 42 MB, 84 MB, 168 MB, or 336 MB. If the "Maximum Pool Capacity" is expanded with the [\[Set Thin](#)

Provisioning] function, the chunk size for the new TPP may differ from the existing TPPs. For example, if the maximum pool size of the ETERNUS DX8900 S4 is expanded from "8 PB" to "128 PB", the chunk size is changed from "21 MB" to "336 MB". The changed chunk size is applied when TPPs are created after the change. As a result, TPPs with different chunk sizes exist in the storage system. The chunk size for the created TPP cannot be changed. The chunk size for a new FTRP is set in the same way as when a TPP is created. The chunk size for each pool is displayed in the TPP list and the FTRP list.

The chunk size of the TPPs for Compression is usually "21 MB". Use "Advanced Setting" to create a TPP with other chunk sizes.

(Example) For the ETERNUS DX8900 S4:

Options for the maximum pool capacity	Displayed chunk size (in the TPP list and the FTRP list)
512 TB	21 MB
1 PB	
2 PB	
4 PB	
8 PB	
128 PB	336 MB

Consistency mode

The Consistency mode secures the order of data transfer to the remote storage systems for all of the specified REC sessions. This mode requires securement of the dedicated [REC Buffer](#) in the cache memory constantly.

Controller Enclosure (CE)

The controller enclosure contains the main controller units for the storage system, such as controller modules (CMs) and channel adapters (CAs).

Controller Module (CM)

The controller module controls all operations in the storage system.

Controlling CM

A controller that controls access is assigned to each RAID group and manages the load balance in the storage system. The controller that controls a RAID group is called a Controlling CM.

Copy Session

→ [Session](#)

[D]

Data Container Volumes

The volumes that are used for storing the data reduction control information, the post-reduction data, and the metadata. This volume is created automatically in the TPP when Deduplication/Compression is enabled for the relevant TPP. In the volume list screen, "System" is displayed in "Usage" of the Data Container Volume. For "Usage Details", "Data Container" is displayed. The volume name is fixed to "\$DATA_CNTNRx" (x: TPP number).

Dedicated Hot Spare

A Dedicated Hot Spare is a registered spare drive (hot spare) in a RAID group that is used instead of a drive that fails. A Dedicated Hot Spare, unlike a Global Hot Spare, is used only for the specific RAID group.

Deduplication/Compression Volumes

Virtual volumes (TPV) that have Deduplication/Compression enabled. Deduplication/Compression Volumes are created in the TPP and can be referred to from the server. In the volume list screen, "Block/Dedupe&Comp", "Block/Dedupe", or "Block/Comp" is displayed in "Usage" of the Deduplication/Compression Volume.

Drive Enclosure (DE)

The drive enclosure contains drives. Three types of drive enclosures are available; a 2.5" type drive enclosure, a 3.5" type drive enclosure, and a 3.5" type high-density drive enclosure.

[E]

Eco-mode

The Eco-mode is a function that reduces power consumption by stopping the rotation of disks that have limited access time for specified periods of time.

Disk spin-up and spin-down schedules can be set for each RAID group or Thin Provisioning Pool (TPP).

Encryption Mode

The mode for encrypting volumes by using the CM.

"Encryption Mode is enabled" indicates that "Fujitsu Original Encryption", "AES-128", or "AES-256" has been selected for "Encryption Mode". Refer to the [Setup Encryption Mode] function for details.

Equivalent Copy (EC)

A type of Advanced Copy. The EC function creates a copy that is always in sync with any updates in the business volume (Mirror Suspend).

This function can back up the copy volume to a tape device while operations with the business volume continue by suspending synchronization (mirroring) between the business volume and the copy volume at a specific point in time. In addition to the Mirror Suspend function, the storage system also provides the Suspend Resume function, which copies only updated data after an initial copy is performed.

Extended Copy (XCOPY)

XCOPY is a Full Copy function for vStorage APIs for Array Integration (VMware VAAI).

External Drives

Volumes in the [external storage system](#) that transfer the [External LU Information](#) to the [local storage system](#). This volume is called "External Drive" because it is equivalent to a drive in the local storage system.

External Drives are displayed in the [External Drives] screen. Only the [Delete] action is available for the created External Drives.

External LU Information

External Drive identification information (such as UIDs, vendor IDs, and product IDs) that is used to access volumes from the host. For volumes that inherit the identification information and volumes that transfer the identification information to the relevant volumes, the host recognizes them as the same volumes.

External RAID Group

Volumes in the [external storage system](#) ([External Drives](#)) that transfer the [External LU Information](#) and are managed as RAID groups in the [local storage system](#).

External RAID Groups are displayed in the [External RAID Group] screen. One "External RAID Group" consists of one "External Drive". The [Delete] and [Recover] actions are available for the created External RAID Groups.

External Storage System

The storage system that connects to the [local storage system](#) as a target and provides [External Drives](#).

For the Non-disruptive Storage Migration function, the external storage system corresponds to the migration source storage system.

External Volume

Volumes in the [external storage system](#) that transfer the [External LU Information \(External Drives\)](#) and are managed as volumes in the [local storage system](#).

External Volumes are displayed in the [Volume] screen. The volume type is "Standard". External Volumes are created in the following order: "External Drive" → "External RAID Group" → "External Volume". One "External RAID Group" consists of one "External Drive". Furthermore, one "External Volume" consists of one "External RAID Group".

For the Non-disruptive Storage Migration function, the External Volume corresponds to the migration source volume. In the [Volume] screen, the External Volumes are displayed as volumes whose "Usage" is "Migration". The [Delete], [Rename], and [Start RAID Migration] actions are available for External Volumes before the data migration. The following operations are not available before the data migration is complete:

- Format, expansion, and encryption of External Volumes
- Storage Migration that uses External Volumes as migration destinations (online Storage Migration/offline Storage Migration)
- Advanced Copy that uses External Volumes as copy sources or copy destinations

After the data migration is completed, External Volumes can be handled equivalently to normal volumes ([internal volumes](#)). However, volumes that inherit the "External LU Information" cannot be used for the Storage Cluster function.

[F]

Fan Expander Module (FEM)

Two FEMs are installed in one high-density DE. These FEMs are used as FANs to cool the DE and as Expanders. An FEM has two Expanders.

Fibre Channel (FC)

An interface type that connects the server and the storage system.

Flexible Tier Pool (FTRP)

An FTRP is a pool that is used by the Flexible Tier (Automated Storage Tiering) function. An FTRP is configured by multiple FTSPs. The FTRP is created by CLI or ETERNUS SF Storage Cruiser.

Flexible Tier Sub Pool (FTSP)

An FTSP is a sub pool that is registered in an FTRP. Up to three FTSPs can be registered in an FTRP. The priority orders can be set per FTSP within one FTRP. An FTSP is configured by multiple RAID groups. The FTSP is created by CLI or ETERNUS SF Storage Cruiser.

Flexible Tier Volume (FTV)

An FTV is a virtual volume that is created in an FTRP. This volume is a target volume for tiering. Data is automatically redistributed in small block units according to the access frequency. The FTV is created by CLI or ETERNUS SF Storage Cruiser.

[G]

Global Hot Spare

A Global Hot Spare is a registered spare drive (hot spare) in a RAID group that is used instead of a drive that fails. A Global Hot Spare, unlike a Dedicated Hot Spare, can be used by all of the RAID groups.

[H]

Host Affinity

The host affinity function controls the host access permission to volumes.

Host Affinity Settings

The host affinity setting is used to associate host groups and port groups with LUN groups. It also used to associate hosts and ports with LUN groups.

By setting host affinity between host groups (or hosts), port groups (or ports), and LUN groups, the volumes in the LUN groups can be accessed from the host via the ports.

[I]

Internal Volume

Volumes that are created in RAID groups configured with drives installed in [CEs](#) or [DEs](#) of the [local storage system](#). "Volumes" indicate "internal volumes". "Volumes" include both "internal volumes" and "External Volumes" if they specially do not require differentiation.

Internet Small Computer System Interface (iSCSI)

An interface type that connects the server and the storage system.

iSCSI is a protocol standard that includes SCSI commands and data within the transmission frame of TCP/IP packets to send or receive commands and data via the IP network. IPv4 and IPv6 are supported.

[J]

[K]

Key Group

The key group combines all of the RAID groups that use the same SED authentication key.

[L]

Local Storage System

The storage system that connects to the [external storage system](#) as an initiator and performs integrated management of [External Drives](#).

For the Non-disruptive Storage Migration function, the local storage system corresponds to the migration destination storage system.

Logical Device Expansion (LDE)

LDE is a function to dynamically expand the RAID group capacity by adding drives to an existing RAID group.

To perform LDE, select the target RAID group and click [Expand] in [Action].

LUN Concatenation

LUN Concatenation is a function that expands the existing volume capacity by concatenating free areas in a RAID group.

To perform LUN Concatenation, select the target volume and click [Expand Volume] in [Action].

LUN Group

A LUN group is a group of volumes that can be accessed from the host.

[M]

Management Information Base (MIB)

MIB describes the specifications and formats for groups of objects and variable numbers that can be read or written via an [SNMP](#) protocol.

In the MIB for this storage system, information for system monitoring (component information such as drives and other setup parameters) are described.

Master CM

When a storage system has multiple CMs, the CM that is given the authority to manage the storage system is called the "Master CM" and the other CMs are called "Slave CMs".

When an error occurs in a CM or a LAN, the Master CM is automatically switched, and the IP address of the old Master CM is passed to the new Master CM. If connection to the Master CM is unavailable due to an error, the Master CM can be forcibly switched to a Slave CM by specifying which Slave CM IP address to connect to.

Meta Cache

Meta cache is a cache area in NAS for storing the management information of the file system. The meta cache is distributed (or initially located) between CMs (CM#0 and CM#1) when NAS volumes (NAS user volumes and NAS backup volumes) are created. If the NAS volume is blocked or an unmount occurs, a failover of the meta cache to the other CM is performed. If the distribution of the meta cache becomes uneven, the memory of the CM with the larger meta cache may become insufficient or the access performance to the NAS volumes from the other CM may be reduced. There are two methods to restore the meta cache to the initial location.

- Initialize Meta Cache Distribution
- Automatic Meta Cache Distribution

Monitor

A Monitor session is a copy session that measures the amount of updates in the copy source area. This session does not perform the copy process and has no copy destination area. A Monitor session can be used to estimate the [SDP](#) capacity or to estimate the [REC](#) bandwidth (*1).

*1: Note that estimations by Monitor sessions are only available when no updates occur during an initial copy or a differential copy.

[N]

Nearline

Nearline disks are high capacity cost effective Nearline SAS disk drives for data backup and archive use. Nearline disks can store a larger amount of volumes than SAS disk drives ([Online](#)) at a lower cost.

Nearline SED

[Nearline](#) drives that have the encryption function built-in (or [SED](#)).

[O]

Offloaded Data Transfer (ODX)

ODX is a function that offloads the load on a server to copy and move data to the storage system. ODX is supported by Windows Server 2012 or later.

One Point Copy (OPC)

A type of Advanced Copy. An OPC is a function that creates a copy of the entire business volume at any point (Background Copy).

This function performs a logical data copy from a business volume to a duplicate volume in a short period of time without waiting for the completion of a physical copy. Duplicate volumes can be backed up to a tape device while operations with the business volume continue.

Online

An online disk is a high performance/high reliability SAS disk drive that supports 24 hour operation every day. This disk drive is used for storing frequently accessed data that requires high performance (such as databases).

Online SED

Online drives that have the encryption function built-in (or SED).

Optimizing Capacity

The optimizing capacity (Zero Reclamation) function that releases the physical area when data in the block (*1) that is allocated to a TPV or an FTV is filled with zeros.

*1: Volume allocation unit

[P]

PCIe Flash Module (PFM)

PFMs are installed in CEs (slot #16 to slot #23) of the ETERNUS DX500 S5/DX600 S5/DX900 S5 or the ETERNUS DX8900 S4. If the Extreme Cache capacity is set after adding PFMs in hot mode, the PFMs can be used as Extreme Cache.

Pinned Data

The pinned data is the data left in the cache memory due to unsuccessful write-back to the volume from the cache memory.

[Q]

QuickOPC

A type of Advanced Copy. A QuickOPC creates a copy of the entire business volume when an initial copy is performed. After this initial copying operation is complete, this function copies only updated (differential) data to a duplicated volume (Background Copy).

A QuickOPC is suitable for large databases that require a reduction in the backup time.

[R]

RAID Migration

RAID migration moves volumes in RAID groups, TPPs, or FTRPs to free areas in other RAID groups, TPPs, or FTRPs. This function can also be used to expand volume capacity or change the RAID level.

REC Buffer

An REC Buffer is used for an REC that is performed with the asynchronous consistency mode. For the copy source storage system, Send REC Buffers are required. For the copy destination storage system, Receive REC Buffers are required. Copy via REC Buffer stores multiple REC session I/Os in the REC Buffer for a certain period of time, and copies in blocks.

REC Disk Buffer

An REC Disk Buffer is used as a temporary destination to save copy data if an REC Buffer are insufficient. REC Disk Buffers are created in drives.

REMOte Customer Support system (REMCS)

REMCS is an original remote maintenance system that is made by Fujitsu. By automatically notifying failures to the remote center, immediate troubleshooting is available.

Remote Equivalent Copy (REC)

An REC is an extended [EC](#) that performs Mirror Suspend as an Advanced Copy (local copy) to enable copying between storage systems in remote sites. Mirroring, snapshots, and backup between multiple storage systems can be performed. This enables data protection from events such as disasters and terrorism as well as quick data recovery.

Representative volume

Representative volume is a volume for WSV, which is created by concatenating multiple RAID groups with striping, that belongs to the RAID group that is first in the concatenation order.

[S]

Self Encrypting Drives (SED)

An SED is hard disk drive that has an encryption chip called the Advanced Encryption Standard (AES) engine and an encryption key within the drive. SEDs perform encryption by themselves and do not require any encryption processes to be performed by the storage system firmware. This enables data to be encrypted without reducing the performance of the storage system.

Authentication keys are required to access SEDs. There are two types of SED authentication keys: an authentication key (a common key) that is created in the storage system and an authentication key that is created in the key server.

"SED" indicates "[Online SED](#)", "[Nearline SED](#)", and "[SSD SED](#)".

Session

A session is a unit to manage copy processes in the storage system. A single session manages the copy process for a sequential data area in the storage system.

Simple Network Management Protocol (SNMP)

SNMP is a monitoring and management protocol for systems and devices in the network. Data for monitoring and managing are defined in [MIB](#).

Snap Data Pool (SDP)

SDP is the area used when in case executing SnapOPC and SnapOPC+ increases the amount of copy data and exceeds the SDV capacity. SDPs cannot be created individually. SDPs are enabled when SDPVs are created. The created SDPVs are automatically registered in the SDP.

Snap Data Pool Element (SDPE)

SDPE is a minimum unit that is used to allocate area from the SDPs to SDVs. The SDPV capacity is an exact multiple of the SDPE.

Snap Data Pool Volume (SDPV)

An SDPV is a volume that is used to configure SDP areas. The SDP capacity equals the total capacity of the SDPVs. A volume is supplied from an SDP when the amount of updates exceeds the capacity of the SDV.

Snap Data Volume (SDV)

The SDV is an area that is used as the copy destination for a SnapOPC/SnapOPC+. For a SnapOPC, SDVs are created for each copy destination. For a SnapOPC+, SDVs are created for each generation of the copy destination.

SnapOPC

A type of Advanced Copy. This function only copies the data prior when data is updated (Copy-on-Write).

This copy method requires a smaller capacity than Full Backup processes and is suitable for system backups of file servers that are updated in small amounts.

SnapOPC+

A type of Advanced Copy. Similar to a SnapOPC, a SnapOPC+ only copies the part of data prior to when data is updated to a duplicate volume. Unlike a SnapOPC, a SnapOPC+ manages the history of updated data (Copy-on-Write). A SnapOPC+ manages data as update history (SnapOPC saves this data redundantly), which enables generation backups based on the disks in a copy destination area that is smaller than the SnapOPC.

Snapshot

Snapshot preserves frequently updated non-structural files created in Office (such as Word/Excel/Power Point) at specific times. Data can be recovered from the snapshot that was acquired if the data is lost or damaged.

Solid State Drive (SSD) / SSD-H / SSD-M / SSD-L

An SSD is a high performance/high reliability drive that supports 24 hour operation every day. This disk drive is used for storing frequently accessed data that requires high performance (such as databases).

SSDs use flash memory as their storage media and provide better random access performance than [Online](#) and [Nearline](#) hard disks. Containing no motors or other moving parts, they are highly resistant to impact and have low power consumption requirements.

"SSD-H" (High), "SSD-M" (Middle), and "SSD-L" (Less) are SSDs with 12 Gbit/s of interface speed (bandwidth). For SSDs, drive features such as performance vary depending on the capacity for the reserved space, also called Over Provisioning. SSD types (H/M/L) are determined by the Over Provisioning capacity.

When a RAID group, a [TPP](#), or an [FTSP](#) is configured with SSDs, "SSD" is displayed as the drive type regardless of the actual SSD type (SSD-H/SSD-M/SSD-L). Unless otherwise specified, this manual refers to "SSD-H", "SSD-M", and "SSD-L" collectively as "SSD".

SSD SED /SSD-H SED / SSD-M SED / SSD-L SED

[SSD-H](#), [SSD-M](#), or [SSD-L](#) that has the encryption function built-in (or [SED](#)).

When a RAID group, a [TPP](#), or an [FTSP](#) is configured with a single SSD type (SSD-H SED/SSD-M SED/SSD-L SED), or configured with multiple SSD types (SSD-H SED/SSD-M SED/SSD-L SED), "SSD SED" is displayed as the drive type. Unless otherwise specified, this manual refers to "SSD-H SED", "SSD-M SED", and "SSD-L SED" collectively as "SSD SED".

Standard

Standard volumes are the most commonly used volumes that are created in RAID groups or External RAID Groups.

A standard volume is used for normal usage, such as file systems and databases. The server recognizes it as a single logical unit.

[T]

Temporary

Temporary is a work volume that is created when a capacity expansion using the LUN Concatenation function is being performed. If the capacity expansion fails, "Temporary" is displayed in the volume list.

Thin Provisioning

Thin Provisioning is a function that virtualizes and allocates storage capacity. This reduces physical storage capacity and unused capacity can be used more efficiently.

Thin Provisioning Pool (TPP)

A TPP is a pool that is used for the Thin Provisioning function. A TPP is configured by multiple RAID groups.

Thin Provisioning Volume (TPV)

TPV is a virtual volume that is created in a Thin Provisioning Pool area. When data is being written to a TPV from the server, the drives are allocated in specified chunk size units.

[U]

[V]

Veeam Snapshot Volume

A snapshot volume that is created by the Veeam Universal Storage Integration API in the Veeam Storage Integration environment.

This volume is a copy destination volume or a restoration source volume for the Veeam sessions (SnapOPC+). In the [Volume] screen, the following are displayed for "Name", "Usage", and "Usage Details".

- The default name is "Copy source volume name_snap_YYMMDDHHMM". (YYMMDDHHMM: the date and time when the volume is created.)

Procedure ►►►

- 1 If the volume name exceeds 32 characters, the excess characters are deleted from the "copy source volume name", and replaced with a "~". Then, the name will contain only 32 characters.
- 2 If the name that is shortened in Step 1 already exists, a suffix number "_X" (X: serial numbers starting with "0") will be added.

-
- "Usage" is "Veeam", "Dedupe&Comp/Veeam", "Dedupe/Veeam", or "Comp/Veeam".
 - "Usage Detail" is "Veeam", "Dedupe&Comp/Veeam", "Dedupe/Veeam", or "Comp/Veeam". Refer to the [Volume (Basic Information)] function for details.

Veeam Storage Integration

Veeam Storage Integration is a function that enables flexible and high-speed backups, restorations, and replications by linking Veeam Backup & Replication with the snapshot function of the storage system.

[W]

Wide Striping Volume (WSV)

WSV is a volume that is created by concatenating distributed areas in from 2 to 64 RAID groups. Processing speed is fast because data access is distributed.

[X]

[Y]

[Z]

D. Factory Default List

This appendix describes the factory default parameters for the following functions.

- ["Volume Management" \(page 1621\)](#)
- ["RAID Group Management" \(page 1626\)](#)
- ["Thin Provisioning Management" \(page 1628\)](#)
- ["Advanced Copy Management" \(page 1630\)](#)
- ["Connectivity Management" \(page 1634\)](#)
- ["System Management" \(page 1645\)](#)

Note that functions and setting items that do not have default settings are not listed.

Volume Management

This section describes the default parameters for the volume management functions.

- ["■ Create Volume" \(page 1621\)](#)
- ["■ Rename Volume" \(page 1622\)](#)
- ["■ Modify Thin Provisioning Volume Threshold" \(page 1622\)](#)
- ["■ Set Allocation" \(page 1623\)](#)
- ["■ Start RAID Migration" \(page 1623\)](#)
- ["■ Modify Cache Parameters" \(page 1624\)](#)
- ["■ Set ALUA" \(page 1624\)](#)
- ["■ Set Volume QoS" \(page 1625\)](#)
- ["■ Set Volume QoS Pattern" \(page 1625\)](#)
- ["■ Change Data Reduction Processing CM" \(page 1625\)](#)
- ["■ Set Snapshot" \(page 1626\)](#)

■ Create Volume

Screen	Item	Default
New Volume	Use External Drive	"Enable" checkbox Cleared
	Deduplication	Disable
	Compression	Disable
	Allocation	Thin
	RAID Group / TPP Selection	Automatic
	Data Integrity	Default
Automatic Setting	Drive Type	Online (*1)
	RAID Level	High Performance (RAID1+0) (*1)
	Key Group	Enable
	Number of Volumes	1
	Start of Suffix	0
	Digits of Suffix	1
	Encryption by CM	Disable

D. Factory Default List
Volume Management

Screen	Item	Default
Manual Setting (When creating Standard type volumes, SDVs, or SDPVs)	Use all Largest Free Space	"Enable" checkbox Cleared
	Start of Suffix	0
	Digits of Suffix	1
	Volume No.	"Specify" checkbox Cleared
	Encryption by CM	Disable
	Number of Volumes	0
	Checkbox to select an External RAID Group	Cleared
Manual Setting (When creating TPVs or NAS Volumes)	Start of Suffix	0
	Digits of Suffix	1
	Volume No.	"Specify" checkbox Cleared
	Number of Volumes	0
Manual Setting (When creating WSVs)	Volume Information	
	Use all Largest Free Space	"Enable" checkbox Cleared
	Number of Volumes	0
	Start of Suffix	0
	Digits of Suffix	1
	Volume No.	"Specify" checkbox Cleared
	Wide Stripe Size	Normal
	Concatenation Order	Automatic
	Encryption by CM	Disable
	Select RAID Group Information	
	Drive Type	Online (*1)
	RAID Level	High Performance (RAID1+0) (*1)
	Number of Member Drives	4 (*1)
	Stripe Depth	64 KB

*1: The default value varies depending on the RAID groups registered in the storage system.

■ Rename Volume

Screen	Item	Default
Rename Setting	Start of Suffix	0
	Digits of Suffix	1

■ Modify Thin Provisioning Volume Threshold

Screen	Item	Default
Threshold Setting	New Threshold	80 (%)

■ Set Allocation

Screen	Item	Default
Allocation Settings	Allocation	Thin

■ Start RAID Migration

Screen	Item	Default	
Setting Volume	Migration Destination	RAID Group / Thin Provisioning Pool / Flexible Tier Pool	
	Volume Capacity	Migration source volume capacity	
	FTSP Priority	Automatic	
	Encryption	Encryption setting for the migration source volume	
	Deduplication	Deduplication status of the migration source volume	
	Compression	Compression status of the migration source volume	
	Allocation	Thin	
	Data Sync after Migration	Automatic Stop	
	Start Optimizing TPV/FTV Capacity after migration	Disable	
	Data Integrity	Data protection method of the migration source volume	
Select Migration Destination	Select Migration Destination	Cleared	
Wide Striping Volume Setting	Volume Information		
		Wide Stripe Size	Normal
		Concatenation Order	Automatic
	Select RAID Group Information		
		Drive Type	Online (*1)
		RAID Level	High Performance (RAID1+0) (*1)
		Number of Member Drives	4 (*1)
	Stripe Depth	64 KB	
Select RAID Group	Select RAID Group	Cleared	

*1: The default value varies depending on the RAID groups registered in the storage system.

■ Modify Cache Parameters

Screen	Item	Default
Parameters Setting	Cache Page Capacity	"-" (hyphen) (Unlimited)
	Prefetch Limit (PL)	8
	Force Prefetch Mode (FP)	Off
	Multi Writeback Count (MWC)	Refer to "■ Allowed Input for MWC When Using the Default Stripe Depth Value (Volume)" (page 1701) in "Allowed Input for MWC When Using the Default Stripe Depth Value" (page 1701) and "■ Allowed Input for MWC When the Stripe Depth Value Is Tuned (Volume)" (page 1704) in "Allowed Input for MWC When the Stripe Depth Value Is Tuned" (page 1704) for details.
	Prefetch Sequential Detect Count (PSDC)	5
	Sequential Dirty Detect Count (SDDC)	5
	Sequential Slope (SS)	128
	Sequential Dirty Slope (SDS)	128
	Sequential Parallel Multi I/O Count (SPMC)	<ul style="list-style-type: none"> • For the ETERNUS DX60 S5 2 • For the ETERNUS DX100 S5 4 • For the ETERNUS DX200 S5 8 • For the ETERNUS DX500 S5 8 • For the ETERNUS DX600 S5 12 • For the ETERNUS DX900 S5 12 • For the ETERNUS DX8100 S4 8 • For the ETERNUS DX8900 S4 12 • For the ETERNUS AF150 S3 4 • For the ETERNUS AF250 S3 8 • For the ETERNUS AF650 S3 12
	Extreme Cache	Enable

■ Set ALUA

Screen	Item	Default
ALUA Settings	New ALUA	Follow Host Response

■ Set Volume QoS

Screen	Item	Default
Volume QoS Setting	New Bandwidth Limit	Unlimited

■ Set Volume QoS Pattern

Screen	Item	Default
QoS Pattern Settings	IOPS	Refer to "The Default Value for "QoS Pattern Settings"" (page 1625) .
	Throughput (MB/s)	Refer to "The Default Value for "QoS Pattern Settings"" (page 1625) .

The Default Value for "QoS Pattern Settings"

No.	IOPS	Throughput (MB/s)
1	15000 IOPS	800 MB/s
2	12600 IOPS	700 MB/s
3	10020 IOPS	600 MB/s
4	7500 IOPS	500 MB/s
5	5040 IOPS	400 MB/s
6	3000 IOPS	300 MB/s
7	1020 IOPS	200 MB/s
8	780 IOPS	100 MB/s
9	600 IOPS	70 MB/s
10	420 IOPS	40 MB/s
11	300 IOPS	25 MB/s
12	240 IOPS	20 MB/s
13	180 IOPS	15 MB/s
14	120 IOPS	10 MB/s
15	60 IOPS	5 MB/s

■ Change Data Reduction Processing CM

Screen	Item	Default
Data Reduction Processing CM Settings	New Data Reduction Processing CM	Automatic

■ Set Snapshot

Screen	Item	Default
Snapshot Setting	Name	<ul style="list-style-type: none"> "Use the volume name to setup snapshot" checkbox Selected Name Blank (*1)
	Number of Generations	7
	Mode	Automatic
	Schedule	
	Day of the Week	All selected
	Time	<ul style="list-style-type: none"> Time Interval 24 When "Advanced Setting" is selected for "Time" All cleared

*1 : For the snapshot destination SDVs, "Selected NAS user volume name" + "\$snap_N" (N: Number of generations between 1 - 128) is automatically specified.

RAID Group Management

This section describes the default parameters for the RAID group management functions.

- ["■ Create RAID Group" \(page 1626\)](#)
- ["■ Rename RAID Group" \(page 1627\)](#)
- ["■ Change Controlling CM" \(page 1627\)](#)
- ["■ Expand RAID Group" \(page 1627\)](#)
- ["■ Modify RAID Group Parameters" \(page 1627\)](#)
- ["■ Assign Eco-mode Schedule \(RAID Group\)" \(page 1627\)](#)
- ["■ Set Key Group \(RAID Group\)" \(page 1627\)](#)

■ Create RAID Group

Screen	Item	Default
New RAID Group	Create Mode	Automatic
Automatic Setting	Drive Type	Online (*1)
	RAID Level	High Performance (RAID1+0)
	Select Drives	Minimize number of using drives
Manual Setting	RAID Level	High Performance (RAID1+0)
	Controlling CM	Automatic
	Fast Recovery Configuration	<ul style="list-style-type: none"> When the RAID level is "High Reliability (RAID6-FR)" (3D+2P)x2+1HS When the RAID level is not "High Reliability (RAID6-FR)" Blank
	DVCF	OFF
Advanced Settings	Stripe Depth	64 KB

D. Factory Default List

RAID Group Management

*1: The default value varies depending on the type of drives that are installed in the storage system and that can be used to create new RAID groups.

■ Rename RAID Group

Screen	Item	Default
Rename Setting	Start of Suffix	0

■ Change Controlling CM

Screen	Item	Default
Change Controlling CM Setting	New Controlling CM	Automatic

■ Expand RAID Group

Screen	Item	Default
Manual Setting	RAID Level after expand	High Performance (RAID1+0)

■ Modify RAID Group Parameters

Screen	Item	Default
Parameters Setting	Rebuild Priority	<ul style="list-style-type: none">• When the RAID level is not "High Reliability (RAID6-FR)" Low• When the RAID level is "High Reliability (RAID6-FR)" High
Advanced Settings	DCMF	1
	Drive Access Priority	Response
	Drive Tuning Parameter Setting	Enable
	Throttle	100%
	Ordered Cut	400

■ Assign Eco-mode Schedule (RAID Group)

Screen	Item	Default
Eco-mode Schedule Settings	Eco-mode Action	<ul style="list-style-type: none">• When no Eco-mode schedules are registered Drive always on• When Eco-mode schedules are registered Do not change

■ Set Key Group (RAID Group)

Screen	Item	Default
Key Group Setting	Key Group	Enable

Thin Provisioning Management

This section describes the default parameters for the Thin Provisioning management functions.

- ["■ Set Thin Provisioning" \(page 1628\)](#)
- ["■ Create Thin Provisioning Pool" \(page 1628\)](#)
- ["■ Rename Thin Provisioning Pool" \(page 1629\)](#)
- ["■ Expand Thin Provisioning Pool" \(page 1629\)](#)
- ["■ Set Deduplication/Compression" \(page 1630\)](#)
- ["■ Modify Threshold Thin Provisioning Pool" \(page 1630\)](#)
- ["■ Modify Cache Parameters \(TPP\)" \(page 1630\)](#)
- ["■ Assign Eco-mode Schedule \(Thin Provisioning Pool\)" \(page 1630\)](#)

■ Set Thin Provisioning

Screen	Item	Default
Thin Provisioning Settings	Thin Provisioning	<ul style="list-style-type: none"> • When the Unified Storage License is installed at the factory Enable • When the Unified Storage License is not installed at the factory Disable
	Maximum Pool Capacity	<ul style="list-style-type: none"> • For the ETERNUS DX60 S5 64 TB • For the ETERNUS DX100 S5 128 TB • For the ETERNUS DX200 S5 256 TB • For the ETERNUS DX500 S5 384 TB • For the ETERNUS DX600 S5 512 TB • For the ETERNUS DX900 S5 512 TB • For the ETERNUS DX8900 S4 512 TB • For the ETERNUS AF150 S3 128 TB • For the ETERNUS AF250 S3 256 TB • For the ETERNUS AF650 S3 512 TB

■ Create Thin Provisioning Pool

Screen	Item	Default
New Thin Provisioning Pool	Create Mode	Automatic

D. Factory Default List
Thin Provisioning Management

Screen	Item	Default
Automatic Setting	Drive Type	Online (*1)
	RAID Level	High Performance (RAID1+0)
	Select Drives	Minimize number of using drives
	Encryption by CM	Disable
	Alarm	<ul style="list-style-type: none"> Warning 90 (%) Attention 75 (%)
	Deduplication	Disable
	Compression	Disable
Manual Setting	Drive Type	Online (*1)
	RAID Level	The current RAID level (*2)
	Fast Recovery Configuration	<ul style="list-style-type: none"> When the RAID level is "High Reliability (RAID6-FR)" (4D+2P)x2+1HS When the RAID level is not "High Reliability (RAID6-FR)" Blank
	Encryption by CM	Disable
	Alarm	<ul style="list-style-type: none"> Warning 90 (%) Attention 75 (%)
	Deduplication	Disable
	Compression	Disable
Add RAID Group	Controlling CM	Automatic
	Checkbox to select a drive	All cleared
Advanced Settings	Stripe Depth	64 KB
	Chunk Size	<ul style="list-style-type: none"> When Deduplication or Compression of the TPP is enabled 21 MB When Deduplication and Compression are disabled for the storage system or TPP 336 MB

*1 : The default value varies depending on the type of drives that are installed in the storage system and that can be used to create new TPPs.

*2 : However, "High Performance (RAID1+0)" is displayed if the current RAID level is RAID1.

■ Rename Thin Provisioning Pool

Screen	Item	Default
Rename Setting	Start of Suffix	0

■ Expand Thin Provisioning Pool

Screen	Item	Default
Setting Thin Provisioning Pool	Expand Mode	Automatic
Manual Setting (Add RAID Group)	Controlling CM	Automatic

■ Set Deduplication/Compression

Screen	Item	Default
Deduplication/Compression Settings	Deduplication	<ul style="list-style-type: none"> If "Current Deduplication" is "Enable", "Error", or "-" (hyphen) Disable If "Current Deduplication" is all "Disable" Enable
	Compression	<ul style="list-style-type: none"> If "Current Compression" is "Enable", "Error", or "-" (hyphen) Disable If "Current Compression" is all "Disable" Enable

■ Modify Threshold Thin Provisioning Pool

Screen	Item	Default
Threshold Setting	Warning	90 (%)
	Attention	75 (%)

■ Modify Cache Parameters (TPP)

Screen	Item	Default
Parameters Setting	Multi Writeback Count (MWC)	Refer to "■ Allowed Input for MWC When Using the Default Stripe Depth Value (TPP)" (page 1703) in "Allowed Input for MWC When Using the Default Stripe Depth Value" (page 1701) and "■ Allowed Input for MWC When the Stripe Depth Value Is Tuned (TPP)" (page 1704) in "Allowed Input for MWC When the Stripe Depth Value Is Tuned" (page 1704) for details.

■ Assign Eco-mode Schedule (Thin Provisioning Pool)

Screen	Item	Default
Eco-mode Schedule Settings	Eco-mode Action	<ul style="list-style-type: none"> When no Eco-mode schedules are registered Drive always on When Eco-mode schedules are registered Do not change

Advanced Copy Management

This section describes the default parameters for the Advanced Copy management functions.

- "■ Register Advanced Copy License" (page 1631)
- "■ Modify EC/OPC Priority" (page 1631)
- "■ Modify Copy Table Size" (page 1631)
- "■ Modify Copy Parameters" (page 1631)
- "■ Set Copy Path" (page 1632)
- "■ Modify REC Buffer" (page 1632)
- "■ Create REC Disk Buffer" (page 1632)

- ["■ Modify REC Multiplicity" \(page 1633\)](#)
- ["■ Set REC Bandwidth Limit" \(page 1633\)](#)
- ["■ ODX" \(page 1633\)](#)
- ["■ Create ODX Buffer Volume" \(page 1634\)](#)

■ Register Advanced Copy License

Screen	Item	Default
License Settings	Registration Method (*1)	Use License Key

*1: This item is displayed for the ETERNUS DX60 S5/DX100 S5/DX200 S5 and the ETERNUS AF150 S3/AF250 S3.

■ Modify EC/OPC Priority

Screen	Item	Default
EC/OPC Priority	EC/OPC Priority	Automatic Priority
Advanced Setting	Copy Schedule Mode	Session Balancing

■ Modify Copy Table Size

Screen	Item	Default
Advanced Copy Table Size Setting	Resolution	<ul style="list-style-type: none"> • For the ETERNUS DX60 S5/DX100 S5/DX200 S5 x16 • For the ETERNUS DX500 S5/DX600 S5/DX900 S5 x1 • For the ETERNUS DX8100 S4/DX8900 S4 x1 • For the ETERNUS AF150 S3/AF250 S3 x16 • For the ETERNUS AF650 S3 x1
	Table Size	<ul style="list-style-type: none"> • For the ETERNUS DX60 S5/DX100 S5/DX200 S5 128 (MB) • For the ETERNUS DX500 S5/DX600 S5/DX900 S5 0 • For the ETERNUS DX8100 S4/DX8900 S4 0 • For the ETERNUS AF150 S3/AF250 S3 128 (MB) • For the ETERNUS AF650 S3 0
	Table Size Threshold	80 (%)

■ Modify Copy Parameters

Screen	Item	Default
Policy of Snap Data Pool	Policy Level 1 (Informational) Threshold	50 (%)
	Policy Level 2 (Warning) Threshold	70 (%)
	Policy Level 3 (Error) Threshold	99 (%)

D. Factory Default List
Advanced Copy Management

Screen	Item	Default
SDPE Setting	SDPE	1 (GB)

■ Set Copy Path

Screen	Item	Default
Operation Mode Selection	Operation Mode	Create Copy Path
Base Information Selection	Base Information	Backup Path File
Storage System Configuration Settings	Initiator / Target Setting (for ETERNUS6000)	Initiator
Port Settings	WWN	FC port WWN
	IP Version	IPv4
	IP Address	Not specified
	IPv6 Link Local Address	Not specified
	IPv6 Connect IP Address	Not specified
Storage System Information Setting	Storage System Type	ETERNUS DX500 S5/DX600 S5
Line Setting	Connection Type	Direct
	Line Speed	1 (Mbit/s)
Path Settings	(Line Setting)	Cleared
Bandwidth Limit Settings	Setting Mode	Set the same Bandwidth Limit for all paths
	Bandwidth Limit	0 (Mbit/s)

■ Modify REC Buffer

Screen	Item	Default
REC Buffer Setting List	Usage	Unused
	Remote Box ID	Remote storage system Box ID (*1)
	Volume Type	Open
	Size	128 MB (*1)
	Forwarding Interval	1 sec. (*1)
	Monitoring Time	5 min. (*1)
	HALT Wait Timer	15 sec. (*1)
Advanced Setting	I/O Priority Mode	Enable (*1)
	Immediate HALT Mode	Enable (*1)
	High Bandwidth Mode	Enable (*1)

*1: The default value when the usage is "Send" or "Receive".

■ Create REC Disk Buffer

Screen	Item	Default
Manual Setting	Controlling CM	Automatic
	Encryption by CM	Off
Advanced Setting	Stripe Depth	64 KB

■ Modify REC Multiplicity

Screen	Item	Default
Remote Box ID List	Priority Level	<ul style="list-style-type: none"> When the local storage system and the remote storage system are connected by direct connection Automatic When the local storage system and the remote storage system are connected by remote connection "- " (hyphen)
	Specification Mode	<ul style="list-style-type: none"> When the local storage system and the remote storage system are connected by remote connection Automatic When the local storage system and the remote storage system are connected by direct connection "- " (hyphen)
	Multiplicity	<ul style="list-style-type: none"> When the local storage system and the remote storage system are connected by remote connection and "Manual" is selected for the specification mode 1 When the local storage system and the remote storage system are connected by remote connection and "Automatic" is selected for the specification mode "- " (hyphen) When the local storage system and the remote storage system are connected by direct connection "- " (hyphen)
Advanced Setting	Copy Schedule Mode	Session Balancing

■ Set REC Bandwidth Limit

Screen	Item	Default
Bandwidth Limit Settings	Setting Mode	Set the same Bandwidth Limit for all paths
	Bandwidth Limit	0 (Mbit/s): Unlimited

■ ODX

Screen	Item	Default
Enable ODX	Operation mode	Disable (*1)
Disable ODX		

*1 : The ODX function is disabled by default and only the [Enable ODX] function is available.

■ Create ODX Buffer Volume

Screen	Item	Default
ODX Buffer Volume	Type	Standard
	Use all Largest Free Space	Cleared
	Encryption by CM	<ul style="list-style-type: none"> When the encryption mode is enabled Off When the encryption mode is disabled Not displayed
	Allocation	Thin
Target RAID Group/Thin Provisioning Pool	Radio button to select a RAID group (when "Type" is "Standard")	Not selected
	Radio button to select a TPP (when "Type" is "Thin Provisioning")	Not selected

Connectivity Management

This section describes the default parameters for the connectivity management functions.

- ["■ Create Host Affinity" \(page 1635\)](#)
- ["■ Add FC Host Group" \(page 1635\)](#)
- ["■ Add iSCSI Host Group" \(page 1635\)](#)
- ["■ Add SAS Host Group" \(page 1635\)](#)
- ["■ Add FC Host" \(page 1635\)](#)
- ["■ Add iSCSI Host" \(page 1636\)](#)
- ["■ Modify FC Port Parameters \(when the port mode is "CA"\)" \(page 1636\)](#)
- ["■ Modify FC Port Parameters \(when the port mode is "RA" or "CA/RA"\)" \(page 1636\)](#)
- ["■ Modify FC Port Parameters \(when the port mode is "Initiator"\)" \(page 1637\)](#)
- ["■ Modify iSCSI Port Parameters \(when the port mode is "CA"\)" \(page 1637\)](#)
- ["■ Modify iSCSI Port Parameters \(when the port mode is "RA"\)" \(page 1638\)](#)
- ["■ Modify iSCSI Port Parameters \(when the port mode is "CA/RA"\)" \(page 1639\)](#)
- ["■ Modify iSCSI Port Parameters \(\[Send Ping\] screen\)" \(page 1640\)](#)
- ["■ Modify SAS Port Parameters" \(page 1640\)](#)
- ["■ Modify Port Mode" \(page 1640\)](#)
- ["■ Add LUN Group" \(page 1640\)](#)
- ["■ Add Host Response" \(page 1640\)](#)
- ["■ Modify CA Reset Group" \(page 1641\)](#)
- ["■ QoS" \(page 1641\)](#)
- ["■ Set Host QoS Pattern" \(page 1641\)](#)
- ["■ Set Port QoS Pattern" \(page 1641\)](#)
- ["■ Set LU QoS Pattern" \(page 1642\)](#)

- ["■ Set FC Host QoS" \(page 1642\)](#)
- ["■ Set iSCSI Host QoS" \(page 1642\)](#)
- ["■ Set SAS Host QoS" \(page 1642\)](#)
- ["■ Set FC Port QoS" \(page 1642\)](#)
- ["■ Set iSCSI Port QoS" \(page 1643\)](#)
- ["■ Set SAS Port QoS" \(page 1643\)](#)
- ["■ Add LU QoS Group" \(page 1643\)](#)
- ["■ Create Shared Folder" \(page 1643\)](#)
- ["■ Create NAS Interface" \(page 1643\)](#)
- ["■ Change NAS Server Name" \(page 1644\)](#)
- ["■ Add Local User" \(page 1644\)](#)
- ["■ Modify Local User" \(page 1644\)](#)
- ["■ Add Quota Setting" \(page 1644\)](#)
- ["■ Automatic Meta Cache Distribution" \(page 1644\)](#)

■ Create Host Affinity

Screen	Item	Default
Target Connection Setting	Target Connection	Host Group - CA Port Group
Select Host Group	Radio buttons to select a host group	All cleared
Select Host Group	Host Response	Default

■ Add FC Host Group

Screen	Item	Default
Host Group Setting	Host Response	Default

■ Add iSCSI Host Group

Screen	Item	Default
Host Group Setting	Host Response	Default
	IP Version	IPv4

■ Add SAS Host Group

Screen	Item	Default
Host Group Setting	Host Response	Default

■ Add FC Host

Screen	Item	Default
Host Setting	Host Response	Default

■ Add iSCSI Host

Screen	Item	Default
Host Setting	Host Response	Default
	IP Version	IPv4

■ Modify FC Port Parameters (when the port mode is "CA")

Screen	Item	Default
Port Settings	Connection	Fabric
	Set Loop ID	Manual
	Loop ID	<ul style="list-style-type: none"> When "Set Loop ID" is "Manual" 0x0 When "Set Loop ID" is "Automatic" Ascending
	Transfer Rate	Auto-negotiation
	Frame Size	2048 (bytes)
	Reset Scope	I_T_L
	Release Reservation if Chip is Reset	Disable

■ Modify FC Port Parameters (when the port mode is "RA" or "CA/RA")

Screen	Item	Default	
Port Settings	Connection	Fabric	
	Set Loop ID	Manual	
	Loop ID	<ul style="list-style-type: none"> When "Set Loop ID" is "Manual" 0x0 When "Set Loop ID" is "Automatic" Ascending 	
	Transfer Rate	Auto-negotiation	
	Frame Size	2048 (bytes)	
	Reset Scope	I_T_L	
	REC Line No.	0	
	REC Transfer Mode		
		Sync (synchronous transfer mode)	Enable
		Async Stack (asynchronous stack mode)	
	Async Consistency (asynchronous consistency mode)		
	Async Through (asynchronous through mode)		

■ Modify FC Port Parameters (when the port mode is "Initiator")

Screen	Item	Default
Port Settings	Connection	Fabric
	Set Loop ID	Manual
	Loop ID	<ul style="list-style-type: none"> When "Set Loop ID" is "Manual" 0x0 When "Set Loop ID" is "Automatic" Ascending
	Transfer Rate	Auto-negotiation
	Frame Size	2048 (bytes)
	WWN (Port Name)	WWPN of the storage system
	WWN (Node Name)	WWNN of the storage system

■ Modify iSCSI Port Parameters (when the port mode is "CA")

Screen	Item	Default
iSCSI Settings	iSCSI Name	iqn.2000-09.com.fujitsu:storage-system.eternus-xxxx:00yyyyyy (*1)
TCP/IP Settings	IP Version	IPv4
	IP Address	192.168.xxx.xxx
	Subnet Mask	255.255.255.0
	Gateway	Not specified
	IPv6 Link Local Address	Address that is obtained from the storage system WWN
	IPv6 Connect IP Address	Not specified
	IPv6 Gateway	Not specified
	TCP Port No.	3260
	TCP Window Scale	2
	iSNS Server	Disable
	iSNS Server Port No.	3205
	VLAN ID	<ul style="list-style-type: none"> Disable When "Enable" is specified 0
Jumbo Frame	Disable	
Security Setting	CHAP	OFF
	Header Digest	OFF
	Data Digest	OFF
Basic Interface	Reset Scope	I_T_L
	Release Reservation if Chip is Reset	Disable
	CmdSN Count	Unlimited

D. Factory Default List
Connectivity Management

Screen	Item	Default
Additional IP Address Settings	Multiple VLAN	Disable
	IP Address	Not specified
	Subnet Mask	Not specified
	Gateway	Not specified
	IPv6 Link Local Address	Not specified
	IPv6 Connect IP Address	Not specified
	IPv6 Gateway	Not specified

*1 : The unique iSCSI name of each port is set by default. Refer to ""The default value for "iSCSI Name"" (page 1638)" for details.

The default value for "iSCSI Name"

The default "iSCSI Name" varies depending on each port. The setting for "iSCSI Name" is as follows:
iqn.2000-09.com.fujitsu:storage-system.eternus-xxxx:00yyyyyy:zzzz

- xxxx
The following character strings are specified for each model.
 - For the ETERNUS DX60 S5/DX100 S5/DX200 S5: "dxl"
 - For the ETERNUS DX500 S5/DX600 S5: "dxm"
 - For the ETERNUS DX900 S5 or the ETERNUS DX8100 S4/DX8900 S4: "dxh"
 - For the ETERNUS AF150 S3/AF250 S3: "dxl"
 - For the ETERNUS AF650 S3: "dxm"
- yyyyyy
"Model ID + unique number" for WWN is specified.
- zzzz
The iSCSI CA installation location information is specified.

■ Modify iSCSI Port Parameters (when the port mode is "RA")

Screen	Item	Default
iSCSI Settings	iSCSI Name	iqn.2000-09.com.fujitsu:storage-system.eternus-xxxx:00yyyyyy (*1)
TCP/IP Settings	IP Version	IPv4
	IP Address	192.168.xxx.xxx
	Subnet Mask	255.255.255.0
	Gateway	Not specified
	IPv6 Link Local Address	Address that is obtained from the storage system WWN
	IPv6 Connect IP Address	Not specified
	IPv6 Gateway	Not specified
	TCP Port No.	3260
	TCP Window Scale	2
	VLAN ID	<ul style="list-style-type: none"> • Disable • When "Enable" is specified 0
MTU	1300 bytes	
Security Setting	CHAP	OFF

D. Factory Default List
Connectivity Management

Screen	Item	Default
REC Settings	REC Line No.	0
	REC Transfer Mode	
	Sync (synchronous transfer mode)	Enable
	Async Stack (asynchronous stack mode)	
	Async Consistency (asynchronous consistency mode)	
Async Through (asynchronous through mode)		

*1: The unique iSCSI name of each port is set by default. Refer to ""The default value for "iSCSI Name"" (page 1638)" for details.

■ Modify iSCSI Port Parameters (when the port mode is "CA/RA")

Screen	Item	Default
iSCSI Settings	iSCSI Name	iqn.2000-09.com.fujitsu:storage-system.eternus-xxxx:00yyyyyy (*1)
TCP/IP Settings	IP Version	IPv4
	IP Address	192.168.xxx.xxx
	Subnet Mask	255.255.255.0
	Gateway	Not specified
	IPv6 Link Local Address	Address that is obtained from the storage system WWN
	IPv6 Connect IP Address	Not specified
	IPv6 Gateway	Not specified
	TCP Port No.	3260
	TCP Window Scale	2
	iSNS Server	Disable
	iSNS Server Port No.	3205
	VLAN ID	<ul style="list-style-type: none"> • Disable • When "Enable" is specified 0
	MTU	<ul style="list-style-type: none"> • When changing the port mode from "CA" to "CA/RA" 1500 bytes <ul style="list-style-type: none"> • When changing the port mode from "RA" to "CA/RA" 1300 bytes
Security Setting	CHAP (CA)	OFF
	CHAP (RA)	OFF
	Header Digest	OFF
	Data Digest	OFF
Basic Interface	Reset Scope	I_T_L
	Release Reservation if Chip is Reset	Disable
	CmdSN Count	Unlimited

D. Factory Default List
Connectivity Management

Screen	Item	Default
REC Settings	REC Line No.	0
	REC Transfer Mode	
	Sync (synchronous transfer mode)	Enable
	Async Stack (asynchronous stack mode)	
	Async Consistency (asynchronous consistency mode)	
Async Through (asynchronous through mode)		

*1: The unique iSCSI name of each port is set by default. Refer to ""The default value for "iSCSI Name"" (page 1638)" for details.

■ Modify iSCSI Port Parameters ([Send Ping] screen)

Screen	Item	Default
CM#x CA#y Port#z	Send Number	1

■ Modify SAS Port Parameters

Screen	Item	Default
Port Settings	Transfer Rate	Auto-negotiation
	Reset Scope	I_T_L
	Release Reservation if Chip is Reset	Disable

■ Modify Port Mode

Screen	Item	Default
Port List	Port Mode(After)	CA

■ Add LUN Group

Screen	Item	Default
LUN Setting	Start Host LUNs	0
	Number of LUNs	1

■ Add Host Response

Screen	Item	Default
LUN Settings	LUN Addressing	Peripheral device addressing (Default)
	LUN Expand Mode (Peripheral Device Addressing)	Disable (Default)
ALUA Settings	Asymmetric / Symmetric Logical Unit Access	<ul style="list-style-type: none"> For the ETERNUS DX900 S5 or the ETERNUS DX8900 S4 ACTIVE / ACTIVE (Default) For the other models ACTIVE-ACTIVE / PREFERRED_PATH (Default)
	TPGS Mode	Enable (Default)
	TPG Referrals Mode	Disable (Default)

D. Factory Default List
Connectivity Management

Screen	Item	Default
Inquiry Command Settings	Peripheral Device Type (Peripheral Device Addressing)	No Device Type (3Fh) (Default)
	Peripheral Device Type (Flat Space Addressing)	No Device Type (3Fh) (Default)
	SCSI Version	Version 6 (Default)
	NACA	Disable (Default)
	Device ID Type	Type3 (Default)
	Product ID	Default
	Product Revision	Not Respond (Default)
Test Unit Ready Command Settings	Reservation Conflict Response	GOOD (Default)
Sense Settings	Notify Change of Volume Mapping	Enable (Default)
	Notify Change of Volume Expansion	Enable (Default)
	Notify Vendor Unique Sense	Disable (Default)
	Sense Data Conversion	No Conversion (Default)
Mode Sense Command Settings	Reservation Conflict Response (Write Exclusive)	RESERVATION CONFLICT (Default)
Other Settings	Command Monitor Time	Default (25sec.)
	Load Balance Response Status	CHECK CONDITION / UNIT ATTENTION (Default)
	iSCSI Discovery Reply Mode	All - Reply All Ports (Default)
	iSCSI Reservation Range	Storage System (Default)

■ Modify CA Reset Group

Screen	Item	Default
Select Ports	"Port" checkbox	All selected

■ QoS

Screen	Item	Default
Enable QoS/Disable QoS	QoS mode	Disable (*1)

*1 : The QoS function is disabled by default and only [Enable QoS] in [Action] is available.

■ Set Host QoS Pattern

Screen	Item	Default
QoS Pattern Settings	IOPS	Refer to "The Default Value for "QoS Pattern Settings" (page 1625) .
	Throughput (MB/s)	Refer to "The Default Value for "QoS Pattern Settings" (page 1625) .

■ Set Port QoS Pattern

Screen	Item	Default
QoS Pattern Settings	IOPS	Refer to "The default value for "Port QoS Pattern Settings" (page 1642) .
	Throughput (MB/s)	Refer to "The default value for "Port QoS Pattern Settings" (page 1642) .

The default value for "Port QoS Pattern Settings"

No.	IOPS	Throughput (MB/s)
1	27000 IOPS	1000 MB/s
2	21000 IOPS	850 MB/s
3	15000 IOPS	700 MB/s
4	10020 IOPS	600 MB/s
5	8040 IOPS	500 MB/s
6	6000 IOPS	400 MB/s
7	5040 IOPS	300 MB/s
8	4020 IOPS	250 MB/s
9	3000 IOPS	200 MB/s
10	2040 IOPS	160 MB/s
11	1020 IOPS	125 MB/s
12	720 IOPS	90 MB/s
13	480 IOPS	60 MB/s
14	240 IOPS	30 MB/s
15	120 IOPS	15 MB/s

■ Set LU QoS Pattern

Screen	Item	Default
QoS Pattern Settings	IOPS	Refer to "The Default Value for "QoS Pattern Settings"" (page 1625).
	Throughput (MB/s)	Refer to "The Default Value for "QoS Pattern Settings"" (page 1625).

■ Set FC Host QoS

Screen	Item	Default
FC Host QoS Setting	Bandwidth Limit	Unlimited

■ Set iSCSI Host QoS

Screen	Item	Default
iSCSI Host QoS Setting	Bandwidth Limit	Unlimited

■ Set SAS Host QoS

Screen	Item	Default
SAS Host QoS Setting	Bandwidth Limit	Unlimited

■ Set FC Port QoS

Screen	Item	Default
FC Port QoS Setting	Bandwidth Limit	Unlimited

■ Set iSCSI Port QoS

Screen	Item	Default
iSCSI Port QoS Setting	Bandwidth Limit	Unlimited

■ Set SAS Port QoS

Screen	Item	Default
SAS Port QoS Setting	Bandwidth Limit	Unlimited

■ Add LU QoS Group

Screen	Item	Default
Add LU QoS Group	Bandwidth Limit	Unlimited

■ Create Shared Folder

Screen	Item	Default
Shared Folder Settings	Usage	File Sharing
	Protocol	CIFS
	Writable	Yes
	Oplocks	Disable
	Owner	root
	Group	root
	SMB Encryption of Data Access	Disable
	Access Based Enumeration	Disable
Select Volume	Radio button to select a volume	<ul style="list-style-type: none"> When only one NAS user volume exists The checkbox for the relevant volume is selected When multiple NAS user volumes exist All cleared
Add CIFS Permission	Type	User
	Authority	Read/Write

■ Create NAS Interface

Screen	Item	Default
NAS Interface Settings	Redundant Port	None
	IP Address	Not specified
	Subnet Mask	Not specified
	Gateway	Not specified
	IPv6 Link Local Address	Not specified
	IPv6 Connect IP Address	Not specified
	IPv6 Gateway	Not specified
	IPv6 Prefix length	Not specified

■ Change NAS Server Name

Screen	Item	Default
NAS Server Settings	Name	DXyyyyyyyyyy (*1)

*1: "DX" is fixed and "yyyyyyyyyy" indicates the serial number of the storage system.

■ Add Local User

Screen	Item	Default
Secondary Group	Checkbox to select a secondary group	All cleared

■ Modify Local User

Screen	Item	Default
Local User Settings	Change Password	Cleared
	Radio button to select a primary group	A radio button for the current primary group to which the selected local user belongs is selected
	Checkbox to select a secondary group	Checkboxes for the current secondary groups to which the selected local user belongs are selected

■ Add Quota Setting

Screen	Item	Default	
Select Volume	Radio button to select a NAS user volume	<ul style="list-style-type: none"> When only one NAS user volume exists The checkbox for the relevant volume is selected When multiple NAS user volumes exist All cleared 	
Add Quota Target	Type	User	
	Drive Space		
		Warning	<ul style="list-style-type: none"> Blank (unlimited) GB
		Limit	<ul style="list-style-type: none"> Blank (unlimited) GB
	File Count		
		Warning	0 (unlimited)
	Limit	0 (unlimited)	

■ Automatic Meta Cache Distribution

Screen	Item	Default
Enable Automatic Meta Cache Distribution	Operation mode	Disabled (*1)
Disable Automatic Meta Cache Distribution		

*1: The "Automatic Meta Cache Distribution" setting is disabled by default and only [Enable Automatic Distribution] is available in [Action].

System Management

This section describes the default parameters for the system management functions.

- ["■ Smart Setup Wizard" \(page 1646\)](#)
- ["■ Set Deduplication/Compression Mode" \(page 1646\)](#)
- ["■ Modify Date and Time" \(page 1647\)](#)
- ["■ Change Box ID" \(page 1647\)](#)
- ["■ Setup Subsystem Parameters" \(page 1648\)](#)
- ["■ Setup Encryption Mode" \(page 1649\)](#)
- ["■ Setup SMI-S Environment" \(page 1649\)](#)
- ["■ Setup Power Management" \(page 1649\)](#)
- ["■ Setup Exclusive Read Cache" \(page 1650\)](#)
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- ["■ Setup Debug Mode" \(page 1650\)](#)
- ["■ Setup Extreme Cache" \(page 1650\)](#)
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- ["■ Setup Extreme Cache Pool" \(page 1650\)](#)
- ["■ Backup Configuration" \(page 1651\)](#)
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- "[■ Audit Log](#)" (page 1659)
- "[■ Setup Audit Log](#)" (page 1659)
- "[■ Add Key Server](#)" (page 1659)
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- "[■ Create External Drive](#)" (page 1660)
- "[■ Setup Remote Support](#)" (page 1660)
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- "[■ Setup Remote Session Permission](#)" (page 1662)
- "[■ Apply Controller Firmware](#)" (page 1662)

■ Smart Setup Wizard

Screen	Item	Default
CA Type Selection	CA Type	The default value varies depending on the CA type installed in the storage system. The priority of the CA types is as follows: FC > iSCSI > SAS
FC connection topology selection	Connection	Fabric
Host Selection (Register Host)	Checkbox to select a host	Cleared
Setting Host NickName	Name	<ul style="list-style-type: none"> • For FC host FC • For iSCSI host iSCSI • For SAS host SAS
Host Selection	Checkbox to select a host	Cleared
New Volume	Number of Volumes	1
Volume Selection	Checkbox to select a volume	Cleared

■ Set Deduplication/Compression Mode

Screen	Item	Default
Deduplication/ Compression Mode Settings	Deduplication/ Compression	<ul style="list-style-type: none"> • For the ETERNUS DX200 S5, the ETERNUS DX500 S5/DX600 S5, and the ETERNUS AF250 S3/AF650 S3 Disable • The ETERNUS DX900 S5 or the ETERNUS DX8900 S4 supports Compression only. Disable

■ Modify Date and Time

Screen	Item	Default
Date/Time Settings	Date	The current date and time that is specified in the storage system (when the storage system is installed in Japan, the local time for Japan is displayed)
Time Zone Settings	Time Zone	<ul style="list-style-type: none"> When the storage system is shipped from Japan and shipped to Japan (GMT+09:00) Tokyo, Osaka, Kyoto, Fukuoka, Sapporo (GMT+09:00) Tokyo, Osaka, Kyoto, Fukuoka, Sapporo When the storage system is shipped from Japan to regions other than Japan (GMT+00:00) Dublin, London, Manchester, Lisbon The default value depends on the shipment information. When selecting "Manually" in the "Time Zone" field +00:00
Daylight Saving Time Settings	Daylight Saving Time	Disable
	Range	By day of the week
	Start	<ul style="list-style-type: none"> When "Range" is "By day of the week" 01 1st Sunday 00:00 When "Range" is "By Date" 01 -01 00:00
	End	<ul style="list-style-type: none"> When "Range" is "By day of the week" 01 1st Sunday 00:00 When "Range" is "By Date" 01 -01 00:00
NTP Settings	Synchronize with NTP Server	Disable
	Primary NTP Server	
	LAN Port used for NTP	MNT
	Secondary NTP Server	
	LAN Port used for NTP	MNT

■ Change Box ID

Screen	Item	Default
Change Box ID	Box ID	Storage system ID

■ Setup Subsystem Parameters

Screen	Item	Default
Setup Subsystem Parameters	1CM Write Through	Disable
	Highland Mode	Disable
	Thin Provisioning Allocation Mode	TPP balancing
	Flexible Write Through	<ul style="list-style-type: none"> • For the ETERNUS AF S3 series Enable • For the other models Disable
	Ignore CM-CM Communication Error	Disable
	Read Sequential	Enable
	Write Sequential	Enable
	Turbo Mode	<ul style="list-style-type: none"> • For the ETERNUS DX100 S5/DX200 S5 and the ETERNUS DX8100 S4 Disable • For the ETERNUS DX500 S5/DX600 S5/DX900 S5, the ETERNUS DX8900 S4, and the ETERNUS AF150 S3/AF250 S3/AF650 S3 Enable
	Writeback Limit Count	512
	Slow Format	Disable
Setup Host	Load Balance	Enable
	Reject INQUIRY from Unauthorized Host	Disable
	Optimize for Advanced Format SSD	Enable
Setup Disk Drive	Critical Disk Mode	Enable
	Disk Media Error Check	Mode1
	Check BID after Write Command	Disable
	Checkcode Enforcement	Enable
	Reduce the Timeout Period for Nearline Disks	Disable
	Skip Retry when Failed to Access	Disable
	Early Isolate Drive when Read Error	Disable
	HDD Shield	Enable
	Copybackless	Enable
Setup Read Compare Mode	Read Compare Mode for Online Disks	16
	Read Compare LBAs for Online Disks	Compare all LBAs
	Read Compare Mode for Nearline Disks	16

D. Factory Default List
System Management

Screen	Item	Default	
Web GUI Settings	Function to Add Host		
		Use "Add Host Group"	Selected
		Use "Add Host"	Cleared
	Session Time-out		60
	Use Cookies for Session Confirmation	<ul style="list-style-type: none"> When the storage system is newly shipped Enable When the existing controller firmware is updated to V11L60 or later Disable 	
Deduplication/Compression Settings	Data Compare when hash collision occurs	Disable	

■ Setup Encryption Mode

Screen	Item	Default
Encryption Mode Setting	Encryption Mode	Disable

■ Setup SMI-S Environment

Screen	Item	Default
SMI-S Settings	SMI-S	<ul style="list-style-type: none"> When the storage system is shipped to EMEA and North America Enable When the storage system is shipped to regions other than above Disable
	SSL Certificate	SMI-S Self-signed SSL Certificate
	Performance information	Disable

■ Setup Power Management

Screen	Item	Default
Power Control by External Device	RCIL	Disable
	Auto Power	Disable
	Power Resume	Disable
Connection Module Settings	PWC	Cleared
PWC Connection Settings	Connection CM	Cleared
	Delay until Shutdown	0 (min.)
	Set management unit interface	Manual
	Power Failure Signal	Positive
	Low Battery Signal	Positive
	UPS Shutdown Signal	<ul style="list-style-type: none"> Cleared When the "Enable" checkbox is selected Positive

■ Setup Exclusive Read Cache

Screen	Item	Default
Cache Size Settings	Exclusive Read Cache	0%

■ Setup Disk Drive Patrol

Screen	Item	Default
Disk Drive Patrol Settings	Disk Drive Patrol	Enable

■ Setup Debug Mode

Screen	Item	Default
Master Trace Level Settings	Master Trace Level	Standard
	Level	0x06
Level by Group	Level	0x06
Panic	Collection Mode	Nose and Tail Mode

■ Setup Extreme Cache

Screen	Item	Default
Extreme Cache Settings	Mode	Disable
Tuning Parameter Settings	Initial Caching Threshold	1
	Caching Threshold	<ul style="list-style-type: none"> • 5 • "Not relocate Cache Data" checkbox Cleared (cache data is relocated)
	Caching Priority	10 (Fastest)
	Monitoring I/O	Read

■ Release Extreme Cache

Screen	Item	Default
Extreme Cache Capacity Information	Checkbox to select Owners of the Extreme Cache to be released	Cleared

■ Setup Extreme Cache Pool

Screen	Item	Default
Extreme Cache Pool Settings	Mode	Disable
Tuning Parameter Settings	Initial Caching Threshold	1
	Caching Threshold	<ul style="list-style-type: none"> • 5 • "Not relocate Cache Data" checkbox Cleared (cache data is relocated)
	Caching Priority	10 (Fastest)
	Monitoring I/O	Read

■ Backup Configuration

Screen	Item	Default
Select Configuration Definition	Select Configuration Definition	Configuration (Latest)
Select Backup Slot	Select Backup Slot	Backup #1

■ Start/Stop Performance Monitoring

Screen	Item	Default
Performance Monitoring (when starting performance monitoring)	Interval	30 (sec.)

■ Clear Cache

Screen	Item	Default
Target Cache Settings	Target Cache	<ul style="list-style-type: none"> • CM Selected • Extreme Cache (*1) Selected • Extreme Cache Pool (*2) Selected

*1 : This item is only displayed when EXC is enabled.

*2 : This item is only displayed when EXCP is enabled.

■ Modify Eco-mode General Setting

Screen	Item	Default
Eco-mode General Settings	Eco-mode	Disable
	Host I/O Monitoring Interval	30 min
	Disk Motor Spin-down Limit Count	25

■ Create Eco-mode Schedule

Screen	Item	Default
Set Event	Event Type	everyday <ul style="list-style-type: none"> • When the event type is "everyday" <ul style="list-style-type: none"> - From Time 00:00 - To Time 00:00 • When "Every week" is selected for the event type <ul style="list-style-type: none"> - Start day Monday - End day Monday - From Time 00:00 - To Time 00:00 • When "Specific days" is selected for the event type <ul style="list-style-type: none"> - Month Every Month - Period (start date) 01 - Period (term) One day only - From Time 00:00 - To Time 00:00 • When "Specific week" is selected for the event type <ul style="list-style-type: none"> - Month Every Month - Period (nth week) 1st - Period (start day) Monday - Period (end day) Monday - From Time 00:00 - To Time 00:00

■ Setup User Account

Screen	Item	Default
Add New User Account	Role	Monitor
	Account	Enable
	Password Policy	Disable
	Lockout Policy	Disable

■ Modify User Policy

Screen	Item	Default
Password Policy	Minimum Password Length	4
	Password Complexity	Disable
	Password History	0 (A history of the passwords used is not managed)
	Minimum Password Age	0 (The password can be changed at anytime)
	Maximum Password Age	0 (The password can be used indefinitely)
Lockout Policy	Lockout Threshold	0 (The lockout function for the user account is disabled)
	Lockout Duration	30 (min.)

■ Modify RADIUS

Screen	Item	Default
RADIUS Setting	RADIUS Authentication	Disable
	Recovery Mode	Yes (Communication error / Authentication error)
Primary Server, Secondary Server	Port No.	1812
	LAN Port	MNT
	Authentication Mode	CHAP
	Retry Out Time	30 (sec.)

■ Add Role

Screen	Item	Default
Target Policy	Status Display	All cleared
	RAID Group Management	
	Volume - Create / Modify	
	Volume - Delete / Format	
	Host Interface Management	
	NAS Management (*1)	
	Advanced Copy Management	
	Copy Session Management	
	Storage Migration Management	
	Storage Management	
	User Management	
	Authentication / Role	
	Security Setting	
	Maintenance Information	
	Firmware Management	
Maintenance Operation		

*1: This policy is displayed in a Unified Storage environment.

■ Setup Network Environment

Screen	Item	Default
LAN	Speed and Duplex	Auto-negotiation
	Wake on LAN	Disable

IPv4 Settings

D. Factory Default List
System Management

Screen	Item	Default
Interface	Master IP Address	<ul style="list-style-type: none"> For the ETERNUS DX60 S5/DX100 S5/DX200 S5 and ETERNUS AF150 S3/AF250 S3 <ul style="list-style-type: none"> MNT port Address that is assigned by the DHCP server RMT port 192.168.1.1 For the other models <ul style="list-style-type: none"> MNT port Address that is assigned by the DHCP server FST port 192.168.1.1
	Slave IP Address	Not specified
	Subnet Mask	<ul style="list-style-type: none"> For the ETERNUS DX60 S5/DX100 S5/DX200 S5 and ETERNUS AF150 S3/AF250 S3 <ul style="list-style-type: none"> MNT port Subnet mask that is assigned by the DHCP server RMT port 255.255.255.0 For the other models <ul style="list-style-type: none"> MNT port Subnet mask that is assigned by the DHCP server FST port 255.255.255.0
	Gateway	Not specified
IPv6 Settings		
Interface	Master IP Link Local Address	The link local address that is based on the storage system WWN
	Master Connect IP Address	Not specified
	Slave IP Link Local Address	Not specified
	Slave Connect IP Address	Not specified
	Length of Subnet Prefix	Not specified
	Gateway	Not specified

■ Setup Firewall

Screen	Item	Default
Firewall Settings		

D. Factory Default List
System Management

Screen	Item	Default
Acceptable Protocol	HTTP	<ul style="list-style-type: none"> • MNT Selected • RMT Selected • FST (*1) Selected
	HTTPS	<ul style="list-style-type: none"> • MNT Selected • RMT Selected • FST (*1) Selected
	Telnet	<ul style="list-style-type: none"> • MNT Selected • RMT Selected • FST (*1) Selected
	SSH	<ul style="list-style-type: none"> • MNT Selected • RMT Selected • FST (*1) Selected
	ICMP	<ul style="list-style-type: none"> • MNT Selected • RMT Selected • FST (*1) Selected
	Maintenance-Secure	<ul style="list-style-type: none"> • MNT Selected • RMT Selected • FST (*1) Selected
	SNMP	<ul style="list-style-type: none"> • MNT Selected • RMT Selected • FST (*1) Selected
	RCIL	MNT Cleared
	ECD	MNT Selected

*1 : FST is displayed when using the ETERNUS DX500 S5/DX600 S5 and the ETERNUS AF650 S3.

■ Setup SNMP Agent Basic Interface

Screen	Item	Default
Basic Interface	SNMP Function	Disable
	LAN Port used for SNMP	MNT
	Authentication Failure	Send SNMP Trap
	Engine ID	Default
	MIB-II RFC Version	RFC1213

■ Setup SNMP Manager

Screen	Item	Default
Manager	IP Version	IPv4

■ Setup SNMP Agent MIB Access View

Screen	Item	Default
MIB Access View	View Name	ViewALL
	Subtree1 - Subtree#10	Inclusion

■ Setup SNMP Agent User

Screen	Item	Default
Setup SNMP Agent User	MIB View Setting	ViewALL
	Authentication	Disable
	Authentication Method	MD5
	Encryption	Disable
	Encryption Method	DES

■ Setup SNMP Agent Community

Screen	Item	Default
Setup SNMP Agent Community	View Name	ViewALL
	Allowed SNMP Manager List	Cleared

■ Setup SNMP Agent Trap

Screen	Item	Default
Setup SNMP Agent Trap	Manager No.	Manager01
	SNMP Version	v1
	Community Name	The first community name in the list box
	User Name	The first user name in the list box
	Port No.	162

■ Download MIB File

Screen	Item	Default
Download MIB File	Option	"The ServerView control code is added to the comment line of the MIB definition file" checkbox Cleared
	Version	v1

■ Setup E-Mail Notification

Screen	Item	Default
Notification E-Mail	Notification E-Mail	Disable
Mail Server Settings	LAN Port used for SMTP Connection	MNT
	SMTP Port No.	25
	SMTP over SSL	None
	Authentication Type	None
	Authentication Method	Automatic

D. Factory Default List
System Management

Screen	Item	Default
Advanced Settings	"Change following Timing Parameter items" checkbox	Cleared
	Connection Timeout	5 (sec.)
	Response Timeout	5 (sec.)
	Maximum Retries	0 (count)
	Retry Interval	1 (sec.)

■ Setup Syslog

Screen	Item	Default
Syslog Server1, Syslog Server2	Send Log	off
	Port No.	514
	LAN Port	MNT

■ Setup SSH Server Key

Screen	Item	Default
SSH Server Key Setting	Key Length	2048 bit

■ Create Self-signed SSL Certificate

Screen	Item	Default
Create Self-signed SSL Certificate Setting	Key Length	2048 bit

■ Create Key/CSR

Screen	Item	Default
Create Key/CSR Setting	Key Length	2048 bit

■ Setup SSL Security Configuration

Screen	Item	Default
SSL Version Settings	Protocol	
	HTTPS (GUI)	<ul style="list-style-type: none"> • TLS1.0 Selected • TLS1.1 Selected • TLS1.2 Selected
	HTTPS (SMI-S)	<ul style="list-style-type: none"> • TLS1.0 Selected • TLS1.1 Selected • TLS1.2 Selected
	Maintenance-Secure	<ul style="list-style-type: none"> • TLS1.0 Selected • TLS1.1 Selected • TLS1.2 Selected

■ Setup Event Notification

Screen	Item	Default
Setting based on Severity	Checkbox to select the notification method	Refer to ""Initial Setting List" (page 1396)" for details.
Error Severity Level		
Warning Level		
Informational Level		

■ Export/Delete Log

Screen	Item	Default
Option	Export Mode	All
	Specify Time Range	No
	Include I/O Module log	Yes
	Include NAS Engine log	Yes
	Log File Size	Non-segmentation
	Delete of Customer Information	No

■ Export/Delete Panic Dump

Screen	Item	Default
Panic Dumps	Panic Dumps	Cleared
Option	Dump File Segment Size	Non-segmentation

■ Audit Log

Screen	Item	Default
Enable Audit Log	Operation mode	Disable (*1)
Disable Audit Log		

*1: The Audit log function is disabled by default and only [Enable Audit log] in [Action] is available.

■ Setup Audit Log

Screen	Item	Default
Syslog Server1, Syslog Server2	Send Audit Log	off
	Port No.	514
	LAN Port	MNT

■ Add Key Server

Screen	Item	Default
Key Server Setting	Port No.	5696
	LAN Port	MNT

■ Create Key Group

Screen	Item	Default
Key Group Setting	Security Level	High
	Recovery Mode	Automatic
	Key Valid Period	Unlimited
	Key Server	
	Master	None
	Slave	None

■ Update SED Authentication Key

Screen	Item	Default
Current SED Authentication Key Setting	Current Key	Enabled Key

■ Create External Drive

Screen	Item	Default
External Drive Setting	External LU Information	"Inherit" checkbox Selected

■ Setup Remote Support

Screen	Item	Default
Customer Information		
Customer Information	"Delete any Customer Identity information from the storage system after the information is sent to the 'REMCS Center'." checkbox	Cleared
Detailed Settings	Country of Installation (ISO3166 A2)	<ul style="list-style-type: none"> When logged with "Japanese" as the selected language JP When logged with "English" as the selected language Blank
Information filled by Field Engineers	Installation Date	2001-01
Communication Environment Information		

D. Factory Default List
System Management

Screen	Item	Default
Connection	Connection Type	Internet Connection
	LAN Port used for Remote Support	MNT
Service	Scheduled Connection Time	Undefined (10:00 - 15:00) (*1)
	Scheduled Connection Period	Every Day
	Specify the Day of the Week	Sunday
Proxy Server	Port No.	0
SMTP Server	Port No.	25
	SMTP over SSL	None
SMTP Authentication Information	Authentication Type	No SMTP Authentication
	Authentication Method	Automatic
	Port No.	110
REMCS Center	REMCS Center	Blank
Detailed Configuration Information	Data Transmission Method	Split (*2)
	Specify Storage System Name for HELO/EHLO Announcement when Sending E-Mail	Do not specify
	Use S/MIME	Use
Result Notification Information		
Detailed Settings	Administrator	Notification
	Connection check operator	Not Notification
Time Information		
Detailed Settings	SMTP Connection Timeout	60 (sec.)
	SMTP Response Timeout	60 (sec.)
	SMTP Retry Count	5 (count)
	SMTP Retry Interval	30 (sec.)
	HTTP Timeout	30 (sec.)
	HTTP Retry Count	5 (count)
	HTTP Retry Interval	5 (sec.)
	Queue Time before Sending EMails (only when POP Before SMTP authentication is enabled)	1000 (msec.)

*1 : Different times are specified in the factory settings.

*2 : The default value when "Split" is selected is "Split large data into multiple E-Mails" and "512KB".

■ Setup Log Sending Parameters

Screen	Item	Default
Configure Automatic Log Transmission		

D. Factory Default List
System Management

Screen	Item	Default
Send Log based on Events	Send Log when Errors Occur	<ul style="list-style-type: none"> When the [Setup Remote Support] setting has not been completed in advance Cleared When the [Setup Remote Support] setting has been completed in advance Selected
	Send Log Periodically	<ul style="list-style-type: none"> When the [Setup Remote Support] setting has not been completed in advance Cleared When the [Setup Remote Support] setting has been completed in advance Selected
	Time	Undefined (10:00 - 15:00) (*1)
	Period	Once per Week
	Day of the Week	Undefined (Monday - Friday) (*2)
Immediately Send Log Manually		
Manual Transmission	Include I/O Module log	Yes
	Time Range Specified	"Specify" checkbox Cleared

*1 : Different times are specified in the factory settings.

*2 : Different days are specified in the factory settings.

■ Setup AIS Connect Environment

Screen	Item	Default
AIS Connect Environment Setting	AIS Connect	Disable
	Use LAN Port	MNT
	SSL Server Certification	Use
	Automatic Log Transmission	Enable
	Connection Type	HTTP
	Change Password	Cleared

■ Setup Remote Session Permission

Screen	Item	Default
Remote Session Permission Setting	Remote Session	Forbid
	Remote Session Timeout	1 h

■ Apply Controller Firmware

Screen	Item	Default
Controller Firmware Archive Settings	Controller Firmware Archive	Latest Version

D. Factory Default List System Management

Screen	Item	Default
Schedule Settings	Apply Date	<ul style="list-style-type: none">• Apply Now• When "Set Date" is selected The current time, which is rounded up to the nearest hour or half-hour, is displayed.
Apply Mode Check	Apply Mode (Permit firmware downgrade)	Cleared

E. Supported Functions for Each Controller Firmware Version

The following shows the functions that are supported for each controller firmware version. "OK" indicates that the function is supported for that specified firmware and later versions.

Function	Supported controller firmware version				
	V11L10	V11L20	V11L21	V11L30	V11L40
Overview					
Overview	OK				
Volume					
Volume (Basic Information)	OK				
Performance (Host I/O)	OK				
Performance (QoS)	OK				
Performance (Advanced Copy)	OK				
LUN Group	OK				
Reservation	OK				
Pinned Data	OK				
Bad Sector	OK				
Balancing Thin Provisioning Volume	OK				
Snapshot			OK		
Create Volume	OK				
Delete Volume	OK				
Rename Volume	OK				
Format Volume	OK				
Expand Volume	OK				
Encrypt Volume	OK				
TPV Management					
Expand Thin Provisioning Volume	OK				
Modify Thin Provisioning Volume Threshold	OK				
Optimize TPV/FTV Capacity	OK				
Cancel Optimizing TPV/FTV Capacity	OK				
Start Balancing Thin Provisioning Volume	OK				
Stop Balancing Thin Provisioning Volume	OK				
Reconfigure NAS Volume			OK		
Set Allocation	OK				
SDV/SDPV Management					
Delete Snap Data Pool Volume	OK				
Force Delete Snap Data Pool Volume	OK				
Initialize Snap Data Volume	OK				
Start RAID Migration	OK				
Stop RAID Migration	OK				

E. Supported Functions for Each Controller Firmware Version

Function	Supported controller firmware version				
	V11L10	V11L20	V11L21	V11L30	V11L40
Stop External Volume Data Synchronization	OK				
Forbid Advanced Copy	OK				
Permit Advanced Copy	OK				
Release Reservation	OK				
Modify Cache Parameters	OK				
Export Cache Parameters	OK				
Export Performance Information	OK				
Set ALUA	OK				
Set Volume QoS	OK				
Set Volume QoS Pattern	OK				
Snapshot Management for NAS Volumes					
Set Snapshot			OK		
Delete Snapshot			OK		
Start Snapshot			OK		
Stop Snapshot			OK		
Delete External LU Information	OK				
Change Data Reduction Processing CM	OK				
RAID Group					
RAID Group (Basic Information)	OK				
Tuning	OK				
Eco-mode Schedule (RAID Group)	OK				
SED Key Group	OK				
External RAID Group	OK				
Create RAID Group	OK				
Delete RAID Group	OK				
Rename RAID Group	OK				
Change Controlling CM	OK				
Expand RAID Group	OK				
Modify RAID Group Parameters	OK				
Assign Eco-mode Schedule (RAID Group)	OK				
Set Key Group (RAID Group)	OK				
Recovery SED	OK				
External RAID Group Management					
Create External RAID Group	OK				
Delete External RAID Group	OK				
Recover External RAID Group	OK				
Thin Provisioning					

E. Supported Functions for Each Controller Firmware Version

Function	Supported controller firmware version				
	V11L10	V11L20	V11L21	V11L30	V11L40
Thin Provisioning Pool					
Thin Provisioning Pool (Basic Information)	OK				
Threshold (Thin Provisioning Pool)	OK				
Eco-mode Schedule (Thin Provisioning Pool)	OK				
Flexible Tier Pool					
Flexible Tier Pool (Basic Information)	OK				
Settings (Thin Provisioning)	OK				
Set Thin Provisioning	OK				
Create Thin Provisioning Pool	OK				
Delete Thin Provisioning Pool	OK				
Rename Thin Provisioning Pool	OK				
Expand Thin Provisioning Pool	OK				
Format Thin Provisioning Pool (All Area)	OK				
Format Thin Provisioning Pool (Unformatted Area)	OK				
Set Deduplication/Compression	OK				
Modify Threshold Thin Provisioning Pool	OK				
Modify Cache Parameters (TPP)	OK				
Assign Eco-mode Schedule (Thin Provisioning Pool)	OK				
Start Balancing Flexible Tier Pool	OK				
Stop Balancing Flexible Tier Pool	OK				
Advanced Copy					
Advanced Copy (Basic Information)	OK				
Advanced Copy (All Local Sessions)	OK				
EC	OK				
OPC	OK				
QuickOPC	OK				
SnapOPC	OK				
SnapOPC+	OK				
Monitor	OK				
Advanced Copy (All Remote Sessions)	OK				
REC	OK				
ODX Sessions	OK				
XCOPY Sessions	OK				
Virtual Volume Sessions	OK				
Settings (Advanced Copy)	OK				

E. Supported Functions for Each Controller Firmware Version

Function		Supported controller firmware version				
		V11L10	V11L20	V11L21	V11L30	V11L40
	Snap Data Pool	OK				
	Copy Path	OK				
	REC Buffer	OK				
	REC Disk Buffer	OK				
	Start SnapOPC+	OK				
	Stop Copy Session	OK				
	Register Advanced Copy License	OK				
	Delete Advanced Copy License	OK				
	Register Veeam Storage Integration License		OK			
	Delete Veeam Storage Integration License		OK			
	Modify EC/OPC Priority	OK				
	Modify Copy Table Size	OK				
	Modify Copy Parameters	OK				
REC Management						
	Export Storage Information	OK				
	Set Copy Path	OK				
	Delete All Copy Path	OK				
	Export All Copy Path	OK				
	Measure Round Trip Time	OK				
	Modify REC Buffer	OK				
	Create REC Disk Buffer	OK				
	Assign REC Disk Buffer	OK				
	Delete REC Disk Buffer	OK				
	Format REC Disk Buffer	OK				
	Modify REC Multiplicity	OK				
	Set REC Bandwidth Limit	OK				
	Set REC Line Speed	OK				
ODX Management						
	Enable ODX	OK				
	Disable ODX	OK				
	Create ODX Buffer Volume	OK				
Connectivity						
	Connectivity (Basic Information)	OK				
	Host Group	OK				
	FC Host	OK				
	iSCSI Host	OK				
	SAS Host					OK
	CA Port Group	OK				

E. Supported Functions for Each Controller Firmware Version

Function		Supported controller firmware version				
		V11L10	V11L20	V11L21	V11L30	V11L40
	FC Port	OK				
	iSCSI Port	OK				
	SAS Port				OK	
	LUN Group	OK				
	Host Response	OK				
	CA Reset Group	OK				
	Host-LU QoS	OK				
	Host QoS (Basic)	OK				
	FC Host QoS	OK				
	iSCSI Host QoS	OK				
	SAS Host QoS				OK	
	Port QoS (Basic)	OK				
	FC Port QoS	OK				
	iSCSI Port QoS	OK				
	SAS Port QoS				OK	
	LU QoS Group	OK				
	NAS			OK		
	NAS Interface			OK		
	Environment Settings			OK		
	Quota Management			OK		
	Meta Cache Distribution			OK		
	Host Affinity Management					
	Create Host Affinity	OK				
	Delete Host Affinity	OK				
	Modify Host Affinity	OK				
	Host Group Management					
	Add FC Host Group	OK				
	Add iSCSI Host Group	OK				
	Add SAS Host Group				OK	
	Delete Host Group	OK				
	Modify Host Group	OK				
	Modify Host Group (FC)	OK				
	Modify Host Group (iSCSI)	OK				
	Modify Host Group (SAS)				OK	
	Add FC Host	OK				
	Add iSCSI Host	OK				
	Add SAS Host				OK	
	Delete FC Host	OK				
	Delete iSCSI Host	OK				
	Delete SAS Host				OK	
	Modify FC Host	OK				

E. Supported Functions for Each Controller Firmware Version

Function		Supported controller firmware version				
		V11L10	V11L20	V11L21	V11L30	V11L40
	Modify iSCSI Host	OK				
	Modify SAS Host				OK	
CA Port Group Management						
	Create FC Port Group	OK				
	Create iSCSI Port Group	OK				
	Create SAS Port Group				OK	
	Delete CA Port Group	OK				
	Modify CA Port Group	OK				
	Modify FC Port Parameters	OK				
	Modify iSCSI Port Parameters	OK				
	Modify SAS Port Parameters				OK	
	Modify Port Mode	OK				
LUN Group Management						
	Add LUN Group	OK				
	Delete LUN Group	OK				
	Modify LUN Group	OK				
Host Response Management						
	Add Host Response	OK				
	Delete Host Response	OK				
	Modify Host Response	OK				
	Modify CA Reset Group	OK				
Host-LU QoS Management						
	Enable QoS/Disable QoS	OK				
	Initialize QoS	OK				
	Set Host-LU QoS	OK				
	Release Host-LU QoS	OK				
	Start Host-LU QoS Performance Monitoring	OK				
	Stop Host-LU QoS Performance Monitoring	OK				
	Set Host QoS Pattern	OK				
	Set Port QoS Pattern	OK				
	Set LU QoS Pattern	OK				
	Set FC Host QoS	OK				
	Set iSCSI Host QoS	OK				
	Set SAS Host QoS				OK	
	Set FC Port QoS	OK				
	Set iSCSI Port QoS	OK				
	Set SAS Port QoS				OK	
	Add LU QoS Group	OK				
	Delete LU QoS Group	OK				
	Modify LU QoS Group	OK				

E. Supported Functions for Each Controller Firmware Version

Function	Supported controller firmware version				
	V11L10	V11L20	V11L21	V11L30	V11L40
NAS Management					
Create Shared Folder			OK		
Delete Shared Folder			OK		
Modify Shared Folder			OK		
Clear NAS Data			OK		
Create NAS Interface			OK		
Delete NAS Interface			OK		
Modify NAS Interface			OK		
Change NAS Server Name			OK		
Set DNS Server			OK		
Set Authentication Server			OK		
Add Local User			OK		
Delete Local User			OK		
Modify Local User			OK		
Add Local Group			OK		
Delete Local Group			OK		
Add Quota Setting			OK		
Delete Quota Setting			OK		
Modify Quota Setting			OK		
Initialize Meta Cache Distribution			OK		
Enable Automatic Meta Cache Distribution			OK		
Disable Automatic Meta Cache Distribution			OK		
Component					
Storage (Basic Information)	OK				
Controller Enclosure	OK				
Controller Module	OK				
Add Controller Module				OK	
Performance (CM)	OK				
Channel Adapter	OK				
Performance (CA)	OK				
Login Host	OK				
PCIe Flash Module	OK				
Performance (PCIe Flash Module)	OK				
Bootup and Utility Device	OK				
Power Supply Unit (CE)	OK				
Battery (BBU)				OK	
Battery (BTU/BCU)	OK				
Frontend Enclosure	OK				

E. Supported Functions for Each Controller Firmware Version

Function		Supported controller firmware version					
		V11L10	V11L20	V11L21	V11L30	V11L40	
	Frontend Router	OK					
	Service Controller	OK					
	Power Supply Unit (FE)	OK					
	FAN Unit	OK					
	Operation Panel	OK					
	Drive Enclosure	OK					
	I/O Module	I/O Module	OK				
		Port Error Statistics	OK				
		Power Supply Unit (DE)	OK				
		Fan Expander Module	OK				
	Drives	OK					
	Performance (Drives)	Performance (Drives)	OK				
		Drive Error Statistics	OK				
	Assign Global Hot Spare	OK					
	Release Global Hot Spare	OK					
	Assign Dedicated Hot Spare	OK					
	Release Dedicated Hot Spare	OK					
	Sanitize Drive		OK				
	Turn on Locator Beacon/Turn off Locator Beacon	OK					
	Add Drive Enclosure		OK				
Add Channel Adapter Port				OK			
NAS Recovery Management			OK				
Force Enable Module	Force Enable Module			OK			
	Recover NAS System Volume			OK			
Export Performance Information	OK						
Clear Drive Error Statistics (All Drives)	OK						
Clear Drive Error Statistics (Selected Drives)	OK						
System							
	System (Basic Information)	OK					
	Network	OK					
	Remote Support	OK					
REMCS	REMCS	OK					
	AIS Connect (*1)	OK					
	Root Certificate	OK					
	Key Management	OK					
	Key Group	OK					
	Define Role	OK					
	Eco-mode	OK					
	Event/Dump	OK					
	Audit Log	OK					

E. Supported Functions for Each Controller Firmware Version

Function	Supported controller firmware version				
	V11L10	V11L20	V11L21	V11L30	V11L40
Firmware Maintenance	OK				
Storage Migration	OK				
External Drives	OK				
Utility	OK				
System Settings	OK				
Initial Setup	OK				
Smart Setup Wizard		OK			
Change User Password	OK				
Set SSH Public Key	OK				
Set Deduplication/Compression Mode	OK				
Enable RESTful API					OK
Register Non-disruptive Storage Migration License	OK				
Delete Non-disruptive Storage Migration License	OK				
System Management					
Modify Storage System Name	OK				
Modify Date and Time	OK				
Change Box ID	OK				
Setup Subsystem Parameters	OK				
Setup Encryption Mode	OK				
Setup SMI-S Environment	OK				
Register SED Authentication Key	OK				
Setup Power Management	OK				
Setup Exclusive Read Cache	OK				
Setup Disk Drive Patrol	OK				
Setup Debug Mode	OK				
Extreme Cache					
Setup Extreme Cache	OK				
Release Extreme Cache	OK				
Extreme Cache Pool					
Setup Extreme Cache Pool				OK	
Release Extreme Cache Pool				OK	
Utility Management					
Shutdown/Restart Storage System	OK				
Backup Configuration	OK				
Export Configuration	OK				
Start/Stop Performance Monitoring	OK				
Clear Cache	OK				
Eco-mode Management					

E. Supported Functions for Each Controller Firmware Version

Function		Supported controller firmware version				
		V11L10	V11L20	V11L21	V11L30	V11L40
	Modify Eco-mode General Setting	OK				
	Create Eco-mode Schedule	OK				
	Delete Eco-mode Schedule	OK				
	Modify Eco-mode Schedule	OK				
User Management						
	Setup User Account	OK				
	Initialize User Account	OK				
	Modify User Policy	OK				
	Modify RADIUS	OK				
	Add Role	OK				
	Delete Role	OK				
	Modify Role	OK				
Network Management						
	Setup Network Environment	OK				
	Setup Firewall	OK				
	Setup SNMP Agent Basic Interface	OK				
	Setup SNMP Manager	OK				
	Setup SNMP Agent MIB Access View	OK				
	Setup SNMP Agent User	OK				
	Setup SNMP Agent Community	OK				
	Setup SNMP Agent Trap	OK				
	Download MIB File	OK				
	Send SNMP Trap Test	OK				
	Display SMTP Log	OK				
	Setup E-Mail Notification	OK				
	Setup Syslog	OK				
	Setup SSH Server Key	OK				
	Create Self-signed SSL Certificate	OK				
	Create Key/CSR	OK				
	Register SSL Certificate	OK				
	Setup SSL Security Configuration	OK				
Event/Dump Management						
	Setup Event Notification	OK				
	Display/Delete Event Log	OK				
	Export/Delete Log	OK				
	Export/Delete Panic Dump	OK				
Audit Log Management						
	Enable Audit Log	OK				
	Disable Audit Log	OK				
	Setup Audit Log	OK				
Key Management						

E. Supported Functions for Each Controller Firmware Version

Function		Supported controller firmware version				
		V11L10	V11L20	V11L21	V11L30	V11L40
	Setup Key Management Machine Name	OK				
	Add Key Server	OK				
	Delete Key Server	OK				
	Modify Key Server	OK				
	Create Key Group	OK				
	Delete Key Group	OK				
	Modify Key Group	OK				
	Update SED Authentication Key	OK				
	Import SSL/KMIP Certificate	OK				
Storage Migration Management						
	Start Storage Migration	OK				
	Download Template File for Storage Migration Settings	OK				
	Delete Storage Migration Path	OK				
	Download Storage Migration Result	OK				
	Restart Storage Migration	OK				
	Suspend Storage Migration	OK				
	Stop Storage Migration	OK				
External Drive Management						
	Create External Drive	OK				
	Delete External Drive	OK				
Remote Support Management (REMCS)						
	Display Communication Log	OK				
	Setup Remote Support	OK				
	Update Customer Information	OK				
	Update Communication Environment Information	OK				
	Setup Log Sending Parameters	OK				
	Stop/Restart Remote Support	OK				
Remote Support Management (AIS Connect) (*1)						
	Setup AIS Connect Environment	OK				
	Setup Remote Session Permission	OK				
	Send Log	OK				
	Test Server Connectivity	OK				
	Send AIS Connect Test Event	OK				
	Setup Customer Information		OK			
	Import Root Certificate	OK				
Firmware Management						
	Apply Controller Firmware	OK				
	Delete Controller Firmware Schedule	OK				

*1 : AIS Connect service ended in December 2022.

F. Supported Functions for Each Model

The following shows the functions that are supported for each model. "OK" indicates that the function is supported for the specified models.

Function	Model											
	DX60 S5	DX100 S5	DX200 S5	DX500 S5	DX600 S5	DX900 S5	DX8100 S4	DX8900 S4	AF150 S3	AF250 S3	AF650 S3	
Overview												
Overview	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
Volume												
Volume (Basic Information)	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
Performance (Host I/O)	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
Performance (QoS)		OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
Performance (Advanced Copy)	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
LUN Group	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
Reservation	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
Pinned Data	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
Bad Sector	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
Balancing Thin Provisioning Volume	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
Snapshot		OK	OK	OK	OK							
Create Volume	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
Delete Volume	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
Rename Volume	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
Format Volume	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
Expand Volume	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
Encrypt Volume		OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
TPV Management												
Expand Thin Provisioning Volume	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
Modify Thin Provisioning Volume Threshold	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
Optimize TPV/FTV Capacity	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
Cancel Optimizing TPV/FTV Capacity	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
Start Balancing Thin Provisioning Volume	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
Stop Balancing Thin Provisioning Volume	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
Reconfigure NAS Volume		OK	OK	OK	OK							
Set Allocation	OK	OK	OK	OK	OK	OK		OK	OK	OK	OK	OK
SDV/SDPV Management												
Delete Snap Data Pool Volume	OK	OK	OK	OK	OK	OK		OK	OK	OK	OK	OK
Force Delete Snap Data Pool Volume	OK	OK	OK	OK	OK	OK		OK	OK	OK	OK	OK
Initialize Snap Data Volume	OK	OK	OK	OK	OK	OK		OK	OK	OK	OK	OK
Start RAID Migration	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
Stop RAID Migration	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
Stop External Volume Data Synchronization	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
Forbid Advanced Copy	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK

F. Supported Functions for Each Model

Function		Model										
		DX60 S5	DX100 S5	DX200 S5	DX500 S5	DX600 S5	DX900 S5	DX8100 S4	DX8900 S4	AF150 S3	AF250 S3	AF650 S3
	Permit Advanced Copy	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
	Release Reservation	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
	Modify Cache Parameters	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
	Export Cache Parameters	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
	Export Performance Information	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
	Set ALUA	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
	Set Volume QoS		OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
	Set Volume QoS Pattern		OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
Snapshot Management for NAS Volumes												
	Set Snapshot		OK	OK	OK	OK						
	Delete Snapshot		OK	OK	OK	OK						
	Start Snapshot		OK	OK	OK	OK						
	Stop Snapshot		OK	OK	OK	OK						
	Delete External LU Information	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
	Change Data Reduction Processing CM			OK	OK	OK	OK		OK		OK	OK
RAID groups												
	RAID Group (Basic Information)	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
	Tuning	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
	Eco-mode Schedule (RAID Group)	OK	OK	OK	OK	OK	OK	OK				
	SED Key Group	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
	External RAID Group	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
	Create RAID Group	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
	Delete RAID Group	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
	Rename RAID Group	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
	Change Controlling CM	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
	Expand RAID Group	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
	Modify RAID Group Parameters	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
	Assign Eco-mode Schedule (RAID Group)	OK	OK	OK	OK	OK	OK	OK				
	Set Key Group (RAID Group)		OK	OK	OK	OK	OK	OK		OK	OK	
	Recovery SED	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
External RAID Group Management												
	Create External RAID Group	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
	Delete External RAID Group	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
	Recover External RAID Group	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
Thin Provisioning												
Thin Provisioning Pools												
	Thin Provisioning Pool (Basic Information)	OK	OK	OK	OK	OK	OK		OK	OK	OK	OK
	Threshold (Thin Provisioning Pool)	OK	OK	OK	OK	OK	OK		OK	OK	OK	OK
	Eco-mode Schedule (Thin Provisioning Pool)	OK	OK	OK	OK	OK	OK		OK			

F. Supported Functions for Each Model

Function	Model											
	DX60 S5	DX100 S5	DX200 S5	DX500 S5	DX600 S5	DX900 S5	DX8100 S4	DX8900 S4	AF150 S3	AF250 S3	AF650 S3	
Flexible Tier Pools												
Flexible Tier Pool (Basic Information)		OK	OK	OK	OK	OK		OK	OK	OK	OK	
Settings (Thin Provisioning)	OK	OK	OK	OK	OK	OK		OK	OK	OK	OK	
Set Thin Provisioning	OK	OK	OK	OK	OK	OK		OK	OK	OK	OK	
Create Thin Provisioning Pool	OK	OK	OK	OK	OK	OK		OK	OK	OK	OK	
Delete Thin Provisioning Pool	OK	OK	OK	OK	OK	OK		OK	OK	OK	OK	
Rename Thin Provisioning Pool	OK	OK	OK	OK	OK	OK		OK	OK	OK	OK	
Expand Thin Provisioning Pool	OK	OK	OK	OK	OK	OK		OK	OK	OK	OK	
Format Thin Provisioning Pool (All Area)	OK	OK	OK	OK	OK	OK		OK	OK	OK	OK	
Format Thin Provisioning Pool (Unformatted Area)	OK	OK	OK	OK	OK	OK		OK	OK	OK	OK	
Set Deduplication/Compression			OK	OK	OK	OK		OK		OK	OK	
Modify Threshold Thin Provisioning Pool	OK	OK	OK	OK	OK	OK		OK	OK	OK	OK	
Modify Cache Parameters (TPP)	OK	OK	OK	OK	OK	OK		OK	OK	OK	OK	
Assign Eco-mode Schedule (Thin Provisioning Pool)	OK	OK	OK	OK	OK	OK		OK				
Start Balancing Flexible Tier Pool		OK	OK	OK	OK	OK		OK	OK	OK	OK	
Stop Balancing Flexible Tier Pool		OK	OK	OK	OK	OK		OK	OK	OK	OK	
Advanced Copy												
Advanced Copy (Basic Information)	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	
Advanced Copy (All Local Sessions)	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	
EC	EC	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	
	OPC	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	
	QuickOPC	OK	OK	OK	OK	OK		OK	OK	OK	OK	
	SnapOPC	OK	OK	OK	OK	OK		OK	OK	OK	OK	
	SnapOPC+	OK	OK	OK	OK	OK		OK	OK	OK	OK	
	Monitor	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
Advanced Copy (All Remote Sessions)		OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	
REC		OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	
ODX Sessions	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	
XCOPY Sessions	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	
Virtual Volume Sessions		OK	OK	OK	OK	OK		OK	OK	OK	OK	
Settings (Advanced Copy)	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	
Snap Data Pool	Snap Data Pool	OK	OK	OK	OK	OK		OK	OK	OK	OK	
	Copy Path		OK	OK	OK	OK	OK	OK	OK	OK	OK	
	REC Buffer		OK	OK	OK	OK	OK	OK	OK	OK	OK	
	REC Disk Buffer		OK	OK	OK	OK	OK	OK	OK	OK	OK	
Start SnapOPC+	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	
Stop Copy Session	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	
Register Advanced Copy License	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	
Delete Advanced Copy License	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	

F. Supported Functions for Each Model

Function	Model										
	DX60 S5	DX100 S5	DX200 S5	DX500 S5	DX600 S5	DX900 S5	DX8100 S4	DX8900 S4	AF150 S3	AF250 S3	AF650 S3
Register Veeam Storage Integration License	OK	OK	OK	OK	OK	OK		OK	OK	OK	OK
Delete Veeam Storage Integration License	OK	OK	OK	OK	OK	OK		OK	OK	OK	OK
Modify EC/OPC Priority	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
Modify Copy Table Size	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
Modify Copy Parameters	OK	OK	OK	OK	OK	OK		OK	OK	OK	OK
REC Management											
Export Storage Information		OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
Set Copy Path		OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
Delete All Copy Path		OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
Export All Copy Path		OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
Measure Round Trip Time		OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
Modify REC Buffer		OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
Create REC Disk Buffer		OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
Assign REC Disk Buffer		OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
Delete REC Disk Buffer		OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
Format REC Disk Buffer		OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
Modify REC Multiplicity		OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
Set REC Bandwidth Limit		OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
Set REC Line Speed		OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
ODX Management											
Enable ODX	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
Disable ODX	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
Create ODX Buffer Volume	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
Connectivity											
Connectivity (Basic Information)	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
Host Group	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
FC Host	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
iSCSI Host	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
SAS Host	OK	OK	OK								
CA Port Group	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
FC Port	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
iSCSI Port	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
SAS Port	OK	OK	OK								
LUN Group	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
Host Response	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
CA Reset Group	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
Host-LU QoS		OK	OK	OK	OK	OK	OK	OK	OK	OK	OK

F. Supported Functions for Each Model

Function		Model										
		DX60 S5	DX100 S5	DX200 S5	DX500 S5	DX600 S5	DX900 S5	DX8100 S4	DX8900 S4	AF150 S3	AF250 S3	AF650 S3
	Host QoS (Basic)		OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
	FC Host QoS		OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
	iSCSI Host QoS		OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
	SAS Host QoS		OK	OK								
	Port QoS (Basic)		OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
	FC Port QoS		OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
	iSCSI Port QoS		OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
	SAS Port QoS		OK	OK								
	LU QoS Group		OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
NAS			OK	OK	OK	OK						
	NAS Interface		OK	OK	OK	OK						
	Environment Settings		OK	OK	OK	OK						
	Quota Management		OK	OK	OK	OK						
	Meta Cache Distribution		OK	OK	OK	OK						
Host Affinity Management												
	Create Host Affinity	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
	Delete Host Affinity	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
	Set Host Affinity	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
Host Group Management												
	Add FC Host Group	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
	Add iSCSI Host Group	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
	Add SAS Host Group	OK	OK	OK								
	Delete Host Group	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
	Modify Host Group	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
	Modify Host Group (FC)	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
	Modify Host Group (iSCSI)	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
	Modify Host Group (SAS)	OK	OK	OK								
	Add FC Host	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
	Add iSCSI Host	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
	Add SAS Host	OK	OK	OK								
	Delete FC Host	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
	Delete iSCSI Host	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
	Delete SAS Host	OK	OK	OK								
	Modify FC Host	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
	Modify iSCSI Host	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
Modify SAS Host	OK	OK	OK									
CA Port Group Management												

F. Supported Functions for Each Model

Function		Model										
		DX60 S5	DX100 S5	DX200 S5	DX500 S5	DX600 S5	DX900 S5	DX8100 S4	DX8900 S4	AF150 S3	AF250 S3	AF650 S3
	Create FC Port Group	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
	Create iSCSI Port Group	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
	Create SAS Port Group	OK	OK	OK								
	Delete CA Port Group	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
	Modify CA Port Group	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
	Modify FC Port Parameters	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
	Modify iSCSI Port Parameters	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
	Modify SAS Port Parameters	OK	OK	OK								
	Modify Port Mode	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
LUN Group Management												
	Add LUN Group	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
	Delete LUN Group	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
	Modify LUN Group	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
Host Response Management												
	Add Host Response	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
	Delete Host Response	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
	Modify Host Response	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
	Modify CA Reset Group	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
Host-LU QoS Management												
	Enable/Disable QoS		OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
	Initialize QoS		OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
	Set Host-LU QoS		OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
	Release Host-LU QoS		OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
	Start Host-LU QoS Performance Monitoring		OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
	Stop Host-LU QoS Performance Monitoring		OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
	Set Host QoS Pattern		OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
	Set Port QoS Pattern		OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
	Set LU QoS Pattern		OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
	Set FC Host QoS		OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
	Set iSCSI Host QoS		OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
	Set SAS Host QoS		OK	OK								
	Set FC Port QoS		OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
	Set iSCSI Port QoS		OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
	Set SAS Port QoS		OK	OK								
	Add LU QoS Group		OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
	Delete LU QoS Group		OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
Modify LU QoS Group		OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	
NAS Management												
	Create Shared Folder		OK	OK	OK	OK						

F. Supported Functions for Each Model

Function		Model										
		DX60 S5	DX100 S5	DX200 S5	DX500 S5	DX600 S5	DX900 S5	DX8100 S4	DX8900 S4	AF150 S3	AF250 S3	AF650 S3
	Delete Shared Folder		OK	OK	OK	OK						
	Modify Shared Folder		OK	OK	OK	OK						
	Clear NAS Data		OK	OK	OK	OK						
	Create NAS Interface		OK	OK	OK	OK						
	Delete NAS Interface		OK	OK	OK	OK						
	Modify NAS Interface		OK	OK	OK	OK						
	Change NAS Server Name		OK	OK	OK	OK						
	Set DNS Server		OK	OK	OK	OK						
	Set Authentication Server		OK	OK	OK	OK						
	Add Local User		OK	OK	OK	OK						
	Delete Local User		OK	OK	OK	OK						
	Modify Local User		OK	OK	OK	OK						
	Add Local Group		OK	OK	OK	OK						
	Delete Local Group		OK	OK	OK	OK						
	Add Quota Setting		OK	OK	OK	OK						
	Delete Quota Setting		OK	OK	OK	OK						
	Modify Quota Setting		OK	OK	OK	OK						
	Initialize Meta Cache Distribution		OK	OK	OK	OK						
	Enable Automatic Meta Cache Distribution		OK	OK	OK	OK						
	Disable Automatic Meta Cache Distribution		OK	OK	OK	OK						
Component												
	Storage (Basic Information)	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
	Controller Enclosure	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
	Controller Module	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
	Add Controller Module	OK	OK	OK								
	Performance (CM)	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
	Channel Adapter	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
	Performance (CA)	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
	Login Host	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
	PCIe Flash Module				OK	OK	OK		OK			
	Performance (PCIe Flash Module)				OK	OK	OK		OK			
	Bootup and Utility Device				OK	OK	OK	OK	OK			OK
	Power Supply Unit (CE)	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
	Battery (BBU)	OK	OK	OK						OK	OK	
	Battery (BTU/BCU)				OK	OK	OK	OK	OK			OK
	Frontend Enclosure						OK		OK			

F. Supported Functions for Each Model

Function		Model										
		DX60 S5	DX100 S5	DX200 S5	DX500 S5	DX600 S5	DX900 S5	DX8100 S4	DX8900 S4	AF150 S3	AF250 S3	AF650 S3
	Frontend Router						OK		OK			
	Service Controller						OK		OK			
	Power Supply Unit (FE)						OK		OK			
	FAN Unit						OK		OK			
	Operation Panel						OK		OK			
Drive Enclosure		OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
	I/O Module	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
	Port Error Statistics	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
	Power Supply Unit (DE)	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
	Fan Expander Module	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
Drives		OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
	Performance (Drives)	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
	Drive Error Statistics	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
Assign Global Hot Spare		OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
Release Global Hot Spare		OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
Assign Dedicated Hot Spare		OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
Release Dedicated Hot Spare		OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
Sanitize Drive		OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
Turn on Locator Beacon/Turn off Locator Beacon		OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
Add Drive Enclosure		OK	OK	OK	OK	OK	OK	OK	OK		OK	OK
Add Channel Adapter Port		OK	OK									
NAS Recovery Management												
	Force Enable Module		OK	OK	OK	OK						
	Recover NAS System Volume		OK	OK	OK	OK						
Export Performance Information		OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
Clear Drive Error Statistics (All Drives)		OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
Clear Drive Error Statistics (Selected Drives)		OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
System												
System (Basic Information)		OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
Network		OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
Remote Support		OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
	REMCS	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
	AIS Connect (*1)	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
	Root Certificate	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
Key Management			OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
	Key Group		OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
Define Role		OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
Eco-mode		OK	OK	OK	OK	OK	OK	OK	OK			
Event/Dump		OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK

F. Supported Functions for Each Model

Function	Model											
	DX60 S5	DX100 S5	DX200 S5	DX500 S5	DX600 S5	DX900 S5	DX8100 S4	DX8900 S4	AF150 S3	AF250 S3	AF650 S3	
Audit Log	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
Firmware Maintenance	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
Storage Migration	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
External Drives	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
Utility	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
System Settings	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
Initial Setup	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
Smart Setup Wizard	OK	OK	OK	OK	OK	OK		OK	OK	OK	OK	OK
Change User Password	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
Set SSH Public Key	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
Set Deduplication/Compression Mode			OK	OK	OK	OK		OK		OK	OK	OK
Enable RESTful API	OK	OK	OK	OK	OK	OK		OK	OK	OK	OK	OK
Register Non-disruptive Storage Migration License	OK	OK	OK	OK	OK	OK		OK	OK	OK	OK	OK
Delete Non-disruptive Storage Migration License	OK	OK	OK	OK	OK	OK		OK	OK	OK	OK	OK
System Management												
Modify Storage System Name	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
Modify Date and Time	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
Change Box ID	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
Setup Subsystem Parameters	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
Setup Encryption Mode		OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
Setup SMI-S Environment	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
Register SED Authentication Key	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
Setup Power Management	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
Setup Exclusive Read Cache	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
Setup Disk Drive Patrol	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
Setup Debug Mode	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
Extreme Cache												
Setup Extreme Cache				OK	OK	OK		OK				
Release Extreme Cache				OK	OK	OK		OK				
Extreme Cache Pool												
Setup Extreme Cache Pool		OK	OK									
Release Extreme Cache Pool		OK	OK									
Utility Management												
Shutdown/Restart Storage System	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
Backup Configuration	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
Export Configuration	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
Start/Stop Performance Monitoring	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
Clear Cache	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
Eco-mode Management												

F. Supported Functions for Each Model

Function		Model										
		DX60 S5	DX100 S5	DX200 S5	DX500 S5	DX600 S5	DX900 S5	DX8100 S4	DX8900 S4	AF150 S3	AF250 S3	AF650 S3
	Modify Eco-mode General Setting	OK	OK	OK	OK	OK	OK	OK	OK			
	Create Eco-mode Schedule	OK	OK	OK	OK	OK	OK	OK	OK			
	Delete Eco-mode Schedule	OK	OK	OK	OK	OK	OK	OK	OK			
	Modify Eco-mode Schedule	OK	OK	OK	OK	OK	OK	OK	OK			
User Management												
	Setup User Account	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
	Initialize User Account	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
	Modify User Policy	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
	Modify RADIUS	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
	Add Role	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
	Delete Role	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
	Modify Role	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
Network Management												
	Setup Network Environment	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
	Setup Firewall	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
	Setup SNMP Agent Basic Interface	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
	Setup SNMP Manager	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
	Setup SNMP Agent MIB Access View	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
	Setup SNMP Agent User	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
	Setup SNMP Agent Community	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
	Setup SNMP Agent Trap	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
	Download MIB File	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
	Send SNMP Trap Test	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
	Display SMTP Log	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
	Setup E-Mail Notification	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
	Setup Syslog	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
	Setup SSH Server Key	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
	Create Self-signed SSL Certificate	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
	Create Key/CSR	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
	Register SSL Certificate	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
	Setup SSL Security Configuration	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
Event/Dump Management												
	Setup Event Notification	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
	Display/Delete Event Log	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
	Export/Delete Log	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
	Export/Delete Panic Dump	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
Audit Log Management												

F. Supported Functions for Each Model

Function	Model											
	DX60 S5	DX100 S5	DX200 S5	DX500 S5	DX600 S5	DX900 S5	DX8100 S4	DX8900 S4	AF150 S3	AF250 S3	AF650 S3	
Enable Audit Log	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
Disable Audit Log	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
Setup Audit Log	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
Key Management												
Setup Key Management Machine Name		OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
Add Key Server		OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
Delete Key Server		OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
Modify Key Server		OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
Create Key Group		OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
Delete Key Group		OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
Modify Key Group		OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
Update SED Authentication Key		OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
Import SSL/KMIP Certificate		OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
Storage Migration Management												
Start Storage Migration	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
Download Template File for Storage Migration Settings	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
Delete Storage Migration Path	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
Download Storage Migration Result	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
Restart Storage Migration	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
Suspend Storage Migration	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
Stop Storage Migration	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
External Drive Management												
Create External Drive	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
Delete External Drive	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
Remote Support Management (REMCS)												
Display Communication Log		OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
Setup Remote Support		OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
Update Customer Information		OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
Update Communication Environment Information		OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
Setup Log Sending Parameters		OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
Stop/Restart Remote Support		OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
Remote Support Management (AIS Connect) (*1)												

F. Supported Functions for Each Model

Function		Model										
		DX60 S5	DX100 S5	DX200 S5	DX500 S5	DX600 S5	DX900 S5	DX8100 S4	DX8900 S4	AF150 S3	AF250 S3	AF650 S3
	Setup AIS Connect Environment	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
	Setup Remote Session Permission	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
	Send Log	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
	Test Server Connectivity	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
	Send AIS Connect Test Event	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
	Setup Customer Information	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
	Import Root Certificate	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
	Firmware Management											
	Apply Controller Firmware	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
	Delete Controller Firmware Schedule	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK

*1 : AIS Connect service ended in December 2022.

G. Naming Conventions of Volumes, Hosts, and External RAID Groups

This appendix describes the naming conventions for volumes and hosts.

Refer to the following.

- ["Naming Conventions of Volumes" \(page 1687\)](#)
- ["Naming Conventions When Adding Hosts" \(page 1688\)](#)
- ["Naming Conventions of External RAID Groups" \(page 1688\)](#)

Naming Conventions of Volumes

The following naming conventions apply when creating and renaming volumes. Note that the same conventions apply when creating and renaming RAID groups and when renaming TPPs.

- When creating or renaming multiple volumes at the same time, the volume name is automatically applied to the volumes according to the specified "Name", selected "Start of Suffix", and selected "Digits of Suffix".
[Example] When the specified volume name is "Volume" (six characters), "Start of Suffix" is "90", "Digits of Suffix" is "2", and the number of volumes is "11": the volume names "Volume90" to "Volume100" are applied to the volumes.
- If the automatically applied volume name exceeds the maximum length due to the "Start of Suffix" and "Digits of Suffix" settings, the excess characters are deleted from the specified "Name", and replaced with a "~". The maximum length of the name is as follows:

- Volume name
32 characters
- RAID group name and TPP name
16 characters

[Example] When the specified volume name is "ETERNUS_DXAF_Standard-XX_VolumeX" (32 characters), "Start of Suffix" is "90", "Digits of Suffix" is "2", and the number of volumes is "11": the volume names "ETERNUS_DXAF_Standard-XX_Volu~90" to "ETERNUS_DXAF_Standard-XX_Vol~100" are applied to the volumes.

- When a volume name including the suffix number already exists, the suffix number is increased by one (+1). The suffix number is increased by one (+1) until no volume names overlap.

Note

- If "Start of Suffix" starts with "0" and it exceeds "Digits of Suffix", the zeros are deleted from "Start of Suffix" and then applied to the volume name.

[Example 1] When the specified volume name is "Volume", "Start of Suffix" is "000", and "Digits of Suffix" is "1": the volume name "Volume0" is applied to the volume.

[Example 2] When the specified volume name is "Volume", "Start of Suffix" is "00005", and "Digits of Suffix" is "2": the volume name "Volume05" is applied to the volume.

Naming Conventions When Adding Hosts

The following naming conventions apply when adding hosts:

- A name is automatically applied to a host with the "host group name" and a suffix number "x" (serial numbers starting with "0").
[Example] When specifying "HOST_Group_001" (14 characters) as the host group name
Names such as "HOST_Group_001_0" and "HOST_Group_001_1" are applied to the host groups.
- When the host name including the suffix number "x" has more than 16 characters, the excess number of characters is deleted from the "host group name", starting with the last character and a suffix number "~x" will be added. Then, the name will contain only 16 characters.
[Example] When specifying "HOST_Group_ABCDE" (16 characters) as the host group name
Names such as "HOST_Group_ABC~0" and "HOST_Group_ABC~1" are applied to the host groups.
- When a host name including the suffix number already exists, the suffix number is increased by one (+1). The suffix number is increased by one (+1) until no host names overlap.
- The hosts, which were selected on the [Now Connected] screen, are named, and then the hosts, which were specified on the [Manual Input] screen, are named next.
- The name of the existing member host will not be changed.

Naming Conventions of External RAID Groups

The following naming conventions apply when creating External RAID Groups:

- When creating multiple External RAID Groups at a time, a name is automatically added to an External RAID Group with the specified "Name" and a suffix number "x" (serial numbers starting with "0").
[Example] When specifying "ExRAIDGroup_aa" (14 characters) as the External RIAD Group name
Names such as "ExRAIDGroup_aa0" and "ExRAIDGroup_aa1" are applied to the External RAID Groups.
- When an External RAID Group name including the suffix number "x" has more than 16 characters, the excess number of characters is deleted from the "Name", starting with the last character and a suffix number "~x" will be added.
[Example] When specifying "ExRAIDGroup_abab" (16 characters) as the External RIAD Group name
Names such as "ExRAIDGroup_ab~0" and "ExRAIDGroup_ab~1" are applied to the External RAID Groups.
- When an External RAID Group name including the suffix number already exists, the suffix number is increased by one (+1). The suffix number is increased by one (+1) until no External RAID Group names overlap.

H. Basic Size and MWC Input Condition for RAID Levels

This appendix describes the basic size for each RAID level and the input conditions for the MWC of each RAID level.

Refer to the following.

- ["Basic Size for each RAID Level" \(page 1689\)](#)
- ["Allowed Input for MWC" \(page 1701\)](#)

Basic Size for each RAID Level

This section describes the basic size for each RAID level.

The allowed input for the basic size varies depending on the RAID level, the drive configuration, and the Stripe Depth value.

Basic Size When Using the Default Stripe Depth Value (For Standard Type Volumes, TPVs, or SDPVs)

When using the default Stripe Depth value, refer to the following table for basic size:

■ Basic Size of Each RAID Group When Using the Default Stripe Depth Value

RAID level	Drive configuration (*1)	Basic size (MB) (Lowest exact MB multiple) (*2) (Stripe Depth = 64KB (Default))
Mirroring (RAID1)	1D+1M	1 (MB)
High Performance (RAID1+0)	2D+2M	1 (MB)
	3D+3M	3 (MB)
	4D+4M	1 (MB)
	5D+5M	5 (MB)
	6D+6M	3 (MB)
	7D+7M	7 (MB)
	8D+8M	1 (MB)
	9D+9M	9 (MB)
	10D+10M	5 (MB)
	11D+11M	11 (MB)
	12D+12M	3 (MB)
	13D+13M	13 (MB)
	14D+14M	7 (MB)
High Performance (RAID1+0)	15D+15M	15 (MB)
	16D+16M	1 (MB)

H. Basic Size and MWC Input Condition for RAID Levels
 Basic Size for each RAID Level

RAID level	Drive configuration (*1)	Basic size (MB) (Lowest exact MB multiple) (*2)
		(Stripe Depth = 64KB (Default))
High Capacity (RAID5)	2D+1P	1 (MB)
	3D+1P	3 (MB)
	4D+1P	1 (MB)
	5D+1P	5 (MB)
	6D+1P	3 (MB)
	7D+1P	7 (MB)
	8D+1P	1 (MB)
	9D+1P	9 (MB)
	10D+1P	5 (MB)
	11D+1P	11 (MB)
	12D+1P	3 (MB)
	13D+1P	13 (MB)
	14D+1P	7 (MB)
	15D+1P	15 (MB)
Reliability (RAID5+0)	(2D+1P)x2	1 (MB)
	(3D+1P)x2	3 (MB)
	(4D+1P)x2	1 (MB)
	(5D+1P)x2	5 (MB)
	(6D+1P)x2	3 (MB)
	(7D+1P)x2	7 (MB)
	(8D+1P)x2	1 (MB)
	(9D+1P)x2	9 (MB)
	(10D+1P)x2	5 (MB)
	(11D+1P)x2	11 (MB)
	(12D+1P)x2	3 (MB)
	(13D+1P)x2	13 (MB)
	(14D+1P)x2	7 (MB)
	(15D+1P)x2	15 (MB)
High Reliability (RAID6)	3D+2P	3 (MB)
	4D+2P	1 (MB)
	5D+2P	5 (MB)
	6D+2P	3 (MB)
	7D+2P	7 (MB)
	8D+2P	1 (MB)
	9D+2P	9 (MB)
	10D+2P	5 (MB)
	11D+2P	11 (MB)
	12D+2P	3 (MB)
	13D+2P	13 (MB)
14D+2P	7 (MB)	

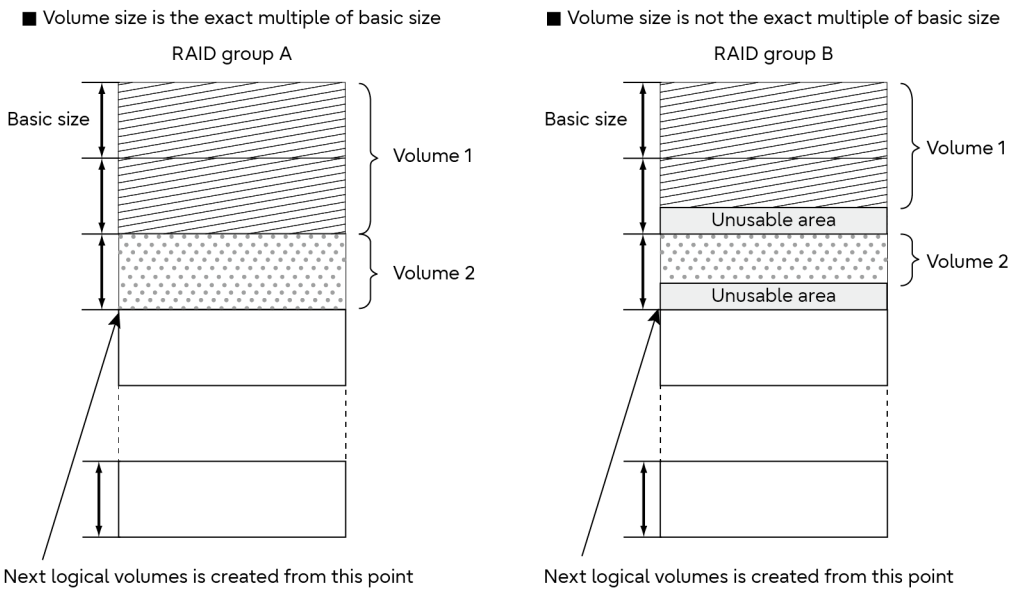
H. Basic Size and MWC Input Condition for RAID Levels
 Basic Size for each RAID Level

RAID level	Drive configuration (*1)	Basic size (MB) (Lowest exact MB multiple) (*2)
		(Stripe Depth = 64KB (Default))
High Reliability (RAID6-FR)	(3D+2P)x2+1HS	3 (MB)
	(4D+2P)x2+1HS	1 (MB)
	(6D+2P)x2+1HS	3 (MB)
	(9D+2P)x2+1HS	9 (MB)
	(12D+2P)x2+1HS	3 (MB)
	(5D+2P)x4+1HS	5 (MB)
	(13D+2P)x2+1HS	13 (MB)
	(8D+2P)x3+1HS	1 (MB)
	(4D+2P)x5+1HS	1 (MB)
(3D+2P)x6+1HS	3 (MB)	

*1 : D: Data drives, M: Mirror drives, P: Parity drives, HS: Hot Spares

*2 : Basic size when creating volumes. This storage system manages volumes in units of stripe size. If the volume size is not an exact multiple of the basic size (stripe size), then when a RAID group is created the remainder at the end of the last stripe used will be lost. Stripe size is independent of the disk drive capacity. Figure 1 shows what happens when the volume size is an integral multiple of the basic size and what happens when it is not.

Figure 1 Basic Size When Creating Volumes



Note

- The basic size is not changed even if the chunk size of the TPP to which the TPV belongs is changed. This also applies even when the Stripe Depth is 128KB or larger. Refer to ["Basic Size When Stripe Depth Is Tuned \(For Standard Type Volumes, TPVs, or SDPVs\)" \(page 1696\)](#) for details.

Basic Size When Using the Default Stripe Depth Value (For WSVs)

When using the default Stripe Depth value, refer to the following table for basic size:

■ Basic Size of Each RAID Group When Using the Default Stripe Depth Value

When the Wide Stripe Size Is "Normal"

For WSVs, the basic size is a multiple of the number of concatenations (the number of RAID groups that are to be concatenated).

RAID level	Drive configuration (*1)	Basic size (MB) (Lowest exact MB multiple) (*2)
		(Stripe Depth = 64KB (Default))
Mirroring (RAID1)	1D+1M	16 (MB) x Number of concatenations
High Performance (RAID1+0)	2D+2M	16 (MB) x Number of concatenations
	3D+3M	255 (MB) x Number of concatenations
	4D+4M	16 (MB) x Number of concatenations
	5D+5M	255 (MB) x Number of concatenations
	6D+6M	63 (MB) x Number of concatenations
	7D+7M	63 (MB) x Number of concatenations
	8D+8M	16 (MB) x Number of concatenations
	9D+9M	63 (MB) x Number of concatenations
	10D+10M	125 (MB) x Number of concatenations
	11D+11M	253 (MB) x Number of concatenations
	12D+12M	63 (MB) x Number of concatenations
	13D+13M	247 (MB) x Number of concatenations
	14D+14M	63 (MB) x Number of concatenations
	15D+15M	255 (MB) x Number of concatenations
16D+16M	16 (MB) x Number of concatenations	
High Capacity (RAID5)	2D+1P	16 (MB) x Number of concatenations
	3D+1P	255 (MB) x Number of concatenations
	4D+1P	16 (MB) x Number of concatenations
	5D+1P	255 (MB) x Number of concatenations
	6D+1P	63 (MB) x Number of concatenations
	7D+1P	63 (MB) x Number of concatenations
	8D+1P	16 (MB) x Number of concatenations
	9D+1P	63 (MB) x Number of concatenations
	10D+1P	125 (MB) x Number of concatenations
	11D+1P	253 (MB) x Number of concatenations
	12D+1P	63 (MB) x Number of concatenations
	13D+1P	247 (MB) x Number of concatenations
	14D+1P	63 (MB) x Number of concatenations
	15D+1P	255 (MB) x Number of concatenations

H. Basic Size and MWC Input Condition for RAID Levels

Basic Size for each RAID Level

RAID level	Drive configuration (*1)	Basic size (MB) (Lowest exact MB multiple) (*2)
		(Stripe Depth = 64KB (Default))
Reliability (RAID5+0)	(2D+1P)x2	16 (MB) x Number of concatenations
	(3D+1P)x2	63 (MB) x Number of concatenations
	(4D+1P)x2	16 (MB) x Number of concatenations
	(5D+1P)x2	125 (MB) x Number of concatenations
	(6D+1P)x2	63 (MB) x Number of concatenations
	(7D+1P)x2	63 (MB) x Number of concatenations
	(8D+1P)x2	16 (MB) x Number of concatenations
	(9D+1P)x2	63 (MB) x Number of concatenations
	(10D+1P)x2	15 (MB) x Number of concatenations
	(11D+1P)x2	121 (MB) x Number of concatenations
	(12D+1P)x2	15 (MB) x Number of concatenations
	(13D+1P)x2	117 (MB) x Number of concatenations
	(14D+1P)x2	63 (MB) x Number of concatenations
	(15D+1P)x2	15 (MB) x Number of concatenations
High Reliability (RAID6)	3D+2P	255 (MB) x Number of concatenations
	4D+2P	16 (MB) x Number of concatenations
	5D+2P	255 (MB) x Number of concatenations
	6D+2P	63 (MB) x Number of concatenations
	7D+2P	63 (MB) x Number of concatenations
	8D+2P	16 (MB) x Number of concatenations
	9D+2P	63 (MB) x Number of concatenations
	10D+2P	125 (MB) x Number of concatenations
	11D+2P	253 (MB) x Number of concatenations
	12D+2P	63 (MB) x Number of concatenations
	13D+2P	247 (MB) x Number of concatenations
	14D+2P	63 (MB) x Number of concatenations

*1 : D: Data drives, M: Mirror drives, P: Parity drives

*2 : Basic size when creating volumes. This storage system manages volumes in units of stripe size. If the volume size is not an exact multiple of the basic size (stripe size), then when a RAID group is created the remainder at the end of the last stripe used will be lost. Stripe size is independent of the disk drive capacity. [Figure 1](#) shows what happens when the volume size is an integral multiple of the basic size and what happens when it is not.

When the Wide Stripe Size Is "Small"

For WSVs, the basic size is a multiple of the number of concatenations (the number of RAID groups that are to be concatenated).

RAID level	Drive configuration (*1)	Basic size (MB) (Lowest exact MB multiple) (*2)
		(Stripe Depth = 64KB (Default))
Mirroring (RAID1)	1D+1M	2 (MB) x Number of concatenations

H. Basic Size and MWC Input Condition for RAID Levels
 Basic Size for each RAID Level

RAID level	Drive configuration (*1)	Basic size (MB) (Lowest exact MB multiple) (*2)
		(Stripe Depth = 64KB (Default))
High Performance (RAID1+0)	2D+2M	2 (MB) x Number of concatenations
	3D+3M	15 (MB) x Number of concatenations
	4D+4M	2 (MB) x Number of concatenations
	5D+5M	15 (MB) x Number of concatenations
	6D+6M	15 (MB) x Number of concatenations
	7D+7M	7 (MB) x Number of concatenations
	8D+8M	2 (MB) x Number of concatenations
	9D+9M	27 (MB) x Number of concatenations
	10D+10M	15 (MB) x Number of concatenations
	11D+11M	11 (MB) x Number of concatenations
	12D+12M	3 (MB) x Number of concatenations
	13D+13M	13 (MB) x Number of concatenations
	14D+14M	7 (MB) x Number of concatenations
	15D+15M	15 (MB) x Number of concatenations
	16D+16M	2 (MB) x Number of concatenations
High Capacity (RAID5)	2D+1P	2 (MB) x Number of concatenations
	3D+1P	15 (MB) x Number of concatenations
	4D+1P	2 (MB) x Number of concatenations
	5D+1P	15 (MB) x Number of concatenations
	6D+1P	15 (MB) x Number of concatenations
	7D+1P	7 (MB) x Number of concatenations
	8D+1P	2 (MB) x Number of concatenations
	9D+1P	27 (MB) x Number of concatenations
	10D+1P	15 (MB) x Number of concatenations
	11D+1P	11 (MB) x Number of concatenations
	12D+1P	3 (MB) x Number of concatenations
	13D+1P	13 (MB) x Number of concatenations
	14D+1P	7 (MB) x Number of concatenations
	15D+1P	15 (MB) x Number of concatenations

H. Basic Size and MWC Input Condition for RAID Levels
 Basic Size for each RAID Level

RAID level	Drive configuration (*1)	Basic size (MB) (Lowest exact MB multiple) (*2)
		(Stripe Depth = 64KB (Default))
Reliability (RAID5+0)	(2D+1P)x2	2 (MB) x Number of concatenations
	(3D+1P)x2	15 (MB) x Number of concatenations
	(4D+1P)x2	2 (MB) x Number of concatenations
	(5D+1P)x2	15 (MB) x Number of concatenations
	(6D+1P)x2	3 (MB) x Number of concatenations
	(7D+1P)x2	7 (MB) x Number of concatenations
	(8D+1P)x2	2 (MB) x Number of concatenations
	(9D+1P)x2	9 (MB) x Number of concatenations
	(10D+1P)x2	5 (MB) x Number of concatenations
	(11D+1P)x2	11 (MB) x Number of concatenations
	(12D+1P)x2	3 (MB) x Number of concatenations
	(13D+1P)x2	13 (MB) x Number of concatenations
	(14D+1P)x2	7 (MB) x Number of concatenations
	(15D+1P)x2	15 (MB) x Number of concatenations
High Reliability (RAID6)	3D+2P	15 (MB) x Number of concatenations
	4D+2P	2 (MB) x Number of concatenations
	5D+2P	15 (MB) x Number of concatenations
	6D+2P	15 (MB) x Number of concatenations
	7D+2P	7 (MB) x Number of concatenations
	8D+2P	2 (MB) x Number of concatenations
	9D+2P	27 (MB) x Number of concatenations
	10D+2P	15 (MB) x Number of concatenations
	11D+2P	11 (MB) x Number of concatenations
	12D+2P	3 (MB) x Number of concatenations
	13D+2P	13 (MB) x Number of concatenations
	14D+2P	7 (MB) x Number of concatenations

*1 : D: Data drives, M: Mirror drives, P: Parity drives

*2 : Basic size when creating volumes. This storage system manages volumes in units of stripe size. If the volume size is not an exact multiple of the basic size (stripe size), then when a RAID group is created the remainder at the end of the last stripe used will be lost. Stripe size is independent of the disk drive capacity. [Figure 1](#) shows what happens when the volume size is an integral multiple of the basic size and what happens when it is not.

Basic Size When Stripe Depth Is Tuned (For Standard Type Volumes, TPVs, or SDPVs)

Refer to the following table for the basic size of RAID groups when the Stripe Depth value is changed:

■ Basic Size of Each RAID Group When the Stripe Depth Value Is Tuned

RAID level	Drive configuration (*1)	Basic size (MB) (Lowest exact MB multiple) (*2)			
		When the Stripe Depth is ...			
		128 KB	256 KB	512 KB	1024 KB
High Performance (RAID1+0)	2D+2M	1 (MB)	1 (MB)	1 (MB)	2 (MB)
	3D+3M	3 (MB)	3 (MB)	3 (MB)	3 (MB)
	4D+4M	1 (MB)	1 (MB)	2 (MB)	4 (MB)
	5D+5M	5 (MB)	5 (MB)	5 (MB)	5 (MB)
	6D+6M	3 (MB)	3 (MB)	3 (MB)	6 (MB)
	7D+7M	7 (MB)	7 (MB)	7 (MB)	7 (MB)
	8D+8M	1 (MB)	2 (MB)	4 (MB)	8 (MB)
	9D+9M	9 (MB)	9 (MB)	9 (MB)	9 (MB)
	10D+10M	5 (MB)	5 (MB)	5 (MB)	10 (MB)
	11D+11M	11 (MB)	11 (MB)	11 (MB)	11 (MB)
	12D+12M	3 (MB)	3 (MB)	6 (MB)	12 (MB)
	13D+13M	13 (MB)	13 (MB)	13 (MB)	13 (MB)
	14D+14M	7 (MB)	7 (MB)	7 (MB)	14 (MB)
	15D+15M	15 (MB)	15 (MB)	15 (MB)	15 (MB)
	16D+16M	2 (MB)	4 (MB)	8 (MB)	16 (MB)
High Capacity (RAID5)	2D+1P	1 (MB)	1 (MB)	1 (MB)	-
	3D+1P	3 (MB)	3 (MB)	3 (MB)	-
	4D+1P	1 (MB)	1 (MB)	2 (MB)	-
	5D+1P	5 (MB)	5 (MB)	-	-
	6D+1P	3 (MB)	3 (MB)	-	-
	7D+1P	7 (MB)	7 (MB)	-	-
	8D+1P	1 (MB)	2 (MB)	-	-
	9D+1P	9 (MB)	-	-	-
	10D+1P	5 (MB)	-	-	-
	11D+1P	11 (MB)	-	-	-
	12D+1P	3 (MB)	-	-	-
	13D+1P	13 (MB)	-	-	-
	14D+1P	7 (MB)	-	-	-
	15D+1P	15 (MB)	-	-	-

*1 : D: Data drives, M: Mirror drives, P: Parity drives

*2 : Basic size when creating volumes. This storage system manages volumes in units of stripe size. If the volume size is not an exact multiple of the basic size (stripe size), then when a RAID group is created the remainder at the end of the last stripe used will be lost. Stripe size is independent of the disk drive capacity. [Figure 1](#) shows what happens when the volume size is an integral multiple of the basic size and what happens when it is not.

Basic Size When Stripe Depth Is Tuned (For WSVs)

Refer to the following table for the basic size of RAID groups when the Stripe Depth value is changed:

■ Basic Size of Each RAID Group When the Stripe Depth Value Is Tuned

When the Wide Stripe Size is "Normal"

For WSVs, the basic size is a multiple of the number of concatenations (the number of RAID groups that are to be concatenated).

RAID level	Drive configuration (*1)	Basic size (MB) (Lowest exact MB multiple) (*2)			
		When the Stripe Depth is ...			
		128 KB	256 KB	512 KB	1024 KB
High Performance (RAID1+0)	2D+2M	16 (MB) x Number of concatenations	16 (MB) x Number of concatenations	16 (MB) x Number of concatenations	16 (MB) x Number of concatenations
	3D+3M	63 (MB) x Number of concatenations	63 (MB) x Number of concatenations	15 (MB) x Number of concatenations	15 (MB) x Number of concatenations
	4D+4M	16 (MB) x Number of concatenations	16 (MB) x Number of concatenations	16 (MB) x Number of concatenations	16 (MB) x Number of concatenations
	5D+5M	125 (MB) x Number of concatenations	15 (MB) x Number of concatenations	15 (MB) x Number of concatenations	15 (MB) x Number of concatenations
	6D+6M	63 (MB) x Number of concatenations	15 (MB) x Number of concatenations	15 (MB) x Number of concatenations	12 (MB) x Number of concatenations
	7D+7M	63 (MB) x Number of concatenations	63 (MB) x Number of concatenations	14 (MB) x Number of concatenations	14 (MB) x Number of concatenations
	8D+8M	16 (MB) x Number of concatenations	16 (MB) x Number of concatenations	16 (MB) x Number of concatenations	16 (MB) x Number of concatenations
	9D+9M	63 (MB) x Number of concatenations	63 (MB) x Number of concatenations	27 (MB) x Number of concatenations	9 (MB) x Number of concatenations
	10D+10M	15 (MB) x Number of concatenations	15 (MB) x Number of concatenations	15 (MB) x Number of concatenations	10 (MB) x Number of concatenations
	11D+11M	121 (MB) x Number of concatenations	55 (MB) x Number of concatenations	11 (MB) x Number of concatenations	11 (MB) x Number of concatenations
	12D+12M	15 (MB) x Number of concatenations	15 (MB) x Number of concatenations	12 (MB) x Number of concatenations	12 (MB) x Number of concatenations
	13D+13M	117 (MB) x Number of concatenations	13 (MB) x Number of concatenations	13 (MB) x Number of concatenations	13 (MB) x Number of concatenations
	14D+14M	63 (MB) x Number of concatenations	14 (MB) x Number of concatenations	14 (MB) x Number of concatenations	14 (MB) x Number of concatenations
	15D+15M	15 (MB) x Number of concatenations	15 (MB) x Number of concatenations	15 (MB) x Number of concatenations	15 (MB) x Number of concatenations
16D+16M	16 (MB) x Number of concatenations	16 (MB) x Number of concatenations	16 (MB) x Number of concatenations	16 (MB) x Number of concatenations	

H. Basic Size and MWC Input Condition for RAID Levels
Basic Size for each RAID Level

RAID level	Drive configuration (*1)	Basic size (MB) (Lowest exact MB multiple) (*2)			
		When the Stripe Depth is ...			
		128 KB	256 KB	512 KB	1024 KB
High Capacity (RAID5)	2D+1P	16 (MB) x Number of concatenations	16 (MB) x Number of concatenations	16 (MB) x Number of concatenations	-
	3D+1P	63 (MB) x Number of concatenations	63 (MB) x Number of concatenations	15 (MB) x Number of concatenations	-
	4D+1P	16 (MB) x Number of concatenations	16 (MB) x Number of concatenations	16 (MB) x Number of concatenations	-
	5D+1P	125 (MB) x Number of concatenations	15 (MB) x Number of concatenations	-	-
	6D+1P	63 (MB) x Number of concatenations	15 (MB) x Number of concatenations	-	-
	7D+1P	63 (MB) x Number of concatenations	63 (MB) x Number of concatenations	-	-
	8D+1P	16 (MB) x Number of concatenations	16 (MB) x Number of concatenations	-	-
	9D+1P	63 (MB) x Number of concatenations	-	-	-
	10D+1P	15 (MB) x Number of concatenations	-	-	-
	11D+1P	121 (MB) x Number of concatenations	-	-	-
	12D+1P	15 (MB) x Number of concatenations	-	-	-
	13D+1P	117 (MB) x Number of concatenations	-	-	-
	14D+1P	63 (MB) x Number of concatenations	-	-	-
	15D+1P	15 (MB) x Number of concatenations	-	-	-

*1 : D: Data drives, M: Mirror drives, P: Parity drives

*2 : Basic size when creating volumes. This storage system manages volumes in units of stripe size. If the volume size is not an exact multiple of the basic size (stripe size), then when a RAID group is created the remainder at the end of the last stripe used will be lost. Stripe size is independent of the disk drive capacity. [Figure 1](#) shows what happens when the volume size is an integral multiple of the basic size and what happens when it is not.

When the Wide Stripe Size Is "Small"

For WSVs, the basic size is a multiple of the number of concatenations (the number of RAID groups that are to be concatenated).

H. Basic Size and MWC Input Condition for RAID Levels
Basic Size for each RAID Level

RAID level	Drive configuration (*1)	Basic size (MB) (Lowest exact MB multiple) (*2)			
		When the Stripe Depth is ...			
		128 KB	256 KB	512 KB	1024 KB
High Performance (RAID1+0)	2D+2M	2 (MB) x Number of concatenations	2 (MB) x Number of concatenations	2 (MB) x Number of concatenations	2 (MB) x Number of concatenations
	3D+3M	15 (MB) x Number of concatenations	3 (MB) x Number of concatenations	3 (MB) x Number of concatenations	3 (MB) x Number of concatenations
	4D+4M	2 (MB) x Number of concatenations	2 (MB) x Number of concatenations	2 (MB) x Number of concatenations	4 (MB) x Number of concatenations
	5D+5M	15 (MB) x Number of concatenations	5 (MB) x Number of concatenations	5 (MB) x Number of concatenations	5 (MB) x Number of concatenations
	6D+6M	3 (MB) x Number of concatenations	3 (MB) x Number of concatenations	3 (MB) x Number of concatenations	6 (MB) x Number of concatenations
	7D+7M	7 (MB) x Number of concatenations	7 (MB) x Number of concatenations	7 (MB) x Number of concatenations	7 (MB) x Number of concatenations
	8D+8M	2 (MB) x Number of concatenations	2 (MB) x Number of concatenations	4 (MB) x Number of concatenations	8 (MB) x Number of concatenations
	9D+9M	9 (MB) x Number of concatenations	9 (MB) x Number of concatenations	9 (MB) x Number of concatenations	9 (MB) x Number of concatenations
	10D+10M	5 (MB) x Number of concatenations	5 (MB) x Number of concatenations	5 (MB) x Number of concatenations	10 (MB) x Number of concatenations
	11D+11M	11 (MB) x Number of concatenations	11 (MB) x Number of concatenations	11 (MB) x Number of concatenations	11 (MB) x Number of concatenations
	12D+12M	3 (MB) x Number of concatenations	3 (MB) x Number of concatenations	6 (MB) x Number of concatenations	12 (MB) x Number of concatenations
	13D+13M	13 (MB) x Number of concatenations	13 (MB) x Number of concatenations	13 (MB) x Number of concatenations	13 (MB) x Number of concatenations
	14D+14M	7 (MB) x Number of concatenations	7 (MB) x Number of concatenations	7 (MB) x Number of concatenations	14 (MB) x Number of concatenations
	15D+15M	15 (MB) x Number of concatenations	15 (MB) x Number of concatenations	15 (MB) x Number of concatenations	15 (MB) x Number of concatenations
16D+16M	2 (MB) x Number of concatenations	4 (MB) x Number of concatenations	8 (MB) x Number of concatenations	16 (MB) x Number of concatenations	

H. Basic Size and MWC Input Condition for RAID Levels
Basic Size for each RAID Level

RAID level	Drive configuration (*1)	Basic size (MB) (Lowest exact MB multiple) (*2)			
		When the Stripe Depth is ...			
		128 KB	256 KB	512 KB	1024 KB
High Capacity (RAID5)	2D+1P	2 (MB) x Number of concatenations	2 (MB) x Number of concatenations	2 (MB) x Number of concatenations	-
	3D+1P	15 (MB) x Number of concatenations	3 (MB) x Number of concatenations	3 (MB) x Number of concatenations	-
	4D+1P	2 (MB) x Number of concatenations	2 (MB) x Number of concatenations	2 (MB) x Number of concatenations	-
	5D+1P	15 (MB) x Number of concatenations	5 (MB) x Number of concatenations	-	-
	6D+1P	3 (MB) x Number of concatenations	3 (MB) x Number of concatenations	-	-
	7D+1P	7 (MB) x Number of concatenations	7 (MB) x Number of concatenations	-	-
	8D+1P	2 (MB) x Number of concatenations	2 (MB) x Number of concatenations	-	-
	9D+1P	9 (MB) x Number of concatenations	-	-	-
	10D+1P	5 (MB) x Number of concatenations	-	-	-
	11D+1P	11 (MB) x Number of concatenations	-	-	-
	12D+1P	3 (MB) x Number of concatenations	-	-	-
	13D+1P	13 (MB) x Number of concatenations	-	-	-
	14D+1P	7 (MB) x Number of concatenations	-	-	-
	15D+1P	15 (MB) x Number of concatenations	-	-	-

*1 : D: Data drives, M: Mirror drives, P: Parity drives

*2 : Basic size when creating volumes. This storage system manages volumes in units of stripe size. If the volume size is not an exact multiple of the basic size (stripe size), then when a RAID group is created the remainder at the end of the last stripe used will be lost. Stripe size is independent of the disk drive capacity. [Figure 1](#) shows what happens when the volume size is an integral multiple of the basic size and what happens when it is not.

Basic Size When Stripe Depth Is Tuned (For TPP Capacity)

When Stripe Depth is tuned for RAID groups that are used as TPPs, the basic size that can be used for the TPPs may increase. Refer to the following for the basic size of RAID groups when the Stripe Depth value is changed:

Basic size	StripeDepth	RAID group configuration
42 MB	256 KB	RAID1+0 (8+8)
	512 KB	RAID0 (4D), RAID1+0 (4+4), RAID1+0 (12+12)
84 MB	512 KB	RAID1+0 (8+8), RAID1+0 (12+12)
	1024 KB	RAID0 (4D), RAID1+0 (4+4), RAID1+0 (12+12)
168 MB	1024 KB	RAID1+0 (8+8)

Note

- If the TPP capacity is not an exact multiple of the basic size, areas that cannot be used as TPPs are created in the RAID group.

Allowed Input for MWC

This section describes the allowed input for MWC.

The allowed input for MWC varies depending on the RAID level, the drive configuration, and the Stripe Depth value.

Allowed Input for MWC When Using the Default Stripe Depth Value

When using the default Stripe Depth value, refer to the following table for the allowed MWC value:

■ Allowed Input for MWC When Using the Default Stripe Depth Value (Volume)

RAID level	Drive configuration (*1)	Allowed input for MWC (Default)
		Stripe Depth = 64KB (Default)
Striping (RAID0)	2D	1 - 16 (4)
	3D	1 - 10 (3)
	4D	1 - 8 (2)
	5D	1 - 6 (2)
	6D	1 - 5 (2)
	7D	1 - 4 (2)
	8D	1 - 4 (1)
	9D	1 - 3 (1)
	10D	1 - 3 (1)
	11D - 16D	1 - 2 (1)
Mirroring (RAID1)	1D+1M	1 - 16 (8)

H. Basic Size and MWC Input Condition for RAID Levels
 Allowed Input for MWC

RAID level	Drive configuration (*1)	Allowed input for MWC (Default)
		Stripe Depth = 64KB (Default)
High Performance (RAID1+0)	2D+2M	1 - 16 (4)
	3D+3M	1 - 10 (3)
	4D+4M	1 - 8 (2)
	5D+5M	1 - 6 (2)
	6D+6M	1 - 5 (2)
	7D+7M	1 - 4 (2)
	8D+8M	1 - 4 (1)
	9D+9M	1 - 3 (1)
	10D+10M	1 - 3 (1)
	11D+11M - 16D+16M	1 - 2 (1)
High Capacity (RAID5)	2D+1P	1 - 8 (4)
	3D+1P	1 - 8 (3)
	4D+1P	1 - 8 (2)
	5D+1P	1 - 6 (2)
	6D+1P	1 - 5 (2)
	7D+1P	1 - 4 (2)
	8D+1P	1 - 4 (1)
	9D+1P	1 - 3 (1)
	10D+1P	1 - 3 (1)
	11D+1P - 15D+1P	1 - 2 (1)
	Reliability (RAID5+0)	(2D+1P) x 2
(3D+1P) x 2		2 (fixed)
(4D+1P) x 2		2 (fixed)
(5D+1P) x 2 - (15D+1P) x 2		1 (fixed)
High Reliability (RAID6)	3D+2P	1 - 8 (3)
	4D+2P	1 - 8 (2)
	5D+2P	1 - 6 (2)
	6D+2P	1 - 5 (2)
	7D+2P	1 - 4 (2)
	8D+2P	1 - 4 (1)
	9D+2P	1 - 3 (1)
	10D+2P	1 - 3 (1)
	11D+2P - 14D+2P	1 - 2 (1)

H. Basic Size and MWC Input Condition for RAID Levels
Allowed Input for MWC

RAID level	Drive configuration (*1)	Allowed input for MWC (Default)
		Stripe Depth = 64KB (Default)
High Reliability (RAID6-FR)	(3D+2P)x2+1HS (3D+2P)x6+1HS	1 - 8 (3)
	(4D+2P)x2+1HS (4D+2P)x5+1HS	1 - 8 (2)
	(5D+2P)x4+1HS	1 - 6 (2)
	(6D+2P)x2+1HS	1 - 5 (2)
	(8D+2P)x3+1HS	1 - 4 (1)
	(9D+2P)x2+1HS	1 - 3 (1)
	(12D+2P)x2+1HS (13D+2P)x2+1HS	1 - 2 (1)

*1 : D: Data drives, M: Mirror drives, P: Parity drives, HS: Hot Spares

■ Allowed Input for MWC When Using the Default Stripe Depth Value (TPP)

RAID level	Drive configuration (*1)	Allowed input for MWC (Default)
		Stripe Depth = 64KB (Default)
Striping (RAID0)	4D	1 - 8 (2)
Mirroring (RAID1)	1D+1M	1 - 16 (8)
High Performance (RAID1+0)	2D+2M	1 - 16 (4)
	4D+4M	1 - 8 (2)
	8D+8M	1 - 4 (1)
	12D+12M	1 - 2 (1)
High Capacity (RAID5)	3D+1P	1 - 8 (3)
	4D+1P	1 - 8 (2)
	6D+1P	1 - 5 (2)
	7D+1P	1 - 4 (2)
	8D+1P	1 - 4 (1)
	12D+1P	1 - 2 (1)
High Reliability (RAID6)	4D+2P	1 - 8 (2)
	6D+2P	1 - 5 (2)
	7D+2P	1 - 4 (2)
	8D+2P	1 - 4 (1)
High Reliability (RAID6-FR)	(4D+2P)x2+1HS (4D+2P)x5+1HS	1 - 8 (2)
	(6D+2P)x2+1HS	1 - 5 (2)
	(8D+2P)x3+1HS	1 - 4 (1)

*1 : D: Data drives, M: Mirror drives, P: Parity drives

Allowed Input for MWC When the Stripe Depth Value Is Tuned

Refer to the following for the allowed MWC value when the Stripe Depth value is changed:

■ Allowed Input for MWC When the Stripe Depth Value Is Tuned (Volume)

RAID level	Drive configuration (*1)	Allowed input for MWC (Default)			
		When the Stripe Depth is ...			
		128 KB	256 KB	512 KB	1024 KB
Striping (RAID0)	2D	1 - 8 (4)	1 - 4 (4)	1 - 2 (2)	1 (fixed)
	3D	1 - 5 (3)	1 - 2 (2)	1 (fixed)	1 (fixed)
	4D	1 - 4 (2)	1 - 2 (2)	1 (fixed)	1 (fixed)
	5D	1 - 3 (2)	1 (fixed)	1 (fixed)	1 (fixed)
	6D	1 - 2 (2)	1 (fixed)	1 (fixed)	1 (fixed)
	7D	1 - 2 (2)	1 (fixed)	1 (fixed)	1 (fixed)
	8D	1 - 2 (1)	1 (fixed)	1 (fixed)	1 (fixed)
	9D - 16D	1 (fixed)	1 (fixed)	1 (fixed)	1 (fixed)
High Performance (RAID1+0)	2D+2M	1 - 8 (4)	1 - 4 (4)	1 - 2 (2)	1 (fixed)
	3D+3M	1 - 5 (3)	1 - 2 (2)	1 (fixed)	1 (fixed)
	4D+4M	1 - 4 (2)	1 - 2 (2)	1 (fixed)	1 (fixed)
	5D+5M	1 - 3 (2)	1 (fixed)	1 (fixed)	1 (fixed)
	6D+6M	1 - 2 (2)	1 (fixed)	1 (fixed)	1 (fixed)
	7D+7M	1 - 2 (2)	1 (fixed)	1 (fixed)	1 (fixed)
	8D+8M	1 - 2 (1)	1 (fixed)	1 (fixed)	1 (fixed)
	9D+9M - 16D+16M	1 (fixed)	1 (fixed)	1 (fixed)	1 (fixed)
High Capacity (RAID5)	2D+1P	1 - 4 (4)	1 - 2 (2)	1 (fixed)	-
	3D+1P	1 - 4 (3)	1 - 2 (2)	1 (fixed)	-
	4D+1P	1 - 4 (2)	1 - 2 (2)	1 (fixed)	-
	5D+1P	1 - 3 (2)	1 (fixed)	-	-
	6D+1P	1 - 2 (2)	1 (fixed)	-	-
	7D+1P	1 - 2 (2)	1 (fixed)	-	-
	8D+1P	1 - 2 (1)	1 (fixed)	-	-
	9D+1P - 15D+1P	1 (fixed)	-	-	-

*1: D: Data drives, M: Mirror drives, P: Parity drives, "-": Stripe Depth expansion is not available

■ Allowed Input for MWC When the Stripe Depth Value Is Tuned (TPP)

RAID level	Drive configuration (*1)	Allowed input for MWC (Default)			
		When the Stripe Depth is ...			
		128 KB	256 KB	512 KB	1024 KB
Striping (RAID0)	4D	1 - 4 (2)	1 - 2 (2)	1 (fixed)	1 (fixed)
High Performance (RAID1+0)	2D+2M	1 - 8 (4)	1 - 4 (4)	1 - 2 (2)	1 (fixed)
	4D+4M	1 - 4 (2)	1 - 2 (2)	1 (fixed)	1 (fixed)
	8D+8M	1 - 2 (1)	1 (fixed)	1 (fixed)	1 (fixed)
	12D+12M	1 (fixed)	1 (fixed)	1 (fixed)	1 (fixed)

H. Basic Size and MWC Input Condition for RAID Levels
Allowed Input for MWC

RAID level	Drive configuration (*1)	Allowed input for MWC (Default)			
		When the Stripe Depth is ...			
		128 KB	256 KB	512 KB	1024 KB
High Capacity (RAID5)	3D+1P	1 - 4 (3)	1 - 2 (2)	1 (fixed)	-
	4D+1P	1 - 4 (2)	1 - 2 (2)	1 (fixed)	-
	6D+1P	1 - 2 (2)	1 (fixed)	-	-
	7D+1P	1 - 2 (2)	1 (fixed)	-	-
	8D+1P	1 - 2 (1)	1 (fixed)	-	-
	12D+1P	1 (fixed)	-	-	-

*1 : D: Data drives, M: Mirror drives, P: Parity drives, "-": Stripe Depth expansion is not available

I. Using RADIUS Authentication

This appendix describes supplementary notes when using RADIUS Authentication. Refer to the following.

- ["Using RADIUS Authentication to Access the ETERNUS AF/DX" \(page 1707\)](#)
- ["Notes When Using RADIUS Authentication for ETERNUS Web GUI" \(page 1707\)](#)
- ["Setting Up the RADIUS Server" \(page 1708\)](#)

Using RADIUS Authentication to Access the ETERNUS AF/DX

- RADIUS Authentication is used to authenticate logging in to the ETERNUS AF/DX with ETERNUS Web GUI or ETERNUS CLI.
- Up to two RADIUS servers can be connected to an ETERNUS AF/DX.
- To use RADIUS Authentication, the user account information (user ID, password, and role) that is allowed to access ETERNUS AF/DX in the RADIUS server must be pre-registered.
- There are two types of authentication methods: CHAP and PAP.
- User roles are specified in the Vendor Specific Attribute (VSA) of the Access-Accept response from the server. The following table shows the syntax of the VSA based account role on the RADIUS server.

Syntax of the Vendor Specific Attribute (VSA) Based Account Role

Item	Size (octets)	Value	Description
Type	1	26	Attribute number for the Vendor Specific Attribute
Length	1	7 or more	Attribute size (calculated by server)
Vendor-Id	4	211	Fujitsu Limited (SMI Private Enterprise Code)
Vendor type	1	1	Eternus-Auth-Role
Vendor length	1	2 or more	Attribute size described after the Vendor type (calculated by server)
Attribute-Specific	1 or more	ASCII characters	List of one or more role names assignable to successfully authenticated users (*1)

*1: The server-side role names are case sensitive and must be set correctly.

[Example] RoleName0

Notes When Using RADIUS Authentication for ETERNUS Web GUI

- A primary server and secondary server can be set as RADIUS servers. If the primary RADIUS server times out, the secondary server is tried.
- If RADIUS Authentication fails and "No" (the internal authentication is not performed) has been selected for "Recovery Mode", it will not be possible to log in to ETERNUS Web GUI or ETERNUS CLI.
- When "Yes (Communication error / Authentication error)" or "Yes (Communication error)" has been selected for "Recovery Mode", Internal Authentication is only performed if RADIUS Authentication fails on both primary and secondary RADIUS servers, and at least one of these failures is due to network error.
- So long as there is no RADIUS Authentication response the storage system will keep retrying to authenticate the user for the entire "Retry Out Time" (sec.) period set on the [Set RADIUS Authentication] function. Authentication not succeeding before the timeout occurs is considered a RADIUS Authentication failure.
- When using RADIUS Authentication, if the role that is received from the server is unknown (not set) for the storage system, RADIUS Authentication fails.

Setting Up the RADIUS Server

Windows Server 2008 R2 Example

Although the procedure to configure RADIUS on Windows Server 2008 R2 is described in this manual, note that this configuration is not guaranteed to work with all network environments. Make sure to obtain your system administrator's help in setting up the system.

The procedure for setting up the RADIUS service on Windows Server 2008 R2 is as follows.

1 Install the Network Policy and Access Services

For details on installing "Network Policy and Access Services", refer to the Microsoft web-site.

2 Enable CHAP

If CHAP Authentication is required, set Windows to store passwords using reversible encryption, rather than relying on the default setting.

Caution

- If the current password is already stored by using irreversible encryption, the current password setting is not changed even when enabling the password to be stored by using reversible encryption. To use reversible encryption to store the current password, set the user password again or specify that the password for each user is changed for the next login.

3 Configure the users

Network Policy Server (NPS) is the Microsoft implementation of a RADIUS server and proxy. When using NPS to check the User login certificate, a list of user groups is displayed instead of a list of specific users. Each user group must be associated with a role that logs into a specific storage system. For example, after setting the "root", "Admin", and "user" user groups, those users that are to be allowed to login must be added to the proper group.

- Create users and user groups

(1) Select [Start] - [Administrative Tools] - [Computer Management].

(2) Select [System Tools] - [Local Users and Groups] - [Users].

Right-click [Users] and select [New User]. Create a storage system login user as the [New User].

(3) Select [System Tools] - [Local Users and Groups] - [Groups]. Right-click [Groups] and select [New Group]. Create a group for the ETERNUS AF/DX as the [New Group] and add the user created in [Step \(2\)](#).

(4) Set the Network Policy and Access Services

The following three steps must be performed:

- Register the ETERNUS AF/DX as a RADIUS client

(i) Select [Start] - [Administrative Tools] - [Server Manager].

(ii) Select [Roles] - [Network Policy and Access Services] - [NPS] - [RADIUS Clients and Servers] - [RADIUS Clients]. Right-click [RADIUS Clients] and select [New RADIUS Client], and set the various items.

- For the "Address (IP or DNS)", set the IP address of the client ETERNUS AF/DX.
- For the "Vendor name", set "RADIUS Standard".
- For the "Shared secret", set the shared key that is registered on the client ETERNUS AF/DX.

- Set the accessible user group and the authentication method
 - (i) Select [Start] - [Administrative Tools] - [Server Manager].
 - (ii) Select [Roles] - [Network Policy and Access Services] - [NPS] - [Policies] - [Network Policies]. Right-click [Network Policies], select [New], and set the various items.
 - Click "Add" in the "Conditions" tab and add "Windows Groups". For "Windows Groups", add the group that was created for the ETERNUS AF/DX.
 - For the "secure authentication methods", check "Encryption authentication (CHAP(C))" or "Unencrypted authentication (PAP,SPAP)(S)". Select the same setting as is set on the ETERNUS AF/DX.
- Set the role with Vendor Specific Attribute (VSA)
 - (i) Select [Start] - [Administrative Tools] - [Server Manager].
 - (ii) Select [Roles] - [Network Policy and Access Services] - [NPS] - [Policies] - [Network Policies]. Select and double-click the newly added policy.
 - (iii) Set the following items using the [Add] button under [Vendor Specific] on the [Settings] tab.
 - For the "Attributes", add "Vendor-Specific/RADIUS Standard".
 - For the "Enter Vendor Code", enter "211".
 - For the "RADIUS RFC", click "Yes, it conforms".
 - For the "Vendor-assigned attribute number", enter "1".
 - For the "Attribute format", select "String".
 - For the "Attribute Value", enter the role name for the user who belongs to the added "Groups". The role name must be registered in the ETERNUS AF/DX in advance. The server-side role names are case sensitive and must be input correctly.
[Example] RoleName0

J. Setting Procedures for Replacing HBAs

This section describes how to replace an HBA in the storage system.

When management software such as ETERNUS SF Storage Cruiser is used, use the management software for migrating the current access path settings instead of the procedure that is provided in this manual.

One of the following connection statuses is used between a host and a storage system. Note that the required procedures depend on the connection status.

- When the host affinity settings are used
- When the host affinity settings are not used (conventional LUN mapping is used)

Refer to the following for the system setting procedures on replacing HBAs.

- ["Advance Preparation" \(page 1710\)](#)
- ["Overview of the Procedure" \(page 1710\)](#)
- ["Checking the Connection Status Between the Host and the Storage System" \(page 1711\)](#)
- ["Required Storage System Settings After HBA Replacement \(When Host Affinity Settings are Used\)" \(page 1711\)](#)
- ["Required Storage System Settings After HBA Replacement \(When Host Affinity Settings are not Used\)" \(page 1712\)](#)

Advance Preparation

Before starting the operation, check the following information.

- The WWN of the current HBA
- The host name corresponds to the WWN of the current HBA
- The WWN of the new HBA

Overview of the Procedure

The workflow for replacing an HBA is as follows. Perform the following procedure.

- 1** Check the connection status between the host and the storage system.
Refer to ["Checking the Connection Status Between the Host and the Storage System" \(page 1711\)](#) for details.
- 2** Replace the HBA in the host and connect the host and the storage system.
This operation must be performed by a maintenance engineer.
- 3** Perform the system settings according to the connection status that was checked in [Step 2](#).
 - When the host affinity settings are used
Settings for the storage system are required. Refer to ["Required Storage System Settings After HBA Replacement \(When Host Affinity Settings are Used\)" \(page 1711\)](#) for details.
 - When the host affinity settings are not used (conventional LUN mapping is used)
Settings for the storage system are not required. This ends the replacement procedure for an HBA.

The following procedure is an example when a FC interface is used between the host and the storage system.

The same procedure can basically be used even when the interface type is iSCSI.

Checking the Connection Status Between the Host and the Storage System

Perform the following procedure to check the connection status between the host and the storage system.

Procedure ▶▶▶

- 1 Click [Connectivity] in the navigation.
- 2 Click [FC] in the category.
→ The [FC Host] screen appears in the main screen.
- 3 Check the connection status between the relevant host and the storage system in the "Status" field.
 - When the host affinity settings are used
→ "Active" is displayed as the status. Proceed to ["Required Storage System Settings After HBA Replacement \(When Host Affinity Settings are Used\)"](#) (page 1711).
 - When the host affinity settings are not used (conventional LUN mapping is used)
→ "Inactive" is displayed as the status. In this case, settings after replacing the HBA are not required. The replacement of the HBA is complete.



Required Storage System Settings After HBA Replacement (When Host Affinity Settings are Used)

In this section, the setting procedure for a storage system that uses host affinity settings is provided.

Caution

- When management software such as ETERNUS SF Storage Cruiser is used, use the management software for migrating the current access path settings instead of the procedure that is provided in this chapter (manual setting).
- To set WWN zoning by using the switch, make sure to change the zoning settings in advance.

The procedure for storage system settings when the host affinity is used is as follows.
Change the WWN of the HBA that is to be replaced to the WWN of the new HBA.

Procedure ▶▶▶

- 1 Input "User ID" and "Password" in the browser and log in to ETERNUS Web GUI.
- 2 Change the WWN of the HBA that is to be replaced to the WWN of the new HBA.
 - (1) Click [Connectivity] in the navigation.
→ The [Connectivity] screen appears.
 - (2) Click [FC] in the category.
→ The [FC Host] screen appears in the main screen.
 - (3) Select the checkbox of the WWN for the HBA that is to be replaced (in this example, "1000000B5D6513FC" is selected).
 - (4) Click [Modify FC Host] in [Action].
→ The [Modify FC Host] screen appears.

- (5) Change the WWN of the HBA that is to be replaced to the WWN of the new HBA, and click the [Modify] button.

Caution

- Do not change the "Name".

- (6) A confirmation screen appears. Click the [OK] button.
→ Changing of the FC host information starts.
- (7) Click the [Done] button to return to the [FC Host] screen.
- (8) Confirm that the WWN is successfully changed.



This ends the host affinity setting for replacing an HBA.

Recover the multipath configuration from the host.

After recovering the multipath configuration, confirm that the storage system can be accessed from the host.

Caution

- If the WWN is changed by the [Modify FC Host] function, changing the host affinity setting is not required.

Required Storage System Settings After HBA Replacement (When Host Affinity Settings are not Used)

When the host affinity function is not used (conventional LUN mapping is used), changing the storage system settings after replacing an HBA is not required.

K. Remote Advanced Copy Path Management

■ Overview

This appendix shows workflows for configuring Remote Advanced Copy paths between currently available models (*1).

The following workflows are available for each copy path to be configured.

- ["Workflow for creating new copy paths" \(page 1716\)](#)
- ["Workflow when using a copy path information file" \(page 1717\)](#)
- ["Workflow for deleting the selected copy path information" \(page 1719\)](#)

Refer to ["■ Configuration Example" \(page 1713\)](#) and each workflow to check the required copy paths.

*1: "Currently available models" refers the following models.

- ETERNUS AF S3 series
- ETERNUS DX S5 series
- ETERNUS DX8000 S4 series

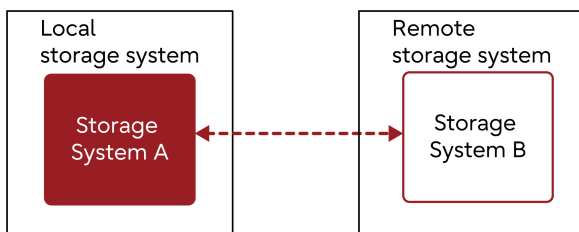
■ Configuration Example

There are multiple configuration patterns: when connecting with currently available models and when connecting with older models.

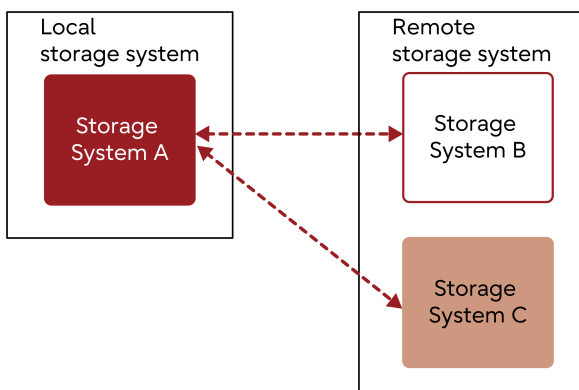
When the configuration includes only currently available models

The following shows examples of configurations that can set copy paths.

- Configuration example for creating new copy paths (["Workflow for creating new copy paths" \(page 1716\)](#))
 - Configuring a copy path between the local storage system and a remote storage system



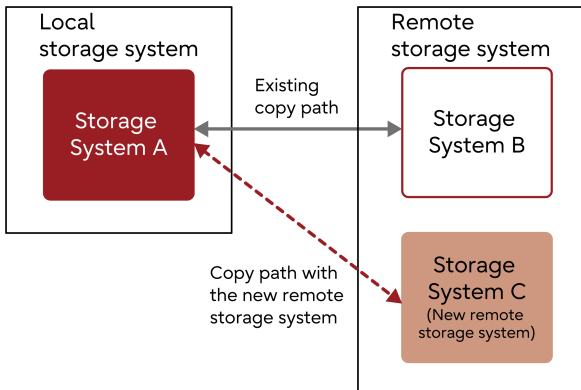
- Configuring copy paths between the local storage system and two remote storage systems



- Configuration example for adding copy paths to the existing configuration ("[Workflow when using a copy path information file](#)" (page 1717))
 - Configuring copy paths to a new remote storage system in addition to the existing storage system

Caution

- In this example, a new copy path is added between the local storage system (Storage System A) and Storage System C in a configuration where a copy path between the local storage system (Storage System A) and Storage System B has already been established. Follow the procedure in "[Workflow when using a copy path information file](#)" (page 1717) to create a copy path information file that includes all the copy path information.
- Note the following points when creating copy paths.
 - In this procedure, the backup path file or the path file is used in the local storage system (Storage System A) to create a path between the new remote storage system (Storage System C) and the local storage system (Storage System A).
 - The created path file is applied to the new remote storage system (Storage system C) and to the existing remote storage system (Storage System B).



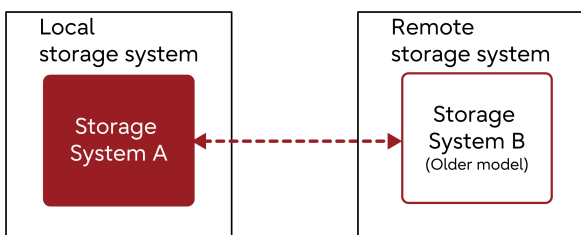
Note

- To configure all the copy paths from the beginning when adding RAs or changing the configuration in the existing storage system, use the procedure in "[Workflow for creating new copy paths](#)" (page 1716).

When adding a new remote storage system to the existing configuration that includes older models

The following shows examples of configurations that can set copy paths.

- Configuration example for creating new copy paths ("[Workflow for creating new copy paths](#)" (page 1716))
 - Configuring a copy path between the local storage system and a remote storage system



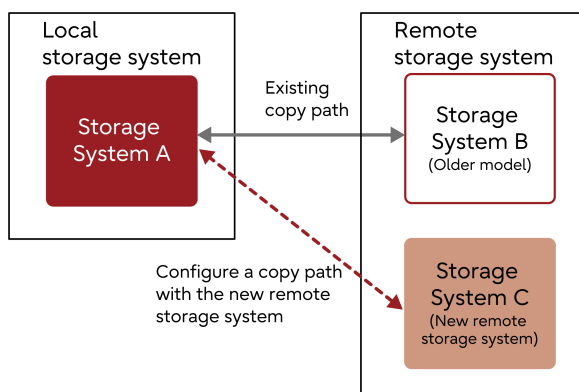
- Configuration example for adding copy paths to the existing configuration ("[Workflow when using a copy path information file](#)" (page 1717))
 - Adding a new remote storage system to the existing copy path that includes older models (when a new remote storage system is connected to the local storage system)

Caution

- In this example, a new copy path is added between the local storage system (Storage System A) and Storage System C in a configuration where a copy path between the local storage system (Storage System A) and the older model (Storage System B) has already been established.

Follow the procedure in "[Workflow when using a copy path information file](#)" (page 1717) to create a copy path information file that includes all the copy path information.

- Note the following points when creating copy paths.
 - In this procedure, the backup path file or the path file is used in the local storage system (Storage System A) to create a path between the new remote storage system (Storage System C) and the local storage system (Storage System A).
 - The created path file is applied to the new remote storage system (Storage System C) and the existing older model (Storage System B).

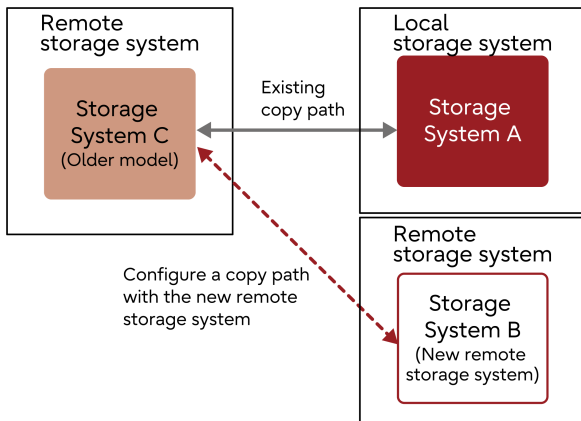


- Adding a new remote storage system to the existing copy path that includes older models (when a new remote storage system is not connected to the local storage system)

Caution

- In this example, a new copy path is added between the older model (Storage System C) and Storage System B in a configuration where a copy path between the local storage system (Storage System A) and the older model (Storage System C) has already been established. Follow the procedure in "[Workflow when using a copy path information file](#)" (page 1717).

- Note the following points when creating copy paths.
 - In this procedure, the backup path file or the path file is used in the local storage system (Storage System A) to create a path between the new remote storage system (Storage System B) and the older model (Storage System C).
 - Apply the created path file to the new remote storage system (Storage system B) and the older model (Storage System C).



■ Creating a New Copy Path

The following shows a procedure for creating all the copy paths. A copy path can be created in the currently available models.

Workflow for creating new copy paths

	Operations	Reference	Storage system to be configured	Details and supplemental information
1	Checking the Advanced Copy setting	"Register Advanced Copy License" (page 466)	Each storage system	For new storage systems, the Advanced Copy license is registered before shipment if it is ordered at the time of purchase.
2	Setting the copy table size	"Modify Copy Table Size" (page 475)	Each storage system	
3	Changing the FC-CA/iSCSI port mode and modifying the parameters	"Modify Port Mode" (page 735) "Modify FC Port Parameters" (page 719) "Modify iSCSI Port Parameters" (page 743)	Each storage system	Confirm that the physical connections such as cables are completed in advance.
4	Obtaining and saving the storage system information file	"Export Storage Information" (page 538)	Each storage system	
5	Setting a copy path in the local storage system	"Set Copy Path" (page 501)	Local storage system	Perform the procedure according to the Set Copy Path wizard. Select the following options for "Operation Mode" and "Base Information". <ul style="list-style-type: none"> • Operation Mode: Create Copy Path • Base Information: Not use
6	Setting a copy path in the remote storage system	"Set Copy Path" (page 501) <ul style="list-style-type: none"> • Apply Copy Path • Set Bandwidth Limit • Measure Round Trip Time 	Remote storage system	Perform the procedure according to the Set Copy Path wizard. Select the following option for "Operation Mode". <ul style="list-style-type: none"> • Operation Mode: Apply Copy Path
7	Confirming the path is in the normal state	"Copy Path" (page 496) <ul style="list-style-type: none"> • Advanced Copy Path Status 	Each storage system	The copy path status, which is used to perform Advanced Copy, is displayed.
8	Modifying multiplicity	"Modify REC Multiplicity" (page 541)	Each storage system	

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	Operations	Reference	Storage system to be configured	Details and supplemental information
9	Modifying REC Buffer	"REC Buffer" (page 549)	Each storage system	The REC Buffer must be configured if REC is to be used with the asynchronous consistency mode.

■ Using the Previously Applied Copy Path Information File

To add a new remote storage system to the existing copy path, configure the copy path using the previously applied copy path information file.

A copy path is created in the currently available models.

Workflow when using a copy path information file

	Operations	Reference	Storage system to be configured	Details and supplemental information
1	Checking the Advanced Copy setting	"Register Advanced Copy License" (page 466)	Remote storage system to be added	For new storage systems, the Advanced Copy license is registered before shipment if it is ordered at the time of purchase.
2	Setting the copy table size	"Modify Copy Table Size" (page 475)	Remote storage system to be added	
3	Changing the FC-CA/iSCSI port mode and modifying the parameters	"Modify Port Mode" (page 735) "Modify FC Port Parameters" (page 719) "Modify iSCSI Port Parameters" (page 743)	Remote storage system to be added	Confirm that the physical connections such as cables are completed in advance. In the existing storage system, confirm that the target port mode is "RA" on the assumption that there have been no modifications to the "RA" port mode settings.
4	Obtaining and saving the storage system information file	"Export Storage Information" (page 538)	Remote storage system to be added	
5	Setting a copy path in the local storage system	"Set Copy Path" (page 501)	Local storage system	Perform the procedure according to the Set Copy Path wizard. Select the following options for "Operation Mode" and "Base Information". <ul style="list-style-type: none"> • Operation Mode: Create Copy Path • Base Information: "Backup Path File" or "Path File"
6	Setting a copy path in the remote storage system	"Set Copy Path" (page 501) <ul style="list-style-type: none"> • Apply Copy Path • Set Bandwidth Limit • Measure Round Trip Time 	Remote storage system to be added	Perform the procedure according to the Set Copy Path wizard. Select the following option for "Operation Mode". <ul style="list-style-type: none"> • Operation Mode: Apply Copy Path
7	Confirming the path is in the normal state	"Copy Path" (page 496)	Each storage system	The copy path status, which is used to perform Advanced Copy, is displayed.
8	Modifying multiplicity	"Modify REC Multiplicity" (page 541)	Each storage system	
9	Modifying REC Buffer	"REC Buffer" (page 549)	Each storage system	The REC Buffer must be configured if REC is to be used with the asynchronous consistency mode.

Note

- Although a new copy path to the new remote storage system can be configured and added, note that the "Backup Path File" that is created after the configuration only includes information for the local storage system and the newly added remote storage system. To configure a path information file that includes all the copy paths (existing copy paths and copy paths to the new remote storage system), perform the following procedure.
 - For Box ID, register the existing storage system.
 - For the storage system configuration settings, select only the RA port to be used with the newly added storage system.
 - For the storage system information file, select and register the file of the storage system to be added.
 - For the copy path information creation, create a combination of the local storage system and the added storage systems.
 - Apply the created/saved copy path information files to each storage system.

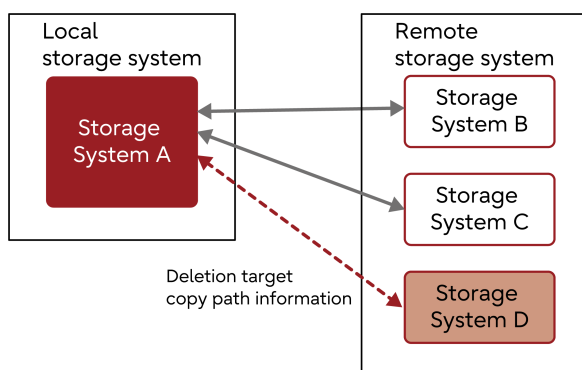
■ Deleting the Selected Copy Paths

The following shows the workflow for deleting the selected copy path information from the existing copy path information.

The operation for deleting the copy path is performed in the local storage system.

Caution

- Make sure to confirm the following in advance.
 - The copy path to be deleted
 - The copy session for the deletion target copy path in the local storage system is stopped
If copy sessions for the copy path are being performed (or when at least one session for the local or remote copy is being performed), contact a maintenance engineer.
 - REC is not being performed
If an REC path that is being used in an REC is deleted, it may affect operations, such as the REC being stopped.
To check if the REC is active, use the [Advanced Copy] screen. Refer to the [Advanced Copy (Basic Information)] function for details.

Example configuration of the existing copy path

Workflow for deleting the selected copy path information

	Operations	Reference	Storage system to be configured	Details and supplemental information
1	Preparing the copy path information	"Export All Copy Path" (page 537)	Local storage system	Download the existing copy path information file in advance.
2	Setting a copy path in the local storage system	"Set Copy Path" (page 501)	Local storage system	<p>Perform the procedure according to the Set Copy Path wizard. Select the following options for "Operation Mode" and "Copy Path Information File Selection".</p> <ul style="list-style-type: none"> • Operation Mode: Apply Copy Path • Copy Path Information File Selection: Specify the copy path information file obtained in "preparing the copy path information". <p>Refer to ""Specification for Applying Result" (page 523) in ""Set Copy Path" (page 501) for the specifications of the application result.</p>
3	Setting the bandwidth limit	"Set REC Bandwidth Limit" (page 544)	Local storage system	
4	Measuring the round trip time	"Measure Round Trip Time" (page 539)	Local storage system	

Note

- The remote storage system information appears after the copy path information file is selected in "Setting the copy path in the local storage system".
Manually select the checkbox for the path information to be deleted, change the parameter from "Do not change" to "Delete", and then apply it.

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