

ETERNUS DX

Disk storage systems

Server Connection Guide (Fibre Channel)

for Linux

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Preface

This document briefly explains the operations that need to be performed by the user in order to connect an ETERNUS DX60/DX80/DX90, ETERNUS DX410/DX440, or ETERNUS DX8100/DX8400/DX8700 Disk storage system to a Linux server.

This document should be used in conjunction with any other applicable user manuals, such as those for the ETERNUS DX60/DX80/DX90, ETERNUS DX410/DX440, or ETERNUS DX8100/DX8400/DX8700 Disk storage system, server, OS used, Fibre Channel cards, drivers, etc.

Note that this manual refers the following documents.

- Server Support Matrix
- Server Support Matrix for FC-SWITCH
- ETERNUS DX Disk storage systems Server Connection Guide (Fibre Channel)
ETERNUS DX Disk Storage System Settings for ETERNUS DX60/DX80/DX90
- ETERNUS DX Disk storage systems Server Connection Guide (Fibre Channel)
ETERNUS DX Disk Storage System Settings for ETERNUS DX400/DX8000 series
- ETERNUS DX Disk storage systems Server Connection Guide (Fibre Channel)
Fibre Channel Switch Settings
- ETERNUS DX Disk storage systems Server Connection Guide (Fibre Channel) for Linux
 - Driver Settings for PRIMERGY/PRIMEQUEST 1000 Series
 - Driver Settings for PRIMEQUEST 500/400 Series
 - Driver Settings for Red Hat Enterprise Linux on Other Brand Servers with Emulex Fibre Channel Cards
 - Driver Settings for Red Hat Enterprise Linux on Other Brand Servers with QLogic Fibre Channel Cards
 - Driver Settings for SUSE Linux Enterprise Server on Other Brand Servers with Emulex Fibre Channel Cards
 - Driver Settings for SUSE Linux Enterprise Server on Other Brand Servers with QLogic Fibre Channel Cards
 - for Linux device-mapper multipath
- Web GUI User Guide
- ETERNUSmgr Install Guide
- ETERNUSmgr User Guide

Also, note that in this document the ETERNUS DX60/DX80/DX90, ETERNUS DX410/DX440, and ETERNUS DX8100/DX8400/DX8700 Disk storage systems are collectively referred to as ETERNUS DX Disk storage systems.

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The Contents and Structure of this Manual

This document is composed of the following 11 chapters and an appendix.

- Chapter 1 Workflow
This describes how to connect the ETERNUS DX Disk storage systems to a server running Linux
- Chapter 2 Checking the Server Environment
This describes which servers can be connected to ETERNUS DX Disk storage systems.
- Chapter 3 Notes
This describes issues that should be noted when connecting the ETERNUS DX Disk storage systems and server.
- Chapter 4 Installing and Setting Up the ETERNUSmgr
This describes how to install ETERNUSmgr.
- Chapter 5 Setting Up the ETERNUS DX Disk Storage Systems
This describes how to use ETERNUSmgr to set up the ETERNUS DX Disk storage systems.
- Chapter 6 Setting the Fibre Channel Switches
This describes how to set up the Fibre Channel switches.
- Chapter 7 Installing and Setting Up the Drivers
This describes how to install the Fibre Channel card drivers and set up the server.
- Chapter 8 Connecting the Server to the ETERNUS DX Disk Storage Systems
This describes how to connect the server and ETERNUS DX Disk storage systems.
- Chapter 9 Logical Unit Recognition
This describes how to recognize the ETERNUS DX Disk storage system logical units from server.
- Chapter 10 Setting Up and Checking the Multipath Driver
This describes how to set up and check the ETERNUS Multipath Driver.
- Chapter 11 Setting Up the File System
This describes how to create a file system on the ETERNUS DX Disk storage systems.

The restoration procedure for when a path degrades in a VERITAS Volume Manager environment is described in the appendix.

Safe Use of this Product

■ Using this manual

This manual contains important information to ensure the safe use of this product. Be sure to thoroughly read and understand its contents before using the product. After reading, store this manual in a safe place for future reference.

FUJITSU has made every effort to ensure the safety of the users and other personnel, and to prevent property damage. When using this product, carefully follow the instructions described in this manual.

Acknowledgments

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Naming Conventions

■ Product Names

- Red Hat Enterprise Linux series products are as described below. "xxx" in the following table indicates an architecture name (example: x86), and "x" indicates a version number.

Product Names	Abbreviation
Red Hat Enterprise Linux	RHEL
Red Hat Enterprise Linux 5	RHEL5
Red Hat Enterprise Linux 5.x	RHEL5.x
Red Hat Enterprise Linux 5 (for xxx)	RHEL5 (xxx)
Red Hat Enterprise Linux 5.x (for xxx)	RHEL5.x (xxx)
Red Hat Enterprise Linux AS v.4	RHEL-AS4
Red Hat Enterprise Linux AS v.4 Update x	RHEL-AS4 Update x

Product Names	Abbreviation
Red Hat Enterprise Linux AS 4.x	RHEL-AS4.x
Red Hat Enterprise Linux AS (v.4 for xxx)	RHEL-AS4 (xxx)
Red Hat Enterprise Linux AS (v.4 for xxx) Update x	RHEL-AS4 (xxx) Update x
Red Hat Enterprise Linux AS (4.x for x86)	RHEL-AS4.x (xxx)
Red Hat Enterprise Linux ES v.4	RHEL-ES4
Red Hat Enterprise Linux ES v.4 Update x	RHEL-ES4 Update x
Red Hat Enterprise Linux ES 4.x	RHEL-ES4.x
Red Hat Enterprise Linux ES (v.4 for xxx)	RHEL-ES4 (xxx)
Red Hat Enterprise Linux ES (v.4 for xxx) Update x	RHEL-ES4 (xxx) Update x
Red Hat Enterprise Linux ES (4.x for xxx)	RHEL-ES4.x (xxx)

- SUSE Linux Enterprise Server series products are as described below.

Product Names	Abbreviation
SUSE Linux Enterprise Server	SLES
SUSE Linux Enterprise Server 11	SLES11
SUSE Linux Enterprise Server 11 for x86	SLES11 (x86)
SUSE Linux Enterprise Server 11 for EM64T	SLES11 (EM64T)
SUSE Linux Enterprise Server 11 for Itanium Processor Family	SLES11 (IPF)
SUSE Linux Enterprise Server 10	SLES10
SUSE Linux Enterprise Server 10 Service Packx	SLES10 SPx
SUSE Linux Enterprise Server 10 for x86	SLES10 (x86)
SUSE Linux Enterprise Server 10 for EM64T	SLES10 (EM64T)
SUSE Linux Enterprise Server 10 for Itanium Processor Family	SLES10 (IPF)
SUSE Linux Enterprise Server 10 for x86 Service Packx	SLES10 (x86) SPx
SUSE Linux Enterprise Server 10 for EM64T Service Packx	SLES10 (EM64T) SPx
SUSE Linux Enterprise Server 10 for Itanium Processor Family Service Packx	SLES10 (IPF) SPx
SUSE Linux Enterprise Server 9	SLES9
SUSE Linux Enterprise Server 9 Service Packx	SLES9 SPx
SUSE Linux Enterprise Server 9 for x86	SLES9 (x86)
SUSE Linux Enterprise Server 9 for EM64T	SLES9 (EM64T)
SUSE Linux Enterprise Server 9 for Itanium Processor Family	SLES9 (IPF)
SUSE Linux Enterprise Server 9 for x86 Service Packx	SLES9 (x86) SPx
SUSE Linux Enterprise Server 9 for EM64T Service Packx	SLES9 (EM64T) SPx
SUSE Linux Enterprise Server 9 for Itanium Processor Family Service Packx	SLES9 (IPF) SPx

■ Other names

- "Channel Adapter" (CA) refers to the Fibre Channel interface module used in the ETERNUS DX Disk storage systems to connect to the server.
- "Fibre Channel card" refers to the Fibre Channel interface module normally used in the server. A "Host Bus Adapter" (HBA) or "Channel Adapter" (CA) may be used instead, depending on the server.
- "Fibre Channel cable" refers to the cable that is used to connect the ETERNUS DX Disk storage systems and server over a Fibre Channel interface. "FC cable", "optical fibre cable", or "multi mode Fibre Channel cable" may be used instead, depending on the storage system.
- Italics are used to show variables such as values and characters that appear in command parameters and output examples.

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Chapter 1 Workflow

This chapter describes how to connect the ETERNUS DX Disk storage system to a server running Linux.

Procedure varies according to whether a single-path or multipath configuration is used.



Note

When a Fibre Channel switch is used to make the connection, refer to the "ETERNUS DX Disk storage systems Server Connection Guide (Fibre Channel) Fibre Channel Switch Settings" and use the procedure described.

1.1 When the Multipath Driver is not Used

The documents and workflow required when a multipath driver is not used are as follows.

Required Documents

- Server Support Matrix
- Server Support Matrix for FC-SWITCH
- ETERNUS DX Disk storage systems Server Connection Guide (Fibre Channel) ETERNUS DX Disk Storage System Settings for ETERNUS DX60/DX80/DX90
- ETERNUS DX Disk storage systems Server Connection Guide (Fibre Channel) ETERNUS DX Disk Storage System Settings for ETERNUS DX400/DX8000 series
- ETERNUS DX Disk storage systems Server Connection Guide (Fibre Channel) Fibre Channel Switch Settings
- ETERNUS DX Disk storage systems Server Connection Guide (Fibre Channel) for Linux (This manual)
 - Driver Settings for PRIMERGY/PRIMEQUEST 1000 Series
 - Driver Settings for PRIMEQUEST 500/400 Series
 - Driver Settings for Red Hat Enterprise Linux on Other Brand Servers with Emulex Fibre Channel Cards
 - Driver Settings for Red Hat Enterprise Linux on Other Brand Servers with QLogic Fibre Channel Cards
 - Driver Settings for SUSE Linux Enterprise Server on Other Brand Servers with Emulex Fibre Channel Cards
 - Driver Settings for SUSE Linux Enterprise Server on Other Brand Servers with QLogic Fibre Channel Cards
- Web GUI User Guide
- ETERNUSmgr Install Guide
- ETERNUSmgr User Guide
- Other manuals provided with each product (server, Fibre Channel Cards, and Fibre Channel Card Driver)

Workflow

1

Install the ETERNUSmgr and Set Up the ETERNUS DX Disk Storage System

If the ETERNUSmgr is to be used, install it and set up the ETERNUS DX Disk storage system.



- ["Chapter 4 Installing and Setting Up the ETERNUSmgr" \(page 25\)](#)
- ["Chapter 5 Setting Up the ETERNUS DX Disk Storage Systems" \(page 26\)](#)
- Check the setup and maintenance operations.
 - "Web GUI User Guide"
- Install ETERNUSmgr.
 - "ETERNUSmgr Install Guide"
- Check ETERNUSmgr operation.
 - "ETERNUSmgr User Guide"
- Set up the ETERNUS DX Disk storage system.
 - "ETERNUS DX Disk storage systems Server Connection Guide (Fibre Channel) ETERNUS DX Disk Storage System Settings for ETERNUS DX60/DX80/DX90"
 - "ETERNUS DX Disk storage systems Server Connection Guide (Fibre Channel) ETERNUS DX Disk Storage System Settings for ETERNUS DX400/DX8000 series"



2

Set Up the Fibre Channel Switch

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



- ["Chapter 6 Setting the Fibre Channel Switches" \(page 27\)](#)
- Set up the Fibre Channel switch.
 - "ETERNUS DX Disk storage systems Server Connection Guide (Fibre Channel) Fibre Channel Switch Settings"
- Check the Fibre Channel switch connection requirements.
 - "Server Support Matrix for FC-SWITCH"



3

Install the Fibre Channel Card Driver

Install the appropriate driver for the Fibre Channel card being used. Applicable manual varies according to the server, OS, and Fibre Channel Card type being used. Select from the following list.



- ["Chapter 7 Installing and Setting Up the Drivers" \(page 28\)](#)
- Mount cards, install drivers, and perform setup.
 - "Driver Settings for PRIMERGY/PRIMEQUEST 1000 Series"
- Mount cards, install drivers, and perform setup.
 - "Driver Settings for PRIMEQUEST 500/400 Series"
- Mount cards, install drivers, and perform setup.
 - "Driver Settings for Red Hat Enterprise Linux on Other Brand Servers with Emulex Fibre Channel Cards"
- Mount cards, install drivers, and perform setup.
 - "Driver Settings for Red Hat Enterprise Linux on Other Brand Servers with QLogic Fibre Channel Cards"
- Mount cards, install drivers, and perform setup.
 - "Driver Settings for SUSE Linux Enterprise Server on Other Brand Server with Emulex Fibre Channel Cards"
- Mount cards, install drivers, and perform setup.
 - "Driver Settings for SUSE Linux Enterprise Server on Other Brand Servers with QLogic Fibre Channel Cards"
- Check the Fibre Channel Card driver versions.
 - "Server Support Matrix"



4

Connect the Server to the ETERNUS DX Disk Storage Systems

Connect the server and the ETERNUS DX Disk storage systems using the Fibre Channel cables.



- ["Chapter 8 Connecting the Server to the ETERNUS DX Disk Storage Systems" \(page 29\)](#)



5

Set the Server to Recognize the Logical Units

Set up the server so that it can recognize the ETERNUS DX Disk storage systems' LUN (logical units).



- ["Chapter 9 Logical Unit Recognition" \(page 30\)](#)



6

Create a File System

Create a file system.



- ["Chapter 11 Setting Up the File System" \(page 34\)](#)

1.2 When the Multipath Driver is Used

The multipath drivers that may be used, and the documents and workflow required when using a multipath driver, are as follows.

Usable Multipath Drivers

- ETERNUS Multipath Driver
- GR Multipath Driver
- VERITAS Volume Manager
- device-mapper multipath

Required Documents

- Server Support Matrix
- Server Support Matrix for FC-SWITCH
- ETERNUS DX Disk storage systems Server Connection Guide (Fibre Channel)
ETERNUS DX Disk Storage System Settings for ETERNUS DX60/DX80/DX90
- ETERNUS DX Disk storage systems Server Connection Guide (Fibre Channel)
ETERNUS DX Disk Storage System Settings for ETERNUS DX400/DX8000 series
- ETERNUS DX Disk storage systems Server Connection Guide (Fibre Channel)
Fibre Channel Switch Settings
- ETERNUS DX Disk storage systems Server Connection Guide (Fibre Channel) for Linux
(This manual)
 - Driver Settings for PRIMERGY/PRIMEQUEST 1000 Series
 - Driver Settings for PRIMEQUEST 500/400 Series
 - Driver Settings for Red Hat Enterprise Linux on Other Brand Servers with Emulex Fibre Channel Cards
 - Driver Settings for Red Hat Enterprise Linux on Other Brand Servers with QLogic Fibre Channel Cards
 - Driver Settings for SUSE Linux Enterprise Server on Other Brand Servers with Emulex Fibre Channel Cards
 - Driver Settings for SUSE Linux Enterprise Server on Other Brand Servers with QLogic Fibre Channel Cards
 - for Linux device-mapper multipath
- Web GUI User Guide
- ETERNUSmgr Install Guide
- ETERNUSmgr User Guide
- Other manuals provided with each product (server, Fibre Channel Cards, Fibre Channel Card Driver, Multipath Driver, and VxVM)

Workflow

1

Install and Set Up ETERNUSmgr

Install and set up the ETERNUSmgr software (if it is to be used).



- ["Chapter 4 Installing and Setting Up the ETERNUSmgr" \(page 25\)](#)
- ["Chapter 5 Setting Up the ETERNUS DX Disk Storage Systems" \(page 26\)](#)
- Check Web GUI operation.
 - "Web GUI User Guide"
- Install ETERNUSmgr.
 - "ETERNUSmgr Install Guide"
- Check ETERNUSmgr operation.
 - "ETERNUSmgr User Guide"
- Set up the ETERNUS DX Disk storage system.
 - "ETERNUS DX Disk storage systems Server Connection Guide (Fibre Channel) ETERNUS DX Disk Storage System Settings for ETERNUS DX60/DX80/DX90"
 - "ETERNUS DX Disk storage systems Server Connection Guide (Fibre Channel) ETERNUS DX Disk Storage System Settings for ETERNUS DX400/DX8000 series"



2

Set Up the Fibre Channel Switch

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



- ["Chapter 6 Setting the Fibre Channel Switches" \(page 27\)](#)
- Set up the Fibre Channel switch.
 - "ETERNUS DX Disk storage systems Server Connection Guide (Fibre Channel) Fibre Channel Switch Settings"
- Check the Fibre Channel switch connection requirements.
 - "Server Support Matrix for FC-SWITCH"



3

Install the Fibre Channel Card Driver

Install the appropriate driver for the Fibre Channel card being used. Applicable manual varies according to the server, OS, and Fibre Channel Card type being used. Select from the following list.



- ["Chapter 7 Installing and Setting Up the Drivers" \(page 28\)](#)
- Mount cards, install drivers, and perform setup.
 - "Driver Settings for PRIMERGY/PRIMEQUEST 1000 Series"
- Mount cards, install drivers, and perform setup.
 - "Driver Settings for PRIMEQUEST 500/400 Series"
- Mount cards, install drivers, and perform setup.
 - "Driver Settings for Red Hat Enterprise Linux on Other Brand Servers with Emulex Fibre Channel Cards"
- Mount cards, install drivers, and perform setup.
 - "Driver Settings for Red Hat Enterprise Linux on Other Brand Servers with QLogic Fibre Channel Cards"
- Mount cards, install drivers, and perform setup.
 - "Driver Settings for SUSE Linux Enterprise Server on Other Brand Server with Emulex Fibre Channel Cards"
- Mount cards, install drivers, and perform setup.
 - "Driver Settings for SUSE Linux Enterprise Server on Other Brand Servers with QLogic Fibre Channel Cards"
- Check the Fibre Channel Card driver versions.
 - "Server Support Matrix"



For ETERNUS Multipath Driver



For VERITAS Volume Manager



For device-mapper multipath

6

Set the Server to Recognize the Logical Units

Set up the server so that it can recognize the ETERNUS DX Disk storage systems' LUN (logical units).



- ["Chapter 9 Logical Unit Recognition" \(page 30\)](#)



For ETERNUS Multipath Driver



For VERITAS Volume Manager



For device-mapper multipath

7

Create a File System

Create a file system.



- ["Chapter 11 Setting Up the File System" \(page 34\)](#)

Install VERITAS Volume Manager

Install and set up the VERITAS Volume Manager software.



- Install and set up the VERITAS Volume Manager.
 - Documentation provided with the product
- Check the corresponding Multipath Driver.
 - "Server Support Matrix"

Set up the device-mapper multipath

Set up and confirm the device-mapper multipath.



- ["Chapter 10 Setting Up and Checking the Multipath Driver" \(page 33\)](#)
- Set up the device-mapper multipath.
 - "ETERNUS DX Disk storage systems Server Connection Guide (Fibre Channel) for Linux device-mapper multipath"

Chapter 2 Checking the Server Environment

Refer to the "Server Support Matrix" to check the server environment.

2.1 Server Hardware

Refer to the "Server Support Matrix".

2.2 Server OS

Refer to the "Server Support Matrix".

Caution 

When using the PRIMERGY or PRIMEQUEST, install the driver provided with the product or released on the Internet.

When installing a driver downloaded from the Emulex or QLogic Corp website, the following packages are required for the compile operation:

- For Red Hat Enterprise Linux
 - Development Tool (For details, add Ruby)
 - Kernel Development
 - Legacy Software Development
 - For SUSE Linux Enterprise Server
 - Languages (C and C++)
 - Kernel Sources
-

2.3 Fibre Channel Cards

Refer to the "Server Support Matrix".

2.4 ETERNUS Multipath Driver or GR Multipath Driver

Refer to the "Server Support Matrix" for ETERNUS Multipath Driver or GR Multipath Driver usage conditions.

2.5 VERITAS Volume Manager (VxVM)

Refer to the "Server Support Matrix" for VxVM usage conditions.

2.6 device-mapper multipath

Refer to the "Server Support Matrix" for device-mapper multipath usage conditions.

2.7 VERITAS Cluster Server

Refer to the "Server Support Matrix" for VERITAS Cluster Server usage conditions.

Chapter 3 Notes

Note the following issues when performing the relevant operation.

3.1 Connection Notes

3.1.1 SCSI Devices and Linux

The ETERNUS DX Disk storage systems represented to the server as set of Fibre Channel connected SCSI disks. The server then handles the ETERNUS DX Disk storage systems' disks as LUN (logical units). Under Linux, SCSI disk devices have the following definitions in "/dev":

Device (LUN)	Partition
sda	sda1, sda2, sda15
sdb	sdb1, sdb2, sdb15
:	
sdz	sdz1, sdz2, sdz15
sdaa-sdaz	sdaa1, sdaa2, sdaz15
sdba-sdbz	sdba1, sdba2, sdbz15
sdca-sdcz	sdca1, sdca2, sdcz15
sdda-sddx	sdda1, sdda2, sddx15
:	
sdia-sdiv	sdia1, sdia2, sdiv15

3.1.2 udev Function Notes

For RHEL-AS4 Update 4 or RHEL-ES4 Update 4 or later, note the following if using the udev function's by-id names to access disks:

- ETERNUS DX Disk storage systems' setting [Inquiry VPD ID Type] must be set to [Type1 + Type3 (Default)] in the Web GUI or ETERNUSmgr [Set Host Response] window.

3.2 Fibre Channel Card Notes

When a Fibre Channel card is installed in the server after installation of the OS, it should be automatically recognized the next time the OS is restarted. Proceed as follows:

- Red Hat Enterprise Linux
The kudzu starts automatically during the system reboot. Select "Ignore".
- SUSE Linux Enterprise Server
The "New hardware detection" window appears during the system reboot. Select "No".

3.3 Fibre Channel Switch Notes

- When using a Fibre Channel switch (ETERNUS SN200 series, Brocade DCX series) between the server and ETERNUS DX Disk storage systems, it is necessary to prepare and set the Fibre Channel switch in advance. When using a Fibre Channel switch (ETERNUS SN200 series, Brocade DCX series), be sure to read the "ETERNUS DX Disk storage systems Server Connection Guide (Fibre Channel) Fibre Channel Switch Settings".
- When 4Gbit/s QLogic Fibre Channel cards are connected to the ETERNUS SN200 series or Brocade DCX series via Fibre Channel switch, and the SFP produces an incorrect linkup, change the Fibre Channel card BIOS settings. Contact your maintenance engineer for SFP details.

3.4 Server Startup and Power Supply Control Notes

Before turning the server on, check that the ETERNUS DX Disk 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 DX Disk storage systems.

Also, when the ETERNUS DX Disk storage system power supply is being controlled by a connected server, make sure that the ETERNUS DX Disk storage system 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 DX Disk storage systems, and already saved data may also be affected.

3.5 Design Sheet Notes

The design sheet is a spreadsheet program work sheet that is used to simplify the process of installing the ETERNUS DX Disk storage systems.
 It is important to save the current environment after first installing the system and also after each post installation system modification, addition, or maintenance operation. Creating a design sheet makes installation and maintenance of the system easy.

3.6 VERITAS Volume Manager (VxVM) Notes

- Install VERITAS Array Support Library (ASL) after installing VxVM.
- Installing VxVM
 VxVM should be installed as specified in its accompanying documentation.
- When using VxVM 5.0
 If the ETERNUS DX Disk storage systems are connected to a configuration that uses the VxVM, the VERITAS Array Support Library (ASL) will also need to be installed. Which version of VERITAS ASL is required will depend on the storage system and version of VxVM used. Download the VERITAS ASL version that matches your environment from the following Symantec web-site.
 Refer to the Symantec web-site for VERITAS ASL installation details.

Storage system	OS version	VxVM	ASL download URL
ETERNUS DX60/DX80/DX90	Red Hat Enterprise Linux	VxVM 5.0 MP1 or later	http://support.veritas.com/docs/323773
	SUSE Linux Enterprise Server		http://support.veritas.com/docs/323774
ETERNUS DX410/DX440 ETERNUS DX8100/DX8400/DX8700	Red Hat Enterprise Linux	VxVM 5.0 MP1 or later	http://support.veritas.com/docs/338462
	SUSE Linux Enterprise Server		

- When using VxVM 5.1
 ASL does not need to be installed.
- If a path degrades when VERITAS Volume Manager is used, some volumes may not be successfully recognized after path restoration regardless of the Linux version or VxVM version that is installed.
 In this case, volume recognition is required after restoring the LUN using the utility provided by each Fibre Channel card vendor. Refer to "[Appendix A Restoration Procedure for when a Path Degrades in a VERITAS Volume Manager Environment](#)" (page 35) for more details.

3.7 VERITAS Cluster Server (VCS) Notes

- Installing VERITAS Cluster Server
VERITAS Cluster Server should be installed according to the directions given in the documentation provided with VERITAS Cluster Server.

3.8 Notes on Connecting the ETERNUS DX Disk Storage System to a Server

When connecting the ETERNUS DX Disk storage system to a server using a Fibre Channel cable, make sure to confirm that all the settings on the ETERNUS DX Disk storage system are complete. The WWN Automatic Acquisition function should not be used because it requires the server to be connected.

Otherwise, LUNs in the ETERNUS DX Disk storage system may not be recognized properly.

Chapter 4 Installing and Setting Up the ETERNUSmgr

If ETERNUSmgr is to be used, install it according to the directions given in the "ETERNUSmgr Install Guide". After the installation, set up ETERNUSmgr following the instructions in the "ETERNUSmgr User Guide".

Chapter 5 Setting Up the ETERNUS DX Disk Storage Systems

Set up the ETERNUS DX Disk storage systems using Web GUI or ETERNUSmgr.

ETERNUS DX Disk storage systems' setup can be performed independently of server setup. For details on how to perform these settings, refer to the "ETERNUS DX Disk storage systems Server Connection Guide (Fibre Channel) ETERNUS DX Disk Storage System Settings for ETERNUS DX60/DX80/DX90", "ETERNUS DX Disk storage systems Server Connection Guide (Fibre Channel) ETERNUS DX Disk Storage System Settings for ETERNUS DX400/DX8000 series", "Web GUI User Guide", and "ETERNUSmgr User Guide".

Chapter 6 Setting the Fibre Channel Switches

This chapter describes about the required settings for connecting ETERNUS DX Disk storage system via Fibre Channel switches.

Set the Fibre Channel switches according to "ETERNUS DX Disk storage systems Server Connection Guide (Fibre Channel) Fibre Channel Switch Settings".

Caution 

When setting the access path using the ETERNUS SF Storage Cruiser, Host Response No. will be set to default values.
Set the Host Response No. after setting the access path using the ETERNUS SF Storage Cruiser.

Chapter 7 Installing and Setting Up the Drivers

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

Refer to each "ETERNUS DX Disk storage systems Server Connection Guide (Fibre Channel) for Linux Driver Settings" for detailed setting procedures.

- ETERNUS DX Disk storage systems Server Connection Guide (Fibre Channel) for Linux
 - Driver Settings for PRIMERGY/PRIMEQUEST 1000 Series
 - Driver Settings for PRIMEQUEST 500/400 Series
 - Driver Settings for Red Hat Enterprise Linux on Other Brand Servers with Emulex Fibre Channel Cards
 - Driver Settings for Red Hat Enterprise Linux on Other Brand Servers with QLogic Fibre Channel Cards
 - Driver Settings for SUSE Linux Enterprise Server on Other Brand Servers with Emulex Fibre Channel Cards
 - Driver Settings for SUSE Linux Enterprise Server on Other Brand Servers with QLogic Fibre Channel Cards

Chapter 8 Connecting the Server to the ETERNUS DX Disk Storage Systems

After all the required drivers have been installed, shut down the OS and make sure the server is turned off.

Connect the shutdown server to the ETERNUS DX Disk storage systems using Fibre Channel cables, then restart the OS.

The server and ETERNUS DX Disk storage systems must be connected for the procedures that follow.

Chapter 9 Logical Unit Recognition

At boot up, Linux automatically recognizes all SCSI disks and assigns them successive device names starting from "sda". When assigning the device names, any internal SCSI disks are assigned first, followed by the assignment of the ETERNUS DX Disk storage systems' LUNs. Example: If there is one internal SCSI disk, it is assigned a SCSI device name as follows:

SCSI device name	by-id name (Example)	Explanation
/dev/sda	/dev/disk/by-id/scsi-36003005700ac3fc013746ef6315e42c4	Internal SCSI disk
/dev/sdb or later	/dev/disk/by-id/scsi-3600000e00d0000000000042200000000 /dev/disk/by-id/scsi-3600000e00d0000000000042200010000 :	ETERNUS DX Disk storage systems' LUN

9.1 Displaying the Recognized Logical Units

The driver version and information of each LUN's SCSI device name, etc. are displayed in the console message when Linux is booted up. Although this console message disappears soon from the screen, it can be re-displayed using the following command:

9.1.1 For Red Hat Enterprise Linux

The driver version and information of each LUN's SCSI device name, etc. are displayed in the console message when Linux is booted up. Although this console message disappears soon from the screen, it can be re-displayed using the following command:

- "dmesg" command for LUN display
Use the "dmesg" command in order to confirm whether Linux has recognized the LUNs in the ETERNUS DX Disk storage systems.
The following shows an example:

```
#dmesg|less
:
Emulex LightPulse FC SCSI/IP 4.21q
PCI:Found IRQ 10 for device 03:06.0
!lpfc0:031:Link Up Event received Data:1 1 1 2
PCI:Found IRQ 5 for device 04:02.0
IRQ routing conflict for 04:02.0,have irq 10,want irq 5
!lpfc0:031:Link Up Event received Data:1 1 1 2
scsi3:Emulex LPFC SCSI on PCI bus 03 device 30 irq 10
scsi4:Emulex LPFC SCSI on PCI bus 04 device 10 irq 10
Vender: FUJITSU Model: ETERNUS_DX400 Rev: 0000
Type: Direct-Access ANSI SCSI revision: 03
Vender: FUJITSU Model: ETERNUS_DX400 Rev: 0000
Type: Direct-Access ANSI SCSI revision: 03
```

- "cat" command for LUN display
Use the "cat" command to display the "/proc/scsi/scsi" file, where you can confirm the recognized SCSI devices.
The following shows an example of this.

```
# cat /proc/scsi/scsi
Attached devices:
Host: scsi2 Channel: 00 Id: 05 Lun: 00
Vender: HP Model: SAFTE; U160/M BP Rev: 1023
Type: processor ANSI SCSI revision: 02
Host: scsi2 Channel: 02 Id: 00 Lun: 00
Vender: MegaRAID Model: LD0 RAID0 8677R Rev: E
Type: Direct-Access ANSI SCSI revision: 02
Host: scsi3 Channel: 00 Id: 00 Lun: 00
Vender: FUJITSU Model: ETERNUS_DX400 Rev: 0000
Type: Direct-Access ANSI SCSI revision: 03
Host: scsi3 Channel: 00 Id: 00 Lun: 01
Vender: FUJITSU Model: ETERNUS_DX400 Rev: 0000
Type: Direct-Access ANSI SCSI revision: 03
```

At this point the Multipath Driver has not been set up yet, so two SCSI devices are shown for each connected LUN (i.e. if there are 3 LUNs, 6 SCSI devices are shown).

9.1.2 For SUSE Linux Enterprise Server

- **Checking for LUNs in the boot message**
Open the `/var/log/boot.msg` file to confirm that Linux has recognized the ETERNUS DX Disk storage systems' LUNs.
The following shows an example (Messages can be scrolled (back and forth) using the arrow keys).

```
<6>qla2x00_set_info starts at address - c3600060
<6>qla2x00: Found VID-1077 DID-2422 SSVID-1077 SSDID-134
<6>scsi(2): Found a QLA2422 @ bus 1, device 0xa, lrq 29, iobase 0xf9o0d000

.
.
.

<6>scsi2 : Qlogic QLA2422 PCI to Fibre Channel Host Adapter: bus 1 device
10 irq 29
<4>      Firmware version: 4.00.12, Driver version 7.07.01 ← Driver version
<4>
<6>scsi3 : Qlogic QLA2422 PCI to Fibre Channel Host Adapter: bus 1 device
10 irq 30
<4>      Firmware version: 4.00.12, Driver version 7.07.01 ← Driver version
<4>
<4> Vendor: FUJITSU Model: ETERNUS_DX400 Rev: 0000
<4> Type: Direct-Access ANSI SCSI revision: 05
<4> Vendor: FUJITSU Model: ETERNUS_DX400 Rev: 0000
<4> Type: Direct-Access ANSI SCSI revision: 05
<6>scsi(2:0:0:0): Enabled tagged queuing, queue depth 20.
<6>scsi(2:0:0:1): Enabled tagged queuing, queue depth 20.
<4>Attached scsi disk sdb at scsi2, channel 0, id 0, lun 0
<4>Attached scsi disk sdb at scsi2, channel 0, id 0, lun 1
<4>SCSI device sdb: 4096000 512-byte hdwr sectors (2097 MB)
<6> sdb: unknown partition table
<4>SCSI device sdb: 4096000 512-byte hdwr sectors (2097 MB)
<6> sdb: unknown partition table
```

- **Checking for LUNs with the "cat" command**
Use the "cat" command to display the `/proc/scsi/scsi` file, which contains a list of recognized SCSI devices.
The following shows an example of this.

```
# cat /proc/scsi/scsi
Attached devices:
Host: scsi0 Channel: 00 Id: 04 Lun: 00
  Vender: FUJITSU Model: MAP3735NC Rev: 5207
  Type: Direct-Access ANSI SCSI revision: 03
Host: scsi0 Channel: 00 Id: 08 Lun: 00
  Vender: SDR Model: GEM318 Rev: 0
  Type: Processor ANSI SCSI revision: 02
Host: scsi1 Channel: 00 Id: 05 Lun: 00
  Vender: SEAGATE Model: DAT 9SP40-000 Rev: 9M38
  Type: Sequential-Access ANSI SCSI revision: 03
Host: scsi2 Channel: 00 Id: 00 Lun: 00
  Vender: FUJITSU Model: ETERNUS_DX400 Rev: 0000
  Type: Direct-Access ANSI SCSI revision: 05
Host: scsi2 Channel: 00 Id: 00 Lun: 01
  Vender: FUJITSU Model: ETERNUS_DX400 Rev: 0000
  Type: Direct-Access ANSI SCSI revision: 05
```

At this point the Multipath Driver has not been set up yet, so two SCSI devices are shown for each connected LUN (i.e. if there are 3 LUNs, 6 SCSI devices are shown).

Chapter 10 Setting Up and Checking the Multipath Driver

10.1 ETERNUS Multipath Driver or GR Multipath Driver

Refer to either the "ETERNUS Multipath Driver" or "GR Multipath Driver" manual (as applicable) for the setup and confirmation procedures.

10.2 device-mapper multipath

Set up and confirm the device mapper multipaths.
Refer to the "ETERNUS DX Disk storage systems Server Connection Guide (Fibre Channel) for Linux device-mapper multipath" for the setup and confirmation procedures.

Chapter 11 Setting Up the File System



After Linux has recognized the ETERNUS DX Disk storage systems' LUNs, access for data storage will be possible after completing the following steps:

- Setting up Partitions
- Formatting Partitions
- Mounting Partitions

Caution

If by-id names are being used with Red Hat Enterprise Linux AS v.4 Update 4 or Red Hat Enterprise Linux ES v.4 Update 4 or later, then the accessible device names will be by-id names.

Appendix A Restoration Procedure for when a Path Degrades in a VERITAS Volume Manager Environment

If a path degrades when VERITAS Volume Manager is used, some volumes may not be recognized properly after path restoration. In this case, volume recognition is required after restoring LUN recognition using the Change LUN State Utility provided by each Fibre Channel card vendor.

Procedure

- 1** Check the Fibre Channel card's controller number and status.
Use the "vxddmpadm" command to check the controller number and controller status of the Fibre Channel card that corresponds to the unrecognized volume.
- 1-1** Check the controller number of the Fibre Channel card in which there is a path connected to the ETERNUS DX Disk storage system.

```
# vxddmpadm listctlr all
```

Example (for ETERNUS DX410)

```
# vxddmpadm listctlr all
CTLR-NAME      ENCLR-TYPE      STATE      ENCLR-NAME
=====
c0              Disk            ENABLED    Disk
c6              FJ_DX400        ENABLED    fj_dx400
c7              FJ_DX400        ENABLED    fj_dx400
```

In this example, the controller numbers of the Fibre Channel cards connected to the ETERNUS DX410 are "c6" and "c7".

>

- 1-2** Check the status of volume paths connected to each Fibre Channel card using the controller numbers that were checked in [Step 1-1](#). In this step, check the controller number corresponding to the volume for which "DISABLED" is displayed.

```
# vxdmpadm getsubpaths ctlr=c<controller number>
```

Example (for ETERNUS DX410)

```
# vxdmpadm getsubpaths ctlr=c6
NAME          STATE      PATH-TYPE  DMPNODENAME  ENCLR-TYPE  ENCLR-NAME
-----
sdb           ENABLED    -          sdb          FJ_DX400    fj_dx400
sdc           ENABLED    -          sdc          FJ_DX400    fj_dx400
sdd           ENABLED    -          sdd          FJ_DX400    fj_dx400

# vxdmpadm getsubpaths ctlr=c7
NAME          STATE      PATH-TYPE  DMPNODENAME  ENCLR-TYPE  ENCLR-NAME
-----
sde           DISABLED   -          sdb          FJ_DX400    fj_dx400
sdf           ENABLED    -          sdc          FJ_DX400    fj_dx400
sdg           ENABLED    -          sdd          FJ_DX400    fj_dx400
```

In this example, "DISABLED" is displayed for the "sde" volume. The controller number of the Fibre Channel card in which the volume cannot be recognized is "c7".

2 Obtain and apply the Change LUN State Utility.

- 2-1** Obtain the Change LUN State Utility provided by each Fibre Channel card vendor.

- For QLogic Fibre Channel cards
Obtain the Change LUN State Utility from the QLogic web-site (<http://www.qlogic.com/>).
- For Emulex Fibre Channel cards
Obtain the Change LUN State Utility from the Emulex web-site (<http://www.emulex.com/>).

Refer to each vendor web-site for details about the Change LUN State Utility.

- 2-2** Apply the Change LUN State Utility that is obtained in [Step 2-1](#) according to the procedure specified by each vendor to change the state of the LUN to recognized. Refer to each vendor web-site for details about how to apply the Change LUN State Utility.

3 Enable VERITAS Volume Manager.

Enable VERITAS Volume Manager using the "vxctl" command.

```
# vxctl enable
```

>

4 Check the volume status.

Check that the status of a volume that was "DISABLED" in [Step 1-2](#) is changed to "ENABLED".

```
# vxddmpadm getsubpaths ctlr=c<controller number>
```

Example (for ETERNUS DX410)

```
# vxddmpadm getsubpaths ctlr=c7
NAME          STATE      PATH-TYPE  DMPNODENAME  ENCLR-TYPE  ENCLR-NAME
-----
sde           ENABLED    -          sdb          FJ_DX400    fj_dx400
sdf           ENABLED    -          sdc          FJ_DX400    fj_dx400
sdg           ENABLED    -          sdd          FJ_DX400    fj_dx400
```

End of procedure

ETERNUS DX Disk storage systems
Server Connection Guide (Fibre Channel) for Linux

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