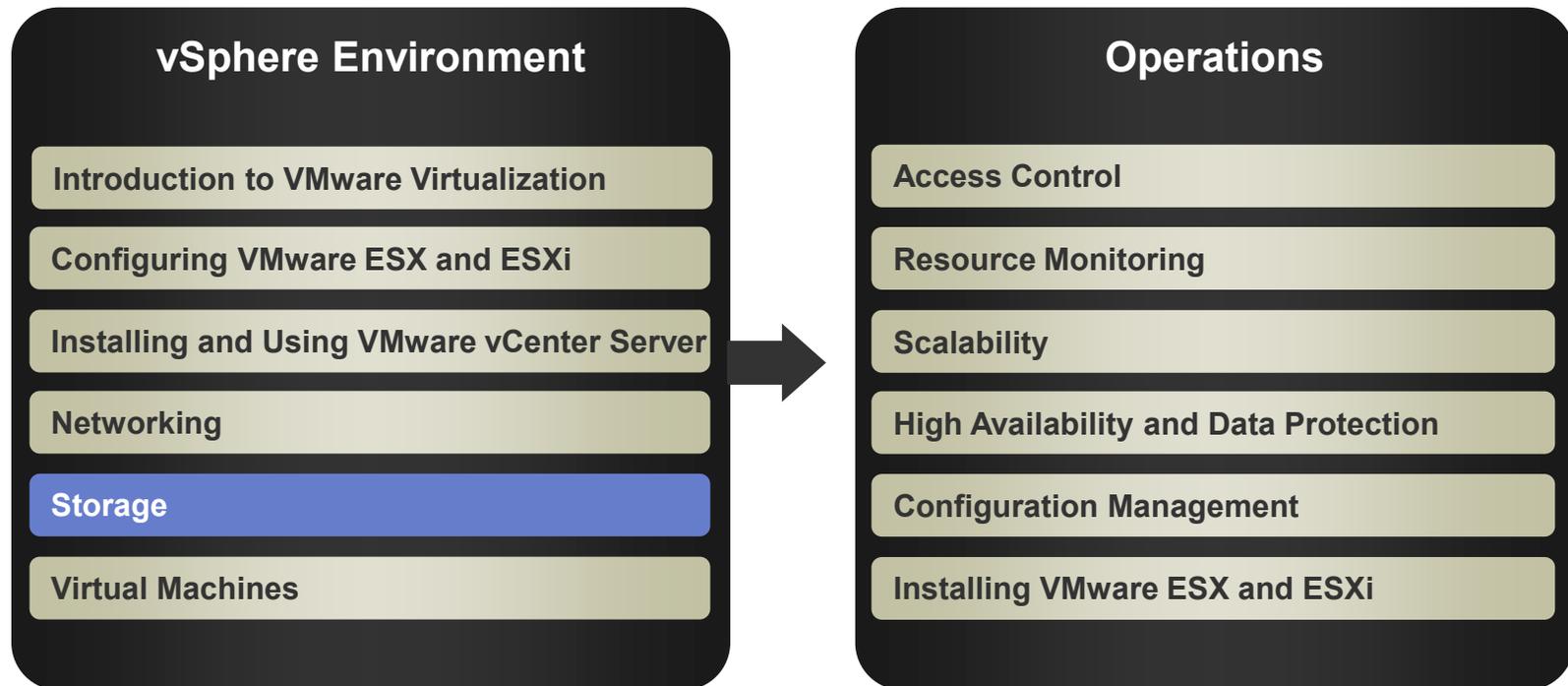




# Storage

## Module 6

## You Are Here



## Importance

- Storage options give you the flexibility to set up your storage based on your cost, performance, and manageability requirements. Shared storage is useful for disaster recovery, high availability, and moving virtual machines between hosts.

## Module Lessons

- Lesson 1: Storage Concepts**
- Lesson 2: Fibre Channel SAN Storage**
- Lesson 3: iSCSI Storage**
- Lesson 4: VMFS Datastores**
- Lesson 5: NAS Storage and NFS Datastores**



# Lesson 1: Storage Concepts

## Lesson Objectives

- Describe VMware® vSphere™ storage technologies and datastores
- Describe the various ways to view storage information
- Understand the storage device naming convention

## Storage Overview

### Storage Technology

Locally Attached

Fibre Channel

iSCSI

NAS

### Datastore Types

VMware vStorage VMFS

NFS

Raw Device Mappings (RDMs)

***Datastores can exist on locally attached or shared storage (Fibre Channel, iSCSI, and NAS).***

## Storage Technology Overview

**Locally-attached storage – Internal or external storage disks or arrays attached to the host through a direct connection**

**Fibre Channel – A high-speed SCSI transport protocol used for storage area networking (SAN)**

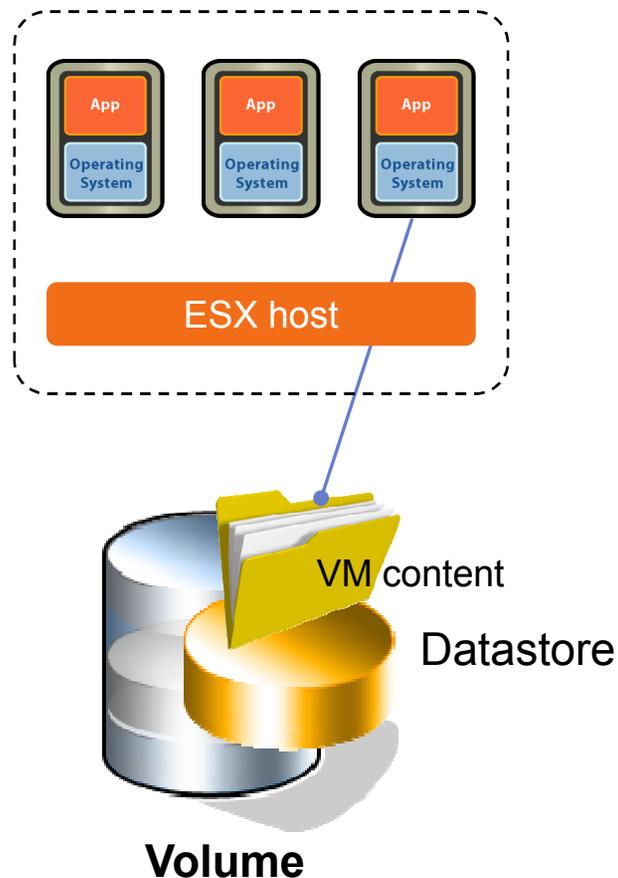
- Fibre Channel switches interconnect multiple nodes to form the “fabric” in a Fibre Channel SAN.

**iSCSI – A SCSI transport protocol, enabling access to storage devices over standard TCP/IP networks**

- iSCSI maps SCSI block-oriented storage over TCP/IP.

**Network-attached storage (NAS) – Storage shared over the network at the file system level**

# Datstores



**A *datstore* is a logical storage unit, which can use disk space on one physical device or one disk partition, or span several physical devices.**

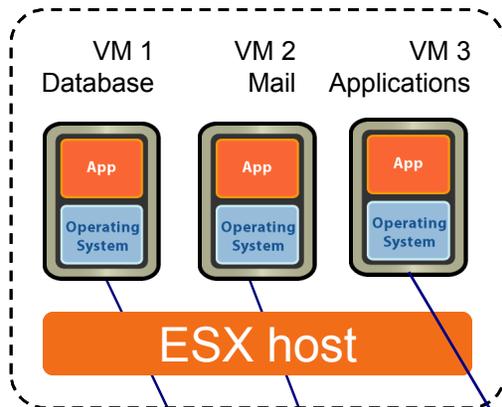
**Types of datstores:**

- VMware Virtual Machine File System (VMFS)
- Network File System (NFS)

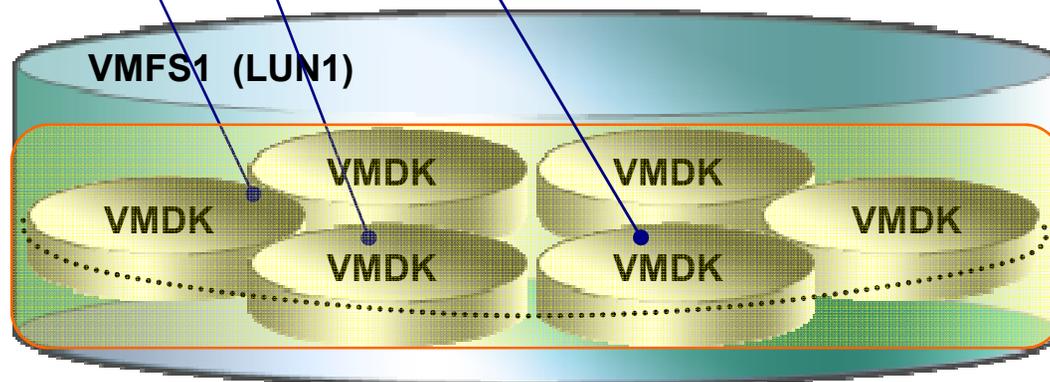
**Datstores are used to hold virtual machines, templates, and ISO images.**

**A VMFS datstore can also hold a raw device mapping (RDM), used to access raw data.**

# VMFS

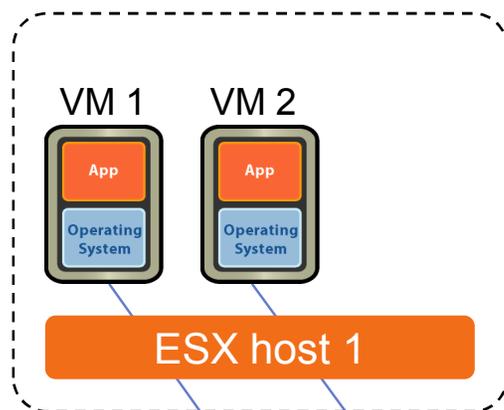


- > Clustered file system
- > Underlying technology for VMotion, VMware HA, and DRS
- > Allows concurrent access to shared storage
- > Provides on-disk locking
- > Can reside on local, Fibre Channel, or iSCSI storage

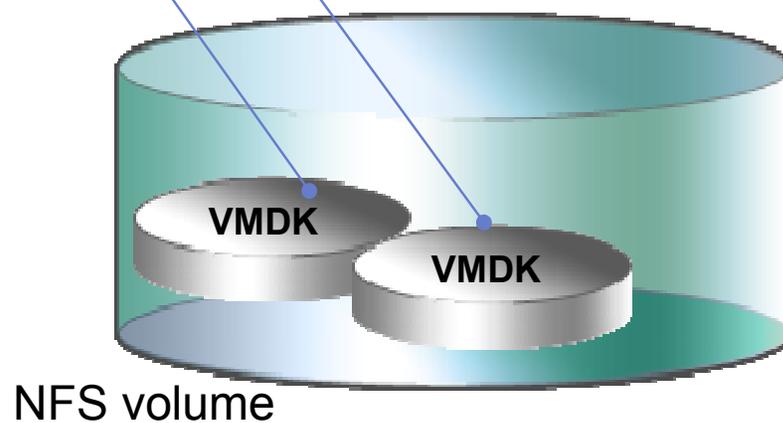


VMFS Volume

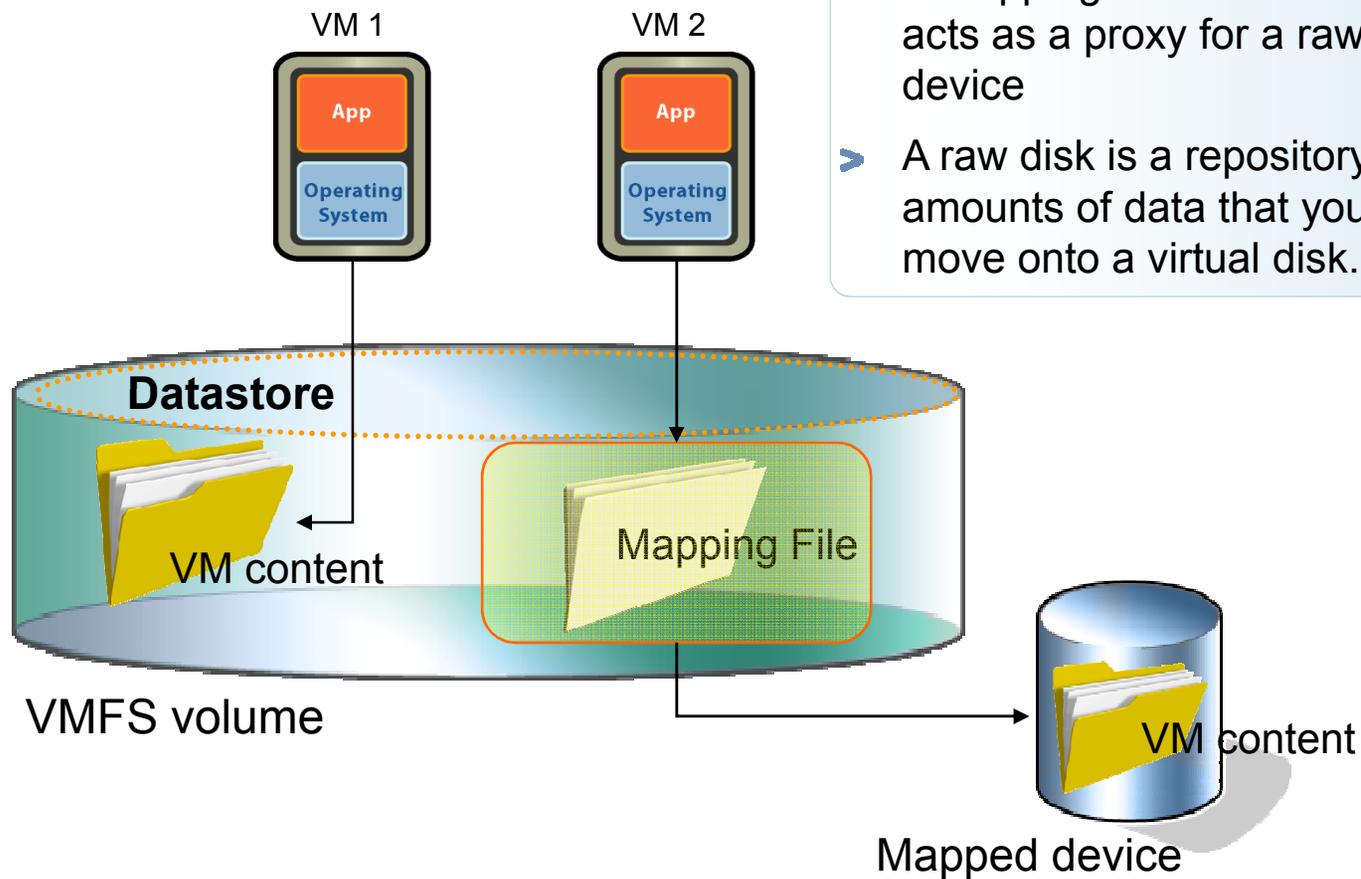
## NFS



- > Storage shared over the network at a file system level
- > Only NFS version 3 over TCP/IP is supported.



## Raw Device Mapping (RDM)



- > A mapping file in a VMFS volume that acts as a proxy for a raw physical device
- > A raw disk is a repository for large amounts of data that you do not want to move onto a virtual disk.

## Local versus Shared Storage

### Advantages of using local storage:

- > Easy to physically move the box
- > Most common location for installing ESX
- > Ideal for small environments

### Advantages of using shared storage:

- > Central repository
- > Scalable and recoverable implementation
- > Multiple hosts can access the same storage space.
- > Virtual machines can be clustered across physical hosts.
- > Virtual machines can take advantage of vSphere features like VMware VMotion™.
- > Allows data replication

## Storage Device Naming Conventions

### Storage devices are identified in several ways:

- > SCSI ID – Unique SCSI identifier
- > Canonical name – The Network Address Authority (NAA) ID is a unique LUN identifier, guaranteed to be unique across reboots.
  - For those devices without a unique ID, a VMware mpx reference is used instead.
- > Runtime name – Uses the convention vmhbaN:C:T:L. This name is not persistent through reboots.

SCSI ID	Canonical Name	Runtime Name	Lun
0000000000766d686261303a303a30	mpx.vmhba0:C0:T0:L0	vmhba0:C0:T0:L0	0
01000100002020457378536373692d...			
020000000050060160c1e0eb0a5006...	naa.50060160c1e0eb0a50060160c1e0eb0a	vmhba1:C0:T0:L0	0
020006000060060160d2b02000bcb9...	naa.60060160d2b02000bcb96451d6b1dd11	vmhba1:C0:T0:L6	6

## Physical Storage Considerations

**Discuss vSphere storage needs with your storage administration team:**

- LUN sizes
- I/O bandwidth
- Disk cache parameters
- Zoning and masking
- Identical LUN presentation to each VMware ESX™/ESXi host
- Active-active or active-passive arrays
- Export properties for NFS datastores

## Lesson Summary

- vSphere supports Fibre Channel, iSCSI, and NAS storage technologies.
- vSphere supports VMFS datastores, RDMs, and NFS datastores.
- View storage information from the host's Configuration tab or the Storage Views tab.
- Storage devices are uniquely identified using the NAA ID.



# Lesson 2: Fibre Channel SAN Storage

## Lesson Objectives

- Describe uses of Fibre Channel with ESX/ESXi
- Describe Fibre Channel components and addressing
- Access Fibre Channel storage
- View Fibre Channel storage information

## Using Fibre Channel with ESX/ESXi

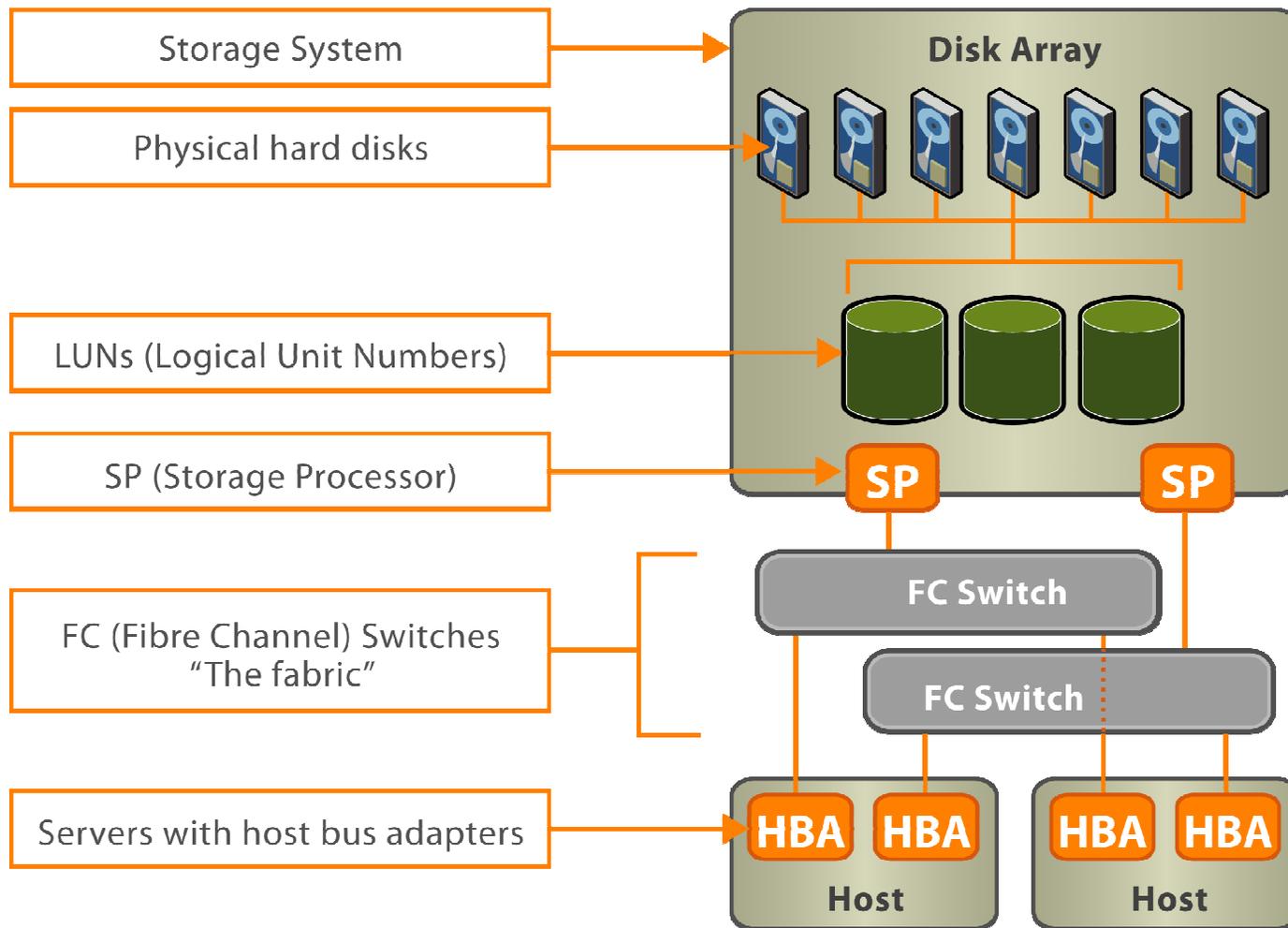
### Uses of Fibre Channel SAN LUNs:

- VMFS datastores to hold virtual machines, ISO images, and templates
- RDMs to hold a virtual machine's raw data
- Supports vSphere features such as VMotion, VMware High Availability, and VMware Distributed Resource Scheduler (DRS)
- To boot ESX from a SAN LUN

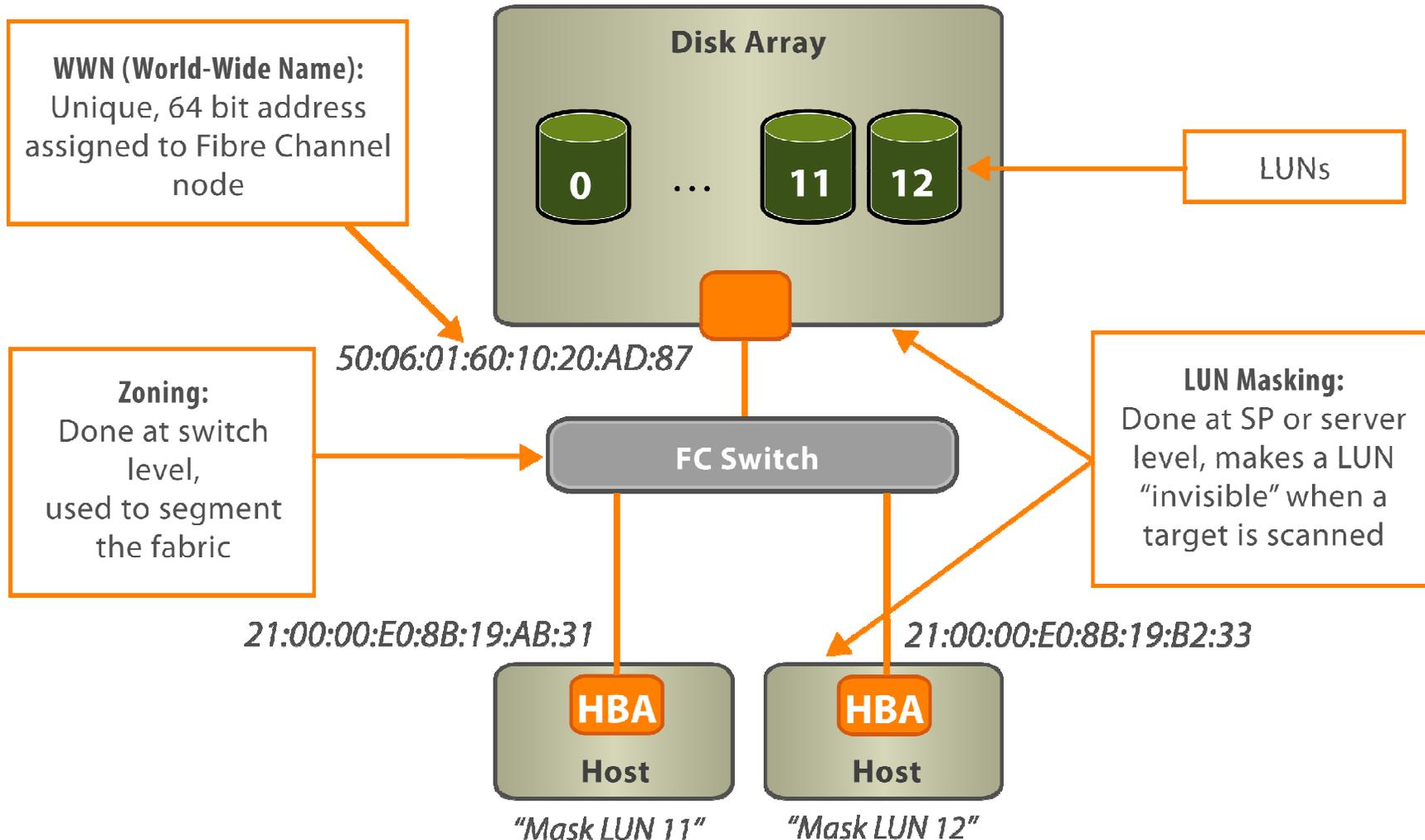
### ESX/ESXi supports:

- 8GB Fibre Channel
- Fibre Channel over Ethernet (FCoE)

# Fibre Channel SAN Components



# Fibre Channel Addressing and Access Control



## Accessing Fibre Channel Storage

- > Install Fibre Channel adapters.
- > During the boot sequence, the adapters are recognized by the ESX/ESXi host.

### Storage Adapters

Refresh

Rescan...

Device	Type	WWN
<b>ISP2432-based 4Gb Fibre Channel to PCI Express HBA</b>		
vmhba1	Fibre Channel	50:01:43:80:02:ae:b2:05 50:01:43:80:02:ae:b2:04
vmhba2	Fibre Channel	50:01:43:80:02:ae:b2:07 50:01:43:80:02:ae:b2:06

- > Clicking the **Rescan** link allows the ESX/ESXi host to rescan all host bus adapters for new storage devices.
  - An ESX/ESXi host supports up to 256 LUNs and 16 HBAs.

# Viewing Fibre Channel Storage Information

The Storage Views tab provides information about all SCSI adapters and NAS mounts.

View: Reports Maps

Show all SCSI Volumes (LUNs) ▾

- Show all Virtual Machines
- Show all Datastores
- Show all SCSI Volumes (LUNs)
- Show all SCSI Paths
- Show all SCSI Adapters
- Show all SCSI Targets (Array Ports)
- Show all NAS Mounts

Getting Started Summary Virtual Machines Performance Configuration Tasks & Events Alarms Permissions Maps Storage Views Hardware Status

Storage Views are generated periodically and may be out of date. To update to the most recent inventory, please click "Update...".

View: Reports Maps Last Update

Show all SCSI Volumes (LUNs) ▾ SCSCI ID, Canonical Name or Runtime Name c

SCSI ID	Canonical Name	Runtime Name	Lun	Status	Host status	Size	Volume Name	Vendor	Device type
0000000000766d6...	mpx.vmhba0:C0:T0:L0	vmhba0:C0:T0:L0	0	Up	Up	136.70 GB	Local VMware Disk (mpx.vmhba0:C0:T0:L...	VMware	Disk
020000000050060...	naa.50060160c1e0eb...	vmhba1:C0:T0:L0	0	Up	Up	0.00 B	DGC Fibre Channel Disk (naa.50060160c1...	DGC	Disk
020006000060060...	naa.60060160d2b020...	vmhba1:C0:T0:L6	6	Up	Up	10.00 GB	DGC Fibre Channel Disk (naa.60060160d2...	DGC	Disk
020015000060060...	naa.60060160d2b020...	vmhba1:C0:T0:L21	21	Up	Up	10.00 GB	DGC Fibre Channel Disk (naa.60060160d2...	DGC	Disk
020016000060060...	naa.60060160d2b020...	vmhba1:C0:T0:L22	22	Up	Up	10.00 GB	DGC Fibre Channel Disk (naa.60060160d2...	DGC	Disk
020019000060060...	naa.60060160d2b020...	vmhba1:C0:T0:L25	25	Up	Up	100.00 GB	DGC Fibre Channel Disk (naa.60060160d2...	DGC	Disk

# Viewing Fibre Channel Storage Maps

The screenshot displays the VMware vSphere Storage Views interface. The top navigation bar includes tabs for Getting Started, Summary, Virtual Machines, Performance, Configuration, Tasks & Events, Alarms, Permissions, Maps, Storage Views, and Hardware St. The 'Storage Views' tab is active, showing a Fibre Channel storage map. The map consists of various storage components connected to a central host. Callouts identify a 'Target' (a storage icon), a 'LUN' (a storage icon), and an 'HBA' (a network icon labeled 'vmhba1'). A 'Controls' panel on the right is highlighted with an orange border, containing a 'Show' section with checkboxes for Datacenter, Cluster, Host, Virtual Machine, **Datastore**, SCSI Volume (LUN), NAS Mount, SCSI Adapter, and SCSI Target (Array Port). Below the 'Show' section is an 'Update View' button and a 'Zoom' section with a small thumbnail of the storage map and the text 'Use CTRL+Click to select multiple ...'. The 'View:' dropdown is set to 'Maps', and the 'Last Update Time' is 2/23/2009 11:56:25 PM.

## Lesson Summary

- Fibre Channel storage devices can be used to hold VMFS datastores or raw data.
- Clicking the Rescan link allows the ESX/ESXi host to rescan all HBAs for new storage devices.
- Fibre Channel storage information is available from the reports provided in the Storage Views tab.



# Lesson 3: iSCSI Storage

## Lesson Objectives

- Describe uses of iSCSI storage with ESX/ESXi
- Describe iSCSI components and addressing
- Configure iSCSI initiators
- View iSCSI storage information

## Using iSCSI with ESX/ESXi

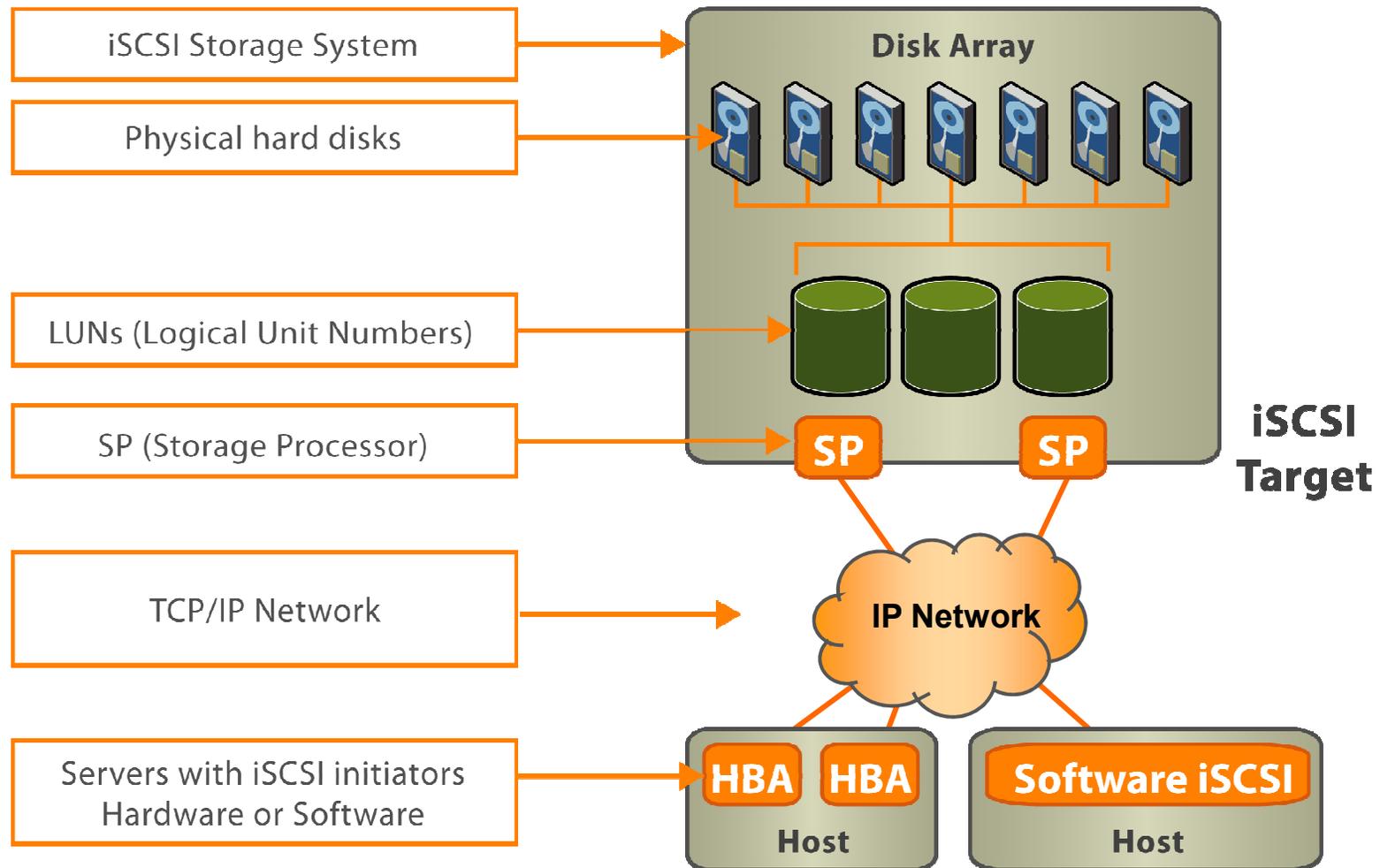
### Uses of iSCSI SAN LUNs:

- VMFS datastores to hold virtual machines, ISO images, and templates
- RDMs to hold a virtual machine's raw data
- Supports vSphere features such as VMotion, VMware HA, and DRS
- To boot ESX from a SAN LUN (hardware initiator only)

### ESX/ESXi supports:

- iSCSI over a 10GbE interface

# iSCSI Components



# iSCSI Addressing

***iSCSI target name:***

***iqn.1992-08.com.netapp:stor1-37bf2c23 or  
eui.fedcba9876543210***

***iSCSI alias: stor1***

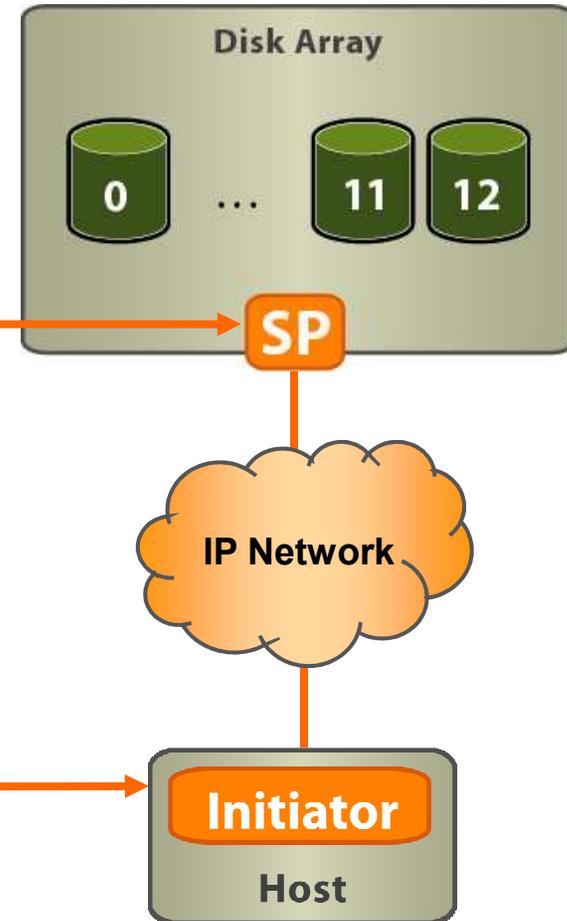
***IP address: 192.168.36.101***

***iSCSI initiator name:***

***iqn.1998-01.com.vmware:train1-64ad4c29 or  
eui.1234567890abcdef***

***iSCSI alias: train1***

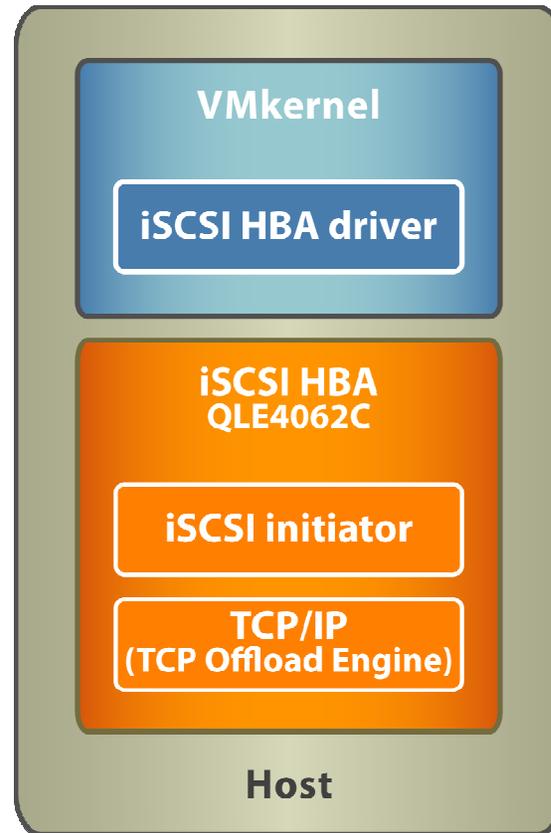
***IP address: 192.168.36.88***



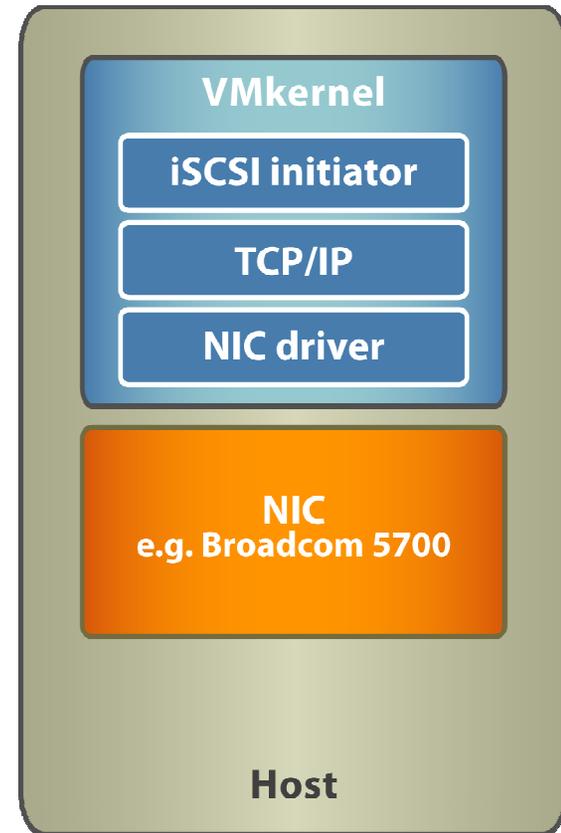
## iSCSI Initiators

ESX/ESXi hosts use iSCSI initiators to access remote targets.

- > **Hardware initiator:**  
An iSCSI HBA responsible for all iSCSI processing and management
- > **Software initiator:**  
Code built into the VMkernel that allows ESX/ESXi to connect to the iSCSI storage device



**Hardware Initiator**



**Software Initiator**

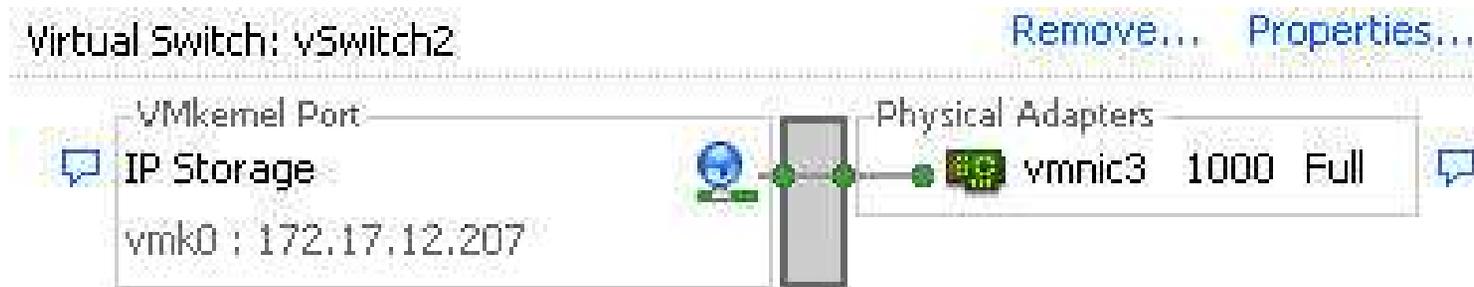
## Steps to Configure Software iSCSI

### To configure the iSCSI software initiator:

1. Configure a VMkernel port for accessing IP storage.
2. Enable the iSCSI software adapter.
3. Configure iSCSI target addresses.
4. Configure iSCSI security (CHAP).

## Configuring Network for Software iSCSI

Create a VMkernel port on a vSwitch for access to IP storage (for example, iSCSI and NFS).

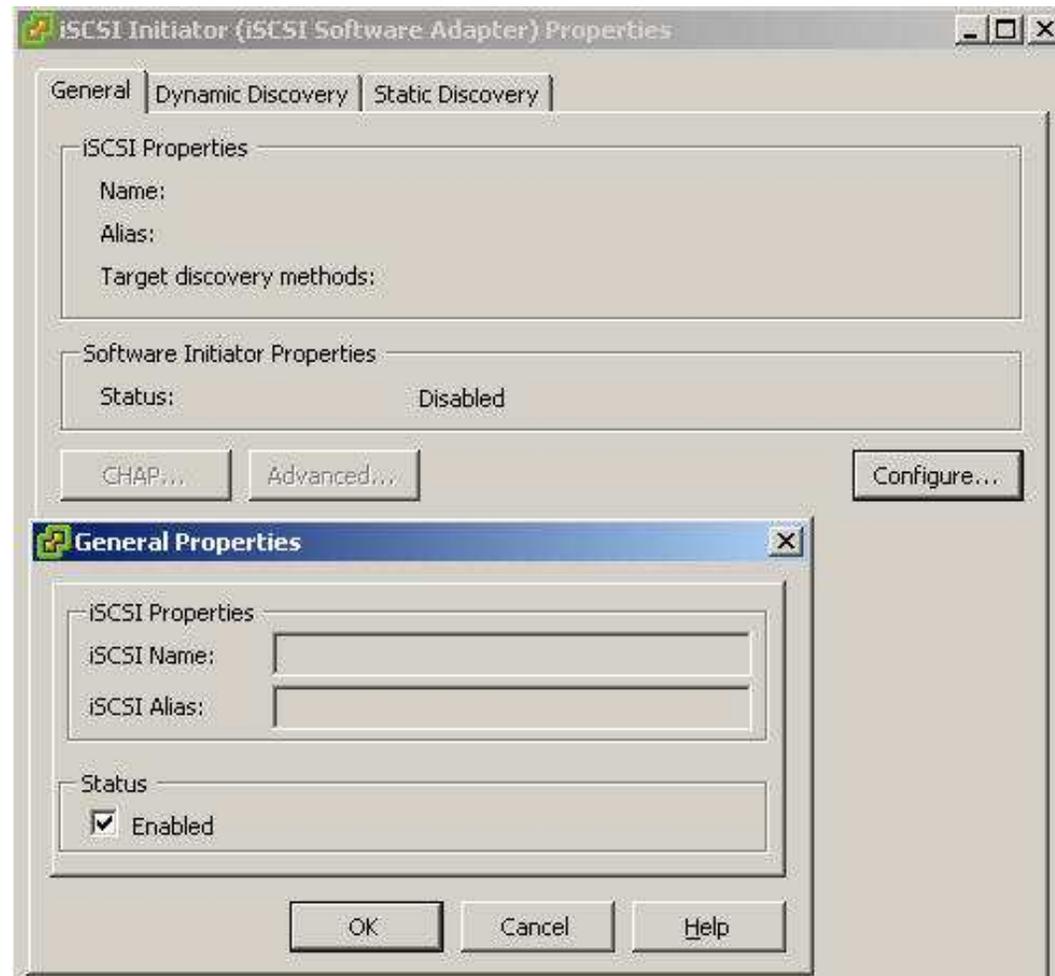


**To optimize your vSphere networking setup:**

- Separate network services like iSCSI and NFS access.
  - Physical separation is preferred.
  - If not possible, use VLANs.

## Enabling the iSCSI Software Adapter

In the Storage Adapters link of the ESX/ESXi host's Configuration tab, click Properties.



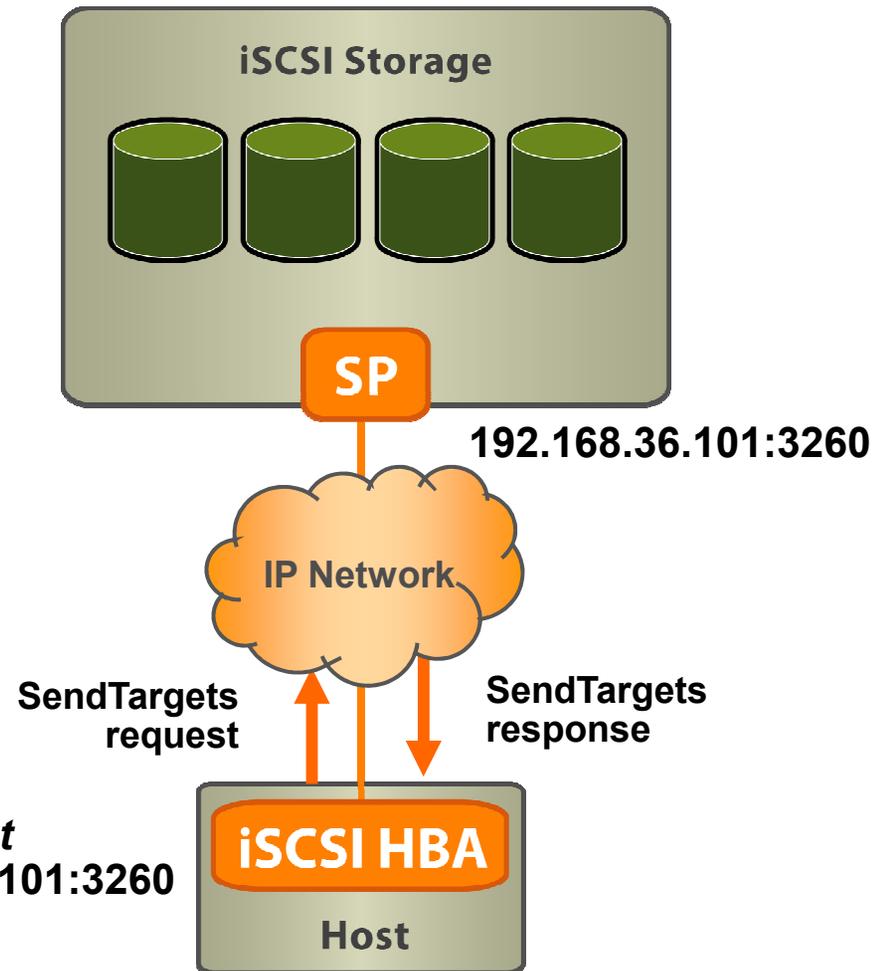
## iSCSI Target-Discovery Methods

Two discovery methods are supported:

- > Dynamic (also known as SendTargets)
- > Static

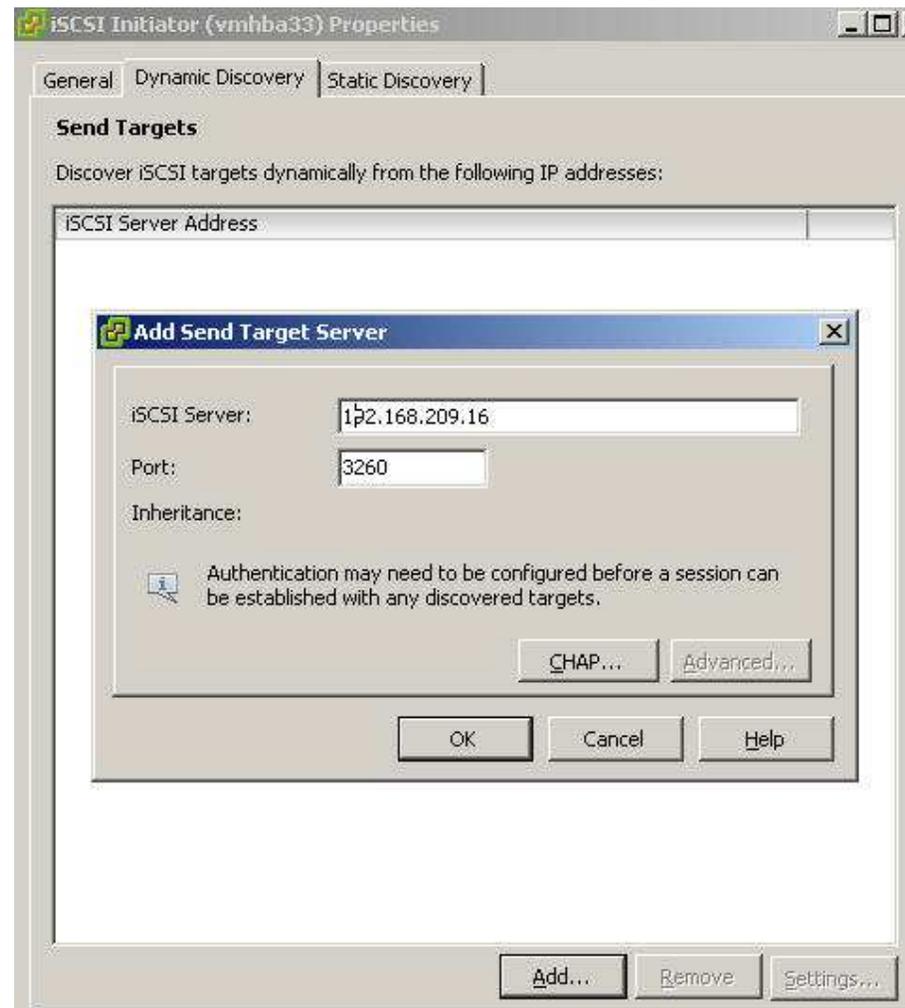
SendTargets response returns IQN and all available IP addresses.

*iSCSI target*  
192.168.36.101:3260



## Configuring iSCSI Target Addresses

**In the Dynamic Discovery tab, enter the IP address or DNS name of each target server for which the initiator establishes a discovery session.**



## iSCSI Security: CHAP

**iSCSI initiators can use Challenge Handshake Authentication Protocol (CHAP) for authentication purposes.**

**ESX/ESXi supports unidirectional and bidirectional CHAP authentication.**

- Unidirectional – Target authenticates initiator, but initiator does not authenticate target.
- Bidirectional (or mutual) – Target authenticates initiator, and initiator authenticates target.

**ESX/ESXi also supports per-target CHAP authentication.**

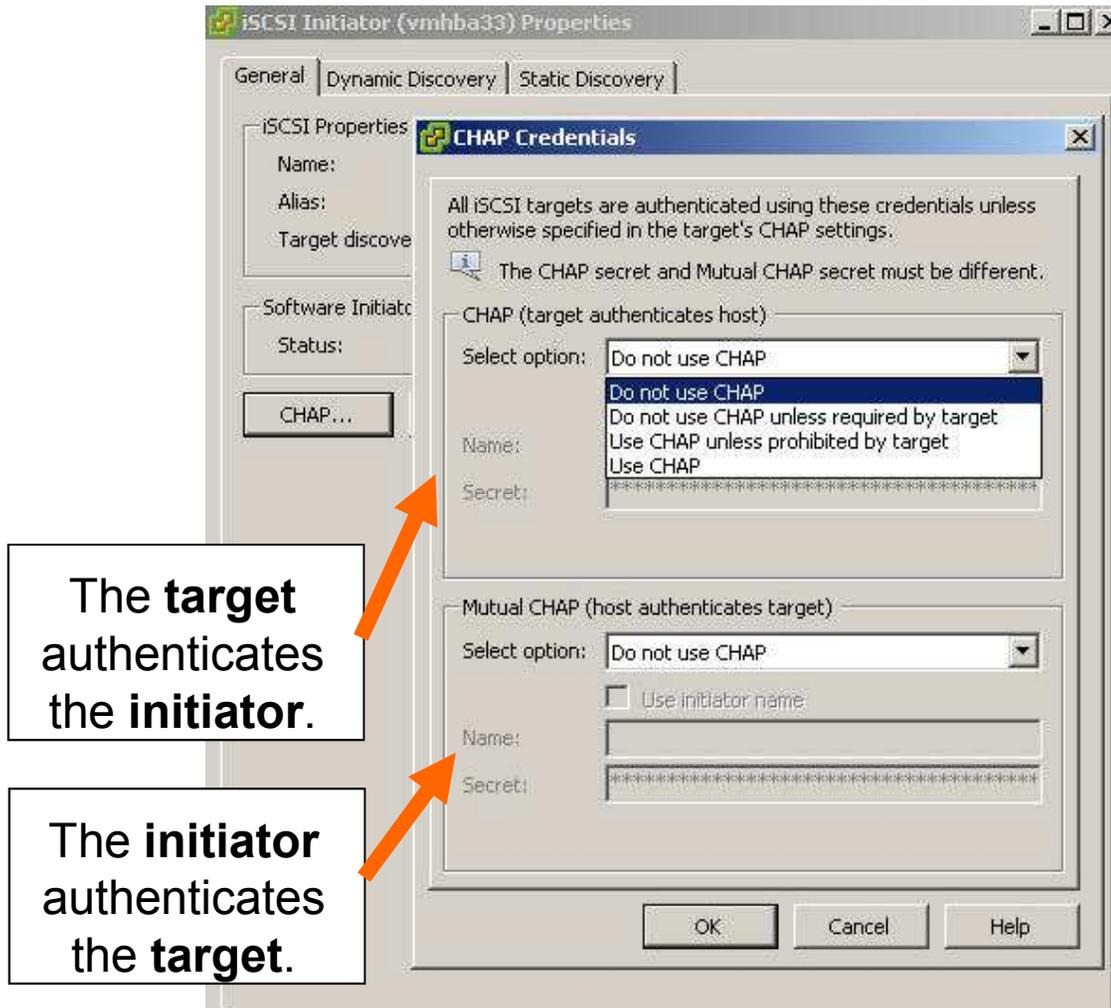
- This enables you to configure different credentials for each target.

## Configuring iSCSI Security: CHAP

By default, CHAP is not configured.

### CHAP options:

- > Do not use CHAP
- > Do not use CHAP unless required by target
- > Use CHAP unless prohibited by target
- > Use CHAP



## Steps to Configure Hardware iSCSI

### To configure the iSCSI hardware initiator:

1. Install the iSCSI hardware adapter.
2. Modify iSCSI name and configure iSCSI alias.
3. Configure iSCSI target addresses.
4. Configure iSCSI security (CHAP).

# Viewing iSCSI Information

Storage link in the Configuration tab

**View:** Datstores Devices

**Datstores**

Identification	Status	Device	Capacity	Free	Type	Last Update
Local06	✓ Normal	Local VMware Disk...	136.25 GB	122.08 GB	vmfs3	2/1/2009 11:06:15 AM
SharedVMs	✓ Normal	DGC Fibre Channel...	99.75 GB	79.35 GB	vmfs3	2/1/2009 11:06:15 AM
iSCSILUN	✓ Normal	IET iSCSI Disk (t...	1.75 GB	1.47 GB	vmfs3	2/1/2009 11:06:15 AM

Storage Adapters link in the Configuration tab

**Storage Adapters**

Device	Type	WWN
<b>iSCSI Software Adapter</b>		
vmhba33	iSCSI	iqn.1998-01.com.vmware:sc-rat01-5f7f8b6f

**Details**

**vmhba33** [Properties...](#)

Model: iSCSI Software Adapter  
 iSCSI Name: iqn.1998-01.com.vmware:sc-rat01-5f7f8b6f  
 iSCSI Alias:  
 Connected Targets: 1      Devices: 1      Paths: 1

**View:** Devices Paths

Name	Runtime Name	LUN	Type	Transport	Capacity	Owner
IET iSCSI Disk (t10.945445000000...	vmhba33:C0:T0:L1	1	disk	iSCSI	2.00 GB	NMP

## Lab 6

**In this lab, you will configure access to an iSCSI datastore.**

1. Create a VMkernel port on the standard switch, vSwitch0.
2. Configure the iSCSI software adapter.
3. View iSCSI storage information.

## Lesson Summary

- ESX/ESXi hosts support both hardware initiators and software initiators.
- For the iSCSI software initiator, a VMkernel port on a distributed switch or standard switch must be configured.
- iSCSI security is achieved by isolating the iSCSI network from other networks as well as by configuring CHAP.



# Lesson 4: VMFS Datastores

## Lesson Objectives

- > Create a VMFS datastore
- > Grow a VMFS datastore
  - Using Volume Grow
  - Using Extent Grow
- > Delete a VMFS datastore

## Using a VMFS with ESX/ESXi

### Use VMFS datastores whenever possible:

- VMFS is optimized for storing and accessing large files.
- A VMFS can have a maximum volume size of 64TB.
- NFS datastores are great for storing virtual machines. However, some functions are not supported.
- Use RDMS if your virtual machine
  - Is performing SAN snapshotting
  - Is clustered to a physical machine using Microsoft Cluster Service (MSCS)
  - Has large amounts of data that you do not want to convert into a virtual disk

## Creating a VMFS

To create a VMFS, use the Add Storage wizard.



**Select LUN.**

**Specify datastore name.**

**Specify datastore size – use full or partial LUN**

## Viewing VMFS Datastores

### Storage link in the Configuration tab

**View:**

**Datastores**

Identification	Status	Device	Capacity	Free	Type	Last Update
 nfs_iso_library...	 Normal	nfs-goose-a:/iso	5.77 GB	2.43 GB	NFS	1/29/2009 10:05:36 AM
 Local06	 Normal	Local VMware Disk ...	136.25 G	124.08 G	vmfs3	1/29/2009 10:05:36 AM
 SharedVMs	 Normal	DGC Fibre Channel ...	99.75 GB	78.85 GB	vmfs3	1/29/2009 10:05:36 AM

### Storage Views tab

**View:**

Show all Datastores ▾

Datastore	File system type	Connectivity Status	Multipathing Status	Capacity	Free Space
nfs_iso_library		Up		5.77 GB	2.43 GB
SharedTMPLs (2)		Up	Partial/No Redundancy	35.75 GB	15.77 GB
Local06		Up	Partial/No Redundancy	136.25 GB	124.08 GB

## Browsing Datastore Contents

Right-click the datastore in either the host's Summary tab or the Storage link in the Configuration tab.

### Datastores

Identification	Status	Device
nfs_iso_library...	Normal	nfs-goose-a;/iso
Local06	Normal	Local VMware Di...
SharedV...		

**Datastore Browser - [Local06]**

Folders | Search | [Local06] /

Name	Size	Type	Path
esxconsole-4978234c...		Folder	[Local06] esxconsole-4978234c-cda...
Greg06-1		Folder	[Local06] Greg06-1
GregTemplate		Folder	[Local06] GregTemplate
SampleVM06		Folder	[Local06] SampleVM06

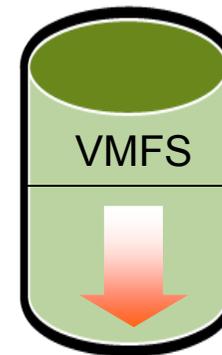
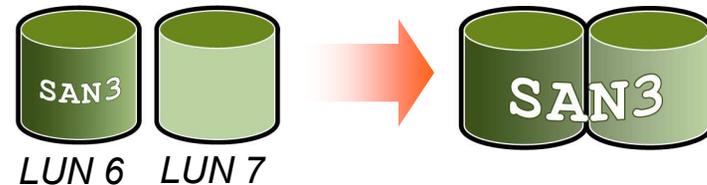
## Growing a VMFS

**Grow a VMFS to give it more space or possibly to improve performance.**

**Two ways to grow a VMFS:**

- **Add an extent to the VMFS –**  
This feature allows you to dynamically add a new extent to a VMFS.
- **Grow the datastore –**  
This feature allows you to dynamically expand a VMFS on the volume partition on which it is located.

*Add an extent to the existing VMFS.*



*Grow the datastore on the existing extent.*

**You can grow but you cannot shrink a VMFS datastore.**

## Comparing Methods for Growing a VMFS

	Growing the datastore	Adding extents to the datastore
<b>VM power state</b>	<b>On</b>	<b>On</b>
<b>Newly provisioned LUN</b>	<b>No</b>	<b>Yes</b>
<b>Existing array-expanded LUN</b>	<b>Yes</b>	<b>Yes</b>
<b>Limits</b>	<b>An extent can be grown any number of times, up to 2TB.</b>	<b>A datastore can have up to 32 extents, each up to 2TB.</b>
<b>New partition</b>	<b>No</b>	<b>Yes</b>
<b>VM availability impact</b>	<b>None, if datastore has only one extent.</b>	<b>Introduces dependency on first extent.</b>

## Before Growing a VMFS

**In general, before making any changes to your storage allocation:**

- Perform a rescan to ensure that your host sees the most current storage.
- Quiesce I/O on all disks involved.
- Note the unique identifier of the volume that you want to grow.

## Growing the VMFS Within the LUN

To grow a VMFS within a LUN, click Properties.

Click Increase to launch the Increase Datastore Capacity wizard.



The selected LUN already contains a datastore, but is also expandable.



# Growing the VMFS: View Disk Layout

View the current disk layout.

This LUN has a capacity of 10GB, 5GB of which is available.

**Increase Datastore Capacity**

**Current Disk Layout**  
You can either expand an existing extent or partition and format a single block of free space as a new extent.

**Extent Device**  
**Current Disk Layout**  
Extent Size  
Ready to Complete

Review the current disk layout:

Device	Capacity	Available	LUN
DGC Fibre Channel Disk (naa.60060160d...)	10.00 GB	5.00 GB	21

Location  
/vmfs/devices/disks/naa.60060160d2b02000f24f097ad6b1dd11

**Primary Partitions**

	Capacity
✓ VMFS (DGC Fibre Channel Disk (naa.600601...))	4.99 GB
✓ Free space	5.00 GB

## Growing the VMFS: Specify Capacity

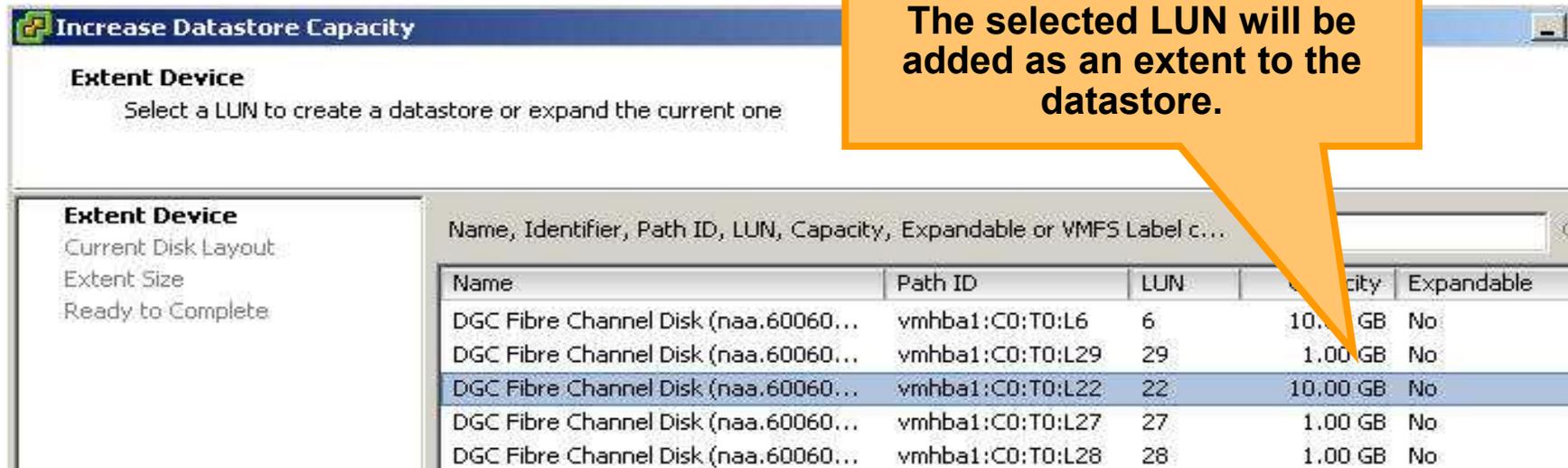
Select maximize capacity to use all remaining free space, or grow the VMFS by a specific size.



The VMFS Properties dialog box shows the new size.

## Adding an Extent: Select LUN

To add an extent to an existing VMFS, click Properties.  
Click Increase to launch the Increase Datastore Capacity wizard.



**Increase Datastore Capacity**

**Extent Device**  
Select a LUN to create a datastore or expand the current one

**Extent Device**  
Current Disk Layout  
Extent Size  
Ready to Complete

Name	Path ID	LUN	Capacity	Expandable
DGC Fibre Channel Disk (naa.60060...)	vmhba1:C0:T0:L6	6	10.00 GB	No
DGC Fibre Channel Disk (naa.60060...)	vmhba1:C0:T0:L29	29	1.00 GB	No
DGC Fibre Channel Disk (naa.60060...)	vmhba1:C0:T0:L22	22	10.00 GB	No
DGC Fibre Channel Disk (naa.60060...)	vmhba1:C0:T0:L27	27	1.00 GB	No
DGC Fibre Channel Disk (naa.60060...)	vmhba1:C0:T0:L28	28	1.00 GB	No

## Deleting a VMFS

Use the Storage link in the Configuration tab to delete the VMFS.

Deleting a VMFS permanently deletes all the files associated with the virtual machines on the datastore.

View: Datastores Devices

**Datastores** Refresh Delete

Identification	Status	Device	Capacity	Free	Type	Last Update
 Local06	 Normal	Local VMware Disk ...	136.25 G	124.08 G	vmfs3	1/29/2009 11:05:39 AM



## Lab 7

**In this lab, you will work with VMFS datastores.**

1. Display information about your shared storage.
2. View information about existing VMFS datastores.
3. Change the name of your local datastore.
4. Create a VMFS datastore.
5. Grow an existing VMFS datastore.
6. Add an extent to a VMFS datastore.
7. Remove an extent by removing the entire VMFS datastore.
8. Recreate the VMFS datastore, without the additional extent.

**Learn from your instructor which LUNs contain VMFS datastores that should not be removed or reformatted.**

## Lesson Summary

- Create a VMFS datastore on locally attached storage, a Fibre Channel SAN LUN, or an iSCSI LUN.
- One way to grow a VMFS is to increase its size in the existing LUN.
- Another way to grow a VMFS is to add an extent to the VMFS.
- When you delete a VMFS datastore, all data is destroyed on the datastore.



# Lesson 5: NAS/NFS Datastores

## Lesson Objectives

- Describe NFS components and addressing
- Create an NFS datastore
- View the contents of a datastore
- Unmount an NFS datastore

## Using NAS/NFS with ESX/ESXi

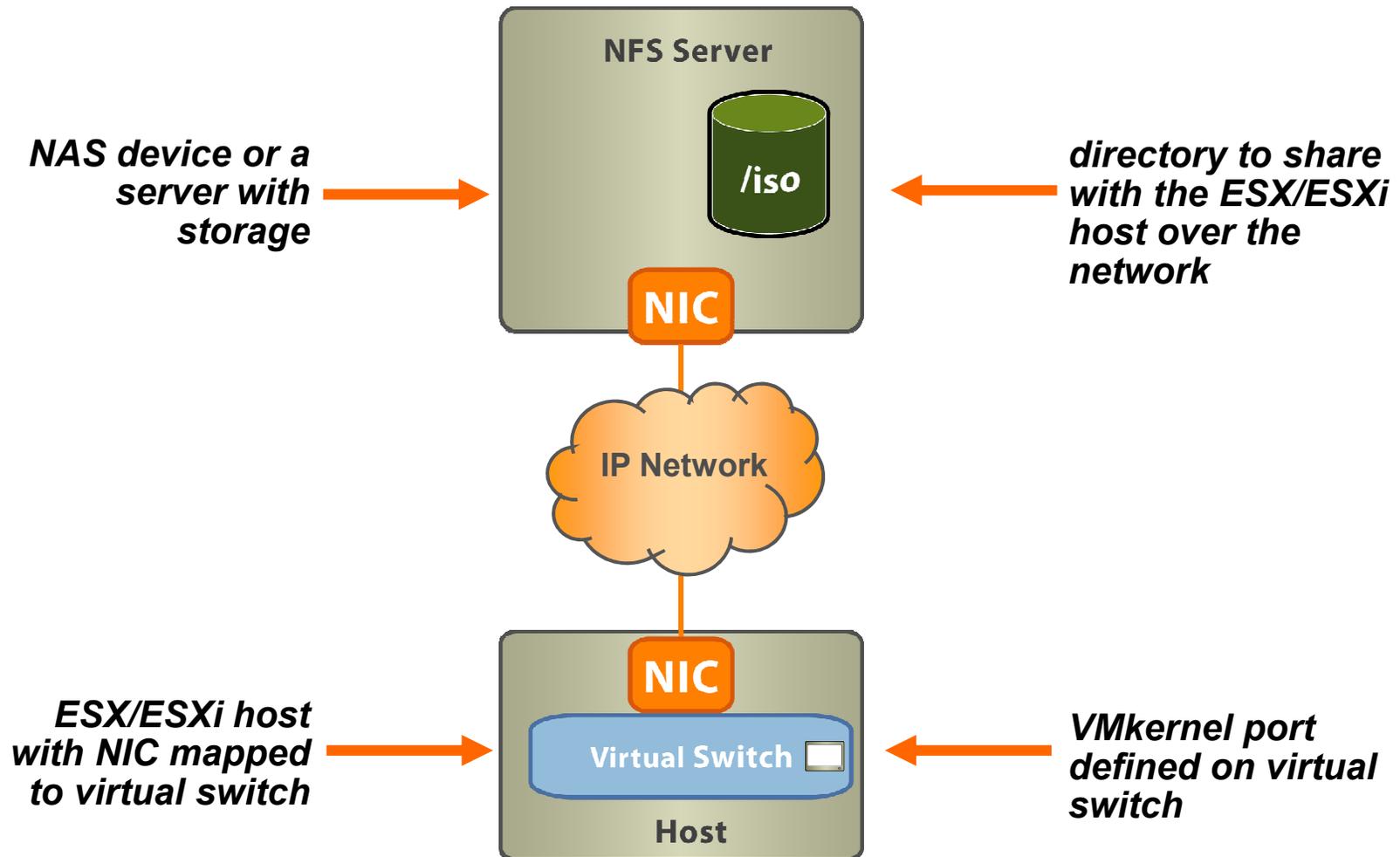
### **NAS/NFS storage:**

- Is used to hold virtual machines, ISO images, and templates
- Supports vSphere features like VMotion, VMware HA, and DRS

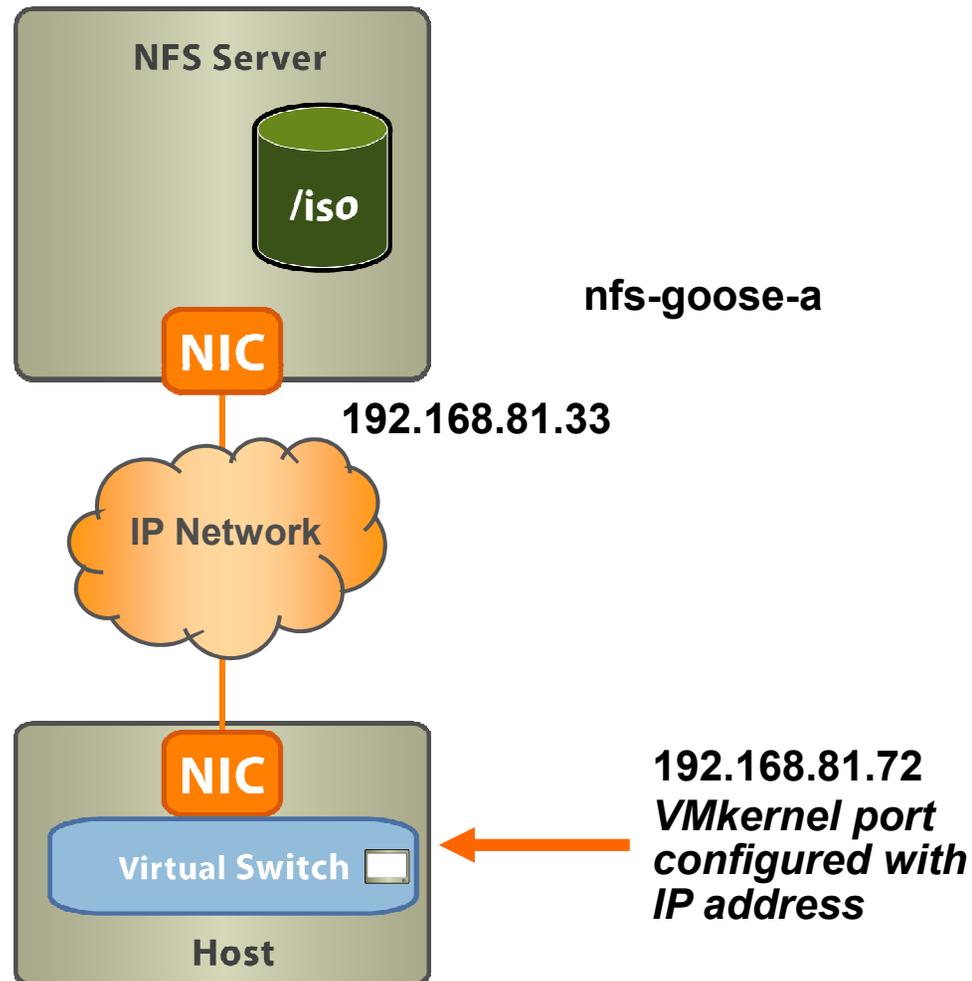
### **ESX/ESXi supports:**

- Up to 64 NFS volumes
- NFS over a 10GbE interface
- NFS in an IPv6 environment

# NFS Components



## Addressing and Access Control with NFS



## Configuring Networking for NFS Access

**Create a VMkernel port on a vSwitch for access to IP storage (for example, iSCSI and NFS).**



**To optimize your vSphere networking setup:**

- Separate network services like iSCSI and NFS access.
  - Physical separation is preferred.
  - If not possible, use VLANs.

## Creating an NFS Datastore

In the Add Storage wizard, enter the following information:

**Add Storage**

**Locate Network File System**  
Which shared folder will be used as a VMware datastore?

**NAS**  
**Network File System**  
Ready to Complete

**Properties**

Server:   
Examples: nas, nas.it.com, 192.168.0.1 or FE80:0:0:0:2AA:FF:FE9A:4CA2

Folder:   
Example: /vols/vol0/datastore-001

Mount NFS read only

**Datastore Name**

- > IP address or host name of NFS server
- > The shared folder on the NFS server
- > Whether to mount NFS read-only
- > The name of the datastore

## Viewing NFS Datastore: Storage Tab

The NFS volume is displayed in the Datastores pane of the Configuration tab.

Browse the NFS datastore to display its contents.

View: **Datastores** Devices

### Datastores

Identification	Status	Device	Capacity	Free	Type	Last Update
 SAN	 Alert	DGC Fibre Channel...	79.75 GB	3.84 GB	vmfs3	4/29/2009 8:41:10 PM
 SharedVMs	 Normal	DGC Fibre Channel...	99.75 GB	91.42 GB	vmfs3	4/29/2009 8:41:10 PM
 Storage1	 Normal	Local VMware Disk...	67.00 GB	49.77 GB	vmfs3	4/29/2009 8:41:10 PM
 NFS_Library (read only)	 Normal	sc9-nas-a:/nfs4/C...	1,008.38 G	629.75 GB	NFS	4/29/2009 8:41:10 PM
 iSCSILUN	 Normal		4.75 GB	1.47 GB	vmfs3	4/29/2009 8:41:10 PM
 Private04	 Normal		4.75 GB	4.45 GB	vmfs3	4/29/2009 8:41:10 PM

### Datastore Details

#### NFS\_Library (Readonly)

Server: sc9-nas-a

- Browse Datastore...
- Alarm
- Rename
- Unmount
- Refresh
- Copy to Clipboard Ctrl+C

Capacity



## Viewing NFS Datastore: Storage Views Tab

The Datastores inventory view includes NFS volumes.

The Storage Views tab shows information about all NAS mounts (NFS datastores):

- NFS server, shared folder, datastore type, and datastore name



The screenshot shows the VMware vSphere interface for the 'NFS\_Library' datastore. The left sidebar shows a tree view with 'Training' expanded, containing 'ISCSILUN', 'NFS\_Library', and 'Private04'. The main pane has a navigation bar with tabs: 'Getting Started', 'Summary', 'Virtual Machines', 'Hosts', 'Performance', 'Configuration', 'Tasks & Events', 'Alarms', 'Permissions', and 'Storage Views'. Below the navigation bar, there are 'View:' buttons for 'Reports' and 'Maps'. A dropdown menu shows 'Show all NAS Mounts'. Below this is a table with the following data:

Remote Host	Remote Path	User name	Type	Datastore
sc9-nas-a	/nfs4/Classes/vSICM40A		NFS	<a href="#">NFS_Library</a>

## Unmounting an NFS Datastore

Use the Storage link in the Configuration tab to unmount an NFS datastore.

Unmounting an NFS datastore makes the files in the shared folder inaccessible to the host.

View: **Datastores** Devices

### Datastores

Refresh **Delete**

Identification	Status	Device	Capacity	Free	Type	Last Update
 SharedVMs	 Normal	DGC Fibre Channel...	99.75 GB	91.42 GB	vmfs3	4/29/2009 9:00:20 PM
 Storage1	 Normal	Local VMware Disk...	67.00 GB	49.77 GB	vmfs3	4/29/2009 9:00:20 PM
 NFS_Library (read only)	 Normal	sc9-nas-a:/nfs4/C...	1,008.38 G	629.75 GB	NFS	4/29/2009 9:00:20 PM
 iSCSILUN	 Normal	IET iSCSI Disk (t...	1.75 GB	1.47 GB	vmfs3	4/29/2009 9:00:20 PM
 Private04	 Normal	DGC Fibre Channel...	4.75 GB	4.45 GB	vmfs3	4/29/2009 9:00:20 PM

### Confirm remove datastore



The files on this datastore will be inaccessible once it is unmounted. Virtual machines that depend on these files will not be able to power on. Are you sure you want to unmount this datastore?

Yes

No

## Lab 8

**In this lab, you will configure access to an NFS datastore.**

1. Verify that a VMkernel port exists for NFS access.
2. Create an NFS datastore and view its contents.

## Lesson Summary

- When you create an NFS datastore, you must specify the NFS server host name and the shared folder on the NFS server.
- The VMware vSphere Client allows you to browse the contents of a VMFS or NFS datastore.
- When you unmount an NFS datastore, all files in the shared folder are inaccessible to the ESX/ESXi host.

## Key Points

- Whenever possible, use VMFS datastores to hold virtual machines' files.
- NFS datastores make a great repository for ISO images.
- Shared storage is integral to vSphere features like VMware HA, DRS, and VMotion.