FUJITSU Storage ETERNUS AF, ETERNUS DX

Configuration Guide -Server Connection-



(Fibre Channel) for Oracle Solaris



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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 Solaris OS via a Fibre Channel interface.

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

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 12 chapters.

• "Chapter 1 Workflow" (page 6)

This chapter describes the workflow required to connect a server running Solaris OS to an ETERNUS AF/DX.

• "Chapter 2 Checking the Server Environment" (page 22)

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

- "Chapter 3 Notes" (page 25)
 This chapter describes issues that should be noted when connecting the ETERNUS AF/DX storage systems and server.
- "Chapter 4 Setting Up the ETERNUS AF/DX" (page 32)

This chapter describes how to set up the ETERNUS AF/DX storage systems using ETERNUS Web GUI.

- "Chapter 5 Setting Up the Fibre Channel Switches" (page 33)
 This chapter describes how to set up the Fibre Channel switches.
- "Chapter 6 Installing Drivers and Setting Up the Server" (page 35)
 This chapter describes the installation of the Fibre Channel card driver and related server settings.
- "Chapter 7 Setting Up the Server to Recognize the Logical Units" (page 36)
 This chapter describes how to make the server recognize the LUNs of the ETERNUS AF/DX.
- "Chapter 8 Setting the Multipaths" (page 37)
 - This chapter describes how to set multipaths for multipath connection.
- "Chapter 9 Setting a File System" (page 38)
- This chapter describes how to create a file system.
- "Chapter 10 SAN Boot" (page 41) This chapter provides notes for SAN Boot.
- "Chapter 11 Storage Migration" (page 42)
 This chapter describes the procedures that are related to Storage Migration.
- "Chapter 12 Non-disruptive Storage Migration" (page 45)
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Chapter 1 Workflow

This chapter describes the procedure for connecting ETERNUS AF/DX storage systems to a server running Solaris OS.

Procedures may vary according to the Fibre Channel card driver type and connection method.

🔵 Note

When a Fibre Channel switch is used to make the connection, refer to the "Configuration Guide -Server Connection- (Fibre Channel) Fibre Channel Switch Settings" and use the procedure described.

1.1 For Fujitsu Drivers

The following documents may be relevant when using a Fujitsu driver.

Exactly which documents are required depends on the connection environment, see the "Workflow" section that follows for details.

Required Documents

- "Server Support Matrix"
- "Server Support Matrix for FC-SWITCH"
- "Configuration Guide -Server Connection- Storage System Settings" that corresponds to the ETERNUS AF/DX to be connected
- "Configuration Guide -Server Connection- (Fibre Channel) Fibre Channel Switch Settings"
- "Configuration Guide -Server Connection- (Fibre Channel) for Oracle Solaris Driver Settings for Fujitsu Fibre Channel Cards"
- "Configuration Guide -Server Connection- (Fibre Channel) for Oracle Solaris Multipath Driver Settings"
- "ETERNUS Web GUI User's Guide"
- Manuals supplied with the Fibre Channel card, multipath driver, and VxVM

Workflow

Setting Up the ETERNUS AF/DX

Set the various parameters required to operate the ETERNUS AF/DX.

- "Chapter 4 Setting Up the ETERNUS AF/DX" (page 32)
- Checking the setup and maintenance operations
 - "ETERNUS Web GUI User's Guide"
- Setting up the ETERNUS AF/DX
 - "Configuration Guide -Server Connection- Storage System Settings" that corresponds to the ETER-NUS AF/DX to be connected





Setting Up the Fibre Channel Switches

If a Fibre Channel switch is to be used, set it up now.

- "Chapter 5 Setting Up the Fibre Channel Switches" (page 33)
- Setting up the Fibre Channel switches
- "Configuration Guide -Server Connection- (Fibre Channel) Fibre Channel Switch Settings"
- Checking the Fibre Channel switch connection requirements
 - "Server Support Matrix for FC-SWITCH"



Installing the Driver

Install the appropriate driver for the Fibre Channel card being used.

- "Chapter 6 Installing Drivers and Setting Up the Server" (page 35)
- Installing Fibre Channel cards and drivers
 - "Configuration Guide -Server Connection- (Fibre Channel) for Oracle Solaris Driver Settings for Fujitsu Fibre Channel Cards"
- Checking the Fibre Channel card driver versions
 - "Server Support Matrix"



When the ETERNUS Multipath Driver or the GR Multipath Driver is used

When VxVM is used



Setting the Multipaths

Install the multipath software and set up the multipath connections. Settings will depend on which multipath software is being used.

- "Chapter 8 Setting the Multipaths" (page 37)
- "Configuration Guide -Server Connection- (Fibre Channel) for Oracle Solaris Multipath Driver Settings"
- Installing and setting up the Multipath Driver
 Multipath Driver product manual
- Checking the corresponding Multipath Driver
 - "Server Support Matrix"

Setting Up VxVM

Install and set up VxVM when VxVM is used.

- "3.5 Veritas Volume Manager (VxVM) Notes" (page 27)
- "Chapter 8 Setting the Multipaths" (page 37)
- Installing and setting up the Veritas Volume
 Manager
 - VxVM product documentation
- Checking the supported version and use environment
 - "Server Support Matrix"



Creating a File System

Create slices, exactly the same as for a regular disk.



Create a file system, exactly the same as for a regular disk.

• "Chapter 9 Setting a File System" (page 38)

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1.2 For Oracle Drivers

The following documents may be relevant when using an Oracle driver.

Exactly which documents are required depends on the connection environment, see the "Workflow" section that follows for details.

Required Documents

- "Server Support Matrix"
- "Server Support Matrix for FC-SWITCH"
- "Configuration Guide -Server Connection- Storage System Settings" that corresponds to the ETERNUS AF/DX to be connected
- "Configuration Guide -Server Connection- (Fibre Channel) Fibre Channel Switch Settings"
- "Configuration Guide -Server Connection- (Fibre Channel) for Oracle Solaris Driver Settings for Non-Fujitsu Fibre Channel Cards"
- "Configuration Guide -Server Connection- (Fibre Channel) for Oracle Solaris Multipath Driver Settings"
- "ETERNUS Web GUI User's Guide"
- Manuals supplied with the Fibre Channel card, MPxIO, and VxVM

Workflow

Setting Up the ETERNUS AF/DX

Set the various parameters required to operate the ETERNUS AF/DX.

- "Chapter 4 Setting Up the ETERNUS AF/DX" (page 32)
- Checking the setup and maintenance operations
 - "ETERNUS Web GUI User's Guide"
- Setting up the ETERNUS AF/DX
 - "Configuration Guide -Server Connection- Storage System Settings" that corresponds to the ETER-NUS AF/DX to be connected





Setting Up the Fibre Channel Switches

If a Fibre Channel switch is to be used, set it up now.

- "Chapter 5 Setting Up the Fibre Channel Switches" (page 33)
- Setting up the Fibre Channel switches
 - "Configuration Guide -Server Connection- (Fibre Channel) Fibre Channel Switch Settings"
- Checking the Fibre Channel switch connection requirements
 - "Server Support Matrix for FC-SWITCH"





1.3 For Emulex Drivers

The following documents may be relevant when using an Emulex driver.

Exactly which documents are required depends on the connection environment, see the "Workflow" section that follows for details.

Required Documents

- "Server Support Matrix"
- "Server Support Matrix for FC-SWITCH"
- "Configuration Guide -Server Connection- Storage System Settings" that corresponds to the ETERNUS AF/DX to be connected
- "Configuration Guide -Server Connection- (Fibre Channel) Fibre Channel Switch Settings"
- "Configuration Guide -Server Connection- (Fibre Channel) for Oracle Solaris Driver Settings for Non-Fujitsu Fibre Channel Cards"
- "Configuration Guide -Server Connection- (Fibre Channel) for Oracle Solaris Multipath Driver Settings"
- "ETERNUS Web GUI User's Guide"
- Manuals supplied with the Fibre Channel card, multipath driver, and VxVM

Workflow

Setting Up the ETERNUS AF/DX

Set the various parameters required to operate the ETERNUS AF/DX.

- "Chapter 4 Setting Up the ETERNUS AF/DX" (page 32)
- Checking the setup and maintenance operations
 - "ETERNUS Web GUI User's Guide"
- Setting up the ETERNUS AF/DX
 - "Configuration Guide -Server Connection- Storage System Settings" that corresponds to the ETER-NUS AF/DX to be connected





Setting Up the Fibre Channel Switches

If a Fibre Channel switch is to be used, set it up now.

- "Chapter 5 Setting Up the Fibre Channel Switches" (page 33)
- Setting up the Fibre Channel switches
 - "Configuration Guide -Server Connection- (Fibre Channel) Fibre Channel Switch Settings"
- Checking the Fibre Channel switch connection requirements
 - "Server Support Matrix for FC-SWITCH"



Setting the Multipaths

Install the multipath software and set up the mul-Install and set up VxVM when VxVM is used. tipath connections. Settings will depend on which "3.5 Veritas Volume Manager (VxVM) Notes" multipath software is being used. (page 27) • "Chapter 8 Setting the Multipaths" (page 37) "Chapter 8 Setting the Multipaths" (page 37) • "Configuration Guide -Server Connection- (Fibre Installing and setting up the Veritas Volume Channel) for Oracle Solaris Multipath Driver Set-Manager tings" - VxVM product documentation Installing and setting up the Multipath Driver · Checking the supported version and use envi-- Multipath Driver product manual ronment Checking the corresponding Multipath Driver "Server Support Matrix" "Server Support Matrix" **Creating the Volumes** Create slices, exactly the same as for a regular disk. **Creating a File System** Create a file system, exactly the same as for a regular disk. • "Chapter 9 Setting a File System" (page 38)

Setting Up VxVM

1.4 For QLogic Drivers

The following documents may be relevant when using a QLogic driver.

Exactly which documents are required depends on the connection environment, see the "Workflow" section that follows for details.

Required Documents

- "Server Support Matrix"
- "Server Support Matrix for FC-SWITCH"
- "Configuration Guide -Server Connection- Storage System Settings" that corresponds to the ETERNUS AF/DX to be connected
- "Configuration Guide -Server Connection- (Fibre Channel) Fibre Channel Switch Settings"
- "Configuration Guide -Server Connection- (Fibre Channel) for Oracle Solaris Driver Settings for Non-Fujitsu Fibre Channel Cards"
- "ETERNUS Web GUI User's Guide"
- Manuals supplied with the Fibre Channel card and VxVM

Workflow

Setting Up the ETERNUS AF/DX

Set the various parameters required to operate the ETERNUS AF/DX.

- "Chapter 4 Setting Up the ETERNUS AF/DX" (page 32)
- Checking the setup and maintenance operations
 - "ETERNUS Web GUI User's Guide"
- Setting up the ETERNUS AF/DX
 - "Configuration Guide -Server Connection- Storage System Settings" that corresponds to the ETER-NUS AF/DX to be connected

Setting Up the Fibre Channel Switches

If a Fibre Channel switch is to be used, set it up now.

- "Chapter 5 Setting Up the Fibre Channel Switches" (page 33)
- Setting up the Fibre Channel switches
 - "Configuration Guide -Server Connection- (Fibre Channel) Fibre Channel Switch Settings"
- Checking the Fibre Channel switch connection requirements
 - "Server Support Matrix for FC-SWITCH"



Installing the Driver Install the appropriate driver for the Fibre Channel card being used. "Chapter 6 Installing Drivers and Setting Up the Server" (page 35) Installing Fibre Channel cards and drivers "Configuration Guide -Server Connection- (Fibre Channel) for Oracle Solaris Driver Settings for 2 Non-Fujitsu Fibre Channel Cards" Checking the Fibre Channel card driver versions "Server Support Matrix" Setting Up the Server Edit the setup file (/kernel/drv/gla2300.conf) to set the parameters required for connection. • "Chapter 6 Installing Drivers and Setting Up the Server" (page 35) Setting up the server "Configuration Guide -Server Connection- (Fibre Channel) for Oracle Solaris Driver Settings for Non-Fujitsu Fibre Channel Cards" Setting Up the Server to Recognize the Logical Units and Labeling LUN (sd Driver) Edit the setup file (sd.conf) to allow the sd driver to recognize the ETERNUS AF/DX storage systems' logical units. Then, label the LUNs using the "format" command. Setting up the server "Configuration Guide -Server Connection- (Fibre Channel) for Oracle Solaris Driver Settings for 2 Non-Fujitsu Fibre Channel Cards"



1.5 For Brocade Drivers

The following documents may be relevant when using a Brocade driver.

Exactly which documents are required depends on the connection environment, see the "Workflow" section that follows for details.

Required Documents

- "Server Support Matrix"
- "Server Support Matrix for FC-SWITCH"
- "Configuration Guide -Server Connection- Storage System Settings" that corresponds to the ETERNUS AF/DX to be connected
- "Configuration Guide -Server Connection- (Fibre Channel) Fibre Channel Switch Settings"
- "Configuration Guide -Server Connection- (Fibre Channel) for Oracle Solaris Driver Settings for Non-Fujitsu Fibre Channel Cards"
- "Configuration Guide -Server Connection- (Fibre Channel) for Oracle Solaris Multipath Driver Settings"
- "ETERNUS Web GUI User's Guide"
- Manuals supplied with the Fibre Channel card and MPxIO

Workflow

Setting Up the ETERNUS AF/DX

Set the various parameters required to operate the ETERNUS AF/DX.

- "Chapter 4 Setting Up the ETERNUS AF/DX" (page 32)
- Checking the setup and maintenance operations
 - "ETERNUS Web GUI User's Guide"
- Setting up the ETERNUS AF/DX
 - "Configuration Guide -Server Connection- Storage System Settings" that corresponds to the ETER-NUS AF/DX to be connected





Setting Up the Fibre Channel Switches

If a Fibre Channel switch is to be used, set it up now.

- "Chapter 5 Setting Up the Fibre Channel Switches" (page 33)
- Setting up the Fibre Channel switches
 - "Configuration Guide -Server Connection- (Fibre Channel) Fibre Channel Switch Settings"
- Checking the Fibre Channel switch connection requirements
 - "Server Support Matrix for FC-SWITCH"





Create a file system, exactly the same as for a regular disk.

• "Chapter 9 Setting a File System" (page 38)

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 Fibre Channel Cards

Refer to the "Server Support Matrix".

2.4 Multipath Driver

When using the ETERNUS Multipath Driver, GR Multipath Driver, or MPxIO, check the "Server Support Matrix".

2.5 Symantec VxVM

When using Symantec VxVM, check the "Server Support Matrix" for Symantec VxVM usage conditions.

2.6 Oracle OEM VxVM

When using Oracle OEM VxVM, check the "Server Support Matrix" for Oracle OEM VxVM usage conditions.

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2.7 SVM

When using SVM, check the "Server Support Matrix" for SVM usage conditions.

2.8 Clusterware

When using clusterware (such as Veritas Cluster Server, Oracle Solaris Cluster, Oracle RAC), check the "Server Support Matrix" for the usage conditions.

2.9 Fibre Channel Cards that Require an Oracle-brand Driver

Irrespective of their actual origin, the Fibre Channel cards listed in the following table require the use of an Oracle-brand Fibre Channel card driver.

Similarly, install and set up these Fibre Channel cards according to the procedures in the "Driver Settings for Non-Fujitsu Fibre Channel Cards" section in the "Configuration Guide -Server Connection- (Fibre Channel) for Oracle Solaris Driver Settings for Non-Fujitsu Fibre Channel Cards".

Supplier	Fibre Channel card product ID
Fujitsu	• SP1X7FAB2F
	SP1X7FBA2F
	• SP1X5FBA2F
	SP1X7FAA2F
	• SP1X5FAA2F
	SP1X7FAR2F
	SP1X7FAS2F
	• SP1X7FBR2F
	SP1X7FBS2F
	• SE0X7F32F
	• SE0X7F31F
	• SE0X7F22F
	• SE0X7F21F
	XSEFC402AF
	XSEFC402A
	XSEFC401AF
	XSEFC401A
	XSPFC212A
	XSPFC211A
	XSPFC202A
	XSPFC201A
	• X6799A
	• X6768A
	• X6767A
	• X6727A

Supplier	Fibre Channel card product ID
Oracle	• 7101689
(Former Sun)	• 7101683
	• 7101681
	• 7101690
	• 7101684
	• 7101682
	• 7101674
	SG-XPCIE2FC-QF8-Z
	SG-XPCIE1FC-QF8-Z
	SG-XPCIE2FC-EM8-Z
	SG-XPCIE1FC-EM8-Z
	SG-XPCIE2FC-QF4
	SG-XPCIE1FC-QF4
	SG-XPCI2FC-QF4
	SG-XPCI1FC-QF4
	• SG-XPCI2FC-EM4-Z
	SG-XPCI1FC-EM4-Z
	• SG-XPCE2FC-EM4
	SG-XPCE1FC-EM4
	 SG-XPCI2FC-QF2-Z
	SG-XPCI2FC-QF2
	SG-XPCI1FC-QF2
	SG-XPCI1FC-QL2
	SG-XPCI2FC-EM2
	• SG-XPCI1FC-EM2

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

3.1 Server Startup and Power Supply Control Notes

Before turning the server on, check that the ETERNUS AF/DX storage systems and Fibre Channel 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 Fibre Channel 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.

3.2 Instance Management Table Notes

The instance management table is a worksheet that helps make installation, setting up and maintenance of a system easy.

It is important that the system details be recorded after first installing the system and also each time the system is subsequently modified, expanded, or has maintenance work performed on it. Creating a WWN instance management table makes installation and maintenance of the system easy. Use the template instance management tables provided in the "Various Management Table Templates" appendix of the "Configuration Guide -Server Connection- (Fibre Channel) for Oracle Solaris Driver Settings" for type of Fibre Channel cards being used.

3.3 System Design Sheet Notes

The system design sheet is a spreadsheet program work sheet that is used to simplify the process of installing the ETERNUS AF/DX. It is important that the system details be recorded after first installing the system and also each time the system is subsequently modified, expanded, or has maintenance work performed on it. Creating a system design sheet makes installation and maintenance of the system easy.

3.4 Fibre Channel Switch Notes

When a Fibre Channel switch (ETERNUS SN200 series, Brocade series) is to be used between the server and ETERNUS AF/DX, follow the preparation-in-advance and Fibre Channel switch setup procedures given in the "Configuration Guide -Server Connection- (Fibre Channel) Fibre Channel Switch Settings".

- Which Fibre Channel switches can be connected to the ETERNUS AF/DX varies depending on the connection environment (server OS and ETERNUS AF/DX model). Refer to "Server Support Matrix for FC-SWITCH" to check the available Fibre Channel switches in advance.
- When connecting any of the following Fibre Channel cards to a Fibre Channel switch, Fibre Channel switch ports must be set:
- SP1X7FAB2F
- SP1X7FAA2F
- SP1X5FAA2F
- SE0X7F22F
- SEOX7F21F
- XSPFC212A
- XSPFC202A
- XSPFC211A
- XSPFC201A
- Oracle Fibre Channel cards (with a "QF" or "QL" designation model name)
- QLogic Fibre Channel cards (using Oracle brand drivers)

Set the link speeds of the Fibre Channel switch ports that connect to the Fibre Channel cards installed in the server according to the following table:

Combination of the devices		Sat the Eibre Channel switch port link		
Maximum link speed of Fibre Channel card	Maximum link speed of the Fibre Channel switch	speed to		
16Gbit/s	32Gbit/s	16Gbit/s fixed		
	16Gbit/s	16Gbit/s fixed		
	8Gbit/s	8Gbit/s fixed		
	4Gbit/s	4Gbit/s fixed		
	2Gbit/s	-		
8Gbit/s	32Gbit/s	8Gbit/s fixed		
	16Gbit/s	8Gbit/s fixed		
	8Gbit/s	8Gbit/s fixed		
	4Gbit/s	4Gbit/s fixed		
	2Gbit/s	2Gbit/s fixed		
4Gbit/s	32Gbit/s	-		
	16Gbit/s	4Gbit/s fixed		
	8Gbit/s	4Gbit/s fixed		
	4Gbit/s	4Gbit/s fixed		
	2Gbit/s	2Gbit/s fixed		
2Gbit/s	32Gbit/s	-		
	16Gbit/s	-		
	8Gbit/s	2Gbit/s fixed		
	4Gbit/s	2Gbit/s fixed		
	2Gbit/s	2Gbit/s fixed		

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3.5 Veritas Volume Manager (VxVM) Notes

3.5.1 Driver Notes

The hddv driver cannot be used with VxVM.

The required driver varies depending on Fibre Channel card manufacturer.

Fibre Channel card	Driver
Fujitsu-brand	sd
Emulex-brand	sd
QLogic-brand	sd
Oracle-brand	ssd

3.5.2 Symantec VxVM

Installing VxVM

VxVM should be installed as specified in its accompanying documentation.

- For VxVM 5.0
 - Confirm and acquire the ASL required for using the ETERNUS AF/DX storage systems from the following Veritas web-site.
 - https://sort.veritas.com/asl
 - Install Veritas Array Support Library (ASL) after installing VxVM.
- For VxVM 5.1 or later

ASL does not need to be installed.

3.5.3 Oracle OEM VxVM

- When installing VxVM in Oracle Solaris Cluster configuration, use Oracle OEM version of VxVM.
- When using MPxIO as the multipath driver Disable the "dmp_fast_recovery" DMP kernel parameter. Refer to the Symantec web-site for details.
- Installing VxVM

VxVM should be installed as specified in its accompanying documentation.

- For VxVM 5.0
 - Confirm and acquire the ASL required for using the ETERNUS AF/DX storage systems from the following Veritas web-site.
 - https://sort.veritas.com/asl
 - Install Veritas Array Support Library (ASL) after installing VxVM.

3.6 Notes for Veritas Volume Manager Dynamic Multipathing (VxVM DMP)

When using the VxVM DMP function, do not use it with a single path configuration.

3.7 Veritas Cluster Server (VCS) Notes

Veritas Cluster Server should be installed according to the directions given in the documentation provided with Veritas Cluster Server.

3.8 MPxIO Notes

When connecting the ETERNUS AF/DX storage systems to a server with MPxIO installed, host responses must be set for the ETERNUS AF/DX storage systems.

Also, check the "Server Support Matrix" for MPxIO support conditions.

MPxIO must be disabled in the setup file for the paths of connected devices that MPxIO does not support (such as a tape device).

3.9 Oracle Solaris Cluster Installation Notes

Before installing the Oracle Solaris Cluster software, carefully read the following notes and check the Oracle web-site (https://www.oracle.com), etc.

3.9.1 Supported Versions and Hardware

When installing Oracle Solaris Cluster on a server that is connected to an ETERNUS AF/DX, check the "Server Support Matrix" for usage conditions.

3.9.2 Multipath Configuration

When connecting an Oracle Solaris Cluster server to ETERNUS AF/DX storage systems via a multipath configuration, the Sun StorEdge Traffic Manager (MPxIO) multipath driver must be installed.

3.9.3 Reset Group Setting

When connecting an Oracle Solaris Cluster server to ETERNUS AF/DX storage systems, reset groups must be set for the ETERNUS AF/DX storage systems.

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3.9.4 Host Response Setting

When connecting an Oracle Solaris Cluster server to ETERNUS AF/DX storage systems, host responses must be set for the ETERNUS AF/DX storage systems.

3.9.5 Installing VxVM

If installing VxVM on an Oracle Solaris Cluster server, use the Oracle OEM version of VxVM. Refer to "3.5.3 Oracle OEM VxVM" (page 27) for details.

3.9.6 Number of Nodes

The maximum number of nodes is four.

3.9.7 Oracle Solaris Cluster Data Service for Oracle Application Server (RAC)

When multiple shared disks are configured in an Oracle Solaris Cluster environment, symptoms such as server panics may occur.

Increase parameter values if a problem occurs with the parameter values in the list. Refer to the Oracle web-site (https://www.oracle.com) for setting procedure details.

When using VxVM in an Oracle Solaris Cluster Data Service for Oracle environment

Set the following "SUNW.rac_cvm" resource advanced properties as indicated.

Refer to the Oracle web-site (https://www.oracle.com) for setting procedure details.

Required parameter values

		Setting value			
SUNW.rac_cvm advanced property			Sun Cluster 3.1		
	Default value	Oracle Solaris Cluster 3.2	No. of shared disks is 128 or less	No. of shared disks is 129 or more	
reservation_timeout	325	6000	525	6000	
cvm_start_step_timeout	120	120	120	120	
cvm_stop_step_timeout	40	40	40	40	
cvm_abort_step_timeout	40	40	40	40	
cvm_return_step_timeout	120	120	120	120	
cvm_step1_timeout	100	400	200	400	
cvm_step2_timeout	100	400	200	400	
cvm_step3_timeout	240	6000	720	6000	
cvm_step4_timeout	320	4000	1380	4000	

• Example:

- Oracle Solaris Cluster 3.2

Using the "clresource" command to change the value of the "cvm_step4_timeout" advanced property parameter to "4000".

```
# clresource set -p cvm_step4_timeout=4000 rac_cvm-rs
```

- Sun Cluster 3.1

Using the "scrgadm" command to change the value of the "cvm_step2_timeout" advanced property parameter to "200".

```
#scrgadm -c -j rac_cvm -x cvm_step2_timeout=200
```

• When using SVM in an Oracle Solaris Cluster Data Service for Oracle environment

Set the following "rac_udlm" and "rac_svm" resource advanced properties as indicated. Refer to the Oracle web-site (https://www.oracle.com) for setting procedure details.

• Required "rac_udlm" advanced property parameter values

rac_udlm advanced property	Default value	Setting value		
		Oracle Solaris Cluster 3.2		
Udlm_start_step_timeout	100	100		
Udlm_abort_step_timeout	100	100		
Udlm_step1_timeout	100	100		
Udlm_step2_timeout	100	100		
Udlm_step3_timeout	100	100		
Udlm_step4_timeout	100	1300		
Udlm_step5_timeout	100	100		

Example:

Using the "clresource" command to change the value of the "Udlm_step4_timeout" advanced property parameter to "1300".

```
# clresource set -p udlm_step4_timeout=1300 rac-udlm-rs
```

Required "rac_svm" advanced property parameter values

rac_svm advanced property	Default value	Setting value		
		Oracle Solaris Cluster 3.2		
Svm_step1_timeout	120	120		
Svm_step2_timeout	120	120		
Svm_step3_timeout	120	120		
Svm_step4_timeout	120	120		
Svm_return_step_timeout	120	360		
Svm_abort_step_timeout	120	120		
Svm_stop_step_timeout	120	120		

rac_svm advanced property	Default value	Setting value	
		Oracle Solaris Cluster 3.2	
Svm_start_step_timeout	120	120	

• Example:

Using the "clresource" command to change the value of the "svm_return_step_timeout" advanced property parameter to "360".

clresource set -p svm_return_step_timeout=360 rac-svm-rs

3.10 hddv Driver Notes

Use the hddv driver if it is already installed and used. Do not use the hddv driver for new connections.

Chapter 4 Setting Up the ETERNUS AF/DX

Set up the ETERNUS AF/DX storage systems using ETERNUS Web GUI.

ETERNUS AF/DX setup can be performed independently of server setup. For details on how to perform these settings, refer to the following manuals.

- "Configuration Guide -Server Connection- Storage System Settings" that corresponds to the ETERNUS AF/DX to be connected
- "ETERNUS Web GUI User's Guide"

Chapter 5 Setting Up the Fibre Channel Switches

Perform the settings required to connect the ETERNUS AF/DX storage systems and server via the Fibre Channel switch, according to "Configuration Guide -Server Connection- (Fibre Channel) Fibre Channel Switch Settings".

Caution

If the access path is set with ETERNUS SF Storage Cruiser, the Host Response settings are set to the default values.

If the Host Response settings are changed from the default values, set the Host Response again.

The following examples show configurations in which a server is connected to a Fibre Channel switch with zoning.

The following example shows a configuration for multiple servers.



FUJITSU Storage ETERNUS AF, ETERNUS DX Configuration Guide -Server Connection- (Fibre Channel) for Oracle Solaris Copyright 2020 FUJITSU LIMITED



The following example shows a configuration for a single server.

Chapter 6 Installing Drivers and Setting Up the Server

Install the Fibre Channel Card driver, and then set up the server environment.

Refer to each "Configuration Guide -Server Connection- (Fibre Channel) for Oracle Solaris" for detailed setting procedures.

- "Configuration Guide -Server Connection- (Fibre Channel) for Oracle Solaris Driver Settings for Fujitsu Fibre Channel Cards"
- "Configuration Guide -Server Connection- (Fibre Channel) for Oracle Solaris Driver Settings for Non-Fujitsu Fibre Channel Cards"

Chapter 7 Setting Up the Server to Recognize the Logical Units

Refer to each "Configuration Guide -Server Connection- (Fibre Channel) for Oracle Solaris" for detailed setting procedures.

- "Configuration Guide -Server Connection- (Fibre Channel) for Oracle Solaris Driver Settings for Fujitsu Fibre Channel Cards"
- "Configuration Guide -Server Connection- (Fibre Channel) for Oracle Solaris Driver Settings for Non-Fujitsu Fibre Channel Cards"

Caution

Skip this chapter if using the ETERNUS Multipath Driver "grmpdautoconf" command, since logical units are automatically recognized.

Chapter 8 Setting the Multipaths

• Multipaths must be set up for multipath connection.

Install the multipath software and set up the multipath connections as detailed in the applicable documentation.

- "Configuration Guide -Server Connection- (Fibre Channel) for Oracle Solaris Multipath Driver Settings"
- When using VxVM DMP without a multipath driver, install and set it up as detailed in its accompanying documentation and the "Server Support Matrix".

Chapter 9 Setting a File System

9.1 Creating a File System

The file system is created using exactly the same procedure as when creating a file system on a regular disk. In each case, a confirmation message will be displayed after the command is executed. Enter "y" in response to create the new file system.

• When using single-path connection with the sd driver or hddv driver Example command:

newfs /dev/rdsk/c4t16d0s0

• When using the ETERNUS Multipath Driver Example command:

newfs /dev/FJSVmplb/rdsk/mplb0s0

• When using single-path connection with the Oracle Fibre Channel card or the Brocade Fibre Channel card Example command:

newfs /dev/rdsk/c2t2050000B5D6A0109d4s0

• When using the MPxIO with the Oracle Fibre Channel card or the Brocade Fibre Channel card Example command:

newfs /dev/rdsk/c7t6000B5D0006A0000006A010900620000d0s0

When using VxVM

Example command:

```
# newfs /dev/vx/rdsk/dg0/v0
```

When using SVM

Example command:

newfs /dev/md/rdsk/d0

9.2 Setting Up Automatic Disk Mounting

The "/etc/vfstab" file can be edited so that the ETERNUS AF/DX storage systems' disks are mounted each time the system is booted in exactly the same way as for regular disks. The mount directories must be created beforehand.

For the following example, the "/mnt" mount directory should be created beforehand.

Procedure

1 Backup "/etc/vfstab" file.

cp /etc/vfstab /etc/vfstab.standard

2 Open the "/etc/vfstab" file using a text editor.

```
#device device mount FS fsck mount mount
#to mount to fsck point type pass at boot options
fd - /dev/fd fd - no -
/proc - /proc proc - no -
/dev/dsk/c0t0d0s4 - - #wap - no -
/dev/dsk/c0t0d0s0 /dev/rdsk/c0t0d0s0 / ufs 1 no -
/dev/dsk/c0t0d0s6 /dev/rdsk/c0t0d0s6 /usr ufs 1 no -
/dev/dsk/c0t0d0s3 /dev/rdsk/c0t0d0s3 /uar ufs 1 no -
/dev/dsk/c0t0d0s7 /dev/rdsk/c0t0d0s7 /export/hone ufs 2 yes -
/dev/dsk/c0t0d0s5 /dev/rdsk/c0t0d0s5 / opt ufs 2 yes -
/dev/dsk/c0t0d0s1 /dev/rdsk/c0t0d0s1 /usr/openwin ufs 2 yes -
swap - /tmp tmpfs - yes
```

- 3 Add the following line.
 - When using single-path connection with the sd driver or hddv driver

/dev/dsk/c4t16d0s0 /dev/rdsk/c4t16d0s0 /mnt ufs 2 yes -

• When using the ETERNUS Multipath Driver

/dev/FJSVmplb/dsk/mplb0s0 /dev/FJSVmplb/rdsk/mplb0s0 /mnt ufs 2 yes -

• When using single-path connection with the Oracle Fibre Channel card or the Brocade Fibre Channel card

/dev/dsk/c2t2050000B5D6A0109d4s0 /dev/rdsk/c2t2050000B5D6A0109d4s0 /mnt ufs 2 yes -

• When using the MPxIO with the Oracle Fibre Channel card or the Brocade Fibre Channel card

```
/dev/dsk/c7t6000B5D0006A0000006A010900620000d0s0 /dev/rdsk/c7t6000B5D0006A0000
006A010900620000d0s0 /mnt ufs 2 yes -
```

End of procedure

Specify the parameters in the "/etc/vfstab" file as shown below.

device to mount

Specify the block device.

device to fsck

Specify the raw device.

• mount point

Specify the mount directory.

FS type

Specify the file system type. Normally "ufs" should be specified.

• fsck pass

Specify whether and with what priority "fsck" should be performed.

mount at boot

Specify whether or not to auto-mount the device when the system is booted.

• mount options

Specify the mount options. Normally "-" may be specified.

Chapter 10 SAN Boot

- Refer to "Server Support Matrix" to check the support status of SAN Boot and refer to the manual of the server, OS, or the Fibre Channel card that is to be used.
- When using a logical unit (LUN) of the ETERNUS AF/DX storage systems as a boot disk, make sure that the LUN has enough capacity to install the OS.

Chapter 11 Storage Migration

This chapter explains how to configure the server for performing Storage Migration.

When Storage Migration is performed, configure the settings so that the ETERNUS AF/DX LUNs can be used from the server (Solaris OS).

Setting Procedure Outline

Execute the operation to start Storage Migration from ETERNUS Web GUI. Perform all other operations in the server (Solaris OS).

In this procedure, MPxIO or ETERNUS Multipath Driver is used as the multipath driver.

The Storage Migration procedure differs depending on the file system (UFS/ZFS) and volume usage (file system/Raw).

If the file system is UFS

- 1 Unmount the UFS.
- 2 Start Storage Migration, change the connection destination to the migration destination ETERNUS AF/DX, and then reboot the server.
- 3 Mount the UFS.

Change the setting so that the UFS is mounted on the WWID of the LUN used for the migration destination ETERNUS AF/DX.

• If the file system is ZFS

- 1 Change the ZFS to a legacy mount.
- 2 Unmount the ZFS.
- 3 Export the ZFS storage pool.
- 4 Start Storage Migration, change the connection destination to the migration destination ETERNUS AF/DX, and then reboot the server.
- 5 Check the status of the storage pool targeted for import.
- 6 Import the ZFS storage pool.
- 7 Mount the ZFS.

- If the volume usage is Raw
 - 1 Start Storage Migration, change the connection destination to the migration destination ETERNUS AF/DX, and then reboot the server.
 - 2 Change the access destination from the Raw device in the migration source to the Raw device in the migration destination.

Change the setting so that Raw device access occurs on the WWID of the LUN used for the migration destination ETERNUS AF/DX.

Example Setting Procedure

The following procedure shows an example configuration for Solaris 10 OS using the ZFS file system.

Procedure

1 Change the ZFS to a legacy mount.

Caution

For ZFS, be sure to change the file to a legacy mount before performing Storage Migration. If this change is not made, the OS might not boot correctly when the system is restarted.

2 Unmount the ZFS.

```
# umount /mnt/zfsdisk05
# umount /mnt/zfsdisk06
```

3 Export the ZFS storage pool.

```
# zpool export mirpool
# zpool export rzpool
```

4 Start Storage Migration from ETERNUS Web GUI and then change the connection destination to the migration destination ETERNUS AF/DX and reboot the server.

5 Check the status of the storage pool targeted for import.

```
____
                          _____
                                                                  ←For MPxIO
 # zpool import -d /dev/dsk
                                                   ←For ETERNUS Multipath Driver
# zpool import -d /dev/FJSVmplb/dsk
   pool: rzpool
     id: 3645995400401482705
  state: ONLINE
 action: The pool can be imported using its name or numeric identifier.
 config:
         rzpool
                                                   ONLINE
          raidz1-0
                                                   ONLINE
             c0t600000E00D2B0000002B010100890000d0s2 ONLINE
             c0t600000E00D2B0000002B0101008A0000d0s2 ONLINE
   pool: mirpool
     id: 11398510775994745273
  state: ONLINE
 action: The pool can be imported using its name or numeric identifier.
 config:
         mirpool
                                                   ONLINE
          mirror-0
                                                   ONLINE
            c0t600000E00D2B0000002B010100870000d0s2 ONLINE
             c0t600000E00D2B0000002B010100880000d0s2 ONLINE
   pool: rpool
     id: 10723447509862228509
  state: UNAVAIL
 status: The pool is formatted using an incompatible version.
 action: The pool cannot be imported. Access the pool on a system running newer
         software, or recreate the pool from backup.
    see: http://www.sun.com/msg/ZFS-8000-A5
 config:
                                  UNAVAIL newer version
         rpool
           c0t5000CCA0128C25C8d0s0 ONLINE
   pool: rpool
     id: 7281854536702749583
 #
```

6 Import the ZFS storage pool.

<pre># zpool import -d /dev/dsk mirpool # zpool import -d /dev/dsk rzpool</pre>	←For MPxIO ←For MPxIO
<pre># zpool import -d /dev/FJSVmplb/dsk mirpool # zpool import -d /dev/FJSVmplb/dsk rzpool</pre>	←For ETERNUS Multipath Driver ←For ETERNUS Multipath Driver

7 Mount the ZFS.

```
# mount -F zfs mirpool/data1 /mnt/zfsdisk05
# mount -F zfs rzpool/data1 /mnt/zfsdisk06
```

End of procedure

After this procedure is completed, the ZFS can be used in the migration destination ETERNUS AF/DX the same way as before the migration.

Chapter 12 Non-disruptive Storage Migration

This chapter describes the procedures for connecting and disconnecting paths and provides notes for when the Non-disruptive Storage Migration function is used in the example environment that uses MPxIO or ETER-NUS Multipath Driver and runs Solaris OS.

12.1 MPxIO Multipath Driver

Connecting Paths

The following procedure shows how to add a path to the migration destination storage system from the server (Solaris OS) after the migration destination storage system is connected.

Procedure

1 Check the multipath status.

In the following example, each LUN has two paths.

🔵 N o t e

The first LUN is not the target for multipath.

```
# mpathadm list lu
        /dev/rdsk/c0t50000394C8091758d0s2
               Total Path Count: 1
               Operational Path Count: 1
        /dev/rdsk/c0t6000B5D0006A0000006A0BA000360000d0s2
               Total Path Count: 2
               Operational Path Count: 2
        /dev/rdsk/c0t6000B5D0006A0000006A0BA000350000d0s2
               Total Path Count: 2
               Operational Path Count: 2
        /dev/rdsk/c0t6000B5D0006A0000006A0BA000340000d0s2
               Total Path Count: 2
               Operational Path Count: 2
        /dev/rdsk/c0t6000B5D0006A0000006A0BA000330000d0s2
               Total Path Count: 2
               Operational Path Count: 2
        /dev/rdsk/c0t6000B5D0006A0000006A0BA000310000d0s2
               Total Path Count: 2
               Operational Path Count: 2
        /dev/rdsk/c0t6000B5D0006A0000006A0BA000300000d0s2
               Total Path Count: 2
               Operational Path Count: 2
        /dev/rdsk/c0t6000B5D0006A0000006A0BA0002F0000d0s2
               Total Path Count: 2
               Operational Path Count: 2
        /dev/rdsk/c0t6000B5D0006A0000006A0BA0002E0000d0s2
                Total Path Count: 2
                Operational Path Count: 2
```

2 Connect the multipath.

#

Add the host affinity setting to the migration destination storage system.

#

3 Reconfigure the server device.

Execute the following command to have the added paths be recognized by the server.

cfgadm -al

4 Check the multipath status again.

> In the following example, two paths are added to each LUN and they becomes a four-path configuration.

```
# mpathadm list lu
        /dev/rdsk/c0t50000394C8091758d0s2
               Total Path Count: 1
               Operational Path Count: 1
        /dev/rdsk/c0t6000B5D0006A0000006A0BA000360000d0s2
               Total Path Count: 4
               Operational Path Count: 4
        /dev/rdsk/c0t6000B5D0006A0000006A0BA000350000d0s2
               Total Path Count: 4
               Operational Path Count: 4
        /dev/rdsk/c0t6000B5D0006A0000006A0BA000340000d0s2
               Total Path Count: 4
               Operational Path Count: 4
        /dev/rdsk/c0t6000B5D0006A0000006A0BA000330000d0s2
               Total Path Count: 4
               Operational Path Count: 4
        /dev/rdsk/c0t6000B5D0006A0000006A0BA000310000d0s2
               Total Path Count: 4
               Operational Path Count: 4
        /dev/rdsk/c0t6000B5D0006A0000006A0BA000300000d0s2
               Total Path Count: 4
                Operational Path Count: 4
        /dev/rdsk/c0t6000B5D0006A0000006A0BA0002F0000d0s2
               Total Path Count: 4
               Operational Path Count: 4
        /dev/rdsk/c0t6000B5D0006A000006A0BA0002E0000d0s2
               Total Path Count: 4
                Operational Path Count: 4
```

End of procedure

Disconnecting the Path

The following procedure shows how to delete a path of the migration destination storage system from the server (Solaris OS) after the migration source storage system is disconnected.

Procedure

1 Disconnect the multipath.

Disconnect the paths between the migration source storage system and the server.

2 Check the multipath status.

> In the following example, the configuration described in Step 4 of "
> Connecting Paths" (page 46) (where each LUN has four paths) is changed to two paths for each LUN.

```
# mpathadm list lu
        /dev/rdsk/c0t50000394C8091758d0s2
                Total Path Count: 1
               Operational Path Count: 1
        /dev/rdsk/c0t6000B5D0006A0000006A0BA000360000d0s2
               Total Path Count: 4
                Operational Path Count: 2
        /dev/rdsk/c0t6000B5D0006A0000006A0BA000350000d0s2
                Total Path Count: 4
                Operational Path Count: 2
        /dev/rdsk/c0t6000B5D0006A0000006A0BA000340000d0s2
               Total Path Count: 4
                Operational Path Count: 2
        /dev/rdsk/c0t6000B5D0006A0000006A0BA000330000d0s2
                Total Path Count: 4
                Operational Path Count: 2
        /dev/rdsk/c0t6000B5D0006A0000006A0BA000310000d0s2
               Total Path Count: 4
                Operational Path Count: 2
        /dev/rdsk/c0t6000B5D0006A0000006A0BA000300000d0s2
                Total Path Count: 4
                Operational Path Count: 2
        /dev/rdsk/c0t6000B5D0006A0000006A0BA0002F0000d0s2
                Total Path Count: 4
                Operational Path Count: 2
        /dev/rdsk/c0t6000B5D0006A0000006A0BA0002E0000d0s2
                Total Path Count: 4
                Operational Path Count: 2
```

🔵 Note

#

For the value of "Total Path Count", although the value remains the same as when paths are connected even after the paths are disconnected, there is no problem.

After the server is rebooted, the configuration is recognized and the correct value is applied.

End of procedure

Notes

If the ALUA setting differs between the migration source and migration destination storage systems, all the paths in the storage system where the ALUA setting is "ACTIVE / ACTIVE" and the priority paths in the storage system where the ALUA setting is "ACTIVE / PREFERRED_PATH" are set as the priority path group while the path is connected. After the path is disconnected, the path group specified in the ALUA setting of the migration destination storage system is used.

The "mpathadm show lu" command displays the detailed path information for each LUN.

The following shows the state before the path is connected, while the path is connected, and after the path is disconnected.

Before the path is connected

Because the migration source is "ACTIVE / ACTIVE", both paths become the priority path group.

```
Logical Unit: /dev/rdsk/c0t6000B5D0006A0000006A0BA000360000d0s2
       mpath-support: libmpscsi vhci.so
       Vendor: FUJITSU
       Product: ETERNUS DX400
       Revision: 0000
       Name Type: unknown type
       Name: 6000b5d0006a000006a0ba000360000
       Asymmetric: yes
       Current Load Balance: round-robin
       Logical Unit Group ID: NA
       Auto Failback: on
       Auto Probing: NA
       Paths:
               Initiator Port Name: 21000024ff363302
               Target Port Name: 2049000b5d6a0ba0
               Override Path: NA
               Path State: OK
               Disabled: no
               Initiator Port Name: 21000024ff36332a
               Target Port Name: 2048000b5d6a0ba0
               Override Path: NA
               Path State: OK
               Disabled: no
       Target Port Groups:
               TD: 17
               Explicit Failover: no
               Access State: active optimized
               Target Ports:
                      Name: 2049000b5d6a0ba0
                      Relative ID: 73
               ID: 16
               Explicit Failover: no
               Access State: active optimized
               Target Ports:
                       Name: 2048000b5d6a0ba0
                       Relative ID: 72
```

• While the path is connected

Because the storage system is mixed with "ACTIVE / ACTIVE" paths and "ACTIVE-ACTIVE / PREFERRED_PATH" paths, four paths exist (three priority path groups and one standby path group).

Logical Unit: /dev/rdsk/c0t6000B5D0006A0000006A0BA000360000d0s2 mpath-support: libmpscsi_vhci.so Vendor: FUJITSU Product: ETERNUS DX400 Revision: 0000 Name Type: unknown type Name: 6000b5d0006a000006a0ba000360000 Asymmetric: yes Current Load Balance: round-robin Logical Unit Group ID: NA Auto Failback: on Auto Probing: NA Paths: Initiator Port Name: 21000024ff363302 Target Port Name: 2049000b5d6a0ba0 Override Path: NA Path State: OK Disabled: no Initiator Port Name: 21000024ff36332a Target Port Name: 2048000b5d6a0ba0 Override Path: NA Path State: OK Disabled: no Initiator Port Name: 21000024ff36332a Target Port Name: 500000e0da120921 Override Path: NA Path State: OK Disabled: no Initiator Port Name: 21000024ff363302 Target Port Name: 500000e0da120931 Override Path: NA Path State: OK Disabled: no (Continued on the next page)

```
(Continued from the previous page)
       Target Port Groups:
              ID: 17
               Explicit Failover: no
               Access State: active optimized
               Target Ports:
                      Name: 2049000b5d6a0ba0
                      Relative ID: 73
               ID: 16
               Explicit Failover: no
               Access State: active optimized
               Target Ports:
                      Name: 2048000b5d6a0ba0
                      Relative ID: 72
               ID: 32897
               Explicit Failover: no
               Access State: active optimized
               Target Ports:
                      Name: 500000e0da120921
                      Relative ID: 16513
               ID: 32913
               Explicit Failover: no
               Access State: active not optimized
               Target Ports:
                      Name: 500000e0da120931
                      Relative ID: 16529
```

After the path is disconnected

Because the migration destination is "ACTIVE-ACTIVE / PREFERRED_PATH", only one path becomes the priority path group.

Logical Unit: /dev/rdsk/c0t6000B5D0006A0000006A0BA000360000d0s2 mpath-support: libmpscsi vhci.so Vendor: FUJITSU Product: ETERNUS DX400 Revision: 0000 Name Type: unknown type Name: 6000b5d0006a000006a0ba000360000 Asymmetric: yes Current Load Balance: round-robin Logical Unit Group ID: NA Auto Failback: on Auto Probing: NA Paths: Initiator Port Name: 21000024ff363302 Target Port Name: 500000e0da120931 Override Path: NA Path State: OK Disabled: no Initiator Port Name: 21000024ff36332a Target Port Name: 500000e0da120921 Override Path: NA Path State: OK Disabled: no Target Port Groups: ID: 32913 Explicit Failover: no Access State: active not optimized Target Ports: Name: 500000e0da120931 Relative ID: 16529 ID: 32897 Explicit Failover: no Access State: active optimized Target Ports: Name: 500000e0da120921 Relative ID: 16513

12.2 ETERNUS Multipath Driver

Connecting Paths

The following procedure shows how to add a path to the migration destination storage system from the server (Solaris OS) after the migration destination storage system is connected.

Procedure

1 Check the multipath status.

In the following example, each LUN has two paths.



2 Connect the multipath.

Add the host affinity setting to the migration destination storage system.

3 Reconfigure the server device.

Execute the following command to have the added paths be recognized by the server.

```
# cfgadm -al
```

4 Install the added paths in the server.

5 Check the multipath status again.

In the following example, two paths are added to each LUN which then becomes a four-path configuration.

<pre># /usr/opt/FJSViomp/bin/iompadm info</pre>							
IOMP: /dev/FJSVmplb/fiomp/adm0							
Element:							
/dev/rdsk/c2t2048000B5D6A0BA0d0s2 /dev/rdsk/c3t2049000B5D6A0BA0d0s2	online online	active block standby block	"good status "good status	[ETERNUS_DX400- [ETERNUS_DX400-	6A0BA0-CM10-CA40-PORT10] 6A0BA0-CM11-CA41-PORT12]	(ssd7)" (ssd15)"	
/dev/rdsk/c2t500000E0DA120921d0s2	online	active block	"good status	[ETERNUS_DX400-	281209-CM10-CA10-PORT01]	(ssd31)"	←Added path
/dev/rdsk/c3t500000E0DA120931d0s2	online	standby block	"good status	[ETERNUS_DX400-	281209-CM11-CA11-PORT03]	(ssd39)"	←Added path
Node:							
/dev/F33Vmplb/rdsk/mplb0a0 /dev/F33Vmplb/rdsk/mplb0a1 /dev/F33Vmplb/rdsk/mplb0a2 /dev/F33Vmplb/rdsk/mplb0a3 /dev/F33Vmplb/rdsk/mplb0a4 /dev/F33Vmplb/rdsk/mplb0a5 /dev/F33Vmplb/rdsk/mplb0a5							
/dev/FJSVmplb/rdsk/mplb0s7							
Function:							
MPmode=true AutoPath=true							
Block=true							
NeedSync=false							
(Omitted)							

End of procedure

Disconnecting the Path

The following procedure shows how to delete a path of the migration destination storage system from the server (Solaris OS) after the migration source storage system is disconnected.

Procedure

1 Disconnect the multipath.

Disconnect the paths between the migration source storage system and the server.

2 Check the multipath status.

Confirm that the state of the disconnected path is "warning" or "failed".

<pre># /usr/opt/FJSViomp/bin/iompadm info</pre>									
IOMP: /dev/FJSVmplb/fiomp/adm8									
Element:									
/dev/rdsk/c6t500000E0DAC103C2d0s2	online active	block "warning status	[ETERNUS_DXH-	2B0101-CM20-CA41-PORT0012] (ssd55)"					
/dev/rdsk/c5t500000E0DAC10302d0s2	online active	block "warning status	[ETERNUS_DXH-	2B0101-CM10-CA40-PORT0010] (ssd47)"					
/dev/rdsk/c5t500000E0DA120921d0s2	online active	block "good status	[ETERNUS_DXH-	281209-CM10-CA10-PORT01] (ssd63)"					
/dev/rdsk/c6t500000E0DA120931d0s2	online standby	block "good status	[ETERNUS_DXH-	281209-CM11-CA11-PORT03] (ssd60)"					
Node:			_						
/dev/FJSVmplb/rdsk/mplb8s0									
/dev/FJSVmplb/rdsk/mplb8s1									
/dev/FJSVmplb/rdsk/mplb8s2									
/dev/FJSVmplb/rdsk/mplb8s3									
/dev/FJSVmplb/rdsk/mplb8s4									
/dev/FJSVmplb/rdsk/mplb8s5									
/dev/FJSVmplb/rdsk/mplb8s6									
/dev/EJSVmplb/rdsk/mplb8s7									
Function:									
MPmode=t rue									
AutoBath-true									
Block=true									
NeedComentaliza									
(Omitted)									
(Onitic ced)									

3 Delete any unnecessary paths.

```
[root@solaris-M10-1]# grmpdautoconf -d
Path : Action : Element path
mplb8 : del : c6t500000EDD
                                                                                     : LUN : Storage
                   : c6t500000E0DAC103C2d0s2 c5t500000E0DAC10302d0s2 : 0 : ETERNUS_DXH- 2B0101
: c6t500000E0DAC103C2d1s2 c5t500000E0DAC10302d1s2 : 1 : ETERNUS_DXH- 2B0101
: c6t500000E0DAC103C2d2s2 c5t500000E0DAC10302d2s2 : 2 : ETERNUS_DXH- 2B0101
mplb9 : del
mplb10 : del
=== Reconfigure plan ===
  Destroy multi path
                                       : 0
  Delete path from multi path : 3 (instance)
mplb8 : It will be a configuration without the redundancy.
mplb9 : It will be a configuration without the redundancy.
mplb10 : It will be a configuration without the redundancy.
Do you want to continue the multipath remove?
  Yes ---> hit the 'y' key
        ---> hit the 'n' key
  No
                       \leftarrow If the deletion targets are correct, press the [y] key and then the [Enter] key
У
#
```

4 Check the multipath status again.

In the following example, two paths are deleted from each LUN which then becomes a two-path configuration.

<pre># /usr/opt/FJSViomp/bin/iompadm info IOMP: / dev/FJSVmplb/fiomp/adm8 Element:</pre>									
	/dev/rdsk/c5t500000E0DA120921d0s2 /dev/rdsk/c6t500000E0DA120931d0s2	online online	active block standby block	"good status "good status	[ETERNUS_DXH- [ETERNUS_DXH-	281209-CM10-CA10-PORT01] 281209-CM11-CA11-PORT03]	(ssd63) " (ssd60) "		
Node:					-				
	<pre>/dev/FJSVmplb/rdsk/mplb8s0 /dev/FJSVmplb/rdsk/mplb8s1 /dev/FJSVmplb/rdsk/mplb8s2 /dev/FJSVmplb/rdsk/mplb8s3 /dev/FJSVmplb/rdsk/mplb8s4 /dev/FJSVmplb/rdsk/mplb8s5 /dev/FJSVmplb/rdsk/mplb8s6 /dev/FJSVmplb/rdsk/mplb8s6</pre>								
Functio	n:								
	MPmode=true AutoPath=true Block=true NeedSync=false								
(Omitte	d)								

End of procedure

Notes

• Since the conditions described below may occur when a path for ETERNUS Multipath Driver is intentionally or unintentionally disconnected, use the "iompadm info" command to check the path status.

/dev/rdsk/c6t500000E0DAC103C2d0s2 online active block "warning status [ETERNUS_DXH- 2B0101-CM20-CA41-PORT0012] (ssd55)" /dev/rdsk/c5t500000E0DAC10302d0s2 online active block "warning status [ETERNUS_DXH- 2B0101-CM10-CA40-PORT0010] (ssd47)"

If the above condition occurs while the path is in the normal state or after recovering from a path disconnection, use the following command to reconfigure the path.

grmpdautoconf

- If there is no path error, a path reconfiguration is performed by the "grmpdautoconf" command and the status is changed from "warning" to "good".
- If a path error is detected, the "grmpdautoconf" command results in an error, the status is changed from "warning" to "failed", and the path status is changed to "offline".

Confirm the cause of the error by checking, for example, the state of the path connection.

If the ALUA setting differs between the migration source and migration destination storage systems, all
the paths in the storage system where the ALUA setting is "ACTIVE / ACTIVE" and the priority paths in the
storage system where the ALUA setting is "ACTIVE-ACTIVE / PREFERRED_PATH" are set as the priority path
group while the path is connected. After the path is disconnected, the path group specified in the ALUA
setting of the migration destination storage system is used.

The ALUA policy for ETERNUS Multipath Driver is specified for each model of the ETERNUS AF/DX instead of the host response.

The "/usr/opt/FJSViomp/bin/iompadm info" command displays the detailed path information for each LUN.

The following shows the state before the path is connected, while the path is connected, and after the path is disconnected.

- Before the path is connected

Because the migration source is "ACTIVE / ACTIVE", both paths become the priority path group.



- While the path is connected

Because the storage system is mixed with "ACTIVE / ACTIVE" paths and "ACTIVE-ACTIVE / PREFER-RED_PATH" paths, four paths exist (three priority path groups and one standby path group).

IOMP: /	dev/FJSVmplb/fiomp/adm8									
Element:										
	/dev/rdsk/c6t500000E0DAC103C2d0s2	online	active	block	"good status	[ETERNUS DXH-	2B0101-CM20-CA41-PORT0012] (ssd55)"			
	/dev/rdsk/c5t500000E0DAC10302d0s2	online	active	block	"good status	[ETERNUS DXH-	2B0101-CM10-CA40-PORT0010] (ssd47)"			
	/dev/rdsk/c5t500000E0DA120921d0s2	online	active	block	"good status	[ETERNUS_DXH-	281209-CM10-CA10-PORT01] (ssd63)"			
	/dev/rdsk/c6t500000E0DA120931d0s2	online	standby	block	"good status	[ETERNUS_DXH-	281209-CM11-CA11-PORT03] (ssd60)"			
Node:						-				
	/dev/FJSVmplb/rdsk/mplb8s0									
	/dev/FJSVmplb/rdsk/mplb8s1									
	/dev/FJSVmplb/rdsk/mplb8s2									
	/dev/FJSVmplb/rdsk/mplb8s3									
	/dev/FJSVmplb/rdsk/mplb8s4									
	/dev/FJSVmplb/rdsk/mplb8s5									
	/dev/FJSVmplb/rdsk/mplb8s6									
	/dev/FJSVmplb/rdsk/mplb8s7									
Functio	Function:									
	MPmode=true									
	AutoPath=true									
	Block=true									
	NeedSync=false									

- After the path is disconnected

Because the migration destination is "ACTIVE-ACTIVE / PREFERRED_PATH", only one priority path becomes the priority path group.

TOMP . /	dev /F.TSVmplb/fiomp/adm8									
Element	Element:									
	/dev/rdsk/c5t500000E0DA120921d0s2 /dev/rdsk/c6t500000E0DA120931d0s2	online online	active block standby block	"good status "good status	[ETERNUS_DXH- [ETERNUS_DXH-	281209-CM10-CA10-PORT01] 281209-CM11-CA11-PORT03]	(ssd63)" (ssd60)"			
Node:	/dev/FJSVmplb/rdsk/mplb8s0 /dev/FJSVmplb/rdsk/mplb8s1 /dev/FJSVmplb/rdsk/mplb8s2 /dev/FJSVmplb/rdsk/mplb8s3 /dev/FJSVmplb/rdsk/mplb8s4 /dev/FJSVmplb/rdsk/mplb8s5 /dev/FJSVmplb/rdsk/mplb8s6 /dev/FJSVmplb/rdsk/mplb8s7									
Function	Function:									
	MPmode=true									
	AutoPath=true									
	Block=true									
	NeedSync=false									

FUJITSU Storage ETERNUS AF, ETERNUS DX Configuration Guide -Server Connection-(Fibre Channel) for Oracle Solaris

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