P3AM-3412-11ENZ0

ETERNUS DX Disk storage systems

User's Guide - Server Connection -

(iSCSI) for VMware[®]ESX



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Preface

This manual briefly explains the operations that need to be performed by the user in order to connect an ETERNUS DX60 S2/DX80 S2/DX90 S2, ETERNUS DX410 S2/DX440 S2, ETERNUS DX8100 S2/DX8700 S2, ETERNUS DX60/DX80, ETERNUS DX410/DX440, or ETERNUS DX8100/DX8400/DX8700 Disk storage system to a server running VMware ESX using iSCSI Software Initiator via an iSCSI interface.

This manual should be used in conjunction with any other applicable user manuals, such as those for the ETERNUS DX60 S2/DX80 S2/DX90 S2, ETERNUS DX410 S2/DX440 S2, ETERNUS DX8100 S2/DX8700 S2, ETERNUS DX60/DX80, ETERNUS DX410/DX440, or ETERNUS DX8100/DX8400/DX8700 Disk storage system, server, OS, adapters, and drivers.

This manual references the following documents:

- Server Support Matrix
- ETERNUS DX Disk storage systems User's Guide -Server Connection- (iSCSI) Disk Storage System Settings (ETERNUS DX80 S2/DX90 S2, ETERNUS DX410 S2/DX440 S2, ETERNUS DX8100 S2/DX8700 S2)
- ETERNUS DX Disk storage systems Server Connection Guide (iSCSI) ETERNUS DX Disk Storage System Settings for ETERNUS DX60/DX60 S2, DX80
- ETERNUS DX Disk storage systems Server Connection Guide (iSCSI) ETERNUS DX Disk Storage System Settings for ETERNUS DX400/DX8000 series
- Web GUI User's Guide
- ETERNUSmgr Install Guide
- ETERNUSmgr User Guide

Also, note that in this manual the ETERNUS DX60 S2/DX80 S2/DX90 S2, ETERNUS DX410 S2/ DX440 S2, ETERNUS DX8100 S2/DX8700 S2, ETERNUS DX60/DX80, 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 manual is composed of the following seven chapters.

Chapter 1 Workflow

This describes how to connect the ETERNUS DX Disk storage systems to a server running VMware ESX.

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 ETERNUSmgr

This describes how to install ETERNUSmgr.

Chapter 5 Setting Up the ETERNUS DX Disk Storage Systems

This describes how to set up the ETERNUS DX Disk storage systems.

Chapter 6 Setting Up the VMware ESX Server

This describes how to set up the VMware ESX server.

Chapter 7 Virtual Machine

This describes how to operate the Virtual Machine.

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Naming Conventions

Product names

- "VMware ESX" represents the following products.
 - VMware vSphere (ESXi 5.1, ESXi 5.0, ESX 4.1, ESXi 4.1, ESX 4.0, ESXi 4.0)
 - VMware Infrastructure 3 (ESX 3.5, ESXi 3.5)
- "Windows Server® 2003" represents the following products.
 - Microsoft® Windows Server® 2003, Standard Edition
 - 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
- "Linux" represents the following products.
 - Red Hat Enterprise Linux 5 (for x86)
 - Red Hat Enterprise Linux 5 (for Intel64)
 - Red Hat Enterprise Linux AS (v.4 for x86)
 - Red Hat Enterprise Linux AS (v.4 for EM64T)
 - Red Hat Enterprise Linux ES (v.4 for x86)
 - Red Hat Enterprise Linux ES (v.4 for EM64T)
 - Red Hat Enterprise Linux WS (v.4)
 - SUSE Linux Enterprise Server
 - SUSE Linux Enterprise Server 11
 - SUSE Linux Enterprise Server 11 Service Packx
 - SUSE Linux Enterprise Server 11 for x86
 - SUSE Linux Enterprise Server 11 for EM64T
 - SUSE Linux Enterprise Server 11 Service Packx for x86
 - SUSE Linux Enterprise Server 11 Service Packx for EM64T
 - SUSE Linux Enterprise Server 10
 - SUSE Linux Enterprise Server 10 Service Packx
 - SUSE Linux Enterprise Server 10 for x86
 - SUSE Linux Enterprise Server 10 for EM64T
 - SUSE Linux Enterprise Server 10 Service Packx for x86
 - SUSE Linux Enterprise Server 10 Service Packx for EM64T
 - SUSE Linux Enterprise Server 9
 - SUSE Linux Enterprise Server 9 Service Packx
 - SUSE Linux Enterprise Server 9 for x86
 - SUSE Linux Enterprise Server 9 for EM64T
 - SUSE Linux Enterprise Server 9 for x86 Service Packx
 - SUSE Linux Enterprise Server 9 for EM64T Service Packx

- Other names
 - "iSCSI port" refers to an iSCSI interface module used in the ETERNUS DX Disk storage systems to connect to the server.
 - "LAN card" refers to the iSCSI interface module normally used in the server. An "onboard LAN", "network interface card" (NIC), "LAN adapter", or "LAN board" may be used instead.
 - "iSCSI cable" refers to the cable that is used to connect the ETERNUS DX Disk storage system and server over an iSCSI interface. "Ethernet cable", "LAN cable", and "twisted pair cable" are alternative names for this cable.
 - "VMware ESX" refers to "VMware vSphere" and "VMware Infrastructure 3", which are datacenter solutions from VMware that virtualize the storage and networking system. The name "VMware vSphere" and "VMware Infrastructure 3" 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.

ETERNUS Disk storage system models

The following naming conventions are used to describe ETERNUS Disk storage system models in this manual.

ETERNUS Disk storage system model	Naming conventions
ETERNUS DX60 S2/DX80 S2/DX90 S2 ETERNUS DX410 S2/DX440 S2 ETERNUS DX8100 S2/DX8700 S2 ETERNUS DX60/DX80 ETERNUS DX410/DX440 ETERNUS DX8100/DX8400/DX8700	ETERNUS DX Disk storage system
ETERNUS DX60/DX80 ETERNUS DX410/DX440 ETERNUS DX8100/DX8400/DX8700	ETERNUS DX Disk storage system (excluding S2)
ETERNUS DX410 S2/DX440 S2	ETERNUS DX400 S2 series
ETERNUS DX8100 S2/DX8700 S2	ETERNUS DX8000 S2 series
ETERNUS DX410/DX440	ETERNUS DX400 series
ETERNUS DX8100/DX8400/DX8700	ETERNUS DX8000 series

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Chapter 1 Workflow

This chapter describes how to connect the ETERNUS DX Disk storage systems to a server that is running VMware ESX.

The workflow is shown below.

Required Documents List

- Server Support Matrix
- ETERNUS DX Disk storage systems User's Guide -Server Connection- (iSCSI) Disk Storage System Settings (ETERNUS DX80 S2/DX90 S2, ETERNUS DX410 S2/DX440 S2, ETERNUS DX8100 S2/DX8700 S2)
- ETERNUS DX Disk storage systems Server Connection Guide (iSCSI) ETERNUS DX Disk Storage System Settings for ETERNUS DX60/DX60 S2, DX80
- ETERNUS DX Disk storage systems Server Connection Guide (iSCSI) ETERNUS DX Disk Storage System Settings for ETERNUS DX400/DX8000 series
- ETERNUS DX Disk storage systems User's Guide -Server Connection- (iSCSI) for VMware® ESX (this manual)
- Web GUI User's Guide
- ETERNUSmgr Install Guide
- ETERNUSmgr User Guide





Chapter 2 Checking the Server Environment

ETERNUS DX Disk storage systems can be connected in the following environments. Check the environment of your server.

2.1 Hardware

- VMware ESX connection requires the use of LAN switches.
- Use the guide at the following URL and the "Server Support Matrix" to check which servers are supported:

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

2.2 LAN Cards

Refer to the "Server Support Matrix" to check which LAN cards are supported by the ETERNUS DX Disk storage system.

2.3 Connection Compatibility of ETERNUS DX Disk Storage Systems to VMware ESX

Use the guide at the following URL to determine which ETERNUS DX 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:

http://partnerweb.vmware.com/GOSIG/home.html

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This chapter describes notes when the ETERNUS DX Disk storage systems are connected to the server via iSCSI interface.

3.1 Connection Notes

3.1.1 For VMware vSphere

Dedicated IP addresses must be allocated to the iSCSI LAN. An IP address must be allocated to each VMkernel that corresponds to an iSCSI Initiator, and a LAN card and VMkernel must be connected via a virtual switch. For example, a total of four IP addresses are required by the following iSCSI connection setup.

Example connection configuration



3.1.2 For VMware Infrastructure 3

Dedicated IP addresses must be allocated to the iSCSI LAN. An IP address must be allocated to each VMkernel that corresponds to an iSCSI Initiator, and a LAN card and VMkernel must be connected via a virtual switch. For example, a total of six IP addresses are required by the following iSCSI connection setup.

Example connection configuration



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 7 Virtual Machine" (page 38).
- The VMware ESX multipath function supports path failover, meaning that server access can continue unaffected by any problems that might arise in the iSCSI cables or LAN 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: "RoundRobin" is recommended
 - For VMware Infrastructure 3: "Fixed"
- ETERNUS Multipath Driver and GR Multipath Driver do not need to be installed on the VMware ESX Virtual Machine. Multipath function of VMware ESX provides path redundancy.

3.3 ETERNUS DX Disk Storage System Setup Notes

- When connecting the ETERNUS DX Disk storage system to VMware ESX, check that the firmware version is as specified in the "Server Support Matrix".
- Assign Affinity Group values starting from LUN0 in ascending order. The server cannot recognize the ETERNUS DX 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 DX Disk storage system.

3.4 SAN Boot Notes

The ETERNUS DX Disk storage systems do not support SAN Boot when they are connected via iSCSI Software Initiator.

3.5 Server Startup and Power Supply Control Notes

Before turning the server on, check that the ETERNUS DX Disk storage systems and LAN switches are all "Ready". Specifically, check that the Ready LED is lit for ETERNUS DX Disk storage systems. 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 LAN switches must also be turned off after the connected servers have been shut down. If turned off, data writes from the running server cannot be saved to the ETERNUS DX Disk storage systems, and already saved data may also be affected.

3.6 LAN Switch Connection Notes

- Since an iSCSI LAN handles large amounts of data (traffic volumes) like an FC-SAN, the iSCSI LAN must have its own switch and be a dedicated LAN separate from the business LANs.
- iSCSI LAN redundancy is achieved by the use of multipaths.
- For IP network security, the iSCSI LAN assumed to be a dedicated LAN separated from the management LAN (for administration).
- The iSCSI LAN must be configured as a dedicated LAN for each path from a server to the ETERNUS DX Disk storage system.



Example of a LAN switch connection configuration

- *1: In this system configuration, multipaths provide redundant connections between the servers and storage system. LAN switches #1 and #2 provide physical separation of the network paths.
- *2: A separate LAN segment is provided in the LAN switch (using the switch VLAN function) for each grouping of business servers and disk storage systems (equivalent to the FC zones).

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3.7 Jumbo Frame Setting Notes

- To enable Jumbo Frame, all the connected devices must support Jumbo Frame. Set the appropriate values for various parameters (such as the MTU size) on each connected device.
- For details about how to set Jumbo Frame for a LAN card and LAN switch, refer to the VMware ESX and each device's manuals. Rebooting the server may be required to apply the new settings.
- The MTU size that is supported by the ETERNUS DX60/DX60 S2, DX80/DX80 S2, and DX90 S2 is 9000 bytes.

3.8 LAN Switch Setting Notes

When using a LAN switch that supports the flow control function, disable the flow control function according to the following notes:

- For access paths that use iSCSI, disable the flow control function on the sending and receiving ends of the port.
- When a cascade connection is used to connect to LAN switches, disable the function for the LAN switch that is directly connected to the ETERNUS DX Disk storage system.

For details on how to set the flow control function of the LAN switch, refer to the LAN switch manual.

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".

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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 following documents:

- ETERNUS DX Disk storage systems User's Guide -Server Connection- (iSCSI) Disk Storage System Settings (ETERNUS DX80 S2/DX90 S2, ETERNUS DX410 S2/DX440 S2, ETERNUS DX8100 S2/DX8700 S2)
- ETERNUS DX Disk storage systems Server Connection Guide (iSCSI) ETERNUS DX Disk Storage System Settings for ETERNUS DX60/DX 60 S2, DX80
- ETERNUS DX Disk storage systems Server Connection Guide (iSCSI) ETERNUS DX Disk Storage System Settings for ETERNUS DX400/DX8000 series
- "Web GUI User's Guide" or "ETERNUSmgr User Guide"

Chapter 6 Setting Up the VMware ESX Server

This chapter describes settings related to the server iSCSI interface.

6.1 Setting Up for VMware vSphere

Set up the VMware ESX server using the vSphere Client. The procedures described here are based on the following multipath configuration.

Example connection configuration



6.1.1 Turning on the Devices

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

Procedure

- Turn on the LAN switch power.
- 2 Check that the LAN switch's Ready (or equivalent) LED is lit.
- **3** Turn on the ETERNUS DX Disk storage systems.
- 4 Check that the ETERNUS DX Disk storage systems' Ready LED is lit.

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5 Turn on the server.

End of procedure

6.1.2 Checking the LAN Cards

Procedure

- Log in to VMware ESX from the vSphere Client and select the [Configuration] tab.
- 2 Click [Network Adapters] in the [Hardware] list. "vmnic1" and "vmnic2" in the following example.

Hardware	Netw	ork Adapt	ers			
100	Devi	ce	Speed	Configured	Switch	MAC Addr
Health Status	825	/1EB Gigab	it Ethernet C	ontroller		
Processors		vmnic1	1000 Full	1000 Full	None	00:15:17:
Memory		vmnic0	1000 Full	1000 Full	None	00:15:17:
Storage	825	75EB Gigab	it Network Co	onnection		
Networking		vmnic3	down	0 Half	None	00:19:99:
Storage Adapters		vmnic2	100 Full	100 Full	vSwitch0	00:19:99:
 Network Adapters 						
Advanced Settings						

End of procedure

6.1.3 Creating the Virtual Switches

Add two virtual switches (vSwitch) for iSCSI to VMware ESX. Add a "VMkernel" and "vmnic" for each vSwitch.

Perform the following procedure to each vmnic that configures iSCSI SAN.

Procedure

- 1 Open the network window by selecting the [Configuration] tab on vSphere Client and click [Add Network] in the upper right of the window.
- **2** Select [VMkernel] and click the [Next] button.

3 Select the checkbox of the target network adapter and click the [Next] button.



4 Set properties of port groups as required, and click the [Next] button.

5 Set the IP address and subnet mask of "VMkernel", and click the [Next] button.

IP Address:	192 . 168 . 40 . 10	
Subnet Mask:	255 , 255 , 255 , 0	
vMkernel Default Gateway:		Edit
w: - VMkemel Port	Physical Adapters	

- 6 Repeat <u>Step 1</u> through <u>Step 5</u> to add another virtual switch (vSwitch2).
- 7 Confirm that a virtual switch and VMkernel are set for each vmnic.

Hardware	View: Virtual Switch	
Health Status	Networking	
Processors		
Memory	Virtual Switch: vSwitch0	Remove Properties
Storage	Listual Machine Deat Comm	Distance Adventure
 Networking 	VM Network	wrnic2 100 Full
Storage Adapters	Service Console Port	
	and then were the total	
Network Adapters	🖵 Service Console 🛛 😡	
Network Adapters Advanced Settings	Service Console	
Network Adapters Advanced Settings Software	VSWIFO : 192.168.246.252	•1
Network Adapters Advanced Settings ioftware Licensed Features	Service Console vswif0 : 192.168.246.252 Virtual Switch: vSwitch1	Remove Properties
Network Adapters Advanced Settings ioftware Licensed Features Time Configuration	Virtual Switch: vSwitch1	Remove Properties
Network Adapters Advanced Settings ioftware Licensed Features Time Configuration DNS and Routing	Virtual Switch: vSwitch1	Remove Properties Physical Adapters Physical Adapters Physical Magnets
Network Adapters Advanced Settings Software Licensed Features Time Configuration DNS and Routing Virtual Machine Startup/Shutdown	Service Console vswif0 : 192.168.246.252 Virtual Switch: vSwitch1 -VVikemel Port vMikernel Vort Virtual Switch : vSwitch1 -VVikemel Port vmikernel Note vmik0 : 192.168.40.10	Remove Properties
Network Adapters Advanced Settings Software Licensed Features Time Configuration DNS and Routing Virtual Machine Startup/Shutdown Virtual Machine Swapfile Location	Virtual Switch: vSwitch1 Virtual Switch: vSwitch1 VMkernel Port VMkernel Port vmk0 : 192.168.40.10	Remove Properties
Network Adapters Advanced Settings ioftware Licensed Features Time Configuration DNS and Routing Virtual Machine Startup/Shutdown Virtual Machine Swapfile Location Security Profile	Virtual Switch: vSwitch1 VMkernel Port VMkernel Port VMkernel 2 Virtual Switch: vSwitch1 VMkernel VMkernel Vmk0 : 192.168.40.10 Virtual Switch: vSwitch2	Remove Properties
Network Adapters Advanced Settings Software Licensed Features Time Configuration DNS and Routing Virtual Machine Stratup/Shutdown Virtual Machine Sivapfile Location Security Profile System Resource Allocation	Service Console vswif0 : 192.168.246.252 Virtual Switch: vSwitch1 VMkernel vmk0 : 192.168.40.10 Virtual Switch: vSwitch2 _VMkernel Port	Remove Properties Physical Adapters Physical Adapters Remove Properties Physical Adapters

End of procedure

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6.1.4 Setting the Software Initiator

Enable Software Initiator in VMware ESX.

Procedure

- Select the [Configuration] tab on vSphere Client and click [Storage Adapters].
- 2 Select the target iSCSI Software Adapter and click [Properties...].

Device	Туре	WWN	
O vmhba32	Block SCSI		
LSI Logic MegaRAID SAS1078	R		
vmhba0	SCSI		
iSCSI Software Adapter			
iSCSI Software Adapter	iSCSI		
			1 2

- **3** Click [Configure] on the [General] tab.
- 4 Select the [Status-Enabled] checkbox and click the [OK] button.
- **5** Confirm that the [Enabled] checkbox is selected under "Status" on the [General] tab and click [Configure] again.
- 6 Confirm that the iSCSI name is displayed in the "iSCSI Name" column and click the [Cancel] button.

CCCI Manager	
pcor wane:	1.1998-01.com.vmware:rx300s5vm-3c3328bc
SCSI Alias:	
tatus	
Enabled	

- 7 Select the [Dynamic Discovery] tab and click the [Add] button.
- 8 Enter the IP address for the iSCSI port of the connected ETERNUS DX Disk storage system as the iSCSI server IP address, confirm that the port is set to "Port 3260" (default), and click the [OK] button.

9 Confirm that the IP address for the iSCSI port of the ETERNUS DX Disk storage system is displayed as follows.



10 If the connected ETERNUS DX Disk storage system uses multiple iSCSI ports, repeat the IP address addition process for each iSCSI port. (Repeat <u>Step 7</u> through <u>Step 9</u>.)

End of procedure

6.1.5 Enabling ALUA

IMPORTANTThis 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 "6.1.6 Checking the LUNs" (page 26).

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

Procedure

- 1 Use the terminal to log in to VMware ESX as "root".
- **2** Execute the following command in the terminal.
 - When connecting to an ETERNUS DX60/DX60 S2, DX80/DX80 S2, or DX90 S2

```
esxcli nmp satp addrule --satp="VMW_SATP_ALUA" --vendor="FUJITSU" --
model="ETERNUS_DXL" --description="ETERNUS DX with ALUA" --claim-
option tpgs_on
```

• When connecting to an ETERNUS DX400/DX400 S2 series

```
esxcli nmp satp addrule --satp="VMW_SATP_ALUA" --vendor="FUJITSU" --
model="ETERNUS_DX400" --description="ETERNUS DX400 with ALUA"
--claim-option tpgs_on
```

• When connecting to an ETERNUS DX8000/DX8000 S2 series

```
esxcli nmp satp addrule --satp="VMW_SATP_ALUA" --vendor="FUJITSU" --
model="ETERNUS_DX8000" --description="ETERNUS DX8000 with ALUA"
--claim-option tpgs_on
```

3 Execute the following command in the terminal.

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



Ignore the following error message 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 terminal.

esxcli corestorage claimrule run

5 Check that the connected ETERNUS DX Disk storage system is shown when the following command is executed in the terminal: Command

esxcli nmp satp listrules --satp VMW_SATP_ALUA

Display result

• When connecting to an ETERNUS DX60/DX60 S2, DX80/DX80 S2, or DX90 S2

VMW_SATP_ALUA FUJITSU ETERNUS_DXL tpgs_on ETERNUS_DXL with ALUA

• When connecting to an ETERNUS DX400/DX400 S2 series

VMW_SATP_ALUA FUJITSU ETERNUS_DX400 tpgs_on ETERNUS_DX400 with ALUA

When connecting to an ETERNUS DX8000/DX8000 S2 series

VMW_SATP_ALUA FUJITSU ETERNUS_DX8000 tpgs_on ETERNUS_DX8000 with ALUA

b Log out of the terminal, and restart the VMware ESX server.

End of procedure

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6.1.6 Checking the LUNs

The following procedure describes how to check LUN recognition using the vSphere Client. Log in to VMware ESX from the vSphere Client, and then check whether the ETERNUS DX Disk storage system LUNs have been recognized. The procedure is as follows:

Procedure

- 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...].

🚺 Note

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

5 If the iSCSI Software Adapter (vmhba34 in this example) is selected from the [Storage Adapters] area, the recognized devices will be shown in the [Details] area, as follows.

Device	Type	WWN						_
iSCSI Software Adapter	1/100	1			1			
G vmhba34	ISCSI	ign.1998-0	01.com.vmware:rx300	s5vm-3c33	328bc:			
ICH10 2 port SATA IDE Controller								
G vmhba2	Block SCSI							
vmhba33	Block SCSI							
ICH10 4 port SATA IDE Controller								
S vmhba1	Block SCSI							
Details								
vmhba34							Pro	oper
Model: iSCSI Softwar	e Adapter							
ISCSI Name: iqn.1998-01.c	om.vmware:rx	300s5vm-3c3328	šbc					
ISCSI Alias:								
Connected Targets: 2 D	evices: 3	Paths:	6					
View: Devices Paths								
Name	Ide	ntifier	Runtime Name	LUN	Туре	Transport	Capac	tity
ELISTER LIGGET Field / CODOLE JOOD	6a00 pa	a.6000b5d000	vmhba34:C0:T1:L0	0	disk	iSCSI	40.00	GB
LOTL20 I2C2T Diak (Ligg*2000020000								
FUJITSU ISCSI Disk (naa.6000b5d000	6a00 na		vmhba34:C0:T1:L1	1	disk	ISCSI	40.00	GB

6 Check the [Path Selection] for all the LUNs in the ETERNUS DX Disk storage system.

When the VMware ESX recognizes the LUN, an active path for each LUN is automatically specified. Even though [Path Selection] is set to [Most Recently Used (VMware)], changing the [Path Selection] for all the LUNs to [RoundRobin] is recommended.

aths				
Runtime Name	Target	LUN Statu	s Preferred	
vmhba2:C0:T0:L2	D	20 🔶	Active	
Name: Runtime Name:	sas.500605b000b5e710-sas.500000e0d vmhba2:C0:T0:L20	0000086-naa.600000e00d00000000000000	R	Refresh

Refer to the following URL or guide for details about the command above:

URL : http://www.vmware.com/support/pubs/ Guide

: "vSphere Command-Line Interface Concepts and Examples"

7 For a multipath configuration, confirm that the paths of all the LUNs in the ETER-NUS DX Disk storage system are configured with multipath. When paths for a LUN are configured with multipath, multiple Runtime Names and Targets are displayed in [Paths].

olicy	
Path Selection: Most Recently Used (VMwa	are)
Storage Array Type: VMW_SATP_ALUA	
aths	
Runtime Name Target	LUN Status Preferred
vmhba2:C0:T0:L20	20 🔶 Active
vinhba0:C0:T0:L20	20 🔶 Active (I/O)
	Refresh
Name: sas.500605b000b5e710-sas.500000 Runtime Name: vmhba2:C0:T0:L20	Refresh
lame: sas.500605b000b5e710-sas.500000 untime Name: vmhba2:C0:T0:L20 Block Adapter	Refresh
Jame: sas.500605b000b5e710-sas.500000 uuntime Name: vmhba2:C0:T0:L20 Block Adapter	Le0d0000086-naa.600000e00d00000000000000000000000000000
lame: sas.500605b000b5e710-sas.500000 untime Name: vmhba2:C0:T0:L20 Block Adapter	Refresh
lame: sas.500605b000b5e710-sas.500000 untime Name: vmhba2:C0:T0:L20 Block Adapter	Refresh

End of procedure

6.1.7 Setting the CHAP Authentication

CHAP and mutual CHAP authentication can be set for VMware ESX connections.

Log in to VMware ESX from the vSphere Client, check whether the ETERNUS DX Disk storage system LUNs have been recognized, and then enable the CHAP authentication. The procedure is as follows:

Procedure

- **1** Select the [Configuration] tab on vSphere Client and select [Storage Adapters].
- 2 Select the target iSCSI Software Adapter and click [Properties].
- **3** Select the [General] tab and click [CHAP].

4 Set CHAP.

When setting CHAP only

Select [Required] for [Select option:] under "CHAP" and set the [Name:] and [Secret:].

■ When setting CHAP and mutual CHAP

Select [Required] for [Select option:] under "CHAP" and "Mutual CHAP" and set the [Name:] and [Secret:].

and Mutual CHAP secret must be differen
Required
Use initiator name
test

Required
Use initiator name
test

End of procedure

6.2 Setting Up for VMware Infrastructure 3

Set up the VMware ESX server using the VMware Infrastructure Client. The procedures described here are based on the following multipath configuration.

Example connection configuration



6.2.1 Turning on the Devices

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

Procedure

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

End of procedure

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6.2.2 Checking the LAN Cards

Procedure

- **1** Select the [Configuration] tab on VMware Infrastructure Client.
- 2 Check the iSCSI SAN configuration Network Adapters. "vmnic1" and "vmnic2" in the following example.

lardware	Network Adapte	rs				
2	Device	Speed	Configured	vSwitch	Observed IP ranges	Wake on LAN S
Processors	NetXtreme BCM5721 Gigabit Ethernet					
Memory	vmnic2	1000 Full	Negotiate	None		Yes
Storage	wmnic1	1000 Full	Negotiate	None		Yes
Networking	EtherExpress PRO/100 Server Adapter					
Storage Adapters	vmnic0	100 Full	Negotiate	vSwitch0	192.168.246.1-192.168	Yes
 Network Adapters 	PRO/1000 XT Se	rver Adapter				
	wmnic3	100 Full	Negotiate	vSwitch1	192.168.80.1-192.168.8	Yes
oftware						
Licensed Features						
Time Configuration						
DN5 and Routing						
Virtual Machine Startup/Shutdown						
Virtual Machine Swapfile Location						
Security Profile						
System Resource Allocation						

End of procedure

6.2.3 Creating the Virtual Switches

Add two virtual switches (vSwitch) for iSCSI to VMware ESX. Define two virtual network port types ("Service Console" and "VMkernel") for the added vSwitch. Also assign IP addresses on the same subnet to the defined Service Console and VMkernel.

6.2.3.1 Adding a Service Console

Procedure

- Select the [Configuration] tab on VMware Infrastructure Client and click [Add Networking].
- **2** Select [Service Console] and click the [Next] button.
- **3** Select the checkbox of the target network adapter and click the [Next] button.
- 4 Check the [Service Console] details, set an arbitrary VLAN ID, IP address, and subnet mask, and click the [Next] button.

5 Check the [Service Console] IP address and click the [Finish] button. Confirm that the virtual switch (vSwitch1) has been created as follows.



6 Repeat <u>Step 1</u> though <u>Step 5</u> to add Service Console to vSwitch2.

End of procedure

6.2.3.2 Adding a VMkernel

Procedure

- Select the [Configuration] tab on VMware Infrastructure Client and select the target virtual switch' s [Properties].
- 2 Click [Add].
- **3** Select the [VMkernel] radio button, and click the [Next] button.
- 4 Confirm that the VMkernel is displayed, set the IP address (an optional VLAN ID may be set, as necessary), and click the [Next] button.
- **5** Confirm the settings shown on the confirmation screen and click the [Finish] button.

A message about Gateway settings appears.

6 Perform any further settings as necessary and click the [Close] button. The VMkernel has been added to the target vSwitch.



7 Repeat <u>Step 1</u> though <u>Step 6</u> to add VMkernel to another vSwitch.

8 Confirm that a virtual switch and VMkernel are set for each vmnic.



End of procedure

6.2.4 Setting the Software Initiator

Enable Software Initiator in VMware ESX.



 Select the [Configuration] tab on VMware Infrastructure Client and click [Storage Adapters].

- 2 Select the target iSCSI Software Adapter and click [Properties].

- **3** Click [Configure] on the [General] tab.
- 4 Select the [Status-Enabled] checkbox and click the [OK] button.
- **5** Confirm that the [Enabled] checkbox is selected under "Status" on the [General] tab and click [Configure] again.
- 6 Confirm that the iSCSI name is displayed as follows and click the [Cancel] button.

🚱 General Properti	89	×
Status Enabled		
iSCSI Properties	qn.1998-01.com.vmware:rx300s2-6vm-0d4cd9da	
ISCSI Alias:	rx300s2-6vm.fujksu.com	
	OK Cancel Help	

- 7 Select the [Dynamic Discovery] tab and click the [Add] button.
- 8 Enter the IP address for the iSCSI port of the connected ETERNUS DX Disk storage system as the iSCSI server IP address, confirm that the port is set to "Port 3260" (default), and click the [OK] button.

9 Confirm that the IP address for the iSCSI port of the ETERNUS DX Disk storage system is displayed as follows and click [Close].

🛃 iSCSI Initiator (vmhba	32) Properties	_ O ×
General Dynamic Disco	very Static Discovery CHAP Authentication	
Send Targets Obtain information abo SendTargets command	ut target devices directly from the following ISCSI	servers using the
ISCSI Server		<u>^</u>
192.168.60.25:3260		
	Add	Remove
	c	lose Help

10 If the connected ETERNUS DX Disk storage system uses multiple iSCSI ports, repeat the IP address addition process for each iSCSI port. (Repeat <u>Step 7</u> through <u>Step 9</u>.)

End of procedure

6.2.5 Setting the CHAP Authentication

For VMware ESX connections, the ETERNUS DX Disk storage system uses a one-way CHAP authentication to authenticate the Software Initiator access. Perform the following settings to enable CHAP authentication.

Procedure

- Select the [Configuration] tab on VMware Infrastructure Client and select [Storage Adapters].
- **2** Select the target iSCSI Software Adapter and click [Properties].
- **3** Select the [CHAP Authentication] tab and click [Configure].
- **4** Select the [Use the following CHAP credentials] radio button.
- **5** Set arbitrary user name during the CHAP authentication.

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6 To set the VMware ESX iSCSI name for the user name, select the [Use initiator name] checkbox.



7 Enter the password in [CHAP Secret] and click the [OK] button. The CHAP Name is displayed as follows.

ć	🛿 ISCSI Initiator (vmhba32) Properties	_ 🗆 🗵
	General Dynamic Discovery Static Discovery CHAP Authentication	
	CHAP Authentication	
	By default, use the following credentials for all iSCSI targets:	
	CHAP Name: ign.1998-01.com.vmware:rx300s2	
	Close	Help

End of procedure

6.2.6 Checking the LUNs

The VMware Infrastructure Client is used to login to VMware ESX and check the LUNs.

Procedure

Select the [Configuration] tab on VMware Infrastructure Client, and select the target iSCSI Adapter.

2 Click [Rescan...].

The LUNs are displayed under the SCSI Target 0 in the "Details" field. In this example, [Path:vmhba32:0:0] is displayed as follows:

Hardware	Storage Adapters					Rescan	
Processors	Device				Туре	SAN Identifier	
Memory Storage	LSI Logic MegaRAID winhba0 ISCSI Software Adapter				SCSI		
Networking	S vmhba32				ISCSI	ign.1998-01.com	n.vmware
 Storage Adapters Network Adapters 							
Software							2
Licensed Pastures	Details						
Time Configuration	vmhba32	ICCCT CA	inne adaptar		1D Address	Prop	perties,
DNS and Routing	iSCSI Name: iSCSI Alias:	iqn.1998 rx300s2-	-01.com.vmware: 6vm.fujitsu.com	rx300s2-6vm	0d4cd: Discovery Me Targets:	thods: Send Targe 2	ts
Virtual Machine Swapfile Location Security Profile System Resource Allocation	SCS1 Target 0 SCS1 Name: ign.2000-09.com/lujtsu:storage-system.orca.00001001.cm0 SCSI Afas: Target LUNi: 1				Hide	LUNs	
Advanced Seconds	Path		Canonical Path	Type	Capacity	LUN ID	~
	vmhba32:0:0		vmhba32:0:0	disk	146.48 GB	0	>
	SCSI Target 1						

Caution

If VMware ESX is running (requiring dynamic LUN recognition), added LUNs should be recognized by performing the VMware Infrastructure Client "Rescan" operation after the LUN has been added to an Affinity Group.

3 Check the multipath. Right-click the [Path:vmhba32:0:0] described in <u>Step 2</u>, and select "Manage Paths".

When paths are configured with multipath, multiple paths are displayed in the "Path" field.

End of procedure

Chapter 7 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 http://partnerweb.vmware.com/GOSIG/home.html

7.1 For Windows®

7.1.1 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:

Name	TimeOutValue
Туре	REG_DWORD
Radix	Hexadecimal
Data	3C

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".

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4 If the contents were modified, reboot the OS.

End of procedure

7.1.2 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.

7.2 For Linux

7.2.1 Applying Required Patches

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

- 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

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