FUJITSU Storage
ETERNUS AF, ETERNUS DX

Configuration Guide -Server Connection-

(iSCSI) for Windows®

FUJITSU

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Preface

This manual briefly explains the operations that need to be performed by the user in order to connect an ETERNUS AF/DX to a server running Windows® via an iSCSI interface.

This manual should be used in conjunction with any other applicable user manuals, such as those for the ETERNUS AF/DX, server, OS, adapters, and drivers.

Use the default values for parameters that are not described in this manual.

Refer to "Configuration Guide -Server Connection- Notations" for the notations used in this manual such as product trademarks and product names. For storage systems that are supported by the OS, refer to the Server Support Matrix of the ETERNUS AF/DX.

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The Contents and Structure of this Manual

This manual is composed of the following six chapters and two appendices.

  This chapter describes how to connect a server to the ETERNUS AF/DX.

  This chapter describes which servers can be connected to ETERNUS AF/DX storage systems.

  This chapter describes issues that should be noted when connecting the ETERNUS AF/DX storage systems and server.

  This chapter describes how to connect a server running Windows® to the ETERNUS AF/DX.

  This chapter describes various settings required for operation.

  This chapter describes how to set the iSCSI QueueDepth value.

"Microsoft® iSCSI Software Initiator iSCSICLI Commands" and "iSCSICLI Setting Examples" are provided as appendices.

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Chapter 1
Workflow

1.1 Connecting the ETERNUS AF/DX

This section describes how to connect the ETERNUS AF/DX storage systems to a server.

IPv4 is used for IP address examples in this manual.

The workflow is shown below.

Required Documents

- "Server Support Matrix"
- "Configuration Guide -Server Connection- Storage System Settings" that corresponds to the ETERNUS AF/DX to be connected

Workflow

1 Checking the Server

Check that the OS, LAN cards, and onboard LANs of the server will allow the ETERNUS AF/DX to be connected to.

Also, check the notes for operation.

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Chapter 2
Checking the Server Environment

Connection to servers is possible in the following environments.
Check the "Server Support Matrix" for server environment conditions.

2.1 Hardware

Refer to the "Server Support Matrix".

2.2 Operating System (OS)

Refer to the "Server Support Matrix".

2.3 Network Interface Card

Refer to the "Server Support Matrix".

2.4 Multipath Configuration

Refer to the "Server Support Matrix".

Chapter 3
Notes

Note the following issues when connecting the ETERNUS AF/DX to a server.

3.1 LAN Card Connection Notes

- The following operation conditions are recommended to maintain storage system reliability:
  - Connection via multiple paths
  - Use of drivers for ETERNUS AF/DX storage systems which support path redundancy control

  Configure a multipath environment and select a driver for ETERNUS AF/DX storage systems that supports path redundancy control to increase redundancy and reliability of the connection between the ETERNUS AF/DX storage systems and the server.
- When the PRIMEQUEST 500/400 series is connected to an ETERNUS AF/DX, LUN recognition by the Windows® Plug and Play function is not guaranteed.
- For a multi-port LAN card, a configuration that connects the two ports on the LAN card to different storage systems is recommended.

3.2 Multiple LAN Cards Installation Notes

When installing multiple LAN cards, record the relation between the PCI slot location and the port name of the LAN card as you install the LAN cards one by one. You can check the port name of the LAN card by clicking [Start] - [Settings] - [Network Connection].

3.3 Driver Notes

Some drivers for ETERNUS AF/DX storage systems support the use of path redundancy (path fail-over). For product information, refer to the following URL:

https://www.fujitsu.com/global/products/computing/storage/software/eternus-mpd/

3.4 LAN Switch Notes

- When multiple ETERNUS AF/DX storage systems are connected to a single server, each iSCSI name of the ETERNUS AF/DX storage systems must be different.

- When installing two LAN cards to one server for path redundancy, connect each LAN card to different LAN switches. If they are connected to the same LAN switch, a single point of failure results in loss of redundancy.

  - Recommended configuration

Server		ETERNUS AF/DX
LAN card	LAN switch 1	
LAN card	LAN switch 2	
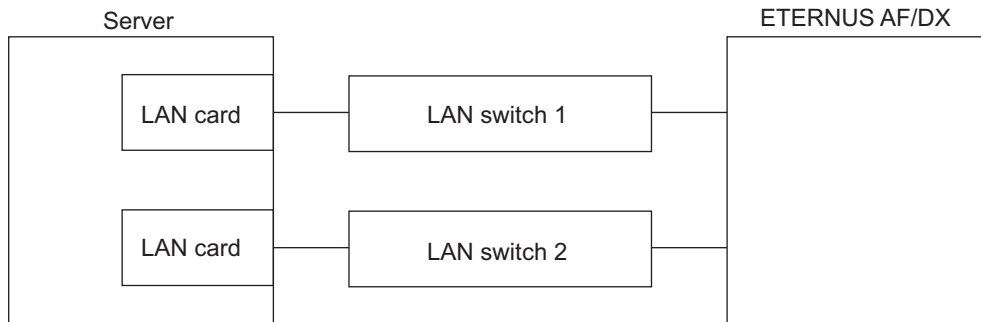
  - Incorrect configuration (loss of redundancy)

Server		ETERNUS AF/DX
LAN card		
	LAN switch	
LAN card		
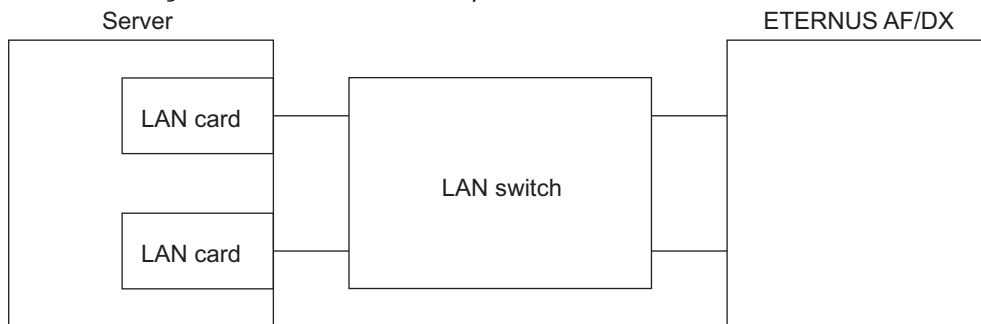
3.5 LAN Environment Notes

- Configure the iSCSI LAN as a dedicated LAN that is separate from the business LAN or the management LAN by segmenting the IP address.

  Example:

  IP address of the LAN for iSCSI: 192.168.10.x/24

  IP address of the business/management LAN: 192.168.70.y/24

  The iSCSI LAN and the business/management LAN must be configured with different network addresses (up to the value "192.168.10.") as shown in the above example.

  If it is not a dedicated LAN, the following may occur.

  - Processes may be delayed in the LANs due to traffic conflicts.

  - In terms of security, SAN data may leak or the iSCSI port may hang due to DoS attacks.

- iSCSI LAN redundancy is achieved by the use of multipaths. The LAN must be configured as a dedicated LAN for each path from a server to the ETERNUS AF/DX.

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Example of a LAN switch connection configuration
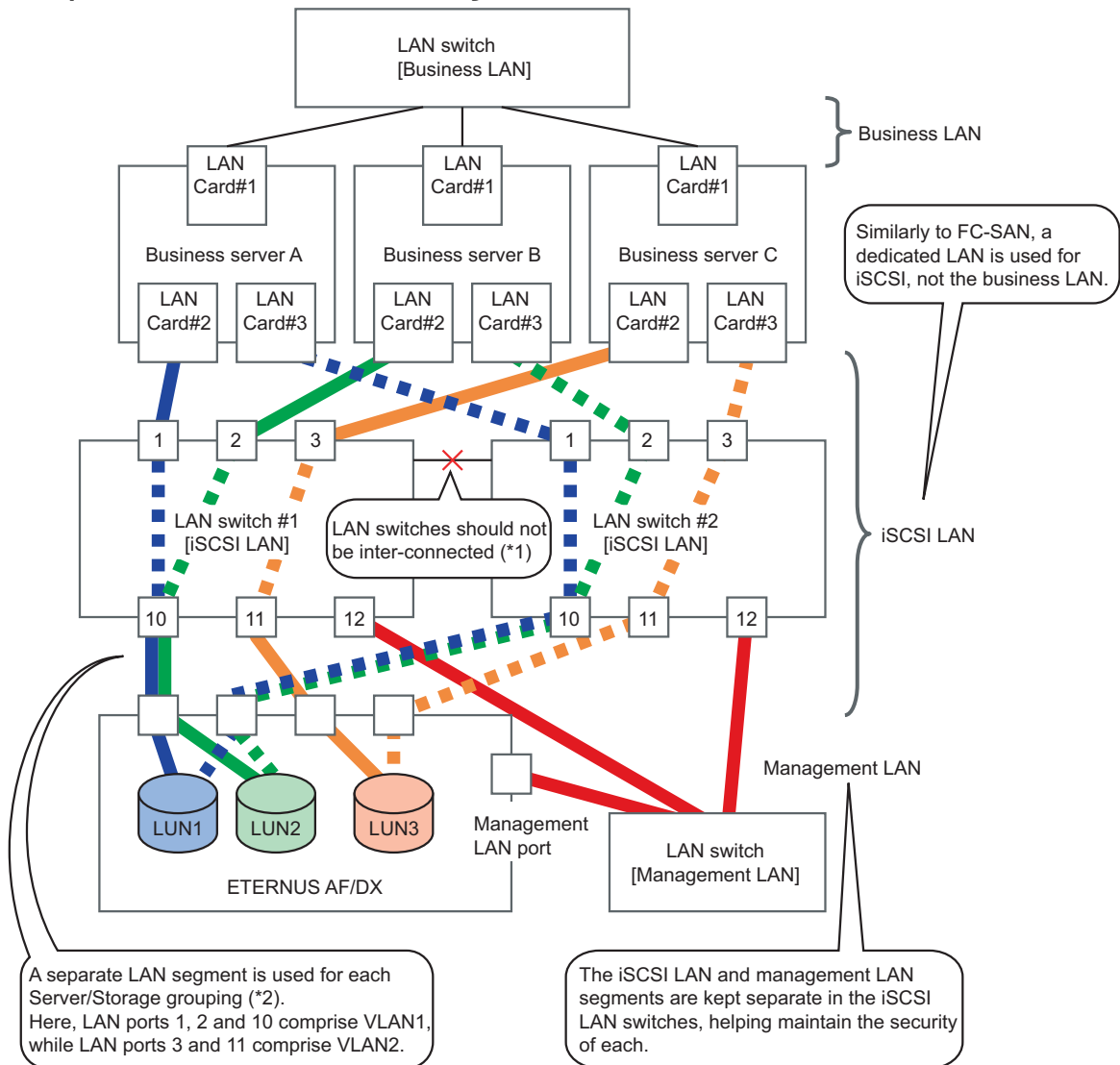
*1: In this system configuration, multipaths provide redundant connections between the servers and storage system. LAN switches #1 and #2 provide physical separation of the network paths.

*2: A separate LAN segment is provided in the LAN switch (using the switch VLAN function) for each grouping of business servers and storage systems (equivalent to the FC zones).

Example of a network address configuration

The following example shows a configuration in which multiple servers are connected to multiple CAs.
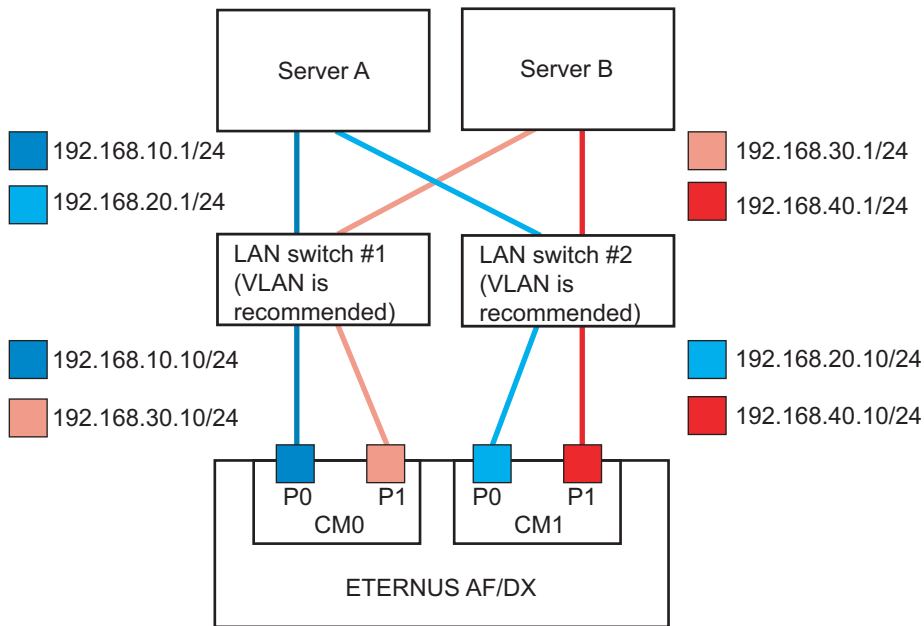
The following example shows a configuration in which a single server is connected to multiple CAs.
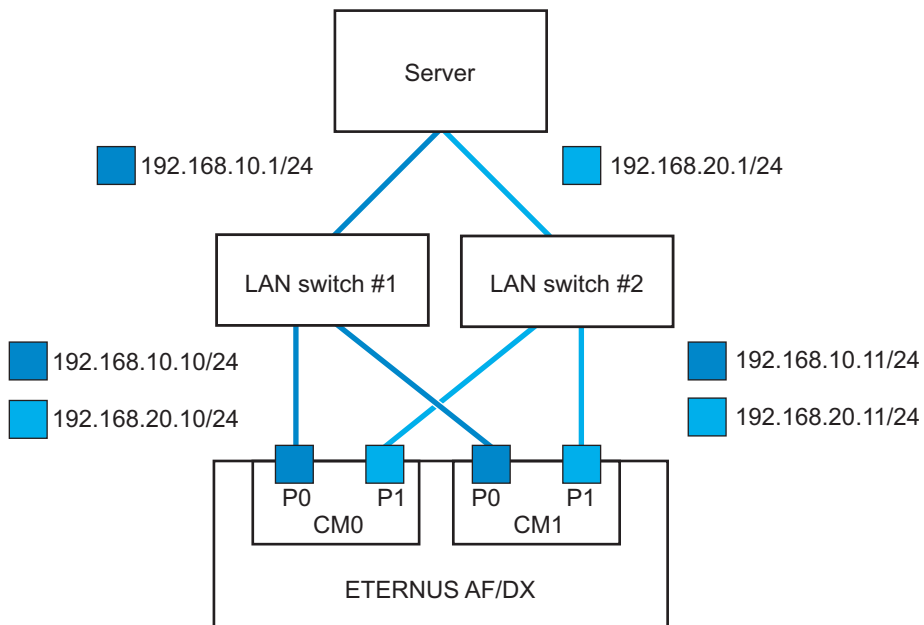
3.6   Network Setting Notes

With an iSCSI connection, SCSI commands are sent between the server and ETERNUS AF/DX via an IP network. Because IP addresses are used to identify devices on the IP network, a network-unique IP address will be required for each server and ETERNUS AF/DX iSCSI adapter used.

> ▷ **Caution**
>
> - The iSCSI name, Alias name, and CHAP authentication information should be specified according to the following conditions:
>   - iSCSI name
>
>   Up to 221 characters comprising some iqn or eui format combination of lower-case alphanumerics, "-" (minus), ":" (colon), and "." (dot) symbols.
>   - Alias name
>
>   Used by the administrator to simplify network management. (Optional)
>
>   Up to 16 arbitrary alphanumeric characters
>   - User name
>
>   Up to 223 alphanumeric characters
>   - Password
>
>   12 to 16 alphanumeric characters
> - Make sure normal LAN connections and iSCSI LAN connections (for the ETERNUS AF/DX) are separated from each other.

3.7   Notes about Standard Multipath Driver (msdsm) for Windows Server®

Various settings, such as the load balance policy and retry count, can be adjusted by using the standard multipath drivers (msdsm) for Windows Server® 2019, Windows Server® 2016, Windows Server® 2012 R2, Windows Server® 2012, Windows Server® 2008 R2 or Windows Server® 2008. For the ETERNUS AF/DX, the following settings should not be changed from their default values.

Screen name	Parameters that may not be changed
MPIO tab of Multi-Path Disk Device properties	Load balance policy, [Details] button, [Edit] button
Details of DSM	Timer counter (path checking period, enable path checking, number of retires, retry interval, PDO deletion period)
Details of MPIO paths	Path status

3.8   Jumbo Frame Setting Notes

- To enable Jumbo Frame, all the connected devices must support Jumbo Frame. Set the appropriate values for various parameters (such as the MTU size) on each connected device.

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- For details about how to set Jumbo Frame for a LAN card and LAN switch, refer to the OS and each device's manuals. Rebooting the server may be required to apply the new settings.
- The MTU size that is supported by the ETERNUS AF/DX is 9,000 bytes.

3.9   Notes when Multiple Disk Devices are Connected to a Single Server

When multiple disks devices are connected in a Windows® environment, some LUNs may not be recognized when the OS is restarted. This problem can be avoided by setting target binding in the server.

Target binding must be set using the iSCSICLI, which is the iSCSI Software Initiator command line tool. Since this setting is overwritten when settings are performed via Microsoft® iSCSI Software Initiator, other iSCSI-related settings must also be performed using the iSCSICLI.

Refer to "Appendix A Microsoft® iSCSI Software Initiator iSCSICLI Commands" (page 50) for details about iSCSICLI commands that are necessary for target binding and ETERNUS AF/DX connection. Also, examples of settings via batch files using the iSCSICLI are described in "Appendix B iSCSICLI Setting Examples" (page 53).

3.10   Notes about Connections with a Windows Server® 2008 R2 and Windows Server® 2008

In both Windows Server® 2008 R2 and Windows Server® 2008, if the file copy and other operations are performed for a disk device that is connected using iSCSI, an iScsiPrt error may be output to the system event log.

In this case, this event can be prevented by disabling the Delayed ACK.

For more details, refer to the Microsoft web-site for KB981482.

3.11   Notes about Connections with a Windows Server® 2019, Windows Server® 2016, Windows Server® 2012 R2 and Windows Server® 2012

When a virtual machine is configured using the Hyper-V function in a state where multiple volumes are connected, the setting screen of the virtual machine may take tens of minutes to display.

In this case, this event can be prevented by disabling the Delayed ACK.

For more details, refer to the Microsoft web-site for KB981482. If a modification method for the relevant version is not described, modify the setting with the method used for Windows Server® 2008 R2 and Windows Server® 2008.

3.12   Notes about Connections with a Windows Server®

When Windows Server® is connected to the ETERNUS AF series (excluding the ETERNUS AF S3 series), the ETERNUS DX S4/S3 series (excluding the ETERNUS DX8900 S4), or the ETERNUS DX200F, and Windows Server® is rebooted after a firmware is applied to the storage system, the status of the disks on Windows Server® may become offline.

The status of the disks on Windows Server® can be checked with the following procedure.

Click the [Start] button, select [Computer Management] under [Administrative Tools] and then select [Manage Discs] (or [Disk Management]) in the left pane.

Note that the occurrence condition and the workaround differ depending on the path configuration of Windows Server®.

For single-path configurations, change the SAN Policy setting before a firmware is applied to prevent the disk from becoming offline after the firmware is applied.

For multi-path configurations, there is no workaround. The procedure in "● Measure to take after a problem occurs" (page 18) must be performed to recover from the offline status.

■ Single-path configuration

The offline status can be avoided only when updating the firmware by changing the SAN Policy setting to "Online All".

If operations are possible with the SAN Policy setting set to "Online All", Step 4 in "● Method for proactively preventing occurrences" (page 16) is not required.

● Checking the SAN Policy setting

The following shows how to check the SAN Policy setting.

1   Execute the "diskpart" command in the command prompt.
The prompt changes to DISKPART.

2   Enter "san" and press the [Enter] key.

```
DISKPART> san
```

3   One of the following SAN Policies appears.
- "Offline Shared"
- "Offline All"
- "Online All"

4   Enter "exit" and press the [Enter] key to complete the "diskpart" command.

● Method for proactively preventing occurrences

Change the SAN Policy setting by performing the following procedure and then update the firmware.

1   Change the SAN Policy setting.
(1)   Execute the "diskpart" command in the command prompt.
The prompt changes to DISKPART.

(2) Enter "san policy=onlineall" and press the [Enter] key.

Example:

```
DISKPART> san policy=onlineall
```

(3) To apply the SAN Policy setting, reboot Windows Server®.

2 Execute the "diskpart" command again in the command prompt and confirm that "Online All" is specified for the SAN Policy setting.

Example:

```
DISKPART> san
SANPolicy : Online All
```

3 Update the firmware.

(1) Update the firmware of the ETERNUS AF/DX.

(2) To get OS to recognize the new instance ID, reboot Windows Server®.

4 Revert the SAN Policy setting to the previous value.

(1) Execute the following command to revert the SAN Policy setting.

Example:

```
DISKPART> san policy=Offline Shared
```

(2) To apply the SAN Policy setting, reboot Windows Server®.

(3) Execute the "diskpart" command again in the command prompt and confirm that the previous value is specified for the SAN Policy setting.

Example:

```
DISKPART> san
SANPolicy : Offline Shared
```

● Measure to take after a problem occurs

Manually change the offline disks to online with the following procedure.

1 Click the [Start] button, select [Computer Management] under [Administrative Tools] and then select [Manage Discs] (or [Disk Management]) in the left pane.

2 Select each offline disk, then right-click the selected disk to change the status to online.

If a firmware update of the ETERNUS AF/DX is performed in a Hyper-V environment where a pass-through disk is configured for the guest OS, the disk is recognized as a new disk and the pass-through disk is removed from the physical hard disk. Therefore, the pass-through disk must be manually reconfigured to be restored.

The procedure for restoring (or reconfiguring) the disk is as follows:

1 Start "Hyper-V Manager".

2   Select the offline guest OS and click [Settings] in the right pane.

The settings pop-up for the guest OS appears.

3   In the settings pop-up under [SCSI Controller], select the hard drive that has the message "Physical drive not found".

4   Select the appropriate disk for the [Physical hard disk] area in the right side of the window.

5   Click the [OK] button.

● SAN Policy supported OSs

- Windows Server® 2022
- Windows Server® 2019
- Windows Server® 2016
- Windows Server® 2012 R2
- Windows Server® 2012

● SAN Policy default value

OS	SAN Policy default value
Windows Server® 2022 (all editions)	Offline Shared
Windows Server® 2019 (all editions)	
Windows Server® 2016 (all editions)	
Windows Server® 2012 R2 (all editions)	
Windows Server® 2012 (all editions)	

■ Multipath configuration

The server starts up with the same disk status (online or offline) as when the multipathing was set up regardless of the SAN Policy setting.

- When the multipathing of an online disk is set up during the configuration of the environment

  The multipath disk starts up in the online status after the firmware is updated.

- When the multipathing of an offline disk is set up during the configuration of the environment

  The multipath disk starts up in the offline status after the firmware is updated.

● Method for proactively preventing occurrences

For multi-path configurations, there are no proactive measures (such as a setting change) to prevent the disk from becoming offline after the environment is configured. In addition, the disk status when multipathing was set up cannot be checked after the environment is configured.

Perform the procedure in "● Measure to take after a problem occurs" (page 18) if the disk becomes offline while the firmware is updated.

● Measure to take after a problem occurs

- When the OS can be started up

  Manually change the offline disks to online by following the procedure below.

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1   Click the [Start] button, select [Computer Management] under [Administrative Tools] and then select [Manage Discs] (or [Disk Management]) in the left pane.

2   Select each offline disk, then right-click the selected disk to change the status to online.

- When the OS cannot be started up

If the Active Directory database is located in a disk other than the OS area, the OS may not be able to start up because the disk is offline and the OS cannot access the Active Directory database.

In this case, the disk can be recovered by starting the OS in the Directory Services Restore Mode and changing the disk status to online.

The procedure for restoring (or reconfiguring) the disk is as follows:

1   Start the server.

2   Press the [F8] key on the server start-up screen.

3   The Advanced Boot Options screen appears.

4   Select Directory Services Restore Mode.

5   Log in as Administrator after the OS starts.

6   Select [Computer Management] under [Administrative Tools] and then select [Manage Discs] (or [Disk Management]) in the left pane.

7   Select each offline disk, then right-click the selected disk to change the status to online.

8   Restart the OS.

If a firmware update of the ETERNUS AF/DX is performed in a Hyper-V environment where a pass-through disk is configured for the guest OS, the disk is recognized as a new disk and the pass-through disk is removed from the physical hard disk. Therefore, the pass-through disk must be manually reconfigured to be restored.

The procedure for restoring (or reconfiguring) the disk is as follows:

1   Start "Hyper-V Manager".

2   Select the offline guest OS and click [Settings] in the right pane.
The settings pop-up for the guest OS appears.

3   In the settings pop-up under [SCSI Controller], select the hard drive that has the message "Physical drive not found".

4   Select the appropriate disk for the [Physical hard disk] area in the right side of the window.

5   Click the [OK] button.

3.13   Notes for Formatting a LUN of the ETERNUS AF/DX from a Windows Server®

If a LUN of the ETERNUS AF/DX is formatted from a Windows Server®, the following problems may occur.

- The formatting operation takes longer to complete.
- If the formatting operation is canceled, the canceled operation becomes unresponsive.

These are the problems caused by performance degradation due to the command being issued to release the storage capacity for the entire formatting area.

Performance degradation can be prevented by executing the following command to change the parameter value to stop the command from releasing the storage capacity of all the volumes.

```
# fsutil behavior set disabledeletenotify 1
```

After all formatting operations have been completed, execute the following command to re-enable the command that releases the storage capacity of all the volumes.

```
# fsutil behavior set disabledeletenotify 0
```

Chapter 4
Setting Up the Server

This chapter describes how to connect the ETERNUS AF/DX to a server using a LAN card.

4.1   Installing the LAN Cards

Install the LAN card when the server is turned off.

For the installation procedure, refer to the User's Guide provided with the server.

When using the onboard LAN card, skip this procedure and go to the next step.

> ▷ **Caution**
>
> When installing multiple LAN cards, record the relation between the PCI slot location and the port name of the LAN card as you install the LAN cards one by one.
>
> You can check the port name of the LAN card by clicking [Start] − [Settings] − [Network Connection].

4.2   Installing the Driver

Start the server and install necessary drivers.

The drivers listed below are necessary:

- LAN card driver
  - LAN driver
  - Supported version of Microsoft® iSCSI Software Initiator
- Driver for ETERNUS AF/DX storage systems

  Install either of the following drivers depending on the type of connection.
  - Single-path configuration

    Driver for ETERNUS AF/DX (ETERNUS Device Driver) is not required.
  - Multipath configuration

    Install one of the following drivers.
    - ETERNUS Multipath Driver
    - Standard multipath driver (msdsm) for Windows Server® 2019, Windows Server® 2016, Windows Server® 2012 R2, Windows Server® 2012, Windows Server® 2008 R2, or Windows Server® 2008

4.2.1   Installing the LAN Driver

Install the LAN driver according to the procedure below.

When using the onboard LAN card, skip this procedure and go to the next step.

iSCSI network connection IP addresses must be set before the ETERNUS AF/DX is connected.

Procedure

1   When installing the LAN driver, refer to the instructions provided with the LAN card.

2   Check that the driver has correctly been installed.

End of procedure

4.2.2   Installing the Driver for ETERNUS AF/DX Storage Systems (ETERNUS Multipath Driver)

- Install the ETERNUS Multipath Driver as required.

  Refer to "3.3 Driver Notes" (page 10) for notes about the ETERNUS Multipath Driver in cases such as when connecting the server to the ETERNUS AF/DX in multipath configuration and using the path redundancy control (path fail-over) function, and for when single-path connection is used between the ETERNUS AF/DX and server.

- For the procedure about how to install (or uninstall), set up, and use the drivers for ETERNUS AF/DX storage systems, refer to the software manuals.

4.2.3   Installing the Driver for ETERNUS AF/DX Storage Systems (Standard Multipath Driver (msdsm) for Windows Server®)

This section describes how to install the standard multipath driver (msdsm) for Windows Server® 2019, Windows Server® 2016, Windows Server® 2012 R2, Windows Server® 2012, Windows Server® 2008 R2, and Windows Server® 2008, which supports the ETERNUS AF/DX.

4.2.3.1   Installing Multipath I/O

Procedure

1   Click [Add Function] in the "Server Manager" screen.

2   Select the "Multipath I/O" checkbox in the "Select Features" screen of the Add Features wizard, and install the Multipath I/O function.
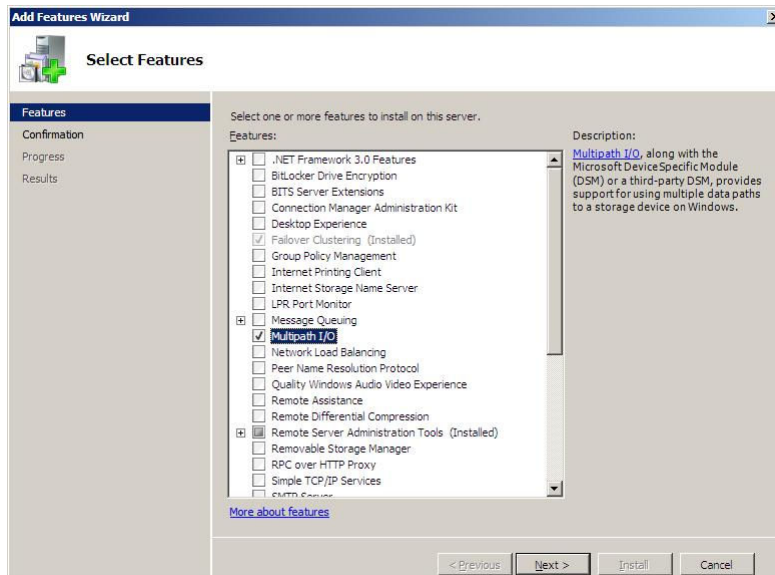
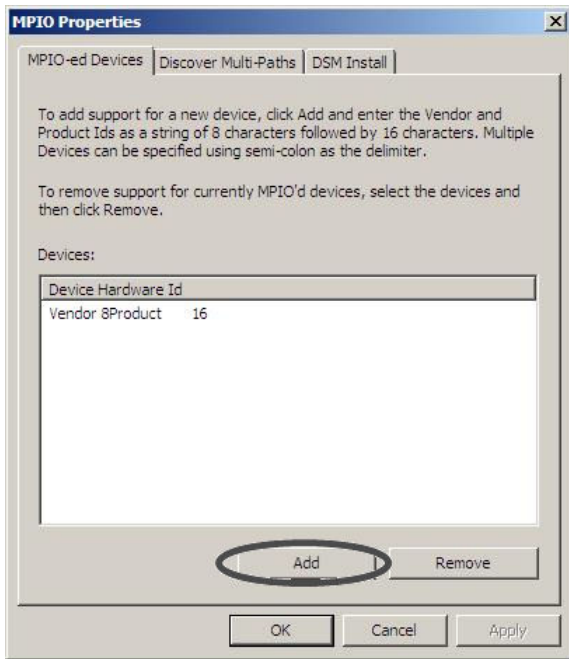3   Reboot the server.

End of procedure

4.2.3.2   Detailed Setup for MPIO

Perform settings to apply the installed Multipath I/O to the ETERNUS AF/DX.
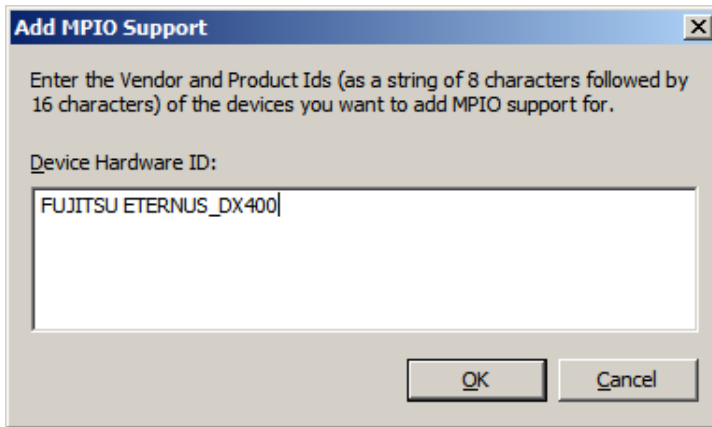
Procedure

1   Click [Control Panel] − [MPIO].
The MPIO properties window appears.

2   In the MPIO properties window, select the [MIPO-ed Devices] tab, and click the [Add] button.

3   Enter the ID of the ETERNUS AF/DX that is to be connected in the [Device Hardware ID] field.

The device hardware ID that must be entered for the ETERNUS AF/DX can be checked with the following table.

ETERNUS AF/DX to be used	Device Hardware ID
ETERNUS AF150 S3/AF250 S3, ETERNUS AF250 S2, ETERNUS AF250, ETERNUS DX60 S5/DX100 S5/DX200 S5, ETERNUS DX60 S4/DX100 S4/DX200 S4, ETERNUS DX60 S3/DX100 S3/DX200 S3, ETERNUS DX60 S2/DX80 S2/DX90 S2, ETERNUS DX200F	FUJITSU ETERNUS_DXL

ETERNUS AF/DX to be used	Device Hardware ID
ETERNUS AF650 S3, ETERNUS AF650 S2, ETERNUS AF650, ETERNUS DX500 S5/DX600 S5, ETERNUS DX500 S4/DX600 S4, ETERNUS DX500 S3/DX600 S3	FUJITSU ETERNUS_DXM
ETERNUS DX900 S5, ETERNUS DX8900 S4, ETERNUS DX8100 S3/DX8700 S3/DX8900 S3	FUJITSU ETERNUS_DXH
ETERNUS DX400 S2 series	FUJITSU ETERNUS_DX400
ETERNUS DX8000 S2 series	FUJITSU ETERNUS_DX8000

▷ **Caution**

 A space is required between the "FUJITSU" and the "ETERNUS_....".

4   Connect the ETERNUS AF/DX using multipath configuration with the server turned off, and then turn the server on.

End of procedure

4.3   Connecting the Cables

Check that the ETERNUS AF/DX and server are both turned off.

Connect the ETERNUS AF/DX iSCSI port and server LAN card port using an iSCSI cable.

When connecting a server to the ETERNUS AF/DX through a LAN switch, make sure it is turned off too, and then use an iSCSI cable to connect the ETERNUS AF/DX iSCSI port and LAN switch port and another iSCSI cable to connect the server LAN card port and (different) LAN switch port.
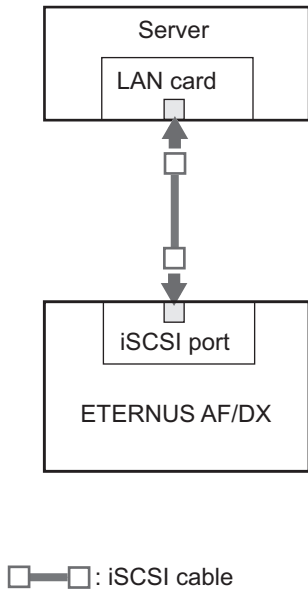
● Direct connection   ● Switching hub connection
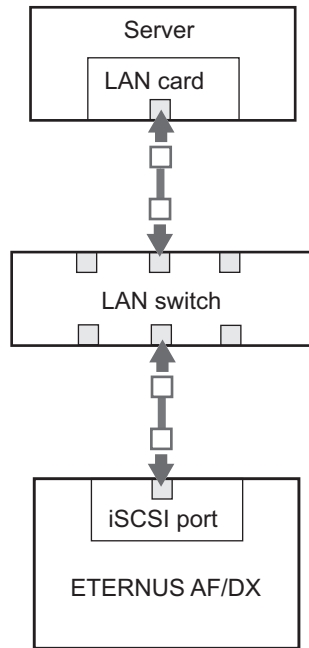
4.4 Turning on the Devices

To turn on the connected devices, use the following procedure:

Procedure

1   Turn on the LAN switch power (if used).

2   Check that the LAN switch's Ready (or equivalent) LED is lit.

3   Turn on the ETERNUS AF/DX.

4   Check that the Ready LED is lit on the ETERNUS AF/DX.

5   Turn on the server.

> **▷ Caution**
>
> Before turning the server on, check that the ETERNUS AF/DX storage systems and LAN switches are all "Ready". If the server is turned on and they are not "Ready", the server will not be able to recognize the ETERNUS AF/DX storage systems. Also, when the ETERNUS AF/DX power supply is being controlled by a connected server, make sure that the ETERNUS AF/DX does not shut down before the connected servers. Similarly, the LAN switches must also be turned off after the connected servers have been shut down. If turned off, data writes from the running server cannot be saved to the ETERNUS AF/DX storage systems, and already saved data may also be affected.

End of procedure

## 4.5 Setting Up the iSCSI Initiator Driver Parameters

Use the iSCSI Initiator to set the iSCSI initiator driver parameters.

Procedure

1   Start the iSCSI Initiator.

2   Click the [Configuration] tab.

3   The current iSCSI name is displayed in [Initiator Name]. To change the iSCSI name, click the [Change] button.

When using the default iSCSI name displayed in [Initiator Name], also click the [Change] button. This allows you to continue to use the above iSCSI name even after changing the "computer name" of the server.
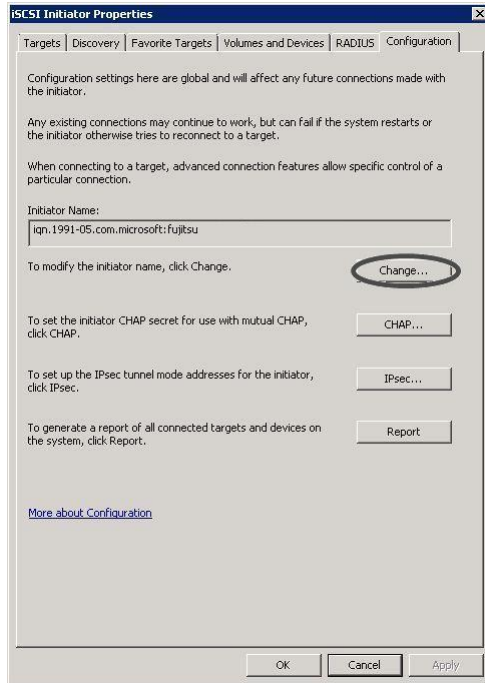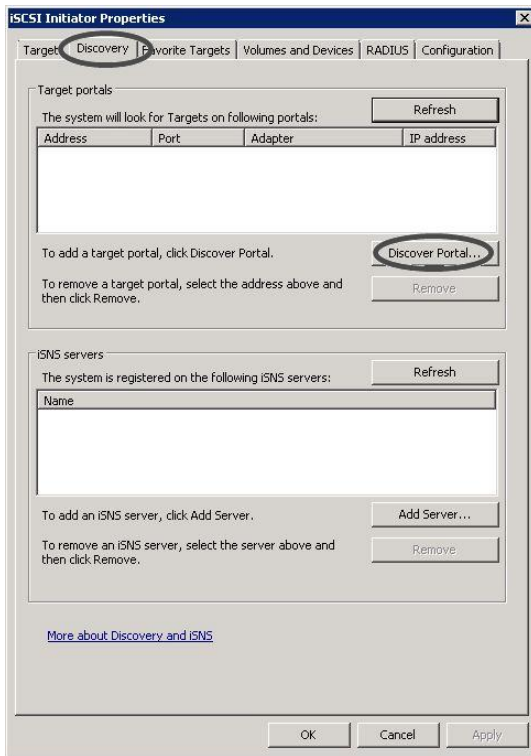

> ▶ **Caution**
>
> If changing the LAN card's iSCSI name results in inconsistency with the ETERNUS AF/DX settings ("4.6.1 CHAP Authentication" (page 34)), redo Step 9 and the rest of the procedure given in "4.6.1 CHAP Authentication" (page 34) to set the changed iSCSI name.
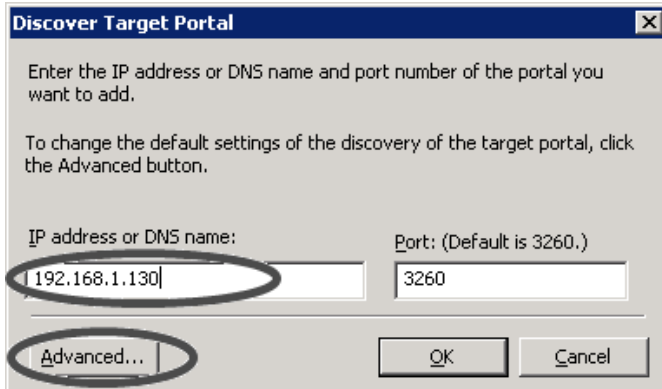
4   Enter the iSCSI name and click the [OK] button.
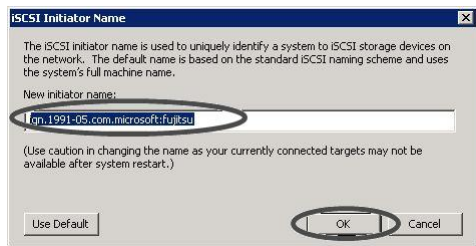
The [iSCSI Initiator Properties] window will appear.

5   Click the [Discovery] tab and then click the [Discover Portal] button.

6   In the [IP address or DNS name] field, enter the IP address of the ETERNUS AF/DX iSCSI port that is to be connected to, and click the [Advanced] button.
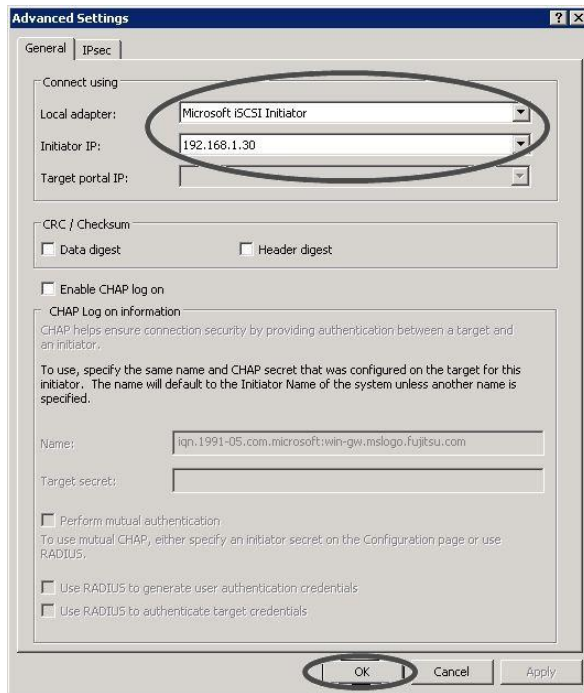

> ▶ **Caution**

The address set in the ETERNUS AF/DX iSCSI TCP/IP settings should be entered as the IP address of the ETERNUS AF/DX. For details on the confirmation method, refer to "Setting the To-server Connection Type" in "Configuration Guide -Server Connection- Storage System Settings" that corresponds to the ETERNUS AF/DX to be connected.

The [Advanced Settings] window appears.

7   Click the [General] tab.

8   Select "Microsoft iSCSI Initiator" for [Local adapter] and set the Initiator server IP address in [Initiator IP] under [Connect using]. Then, click the [OK] button.

The settings of CHAP authentication can also be made. For details of the settings, refer to "4.6 Setting CHAP Authentication" (page 34).
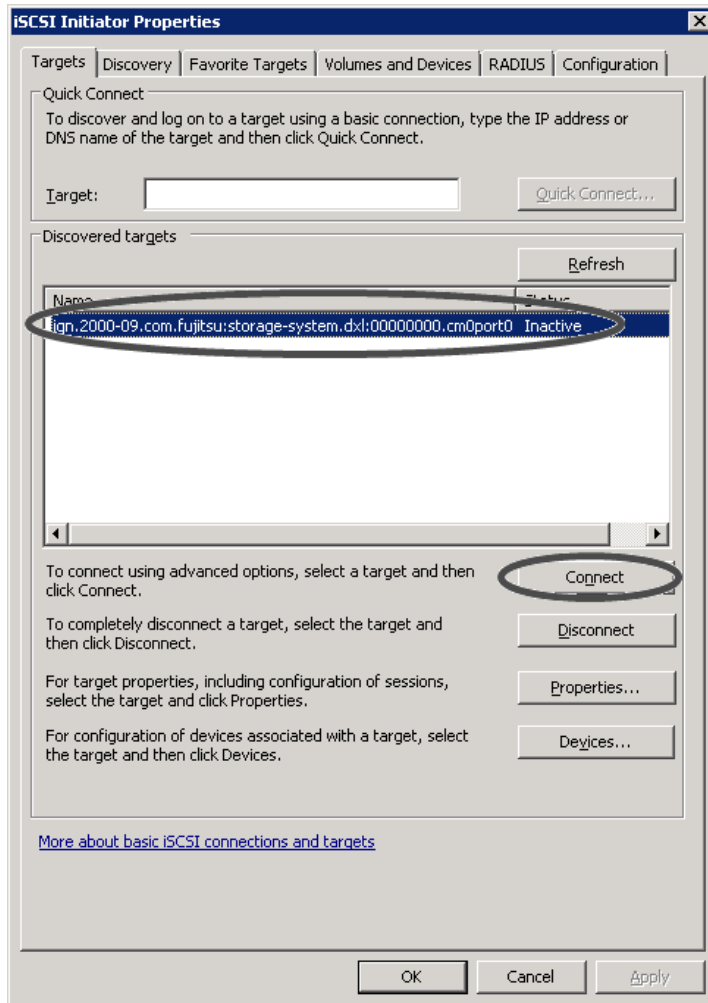

9   Click the [OK] button.
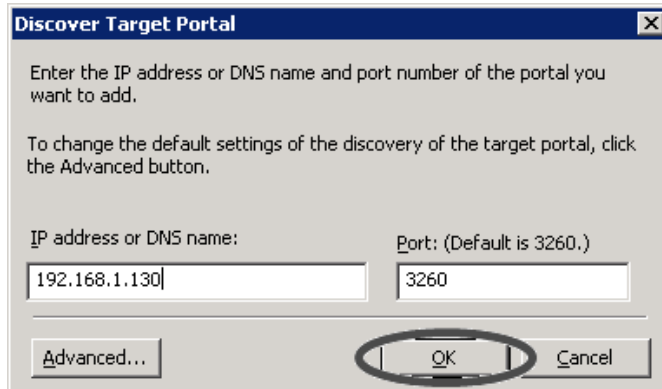
10   Click the [Targets] tab.

11   Check the connection and click the [Connect] button.

If the connection is OK, the ETERNUS AF/DX iSCSI name should appear in [Discovered targets] and the [Status] should be "Inactive".
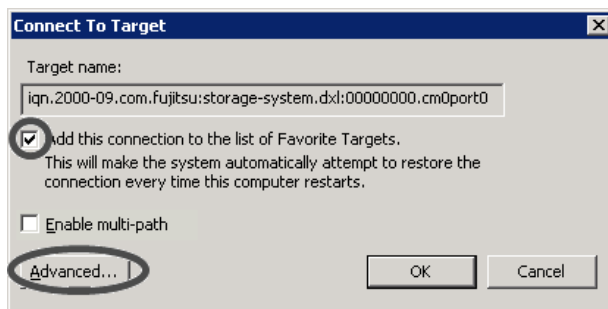

> **▷ Caution**

Even if the connection is correctly made, the ETERNUS AF/DX iSCSI name may not appear in [Discovered targets]. Perform the following steps.

- Check that the cables are connected correctly.
- Click the [Refresh] button.

12   Select the [Add this connection to the list of Favorite Targets.] checkbox and click the [Advanced] button.

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13   Select "Microsoft iSCSI Initiator" for [Local adapter]. Next, set the Initiator server IP address and the ETERNUS AF/DX IP address/port number (for example, 192.168.1.130 / 3260), in [Initiator IP] and [Target portal IP] respectively under [Connect using]. Then, click the [OK] button.
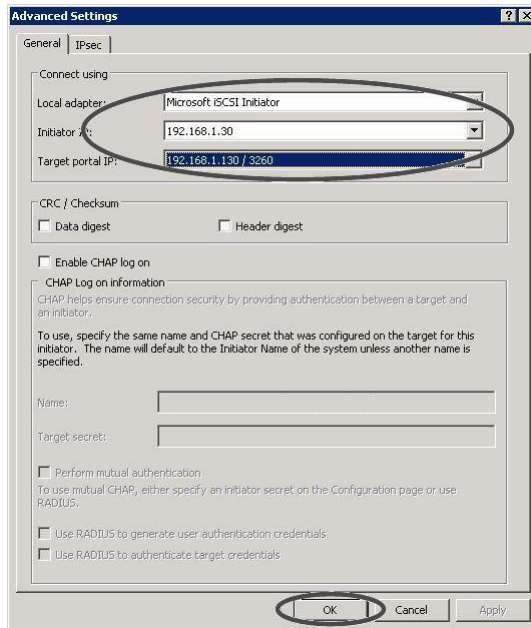
14   Click the [OK] button.
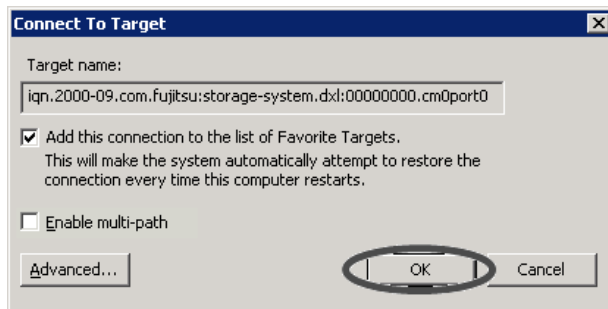
If the logon is successful, the [Status] of the ETERNUS AF/DX iSCSI name displayed in the [Targets] tab window should change to "Connected".

End of procedure

4.6   Setting CHAP Authentication

The following two types of authentication are available:

- CHAP Authentication

  The ETERNUS AF/DX authenticates the server.

  Secrets are set to the target only and all servers attempting to access the target need to start logon sessions with target using the same secrets.
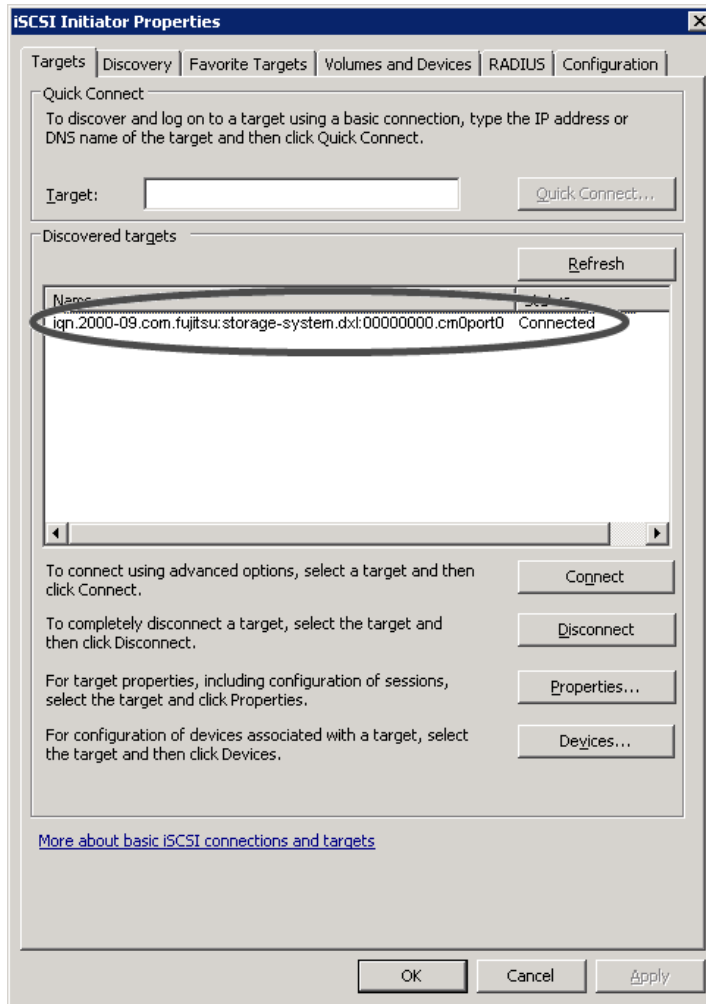
- Bidirectional CHAP Authentication

  The ETERNUS AF/DX and the server authenticate each other. Different secrets are set to each target in the Storage Area Network (SAN) and to each side of the transmission.

If authentication is to be used, certain type-dependent settings are required. The similar settings also need to be performed for the ETERNUS AF/DX.

If these authentication settings are omitted, unauthenticated connections will be established.
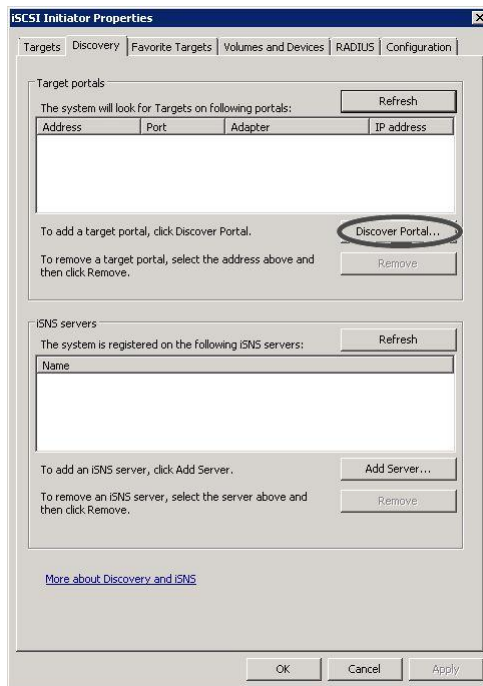
If CHAP authentication is set up on the ETERNUS AF/DX side only, a result of "Authentication Failure" will be produced when the server attempts to log on.

4.6.1   CHAP Authentication

CHAP authentication should be set up on the server as follows:

Procedure

1   Start the iSCSI Initiator.

2   Click the [Discovery] tab.

3   Click the [Discover Portal] button.

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The [Discover Target Portal] window will appear.

4   In the [IP address or DNS name] field, enter the IP address of the ETERNUS AF/DX iSCSI port that is to be connected to, and click the [Advanced] button.
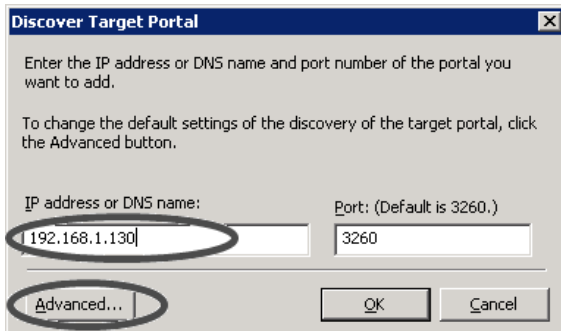
The [Advanced Settings] window appears.

5   Set "Microsoft iSCSI Initiator" in [Local adapter], set the Initiator server IP address in [Initiator IP] under [Connect using], and click the [OK] button.

Then, select the [Enable CHAP log on] checkbox, specify [Name] and [Target secret], and click the [OK] button.
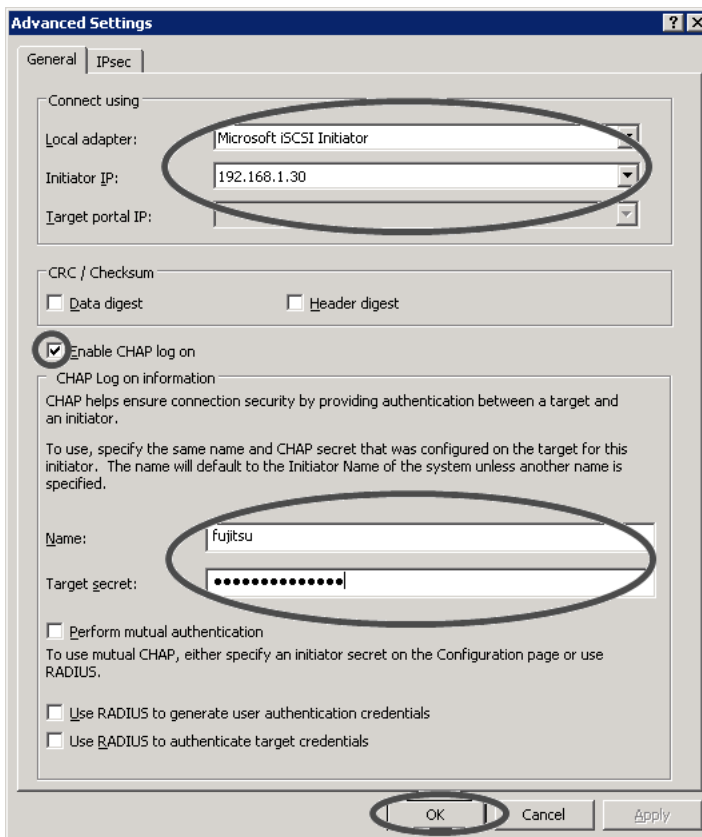
▶ **Caution**

The [Name] and [Target secret] set here must match the [CHAP User ID] and [CHAP Password] set for the ETERNUS AF/DX. For details on the confirmation method, refer to "Setting CHAP Authentication" in "Configuration Guide -Server Connection- Storage System Settings" that corresponds to the ETERNUS AF/DX to be connected.

6   Click the [OK] button.
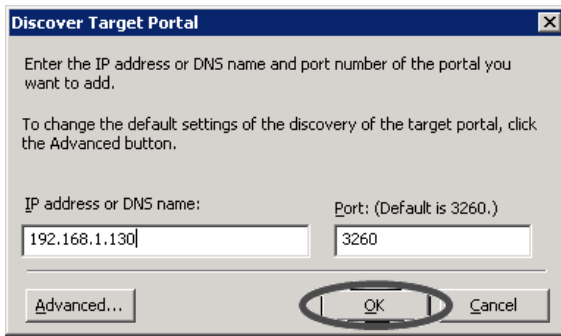
7   Click the [Targets] tab.

8   Check the connection and click the [Connect] button.

When CHAP authentication is complete and the connection is OK, the ETERNUS AF/DX iSCSI name should appear in [Discovered targets] and the [Status] should be "Inactive".
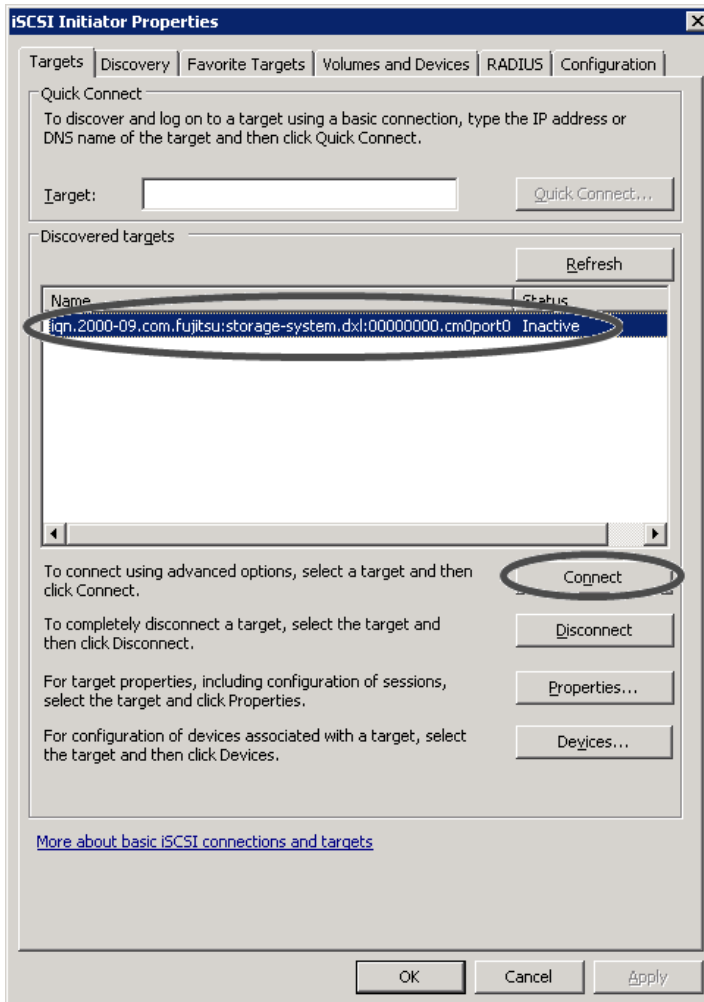
> ▶ **Caution**

Even if CHAP authentication is working, the ETERNUS AF/DX iSCSI name sometimes fails to appear in [Discovered targets]. Clicking the [Refresh] button may help.

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The [Connect To Target] window appears.

9   Select the [Add this connection to the list of Favorite Targets.] checkbox and click the [Advanced] button.
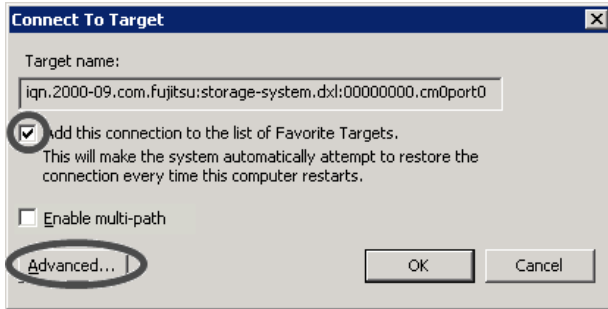
10   Check that "Microsoft iSCSI Initiator" is set for [Local adapter], Initiator server IP address is set in [Initiator IP], and the ETERNUS AF/DX IP address/port number (for example, 192.168.1.130 / 3260) is set in [Target portal IP] under [Connect using].

Then, select the [Enable CHAP log on] checkbox, specify [Name] and [Target secret], and click the [OK] button.
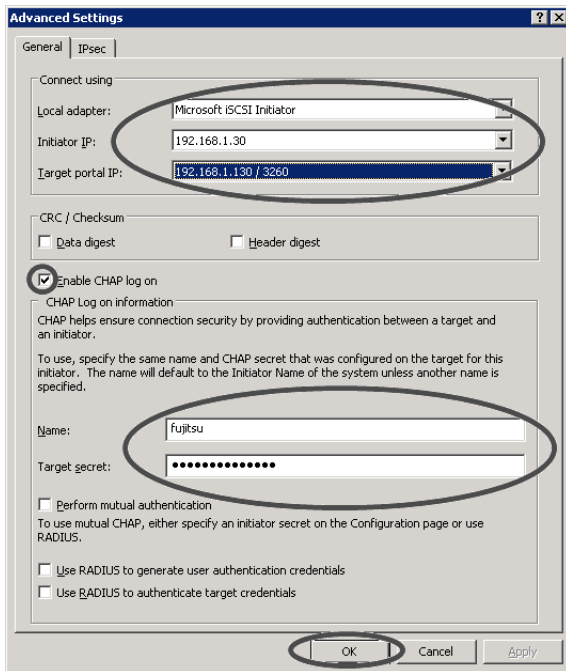
11   Click the [OK] button.
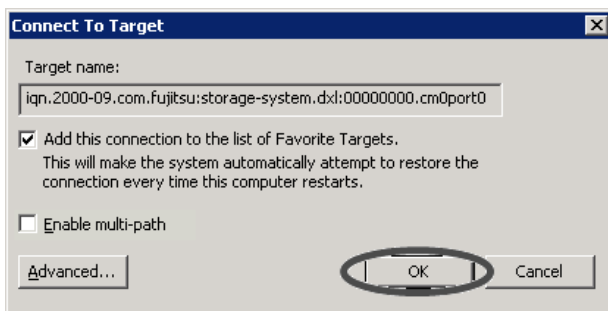
If the logon is successful, the [Status] of the ETERNUS AF/DX iSCSI name displayed in [Discovered targets] of the [Targets] tab should change to "Connected".
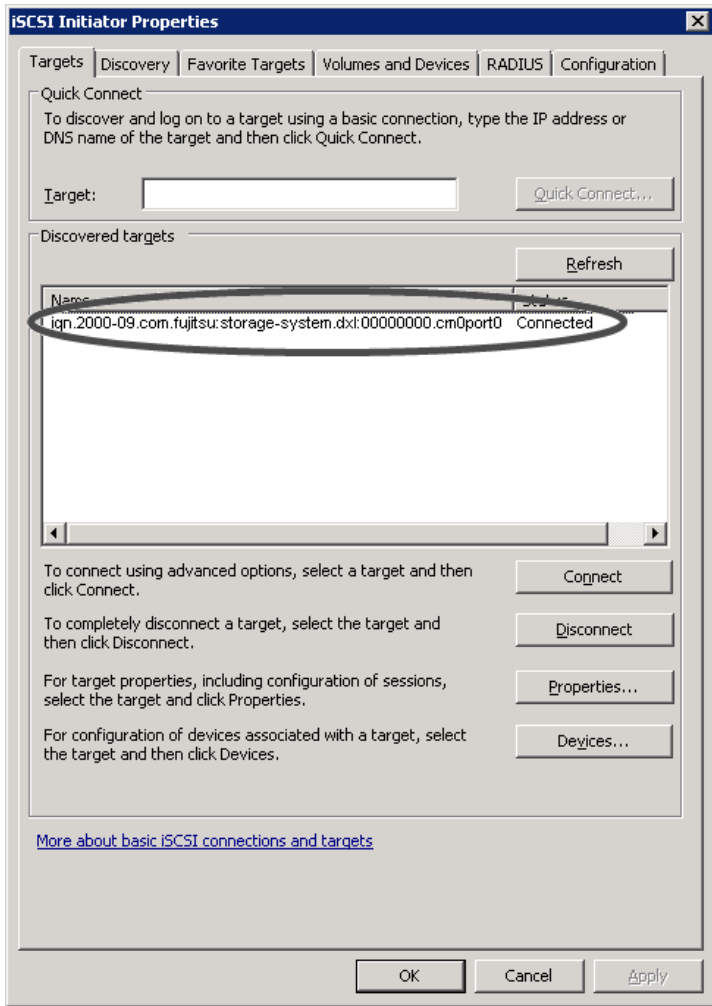
End of procedure

4.6.2 Bidirectional CHAP Authentication

Bidirectional CHAP authentication should be set up on the server as follows:

Procedure

1   Start the iSCSI Initiator.

2   Select the [Configuration] tab and click the [CHAP] button.
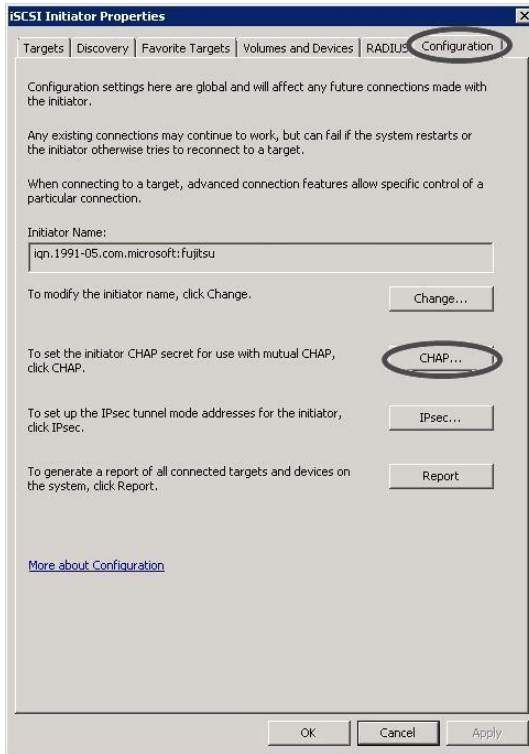
3   Enter the password under [Initiator CHAP secret] and then click the [OK] button.

[Initiator CHAP secret] must be specified with 12 to 16 alphanumeric characters. Clicking the [OK] button makes the password specified in [Initiator CHAP secret] disappear.
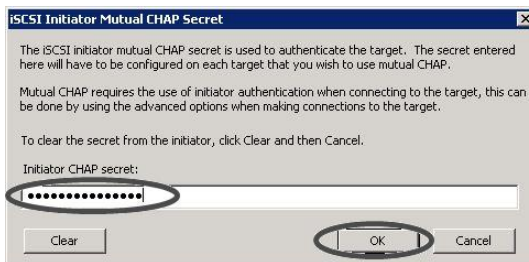
▶ **Caution**

The password for [Initiator CHAP secret] must match the [New Password] of the CHAP authentication setting for the iSCSI port parameters of the ETERNUS AF/DX.

4   Click the [Discovery] tab.

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5   Click the [Discover Portal] button.
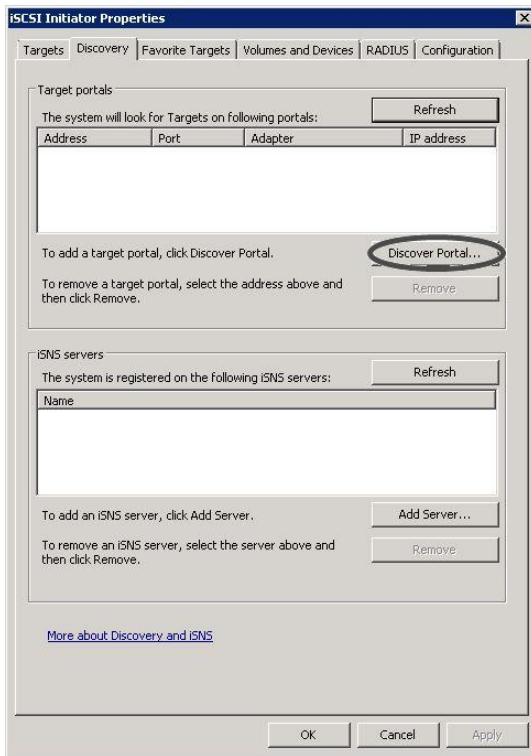
The [Discover Target Portal] window will appear.

6   In the [IP address or DNS name] field, enter the IP address of the ETERNUS AF/DX iSCSI port that is to be connected to, and click the [Advanced] button.
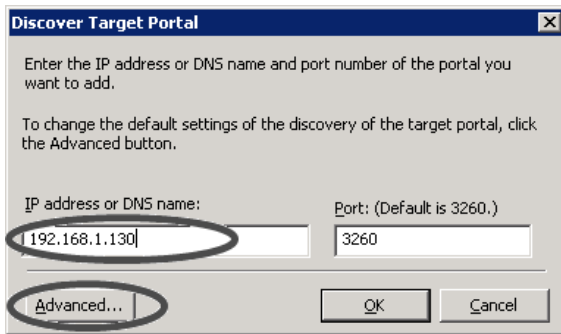
The [Advanced Settings] window appears.

7   Set "Microsoft iSCSI Initiator" in [Local adapter], set the Initiator server IP address in [Initiator IP] under [Connect using], and click the [OK] button.

Then, select the [Enable CHAP log on] checkbox, and specify [Name] and [Target secret]. When setting the password for [Target secret], use a different password from the password that was set for [Initiator CHAP secret] in Step 3. Select the [Perform mutual authentication] checkbox, and click the [OK] button.
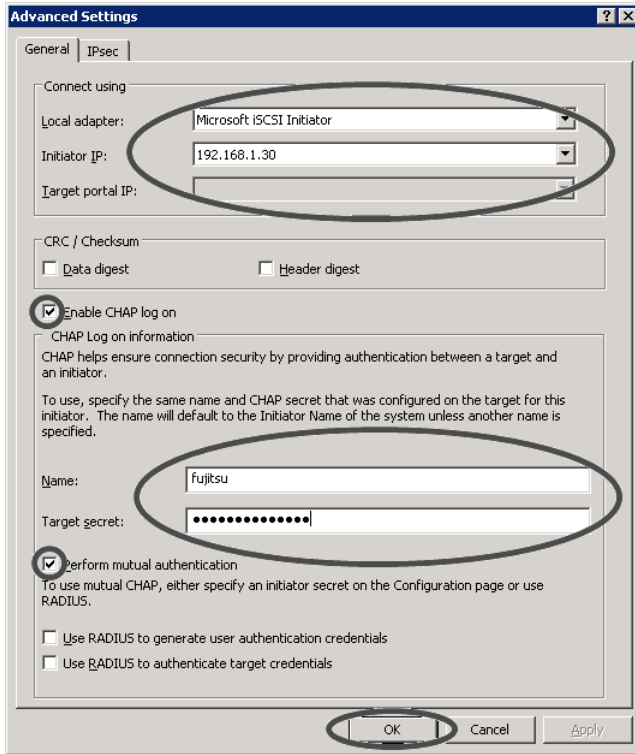
> **⚠ Caution**

The [Name] and [Target secret] set here must match the [CHAP User ID] and [CHAP Password] in the iSCSI host settings for the ETERNUS AF/DX. For details on the confirmation method, refer to "Setting CHAP Authentication" in "Configuration Guide -Server Connection- Storage System Settings" that corresponds to the ETERNUS AF/DX to be connected.

8   Click the [OK] button.
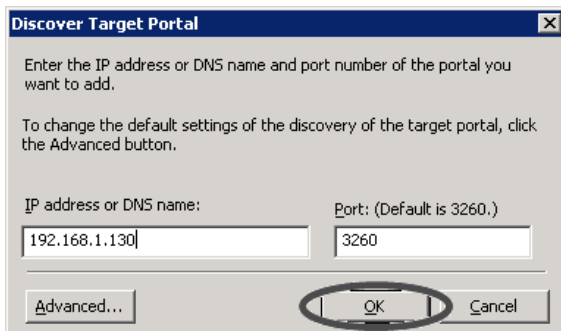
9   Click the [Targets] tab.

10 Check the connection and click the [Connect] button.

When bidirectional CHAP authentication is complete and the connection is OK, the ETERNUS AF/DX iSCSI name should appear in [Discovered targets] and the [Status] should be "Inactive".
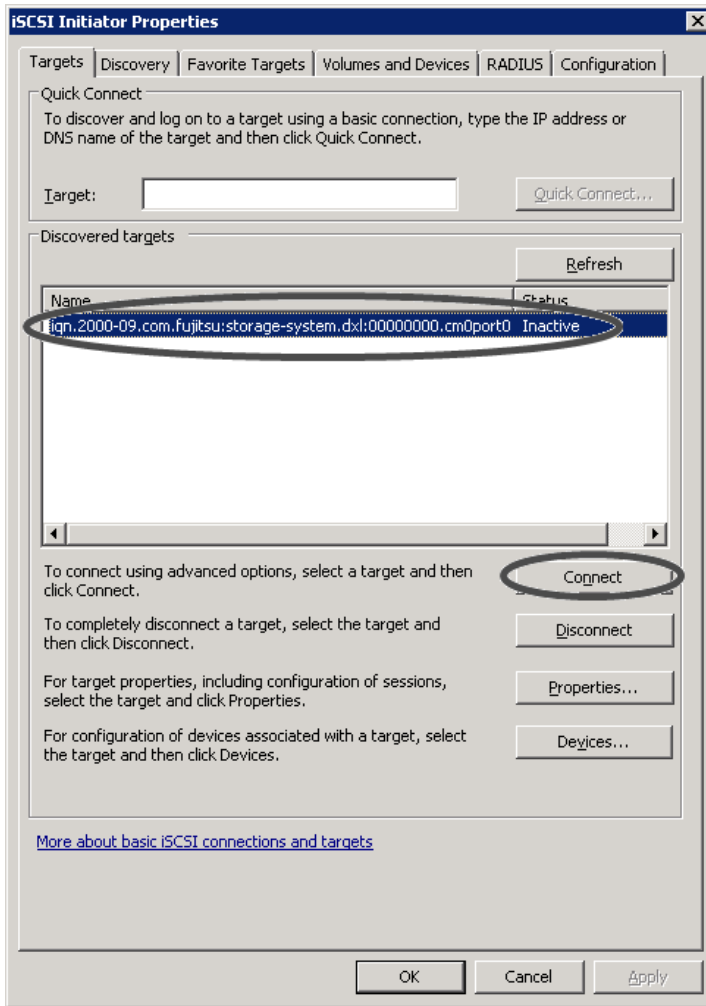
> ▶ **Caution**

Even if bidirectional CHAP authentication is working, the ETERNUS AF/DX iSCSI name sometimes fails to appear in [Discovered targets]. Clicking the [Refresh] button may help.

The [Connect To Target] window appears.

11 Select the [Add this connection to the list of Favorite Targets.] checkbox and click the [Advanced] button.

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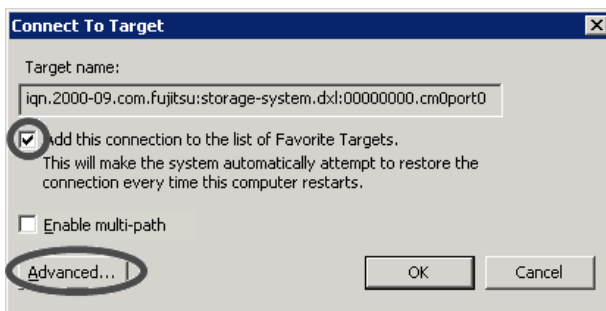
12   Check that "Microsoft iSCSI Initiator" is set for [Local adapter], Initiator server IP address is set in [Initiator IP], and the ETERNUS AF/DX IP address/port number (for example, 192.168.1.130 / 3260) is set in [Target portal IP] under [Connect using].

Then, select the [Enable CHAP log on] checkbox, and specify [Name] and [Target secret]. Use the [Name] and [Target secret] settings that were set for Step 7. Select the [Perform mutual authentication] checkbox, and click the [OK] button.
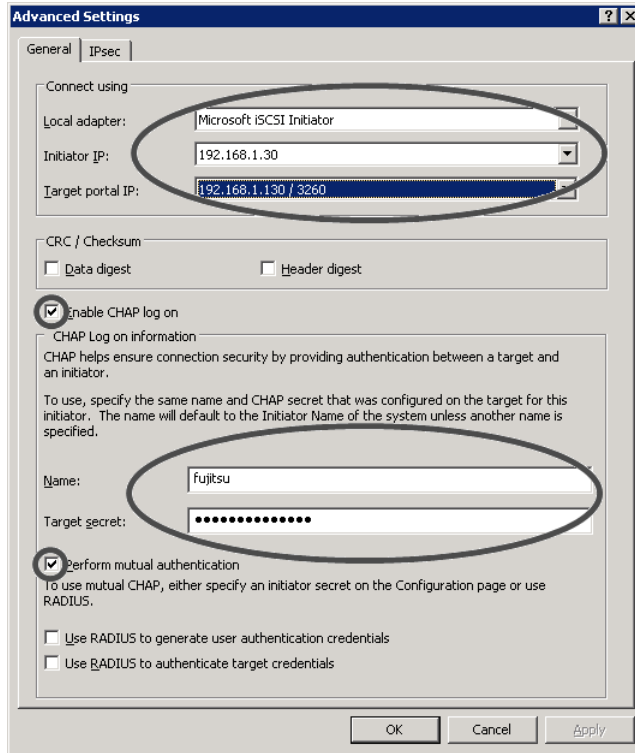
13   Click the [OK] button.
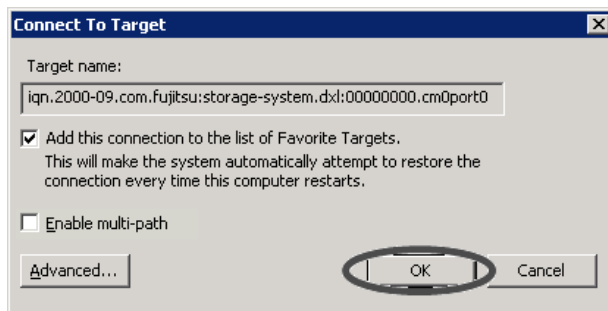
If the logon is successful, the [Status] of the ETERNUS AF/DX iSCSI name displayed in [Discovered tar-
gets] of the [Targets] tab should change to "Connected".
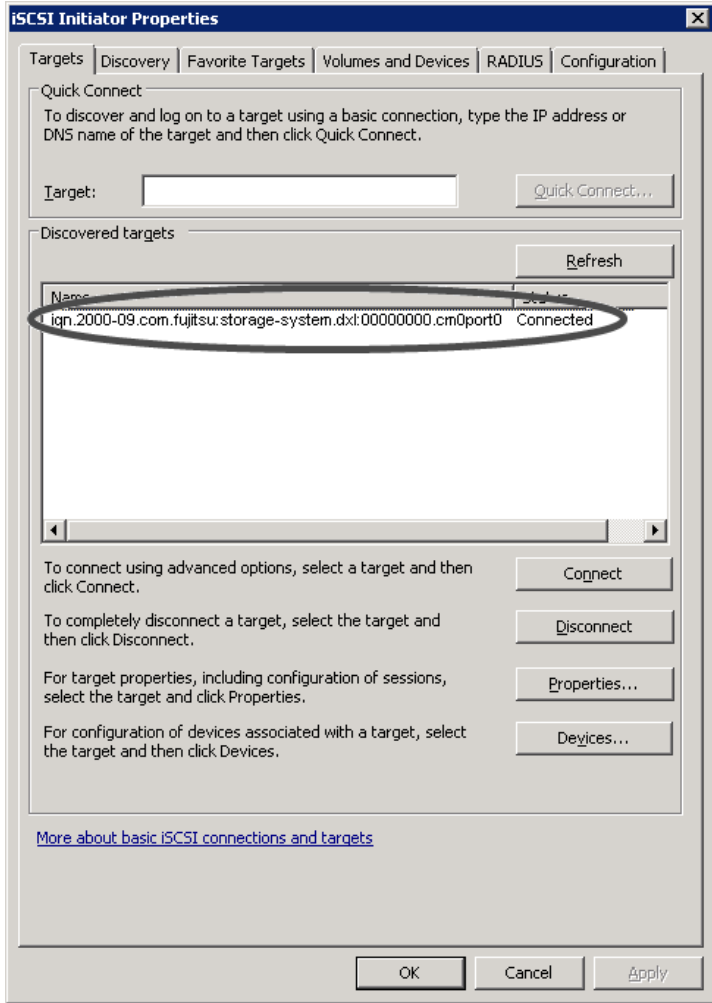
End of procedure

4.7   Checking the ETERNUS AF/DX Storage Systems' Connection Status

The following items can be set and displayed in the "ETERNUS Multipath Manager" main window when the ETERNUS Multipath Driver is used.

- ETERNUS AF/DX storage systems' connection status
- Connected LUNs
- Path status
- Path restoration or release

These describe ETERNUS AF/DX storage systems' connection status and the checking of paths.

Procedure

1   Start up ETERNUS AF/DX storage systems (assuming that LUNs are already set up), and check that it is "Ready" before starting up the server.

2   When the server is Ready, start up Multipath Manager.

3   The main window will appear.

   The status of the ETERNUS AF/DX storage systems connected to the server (connection status, path status) can be checked.

End of procedure

For details on ETERNUS Multipath Manager operations, refer to the manual provided with the ETERNUS Multipath Driver.

Chapter 5
Notes on Operation

5.1 Creating the Disk Partitions

Create disk partitions as necessary, using the following procedure.

Procedure

1 Open [Disk Management] via [Computer Management].
  If unsigned disks exist, a query about whether or not to sign disks for the connected devices is made.

2 Sign disks and create partitions as necessary.

> **Note**
> - This setup can also be used to upgrade to dynamic disks.
> - 2TB or larger disks must be converted to GPT disks.

End of procedure

5.2 Binding the Volumes

> ▶ **Caution**
>
> Bind the volumes after creating the partitions.
> After adding a volume or server, be sure to perform binding again.

Procedure

1 Start the iSCSI Initiator.

2   Select [Volumes and Devices], and click the [Autoconfigure] button.
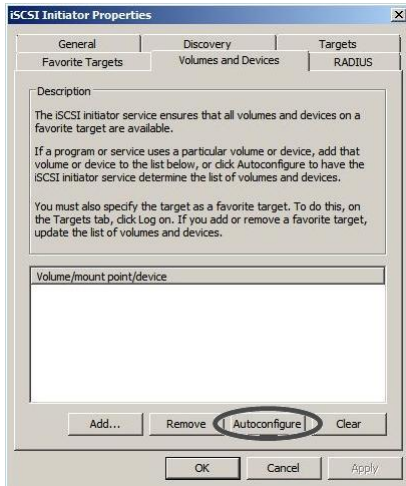
3   Check that the assigned drive letter is displayed in the [Volume/mount point/device] field.
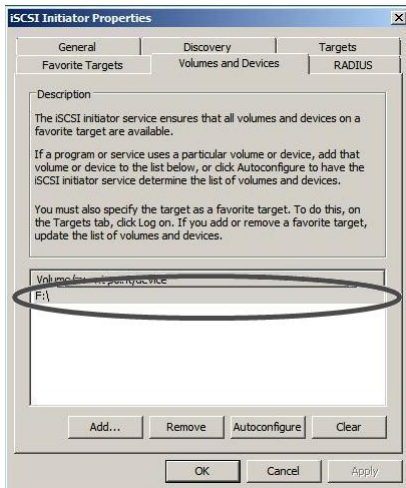
4   Click the [OK] button to exit the iSCSI initiator.

End of procedure

5.3   Setting Up the Cluster Configuration

If configuring a cluster (WSFC/MSCS), install the cluster related applications, as necessary.

Chapter 6
Setting the iSCSI QueueDepth Value

For Microsoft® iSCSI Software Initiator, set "CmdSN Count" of the ETERNUS AF/DX to manage the QueueDepth.

6.1   When Host Affinity Is Used

When Host Affinity is used, set the QueueDepth value according to the following procedure.

Procedure

1   Log in to the ETERNUS AF/DX from ETERNUS CLI.

2   Execute the "show host-iscsi-names" command to check "iSCSI Host No." of the iSCSI host that is registered in the system.

3   Execute the "set host-iscsi-name -host-number <iSCSI Host No.> -cmdsn-count <setting value>" command to set "CmdSN Count".

   Check the following table and enter "CmdSN Count".

Number of hosts that are connected to a single CA port	CmdSN Count (*1)	
	AF S3 series, DX S5 series, DX8900 S4	Models that are not described in the left column
4 or less	Unlimited (default)	Unlimited (default)
5	Unlimited (default)	180
6 to 8	Unlimited (default)	120
9 to 12	120	80
13 to 25	80	40
26 to 51	40	20
52 or more	20	20

*1:   To achieve maximum system performance, this value can be changed according to the server load and the peak operating times.

   The maximum number of simultaneous command processes per CA port is limited to 2048 for the ETERNUS AF S3 series, ETERNUS DX S5 series, and ETERNUS DX8900 S4, and 1024 for the other models. The value is used by multiple servers that share the CA port. The commands are processed until the limit is reached.

4   Change "iSCSI Host No." for all paths that are connected to a single CA port and repeat Step 3.

5   Reboot the server that is connected to the ETERNUS AF/DX or perform a "Disconnect" - "Connect" for the target by using the iSCSI Initiator.

End of procedure

6.2   When LUN Mapping Is Used

When LUN Mapping is used, set the QueueDepth value according to the following procedure.

Procedure

1   Log in to the ETERNUS AF/DX from ETERNUS Web GUI.

2   Select [Connectivity] from the menu.

3   From the Category area, select [iSCSI] under [Port Group].

4   Select the checkbox for the port for which the parameter is set and click [Modify iSCSI Port Parameters].

5   Under General Settings, select the [CmdSN Count] value from the pull-down menu and click the [Modify] button.
Check the following table and select "CmdSN Count".

Number of hosts that are connected to a single CA port	CmdSN Count (*1)	
	AF S3 series, DX S5 series, DX8900 S4	Models that are not described in the left column
4 or less	Unlimited (default)	Unlimited (default)
5	Unlimited (default)	180
6 to 8	Unlimited (default)	120
9 to 12	120	80
13 to 25	80	40
26 to 51	40	20
52 or more	20	20

*1:   To achieve maximum system performance, this value can be changed according to the server load and the peak operating times.

The maximum number of simultaneous command processes per CA port is limited to 2048 for the ETERNUS AF S3 series, ETERNUS DX S5 series, and ETERNUS DX8900 S4, and 1024 for the other models. The value is used by multiple servers that share the CA port. The commands are processed until the limit is reached.

6   Repeat Step 5 for all ports to be used.

7   Reboot the servers that are connected to the ETERNUS AF/DX or perform a "Disconnect" - "Connect" for the target by using the iSCSI Initiator.

End of procedure

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Appendix A
Microsoft® iSCSI Software Initiator iSCSICLI Commands

The following section shows iSCSICLI commands that are related to iSCSI settings and an overview of these commands. For more details, refer to "Microsoft® iSCSI Software Initiator Users Guide".

1   Command   NodeName <node name>

    Parameter   <node name>: iSCSI name of the initiator

    Description   This command sets the iSCSI name of the iSCSI initiator.

2   Command   CHAPSecret <CHAP secret>

    Parameter   <CHAP secret>: Password of the initiator

    Description   This command sets the password of the iSCSI initiator (Only when bidirectional CHAP is used).

3   Command   AddiSNSServer <iSNS Server Address>

    Parameter   <iSNS Server Address>: IP address of the iSNS server

    Description   This command adds an iSNS server (Only when an iSNS server is used).

4   Command   QAddTargetPortal <Portal IP Address> [CHAP Username] [CHAP Password]

    Parameter   <Portal IP Address>: IP address of the iSCSI port on the ETERNUS AF/DX
                              [CHAP Username]: User name of the target (Only when CHAP is used)
                              [CHAP Password]: Password of the target (Only when CHAP is used)

    Description   This command adds an iSCSI port of the ETERNUS AF/DX.

5   Command   ListTargets

    Parameter   None

    Description   This command displays the added iSCSI port of the ETERNUS AF/DX.

6   Command   LoginTarget <TargetName> <ReportToPNP> <TargetPortalAddress> <TargetPortalSocket> <Initiator Instance Name> <Port number> <Security Flags> <Login Flags> <Header Digest> <Data Digest> <Max Connections> <DefaultTime2Wait> <DefaultTime2Retain> <Username> <Password> <AuthType> <Key> <Mapping Count> <Target Lun> <OS Bus> <Os Target> <OS Lun> ...

Parameter   <TargetName>: iSCSI name of the target

                   <ReportToPNP>: When "T" or "t" is input, a LUN is recognized as a device by the OS

                   <TargetPortalAddress>: IP address of the iSCSI port on the ETERNUS AF/DX

                   <TargetPortalSocket>: TCP port number 3260

                   <Username>: CHAP user name that is used to log in to the target

                   <Password>: CHAP password that is used to log in to the target

                   <AuthType>: The login authentication method

                          0 when not using CHAP
                          1 when using CHAP
                          2 when using bidirectional CHAP

                   <Mapping Count> : The number of LUNs

                   <Target Lun>: LUN of the ETERNUS AF/DX

                   <OS Bus>: Bus number

                   <Os Target>: Target ID that the OS uses

                   <OS Lun>: LUN that the OS uses

Description   This command logs in to the target.

                   This command specifies <OS Lun> from <Target Lun> for the same number of times as the number of LUNs that is specified in <Mapping Count>.

                   Specify "*" (asterisk) for arguments that do not need to be specified.

7   Command   ReportTargetMappings

     Parameter   None

     Description   This command displays the target mapping status.

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8	Command	PersistentLoginTarget \<TargetName\> \<ReportToPNP\> \<TargetPortalAddress\> \<TargetPortal-Socket\> \<InitiatorInstance\> \<Port number\> \<Security Flags\> \<Login Flags\> \<Header Digest\> \<Data Digest\> \<Max Connections\> \<DefaultTime2Wait\> \<DefaultTime2Retain\> \<Username\> \<Password\> \<AuthType\> \<Key\> \<Mapping Count\> \<Target Lun\> \<OS Bus\> \<Os Target\> \<OS Lun\> ...
	Parameter	\<TargetName\>: iSCSI name of the target
		\<TargetToPNP\>: When "T" or "t" is input, a LUN is reported to the OS as a device
		\<TargetPortalAddress\>: IP address or DNS name of the iSCSI port on the ETERNUS AF/DX
		\<TargetPortalSocket\>: TCP port number 3260
		\<Username\>: CHAP user name that is used to log in to the target
		\<Password\>: CHAP password that is used to log in to the target
		\<AuthType\>: The login authentication method
		0 when not using CHAP
		1 when using CHAP
		2 when using bidirectional CHAP
		\<Mapping Count\> : The number of LUNs
		\<Target Lun\>: LUN of the ETERNUS AF/DX
		\<OS Bus\>: Bus number
		\<Os Target\>: Target ID that the OS uses
		\<OS Lun\>: LUN that the OS uses
	Description	This command sets persistent login to the target.
		This command specifies \<OS Lun\> from \<Target Lun\> for the same number of times as the number of LUNs that is specified in \<Mapping Count\>.
		Specify "*" (asterisk) for arguments that do not need to be specified.
9	Command	ListPersistentTargets
	Parameter	None
	Description	This command displays the persistent login setting status.
10	Command	BindPersistentDevices
	Parameter	None
	Description	This command recognizes the device for which target binding is performed and links service startup.

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Appendix B
iSCSICLI Setting Examples

B.1 iSCSI Connection Setting Procedure using the iSCSICLI

The following section shows the procedure for performing iSCSI connection settings using the iSCSICLI:

Procedure

1   Stop the service that is running on the server.

2   Clear all the settings that are related to iSCSI.

   (1)   Execute the following command to start Microsoft® iSCSI Software Initiator.

```
C:\>iscsicpl
```

   (2)   Click the [Discovery] tab to delete all the entries of the iSCSI port.

   (3)   Click the [Favorite Targets] tab to delete all the entries of the favorite targets.

   (4)   Click the [Volumes and Devices] tab to delete all the entries of the volume list.

   (5)   Click the [OK] button.

3   Set target binding using the iSCSICLI.

To use the iSNS server and CHAP authentication, perform settings in this step. The following examples of settings that use batch files are provided.

- An example of a setting that only performs target binding

- An example of a target binding setting that includes iSNS server addition and CHAP authentication setting

4   Check the target binding settings.

Execute the following command:

```
C:\> iscsicli ListPersistentTargets
Microsoft iSCSI Initiator Version 6.1 Build 7600

Total of 2 persistent targets
   Target Name : iqn.2000-09.com.fujitsu:storage-system.eternus-dxl:00010345
   Address and Socket : 192.168.1.110 3260
   Session Type : Data
   Initiator Name : Root\ISCSIPRT\0000_0
   Port Number : <Any Port>
   Security Flags : 0x0
   Version : 0
   Information Specified: 0x20
   Login Flags : 0x0
   Username :
   Session Id : 0-0
   Target Name :
   Initiator :
   Initiator Scsi Device :
   Initiator Bus : 0
   Initiator Target Id : 10
      Target Lun: 0x0 <--> OS Lun: 0x0
      Target Lun: 0x100 <--> OS Lun: 0x1
      Target Lun: 0x200 <--> OS Lun: 0x2
      Target Lun: 0x300 <--> OS Lun: 0x3
      Target Lun: 0x400 <--> OS Lun: 0x4


   Target Name : iqn.2000-09.com.fujitsu:storage-system.eternus-dxl:00010346
   Address and Socket : 192.168.2.110 3260
   Session Type : Data
   Initiator Name : Root\ISCSIPRT\0000_0
   Port Number : <Any Port>
   Security Flags : 0x0
   Version : 0
   Information Specified: 0x20
   Login Flags : 0x0
   Username :
   Session Id : 0-0
   Target Name :
   Initiator :
   Initiator Scsi Device :
   Initiator Bus : 0
   Initiator Target Id : 20
      Target Lun: 0x0 <--> OS Lun: 0x0
      Target Lun: 0x100 <--> OS Lun: 0x1
      Target Lun: 0x200 <--> OS Lun: 0x2
      Target Lun: 0x300 <--> OS Lun: 0x3
      Target Lun: 0x400 <--> OS Lun: 0x4

The operation completed successfully.
```

Check that the Initiator Target Id values are correctly set and that the LUNs (Target LUN) of the ETER-NUS AF/DX correspond to the LUNs that the OS uses (OS LUN).

5   Reboot the server.

6   Check that paths are normally configured using ETERNUS Multipath Manager.

For more details, refer to the ETERNUS Multipath Driver manual.

7   Perform settings for device recognition and service startup synchronization.

Execute the following command to complete the settings that allow the device for which target binding is performed to be recognized at the next OS startup and that allow the service to start up synchronously at the next OS startup.

```
C:\>iscsicli BindPersistentDevices
```

> **N o t e**
>
> - Once settings are made, they are not deleted when the server is restarted.
> - When the system configuration is changed (for example, LUNs are added or the iSCSI name is changed), perform the settings related to the iSCSI connection again by repeating Step 1 to Step 7.

End of procedure

B.2   Target Binding Setting Example

This section provides an example of a batch file that is used in the environment shown below to bind target ID: 10 with CM#0 CA#1 Port#0 and to bind target ID: 20 with CM#1 CA#1 Port#0. The settings of an iSNS server and CHAP are not included.
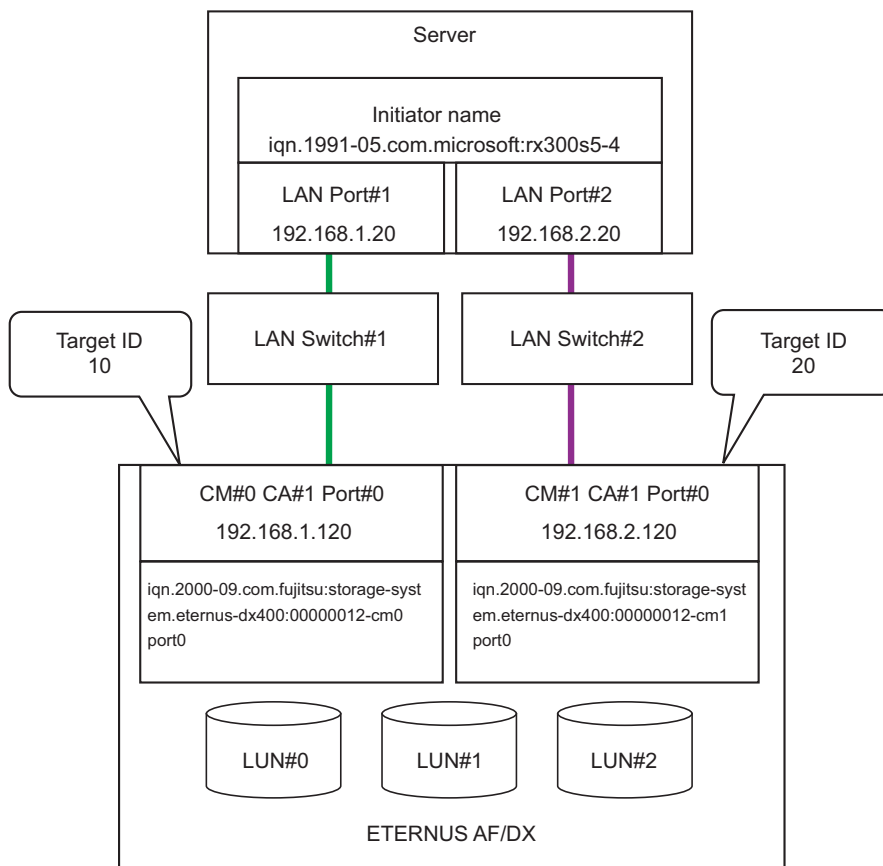
```
@echo off

rem ##########################################
rem # Configuration
rem ##########################################

rem # iSCSI initiator name
rem #--------------------------------
set INITIATOR_NAME=iqn.1991-05.com.microsoft:rx300s5-4

rem # Target portal IP address
rem #--------------------------------
set TARGET_IP1=192.168.1.120
set TARGET_IP2=192.168.2.120

rem # Target portal port number
rem #--------------------------------
set TARGETPORTALSOCKET=3260

rem # Target IQN
rem #--------------------------------
set TARGET_IQN1=iqn.2000-09.com.fujitsu:storage-system.eternus-dx400:00000012-cm0port0
set TARGET_IQN2=iqn.2000-09.com.fujitsu:storage-system.eternus-dx400:00000012-cm1port0

rem # Count of Logical Unit
rem #--------------------------------
set MAPPINGCOUNT=3

rem # Logical Unit number(hex)
rem # You should input LUN like as following format;
rem #
rem # ETERNUS 0x0 = 0x0000000000000000
rem # ETERNUS 0x1 = 0x0000000000000100
rem # ETERNUS 0x2 = 0x0000000000000200
rem # ....
rem # ETERNUS 0xff = 0x000000000000ff00
rem #--------------------------------
set TARGET_LUN1=0x0000000000000000
set TARGET_LUN2=0x0000000000000100
set TARGET_LUN3=0x0000000000000200
```

> Use a 14-digit hexadecimal number + "00" between 0x00000000000000 and 0x000000000000ff to specify the logical unit numbers that are set in the ETERNUS AF/DX. "0" cannot be omitted.

```
rem # TARGET ID(dec)
rem # You should assign fixed number for all target
rem # those are connected to a server.
rem #--------------------------------
set TARGET_ID1=10
set TARGET_ID2=20
```

> Use decimal numbers between 0 and 254 to specify any target IDs.

```
rem ##########################################
rem # Running iSCSICLI commands
rem ##########################################

rem #--------------------------------
rem # set Initiator IQN
rem #--------------------------------
iscsicli NodeName %INITIATOR_NAME%

rem #--------------------------------
rem # set target portal IP
rem #--------------------------------
iscsicli QAddTargetPortal %TARGET_IP1%
iscsicli QAddTargetPortal %TARGET_IP2%
```

> Specify "*" for arguments such as Username and Password that do not need to be specified.

```
rem #--------------------------------
rem # login to Target
rem #--------------------------------
iscsicli LoginTarget %TARGET_IQN1% T %TARGET_IP1% %TARGETPORTALSOCKET% * * * * * * * * * * * * *
%MAPPINGCOUNT% %TARGET_LUN1% 0 %TARGET_ID1% 0 %TARGET_LUN2% 0 %TARGET_ID1% 1 %TARGET_LUN3% 0
%TARGET_ID1% 2
iscsicli LoginTarget %TARGET_IQN2% T %TARGET_IP2% %TARGETPORTALSOCKET% * * * * * * * * * * * * *
%MAPPINGCOUNT% %TARGET_LUN1% 0 %TARGET_ID2% 0 %TARGET_LUN2% 0 %TARGET_ID2% 1 %TARGET_LUN3% 0
%TARGET_ID2% 2


rem #--------------------------------
rem # set PersistentLoginTarget
rem #--------------------------------
iscsicli PersistentLoginTarget %TARGET_IQN1% T %TARGET_IP1% %TARGETPORTALSOCKET% * * * * * * * * *
* * * * %MAPPINGCOUNT% %TARGET_LUN1% 0 %TARGET_ID1% 0 %TARGET_LUN2% 0 %TARGET_ID1% 1 %TARGET_LUN3% 0
%TARGET_ID1% 2
iscsicli PersistentLoginTarget %TARGET_IQN2% T %TARGET_IP2% %TARGETPORTALSOCKET% * * * * * * * * *
* * * * %MAPPINGCOUNT% %TARGET_LUN1% 0 %TARGET_ID2% 0 %TARGET_LUN2% 0 %TARGET_ID2% 1 %TARGET_LUN3% 0
%TARGET_ID2% 2


rem #--------------------------------
rem # reboot
rem #--------------------------------
echo "Reboot the system to reflect iSCSI configuration."
echo "After booting up the system, execute following;"
echo "iscsicli BindPersistentDevices"
```

> Specify "*" for arguments such as Username and Password that do not need to be specified.

B.3   Target Binding Setting Example that Includes iSNS Server Addition and CHAP Authentication Setting

This section provides an example of a batch file that is used in the environment shown below to set the iSNS server and bidirectional CHAP, to bind target ID: 6 with CM#0 CA#1 Port#0, and to bind target ID:8 with CM#1 CA#1 Port#0.
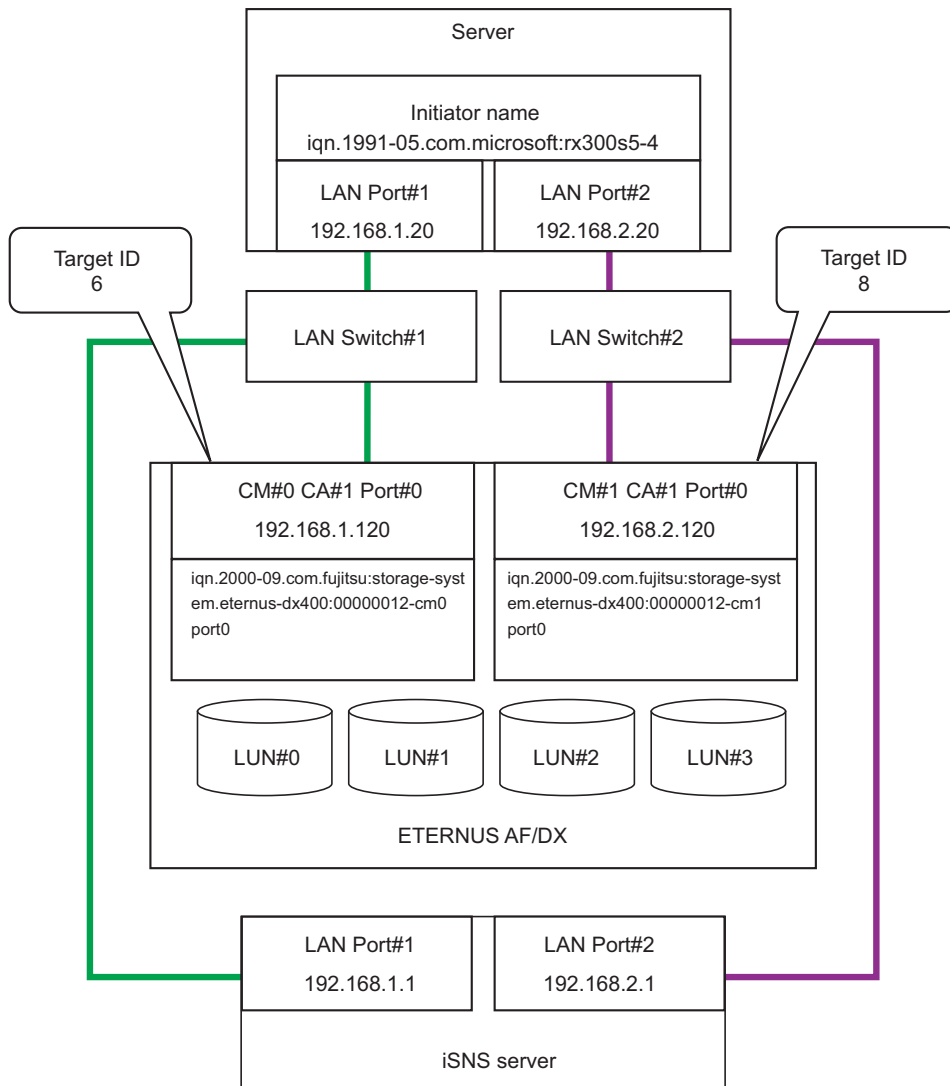
```
@echo off

rem ########################################
rem #              Configuration
rem ########################################

rem # iSCSI initiator name
rem #--------------------------------
set INITIATOR_NAME=iqn.1991-05.com.microsoft:rx300s5-4


rem # iSNS server IP address
rem #--------------------------------
set ISNS_SERVER1=192.168.1.1
set ISNS_SERVER2=192.168.2.1
```
These lines are not necessary when an iSNS server is not used.

```
rem # Target portal IP address
rem #--------------------------------
set TARGET_IP1=192.168.1.120
set TARGET_IP2=192.168.2.120

rem # Target portal port number
rem #--------------------------------
set TARGETPORTALSOCKET=3260

rem # Target IQN
rem #--------------------------------
set TARGET_IQN1=iqn.2000-09.com.fujitsu:storage-system.eternus-dx400:00000012-cm0port0
set TARGET_IQN2=iqn.2000-09.com.fujitsu:storage-system.eternus-dx400:00000012-cm1port0


rem # CHAP Secret: string of initiator CHAP secret
rem #              used for mutual CHAP authentication
rem # User name  : string of CHAP username
rem # Password   : string of target's CHAP secret
rem # Auth Type  : 0 - no authentication
rem #              1 - one-way CHAP
rem #              2 - mutual CHAP
rem #--------------------------------
set CHAP_SECRET=dx400-dx400-dx
```
This line is not necessary for unidirectional CHAP.

```
set USER_NAME=fujitsu
set PASSWORD=irohanihoheto
set AUTHTYPE=2


rem # Count of Logical Unit
rem #--------------------------------
set MAPPINGCOUNT=4

rem # Logical Unit number(hex)
rem # You should input LUN like as following format;
rem #
rem # ETERNUS 0x0  = 0x0000000000000000
rem # ETERNUS 0x1  = 0x0000000000000100
rem # ETERNUS 0x2  = 0x0000000000000200
rem # ....
rem # ETERNUS 0xff = 0x000000000000ff00
rem #--------------------------------
set TARGET_LUN1=0x0000000000000000
set TARGET_LUN2=0x0000000000000100
set TARGET_LUN3=0x0000000000000200
set TARGET_LUN4=0x0000000000000300
```
Use a 14-digit hexadecimal number + "00" between 0x00000000000000 and 0x000000000000ff to specify the logical unit numbers that are set in the ETERNUS AF/DX. "0" cannot be omitted.

```
rem # TARGET ID
rem # You should assign fixed number for all target
rem # those are connected to a server.
rem #--------------------------------
set TARGET_ID1=6
set TARGET_ID2=8
```
Use decimal numbers between 0 and 254 to specify any target IDs.

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```
rem #######################################
rem #          Running iSCSICLI commands
rem #######################################

rem #--------------------------------
rem # set Initiator IQN
rem #--------------------------------
iscsicli NodeName %INITIATOR_NAME%


rem #--------------------------------
rem # set CHAP secret
rem # only to use mutual-CHAP
rem #--------------------------------
iscsicli CHAPSecret %CHAP_SECRET%              This line is not necessary for unidirectional CHAP.


rem #--------------------------------
rem # set iSNS server IP address
rem # only to use iSNS server
rem #--------------------------------
iscsicli AddiSNSServer %ISNS_SERVER1%          These lines are not necessary when an iSNS
iscsicli AddiSNSServer %ISNS_SERVER2%          server is not used.


rem #--------------------------------
rem # set target portal IP
rem #--------------------------------
iscsicli QAddTargetPortal %TARGET_IP1% %USER_NAME% %PASSWORD%
iscsicli QAddTargetPortal %TARGET_IP2% %USER_NAME% %PASSWORD%       Specify "*" for arguments that do not need to
                                                                    be specified.

rem #--------------------------------
rem # login to Target
rem #--------------------------------
iscsicli LoginTarget %TARGET_IQN1% T %TARGET_IP1% %TARGETPORTALSOCKET% * * * * * * * * *
%USER_NAME% %PASSWORD% %AUTHTYPE% * %MAPPINGCOUNT% %TARGET_LUN1% 0 %TARGET_ID1% 0 %TARGET_LUN2% 0
%TARGET_ID1% 1 %TARGET_LUN3% 0 %TARGET_ID1% 2 %TARGET_LUN4% 0 %TARGET_ID1% 3
iscsicli LoginTarget %TARGET_IQN2% T %TARGET_IP2% %TARGETPORTALSOCKET% * * * * * * * * *
%USER_NAME% %PASSWORD% %AUTHTYPE% * %MAPPINGCOUNT% %TARGET_LUN1% 0 %TARGET_ID2% 0 %TARGET_LUN2% 0
%TARGET_ID2% 1 %TARGET_LUN3% 0 %TARGET_ID2% 2 %TARGET_LUN4% 0 %TARGET_ID2% 3


rem #--------------------------------
rem # set PersistentLoginTarget
rem #--------------------------------
iscsicli PersistentLoginTarget %TARGET_IQN1% T %TARGET_IP1% %TARGETPORTALSOCKET% * * * * * * * * *
%USER_NAME% %PASSWORD% %AUTHTYPE% * %MAPPINGCOUNT% %TARGET_LUN1% 0 %TARGET_ID1% 0 %TARGET_LUN2% 0
%TARGET_ID1% 1 %TARGET_LUN3% 0 %TARGET_ID1% 2 %TARGET_LUN4% 0 %TARGET_ID1% 3
iscsicli PersistentLoginTarget %TARGET_IQN2% T %TARGET_IP2% %TARGETPORTALSOCKET% * * * * * * * * *
%USER_NAME% %PASSWORD% %AUTHTYPE% * %MAPPINGCOUNT% %TARGET_LUN1% 0 %TARGET_ID2% 0 %TARGET_LUN2% 0
%TARGET_ID2% 1 %TARGET_LUN3% 0 %TARGET_ID2% 2 %TARGET_LUN4% 0 %TARGET_ID2% 3


rem #--------------------------------
rem # reboot
rem #--------------------------------
echo "Reboot the system to reflect iSCSI configuration."
echo "After booting up the system, execute following;"       Specify "*" for arguments that do not need to
echo "iscsicli BindPersistentDevices"                          be specified.
```

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