

# HYPER-UNIFIED STORAGE

**Nexsan Unity** 

Multipathing Best Practices Guide

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# About this document

This guide describes how to set up multipathing for Linux, Windows, VMware vSphere host systems.

### Audience

This guide has been prepared for the following audience:

- IT system administrators
- Engineers
- Technicians
- Any qualified NST/Unity administrator.

## Conventions

Here is a list of text conventions used in this document:

Convention	Description
underlined blue	Cross-references, hyperlinks, URLs, and email addresses.
boldface	Text that refers to labels on the physical unit or interactive items in the graphical user interface (GUI).
monospace	Text that is displayed in the command-line interface (CLI) or text that refers to file or directory names.
monospace bold	Text strings that must be entered by the user in the command-line interface or in text fields in the graphical user interface (GUI).
italics	System messages and non-interactive items in the graphical user interface (GUI) References to Software User Guides

#### Notes, Tips, Cautions, and Warnings

Note Notes contain important information, present alternative procedures, or call attention to certain items.

Tip Tips contain handy information for end-users, such as other ways to perform an action.



**CAUTION:** In hardware manuals, cautions alert the user to items or situations which may cause damage to the unit or result in mild injury to the user, or both. In software manuals, cautions alert the user to situations which may cause data corruption or data loss.



WARNING: Warnings alert the user to items or situations which may result in severe injury or death to the user.

## **Contacting Nexsan**

For questions about Nexsan products, please visit the <u>Nexsan support</u> Web page, and the Nexsan Unity <u>Documents & Online Help</u> page. If you are unable to find the answer to your question there, please see our contact information below.

#### Service and support

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Nexsan Unity Documentation & Online Help page: <u>https://helper.nexsansupport.com/unt\_</u> downloads.html

Unity Online Help page: https://helper.nexsansupport.com/unt\_ onlinehelp.html Contact Nexsan Unity support: https://helper.nexsansupport.com/unt\_support

Worldwide Web site: www.nexsan.com

# **Related documentation**

The following Nexsan product manuals contain related information:

- Nexsan Unity Online Help
- Nexsan Unity Hardware Reference Guide
- Nexsan Unity Hardware Maintenance Guide, Unity Next Generation
- Nexsan Unity Software User Guide
- Nexsan Unity nxadmin Command-line Interface Reference Guide
- Nexsan Unity nxcmd Command-line Interface Reference Guide
- Nexsan Unity Snapshots and Replication Guide
- Nexsan Unity Storage Expansion Reference Guide
- Nexsan Unity VMware Best Practices Guide
- Nexsan Unity NFS Interoperability
- Nexsan Unity Networking Best Practices Guide
- Nexsan Unity Performance Best Practices Guide
- Nexsan Unity Microsoft Best Practices Guide

# Chapter 1

# Configuring multipathing on Linux

This section describes how to configure multipathing Fibre Channel LUNs on Linux host systems. The procedure applies to all Linux versions running *Multipath 0.49*. If you are using a different version of Multipath, make sure to adapt the code accordingly.

#### **Before you begin:**

The APAL feature must be enabled and set up properly on Unity.

- **•** To configure multipathing for Fibre Channel:
- 1. Set up the Linux multipath service, where its default configuration file would be:

/etc/multipath.conf

2. Add these lines to describe the Unity Storage Systems into /etc/multipath.conf.

Notes:

- The polling\_interval and max\_fds parameters are usually defined in the default section. If so, please remove them from the code below.
- For Red Hat 7 and above, remove the getuid\_callout parameter to eliminate a benign error message. The parameter is not required for multipathing.

```
devices {
   device {
       vendor "Nexsan"
       product "NestOS"
       polling interval 10
       path grouping policy group by prio
       prio alua
       getuid callout "/lib/udev/scsi id --whitelisted --device=/dev/%n"
       path checker tur
       path selector "round-robin 0"
       rr min io 1 (for kernels older than ver. 2.6.31)
       rr min io rq 1 (for kernels at ver. 2.6.31 and above)
       flush on last del no
       max fds 8192
       hardware handler "1 alua"
       failback immediate
       rr weight priorities
       no path retry queue
   }
}
```

- 3. Reload the multipathing configuration and rediscover multipathing of all storage systems.
- 4. Verify multipathing to Unity LUNs. Use the multipath -ll command to retrieve the discovered multipath. The Unity LUN supports ALUA and provides two types of paths, optimized path and non-optimized path.

This example shows a Unity LUN with two paths. The first path is "active", meaning it is the planned and optimized normal I/O path. The second path is an "enabled" path, and is not optimized but can be used for I/O if the active path is lost.

```
# multipath -11
36000402e500000004de5c7e8f67547da dm-4 Nexsan,NestOS
size=110G features='1 queue_if_no_path' hwhandler='1 alua' wp=rw
|-+- policy='round-robin 0' prio=130 status=active
| `- 7:0:0:5 sdj 8:144 active ready running
`-+- policy='round-robin 0' prio=10 status=enabled
`- 6:0:0:5 sdd 8:48 active ready running
```

#### To configure multipathing for iSCSI:

The recommended settings for iSCSI are similar to the ones for Fibre Channel. Make sure the lines of code highlighted below appear in the /etc/multipath.conf file.

#### Note

For Red Hat 7 and above, remove the getuid\_callout parameter to eliminate a benign error message. The parameter is not required for multipathing.

```
devices {
    device {
        vendor "Nexsan"
        product "NestOS"
        polling interval 10
        path grouping policy group by prio
        prio alua
        getuid callout "/lib/udev/scsi id --whitelisted --device=/dev/%n"
        path checker tur
        path selector "round-robin 0"
        rr min io 1 (for kernels older than ver. 2.6.31)
        rr min io rq 1 (for kernels at ver. 2.6.31 and above)
        flush on last del no
        max fds 8192
        hardware handler "1 alua"
        failback immediate
        rr weight priorities
        no path retry queue
        dev loss tmo 60
```

}

}

# Chapter 2

# Configuring multipathing for Windows hosts

Use this section to set up multipathing for Unity LUNs on Windows hosts. You must first configure Unity Storage Systems in the MPIO Device Manager, and then discover your LUNs with the MPIO feature enabled.

The main purpose of multipath connectivity is to provide redundant access to storage systems when one or more hardware components in a path fails. Another advantage of multipathing is increased throughput by way of load balancing. This provides redundancy and maximum performance.

#### Notes:

- Multipathing on Unity can only be done using MPIO. MSIO is not supported.
- When connecting your LUNs to Windows hosts using the Multipathing I/O (MPIO) feature, you must enter the Unity Vendor and Product names for the LUN to be assigned as a multipath disk exactly as described in the procedure to configure MPIO.

#### **To configure MPIO:**

1. From the Windows Server host, select **Start> MPIO Configuration**.

Figure 2-1: Starting the MPIO Device Manager

MPIO Properties
MPIO Devices Discover Multi-Paths DSM Install Configuration Snapshot
To add support for a new device, click Add and enter the Vendor and Product Ids as a string of 8 characters followed by 16 characters. Multiple Devices can be specified using semi-colon as the delimiter. To remove support for currently MPIO'd devices, select the devices and then click Remove.
Devices:
Device Hardware Id
NEXSAN NESTOS
Add Remove
OK Cancel

2. By default, the **MPIO Devices** tab is open. Click **Add**.

Figure 2-2: Adding a device to MPIO support

Add MPIO Support 🛛 🗙
Enter the Vendor and Product Ids (as a string of 8 characters followed by 16 characters) of the devices you want to add MPIO support for.
Device Hardware ID:
<u>O</u> K <u>Cancel</u>

- 3. In the Device Hardware ID box:
  - a. Enter the Unity Vendor and Product names for the LUN to be assigned as a multipath disk in this format:
    - The Vendor format is "Nexsan " followed by 2 spaces, for a total of 8 characters.

Note The Vendor and Product names are case-sensitive.

- b. Click OK.
- 4. Reboot the windows machine.
- **To discover LUNs with MPIO enabled:**
- 1. On the Windows server, select Start> All Programs> iSCSI Initiator.
- 2. In the **Target** field, type the IP address of Unity.
- 3. Click Connect.

4. When the Connect To Target dialog box opens, select the **Enable multi-path** option and click **OK**.

Figure 2-3:	Enabling	multipathing	when c	discoverina	LUNs
J · · ·	J				

SCSI Initiator Properties	×			
Targets         Discovery         Favorite Targets         Volumes and Devices         RADIUS         Configuration           Quick Connect				
Target: 172.21.156.192 Quick Connect				
Discoveri Connect To Target	×			
Target name:				
Name ign.1999-02.com.nexsan:es156190-001:test1:mgmt				
iqn.199 iqn.199 iqn.199 iqn.199 iqn.199 This will make the system automatically attempt to restore the connection every time this computer restarts.				
Enable multi-path				
Advanced OK Cancel	]			
	Т			
To connect using advanced options, select a target and then Connect				
To completely disconnect a target, select the target and Disconnect Disconnect				
For target properties, including configuration of sessions, Properties				
For configuration of devices associated with a target, select				
More about basic iSCSI connections and targets				
OK Cancel Apply				

- 5. Click **OK** to exit the iSCSI Initiator.
- 6. Verify that both LUNs appear as disks on the Windows host; to configure the disks in *Disk Management*, see Configuring the LUNs in Disk Management below.

## Configuring the LUNs in Disk Management

After discovering your LUNs with the Windows iSCSI Initiator, the LUNs appear as new disks, which you need to initialize and configure before you can use them.

#### **•** To initialize and configure disks in *Disk Management*:

1. Open Disk Management. The discovered targets appear as Offline and Unallocated.

This example shows two new disks, *Disk 4* and *Disk 5*, that correspond to two LUNs using the same iSCSI target on Unity.

Disk Managemen	t Volum	e List +	Graphical Vie	W .				
Volume	Layout	Туре	File System	Status	Capacity	Free Space	% Free	F.
📾 (C:)	Simple	Basic	NTFS	Healthy (Boot, Page File, Crash Dump, Primary Partition)	418.90 GB	348.24 GB	83 %	N
Boy (E:)	Simple	Basic	NTFS	Healthy (Primary Partition)	1862.90 GB	28.71 GB	2%	N
📼 data (F:)	Simple	Basic	NTFS	Healthy (Primary Partition)	419.00 GB	118.88 GB	28 %	N
System Reserved	Simple	Basic	NTFS	Healthy (System, Active, Primary Partition)	100 MB	72 MB	72 %	N
•								Þ
Disk 1								
Basic	data (F	:)						
419.00 GB Online	419.00 G  Healtby (	B NTFS Primary	i / Partition)					
Of Mario	licality	(Frinding	rarddony					
	,							1
Disk 2		、						
1862.90 GB	Boy (E:	) GBINTE						
Online	Healthy (	(Primary	/ Partition)					
Basic								1
2048.00 GB	2048.00	GB						
Online	Unallocal	ted						
GDisk 4								
Unknown								
1.00 GB	2048.00	GB						
	Unallocal	ted						
Help								
🐨 Disk 5								
Unknown								
1.00 GB	2048.00	GB						
Help	Unallocal	lea						
	1							
CD-ROM 0								-
Unallocated	Primary	/ partil	tion					

Figure 2-4: Discovered target	ets in Disk Management
-------------------------------	------------------------

2. Right-click a disk on the left-hand side and select **Online**. The status changes to *Not Initialized* and *Online*.

- 3. Right-click the same disk on the left-hand side and select **Initialize Disk**.
  - For disks bigger than 2 TB, select GPT (GUID Partition Table).
  - For disks smaller than 2 TB, leave the default option set to MBR (Master Boot Record).

The status changes to Basic.

- 4. Right-click the initialized disk on the right-hand side. The context menu offers new options; select **New Simple Volume**.
- 5. Follow these steps in the New Simple Volume wizard:
  - a. Assign a volume size.
  - b. Assign a drive letter or mount the volume in an empty NTFS folder.
  - c. Format the volume as NTFS.
  - d. Give it a meaningful name.
  - e. Perform a quick format.
- 6. The volume appears as *Healthy* and displays your configuration settings.

Figure 2-5: Configured volume in Disk Management



7. Repeat steps 2 to 5 for each discovered target disk.

8. Right-click a volume. The Properties dialog box displays a new tab called **Nexsan Unity** with the disk details, such as the pool name, Controller ID, and GUID.

Note The Properties panel will also display the Nexsan Unity tab when opened from Explorer.

🛷 FinanceQC (I	(:) Properties		2
General T Previous Vers	ools   Hardware   ions   Quota	Sharing Sec Nexsan NST app	urity   Shadow Copies Jiance   Customize
Volume Infor Pool Name:	nation FinancePool1	Volume Name:	FinanceQC
Site Name:	resetSite	Site Model:	NST5000
Controller:	ES260786-176-02	Site Serial #:	ES260786-176
GUID:	6000402E50000007	AFB8ACA87CD478	32
Click on Displa	y Snapshots to retrieve	e the list of snapsho	ts.
Snapshot Nar	ne	Creation Time	Mount Point
Manage Snaj	oshot v Crea	ite Snapshot	Display Snapshots
Group Config	uration		About
		ок с	ancel <u>Apply</u>

Figure 2-6: Disk Properties—Nexsan Unity tab

# Configuring Windows iSCSI Initiator settings

In firmware releases prior to 2.2, with multiple iSCSI LUNs connected to a single Microsoft Cluster host, deleting a large VHD (Virtual Hard Disk) from the host system may cause it to lose connection to iSCSI LUNs on the corresponding Unity.

This issue is due to small time-out values for two Windows iSCSI Initiator registry parameters on the Microsoft Cluster host. We strongly recommend that you increase the time-out values for these parameters.

## iSCSI LUNs

On the Microsoft Cluster host, modify Windows iSCSI Initiator settings in the system registry as described below.

- ► To configure Windows iSCSI Initiator for iSCSI LUNs:
- 1. Click Start and select Run.
- 2. In the Run dialog box, type regedit, and click OK.
- 3. Navigate to the following registry key:

HKEY\_LOCAL\_MACHINE\SYSTEM\CurrentControlSet

4. With the CurrentControlSet key selected, open the Edit menu and select Find.

- 5. Type MaxRequestHoldTime, and click Find.
- 6. Set the MaxRequestHoldTime parameter to 300 seconds (5 minutes).

This is the maximum time (in seconds) for which requests will be queued if connection to the target is lost and the connection is being retried. After this hold period, requests fail with an error and device (disk) will be removed from the system.



7. Set the LinkDownTime parameter to **35**. This value determines how long requests will be held in the device queue and retried if the connection to the target is lost.

## Fibre Channel LUNs

For Windows hosts using MPIO (mostly for Fibre Channel LUNs), it is recommended to set these registry settings to the values mentioned below.

- <u>PDORemovePeriod</u>: This setting controls the amount of time (in seconds) that the multipath LUN will continue to remain in system memory, even after losing all paths to the device. When this timer value is exceeded, pending I/O operations will fail, and the failure is exposed to the application rather than attempting to continue to recover active paths.
- <u>PathRecoveryInterval</u>: This setting specifies how long (in seconds) the MPIO component waits before retrying a lost path.
- <u>UseCustomPathRecoveryInterval</u>: If this key exists and is set to 1, it allows the use of PathRecoveryInterval.

#### Recommended MPIO hot fixes for Windows Server:

- Windows Server 2008 R2 SP1: KB2871163, KB2851144, KB2754704, KB2684681, KB2406705, KB2522766, KB2670762, KB2718576
- Windows Server 2012 R1: KB2867201, KB2889784, KB2869606, KB2779768
- To configure Windows iSCSI Initiator for Fibre Channel LUNs:
- 1. Start the registry editor by selecting Start > Run and typing regedit.
- 2. Navigate to the following registry key:

```
HKEY LOCAL MACHINE\SYSTEM\CurrentControlSet\Services\mpio\Parameters
```

- 3. Set new values to these entries:
  - a. Set the PDORemovePeriod parameter to 90.
  - b. Set the PathRecoveryInterval parameter to 30.
  - c. Set the UseCustomPathRecoveryInterval parameter to 1.

# Chapter 3

# Configuring multipathing on VMware vSphere

This section provides procedures to set up vSphere ESXi 5.1 for multipathing on Unity.

#### Main steps:

- 1. Configure multipathing on Unity for iSCSI LUNs—see Setting up Unity for multipathing below.
- 2. Configure vSphere:
  - vNetwork standard switches—see <u>Creating a vNetwork distributed switch on page 35</u>
  - vNetwork distributed switches (recommended)—see <u>Creating a vNetwork distributed switch on</u> page 35
- 3. Configure Jumbo Frames on vSphere—see Enabling Jumbo Frames in vSphere on page 48.

## Setting up Unity for multipathing

This section describes how to configure multipathing on Unity for iSCSI LUNs. You must configure the nx1 network interface on a separate subnet using NestOS Menu commands.

- To configure the nx1 interface:
- 1. At the CLI command prompt, type **menu**.
- 2. In the NestOS Admin Menu, type **1** (**Network Menu**) and then press Enter. This displays the NestOS Network Menu.
- 3. Type 6 (Configure iSCSI targets) and press Enter.
- 4. Type 2 (Recalculate Allocations to Detect IP Address Changes) and press Enter.
- 5. Type 3 (Change the network interface that an iSCSI target is presented on) and press Enter.
- 6. Select the target to make modifications to by typing its corresponding number and pressing Enter.

```
List of Targets to make modifications to:

1: iqn.1999-02.com.nexsan:dansystem:fredpool:1 - 172.21.153.194 172.21.14.179

2: iqn.1999-02.com.nexsan:dansystem:fredpool:0 - 172.21.153.194 172.21.14.179

3: iqn.1999-02.com.nexsan:es922001-001:fredpool:mgmt - 172.21.153.194 172.21.14.179

4: iqn.1999-02.com.nexsan:es922001-001:ericpool:mgmt - 172.21.14.173

Please select an option or q to quit: done

4
```

7. Type 1 (Add interface for the target to listen to) and press Enter.

- 8. Select the IP address to be added by typing its corresponding number and pressing Enter.
- 9. Repeat these steps on the second controller.

#### What's next:

You can now proceed to configuring vSphere using vNetwork standard switches or distributed switches (recommended).

Creating a vNetwork standard switch below

Creating a vNetwork distributed switch on page 35

### Creating a vNetwork standard switch

This section describes how to create a vSphere standard switch for multipathing of iSCSI LUNs. You create a standard VMkernel vSwitch, and then you configure iSCSI settings for this switch.

#### **•** To configure a vNetwork standard switch:

- 1. In vSphere, launch the Add Network wizard.
- 2. Select VMkernel and click Next.

#### Figure 3-1: Creating vSphere Standard Switch—Choosing the connection type

🛃 Add Network Wizard		<u>-                                    </u>
Connection Type Networking hardware can	be partitioned to accommodate each service that requires connectivity.	
Connection Type Network Access Connection Settings Summary	Connection Types           Virtual Machine           Add a labeled network to handle virtual machine network traffic.           VMkernel           The VMkernel TCP/IP stack handles traffic for the following ESXi services: vSphere vMotion, iSCSI, NFS, and host management.	
Help	< Back Next >	Cancel

3. Enter a name for the vSwitch in the **Network Label** field. Leave the **Network Type** default to **IP**. Click **Next**. In our example, we are calling it *iSCSI vSwitch*.

🛃 Add Network Wizard			
VMkernel - Connection Se Use network labels to ide	ettings entify VMkernel connections while r	nanaging your hosts and datacenters.	
Connection Type Network Access Connection Settings IP Settings Summary	Port Group Properties Network Label: VLAN ID (Optional): Network Type: Preview: VMkemel Port iSCSI vSwitch	iSCSI vSwitch         None (0)         Use this port group for vMotion         Use this port group for Fault Tolerance logging         Use this port group for management traffic         IP (Default)         IP (Default)         Image: Physical Adapters         Image: Vmnic0         Image: Vmnic0         Image: Vmnic0	
Help		< Back Next >	Cancel

Figure 3-2: Creating vSphere Standard Switch—Choosing the connection type

4. For IP connections settings, select a static IP address and click Next.

Figure 3-3: Creating vSphere Standard Switch—Setting the IP address

🛃 Add Network Wizard		
VMkernel - IP Connection Specify VMkernel IP settin	<b>Settings</b> ngs	
Connection Type Network Access Connection Settings IP Settings Summary	Obtain IP settings automatically Use the following IP settings: IP Address: 172.21.15.32 VMkernel Default Gateway: 172.21.12.254 Edit Preview: VMkernel Port	
Help	< Back Next > C	ancel

5. Click Finish.

- 6. Go into the properties of the newly created vSwitch:
  - a. Add another VMkernel port group, VMkernel 2 in our example.
  - b. Set the other IP address on the secondary subnet.

Figure 3-4: Adding a VMkernel to the standard iSCSI vSwitch

🗗 vSwi	tch1 Properties				_	
Ports	Network Adapters					
Cont Cont Q	figuration vSwitch VMkernel 2 iSCSI vSwitch	Summary 120 Ports vMotion and IP vMotion and IP	Port Properties Network Label: VLAN ID: vMotion: Fault Tolerance Logging: Management Traffic:	VMkernel 2 None (0) Disabled Disabled Disabled		
			ISCSI Port Binding: NIC Settings MAC Address: MTU:	Disabled 00:50:56:6c:ce:55 1500		
			IP Settings IP Address: Subnet Mask:	172.22.15.32 255.255.0.0	View Routing Table	
Ac	dd	Edit Remove	Effective Policies Security Promiscuous Mode: MAC Address Changes: Forged Transmits:	Reject Accept Accept		
					Close He	lp

7. Select iSCSI vSwitch and click Edit.

- 8. In the iSCSI vSwitch Properties dialog box:
  - a. Select the **Override switch failover order** option so that only one of the NIC is Active and the other (s) are set to *Unused*.
  - b. Click OK.

Load Balancing			
	:	Route based on the origina	iting virtual port ID 🔄
Network Failove	er Detection:	Link status only	<b>*</b>
Notify Switches		Yes	<b>_</b>
Failback:		Yes	<b>_</b>
Failover Order:			
<ul> <li>Override sw</li> </ul>	vitch failover orde	er:	
Select active ar	nd standby adapt	ers for this port group. In a failover situ	uation, standby
adapters activa	ate in the order s	pecified below.	
Name	Speed	Networks	Move Up
Active Adapt	ers		
vmnic0	10000 Full	172.21.12.1-172.21.15.254	Move Down
Standby Ada	pters		
	-		
Unused Adap	oters		
Unused Adag	1000 Full	172.21.12.1-172.21.15.254	
Unused Ada wmnic3	pters 1000 Full	172.21.12.1-172.21.15.254	
Unused Ada wmnic3	pters 1000 Full	172.21.12.1-172.21.15.254	
Unused Ada wmnic3	pters 1000 Full	172.21.12.1-172.21.15.254	
Unused Ada vmnic3	ils	172.21.12.1-172.21.15.254	
Adapter Deta	ils	172.21.12.1-172.21.15.254 Network Connection	
Adapter Deta Intel Corpora Name:	ils	172.21.12.1-172.21.15.254 Network Connection vmnic3	
<ul> <li>Unused Adap</li> <li>vmnic3</li> <li>Adapter Deta</li> <li>Intel Corpora</li> <li>Name:</li> <li>Location:</li> </ul>	ils	172.21.12.1-172.21.15.254 Network Connection vmnic3 PCI 06:00.1	
<ul> <li>Unused Adap</li> <li>vmnic3</li> <li>Adapter Deta</li> <li>Intel Corpora</li> <li>Name:</li> <li>Location:</li> <li>Driver:</li> </ul>	ils	172.21.12.1-172.21.15.254 Network Connection vmnic3 PCI 06:00.1 igb	

Figure 3-5: Setting the failover order for the standard iSCSI vSwitch

- 9. Back in the vSwitch Properties dialog box, select **VMkernel 2** and click **Edit**. In the VMkernel 2 Properties dialog box:
  - a. Select the **Override switch failover order** option so that only one of the NIC is Active and the other (s) are set to *Unused*.
  - b. Click OK.

	5		
Load Balancing:		Route based on the originati	ng virtual port ID 🔄
Network Failove	r Detection:	Link status only	<b>_</b>
Notify Switches:		Yes	V
Failback:		Yes	Y
Failover Order: Override swi	tch failover order	:	
Select active an adapters activa	d standby adapte te in the order sp	rs for this port group. In a failover situa ecified below.	ation, standby
Name	Speed	Networks	Move Up
Active Adapt	215		Move Down
wmnic3	1000 Full	172.21.12.1-172.21.13.254	Move Down
Standby Adap	oters		
Unused Adap	ters		
winicu	10000 Full	1/2.21.12.1-1/2.21.13.254	
- Adapter Detai	-		
-Adapter Detai	s —		
- Adapter Detail Name:	s		
- Adapter Detail Name: Location:	s		
- Adapter Detail Name: Location: Driver:	s		
- Adapter Detail Name: Location: Driver:	s		

Figure 3-6: Setting the failover order for the VMkernel

#### What's next:

Proceed to Configuring iSCSI settings of the standard vSwitch on the next page.

#### Configuring iSCSI settings of the standard vSwitch

After creating the standard vSwitch, you must add and configure the iSCSI Storage Adapter.

- **•** To configure the iSCSI settings of the standard vSwitch:
- 1. Select Host > Configuration > Storage Adapters. Click Add.

Figure 3-7: Adding an iSCSI storage adapter



- 2. Click OK to add the iSCSI adapter.
- 3. At the following message, click **OK**.

Software	iSCSI Adapter
2	A new software ISCSI adapter will be added to the Storage Adapters list. After it has been added, select the software ISCSI adapter in the list and click on Properties to complete the configuration.
	Cancel

- 4. To configure the iSCSI adapter, click Properties.
- 5. In the iSCSI Initiator Properties dialog box, select the Network Configuration tab.

Figure 3-8: iSCSI initiator properties

🛃 iSCSI I	nitiator (vmhba37) I	Properties			
General	Network Configuration	Dynamic Discovery	Static Discovery		
VMkern	el Port Bindings:				
Port G	roup	VMkernel Adapter	Port Group Policy	Path Status	
•					
			Add	Remo	ive

6. Click Add. The two ports that we created earlier are now added; *iSCSI vSwitch* and *VMkernel 2* in our example.

Figure 3-9: Binding the standard switch with VMkernel network adapter

🗿 Bind with VMkernel Net	work Adapte	er		<u>_     ×</u>
Only VMkernel adapter physical adapters are l	s compatible w isted.	ith the iSCSI port binding r	equirements and	available
If a targeted VMkernel its effective teaming p	adapter is not olicy.	: listed, go to Host > Config	guration > Netwo	rking to update
Port Group	ind with the IS	VMkernel Adapter	Physical Ada	anter 🔺
iscsI vswitch (vswit	-h1)	vmk1	vmnic(	0 (10000, Full)
Management Networ	k(vSwitch0)	vmk0	vmnic	2 (1000, Full)
VMkernel 2 (vSwitch)	L)	vmk2	vmnic3	3 (1000, Full)
			vmnic	5 (1000, Full)
-			vmnic <sup>4</sup>	4 (1000, Full) 💌
•				
Network Adapters Details:	er			
VMkernel:	vmk1			
Switch:	vSwitch1			
Port Group:	iSCSI vSwi	tch		
IP Address:	172.21.15.	32		
Subnet Mask:	255.255.0.	0		
IPv6 Address:	fe80::250:	56ff:fe69:7597/64		
Physical Network Adap	ter			
Name:	vmnic0			
Device:	Intel Corp	oration 82599EB 10 Gigab	oit TN Network C	onnection
Link Status:	Connected	ł		
Configured Speed:	10000 Mbp	os (Full Duplex)		
,		ОК	Cancel	Help

 Click OK to close the dialog box. When you go back to the iSCSI Initiator Properties dialog box, both port groups are listed.

Figure 3-10: iSCSI initiator properties with port groups

2	iSCSI	Initiator (vmhba37) P	roperties							
T	General	Network Configuration	Dynamic Discovery	Static Dis	coverv					
	Videnced Deet Discovery									
	VMken	nel Port Bindings:								
	Port	Group /	<ul> <li>VMkernel Adapter</li> </ul>	Port	Group Policy	Path	Status			
	۲	iSCSI vSwitch (vSwitch1)	vmk1	0	Compliant	$\diamond$	Not Used			
	۲	VMkernel 2 (vSwitch1)	vmk2	0	Compliant	$\diamond$	Not Used			
					Add		Remo	ve		
	VMker	nel Port Binding Details:								

- 8. Select the Dynamic Discovery tab.
- 9. Click Add.
- 10. Enter the IP address of the NST5000 resource group you have iSCSI target set on, and click OK.
  - Figure 3-11: Adding a Send target server to the iSCSI initiator

Ć	Add Send Target S	erver	×
	iSCSI Server:	172.21.14.179	
	Port:	3260	
	Parent:		
	Authentication be established	n may need to be configured before a session can d with any discovered targets.	
		CHAP Advanced,,,	
		OK Cancel Help	

11. Click Close.

# 12. When prompted to rescan for devices, click **Yes**. In our example, the iSCSI Storage Adapter displays four iSCSI disks.

Storage Adapters				Add	Remove	Refresh	Rescan All
Device	Туре	WWN					
iSCSI Software Adapter							
🚱 vmhba37	ISCSI	iqn.1998-0	1.com.vmware:fred	esxi51-545	00510:	]	l l
Details							
vmhba37							Properties
Model: iSCSI Soft	ware Adapter						
iSCSI Name: iqn. 1998-0	1.com.vmware:frede	sxi51-54500	510				
iSCSI Alias:							
Connected Targets: 5	Devices: 4	Paths:	5				
View: Devices Paths							
Name	Identifier	F	Runtime Name	Operation	al State	LUN T	ype Driv
Nexsan iSCSI Disk (naa.6000402	e5 naa.6000402e	592200 v	/mhba37:C0:T3:L0	Mounted		0 d	isk Noi
Nexsan iSCSI Disk (naa.6000402	e5 naa.6000402e	592200 v	/mhba37:C0:T2:L0	Mounted		0 d	isk Nor
Nexsan iSCSIDisk (naa.6000402	e5 naa.6000402e	50 <u>0000 v</u>	vmhba37:C0:T1:L0	Mounted		0 d	isk Noi
Nexsan iSCSIDisk (naa.6000402	e5 naa.6000402e	50 naa.6000	402e592200120121	1281309055	09	0 d	isk Noi

- 13. To configure your path to fail back after a link recovers from a failure, perform these steps:
  - a. Right-click the iSCSI disk and select Manage Paths.
  - b. Set the Path Selection to Fixed (VMware).
  - c. Click on **Change** to apply the setting.
  - d. Click Close.

**Note** For performance, you would use all the NICs in round robin fashion by setting the Path Selection to **Round Robin (VMware)**.

Uncy									
Path Selection:	·	Fixed (VM	ware)					<u> </u>	Change
Storage Array T	Туре: \	VMW_SAT	P_ALUA						
aths									
Runtime Name	Targe	et				LUN	Stat	tus	Preferre
vmhba37:C0:T0	0:L0 iqn.19	999-02.cor	n.nexsan:dar	nsystem:fredpoo	0:0:172.21.14.179:3260	0	•	Active (I/O)	*
vmhba37:C1:T0	0:L0 iqn.19	999-02.cor	n.nexsan:dar	nsystem:fredpoo	01:0:172.22.14.179:3260	0	•	Active	
•									
۹]									Pefreth
(									Refresh
Name:	iqn, 1998-(	-01.com.vn	ware:fredes:	xi51-54500510-0	0023d00000 1,iqn, 1999	0-02.com.next	san:dans	system:fredpo	Refresh
✓ Name: Runtime Name:	iqn. 1998-( vmhba37:	-01.com.vn :C0:T0:L0	nware:fredes:	xi51-54500510-0	0023d000001,iqn. 1999	)-02.com.nex	san:dans	system:fredpo	Refresh ol:0,t,2
Name: Runtime Name:	iqn. 1998-( vmhba37:	-01.com.vn :C0:T0:L0	ware:fredes:	xi51-54500510-0	0023d00000 1,iqn. 1999	)-02.com.nex:	san:dans	system:fredpo	Refresh ol:0,t,2
Vame: Runtime Name: iSCSI	iqn. 1998-( vmhba37:	-01.com.vn :C0:T0:L0	ware:fredes:	xi51-54500510-0	0023d000001,iqn. 1999	9-02.com.nex	san:dans	system:fredpo	Refresh ol:0,t,2
Vame: Runtime Name:  iSCSI Adapter:	iqn. 1998-( vmhba37: iqn. 1998-0	-01.com.vn :C0:T0:L0 01.com.vm	ware:fredes: ware:fredes	xi51-54500510-0 d51-54500510	0023d00000 1,iqn. 1999	9-02.com.nex	san:dans	system:fredpo	Refresh ol:0,t,2
Aame: Runtime Name:  iSCSI Adapter: iSCSI Alias:	iqn. 1998-( vmhba37: iqn. 1998-0	-01.com.vn :C0:T0:L0 01.com.vm	ware:fredes: ware:fredes;	xi51-54500510-0 ci51-54500510	0023d00000 1,iqn. 1999	9-02.com.nex	san:dans	system:fredpo	Refresh ol:0,t,2
Name: Runtime Name: iSCSI Adapter: iSCSI Alias: Target:	iqn. 1998-0 vmhba37: iqn. 1998-0 iqn. 1999-0	-01.com.vn :C0:T0:L0 01.com.vm 02.com.ne	ware:fredes: ware:fredes; ware:fredes;	xi51-54500510-0 ii51-54500510 em:fredpool:0	0023d00000 1,iqn. 1999	-02.com.nex:	san:dans	system:fredpo	Refresh ol:0,t,2
Name: Runtime Name: iSCSI Adapter: iSCSI Alias: Target:	iqn. 1998-0 vmhba37: iqn. 1998-0 iqn. 1999-0 172.21.14	-01.com.vn :C0:T0:L0 01.com.vm 02.com.ne 4.179:3260	ware:fredes: ware:fredes: xsan:dansyst	xi51-54500510-0 i51-54500510 em:fredpool:0	0023d00000 1,iqn. 1999	)-02.com.nex:	san:dans	system:fredpo	Refresh ol:0,t,2

Figure 3-13: Managing paths for the iSCSI disk

14. Verify your new datastores. You may have to refresh the screen to get a clean view.

Figure 3-14: Reviewing your new datastores

	View:	Datastores	Devi	tes						
I	Datast	ores				Refresh	Delete Ad	ld Storage	Rescan	All
ſ	Identi	fication		Status	Device	Drive Type	Capacity	Free	Туре	La
		NST1		Normal	Nexsan iSCSI Disk (na	Non-SSD	499.75 GB	498.80 GB	VMFS5	12
		NST-Backup		Normal	Nexsan iSCSI Disk (na	Non-SSD	499.75 GB	498.80 GB	VMFS5	12

# Creating a vNetwork distributed switch

After configuring multipathing on Unity, you must create a new vSphere Distributed Switch and then configure iSCSI for that switch.

This procedure pertains to vSphere 5.1.

- To create a VMkernel vSwitch:
- 1. In vSphere, launch the Add Network wizard.
- 2. For the VDS version , select vSphere Distributed Switch Version 5.1.0 and click Next.

Figure 3-15: Creating vSphere Distributed Switch—Selecting the distributed switch version

🛃 Create vSphere Distributed Switch	
Select vSphere Distributed Switch Specify vSphere distributed switch	Version vSphere Distributed Switch Version: 5.1.0 version.
Select VDS Version General Properties Add Hosts and Physical Adapters Ready to Complete	<ul> <li>vSphere Distributed Switch Version</li> <li>vSphere Distributed Switch Version: 4.0</li> <li>This version is compatible with VMware ESX version 4.0 and later. The features supported by later vSphere distributed switch versions will not be available.</li> <li>vSphere Distributed Switch Version: 4.1.0</li> <li>This version is compatible with VMware ESX version 4.1 and later. The following new features are available: Load-Based Teaming and Network I/O Control.</li> <li>vSphere Distributed Switch Version: 5.0.0</li> <li>This version is compatible with VMware ESX version 5.0 and later. The following new features are available: User-defined network resource pools in Network I/O Control, NetFlow and Port Mirroring.</li> <li>vSphere Distributed Switch Version: 5.1.0</li> <li>See the VMware documentation for a list of compatible VMware ESX version and supported features for this version of the vSphere distributed switch.</li> </ul>
Help	< Back Next > Cancel

3. Set the number of uplink ports to 2; this will use two physical adapters per host. Click Next.

Figure 3-16: Creating vSphere Distributed Switch—Setting general properties

🛃 Create vSphere Distributed Switch		
General Properties Specify the vSphere distributed sw	itch properties.	vSphere Distributed Switch Version: 5, 1.0
Select VDS Version General Properties Add Hosts and Physical Adapters Ready to Complete	General Name: Name: Number of uplink ports:	SCSI dvSwitch
	iSCSI dvSwitch	ill go here.
Help		< Back Next > Cancel

4. Select the physical adapters and click **Next**. In our example, we are using *vmnic0* and *vmnic1* on each of our servers.

In summary, *dvUplink1* will use *Host1/vmnic0* and *Host2/vmnic0*, and *dvUplink2* will use *Host1/vmnic0* and *Host2/vmnic0*.

Figure 3-17: Creating vSphere Distributed Swi	tch—Adding hosts and physical ad	apters
---	----------------------------------	--------

🕑 Create vSphere Distributed Switch				
Add Hosts and Physical Adapters Select hosts and physical adapters	to add to the new vSphere distributed swi	tch.	vSphere Distri	buted Switch Version: 5.1.0
Select VDS Version General Properties Add Hosts and Physical Adapters Ready to Complete	When do you want to add hosts and the Add now Add later	eir physical adapters to t	he new vSphere distributed : Settings	switch? View Incompatible Hosts
	Host/Physical adapters	In use by switch	Settings	
	□ 🔽 🗐 172.21.12.86		View Details	
	Select physical adapters			
	vmnic0		View Details	
	Vmnic1		View Details	
	vmnic3		View Details	
	vmnic4		View Details	
Help	<u></u>		< Back N	ext > Cancel

- 5. In this step, we create two default port groups. For iSCSI multipathing, your VMkernel interface must be configured to have one active adapter and no standby adapters. For further details, see the VMware vSphere Storage documentation.
  - a. Adjust the **Teaming and Failover** settings as displayed in the image below.
  - b. Set up your iSCSI adapter to use a compliant portgroup policy as follows:

Portgroup1:

- Active Uplink = *dvUplink1*
- Unused Uplink = *dvUplink2*

Portgroup2:

- Active Uplink = *dvUplink2*
- Unused Uplink = *dvUplink1*

Figure 3-18: Creating vSphere Distributed Switch—Setting the Teaming and Failover options

🛃 dvPortGroup Settings				<u> </u>
General Policies Security Traffic Shaping VLAN Teaming and Failover Resource Allocation Monitoring Miscellaneous Advanced	Policies         Teaming and Failover         Load Balancing:         Network Failover Detection:         Notify Switches:         Failoack:         Failover Order         Select active and standby uplinks. During a forder specified below.         Name         Active Uplinks         dvUplink1         Standby Uplinks         Unused Uplinks         dvUplink2	Route based on originat Link status only Yes Yes failover, standby uplinks a	ing virtual port	
Help			ок с	ancel

When you are done, the distributed vSwitch should display as follows:



Figure 3-19: Viewing the new vSphere Distributed Switch

#### What's next:

Proceed to Creating VMkernel virtual adapters below.

#### Creating VMkernel virtual adapters

In order to talk to the iSCSI host, we need to bind a VMkernel to each port group.

- To create a virtual adapter:
- 1. On each host, navigate to Configuration> Networking> vSphere Distributed Switch> iSCSIdvSwitch.
- 2. Select Manage Virtual Adapters.

#### 3. Select VMkernel from the virtual adapter types and click Next.

Figure 3-20: Adding a virtual adapter—Selecting the virtual adapter type

🛃 Add Virtual Adapter		
<ul> <li>Add Virtual Adapter</li> <li>Virtual Adapter Type         <ul> <li>Networking hardware can be</li> </ul> </li> <li>Creation Type         <ul> <li>Virtual Adapter Type</li> <li>Connection Settings</li></ul></li></ul>	Pirtual Adapter Types Virtual Adapter Types The VMkernel The VMkernel TCP/IP stack handles traffic for the following ESXi services: vSphere vMotion, iSCSI, NFS, and host management.	
Help	< Back Next >	Cancel

#### 4. Select dvPortGroup for the network connection and click Next.

Figure 3-21:	Adding a	virtual	adapter-	-Selectina	the por	aroup
				00.000		. 9

🛃 Add Virtual Adapter			-OX
Connection Settings Specify VMkernel connection	n settings.		
Creation Type Virtual Adapter Type Connection Settings IP Settings Ready to Complete	Network Connection         vSphere Distributed Switch:         Select port group         Select port         Select port	ISCSI dvSwitch  VPortGroup  Offer  Port: N/A  Use this virtual adapter for vMotion Use this virtual adapter for Fault Tolerance logging Use this virtual adapter for management traffic  Protection  P	
Help		< Back Next >	Cancel

5. Select **Use the following IP settings** and enter a static IP address. Click **Next**.

Figure 3-22: Adding a virtual adapter—Setting the IP address

🛃 Add Virtual Adapter				
VMkernel - IP Connection S	ettings			
Specify Wikemer P Setung	5			
Creation Type Virtual Adapter Type Connection Settings IP Settings Ready to Complete	<ul> <li>Obtain IP settings automatically</li> <li>Use the following IP settings:</li> <li>IP Address:</li> <li>Subnet Mask:</li> <li>VMkernel Default Gateway:</li> </ul>	172       21       15       32         255       255       0       0         172       21       12       254	Edit	
Help		< Back	Next >	Cancel

6. Click Finish.

7. Repeat these steps for each port group and each host.

When you are done, your iSCSI distributed vSwitch should look similar to this:



#### What's next:

Proceed to Configuring iSCSI settings for distributed vSwitch below.

#### Configuring iSCSI settings for distributed vSwitch

After adding the virtual adapters to the distributed vSwitch, you need to add and configure an iSCSI storage adapter.

- **•** To configure the iSCSI settings of the distributed vSwitch:
- 1. Select Host > Configuration > Storage Adapters. Click Add.

Figure 3-23: Adding an iSCSI storage adapter



- 2. Click OK to add the iSCSI adapter.
- 3. At the following message, click **OK**.

Software	e iSCSI Adapter
<u>.</u>	A new software ISCSI adapter will be added to the Storage Adapters list. After it has been added, select the software ISCSI adapter in the list and click on Properties to complete the configuration.
	Cancel

- 4. To configure the iSCSI adapter, click **Properties**.
- 5. In the iSCSI Initiator Properties dialog box, select the **Network Configuration** tab.

Figure 3-24: iSCSI initiator properties

ć	iscsi I	nitiator (vmhba37) P	Properties			
	General	Network Configuration	Dynamic Discovery St	atic Discovery		
	VMkern	el Port Bindings:				
	Port G	iroup	VMkernel Adapter	Port Group Policy	Path Status	
	•					<b>_</b>
				Add	Remo	ove

6. Click Add. The two ports that we created earlier are now added; *iSCSI vSwitch* and *VMkernel* 2 in our example.

Figure 3-25: Binding the standard switch with VMkernel network adapter

🚱 Bind with VMkernel Network Adapter Only VMkernel adapters compatible with the iSCSI port binding requirements and available physical adapters are listed. If a targeted VMkernel adapter is not listed, go to Host > Configuration > Networking to update its effective teaming policy. Select VMkernel adapter to bind with the iSCSI adapter: Port Group VMkernel Adapter Physical Adapter dvPortGroup (iSCSI dvSwitch) vmk1 vmnic0 (10000, Full) dvPortGroup2 (iSCSI dvSwitch) vmk2 vmnic0 (10000, Full) 2 ii C Management Network (vSwitch0) vmk0 vmnic2 (1000, Full) Q 6.0 vmnic4 (1000, Full) ----80 vmnic5 • | Network Adapters Details: Virtual Network Adapter VMkernel: vmk1 Switch: iSCSI dySwitch Port Group: dvPortGroup IP Address: 172.21.15.32 Subnet Mask: 255.255.0.0 IPv6 Address: fe80::250:56ff:fe6b:f212/64 Physical Network Adapter Name: vmnic0 Device: Intel Corporation 82599EB 10 Gigabit TN Network Connection Link Status: Connected Configured Speed: 10000 Mbps (Full Duplex) OK Cancel Help

7. Click **OK** to close the dialog box. When you go back to the iSCSI Initiator Properties dialog box, both port groups are listed.

Figure 3-26: iSCSI initiator properties with port groups

Ikernel Port Bindinas:			
ort Group	VMkernel Adapter	Port Group Policy	Path Status
dvPortGroup (iSCSI	dvSw vmk1	Compliant	Not Used
dvPortGroup2 (iSCS	Idv vmk2	Compliant	Ont Used
		Add	Remove
		Add	Kellove
Ikernel Port Binding Detail	S:		
/irtual Network Adapt	er		
VMkernel:	vmk1		
Switch:	iSCSI dvSwitch		
Port Group:	dvPortGroup		
Port Group Policy:	📀 Compliant		
IP Address:	172.21.15.32		
	255.255.0.0		
Subnet Mask:	fe80::250:56ff:fe6b:f21	12/64	
Subnet Mask: IPv6 Address:			
Subnet Mask: IPv6 Address: Physical Network Adap	oter		
Subnet Mask: IPv6 Address: Physical Network Adag Name:	vmnic0		
Subnet Mask: IPv6 Address: <b>Physical Network Adag</b> Name: Device:	oter vmnic0 Intel Corporation 82599	9EB 10 Gigabit TN Netv	vork Connection
Subnet Mask: IPv6 Address: Physical Network Adap Name: Device: Link Status:	oter vmnic0 Intel Corporation 82599 Connected	9EB 10 Gigabit TN Netv	vork Connection
Subnet Mask: IPv6 Address: Physical Network Adap Name: Device: Link Status: Configured Speed:	oter vmnic0 Intel Corporation 82599 Connected 10000 Mbps (Full Duple	9EB 10 Gigabit TN Netv ex)	vork Connection

- 8. Select the Dynamic Discovery tab.
- 9. Click Add.

#### 10. Enter the IP address of the NST5000 resource group you have iSCSI target set on, and click **OK**.

Figure 3-27: Adding a Send target server to the iSCSI initiator

Ð	🛃 Add Send Target Server						
	iSCSI Server:	172.21.14.179					
	Port:	3260					
	Parent:						
	Authentication may need to be configured before a session can be established with any discovered targets.						
			CHAP Advanced				
		OK	Cancel Help				

#### 11. Click Close.

12. When prompted to rescan for devices, click **Yes**. In our example, the iSCSI Storage Adapter displays four iSCSI disks.

Figure 3-28: Viewing the iSCSI storage adapter

Storage Adapters				Add	Remove	Refresh	Rescan All	
Device	Type V	WWN						-
iSCSI Software Adapter								
📀 vmhba37	iSCSI i	qn.1998	3-01.com.vmware:fred	esxi51-5450	0510:			
Details								
vmhba37							Properties	
Model: iSCSI Softwa	re Adapter							
iSCSI Name: iqn. 1998-01.com.vmware:fredesxi51-54500510								
iSCSI Alias:								
Connected Targets: 5	Devices: 4	Paths	: 5					
View: Devices Paths								
Name	Identifier		Runtime Name	Operation	al State	LUN	Туре	Driv
Nexsan iSCSI Disk (naa.6000402e5	naa.6000402e592	2200	vmhba37:C0:T3:L0	Mounted		0	disk	Nor
Nexsan iSCSI Disk (naa.6000402e5	naa.6000402e592	2200	vmhba37:C0:T2:L0	Mounted		0	disk	Nor
Nexsan iSCSI Disk (naa.6000402e5	naa.6000402e500	0000	vmhba37:C0:T1:L0	Mounted	_	0	disk	Nor
Nexsan iSCSI Disk (naa.6000402e5	naa.6000402e50	naa.60	00402e592200120121	1281309055	09	0	disk	Noi

13. Verify your new datastores. You may have to refresh the screen to get a clean view.

Figure 3-29: Reviewing your new datastores

View: Datastores Devices								
Datastores			Refresh	Delete Add Storage Res		Rescan	an All	
Identification	<ul> <li>Status</li> </ul>	Device	Drive Type	Capacity	Free	Туре	La	
NST1	📀 Normal	Nexsan iSCSI Disk (na	Non-SSD	499.75 GB	498.80 GB	VMFS5	12	
NST-Backup	Normal	Nexsan iSCSI Disk (na	Non-SSD	499.75 GB	498.80 GB	VMFS5	12	

# Enabling Jumbo Frames in vSphere

Enabling jumbo frames on Unity can significantly increase network throughput while consuming fewer CPU cycles on the system. A jumbo frame is essentially an Ethernet frame that is larger than 1,518 bytes. When the frame is 1,518 bytes, the MTU (or payload—not frames) on Unity is actually 1500 bytes. For Unity, gigabit Ethernet supports a maximum MTU (payload) of 9,000 bytes. You will notice the greatest benefit from enabling jumbo frames when you transfer large files across your network: since fewer frames are needed to carry the same amount of data, transfer speeds go up and CPU utilization goes down.

#### Before you begin:

- Make sure to enable jumbo frames on Unity (as described in the Nexsan Unity Software User Guide)
- Make sure that all switch(es) that Unity is connected to, as well as all client systems and disk arrays, are configured for and support jumbo frames.

You need to enable Jumbo Frames in two places in vSphere:

- the VMkernel, more specifically, the NIC attached to the VMkernel being used for iSCSI traffic;
- the vSwitch itself.
- To configure the VMkernel MTU settings:
- 1. In vSphere, go to Inventory> Host and Clusters.
- 2. Click on the host and select the **Configuration** tab.
- 3. Select Networking.
- 4. Select Virtual Distributed Switch.
- 5. Click on Manage Virtual Adapters.
- 6. Select the VMkernel and click Edit.

Figure 3-30: Configuring the VMkernel MTU settings

Ð	Manage Virtual A	🛃 Edit Virtual Adapter vmk1	×
	Vame VMkernel vmk1 vmk2	General       IP Settings         Network Connection       vSphere Distributed Switch:         vSphere Distributed Switch:       iSCSI dvSwitch         Select port group       dvPortGroup         Select port       Image: Comparison of the second sec	h virtual adapter for vMotion virtual adapter for Fault Tolerance logging virtual adapter for management traffic virtual adapter for iSCSI port binding
		MTU: 1500	•

- 7. Under the General tab, set the MTU value to 9000.
- 8. Repeat these steps for each port group.

- **•** To configure the distributed vSwitch MTU settings:
- 1. Go to **Inventory> Host and Clusters**.
- 2. Click on the host and select the **Configuration** tab.
- 3. Select Networking.
- 4. Select the distributed vSwitch and click Edit.

Figure 3-31: Configuring the vSwitch MTU settings

Managa Virtual Ar	🛃 Edit Virtual Adapter vmk1		×
Name VMkernel vmk1 vmk2	General IP Settings Network Connection vSphere Distributed Switch: Select port group Select port	iSCSI dvSwitch dvPortGroup Port: 2 Use this virtual adapter for vMotion Use this virtual adapter for Fault Tolerance logging Use this virtual adapter for management traffic Use this virtual adapter for iSCSI port binding	
	NIC Settings	1500	

5. Under the **Properties** tab, set the **Maximum MTU** value to **9000**.

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