

FUJITSU Storage ETERNUS AF, ETERNUS DX

Configuration Guide -Server Connection-



(Fibre Channel) for Oracle VM Server for x86

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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 Oracle VM Server for x86 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.

In this manual, the setting procedures are explained using examples in the BIOS mode.

For the UEFI mode, the parameter names and the procedures may differ from those in this manual. Replace the setting values of the BIOS mode in this manual with the corresponding setting values found in the manuals of the Fibre Channel card and the server.

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.

22nd Edition
December 2021

The Contents and Structure of this Manual

This manual is composed of the following seven chapters and an appendix.

- "Chapter 1 Workflow" (page 7)

This chapter describes how to connect the ETERNUS AF/DX storage systems to a server running Oracle VM Server for x86.

- "Chapter 2 Checking the Server Environment" (page 10)

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

- "Chapter 3 Notes" (page 11)

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

- "Chapter 4 Checking Fibre Channel Card Information" (page 13)

This chapter describes the Fibre Channel card WWNs that are required for ETERNUS AF/DX settings and Fibre Channel switch settings.

- "Chapter 5 Setting Up the ETERNUS AF/DX" (page 14)

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

- "Chapter 6 Setting Up the Fibre Channel Switches" (page 15)

This chapter describes how to set up the Fibre Channel switches.

- "Chapter 7 Setting Up Oracle VM Server" (page 17)

This chapter describes how to set up Oracle VM Server.

The appendix contains the management tables that are used in "Installing the Fibre Channel Card".

Oracle VM Server Terminology

- Oracle VM Manager (OVM)

An application that manages the Oracle VM Server, virtual machines, and resources. This application can be used via a web browser.

- Virtual Machine (VM)

A virtual machine (Guest OS) that is created in an Oracle VM Server.

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Chapter 1

Workflow

This chapter describes how to connect the ETERNUS AF/DX to a server running Oracle VM Server. This manual explains how to perform various operations not referenced in other documents.

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"
- "ETERNUS Web GUI User's Guide"
- Manuals supplied with the Fibre Channel card and software

Workflow

1

Checking the Fibre Channel Card Information

Obtain the WWN information of the Fibre Channel card.

- ["Chapter 4 Checking Fibre Channel Card Information" \(page 13\)](#)



2

Setting Up the ETERNUS AF/DX

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

- ["Chapter 5 Setting Up the ETERNUS AF/DX" \(page 14\)](#)
- 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 ETERNUS AF/DX to be connected



3

Setting Up the Fibre Channel Switches

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

- ["Chapter 6 Setting Up the Fibre Channel Switches" \(page 15\)](#)
- 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"](#)



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Setting Up Oracle VM Server

Set up Oracle VM Server to connect to the ETERNUS AF/DX.

- ["Chapter 7 Setting Up Oracle VM Server" \(page 17\)](#)
- Setting up Oracle VM Server and the Fibre Channel card
 - ["7.1 Setting Up the Fibre Channel Cards" \(page 17\)](#)
- Checking the Fibre Channel card driver versions
 - ["Server Support Matrix"](#)



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Checking the LUNs

Check whether the server recognizes the LUNs of the ETERNUS AF/DX and set up the LUNs so that they can be used on Oracle VM Server.

- ["7.3 Checking LUN Status" \(page 36\)](#)



6

Checking the Multipath

Use the Oracle VM Server multipath to perform a redundant configuration.

- ["7.4 Checking the Multipath" \(page 37\)](#)



7

Installing and Setting Oracle VM Manager

Set up the Oracle VM Manager.

- ["7.5 Installing and Setting Oracle VM Manager" \(page 37\)](#)
-

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 Servers

Refer to "Server Support Matrix" and the following URL:
<https://linux.oracle.com/pls/apex/f?p=117:1>

2.2 Fibre Channel Switches

The Fibre Channel switches that can be connected depend on the connection configuration that is used (the OS and the ETERNUS AF/DX). Refer to "Server Support Matrix for FC-SWITCH".

2.3 Fibre Channel Cards

Refer to the "Server Support Matrix".

2.4 Connection Compatibility of ETERNUS AF/DX Storage Systems to Oracle VM Server

Refer to the "Server Support Matrix".

2.5 Virtual Machine

For details on the procedure and notes about installing a Virtual Machine that is supported by Oracle VM Server, refer to the manuals that can be obtained on the following Oracle web-site:
<https://linux.oracle.com/pls/apex/f?p=117:1>

Chapter 3

Notes

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

3.1 Installation Notes

- To ensure reliable access to ETERNUS AF/DX storage systems, multipath configuration is recommended. Setting up multiple access paths between the server and the ETERNUS AF/DX storage systems, then using the Oracle VM Server multipath, provides improved access redundancy.
- Enable the virtualization support functions (Intel VT or AMD-V) of the server before installing Oracle VM Server. For details on the settings, refer to the relevant manual of the server to be used.
- Install Oracle VM Server when the ETERNUS AF/DX is not connected to the server.
- The ETERNUS Multipath Driver does not need to be installed on the Oracle VM Server Virtual Machine. The Oracle VM Server multipath driver provides path redundancy.
- When multiple paths are used, the Oracle VM Server multipath driver must be set. If a multipath driver is not set, the Oracle VM Server multipath driver does not perform proper load balancing for the ETERNUS AF/DX.

3.2 ETERNUS AF/DX Setup Notes

Host response must be set before the ETERNUS AF/DX is connected to the Oracle VM Server host.

3.3 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.

3.4 Notes on Using Thin Provisioning Volumes

If the environment meets all of the following conditions, the area of Thin Provisioning Volumes may not be released properly.

- Oracle VM Server 3.4.4 or later is used.
- A TPV or an FTV with an Allocation setting of "Thin" is used

To avoid this, perform the following procedure.

- 1 Locate the configuration file (99-eternus.rules) in /etc/udev/rules.d/ and add the following content to that file.

```
ACTION=="add", SUBSYSTEM=="scsi_disk", ATTRS{vendor}=="FUJITSU", ATTRS{model}=="ETERNUS_DXH", ATTR{thin_provisioning}=="1", ATTR{provisioning_mode}="unmap"
ACTION=="add", SUBSYSTEM=="scsi_disk", ATTRS{vendor}=="FUJITSU", ATTRS{model}=="ETERNUS_DXM", ATTR{thin_provisioning}=="1", ATTR{provisioning_mode}="unmap"
ACTION=="add", SUBSYSTEM=="scsi_disk", ATTRS{vendor}=="FUJITSU", ATTRS{model}=="ETERNUS_DXL", ATTR{thin_provisioning}=="1", ATTR{provisioning_mode}="unmap"
ACTION=="add", SUBSYSTEM=="scsi_disk", ATTRS{vendor}=="FUJITSU", ATTRS{model}=="ETERNUS_DX400", ATTR{thin_provisioning}=="1", ATTR{provisioning_mode}="unmap"
ACTION=="add", SUBSYSTEM=="scsi_disk", ATTRS{vendor}=="FUJITSU", ATTRS{model}=="ETERNUS_DX8000", ATTR{thin_provisioning}=="1", ATTR{provisioning_mode}="unmap"
```

- 2 Restart the OS.

Chapter 4

Checking Fibre Channel Card Information

The WWNs of Fibre Channel cards are necessary when a system error occurs, when server access to the ETERNUS AF/DX is limited (such as when using the Host Affinity function), or when the ETERNUS AF/DX is connected to the server via Fibre Channel switches.

Use the methods described in the following examples to obtain the WWN information of the Fibre Channel card to be used.

Example:

Check the WWN using the utilities that are provided by the Fibre Channel card vendors.

Emulex: LightPulse BIOS Utility

QLogic: Fast!UTIL

Chapter 5

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 6

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".

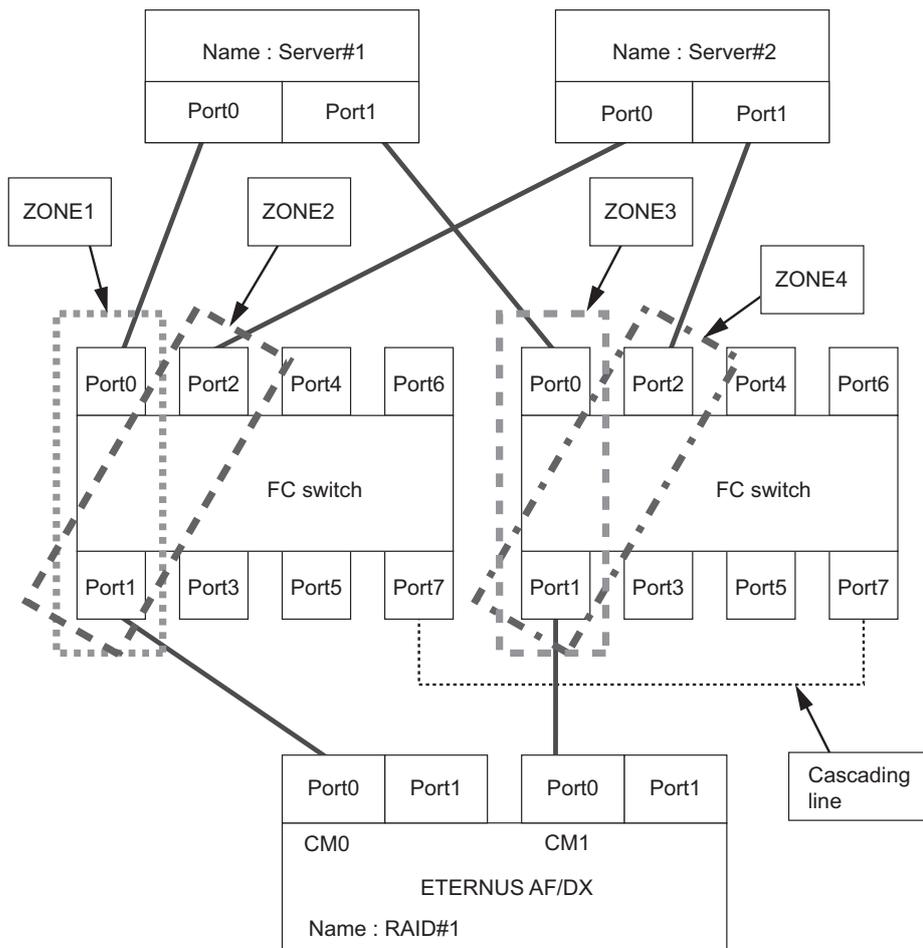
Caution

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

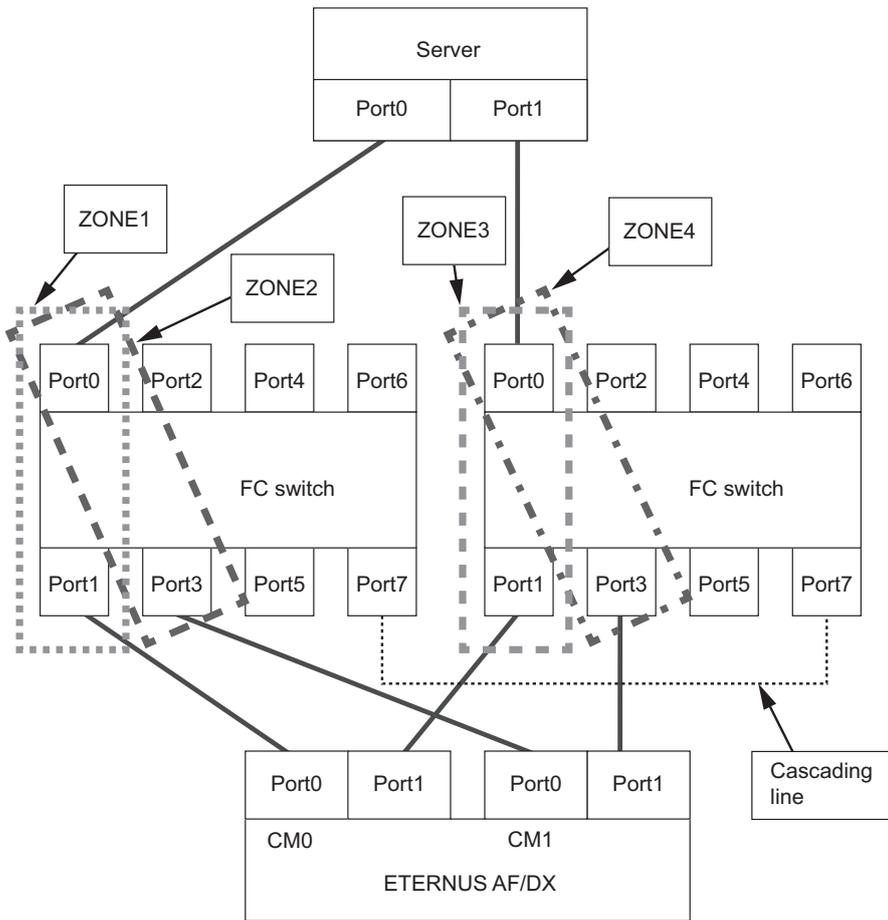
If the Host Response settings are changed from the default values, set the Host Response again.

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.



The following example shows a configuration for a single server.



Chapter 7

Setting Up Oracle VM Server

Set up Oracle VM Server to connect the ETERNUS AF/DX.

The settings described in this chapter are performed using Oracle VM Manager. Prepare a Oracle VM Manager environment before setting up Oracle VM Server. For details on how to install and operate Oracle VM Manager, refer to the Oracle documents.

7.1 Setting Up the Fibre Channel Cards

Perform Fibre Channel card settings.

7.1.1 For Emulex Fibre Channel Cards

This section explains how to install Emulex Fibre Channel cards in the Oracle VM Server host and how to connect the ETERNUS AF/DX.

7.1.1.1 Setting Up the Fibre Channel Cards

Install the Fibre Channel cards in the server, acquire the relevant physical addresses and World Wide Names (WWNs), and perform Topology and LinkSpeed settings.

The physical address and WWN of a Fibre Channel card are required information in the following cases: when an error has occurred in the system, when using the ETERNUS AF/DX storage systems (security function, host affinity function, etc.) to restrict server access, or when connecting the ETERNUS AF/DX storage systems and the server using a Fibre Channel switch.

■ Checking and Configuring with UEFI

The workflow is shown below.

- (1) Install the Fibre Channel card
- (2) Turn on the server
- (3) Acquire the WWN for the Fibre Channel card
- (4) Add a record for the server in the WWN instance management table for the server
- (5) Set the Topology and LinkSpeed

The following shows an example of the checking and configuration procedure.

Note

If the setting window is different, confirm that the parameters are same as the example and then perform a configuration.

Procedure

- 1 Install the Fibre Channel card in the server.
 For the installation method, slot positions, activation of the installed slot, and notes regarding the Fibre Channel card, refer to the manual provided with the Fibre Channel card or the user guide of the server.
- 2 Turn on the server, and start the [UEFI BIOS setup] menu.
 To display the menu, refer to the User's Guide for the server.
- 3 Select the port for the Fibre Channel card that is to be checked and press the [Enter] key.
- 4 Check the value of [Port Name].
 The value of [Port Name] is the WWN.



- 5 Record the WWN in the "WWN instance management table for the server".
 (found in "[Appendix A WWN Instance Management Table for the Server \(Blank\)](#)" (page 38)).
 The following shows an example of this.
 WWN instance management table for the server

Host name	Server#1		
IP Address	192.168.0.10		
Physical slot name	Fibre Channel card WWN	Instance name	Cable tag
slot0	100000109B1B97C0		SRV1_SLOT0 to G620_1_port0

Details of contents

The details of contents for the WWN instance management table for the server are as follows:

Host name:

Record the host name.

IP Address:

Record the IP address of the server.

Physical slot name:

Record the slot position of the installed Fibre Channel card.

For the installation location, refer to the User's Guide for each server.

Fibre Channel card WWN:

Record the value of [Port Name].

Instance name:

Not necessary to record.

Cable tag:

Record a tag name which indicates the connection path (relationship between the connected device and the port).

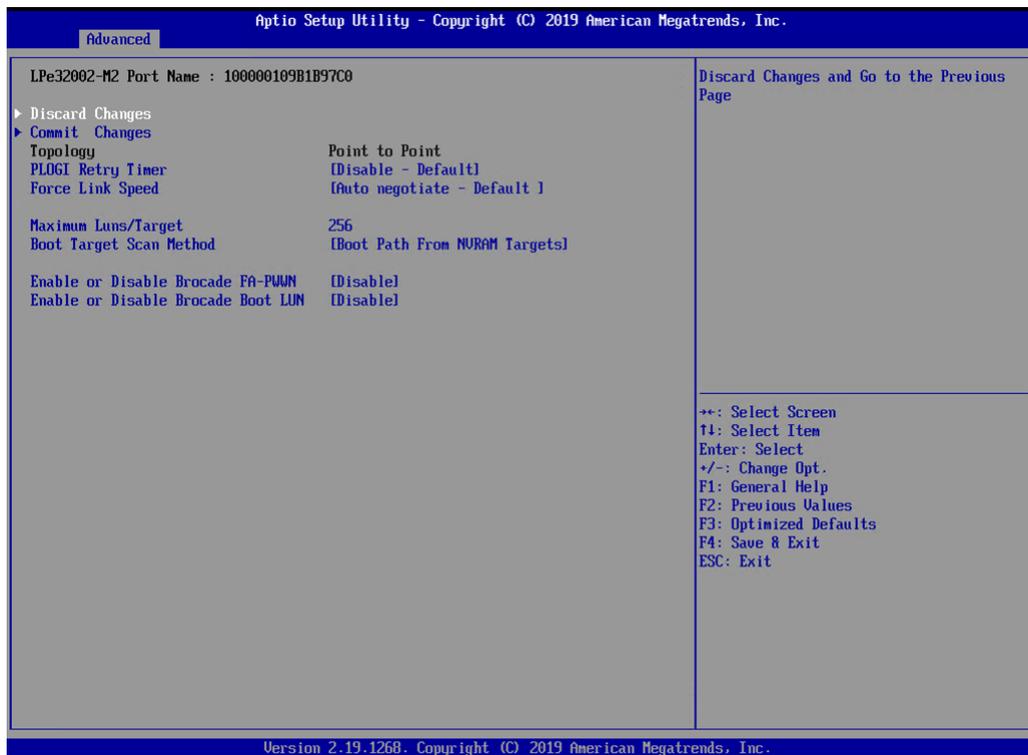
- 6 Select "Configure HBA and Boot Parameters" and press the [Enter] key.
- 7 Select "Topology" and press the [Enter] key.

 **Note**

This setting is not required if an LPe3xxxx series Fibre Channel card is used. Proceed to [Step 9](#).

- 8 Select "FC-AL" (for a direct connection) or "Point to Point" (for a switch connection), and then press the [Enter] key.

When a direct connection is used and the LinkSpeed is 16Gbit/s, select "Point to Point".

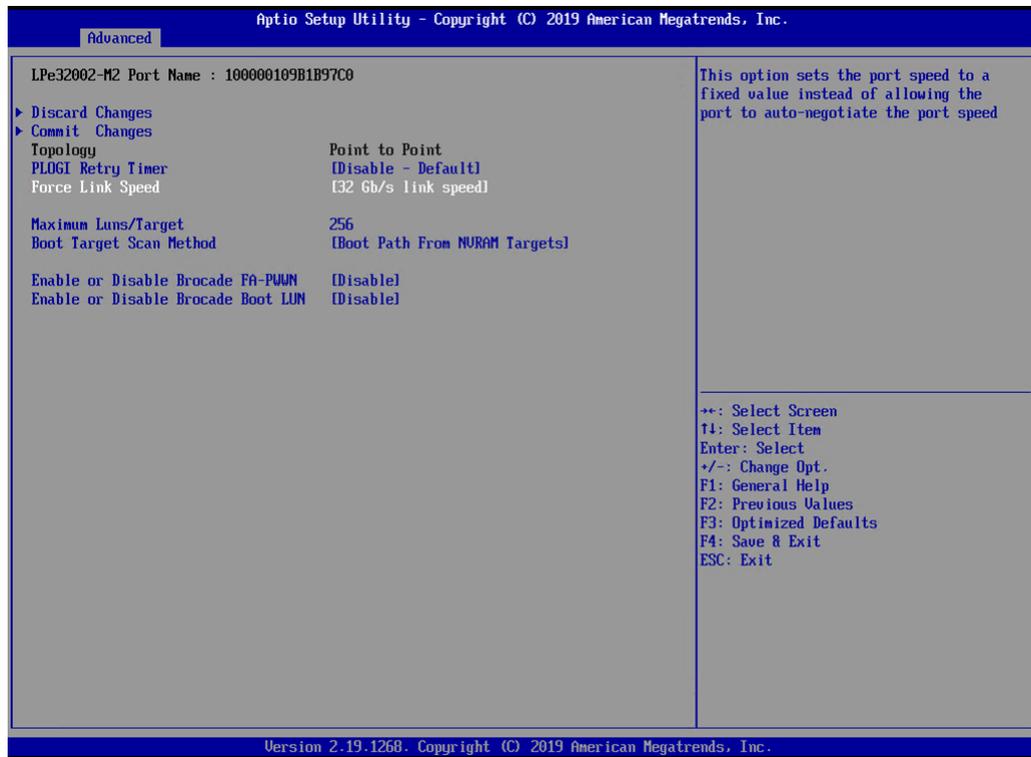


- 9 Select "Force Link Speed" and press the [Enter] key.

- 10 Select the transfer rate according to the values listed in the LinkSpeed settings table below, and press the [Enter] key.

LinkSpeed settings

Maximum transfer rate of the Fibre Channel card to be connected	Switch connection Fibre Channel switch maximum transfer rate						Direct connection Maximum CA transfer rate			
	32Gbit/s	16Gbit/s	8Gbit/s	4Gbit/s	2Gbit/s	1Gbit/s	32Gbit/s	16Gbit/s	8Gbit/s	4Gbit/s
32Gbit/s	32	16	8	–	–	–	32	16	8	–
16Gbit/s	16	16	8	4	–	–	16	16	8	4
8Gbit/s	8	8	8	4	2	–	8	8	8	4
4Gbit/s	–	4	4	4	2	1	–	4	4	4
2Gbit/s	–	–	2	2	2	1	–	–	2	2



Caution

Contact the server vendor for supported transfer speeds because the supported transfer speeds vary depending on the OS and the storage system that is used.

- 11 Select "Commit Changes" and press the [Enter] key.
- 12 Return to the [UEFI BIOS setup] menu by pressing the [Esc] key.

- 13 Save the settings in the [UEFI BIOS setup] menu and then reboot.
For details, refer to the User's Guide for the server.

End of procedure

■ Checking and Configuring with Emulex LightPulse FC BIOS Utility

- Depending on the Fibre Channel card used, the actual on-screen Fibre Channel card information may differ from that in the screenshots shown in this manual.
- The relationship between a physical address and WWN cannot be determined from BIOS and OS. The physical address and WWN must be recorded as a pair when each Fibre Channel card is installed. Physical address and WWN must be assigned to "WWN instance management table for the server".

The workflow is shown below.

- (1) Install the Fibre Channel card
- (2) Turn on the server
- (3) Acquire the physical address and WWN for the Fibre Channel card
- (4) Add a record for the server in the WWN instance management table for the server
- (5) Set the Topology and LinkSpeed

When installing two or more Fibre Channel cards in the server, first turn off the server, then repeat Steps (1) through (5) above for each Fibre Channel card to be installed.

The following shows an example of the checking and configuration procedure.

Note

If the setting window is different, confirm that the parameters are same as the example and then perform a configuration.

Procedure

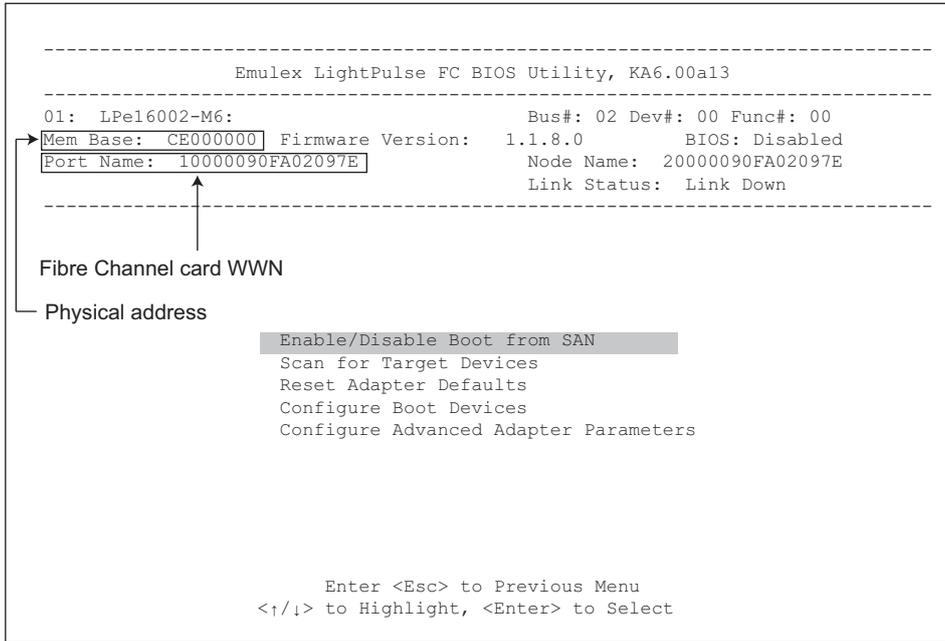
- 1 Install the Fibre Channel card in the server.
For the installation method, slot positions, activation of the installed slot, and notes regarding the Fibre Channel card, refer to the manual provided with the Fibre Channel card or the user guide of the server.
- 2 Turn on the server, and press the [Alt] + [E] keys or [Ctrl] + [E] keys while the following message is displayed.

```
!!! Emulex LightPulse x86 BIOS !!!, Version xxxxxx  
Copyright (c)1997-2010 Emulex.All rights reserved.  
Press <Alt E> or <Ctrl E> to enter Emulex BIOS configuration  
utility. Press <s> to skip Emulex BIOS.
```

"Emulex LightPulse FC BIOS Utility" starts.

- 3 Select the port for the Fibre Channel card that is to be checked and press the [Enter] key.

- 4 Check the [Mem Base] and [Port Name] values.
 The value of [Mem Base] is the physical address and the value of [Port Name] is the WWN.



Note

The name of the physical address might be "I/O Base", "I/O Address", or "Mem Base", depending on the HBA BIOS version. For more information about how to check the physical address, refer to the HBA manual.

- 5 Record the physical address and WWN in the "WWN instance management table for the server". (found in "Appendix A WWN Instance Management Table for the Server (Blank)" (page 38)).

The following shows an example of this.

WWN instance management table for the server

Host name				
IP Address				
Physical slot name	Fibre Channel card WWN	Instance name	Physical address	Cable tag
slot0	10000090FA02097E		CE000000	

Details of contents

The details of contents for the WWN instance management table for the server are as follows:

Host name:

Record the host name.

IP Address:

Record the IP address of the server.

Physical slot name:

Record the slot position of the installed Fibre Channel card.
 For the installation location, refer to the User's Guide for each server.

Fibre Channel card WWN:

Record the value of [Port Name] or [Adapter Port Name].

Instance name:

Not necessary to record.

Physical address:

Record the value of [I/O Base], [I/O Address], or [Mem Base].

Cable tag:

Record a tag name which indicates the connection path (relationship between the connected device and the port).

- 6 Select "Configure Advanced Adapter Parameters" and press the [Enter] key.
- 7 Select "Topology Selection" and press the [Enter] key.
- 8 Select "FC-AL" (for a direct connection) or "Fabric Point to Point" (for a switch connection), and then press the [Enter] key.

When a direct connection is used and the LinkSpeed is 16Gbit/s, select "Fabric Point to Point".

Note

This setting is not required if the following Fibre Channel cards are used.

- LPe3xxx series
- PY-FC33x/PY-FC35x/PY-FC42x series
- MC-0JFCFx/MC-0JFCGx/MC-0JFCMx/MC-0JFCNx series

- 9 Press the [Esc] key to return to the window shown in [Step 7](#).
- 10 Select "Link Speed Selection" and press the [Enter] key.
- 11 Select the transfer rate according to the values listed in the LinkSpeed settings table below, and press the [Enter] key.

LinkSpeed settings

Maximum transfer rate of the Fibre Channel card to be connected	Switch connection Fibre Channel switch maximum transfer rate					Direct connection Maximum CA transfer rate			
	32Gbit/s	16Gbit/s	8Gbit/s	4Gbit/s	2Gbit/s	32Gbit/s	16Gbit/s	8Gbit/s	4Gbit/s
32Gbit/s	32	16	8	—	—	32	16	8	—
16Gbit/s	16	16	8	4	—	16	16	8	4
8Gbit/s	8	8	8	4	2	8	8	8	4
4Gbit/s	—	4	4	4	2	—	4	4	4
2Gbit/s	—	—	2	2	2	—	—	2	2

12 Press the [Esc] key to quit the "Emulex LightPulse FC BIOS Utility".

When the total number of ports for installed Fibre Channel cards is two or more, first repeat [Step 3](#) through [Step 11](#) for each port, and then press the [Esc] key to exit "Emulex LightPulse FC BIOS Utility".

Caution

If two or more Fibre Channel cards have already been installed in the server at the time of purchase, the one-to-one relationship between the WWNs and Fibre Channel cards may not be easy to determine. The WWNs that are obtained in this section may need to be repeatedly registered and set up on the ETERNUS AF/DX until a server recognizes the ETERNUS AF/DX logical disks.

For details about ETERNUS AF/DX settings, refer to "Configuration Guide -Server Connection- Storage System Settings" that corresponds to the ETERNUS AF/DX to be connected.

End of procedure

7.1.1.2 Setting Up the Driver Parameters

Note

Since the standard driver that is supplied with the OS is used for the Fibre Channel driver, other drivers do not need to be installed.

Use the following procedure to set the drive parameters.

Use an editor such as "vi" to add the setting values to the configuration file.

- Configuration file

OS	Configuration file
Oracle VM Server 3.4	Any file (.conf) in /etc/modprobe.d/
Oracle VM Server 3.3	
Oracle VM Server 3.2	/etc/modprobe.conf
Oracle VM Server 3.1	/etc/modprobe.conf

Note that the setting values and items vary depending on the ETERNUS AF/DX that is used.

- Example:

```
options lpfc lpfc_lun_queue_depth=8 lpfc_link_speed=8 lpfc_topology=2
```

Procedure

- 1 Perform the following driver parameter settings for each model of ETERNUS AF/DX that is to be connected.

Driver parameter	Setting value
lpfc_lun_queue_depth	Arbitrary (*1)
lpfc_topology	<ul style="list-style-type: none"> • For direct connections: 4 • For switch connections: 2 For the following cases, select "2". <ul style="list-style-type: none"> • A direct connection is used and the LinkSpeed is 16Gbit/s or more • A direct connection is used with the following Fibre Channel cards <ul style="list-style-type: none"> - LPe3xxx series - PY-FC33x/PY-FC35x/PY-FC42x series - MC-0JFCFx/MC-0JFCGx/MC-0JFCMx/MC-0JFCNx series
lpfc_link_speed	(*2)

***1:** Recommended value = (maximum number of simultaneous command processes per CA port) ÷ (number of Fibre Channel ports connected to a single CA port) ÷ (number of LUNs)

(Round the result down)

- The maximum number of simultaneous command processes per CA port is as follows:

The value is used by multiple servers that share the CA port. The commands are processed until the limit is reached.

Model	Maximum number of simultaneous command processes
ETERNUS AF S3 series, ETERNUS DX S5 series, ETERNUS DX8900 S4	2048
Models other than the above	1024

- Use the value of "8" if the actual result is lower. Use the maximum value if the actual result exceeds the maximum value of the OS or the driver.
- To achieve maximum system performance, this value can be changed according to the server load and the peak operating times.

***2:** Use the following "lpfc_link_speed" setting values.

Maximum transfer rate of the Fibre Channel card to be connected	Switch connection Fibre Channel switch maximum speed						Direct connection Maximum CA transfer rate		
	32Gbit/s	16Gbit/s	8Gbit/s	4Gbit/s	2Gbit/s	1Gbit/s	16Gbit/s	8Gbit/s	4Gbit/s
32Gbit/s	32	16	8	—	—	—	16	8	—
16Gbit/s	16	16	8	4	—	—	16	8	4
8Gbit/s	8	8	8	4	2	—	8	8	4
4Gbit/s	—	4	4	4	2	1	4	4	4
2Gbit/s	—	—	2	2	2	1	—	2	2

2 Shut down the server.

After the driver parameter settings are complete, shut down the Oracle VM Server, and then connect the ETERNUS AF/DX to the server with cables.

End of procedure

7.1.2 For QLogic Fibre Channel Cards

This section explains how to install QLogic Fibre Channel cards in the Oracle VM Server host and how to connect the ETERNUS AF/DX.

Note

Since the standard driver that is supplied with the OS is used for the Fibre Channel driver, other drivers do not need to be installed.

■ Checking and Configuring with UEFI

The workflow is shown below.

- (1) Install the Fibre Channel card
- (2) Turn on the server
- (3) Acquire the WWN for the Fibre Channel card
- (4) Add a record for the server in the WWN instance management table for the server
- (5) Set the Topology and LinkSpeed

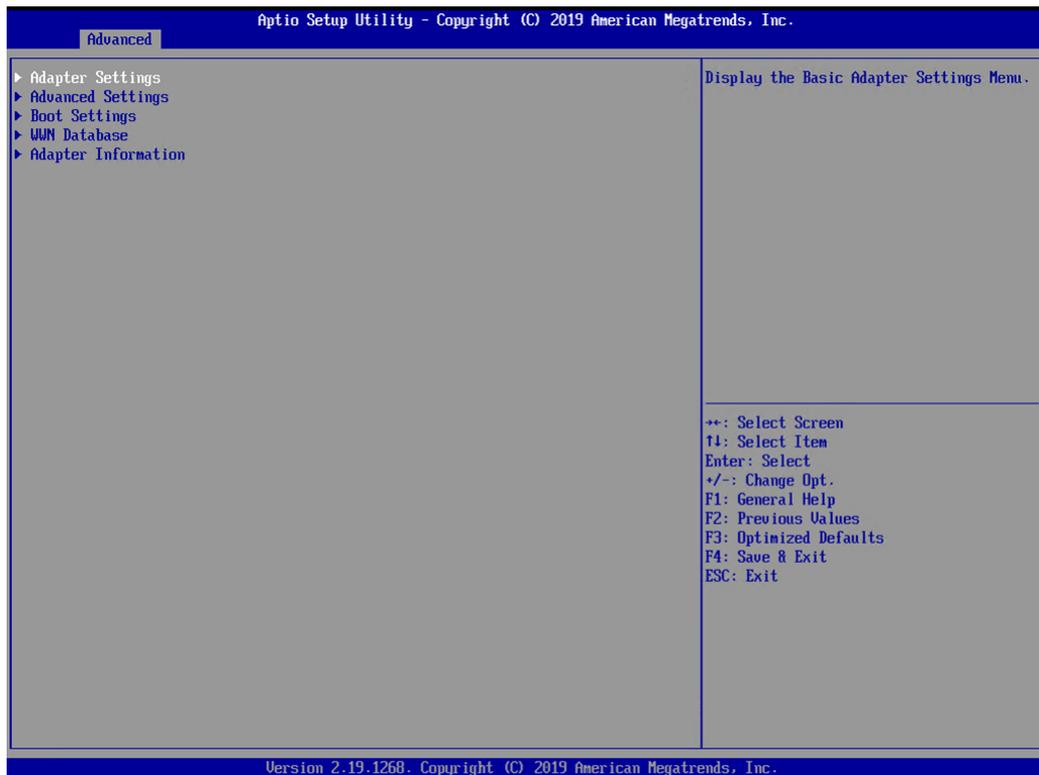
The following shows an example of the checking and configuration procedure.

Note

If the setting window is different, confirm that the parameters are same as the example and then perform a configuration.

Procedure

- 1 Install the Fibre Channel card in the server.
For the installation method, slot positions, activation of the installed slot, and notes regarding the Fibre Channel card, refer to the manual provided with the Fibre Channel card or the user guide of the server.
- 2 Turn on the server, and start the [UEFI BIOS setup] menu.
To display the menu, refer to the User's Guide for the server.
- 3 Select the port for the Fibre Channel card that is to be checked and press the [Enter] key.
- 4 Select "Adapter Information" and press the [Enter] key.



5 Check the "WWPN" setting.



6 Record the WWN in the "WWN instance management table for the server".
(found in "Appendix A WWN Instance Management Table for the Server (Blank)" (page 38)).

The following shows an example of this.

WWN instance management table for the server

Host name	Server#1		
IP Address	192.168.0.10		
Physical slot name	Fibre Channel card WWN	Instance name	Cable tag
slot0	21000024FF1712F4		SRV2_SLOT0 to G620_2_port0

Details of contents

The details of contents for the WWN instance management table for the server are as follows:

Host name:

Record the host name.

IP Address:

Record the IP address of the server.

Physical slot name:

Record the slot position of the installed Fibre Channel card.

For the installation location, refer to the User's Guide for each server.

Fibre Channel card WWN:

Record the value of [WWPN].

Instance name:

Not necessary to record.

Cable tag:

Record a tag name which indicates the connection path (relationship between the connected device and the port).

- 7 Return to the menu shown in [Step 3](#) by pressing the [Esc] key.
- 8 Select "Adapter Settings" and press the [Enter] key.
- 9 Select "FC Tape" and press the [Enter] key.



- 10 Select "Disabled" and press the [Enter] key.
- 11 Select "Connection Option" and press the [Enter] key.
- 12 Select "FC-AL" (for direct connections with an 8Gbit/s or lower Link Speed) or "Point to Point" (for other speeds), and then press the [Enter] key.
- 13 Select "Data Rate" and press the [Enter] key.

- Select the transfer rate according to the values listed in the LinkSpeed settings table below, and press the [Enter] key.

LinkSpeed settings

Maximum transfer rate of the Fibre Channel card to be connected	Switch connection Fibre Channel switch maximum transfer rate						Direct connection Maximum CA transfer rate			
	32Gbit/s	16Gbit/s	8Gbit/s	4Gbit/s	2Gbit/s	1Gbit/s	32Gbit/s	16Gbit/s	8Gbit/s	4Gbit/s
32Gbit/s	32	16	8	–	–	–	32	16	8	–
16Gbit/s	16	16	8	4	–	–	16	16	8	4
8Gbit/s	8	8	8	4	2	–	8	8	8	4
4Gbit/s	–	4	4	4	2	1	–	4	4	4
2Gbit/s	–	–	2	2	2	1	–	–	2	2



Caution

Contact the server vendor for supported transfer speeds because the supported transfer speeds vary depending on the OS and the storage system that is used.

- Press the [Esc] key twice to return to the [UEFI BIOS setup] menu.
- Save the settings in the [UEFI BIOS setup] menu and then reboot.
For details, refer to the User's Guide for the server.

End of procedure

■ Checking and Configuring with Fast!UTIL

The following shows an example of the checking and configuration procedure.

● Note

If the setting window is different, confirm that the parameters are same as the example and then perform a configuration.

Procedure

- 1 Turn the server on, and watch for the following message to be displayed, in order to confirm that the BIOS version specified in "Server Support Matrix" is installed.

```
QLogic Corporation
QLAxxxx PCI Fibre Channel ROM BIOS Version 1.50
Copyright (C) QLogic Corporation 1993-2006. All right reserved.
www.qlogic.com

Press <CTRL-Q> for Fast!UTIL
```

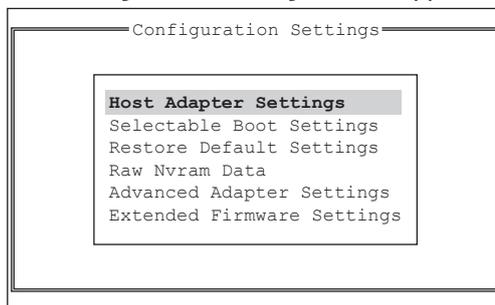
If the BIOS version matches that specified in "Server Support Matrix", press the [Ctrl]+[Q] keys while the above message is displayed.

If the BIOS version differs from that specified in "Server Support Matrix", download and install the BIOS version specified in "Server Support Matrix" from the QLogic Corp. web-site.

▶ Caution

When two or more Fibre Channel cards are installed, the [Select Host Adapter] window appears. Select the Fibre Channel card to be set in the window.

- 2 Select [Configuration Settings] from the [Fast!UTIL Options] menu and press the [Enter] key. The [Configuration Settings] menu appears.



- 3 Select the [Host Adapter Settings] item.
- 4 Check the values that are set in the [Host Adapter Settings] or [Adapter Settings] window. The setting values vary depending on the type of Fibre Channel card used. Refer to the following tables. If the displayed values are different from those given in the following table, adjust them.

Refer to the Fibre Channel card manual and/or QLogic Corp. web-site for details.

- Parameter Settings List displayed in the [Host Adapter Settings] window or [Adapter Settings] window

The setting items may not be available depending on the BIOS version.

Parameter	Setting value	Remarks
BIOS Address	Fixed for each card	Settings cannot be changed.
BIOS Revision (*1)		
Adapter Serial Number		
Interrupt Level		
Adapter Port Name		
Host Adapter BIOS	Enabled or Disabled	<ul style="list-style-type: none"> Set [Enabled] for SAN Boot. Set [Disabled] for non SAN Boot.
Frame Size	2048	If the current parameter values are different, change them to the indicated values.
Loop Reset Delay	5	
Adapter Hard Loop ID	Disabled	
Hard Loop ID	0	
Spinup Delay	Disabled	
Connection Options	0 or 1	<ul style="list-style-type: none"> For direct connection: 0 (*2) For switch connection: 1 (*3)
Fibre Channel Tape Support	Disabled	If the current parameter values are different, change them to the indicated values.
Data Rate	(*4)	0: 1Gbit/s fixed 1: 2Gbit/s fixed 2: Auto-negotiated 3: 4Gbit/s fixed 4: 8Gbit/s fixed 5: 16Gbit/s fixed 6: 32Gbit/s fixed

***1:** The BIOS version of the Fibre Channel card is displayed. Check that the BIOS version is the same as shown in "Server Support Matrix".

***2:** This includes when directly connecting to the ETERNUS AF/DX storage systems via a Fibre Channel pass-through blade.

However, select "1" for direct connections between a 16Gbit/s Fibre Channel card or a 32Gbit/s Fibre Channel card and CAs that have a 16Gbit/s or faster maximum transfer rate.

***3:** This includes when connecting the Fibre Channel switch to the ETERNUS AF/DX storage systems via a Fibre Channel pass-through blade or a Fibre Channel switch blade.

***4:** Data Rate setting value list

Maximum transfer rate of the Fibre Channel card to be connected	Switch connection Fibre Channel switch maximum transfer rate						Direct connection Maximum CA transfer rate			
	32Gbit/s	16Gbit/s	8Gbit/s	4Gbit/s	2Gbit/s	1Gbit/s	32Gbit/s	16Gbit/s	8Gbit/s	4Gbit/s
32Gbit/s	6	5	4	—	—	—	6	5	4	—
16Gbit/s	5	5	4	3	—	—	5	5	4	3
8Gbit/s	4	4	4	3	1	—	4	4	4	3
4Gbit/s	—	3	3	3	1	0	—	3	3	3
2Gbit/s	—	—	1	1	1	0	—	—	1	1

When connecting a QLogic 4Gbit/s Fibre Channel card and ETERNUS SN200 series Fibre Channel switch, the SFP can prevent the link from being established. Set Data Rate to 2 (AutoSelect) in that case. Contact your Fujitsu maintenance engineer for more details.

- 5 Select [Advanced Adapter Settings].
- 6 Check the values that are set in the [Advanced Adapter Settings] window or [Adapter Settings] window. The setting values vary depending on the type of Fibre Channel card used. Refer to the following tables. If the displayed values are different from those given in the following table, adjust them. Refer to the Fibre Channel card manual and/or QLogic Corp. web-site for details.

- Parameter Settings List displayed in the [Advanced Adapter Settings] window or [Adapter Settings] window

The setting items may not be available depending on the BIOS version.

Parameter	Setting value				
	32Gbit/s Fi- bre Channel card	16Gbit/s Fi- bre Channel card	8Gbit/s Fibre Channel card	4Gbit/s Fibre Channel card	2Gbit/s Fibre Channel card
Execution Throttle	—	—	65535	16	16
LUNs per Target	128				8
Enable LIP Reset	No				
Enable LIP Full Login	Yes				
Enable Target Reset	Yes				
Login Retry Count	8				
Port Down Retry Count	30				
Link Down Timeout	30				
Extended Error Logging	Disabled				
RIO Operation Mode	0				
Interrupt Delay Timer	0				
Enabled interrupt	No				—
EV Controller Order	Disabled				—

- 7 Use an editor such as "vi" to add the setting values to the configuration file.
 - Configuration file

OS	Configuration file
Oracle VM Server 3.4	Any file (.conf) in /etc/modprobe.d/
Oracle VM Server 3.3	
Oracle VM Server 3.2	/etc/modprobe.conf
Oracle VM Server 3.1	/etc/modprobe.conf

- Example
When "8" is set for "ql2xmaxqdepth"

```
options qla2xxx ql2xmaxqdepth=8
```

End of procedure

7.1.3 Creating an Initial RAM Disk

Create an initial RAM disk image file to match the kernel being used. Refer to manuals supplied with the Fibre Channel cards for details.

7.1.4 Rebooting the OS

Reboot the OS.

7.2 Turning On the Devices

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

Procedure

- 1 Turn on the Fibre Channel switch power (if used).
- 2 Check that the Ready LED (or equivalent) is lit on the Fibre Channel switch.
- 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.

End of procedure

7.3 Checking LUN Status

This section describes how to check LUNs.

Procedure

- 1 Log in to Oracle VM Server with the administrator account (root user).
- 2 Execute the following command in the console screen and check the recognition status of the LUNs.

```
cat /proc/scsi/scsi
```

Output example:

When connecting the ETERNUS DX60 S4 in a two-path configuration by creating two LUNs

Check that the number of recognized LUNs is correct. The SCSI disks for the number of connected LUNs for each path are recognized. (In this example, four SCSI disks are recognized since there are two LUNs in the two-path configuration.)

Check that the connected ETERNUS AF/DX model is correct.

```
$ cat /proc/scsi/scsi
Host: scsi5 Channel: 00 Id: 00 Lun: 00
Vendor: FUJITSU Model: ETERNUS_DXL Rev: 0000
Type: Direct-Access ANSI SCSI revision: 05
Host: scsi5 Channel: 00 Id: 00 Lun: 01
Vendor: FUJITSU Model: ETERNUS_DXL Rev: 0000
Type: Direct-Access ANSI SCSI revision: 05
Host: scsi6 Channel: 00 Id: 00 Lun: 00
Vendor: FUJITSU Model: ETERNUS_DXL Rev: 0000
Type: Direct-Access ANSI SCSI revision: 05
Host: scsi6 Channel: 00 Id: 00 Lun: 01
Vendor: FUJITSU Model: ETERNUS_DXL Rev: 0000
Type: Direct-Access ANSI SCSI revision: 05
```

For a multipath configuration, check that the same number of LUNs is recognized for each path.

End of procedure

7.4 Checking the Multipath

The Oracle VM Server multipath improves path redundancy.

Because the multipath function is enabled by default, a multipath configuration is automatically set when a server with Oracle VM Server and the ETERNUS AF/DX are connected.

The multipath setting does not need to be changed.

Execute the "multipath -ll" command to check the items shown below.

Example:

When the ETERNUS DX60 S4 is connected in a two-path configuration

The screenshot shows the output of the 'multipath -ll' command. Callouts provide the following explanations:

- "The multipath consists of the block device names "sdb" and "sdn". "3600000e00d10000000100105006c0000" is created." (points to the device ID)
- "ETERNUS_DXL" is displayed since the ETERNUS DX60 S4 is connected." (points to the vendor name)
- Two block device names are displayed for a two-path configuration. (points to 'sdc' and 'sdg')
- When the path status is normal, "active ready" is displayed. (points to the status of the paths)

```
# multipath -ll
3600000e00d10000000100105006c0000 dm-0 FUJITSU,ETERNUS_DXL
size=2.0G features='1 queue_if_no_path' hwhandler='0' wp=rw
|+- policy='round-robin 0' prio=50 status=active
|  `-- 1:0:0:1 sdc 8:32 active ready running
`+- policy='round-robin 0' prio=10 status=enabled
   `-- 2:0:0:1 sdg 8:9 active ready running
```

Caution

The settings for the ETERNUS AF/DX are stored in the multipath configuration file, "/etc/multipath.conf".

When connecting the ETERNUS AF650 S3, the ETERNUS AF650 S2, the ETERNUS AF650, the ETERNUS DX500 S5/DX600 S5/DX900 S5, the ETERNUS DX500 S4/DX600 S4, the ETERNUS DX8900 S4, the ETERNUS DX500 S3/DX600 S3, or the ETERNUS DX8700 S3/DX8900 S3, check the "/etc/multipath.conf" file for the system that is used and apply the necessary changes to the file according to the following example.

- Example:

Add "|ETERNUS_DXM|ETERNUS_DXH" to the "product" line.

The screenshot shows a snippet of the "/etc/multipath.conf" file. A callout points to the "product" line, indicating that "|ETERNUS_DXM|ETERNUS_DXH" should be added.

```
devices {
  device {
    vendor "FUJITSU"
    product "ETERNUS_DXL|ETERNUS_DX400|ETERNUS_DX8000|ETERNUS_DXM|ETERNUS_DXH"
    prio alua
    path_grouping_policy group_by_prio
    path_selector "round-robin 0"
    failback immediate
    no_path_retry 10
  }
}
```

7.5 Installing and Setting Oracle VM Manager

Refer to the Oracle VM manuals for details.

Appendix A

WWN Instance Management Table for the Server (Blank)

This management table is used in "Checking the Fibre Channel Card".
Utilize this table if necessary.

Host name				
IP Address				
Physical slot name	Fibre Channel card WWN	Instance name	Physical address	Cable tag

FUJITSU Storage ETERNUS AF, ETERNUS DX Configuration Guide -Server Connection-
(Fibre Channel) for Oracle VM Server for x86

P3AM-6612-22ENZO

Date of issuance: December 2021
Issuance responsibility: FUJITSU LIMITED

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