ETERNUS
Disk storage systems
Server Connection Guide (Fibre Channel)
for VMware® ESX
This page is intentionally left blank.
Preface

This document briefly explains the operations that need to be performed by the user in order to connect an ETERNUS2000 model 100 or 200, ETERNUS4000 model 300, 400, 500, or 600, or ETERNUS8000 model 700, 800, 900, 1100, 1200, 2100, or 2200 Disk storage system to a server running VMware® ESX via a Fibre Channel interface.

This document should be used in conjunction with any other applicable user manuals, such as those for the ETERNUS2000 model 100 or 200, ETERNUS4000 model 300, 400, 500, or 600, or ETERNUS8000 model 700, 800, 900, 1100, 1200, 2100, or 2200 Disk storage system, server, OS, Fibre Channel cards, drivers, etc.

This document references the following documents:

- Server Support Matrix
- ETERNUS Disk storage systems Server Connection Guide (Fibre Channel) ETERNUS Disk Storage System Settings
- ETERNUS Disk storage systems Server Connection Guide (Fibre Channel) Fibre Channel Switch Settings
- ETERNUS Disk storage systems Server Connection Guide (Fibre Channel) for VMware® ESX
  - Driver Settings for PRIMERGY/PRIMEQUEST 1000 Series
  - Driver Settings for Emulex Fibre Channel Cards
  - Driver Settings for QLogic Fibre Channel Cards
- ETERNUSmgr Install Guide
- ETERNUSmgr User Guide

Also note that in this document the ETERNUS2000 models 100 and 200, ETERNUS4000 models 300, 400, 500, and 600, and ETERNUS8000 models 700, 800, 900, 1100, 1200, 2100, and 2200 Disk storage systems are collectively referred to as ETERNUS Disk storage systems.

The Contents and Structure of this Manual

This document is composed of the following 12 chapters.

- Chapter 1   Workflow
  This describes how to connect the ETERNUS Disk storage systems to a server running VMware ESX.

- Chapter 2   Checking the Server Environment
  This describes which servers can be connected to ETERNUS Disk storage systems.
• Chapter 3  Notes
  This describes issues that should be noted when connecting the ETERNUS Disk storage systems and server.

• Chapter 4  Installing and Setting Up ETERNUSmgr
  This describes how to install ETERNUSmgr.

• Chapter 5  Setting Up the ETERNUS Disk Storage Systems
  This describes how to set up the ETERNUS Disk storage systems.

• Chapter 6  Setting Up the Fibre Channel Switches
  This describes how to set up the Fibre Channel switches.

• Chapter 7  Setting Up the VMware ESX Server
  This describes how to set up the VMware ESX server.

• Chapter 8  Setting Up for VMware vSphere
  This describes how to set up for use with VMware vSphere.

• Chapter 9  Setting Up for VMware Infrastructure 3
  This describes how to set up for use with VMware Infrastructure 3.

• Chapter 10  Setting Up for VMware ESX Server 2.5.x
  This describes how to set up for use with VMware ESX Server 2.5.x.

• Chapter 11  Virtual Machine
  This describes dynamic recognition of LUNs added while VMware ESX is in use.

• Chapter 12  Dynamic Recognition of LUNs Added While VMware ESX is in Use
  This describes dynamic recognition of LUNs added while VMware ESX is in use.

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

- VMware, VMware logos, Virtual SMP, and VMotion are either registered trademarks or trademarks of VMware, Inc. in the U.S. and/or other countries.
- Microsoft, Windows, and Windows Server are either registered trademarks or trademarks of Microsoft Corporation in the U.S. and/or other countries.
- Emulex is a trademark of Emulex Corp.
- QLogic is a trademark of QLogic Corp.
- Linux is a trademark or registered trademark of Linus Torvalds in the USA and other countries.
- Red Hat, PRM, and all Red Hat-based trademarks and logos are trademarks or registered trademarks of Red Hat, Inc. in the USA and other countries.
- SUSE is a registered trademark of SUSE Linux AG., a subsidiary of Novell, Inc.
- The company names, product names and service names mentioned in this document are registered trademarks or trademarks of their respective companies.

Naming Conventions

- **Product names**
  - "VMware ESX" represents the following products:
    - VMware vSphere (ESX 4.1, ESXi 4.1, ESX 4.0, ESXi 4.0)
    - VMware Infrastructure 3 (ESX 3.5, ESXi 3.5)
    - VMware ESX Server 3.0.x
    - VMware ESX Server 2.5.x
  - "Windows Server® 2003" represents the following products.
    - Microsoft® Windows Server® 2003, Enterprise Edition
    - Microsoft® Windows Server® 2003, Standard x64 Edition
    - Microsoft® Windows Server® 2003, Enterprise x64 Edition
    - Microsoft® Windows Server® 2003 R2, Standard Edition
    - Microsoft® Windows Server® 2003 R2, Enterprise Edition
    - Microsoft® Windows Server® 2003 R2, Standard x64 Edition
    - Microsoft® Windows Server® 2003 R2, Enterprise x64 Edition
    - Microsoft® Windows® Storage Server 2003 R2, Standard Edition
    - Microsoft® Windows® Storage Server 2003 R2, Enterprise Edition
    - Microsoft® Windows® Storage Server 2003 R2, Standard x64 Edition
    - Microsoft® Windows® Storage Server 2003 R2, Enterprise x64 Edition
Other names

- "Channel Adapter" (CA) refers to a Fibre Channel interface module used in the ETERNUS 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 Disk storage systems and server via a Fibre Channel interface. "FC cable", "optical fibre cable", or "multi mode Fibre Channel cable" may be used instead, depending on the storage system.
- "VMware ESX" refers to "VMware vSphere", "VMware Infrastructure 3", and "VMware ESX Server 2.5.x", which are datacenter solutions from VMware that virtualize the storage and networking system. The name "VMware vSphere", "VMware Infrastructure 3", and "VMware ESX Server 2.5.x" are used in specific datacenter sections.
- Italics are used to show variables such as values and characters that appear in command parameters and output examples.

Screen shot(s) reprinted with permission from Microsoft Corporation.

Copyright 2010 FUJITSU LIMITED
Contents

Chapter 1  Workflow ........................................................................................................9

Chapter 2  Checking the Server Environment .............................................................12
  2.1  Hardware .....................................................................................................................12
  2.2  Fibre Channel Cards .................................................................................................12
  2.3  Connection Compatibility of ETERNUS Disk Storage Systems to VMware ESX .......................................................... 13
  2.4  Virtual Machine .........................................................................................................13

Chapter 3  Notes ..................................................................................................................14
  3.1  Connection Notes .......................................................................................................14
  3.2  VMware ESX Operating Notes ..................................................................................15
  3.3  ETERNUS Disk Storage System Setup Notes .........................................................16
  3.4  SAN Boot Notes .......................................................................................................16
  3.5  ETERNUS Disk Storage System to VMware VCB Proxy Server (on Windows®) Connection Notes ........................................ 18
  3.6  Server Startup and Power Supply Control Notes ....................................................19
  3.7  Notes on WWN Instance Management Table for the Server ...................................19
  3.8  Design Sheet Notes ..................................................................................................19

Chapter 4  Installing and Setting Up ETERNUSmgr .........................................................20

Chapter 5  Setting Up the ETERNUS Disk Storage Systems .........................................21

Chapter 6  Setting Up the Fibre Channel Switches ........................................................22

Chapter 7  Setting Up the VMware ESX Server ..............................................................23

Chapter 8  Setting Up for VMware vSphere ....................................................................24
  8.1  Checking the LUNs (VMware vSphere) .....................................................................24
  8.1.1  Turning on the Devices ..........................................................................................24
  8.1.2  Checking the Connected Devices ..........................................................................24
  8.1.3  Enabling ALUA .....................................................................................................25
  8.1.4  Checking the LUNs .................................................................................................27
  8.2  Checking the Active Paths (VMware vSphere) .........................................................28
  8.2.1  Checking the Active Path for a Single-path Configuration ......................................28
  8.2.2  Checking the Active Path for a Multi-path Configuration .......................................30
  8.3  Setting Up the Volumes (VMware vSphere) .............................................................36
## Chapter 9 Setting Up for VMware Infrastructure 3

9.1 Checking the LUNs (VMware Infrastructure 3) .................................................. 39
  9.1.1 Turning on the Devices ....................................................................................... 39
  9.1.2 Checking the Connected Devices ........................................................................ 39
  9.1.3 Checking the LUNs ............................................................................................. 40

9.2 Checking the Active Paths (VMware Infrastructure 3) ......................................... 41
  9.2.1 Checking the Active Path for a Single-path Configuration ................................. 41
  9.2.2 Checking the Active Path for a Multi-path Configuration .................................... 43

9.3 Setting Up the Volumes (VMware Infrastructure 3) ............................................. 50

## Chapter 10 Setting Up for VMware ESX Server 2.5.x

10.1 Checking the LUN (VMware ESX Server 2.5.x) ................................................... 53
  10.1.1 Turning on the Devices ...................................................................................... 53
  10.1.2 Checking the Connected Devices ....................................................................... 53
  10.1.3 Checking the LUNs ........................................................................................... 54

10.2 Checking the Active Path (VMware ESX Server 2.5.x) .......................................... 55
  10.2.1 Checking the Active Path for a Single-path Configuration ............................... 55
  10.2.2 Checking the Active Path for a Multi-path Configuration ................................... 56

10.3 Setting up the Volumes (VMware ESX Server 2.5.x) ............................................ 60

## Chapter 11 Virtual Machine

11.1 For Windows® ....................................................................................................... 62
  11.1.1 Setting the Disk TimeOutValue ......................................................................... 62
  11.1.2 Applying Required Patches .............................................................................. 63

11.2 For Linux .............................................................................................................. 63
  11.2.1 Applying Required Patches .............................................................................. 63
  11.2.2 Installation Notes ........................................................................................... 63

## Chapter 12 Dynamic Recognition of LUNs

  Added While VMware ESX is in Use ................................................................. 64
Chapter 1  Workflow

This chapter describes how to connect the ETERNUS Disk storage systems to a "VMware ESX". This manual explains how to perform various operations not referenced in other documents.

Documents required in the workflow:

- Server Support Matrix
- Server Support Matrix for FC-SWITCH
- ETERNUS Disk storage systems Server Connection Guide (Fibre Channel) ETERNUS Disk Storage System Settings
- ETERNUS Disk storage systems Server Connection Guide (Fibre Channel) Fibre Channel Switch Settings
- ETERNUS Disk storage systems Server Connection Guide (Fibre Channel) for VMware® ESX (this manual)
  - Driver Settings for PRIMERGY/PRIMEQUEST 1000 Series
  - Driver Settings for Emulex Fibre Channel Cards
  - Driver Settings for QLogic Fibre Channel Cards
- ETERNUSmgr Install Guide
- ETERNUSmgr User Guide
- Any manuals supplied with the Fibre Channel card driver and software

Workflow

1. Install ETERNUSmgr and Set Up the ETERNUS Disk Storage System

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

Refer

- "Chapter 4 Installing and Setting Up ETERNUSmgr" (page 20)
- "Chapter 5 Setting Up the ETERNUS Disk Storage Systems" (page 21)
- Installing ETERNUSmgr
  - ETERNUSmgr Install Guide
- Checking the ETERNUSmgr operational procedures
  - ETERNUSmgr User Guide
- Setting up the ETERNUS Disk storage system
  - ETERNUS Disk storage systems Server Connection Guide (Fibre Channel) ETERNUS Disk Storage System Settings
Set Up the Fibre Channel Switch
Set the Fibre Channel switch (if it is to be used).

- "Chapter 6 Setting Up the Fibre Channel Switches" (page 22)
- Setting up Fibre Channel switch
  - ETERNUS Disk storage systems Server Connection Guide (Fibre Channel) Fibre Channel Switch Settings
- Checking the Fibre Channel switch connection requirements
  - Server Support Matrix for FC-SWITCH

Set Up the VMware ESX Server
Install the Fibre Channel card in the server, then identify and record the Fibre Channel card details.
For a SAN Boot configuration, also perform the SAN Boot settings.

- "Chapter 7 Setting Up the VMware ESX Server" (page 23)
- Setting up the VMware ESX server, SAN Boot, and Fibre Channel card BIOS
  - ETERNUS Disk storage systems Server Connection Guide (Fibre Channel) for VMware® ESX Driver Settings for PRIMERGY/PRIMEQUEST 1000 Series
  - ETERNUS Disk storage systems Server Connection Guide (Fibre Channel) for VMware® ESX Driver Settings for Emulex Fibre Channel Cards
  - ETERNUS Disk storage systems Server Connection Guide (Fibre Channel) for VMware® ESX Driver Settings for QLogic Fibre Channel Cards
- Checking the driver version for the Fibre Channel card being used
  - Server Support Matrix

Check the LUNs
Confirm the VMware ESX LUNs (logical units).

- For VMware vSphere
  - "8.1 Checking the LUNs (VMware vSphere)" (page 24)
- For VMware Infrastructure 3
  - "9.1 Checking the LUNs (VMware Infrastructure 3)" (page 39)
- For VMware ESX Server 2.5.x
  - "10.1 Checking the LUN (VMware ESX Server 2.5.x)" (page 53)
Chapter 1 Workflow

5 Check the Active Paths
Confirm the VMware ESX path(s).

- For VMware vSphere
  - "8.2 Checking the Active Paths (VMware vSphere)" (page 28)
- For VMware Infrastructure 3
  - "9.2 Checking the Active Paths (VMware Infrastructure 3)" (page 41)
- For VMware ESX Server 2.5.x
  - "10.2 Checking the Active Path (VMware ESX Server 2.5.x)" (page 55)

6 Create the Volumes
Create the VMware ESX volumes.

- For VMware vSphere
  - "8.3 Setting Up the Volumes (VMware vSphere)" (page 36)
- For VMware Infrastructure 3
  - "9.3 Setting Up the Volumes (VMware Infrastructure 3)" (page 50)
- For VMware ESX Server 2.5.x
  - "10.3 Setting up the Volumes (VMware ESX Server 2.5.x)" (page 60)

7 Start the Virtual Machine
Notes on Virtual Machine operation and related settings are given in this manual and other documents.

- "Chapter 11 Virtual Machine" (page 62)
ETERNUS Disk storage systems can be connected in the following environments. Check the environment of your server.

### Chapter 2  Checking the Server Environment

#### 2.1 Hardware

- VMware ESX connection may require the use of Fibre Channel switches, depending on the version of VMware ESX used. Fibre Channel switches that can be connected to the ETERNUS Disk storage system vary depending on the connection environment (OS or the ETERNUS Disk storage system). Refer to "Server Support Matrix for FC-SWITCH" to check the available Fibre Channel switches.

- Access the following documents or use the "Server Support Matrix" to check which models are compatible with VMware Infrastructure and VMware ESX:
  - Search the VMware Compatibility Guide
    http://www.vmware.com/resources/compatibility/search.php

- The ETERNUS Disk storage systems support SAN Boot. For SAN Boot details, refer to "3.4 SAN Boot Notes" (page 16).

- VMware ESX may be SAN Booted if a SAN Boot capable Fibre Channel card is used. For more details of VMware ESX SAN Booting, refer to the following web-site:
  - Reference URL:
    http://www.vmware.com/support/pubs/
  - Reference documents:
    "VMware vSphere 4 Documentation: Fibre Channel SAN Configuration Guide"
    "VMware Infrastructure 3 Documentation: Fibre Channel SAN Configuration Guide"
    "VMware ESX Server 2.x Documentation: Server SAN Configuration Guide"

#### 2.2 Fibre Channel Cards

Refer to "Server Support Matrix" and check which Fibre Channel cards are supported by the ETERNUS Disk storage system.
2.3 Connection Compatibility of ETERNUS Disk Storage Systems to VMware ESX

Access the following web-site to check which ETERNUS Disk storage system models may be connected to VMware ESX:

- Search the VMware Compatibility Guide
  http://www.vmware.com/resources/compatibility/search.php

2.4 Virtual Machine

Virtual Machine is a virtual machine created on the VMware ESX server. Details of how to install an OS on the VMware ESX Virtual Machine may be checked via the following URL:

Chapter 3  Notes

3.1 Connection Notes

• To ensure reliable access to the ETERNUS Disk storage systems, the following methods are recommended:
  • Connection via multiple paths
  • Balancing of active paths

Setting up multiple access paths between the VMware ESX and the ETERNUS Disk storage systems, then using the VMware ESX’s multipath function, provides improved access redundancy.

• For VMware vSphere
  • When a multipath connected VMware ESX server is restarted, the active path for each LUN is automatically set. These paths do not need to be reconfigured.
  • Load balancing for VMware ESX multipaths is not supported.
• For VMware Infrastructure 3
  • When an VMware ESX that uses multipath access is restarted, the active paths corresponding to each LUN are automatically set. The system should then be reconfigured, with the active path for each LUN being switched over to the target CM for that LUN's RAID group.
  • Load balancing for VMware ESX multipaths is not supported.

• It is recommended that design sheets be drawn up. When deciding the access paths for the multipath function, first design a load balanced system, and then create the corresponding system design sheets.

3.2 VMware ESX Operating Notes

• Refer to the following web-site for the number of LUNs that VMware ESX can recognize.
  http://www.vmware.com/support/pubs/

• When Windows® is used on the Virtual Machine, the registry will need to be modified after Windows® is installed. For details, refer to "Chapter 11 Virtual Machine" (page 62).

• The VMware ESX's multipath function supports path failover, meaning that server access can continue unaffected by any problems that might arise in the Fibre Channel cables or switches. It should be noted that path failover can fail to occur when multiple SCSI sense codes are repeatedly and simultaneously received.

• Set the "Path Selection Policy" (per-LUN) as follows:
  For VMware vSphere: "Most Recently Used (VMware)"
  For VMware Infrastructure 3: "Fixed"

• ETERNUS Multipath Driver and GR Multipath Driver do not need to be installed on the VMware ESX's Virtual Machine. Multipath function of VMware ESX provides path redundancy.
3.3 ETERNUS Disk Storage System Setup Notes

- When connecting a VMware ESX server to the ETERNUS Disk storage system, check that the firmware version is as specified in the "Server Support Matrix".
- Host Response must be set before connecting a VMware ESX to the ETERNUS Disk storage system.
- Assign Affinity Group values starting from LUN0 in ascending order. The server cannot recognize the ETERNUS Disk storage system LUNs if some other assignment order is used.
- When LUNs are shared among multiple physical servers (in a VMotion configuration, for example), an Affinity Group mapping should be used to ensure that each shared LUN is assigned the same LUN number across every physical server.
- When connecting to VMware ESX with multiple paths sharing a single LUN, a Reset Group setting is required for the ETERNUS Disk storage system device.
- Details of dynamic recognition of LUNs added while VMware ESX is running are given in the "Chapter 11 Virtual Machine" (page 62).

3.4 SAN Boot Notes

- All the ETERNUS Disk storage systems support SAN Boot.
- The VMware ESX calls SAN Boot to "Boot From a SAN". "Boot From a SAN" means to boot the VMware ESX from a SAN (Storage Area Network).
- Only set SAN Boot for supported Fibre Channel cards. For the Fibre Channel card settings, refer to "ETERNUS Disk storage systems Server Connection Guide (Fibre Channel) for VMware® ESX Driver Settings" for the Fibre Channel cards to be used.
When using VMware ESX Server 2.5.x with Raw Device Mapping (RDM) in a "Boot From a SAN" environment, mapping of the RDM devices via the system boot path (Fibre Channel card) is not allowed. Instead, Fibre Channel cards not used for the system boot must be added to permit RDM access.

Examples of configurations that do not and do allow RDM follow:

- RDM impossible example configuration

![Diagram showing configuration of VMware ESX Server 2.5.x, Fibre Channel switch, and LUN access via RDM and Raw Device Mapping (RDM)]
3.5 ETERNUS Disk Storage System to VMware VCB Proxy Server (on Windows®) Connection Notes

When connecting a Windows®-based VMware VCB (VMware Consolidated Backup) Proxy server to an ETERNUS Disk storage system, the LUNs are shared with VMware ESX, and the ETERNUS Disk storage system settings must be adjusted as detailed in the "ETERNUS Disk storage systems Server Connection Guide (Fibre Channel) ETERNUS Disk Storage System Settings".
3.6 Server Startup and Power Supply Control Notes

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

3.7 Notes on WWN Instance Management Table for the Server

The WWN instance management table is a spreadsheet program work sheet that is used to simplify the process of installing the ETERNUS Disk storage systems.
It is important to save the current environment after first installing the system and also after each postinstallation system modification, addition, or maintenance operation. Creating a WWN instance management table makes installation and maintenance of the system easy.
WWN instance management table templates may be found in the "ETERNUS Disk storage systems Server Connection Guide (Fibre Channel) for VMware® ESX Driver Settings" for the Fibre Channel card being used.

3.8 Design Sheet Notes

The design sheet is a spreadsheet program work sheet that is used to simplify the process of installing the ETERNUS Disk storage systems.
It is important to save the current environment after first installing the system and also after each postinstallation system modification, addition, or maintenance operation. Creating a design sheet makes installation and maintenance of the system easy.
Chapter 4 Installing and Setting Up 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 Disk Storage Systems

Set up the ETERNUS Disk storage systems using ETERNUSmgr.

ETERNUS Disk storage systems' setup can be performed independently of server setup. For details on how to perform these settings, refer to the "ETERNUS Disk storage systems Server Connection Guide (Fibre Channel) ETERNUS Disk Storage System Settings" and "ETERNUSmgr User Guide".
Chapter 6  Setting Up the Fibre Channel Switches

Perform the settings required to connect the ETERNUS Disk storage systems and server via the Fibre Channel switch, according to "ETERNUS Disk storage systems Server Connection Guide (Fibre Channel) Fibre Channel Switch Settings".
Chapter 7   Setting Up the VMware ESX Server

Set up the VMware ESX server as detailed in the "ETERNUS Disk storage systems Server Connection Guide (Fibre Channel) for VMware® ESX Driver Settings" for the Fibre Channel card being used.

- ETERNUS Disk storage systems Server Connection Guide (Fibre Channel) for VMware® ESX
  - Driver Settings for PRIMERGY/PRIMEQUEST 1000 Series
  - Driver Settings for Emulex Fibre Channel Cards
  - Driver Settings for QLogic Fibre Channel Cards
Chapter 8  Setting Up for VMware vSphere

8.1 Checking the LUNs (VMware vSphere)

This section describes how to check the LUNs.

8.1.1 Turning on the Devices

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

Procedure

1  Turn on the Fibre Channel switch power.
2  Check that the Fibre Channel switch's Ready (or equivalent) LED is lit.
3  Turn on the ETERNUS Disk storage systems.
4  Check that the ETERNUS Disk storage systems' Ready LED is lit.
5  Turn on the server.

End of procedure

8.1.2 Checking the Connected Devices

Check the state of the connection between the server and ETERNUS Disk storage systems.

Check that the ETERNUS Disk storage systems' LUNs are recognized by the server according to the procedure in the "vSphere Basic System Administration", which may be obtained from the following URL.

http://www.vmware.com/support/pubs
8.1.3 Enabling ALUA

**IMPORTANT**  This procedure is only required when VMware vSphere contains VMware ESX 4.0/VMware ESXi 4.0. It does not need to be performed when VMware vSphere contains VMware ESX 4.0 Update 1/VMware ESXi 4.0 Update 1 or later versions. In this case, proceed to “8.1.4 Checking the LUNs” (page 27).

After the VMware ESX server has been installed, Asymmetric Logical Unit Access (ALUA) should be enabled according to the following procedure.

**Procedure**

1. Press the [Alt] + [F1] keys on the VMware ESX server to open a service console, and log in as root.

2. Execute the appropriate command in the service console:
   - For the ETERNUS2000
     
     ```
     esxcli nmp satp addrule --satp="VMW_SATP_ALUA" --vendor="FUJITSU" --model="E2000" --description="ETERNUS2000 with ALUA" --claim-option tpgs_on
     ```
   - For the ETERNUS4000
     
     ```
     esxcli nmp satp addrule --satp="VMW_SATP_ALUA" --vendor="FUJITSU" --model="E4000" --description="ETERNUS4000 with ALUA" --claim-option tpgs_on
     ```
   - For the ETERNUS8000
     
     ```
     esxcli nmp satp addrule --satp="VMW_SATP_ALUA" --vendor="FUJITSU" --model="E8000" --description="ETERNUS8000 with ALUA" --claim-option tpgs_on
     ```

3. Execute the following command in the service console.

   ```
   esxcli corestorage claiming unclaim --type location
   ```

   The following error message may be ignored if it appears when the preceding command is executed:

   ```
   Errors:
   Unable to perform unclaim. Error message was : Unable to unclaim paths. Busy or in use devices detected. See VMkernel logs for more information.
   ```

4. Execute the following command in the service console.

   ```
   esxcli corestorage claimrule run
   ```
Check that the connected ETERNUS Disk storage system is shown when the appropriate command is executed in the service console:

```
esxcli nmp satp listrules --satp VMW_SATP_ALUA
```

- For the ETERNUS2000

```
VMW_SATP_ALUA FUJITSU E2000 tpgs_on E2000 ALUA enabled
```

- For the ETERNUS4000

```
VMW_SATP_ALUA FUJITSU E4000 tpgs_on E4000 ALUA enabled
```

- For the ETERNUS8000

```
VMW_SATP_ALUA FUJITSU E8000 tpgs_on E8000 ALUA enabled
```

Log out of the service console, and restart the VMware ESX server.

Connect to the VMware ESX server via the vSphere Client, and for each ETERNUS Disk storage system LUN confirm that the [Path Selection Policy] is set to [Most Recently Used (VMware)]. If not, set the LUN's [Path Selection Policy] to [Most Recently Used (VMware)].

Refer to the following for details of the above commands:

- URL
  http://www.vmware.com/support/pubs/
- Document
  "vSphere Command-Line Interface Installation and Reference Guide"
8.1.4 Checking the LUNs

The following procedure describes how to check LUN recognition using the VMware vSphere Client. Log in to the VMware ESX from the vSphere Client, and then check whether the LUNs are recognized. The procedure is as follows:

**Procedure**

1. Use the vSphere Client to login to VMware ESX as "root".
2. Select the [Configuration] tab.
3. Select [Storage Adapters] from the [Hardware] list.
4. Select [Rescan...].
5. If the virtual HBA (vmhba2 in this example) for the Fibre Channel card is selected from the [Storage Adapters] area, the recognized devices will be shown in the [Details] area, as follows.

After selecting [Rescan...], the VMware ESX should attempt to recognize the ETERNUS Disk storage systems' LUNs again.

**End of procedure**
8.2 Checking the Active Paths (VMware vSphere)

8.2.1 Checking the Active Path for a Single-path Configuration

The following example configuration is used to describe how to check and set an active path with the vSphere Client.

Outline of checking and setting the active path is as follows:

1. Check the WWN of HBA#1.
2. Check the WWN of CM#0 CA#0 Port#0.
3. Check the connection of HBA#1 and CM#0 CA#0 Port#0 with the WWN.

The procedures follow:

**Procedure**

1. Use the vSphere Client to login to VMware ESX as "root".
2. Select the [Configuration] tab.
3. Select [Storage Adapters] from the [Hardware] list.
4. If the virtual HBA (vmhba2 in this example) for the Fibre Channel card is selected from the [Storage Adapters] area, the recognized devices will be shown in the [Details] area, as follows.

5. Select and right click the virtual device (vmhba1:C0:T0:L21 in this example) in the [Details] area. Select [Manage Paths] from the popup.
6  Check the WWN of the ETERNUS Disk storage systems’ CA ports that are connected with the Fibre Channel cards.
The following connection would be displayed for the current configuration example:

- HBA#1 and ETERNUS Disk storage system CM#0 CA#0 Port#0

---

8.2.2  Checking the Active Path for a Multi-path Configuration

For multipath configurations, the VMware ESX multipath function works as follows:

- For the ETERNUS2000, ETERNUS4000 model 300, 400, 500, and 600
  When the VMware ESX server recognizes the LUNs, the active path for each LUN is automatically set to the assigned CM for the LUN’s RAID group. These active paths do not need to be changed.

- For the ETERNUS8000
  When the VMware ESX server recognizes the LUNs, the active path for each LUN is automatically set. These active paths do not need to be changed.
The following ETERNUS Disk storage system configuration example will be used to describe how to check the active paths.

Outline of checking the active path is as follows.

1. Check the WWNs of HBA#1 and HBA#2.
2. Check the WWNs of CM#0 CA#0 Port#0 and CM#1 CA#0 Port#0.
3. Check the connection of HBA#1 and CM#0 CA#0 Port#0 with the WWN.
4. Check the connection of HBA#2 and CM#1 CA#0 Port#0 with the WWN.
5. Using the server, check whether it is HBA#1 or HBA#2 that will access LUN0.
6. Set the server to access LUN0 using HBA#1.
7. Using the server, check whether it is HBA#1 or HBA#2 that will access LUN1.

The procedures are described below:

**Procedure**

1. Use the vSphere Client to login to VMware ESX as "root".
2. Select the [Configuration] tab.
3. Select [Storage Adapters] from the [Hardware] list.
4. If the virtual HBA (vmhba2 in the following example) for the Fibre Channel card is selected from the [Storage Adapters] area, the recognized devices will be shown in the [Details] area, as follows:

![Diagram showing virtual device selection in Storage Adapters]

5. Select and right click the virtual device in the [Details] area.
In this example the vmhba1:C0:T0 path status is shown:

6 Check the WWNs of the ETERNUS Disk storage systems' CA ports that are connected with the Fibre Channel cards.

In the configuration example in this chapter, the following connections can be checked:

- RAID Group#0:LUN0 has the following access paths:
  - HBA#1 to ETERNUS Disk storage system CM#0 CA#0 Port#0
  - HBA#2 to ETERNUS Disk storage system CM#1 CA#0 Port#0
7 Check the active path for each virtual device.

In this example, it can be confirmed that the operating paths for RAID Group0:LUN0 and RAID Group1:LUN1 are as follows.

For RAID Group0:LUN0, it can be seen that
- ETERNUS Disk storage system CM#0 CA#0 Port#0 to HBA#1 is the "Active (I/O)" path
- ETERNUS Disk storage system CM#1 CA#0 Port#0 to HBA#2 is the "Active" path

For RAID Group0:LUN1, it can be seen that
- ETERNUS Disk storage system CM#0 CA#0 Port#0 to HBA#1 is the "Active" path
- ETERNUS Disk storage system CM#1 CA#0 Port#0 to HBA#2 is the "Active (I/O)" path

RAID Group0:LUN0 paths can be checked in the following window:
• RAID Group#1:LUN1 paths can be checked in the following window:

End of procedure
8.3 Setting Up the Volumes (VMware vSphere)

Start the VMware ESX.

The following ETERNUS Disk storage system connection example describes how to create a volume (VMFS).

Procedure

1. Use the vSphere Client to login to VMware ESX as "root".
2. Select the [Configuration] tab.
3. Select [Storage] from the [Hardware] list.
4. Select the [Add Storage...] function in the [Storage] area.
5. Select [Disk/LUN] and click the [Next] button.
6. Select the desired LUN and click the [Next] button.
Device information is displayed.

7 Enter the [Datastore Name] and click the [Next] button.

8 Select the [Maximum file size] and click the [Next] button.

9 The settings are displayed. Check them, and click the [Finish] button if they are correct.

10 Check the created volume in the [Storage] area.
11 To check or change the settings of the created volume, select the matching LUN in the [Storage] area. Click the [Properties...] link after the volume details are displayed in the [Details] area.

12 Change the settings in the [Volume Properties]. This example shows how to change the datastore name. Click the [Rename] button in the [General] area.

13 Change the datastore name and click the [OK] button.

End of procedure
Chapter 9  Setting Up for VMware Infrastructure 3

9.1 Checking the LUNs (VMware Infrastructure 3)

This chapter describes how to check the LUNs.

9.1.1 Turning on the Devices

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

**Procedure**

1. Turn on the Fibre Channel switch power.
2. Check that the Fibre Channel switch's Ready (or equivalent) LED is lit.
3. Turn on the ETERNUS Disk storage systems.
4. Check that the ETERNUS Disk storage systems' Ready LED is lit.
5. Turn on the server.

**End of procedure**

9.1.2 Checking the Connected Devices

Check the state of the connection between the server and ETERNUS Disk storage systems.

Check that the ETERNUS Disk storage systems' LUNs are recognized by the server according to the procedure in the "Basic System Administration", which may be obtained from the following URL.

http://www.vmware.com/support/pubs
9.1.3 Checking the LUNs

The following procedure describes how to check LUN recognition using the Virtual Infrastructure Client (VI Client).
Log in to the VMware ESX from the VI Client, and then check whether the LUNs are recognized.
The procedure is as follows:

**Procedure**

1. Use the VI Client to login to VMware ESX as "root".
2. Select the [Configuration] tab.
3. Select [Storage Adapters] from the [Hardware] list.
4. Select [Rescan...].

**Note**
After selecting [Rescan...], the VMware ESX should attempt to recognize the ETERNUS Disk storage systems’ LUNs again.

5. If the virtual HBA (vmhba2 in this example) for the Fibre Channel card is selected from the [Storage Adapters] area, the recognized devices will be shown in the [Details] area, as follows.

---

**End of procedure**
9.2 Checking the Active Paths (VMware Infrastructure 3)

Check the active paths to improve the access performance by the server.

Example of each type of configuration and the corresponding active path setting operations follow.

9.2.1 Checking the Active Path for a Single-path Configuration

The following example configuration is used to describe how to check and set an active path with the VI Client.

```
Outline of checking and setting the active path is as follows:

1. Check the WWN of HBA#1.
2. Check the WWN of CM#0 CA#0 Port#0.
3. Check the connection of HBA#1 and CM#0 CA#0 Port#0 with the WWN.
```

The procedures follow:

```
Procedure

1. Use the VI Client to login to VMware ESX as "root".
2. Select the [Configuration] tab.
```
3. Select [Storage Adapters] from the [Hardware] list.

4. If the virtual HBA (vmhba2 in this example) for the Fibre Channel card is selected from the [Storage Adapters] area, the recognized devices will be shown in the [Details] area, as follows.

5. Select and right click the virtual device (vmhba2:0:1 in this example) in the [Details] area.
   Select [Manage Paths] from the popup.
6 Check the WWN of the ETERNUS Disk storage systems’ CA ports that are connected with the Fibre Channel cards.

The following connection would be displayed for the current configuration example:

- HBA#1 and ETERNUS Disk storage system CM#0 CA#0 Port#0

9.2.2 Checking the Active Path for a Multi-path Configuration

For multipath configurations, the VMware ESX multipath function is used. However, note that since the VMware ESX’s multipath function does not perform load balancing, server access performance may be improved if the active paths are balanced. When the VMware ESX recognizes the LUNs, the active paths corresponding to each LUN are automatically set. The system should then be reconfigured, with the active path for each LUN being switched over to the target CM for that LUN’s RAID group.

- Server-side active paths can be changed on a per LUN (as recognized by the VMware ESX) basis, using the VI Client.
The following ETERNUS Disk storage system configuration example will be used to describe how to check and set the active paths.

Outline of checking the active path is as follows.

(1) Check the WWNs of HBA#1 and HBA#2.
(2) Check the WWNs of CM#0 CA#0 Port#0 and CM#1 CA#0 Port#0.
(3) Check the connection of HBA#1 and CM#0 CA#0 Port#0 with the WWN.
(4) Check the connection of HBA#2 and CM#1 CA#0 Port#0 with the WWN.
(5) Using the server, check whether it is HBA#1 or HBA#2 that will access LUN0.
(6) Set the server to access LUN0 using HBA#1.
(7) Using the server, check whether it is HBA#1 or HBA#2 that will access LUN1.
(8) Set the server to access LUN1 using HBA#2.

The procedures are described below:

**Procedure**

1. Use the VI Client to login to VMware ESX as "root".
2. Select the [Configuration] tab.
3. Select [Storage Adapters] from the [Hardware] list.
4 If the virtual HBA (vmhba2 in the following example) for the Fibre Channel card is selected from the [Storage Adapters] area, the recognized devices will be shown in the [Details] area, as follows.

5 Select and right click the virtual device in the [Details] area.
In this example the vmhba2:0:1 path status is shown:

Check the WWNs of the ETERNUS Disk storage systems’ CA ports that are connected with the Fibre Channel cards.

In the configuration example in this chapter, the following connections can be checked:

- RAID Group#0:LUN0 has the following access paths:
  - HBA#1 to ETERNUS Disk storage system CM#0 CA#0 Port#0
  - HBA#2 to ETERNUS Disk storage system CM#1 CA#0 Port#0
Chapter 9  Setting Up for VMware Infrastructure 3
>  9.2 Checking the Active Paths (VMware Infrastructure 3)

• RAID Group#1:LUN1 has the following access paths:
  - HBA#1 to ETERNUS Disk storage system CM#0 CA#0 Port#0
  - HBA#2 to ETERNUS Disk storage system CM#1 CA#0 Port#0

7 Check the active path for each virtual device.
In this example, it can be confirmed that the operating paths for RAID Group#0:LUN0 and RAID Group#1:LUN1 are as follows.

For both RAID Group#0:LUN0 and RAID Group#1:LUN1, it can be seen that
• ETERNUS Disk storage system CM#0 CA#0 Port#0 to HBA#1 is the "Active" path
• ETERNUS Disk storage system CM#1 CA#0 Port#0 to HBA#2 is the "Standby" path
• RAID Group#0:LUN0 paths can be checked in the following window:
RAID Group#1:LUN1 paths can be checked in the following window:

8 To balance the access paths in this example, the RAID Group#1:LUN1 active paths must be switched.

To change an active path, select a new virtual HBA (vmhba3 in this example) for the LUN in its [Manage Paths] dialog.

The LUN settings to be changed are displayed as follows.
9 Select the [Preferred] checkbox and click the [OK] button to change the preferred path.

10 Check that [*] is displayed in the [Preferred] column for the preferred virtual HBA path (vmhba3:0:1 in the following example) in the [Manage Paths] dialog, and click the [OK] button.

11 Select [Manage Paths] again to check that the path has been changed. "Active" should be displayed in the [Status] column for the preferred path, as shown below.

End of procedure
9.3 Setting Up the Volumes (VMware Infrastructure 3)

Start the VMware ESX.

The following ETERNUS Disk storage system connection example describes how to create a volume (VMFS).

**Procedure**

1. Use the VI Client to login to VMware ESX as "root".
2. Select the [Configuration] tab.
3. Select [Storage] from the [Hardware] list.
4. Select the [Add Storage...] function in the [Storage] area.
5. Select [Disk/LUN] and click the [Next] button.
6. Select the desired LUN and click the [Next] button.
Device information is displayed.

7 Enter the [Datastore Name] and click the [Next] button.

8 Select the [Maximum file size] and click the [Next] button.

9 The settings are displayed. Check them, and click the [Finish] button if they are correct.

10 Check the created volume in the [Storage] area.
11 To check or change the settings of the created volume, select the matching LUN in the [Storage] area. Click the [Properties...] link after the volume details are displayed in the [Details] area.

12 Change the settings in the [Volume Properties]. This example shows how to change the datastore name. Click the [Change] button in the [General] area.

13 Change the datastore name and click the [OK] button.

End of procedure
Chapter 10  Setting Up for VMware ESX Server 2.5.x

10.1 Checking the LUN (VMware ESX Server 2.5.x)

10.1.1 Turning on the Devices

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

<table>
<thead>
<tr>
<th>Procedure</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Turn on the Fibre Channel switch power.</td>
</tr>
<tr>
<td>2</td>
<td>Check that the Fibre Channel switch’s Ready (or equivalent) LED is lit.</td>
</tr>
<tr>
<td>3</td>
<td>Turn on the ETERNUS Disk storage systems.</td>
</tr>
<tr>
<td>4</td>
<td>Check that the ETERNUS Disk storage systems’ Ready LED is lit.</td>
</tr>
<tr>
<td>5</td>
<td>Turn on the server.</td>
</tr>
</tbody>
</table>

End of procedure

10.1.2 Checking the Connected Devices

- Check the state of the connection between the server and ETERNUS Disk storage systems.
  Check that the ETERNUS Disk storage systems’ LUNs are recognized by the server according to the procedure in the "VMware ESX Server 2.x Administration Guide".
- "VMware ESX Server 2.x Administration Guide" may be obtained from the following URL: http://www.vmware.com/support/pubs/esx_pubs.html
10.1.3 Checking the LUNs

The following procedure describes how to check the ETERNUS4000 or ETERNUS8000 LUNs using the Management User Interface (MUI). Connect to the MUI by entering the IP address set for the VMware ESX in the browser. The procedure to check the devices is as follows:

**Procedure**

1. Use the MUI to login to VMware ESX as "root".
2. Select the [Options] tab.
3. Select the [Storage Management] option.
4. Select [Rescan SAN].

**Note**

After selecting [Rescan SAN], the VMware ESX should attempt to recognize the ETERNUS4000 or ETERNUS8000 LUNs again.

5. If a new device is found, it will be shown on screen, as follows.

After selecting [Rescan SAN], the VMware ESX should attempt to recognize the ETERNUS4000 or ETERNUS8000 LUNs again.
10.2 Checking the Active Path (VMware ESX Server 2.5.x)

To improve access performance by the server, check the active path used by the server is set correctly. Example of each type of configuration and the corresponding active path setting operations follow.

10.2.1 Checking the Active Path for a Single-path Configuration

The following example configuration is used to describe how to check and set an active path with the MUI.

Outline of checking and setting the active path is as follows:

(1) Check the WWN of HBA#1.
(2) Check the WWN of CM#0 CA#0 Port#0.
(3) Check the connection of HBA#1 and CM#0 CA#0 Port#0 with the WWN.

The procedures follow:

Procedure

1. Use the MUI to login to VMware ESX as "root".
2. Select the [Options] tab.
3. Select the [Storage Management] option.
4 Select the [Adapter Bindings] tab.

5 Check the state of the connection between the Fibre Channel cards and the ETERNUS Disk storage system CA ports.

In this example, the following connection can be checked:
- HBA#1 to ETERNUS Disk storage system CM#0 CA#0 Port#0

---

**End of procedure**

---

### 10.2.2 Checking the Active Path for a Multi-path Configuration

For multipath configurations, the VMware ESX multipath function is used. However, note that since the VMware ESX’s multipath function does not perform load balancing, server access performance may be improved if the active paths are balanced.

When the VMware ESX recognizes the LUNs, the active paths corresponding to each LUN are automatically set. The system should then be reconfigured, with the active path for each LUN being switched over to the target CM for that LUN’s RAID group.

- Server-side active paths can be changed on a per LUN (as recognized by the VMware ESX) basis, using the MUI.

The following ETERNUS Disk storage system configuration example will be used to describe how to check and set the active paths.
Outline of checking the active path is as follows.

(1) Check the WWNs of HBA#1 and HBA#2.
(2) Check the WWNs of CM#0 CA#0 Port#0 and CM#1 CA#0 Port#0.
(3) Check the connection of HBA#1 and CM#0 CA#0 Port#0 with the WWN.
(4) Check the connection of HBA#2 and CM#1 CA#0 Port#0 with the WWN.
(5) Using the server, check whether it is HBA#1 or HBA#2 that will access LUN0.
(6) Set the server to access LUN0 using HBA#1.
(7) Using the server, check whether it is HBA#1 or HBA#2 that will access LUN1.
(8) Set the server to access LUN1 using HBA#2.

The procedures are described below:

**Procedure**

1. Use the MUI to login to VMware ESX as "root".
2. Select the [Options] tab.
3. Select the [Storage Management] option.

Check the state of the connection between the Fibre Channel cards (vmhba virtual adapter) and the ETERNUS Disk storage system CA ports.

The following connection would be displayed for the current configuration example:

- HBA#1 to ETERNUS Disk storage system CM#0 CA#0 Port#0
- HBA#2 to ETERNUS Disk storage system CM#1 CA#0 Port#0
5. Select the [Failover paths] tab. Check the active path.

In the current configuration example, it can be confirmed that the operating paths for RAID Group#0:LUN0 and RAID Group#1:LUN1 are as follows:

- HBA#1 to ETERNUS Disk storage system CM#0 CA#0 Port#0
- HBA#2 to ETERNUS Disk storage system CM#1 CA#0 Port#0

6. To balance the access paths in this example, the RAID Group#1:LUN1 active paths must be switched.

To change the active paths, select [Edit...] for the appropriate LUN.

LUN to be changed is displayed as follows.
7 Select the desired mode for the Fibre Channel card (vmhba virtual adapter) that is to access this LUN.
In this example, vmhba3 is to be changed to the active path. This is done by clicking on vmhba3 and setting it to use the "Preferred" mode.
For details of this setting, refer to the "VMware ESX Server 2.x Administration Guide".

![Image of Fibre Channel card settings]

8 When it is changed, the following should be seen.
Check the setting has changed, and select [OK].

![Image of Fibre Channel card settings after change]

After this change, the following should be seen.

![Image of Fibre Channel card settings after change]

End of procedure
10.3 Setting up the Volumes (VMware ESX Server 2.5.x)

Start the VMware ESX.
The following ETERNUS8000 connection example describes how to create a volume (VMFS) using the MUI.

**Procedure**

1. Use the MUI to login to VMware ESX as "root".
2. Select the [Options] tab.
3. Select the [Storage Management] option.
4. Select [Create Volume...] for the desired LUN.
5. Select a creation method.

In this example, [Typical] is selected.

6. Enter the volume name.

After the volume has been created, it should appear as follows:
7 Select [Edit...] to check or change the settings of the created volume.

8 After the details of the volume have been checked or changed, select [OK].

End of procedure
Chapter 11 Virtual Machine

This chapter describes the notes on the Virtual Machine and its settings.

To configure the Virtual Machine, access the following web-site and check the "Guest Operation System Installation Guide".

- Guest Operation System Installation Guide

11.1 For Windows®

11.1.1 Setting the Disk TimeOutValue

Check the value of the "TimeOutValue" registry key. If the "TimeOutValue" registry key does not exist, it should be created.

**Caution**

If the "TimeOutValue" key does not exist, add a registry key with the following values:

<table>
<thead>
<tr>
<th>Name:</th>
<th>TimeOutValue</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type:</td>
<td>REG_DWORD</td>
</tr>
<tr>
<td>Radix:</td>
<td>Hexadecimal</td>
</tr>
<tr>
<td>Data:</td>
<td>3C</td>
</tr>
</tbody>
</table>

Be sure to backup the registry before editing it.

**Procedure**

1. Start the registry editor (regedit.exe).
2. Follow the path described below:
   
   \HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Services\Disk

3. Check the value of the "TimeOutValue" registry key.
   Check that the value of the "TimeOutValue" registry key is "0x3C". If set to a different value, change it to "0x3C".
**Chapter 11  Virtual Machine**

**> 11.2 For Linux**

**4** If the contents were modified, reboot the OS.

---

**11.1.2 Applying Required Patches**

Patches provided by Microsoft® are necessary for Windows Server® 2003 with Service Pack 1 applied and Windows Server® 2003 R2. Refer to VMware KB 2267 on the VMware web-site or check with Microsoft® for patch details.

---

**11.2 For Linux**

**11.2.1 Applying Required Patches**

For the following OSes, the Virtual Machine file system may be restricted to being read-only:

- Red Hat Enterprise Linux 5
- Red Hat Enterprise Linux AS v.4 Update 4
- Red Hat Enterprise Linux AS v.4 Update 3
- SUSE Linux Enterprise Server 10
- SUSE Linux Enterprise Server 9 Service Pack 3

If this is a problem, refer to "VMware KB Article 51306" on the VMware web-site for details, and patch the Virtual Machine as required.

**11.2.2 Installation Notes**

When using Red Hat Enterprise Linux AS (v.4 for x86) or Red Hat Enterprise Linux ES (v.4 for x86) as a Virtual Machine on VMware ESX Server 2.5.x, a special VMware driver and tool are required. They may be downloaded from the following URL:

http://www.vmware.com/download/esx/esx2-rhel4-update.html
Chapter 12  Dynamic Recognition of LUNs Added While VMware ESX is in Use

When adding LUNs while VMware ESX is in use (recognizing LUNs dynamically), first assign the added volumes to an ETERNUS Disk storage system Host Affinity Group, and then LUNs should be recognized with the "Rescan" operation via the Management User Interface (VMware ESX Server 2.5.x), VMware Infrastructure Client (Infrastructure 3), or vSphere Client, respectively described in "8.1 Checking the LUNs (VMware vSphere)" (page 24), "9.1 Checking the LUNs (VMware Infrastructure 3)" (page 39), and "10.1 Checking the LUN (VMware ESX Server 2.5.x)" (page 53).
The contents of this manual are liable to being updated without notice.

While the contents of this manual are the product of all due care and diligence, no responsibility can be accepted for operational problems arising from any errors or missing information, or other use of the information contained in this manual.

Fujitsu assumes no liability for damages to third party copyrights or other rights arising from the use of any information in this manual.

Contents of this manual are not to be reproduced without permission from Fujitsu.