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Configuring Hosts to Access VMware  
Datastores

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# Additional resources

As part of an effort to improve its product lines, EMC periodically releases revisions of its software and hardware. Therefore, some functions described in this document might not be supported by all versions of the software or hardware currently in use. The product release notes provide the most up-to-date information on product features. Contact your EMC technical support professional if a product does not function properly or does not function as described in this document.

## Where to get help

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### Product information

For product and feature documentation or release notes, go to Unity Technical Documentation at: [www.emc.com/en-us/documentation/unity-family/index.htm](http://www.emc.com/en-us/documentation/unity-family/index.htm). You can also access this page from the Unity product family page at: [www.emc.com/en-us/storage/unity.htm](http://www.emc.com/en-us/storage/unity.htm). In the **Why Unity** section, click **Unity Product Resources**.

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### Special notice conventions used in this document

EMC uses the following conventions for special notices:

#### **DANGER**

Indicates a hazardous situation which, if not avoided, will result in death or serious injury.

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#### **WARNING**

Indicates a hazardous situation which, if not avoided, could result in death or serious injury.

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#### **CAUTION**

Indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.

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#### **NOTICE**

Addresses practices not related to personal injury.

---

#### **Note**

Presents information that is important, but not hazard-related.

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Additional resources

# CHAPTER 1

## Introduction

This chapter describes high-level host requirements and contains the following topics:

- [System requirements](#)..... 8
- [Managed and generic host objects](#)..... 8
- [VMware vSphere versions](#)..... 9

## System requirements

Before configuring hosts to access the storage system, ensure that these requirements are met.

Complete the following tasks before connecting hosts to the storage system:

- Install and configure the system using the **Initial Configuration** wizard.
- Use Unisphere or the CLI to configure NAS servers or interfaces, or iSCSI or Fibre Channel (FC) LUNs, on the storage system.

## Managed and generic host objects

There are two ways of deploying traditional Unity VMFS and NFS datastores to vSphere:

- Automatically using managed host objects
- Manually using generic host objects

### Managed host objects

Managed host objects use a set of APIs on the array to prepare vSphere for Unity VMFS or NFS datastores and mounts them automatically.

For example, when deploying an iSCSI VMFS datastore:

1. The user completes the following actions on the storage system:
  - a. Creates the iSCSI interface.
  - b. Creates the VMFS datastore.
  - c. Grants host access to the datastore.
2. The following processes then occur automatically:
  - a. The storage system sends a request to the associated hosts to add the iSCSI interface for the VMFS datastore to the iSCSI table in vSphere.
  - b. vSphere confirms to the storage system that the LUN device (for the VMFS datastore) has been added to the target table in vSphere.
  - c. The storage system sends a request to vSphere to format that LUN device as a VMFS datastore.

### Generic host objects

Unity File VVol and Block VVol datastores use generic host objects by default. Refer to [Setting up a host to use Unity VVol datastores on page 33](#) for more information.

You may also want to use generic host objects in the following cases:

- You want to boot the host from the storage system
- You are using non-ESXi hosts for backup purposes
- You are deploying an NFS datastore on a NAS server using NFSv4.0 or later (managed host objects deploy NFS datastores as the default NFSv3.0).

To use generic host objects, manually set up the connection to the datastores as described in [Manually setting up the iSCSI connection for a Unity VMFS datastore on page 24](#) or [Manually setting up the connection to a Unity NFS datastore on page 14](#)

## VMware vSphere versions

The VMware vSphere instructions in this guide may not be consistent with your version of vSphere. Always use the VMware documentation for your vSphere version for the most up-to-date detailed instructions.

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### Note

All VVols-related vSphere instructions in this guide are based on the vSphere 6.x web client as the VVols feature is not available in previous VMware releases of vSphere.

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# CHAPTER 2

## Setting up a host to use Unity VMware NFS datastores

This chapter describes how to set up a VMware ESXi host or virtual machine to use Unity VMware NFS datastores and contains the following topics:

- [Requirements for setting up a host](#)..... 12
- [Using network high availability](#)..... 12
- [Configuring Unity NFS datastores for the host](#)..... 14
- [Manually setting up the connection to a Unity NFS datastore](#)..... 14

## Requirements for setting up a host

These system and network requirements must be met before setting up a host to use Unity storage.

Before you can set up a host to use Unity storage, the following storage system and network requirements must be met.

### Network requirements

This topic lists the network requirements for a host attaching to a Unity system.

Ensure that you meet these network requirements:

- The host (client) is in the same LAN environment as the Unity NAS server.
- If the NAS server is enabled for multiprotocol (CIFS and NFS), you have connected it to an NIS server or an LDAP server. The Unisphere online help describes how to configure Unix Directory Service (either NIS or LDAP) on the system.

---

#### Note

Users can store files on a Unity NAS server in a Network Information Service (NIS) environment, but you cannot configure a Unity NAS server as an NIS client.

---

## Using network high availability

This topic describes how to use link aggregation for high availability configurations.

The Unity system supports link aggregations that allow up to four Ethernet ports connected to the same physical or logical switch to be combined into a single logical link. To configure link aggregation on the system, each storage processor (SP) must have the same type and number of Ethernet ports as link aggregation actually creates two link aggregations — one on each SP. This provides high availability. If one of the ports in the link aggregation fails, the system directs the network traffic to one of the other ports in the aggregation. If you add an Ethernet I/O module to each SP in the system, you can create one additional link aggregation group (LAG) on the set of ports in the I/O module.

### Link aggregations

This topic describes the advantages and function of link aggregations.

Link aggregations use the Link Aggregation Control Protocol (LACP) IEEE 802.3ad standard.

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#### Note

Link Aggregation does not apply to iSCSI interfaces.

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A link aggregation appears as a single Ethernet link with these advantages:

- High availability of network paths to and from the Unity system — If one physical port in a link aggregation fails, the system does not lose connectivity.
- Possible increased overall throughput — Because multiple physical ports are bonded into one logical port with network traffic distributed between the multiple physical ports.

Although link aggregations can provide more overall bandwidth than a single port, the connection to any single client runs through one physical port and is therefore limited by

the port's bandwidth. If the connection to one port fails, the switch automatically switches traffic to the remaining ports in the group. When the connection is restored, the switch automatically resumes using the port as part of the group.

On the Unity system, you can configure up to four ports in a link aggregation. When you configure a link aggregation, you are configuring two link aggregations — one on each SP. If one of the ports in an aggregation fails, the system directs network traffic to one of the other ports in the group.

## Switch requirements

This topic describes switch requirements when using link aggregation.

If the Unity ports are connected to different network switches, you should configure all switch ports connected to these ports to immediately switch from blocking mode to forwarding mode and not pass through spanning tree states of listening and learning when an interface comes up. On Cisco switches, this means that you must enable the portfast capability for each switch port connected to a Unity port to guarantee that the switch forwards the Ethernet frame that the storage system generates when a physical link is enabled. You enable the portfast capability on a port-to-port basis. When enabled, the portfast variable causes the port to immediately switch from blocking to forwarding mode. Do not use portfast on switch-to-switch connections.

For link aggregation, network switches must have IEEE 802.3ad protocol support and guarantee that packets from a single TCP connection always go through the same link in a single direction.

## Configuring a link aggregation

This topic describes link aggregation configuration and lists the required configuration tasks.

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### Note

Windows 7 and Windows Server 2003 do not provide link aggregation (NIC teaming) support. Some NIC vendors provide drivers that support NIC teaming. For more information, contact your NIC vendor. Windows Server 2008 does support NIC teaming.

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For link aggregation, you have at least one 802.3ad-compliant switch, each with an available port for each switch port you want to connect to a Unity port in the aggregation.

The term NIC teaming refers to all NIC redundancy schemes, including link aggregation with 802.3ad.

For link aggregation, you need to perform two sets of configuration tasks:

- Configure a link aggregation from the switch to the Unity system
- Configure a link aggregation from the host to the switch

## Configuring link aggregation from the switch to the Unity system

Learn how to configure the switch ports and join them into a link aggregation.

### Procedure

1. Configure the switch ports, which are connected to the Unity system, for LACP in active mode. Refer to the documentation provided with your switch for details.
2. Join the ports into a link aggregation using Unisphere. To do this:
  - a. Select the **Settings** icon, then select **Access > Ethernet**.
  - b. Select an Ethernet port, then select **Link Aggregation > Create Link Aggregation**.

- c. Select the ports for the link aggregation, then select **Create**.

### Results

Two link aggregations are created with the same ports — one aggregation on each SP.

## Configuring link aggregation from the ESXi host to the switch

### Procedure

1. Configure the switch ports for link aggregation.

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#### Note

Depending on the type of NIC teaming used, you may not need to configure these switch ports for link aggregation. For more information, refer to your VMware documentation.

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2. On an ESXi host, you create a NIC team by creating a virtual switch with two or more physical NICs. For information on creating a virtual switch, refer to the VMware documentation for the version of ESXi running on the host.

## Configuring Unity NFS datastores for the host

Use the Unisphere UI or CLI to:

### Procedure

1. Discover VMware ESXi hosts.
2. Create NFS datastores.

When you create NFS datastores for discovered VMware ESXi hosts, the Unity system automatically configures the hosts to use the datastores. If you select multiple hosts to have access to the NFS datastore, all the selected hosts are configured automatically.

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#### Note

The Unity system automatically mounts NFS datastores as NFSv3.0. NAS servers using Kerberos security use NFSv4.1. In order to use NAS servers enabled for Kerberos or NFSv4 for Unity NFS datastores, you must manually mount the datastores. Refer to [Configuring Unity NFS datastores for the host on page 14](#)

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### After you finish

For more information on performing these tasks, refer to the Unisphere online help or *Unisphere CLI User Guide*.

## Manually setting up the connection to a Unity NFS datastore

### Before you begin

Manually set up the connection to an NFS datastore if you are using generic host objects, or if you want to mount NFS datastores as NFSv4 and later.

### Procedure

1. In Unisphere, find the IP address of the NAS server for the NFS datastore.
  - a. Under **Storage**, select **VMware** > **Datastores**.

- b. Select the NFS datastore and click the **Edit** icon to view its properties. On the **General** tab, note the **Export Paths**.

For example, for Export Path 10.0.0.1/nfsdatastore123, 10.0.0.1 is the IP address of the NAS server for NFS datastore nfsdatastore123.

2. Log into vSphere as an administrator.

3. For each NFS datastore:

- a. On the **Inventory** panel, select the host and click the **Configuration** tab.

- b. On the **Hardware** panel, click **Storage**, then **Add Storage**.

- c. Select **Network File System** as the file storage type.

- d. Enter the following information:

- For server, enter the IP address of the Unity NAS server.
- For folder, enter the path to the Unity share.
- For name, enter the name of the new VMware datastore.



# CHAPTER 3

## Setting up a host to use Unity VMware VMFS iSCSI datastores

This chapter describes the requirements for setting up an ESXi host to use EMC Unity VMFS datastores, how to set up the ESXi host for path management software, and how to troubleshoot the connection between the ESXi host and a Unity VMFS datastore.

This chapter contains the following topics:

- [Requirements for setting up a host to use Unity VMware VMFS datastores](#)..... 18
- [Using multi-path management software with ESXi hosts](#)..... 19
- [Configuring the ESXi iSCSI adapters](#)..... 20
- [Creating a VMkernel port for the software iSCSI adapter](#)..... 20
- [Setting up multipathing for iSCSI](#)..... 21
- [Configuring the Unity VMware VMFS datastores for the host](#)..... 23
- [Configuring ESXi host native failover](#)..... 24
- [Manually setting up the iSCSI connection for a Unity VMFS datastore](#)..... 24
- [Manually setting up the connection to a Unity iSCSI VMFS datastore](#)..... 25
- [iSCSI session troubleshooting for ESXi hosts](#)..... 26

## Requirements for setting up a host to use Unity VMware VMFS datastores

Before you set up a host to use Unity VMware VMFS datastores, these storage system and host and network requirements must be met.

### iSCSI network requirements for host connection to VMFS datastores

For a host to connect to VMware VMFS datastores on a Unity iSCSI interface, the host must be in a network environment as the iSCSI interface. To achieve best performance, the host should be on a local subnet with each Unity iSCSI interface that provides storage. For a Windows multi-pathing environment, each Unity iSCSI interface providing iSCSI LUNs for the host must have two IP addresses associated with it. These two addresses should be on different subnets to ensure high availability. If possible, you should segment network traffic from the Unity system through a private LAN using either a virtual LAN or a dedicated network switch.

To achieve maximum throughput, connect the Unity iSCSI interface and the hosts for which it provides storage to their own dedicated private network. Consider network performance when choosing the network.

### Path management network requirements for VMFS datastores

When implementing a highly-available network between a host and the Unity system, keep in mind that:

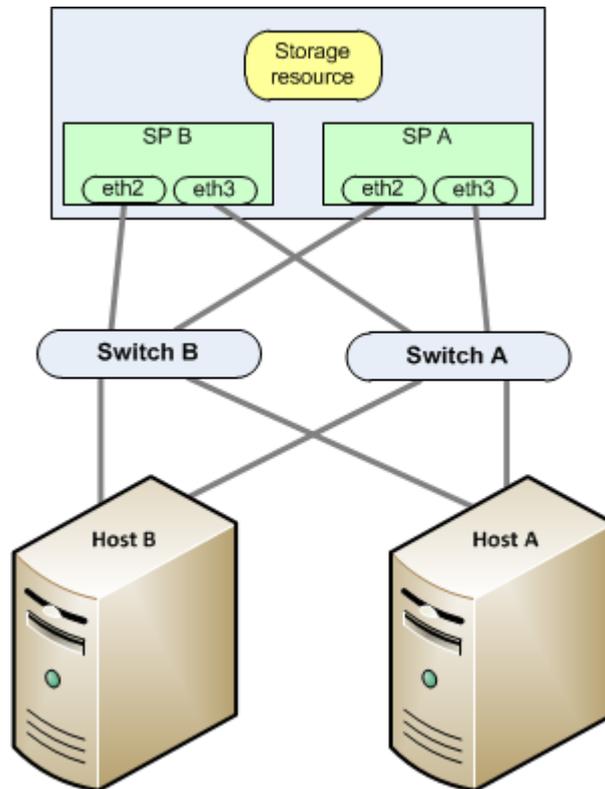
- You can configure up to 32 IPs/VLANs per physical interface. You can create up to 64 iSCSI IPs per system.
- Network switches may be on separate subnets.

---

#### Note

Directly attaching an ESX host to a Unity system is supported.

The following figure shows a highly-available iSCSI network configuration for hosts accessing a Unity storage resource (VMware VMFS datastore). Switch A and Switch B are on separate subnets. Host A and Host B can each access the storage resource through separate NICs. If the storage resource is owned by SP A, the hosts can access the storage resource through the paths to the eth2 interface on SP A. Should SP A fail, the Unity system transfers ownership of the resource to SP B and the hosts can access the storage resource through the paths to the eth2 interface on SP B.

**Figure 1** Highly-available iSCSI network example

## Using multi-path management software with ESXi hosts

Multi-path management software manages the connections (paths) between the host and the Unity system to provide access to the Unity storage should one of the paths fail. The following types of multi-path management software are available for an ESXi host connected to a Unity system:

- ESXi native failover on any ESXi host
- EMC PowerPath/VE software on an ESXi 5.x or later host

For the supported versions of the PowerPath/VE software, refer to the *Unity Support Matrix* on the support website.

## Setting up your system for multi-path management software

For your system to operate with hosts running multi-path management software, two iSCSI IPs are required. These IPs should be on separate physical interfaces on separate SPs.

Verify the configuration in Unisphere. For details on how to configure iSCSI interfaces, refer to topics about iSCSI interfaces in the Unisphere online help.

---

### Note

For highest availability, use two network interfaces on the iSCSI interface. The network interfaces should be on separate subnets. You can view the network interfaces for an iSCSI interface within Unisphere.

---

## Installing PowerPath

### Procedure

1. On the host or virtual machine, download the latest PowerPath version from the PowerPath software downloads section on the EMC Online Support website.
2. Install PowerPath as described in the appropriate PowerPath installation and administration guide for the host's or virtual machine's operating system.  
  
This guide is available on EMC Online Support. If the host or virtual machine is running the most recent version and a patch exists for this version, install it, as described in the `readme` file that accompanies the patch.
3. When the installation is complete, reboot the host or virtual machine.
4. When the host or virtual machine is back up, verify that the PowerPath service has started.

## Configuring the ESXi iSCSI adapters

Follow these steps to configure software iSCSI adapters. If CHAP authentication is required, follow VMware vSphere documentation to configure CHAP parameters for iSCSI adapters.

### Procedure

1. Log into VMware vSphere Client as administrator.
2. From the **Inventory** panel, select the server with the initiator that you want to configure.
3. Click the **Configuration** tab, and click **Storage Adapters**.
4. Click **Add** in the **Add Storage Adapter** dialog box, and then select **Add Software iSCSI Adapter**.
5. Select the iSCSI initiator that you want to configure, and click **Properties**.
6. In the **iSCSI Initiator Properties** page, click the **General** tab and then click **Configure**.
7. Select **Enabled**.
8. Under **iSCSI Properties**, enter a user-friendly iSCSI name and an iSCSI alias for the software iSCSI initiator, and then click **OK**.
9. [Generic host objects only] Add target addresses for the software iSCSI initiator:
  - a. Click the **Static Discovery** tab and click **Add**.
  - b. Add the target's information and click **OK**.
  - c. Rescan the adapter.
10. If you want to configure CHAP credentials for the target, access the **iSCSI Initiator Properties** page, click the **Static Discovery** tab, and click **Settings** > **CHAP**. Then rescan the adapter.

## Creating a VMkernel port for the software iSCSI adapter

Connect the VMkernel, which runs services for iSCSI storage, to the physical network adapter.

**Procedure**

1. Log in to the vSphere Client as an administrator.
2. From the **Inventory** panel, select the host.
3. Click the **Configuration** tab, and click **Networking**.
4. In the **Virtual Switch** view, click **Add Networking**.
5. Select **VMkernel** and click **Next**.
6. Select **Create a virtual switch** to create a new vSwitch.
7. Select an adapter that you want to use for iSCSI traffic and click **Next**.

**Note**

Do not use iSCSI on 100 Mbps or slower adapters.

If no adapters appear under **Create a virtual switch**, the existing vSwitches are using all the network adapter in the host. In this situation, you can use an existing vSwitch for iSCSI traffic.

8. Under **Port Group Properties**, enter the network label, and click **Next**.  
The network label is the name that you want to identify the VMkernel port that you are creating.
9. Specify the IP settings and click **Next**.
10. After you review the summary information, click **Finish**.

**After you finish**

If your host uses only one physical network adapter for iSCSI, your network configuration is complete.

If your host uses more than one physical network adapter for iSCSI, you must connect additional adapters to the vSwitch and associate each port with a VMkernel port using the port binding technique. You can do this in one of following ways:

- Create separate vSwitches for each additional network adapter by repeating the above steps for each additional adapter.
- Use a single vSwitch for iSCSI multipathing by connecting the additional network adapters and VMkernel ports to the vSwitch that you just created and override the default setup so that each port maps to only one active adapter.

## Setting up multipathing for iSCSI

**Before you begin**

Use this procedure only if both of these conditions are met:

- You want to connect all of these iSCSI NICs to a single vSwitch.
- You have two or more NICs that you can designate for iSCSI.

Before following the procedure below to set up multipathing for software iSCSI, you must have created one VMkernel port for your network adapter.

**NOTICE**

If the network adapter that you add to the software iSCSI initiator is not in the same subnet as your iSCSI target (iSCSI interface), the host cannot establish sessions from this network adapter to the target.

The procedure associates VMkernel ports with the iSCSI NICs using a 1-to-1 mapping.

### Procedure

1. Log in to the vSphere Client as an administrator.
2. From the **Inventory** panel, select the host.
3. Click the **Configuration** tab, and click **Networking**.
4. Select the vSwitch that you use for iSCSI and click **Properties**.
5. Bind additional network adapters to the vSwitch:
  - a. In the **vSwitch Properties** dialog box, click the **Network Adapters** tab and click **Add**.
  - b. From the list of adapters, select the ones that you want to add to the vSwitch and click **Next**.
  - c. After you review the information on the summary page, click **Finish**.  
The list of network adapters reappears, showing the network adapters that the vSwitch claims.
6. Create VMkernel ports for that network adapters that you connected to the vSwitch:

---

#### Note

Each VMkernel port in a vSwitch with multiple network adapters must have only one network adapter designated as active for each VMkernel port. The other adapters must be designated as unused.

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- a. In the **vSwitch Properties** dialog box, click the **Ports** tab and click **Add**.
  - b. Select **VMkernel** and click **Next**.
  - c. Under **Port Group Properties**, enter a network label and click **Next**.  
The network label is the name that you want to identify the VMkernel port group that you are creating.
  - d. Specify the IP settings and click **Next**. When you enter the subnet mask, be sure that the network adapter is set to the subnet of the iSCSI interface to which it connects.
  - e. After you review the information on the summary page, click **Finish**.
7. Map each VMkernel port to just one active adapter.  
By default all network adapters appear as active for each VMkernel on the vSwitch. You must override this setup so that each port maps to only one active adapter. For example, VMkernel port vmk1 maps to active adapter vmnic1, port vmk2 maps to vmnic2, and so on.  
For each VMkernel port on the vSwitch:
    - a. On the **Ports** tab, select a VMkernel port and click **Edit**.
    - b. Click the **NIC Teaming** tab and select **Override vSwitch failover order**.
    - c. Specify only one adapter as active and move all the remaining adapters to the **Unused Adapters** list.
  8. Connect the VMkernel ports to the software iSCSI initiator:
    - a. Log in to the vSphere client as an administrator.

- b. From the **Inventory** panel, select the host.
- c. Click the **Configuration** tab, and click **Storage Adapters**.
- d. Select the iSCSI adapter and click **Properties**.
- e. Select the **Network Configuration** tab and click **Select**.
- f. Select the VMkernel ports on the vSwitch and then click **OK**.
- g. Review the summary and click **Finish**.

## Configuring the Unity VMware VMFS datastores for the host

### Procedure

1. Add the software iSCSI adapter, if not already added, as described in VMware vSphere documentation.
2. Use Unisphere UI or CLI to:
  - a. Discover VMware ESXi hosts.
  - b. Create Unity VMFS datastores.

For more information about completing these tasks, refer to the Unisphere online help or the *Unisphere CLI User Guide*.

---

### Note

When you create Unity VMFS datastores for discovered VMware ESXi hosts, the system automatically configures the hosts to use the datastores. If you select multiple discovered hosts for the datastores, all the selected hosts are configured automatically. The VMware VMFS datastores are presented directly to the ESXi hosts and not to the hosts' virtual machines. If an ESXi host cannot see the VMFS datastore after you create the datastore, manually configure the connection to the VMFS datastore.

---

3. Rescan for the VMFS datastores:
  - a. From the **Hosts and Clusters** panel, select the server.
  - b. Select **Manage**.
  - c. Under **Storage**, select **Storage Adapters**.
    - a. Select the iSCSI storage adapter in the list of adapters.
    - b. Select the **Rescan** icon.
  - d. Under **Storage**, select **Storage Devices**.
  - e. Select the **Rescan** icon.

If the host can see the VMFS datastore, you must set up the host to use the datastore, as described in the next section.

If the host cannot see the VMFS datastore, you may have a problem with the connection between the host and iSCSI target (iSCSI connection). Refer to [iSCSI session troubleshooting for ESXi hosts on page 26](#) for additional steps to resolve the problem.

## Configuring ESXi host native failover

ESXi hosts include native failover for managing the I/O paths between the server and storage system. Native failover provides multiple paths from the server to the storage system. To use ESXi host native failover with your storage system, you must implement one of the failover policies listed below. For more information about these policies, refer to VMware ESXi configuration documentation.

- Round Robin (default)
- Fixed with failover mode
- Most Recently Used (MRU)

## Configuring the native failover policy for iSCSI connections

### Procedure

1. Log into the vSphere client as administrator.
2. From the **Inventory** panel, select the server, and click the **Configuration** tab.
3. Under Hardware, click **Storage** and select the datastore (LUN).
4. Click **Properties**.
5. In the **Properties** page, click **Manage Paths**.
6. In the **Manage Paths** page, under **Policy**, verify that the policy is one you want:
  - `Fixed (VMware)` for fixed native failover policy
  - `Round Robin (VMware)` for Round Robin native failover policy
  - `Most Recently Used (VMware)` for MRU native failover policyIf the policy is not set to the desired policy, in the policy selection dialog, select the correct policy.
7. If you selected the `Fixed (VMware)` policy, under **Paths**, select the preferred path.

You can statically balance the load using the fixed policy by selecting different paths for each datastore. To designate a different path as preferred, right click on the path and click **preferred**.

8. Click **Close**.

### After you finish

You are now ready to either migrate a virtual machine to the VMFS datastore or create a virtual machine on the VMFS datastore. To migrate a virtual disk to the VMFS datastore, see the section on Migrating VMware Virtual Machines to the Unity System. For information about creating a virtual machine on the VMFS datastore, refer to the VMware documentation.

A rescan of the storage is required after any change is made to the SAN.

## Manually setting up the iSCSI connection for a Unity VMFS datastore

If you want to use generic host objects, you must manually add the software iSCSI adapter:

**Procedure**

1. Log in to the vSphere Client as an administrator.
2. From the **Inventory** panel, select the host with the initiator you want to configure.
3. Click the **Configuration** tab, and click **Storage Adapters**.
4. If the Software iSCSI adapter is not listed, click **Add** in the **Add Storage Adapter** dialog box, and then select **Add Software iSCSI Adapter**.
5. Select the iSCSI initiator that you want to configure, and click **Properties**.
6. In the **iSCSI Initiator Properties** page, click the **General** tab and then click **Configure**.
7. If the adapter is not already enabled, select **Enabled**.
8. If you want a name and alias for the software iSCSI adapter, enter them under **iSCSI Initiator Properties** and click **OK**.

## Manually setting up the connection to a Unity iSCSI VMFS datastore

**Procedure**

1. Log in to the vSphere client as an administrator.
2. Rescan for new storage devices:
  - a. From the **Inventory** panel, select the server, and click the **Configuration** tab.
  - b. Verify that the iSCSI adapter is in the vSphere static discovery table.
    - a. Select the **Manage** tab, then select **Storage**.
    - b. Under **Adapter Details**, select **Targets** and **Static Discovery**.
    - c. Verify that the storage system iSCSI adapter information appears.
  - c. Under **Hardware**, click **Storage Adapters**.
    - a. Under **iSCSI Software Adapters** in the list of adapters, select the adapter (NIC), and then click **Rescan**.
    - b. In the **Rescan** dialog box, select the adapter (NIC), and then click **Rescan**.
  - d. In the **Rescan** dialog box, select both **Scan for New Storage Devices** and **Scan for New VMFS Volumes**, and click **OK**.
3. Add each VMFS datastore to the ESXi host:
  - a. From the **Inventory** panel, select the host and click the **Configuration** tab.
  - b. Under **Hardware**, click **Storage**, and click **Add Storage**.
  - c. On the **Select Disk/LUN** page, select the Unity VMFS datastore that you want to use for the datastore, and click **Next**.
  - d. On the **Current Disk Layout** page, review the current virtual disk layout, and click **Next**.
  - e. On the **Disk/LUN-Properties** page, enter the exact same name that was used to create the datastore on the storage system.  
You can find this name using Unisphere.
  - f. On the **Disk/LUN-Formatting** page, if needed, adjust the file system values and the capacity for the datastore, and click **Next**.

- g. On the **Ready to Complete** page, review the datastore information, and click **Finish**

### Results

The datastore (VMFS volume) is created on the Unity VMFS datastore for the ESXi host.

## iSCSI session troubleshooting for ESXi hosts

Verify the connectivity between the host and the target either from the storage system iSCSI interface IP interface or from the ESXi host:

### Procedure

1. Verify the connectivity between the host and the target either from the Unity iSCSI interface IP interface or from the ESXi host:

From the iSCSI IP interface:

- a. Select the **Settings** icon, then select **Access > Routing**.
- b. Select the iSCSI interface and select **Ping/Trace**.
- c. Enter the network name of the host iSCSI adapter, select the IP address from which to send the request, and click **Ping**.

From the ESXi host:

- a. Use `vmkping` to verify connectivity to the Unity iSCSI interface IP interfaces.
- b. If jumbo frames are configured, you should use `vmkping` with the `-s` option at a size larger than 1500 to verify that all network elements are properly configured for jumbo frames.

```
vmkping -s 9000 <IP_address_of_iSCSI_Server>
```

Using the IP address avoids name resolution issues.

---

### Note

You can find the IP address for the target by selecting **Settings > iSCSI Settings** in Unisphere.

---

Some switches intentionally drop ping packets or lower their priority during times of high workload. If the ping testing fails when network traffic is heavy, verify the switch settings to ensure the ping testing is valid.

2. On the host, verify that the iSCSI adapter has been added.

---

### Note

The iSCSI service on the iSCSI interface starts in vSphere when the storage system is powered up.

3. If you are using CHAP authentication, ensure that the CHAP security settings are correct for your system. See VMware vSphere steps for configuring CHAP parameters for iSCSI adapters.

# CHAPTER 4

## Setting up a host to use Unity VMware VMFS FC datastores

This chapter contains the following topics:

- [Requirements for setting up a host to use Unity VMware VMFS datastores with FC](#) ..... 28
- [Using multi-path management software with ESXi hosts](#) .....28
- [Configuring ESXi host native failover](#)..... 29
- [Configuring the Unity VMware VMFS datastores for the host](#)..... 30
- [Manually setting up the host connection to a Unity FC VMFS datastore](#)..... 31

## Requirements for setting up a host to use Unity VMware VMFS datastores with FC

Before you set up a host to use Unity VMware VMFS datastores, the Unity system and host and network requirements in described this section must be met.

Unity automatically detects VMware ESXi hosts on the SAN. It is possible to add ESXi hosts manually, but letting the storage system detect ESXi hosts automatically provides the highest level of functionality.

### SAN requirements

For a host to connect to FC LUNs or VMware VMFS and Block VVol datastores on the Unity system, the host must be in a SAN environment with the storage system, and zoned so that the host and the storage system are visible to each other over the SAN. For a multi-pathing environment, each Unity FC LUN for the host must have two paths associated with it. These two paths should be on different switches to ensure high availability.

### Path management SAN requirements

When implementing a highly-available SAN between a host and the Unity system, keep in mind that:

- A LUN or VMware VMFS datastore is visible to both SPs.
- You can configure multiple paths for a LUN. These paths should be associated with separate physical ports on the same SP.
- Each LUN must present the same LUN ID to all hosts.

---

#### Note

Directly attaching a host to a storage system is supported if the host connects to both SPs and has the required multipath software.

---

## Using multi-path management software with ESXi hosts

Multi-path management software manages the connections (paths) between the host and the Unity system to provide access to the Unity storage should one of the paths fail. The following types of multi-path management software are available for an ESXi host connected to a Unity system:

- ESXi native failover on any ESXi host
- EMC PowerPath/VE software on an ESXi 5.x or later host

For the supported versions of the PowerPath/VE software, refer to the *Unity Support Matrix* on the support website.

### Setting up a Unity system for multi-path management software

For a Unity system to operate with hosts running multi-path management software, each FC LUN on the Unity system should be associated with multiple paths.

## Installing PowerPath

### Procedure

1. On the host or virtual machine, download the latest PowerPath version from the PowerPath software downloads section on the EMC Online Support website.
2. Install PowerPath as described in the appropriate PowerPath installation and administration guide for the host's or virtual machine's operating system.

This guide is available on EMC Online Support. If the host or virtual machine is running the most recent version and a patch exists for this version, install it, as described in the `readme` file that accompanies the patch.

3. When the installation is complete, reboot the host or virtual machine.
4. When the host or virtual machine is back up, verify that the PowerPath service has started.

## Configuring ESXi host native failover

ESXi hosts include native failover for managing the I/O paths between the server and storage system. Native failover provides multiple paths from the server to the storage system. To use ESXi host native failover with your storage system, you must implement one of the failover policies listed below. For more information about these policies, refer to VMware ESXi configuration documentation.

- Round Robin (default)
- Fixed with failover mode
- Most Recently Used (MRU)

## Configuring the native failover policy for FC connections

### Procedure

1. Log into VMware vSphere client as administrator.
2. From the **Inventory** panel, select the server, and click the **Configuration** tab.
3. Under **Hardware**, click **Storage** and select the datastore (LUN).
4. Click **Properties**.
5. In the **Properties** page, click **Manage Paths**.
6. In the **Manage Paths** page, under **Policy**, verify that the policy is one you want:

- `Fixed (VMware)` for fixed native failover policy
- `Round Robin (VMware)` for Round Robin native failover policy
- `Most Recently Used (VMware)` for MRU native failover policy

If the policy is not set to the desired policy, in the policy selection dialog, select the correct policy.

7. If you selected the `Fixed (VMware)` policy, under **Paths**, select the preferred path.

You can statically balance the load using the fixed policy by selecting different paths for each datastore. To designate a different path as preferred, right click on the path and click **preferred**.

8. Click **Close**.

### After you finish

You are now ready to either migrate a virtual machine to the VMFS datastore or create a virtual machine on the VMFS datastore. To migrate a virtual disk to the VMFS datastore, see the section on Migrating VMware Virtual Machines to the Unity System. For information about creating a virtual machine on the VMFS datastore, refer to the VMware documentation.

For FC connections, if you receive a connection error when the host is trying to log into an FC LUN, or you cannot see the datastores on the target, you may be having problems with the SAN connection between the host and the storage system. This problem may occur because:

- The Fibre Channel SAN is zoned incorrectly.
- A physical hardware issue is disrupting the SAN connectivity.

A rescan of the storage is required after any change is made to the SAN.

## Configuring the Unity VMware VMFS datastores for the host

### Procedure

1. Use Unisphere UI or CLI to:
  - a. Discover VMware ESXi hosts.
  - b. Create Unity VMFS datastores.

For more information about completing these tasks, refer to the Unisphere online help or the *Unisphere CLI User Guide*.

---

### Note

When you create Unity VMFS datastores for discovered VMware ESXi hosts, the system automatically configures the hosts to use the datastores. If you select multiple discovered hosts for the datastores, all the selected hosts are configured automatically. The VMware VMFS datastores are presented directly to the ESXi hosts and not to the hosts' virtual machines. If an ESXi host cannot see the VMFS datastore after you create the datastore, manually configure the connection to the VMFS datastore.

---

2. [Generic host objects only] Rescan for the VMFS datastores:
  - a. From the **Hosts and Clusters** panel, select the server.
  - b. Select **Manage**.
  - c. Under **Storage**, select **Storage Adapters**.
    - a. Right click on the FC HBA and then click **Rescan**.
    - b. In the **Rescan** dialog box, select the FC HBA, and then click **Rescan**.
  - d. Under **Storage**, select **Storage Devices**.
  - e. Select the **Rescan** icon.

If the host can see the VMFS datastore, you must set up the host to use the datastore, as described in the next section.

If the host cannot see the VMFS datastore, there may be a problem with SAN connection between the host and the FC LUN (FC connection), in which case you need to manually configure this connection.

## Manually setting up the host connection to a Unity FC VMFS datastore

### Procedure

1. Log in to the vSphere client as an administrator
2. Rescan for new storage devices:
  - a. From the **Inventory** panel, select the server, and click the **Configuration** tab.
  - b. Under **Hardware**, click **Storage Adapters**.
    - a. In the list of adapters, select the **FC HBA**, and then click **Rescan**.
    - b. In the **Rescan** dialog box, select the FC HBA, and then click **Rescan**.
  - c. In the **Rescan** dialog box, select both **Scan for New Storage Devices** and **Scan for New VMFS Volumes**, and click **OK**.
3. Add each VMFS datastore to the ESXi host:
  - a. From the **Inventory** panel, select the host and click the **Configuration** tab.
  - b. Under **Hardware**, click **Storage**, and click **Add Storage**.
  - c. On the **Select Disk/LUN** page, select the Unity VMFS datastore that you want to use for the datastore, and click **Next**.
  - d. On the **Current Disk Layout** page, review the current virtual disk layout, and click **Next**.
  - e. On the **Disk/LUN-Properties** page, enter the exact same name that was used to create the datastore on the storage system.

You can find this name using Unisphere.
  - f. On the **Disk/LUN-Formatting** page, if needed, adjust the file system values and the capacity for the datastore, and click **Next**.
  - g. On the **Ready to Complete** page, review the datastore information, and click **Finish**

### Results

The datastore (VMFS volume) is created on the Unity VMFS datastore for the ESXi host.



# CHAPTER 5

## Setting up a host to use Unity VVol datastores

This chapter contains the following topics:

- [Add the storage system as a VASA provider.....](#) 34
- [Configuring Unity File VVol datastores for the host.....](#) 34
- [Setting up the connection to a File VVol datastore.....](#) 34
- [Add an iSCSI target for Block VVol datastores.....](#) 35
- [Configuring the Unity Block VVol datastores for the host.....](#) 35

## Add the storage system as a VASA provider

Add the system as a VASA provider in vSphere.

### Procedure

1. In vSphere, go to **Storage > Manage**.
2. Select **Storage provider**, then select the **Add** icon.
3. Enter the **Name** of the storage system. It is recommended that you use the same system name as Unisphere.
4. Enter the VASA provider **URL** for the Unity system. Use the following format:  
`https://<management IP address>:8443/vasa/version.xml`.
5. Enter the Unisphere credentials and select **OK**.

### After you finish

It may take a few minutes for the registration to complete.

## Configuring Unity File VVol datastores for the host

Use the Unisphere UI or CLI to:

### Procedure

1. Discover VMware ESXi hosts.
2. Create capability profiles, NAS protocol endpoint servers (VVols-enabled NAS servers), and File VVol datastores.. You must create a VVol-enabled NAS server on each SP.

### After you finish

For more information on performing these tasks, refer to the Unisphere online help or *Unisphere CLI User Guide*.

## Setting up the connection to a File VVol datastore

### Before you begin

If the ESXi host cannot detect the storage system File VVol datastore, or if you are using generic host objects, you will need to manually set up the connection.

### Procedure

1. Log into vSphere as an administrator.
2. For each File VVol datastore:
  - a. On the **Inventory** panel, select the host and click the **Configuration** tab.
  - b. On the **Hardware** panel, click **Storage**, then **Add Storage**.
  - c. Select **Network File System** as the file storage type.
  - d. Enter the following information:
    - For folder, enter the path to the Unity share.
    - For name, enter the name of the new VMware datastore.

- e. Perform a rescan in vSphere to ensure that the VMware NFS datastore is now visible to the ESXi host.

## Add an iSCSI target for Block VVol datastores

Add an iSCSI target in vSphere for SCSI Block VVol datastores.

### Procedure

1. Under **Hosts and Clusters**, go to **Manage** > **Storage**.
2. Under **Storage Adapters**, select the iSCSI Software Adapter.
3. On the **Targets** tab, click **Add**.
4. Enter the iSCSI details and click **OK**.

## Configuring the Unity Block VVol datastores for the host

### Procedure

1. [For iSCSI only:] Add the software iSCSI adapter, if not already added, as described in VMware vSphere documentation.
2. Use Unisphere UI or CLI to:
  - a. Discover VMware ESXi hosts.
  - b. Create Unity Block VVol datastores.

For more information about completing these tasks, refer to the Unisphere online help or the *Unisphere CLI User Guide*.

3. Rescan for the VMFS datastores:
  - a. From the **Hosts and Clusters** panel, select the server.
  - b. Select **Manage**.
  - c. Under **Storage**, select **Storage Adapters**.

For iSCSI:

- a. Select the iSCSI storage adapter in the list of adapters.
- b. Select the **Rescan** icon.

For FC:

- a. Right click on the FC HBA and then click **Rescan**.
- b. In the **Rescan** dialog box, select the FC HBA, and then click **Rescan**.

- d. Under **Storage**, select **Storage Devices**.
- e. Select the **Rescan** icon.

If the host can see the Block VVol datastore, you must set up the host to use the datastore, as described in the next section.

If the host cannot see the Block VVol datastore, you may have one of the following issues.

- iSCSI: A problem with the connection between the host and iSCSI target (iSCSI connection). Refer to [iSCSI session troubleshooting for ESXi hosts on page 26](#) for additional steps to resolve the problem.

- FC: A problem with SAN connection between the host and the FC LUN (FC connection), in which case you need to manually configure this connection.

# CHAPTER 6

## Migrating VMware Virtual Machines to the Unity system

This chapter contains the following topics:

- [VMware virtual machine migration environment and limitations](#)..... 38
- [Migrating a virtual machine to a Unity datastore](#)..... 38

## VMware virtual machine migration environment and limitations

The table below provides a high-level outline of the environments for suspended migration and vMotion migration. Refer to the VMware documentation for more detailed information about migration limitations.

**Table 1** Virtual machine migration environment and limitations

Component	Requirement	
	Suspended Migration	vMotion migration
Unity	Datastore sized to accommodate the existing data that you are migrating and to allow for data growth.	
Hosts	One or two ESXi hosts	One or two ESXi hosts, each with: <ul style="list-style-type: none"> <li>• A vMotion license and configured for vMotion.</li> <li>• Access to both the source and target datastores.</li> <li>• Sufficient resources to support two instances of the virtual machine running concurrently for a brief time.</li> </ul>
Virtual machines	None.	Virtual machines with snapshots cannot be migrated.
Datastores	<ul style="list-style-type: none"> <li>• Datastore is on either a local or attached storage device and does not need to be shared storage.</li> <li>• Entire datastore is migrated to the Unity datastore.</li> </ul>	<ul style="list-style-type: none"> <li>• Datastore is on either a local or attached storage device and must be shared storage.</li> <li>• Entire datastore is migrated to the Unity datastore.</li> <li>• Datastore is in persistent mode.</li> </ul>

**Table 2** Comparison of suspended migration versus vMotion migration of a virtual machine

Parameter	Suspended Migration	vMotion Migration
Graphic user interface (GUI)	Provided by ESXi host <b>Migrate Virtual Machine</b> wizard.	Provided by ESXi host <b>Migrate Virtual Machine</b> wizard.
Access to virtual machine	Disrupted relative to time required for the copying of the virtual machine to the Unity datastore.	No disruption.

## Migrating a virtual machine to a Unity datastore

To migrate a virtual machine to a Unity datastore, perform these tasks:

1. Set up the host of the virtual machine migration.

2. [Migrating a virtual machine with suspended migration on page 39](#) or [Migrating a virtual machine with vMotion on page 39](#)

---

#### Note

In Unisphere, the polling period for a VMware ESXi host or vCenter is once every 24 hours.

---

## Migrating a virtual machine with suspended migration

Use the **Migrate Virtual Machine** wizard to migrate the datastore, as described in the VMware documentation for your ESX Server.

After you click **Finish** in the wizard, the migration operation begins. During the migration operation, you have no access to the virtual machine's functions.

## Migrating a virtual machine with vMotion

### Procedure

1. In the vSphere client, set up VMkernel for vMotion:
  - a. From the **Inventory** panel, select the server, and click the **Configuration** tab.
  - b. Click **Networking**.
  - c. In the **Virtual Switch** view, click **Add Networking**.
  - d. Select **VMkernel**, and then click **Next**.
  - e. Either select the virtual switch or create one.
  - f. Select the network adapters for the virtual switch to use and click **Next**.
  - g. Specify the name and VLAN ID for the port group you are creating.
  - h. Select **Use this port group for vMotion**, and then click **Next**.
  - i. Select one of the following:
    - **Obtain IP settings automatically**
    - **Use the following IP settings:**
      - a. Enter the IP settings
      - b. Click **Edit** to set the VMKernel default gateway for VMkernel services, such as vMotion.
      - c. Click **OK** and **Next**.
  - j. Proceed through the remaining pages until you reach the summary page.
  - k. On the summary page, verify the settings and then click **Finish**.
2. From the **Inventory** panel, select the server with the virtual machine that you want to migrate and click the **Virtual Machine** tab.
3. Right-click the virtual machine that you want to migrate, select **Migrate** and click **Next**.
4. Select the Unity VMware datastore.
5. For **Disk format** select **Same format as source** and click **Finish**.

