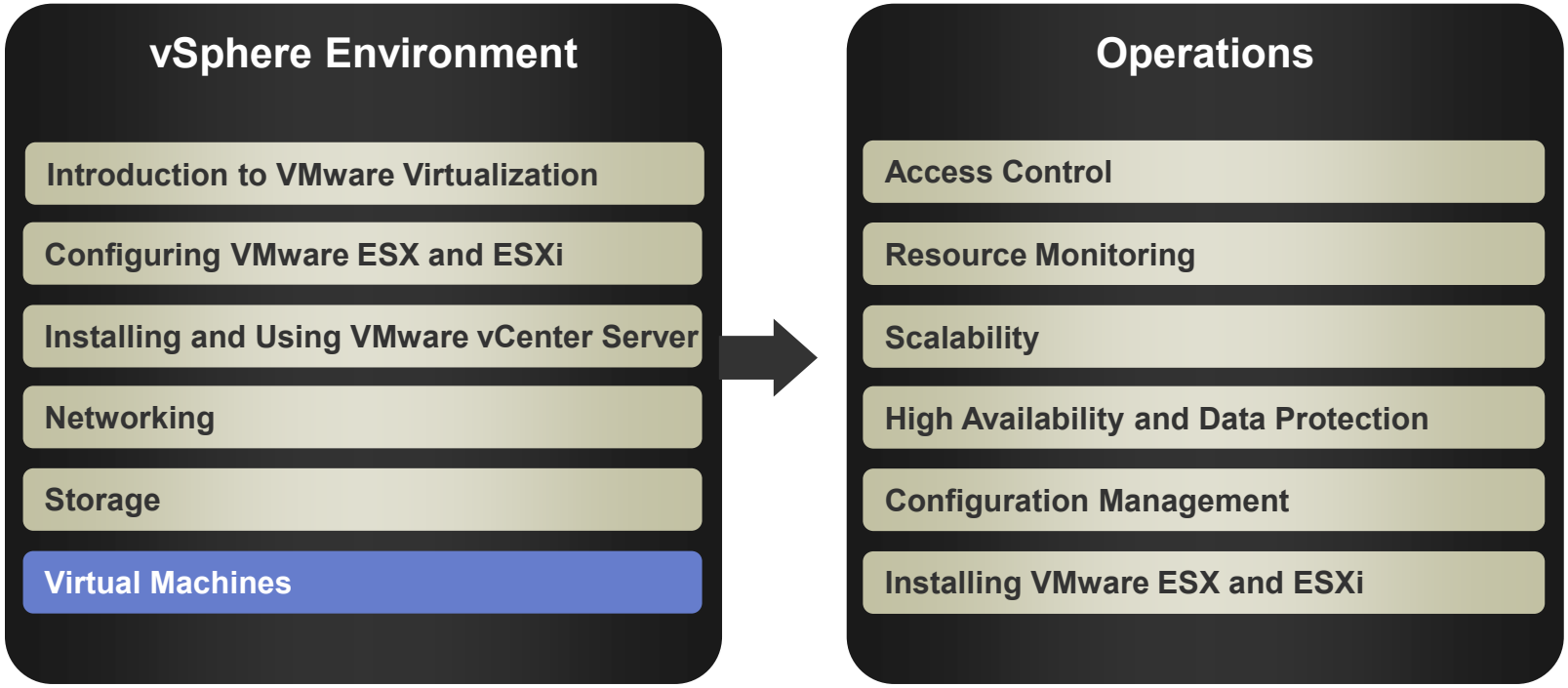
Virtual Machines

Module 7

You Are Here



Importance

- There are a number of ways to create a virtual machine. Choosing the correct method can help you save time and make the deployment process manageable and scalable.

Module Lessons

Lesson 1: Virtual Machine Concepts

Lesson 2: Creating a Virtual Machine

Lesson 3: Creating Templates and Clones

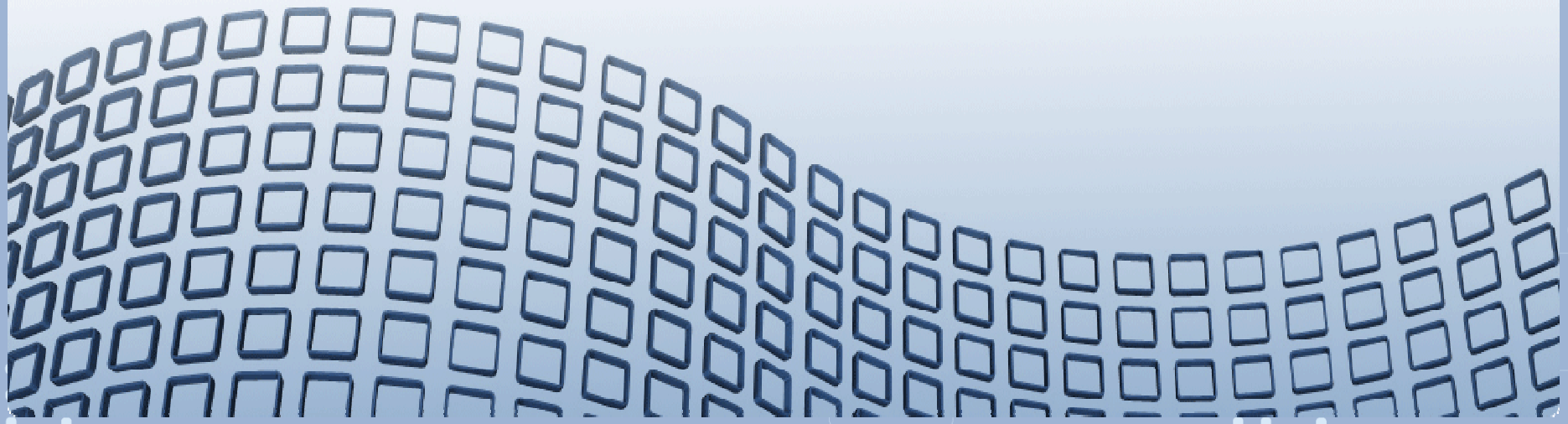
Lesson 4: VMware vCenter Converter

Lesson 5: vCenter Guided Consolidation

Lesson 6: Modifying Virtual Machines

Lesson 7: Managing Virtual Machines

Lesson 1:
Virtual Machine Concepts

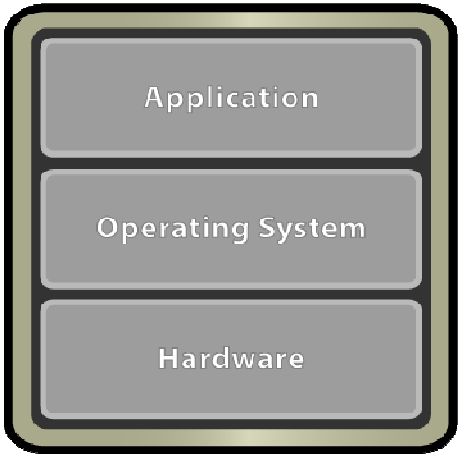


Lesson Objectives

- Describe a virtual machine
- List the virtual machine hardware
- Display a virtual machine's files

What Is a Virtual Machine?

- It is a set of virtual hardware on which a supported guest operating system and its applications run.
- It is a set of discrete files.
- A virtual machine's configuration file describes the virtual machine's configuration, including its virtual hardware.
  - Avoid using special characters and spaces in the virtual machine's name.



Virtual Machine

MyVM.vmx

```
guestOS = "winnetstandard"
displayName = "MyVM"
(etc.)
```

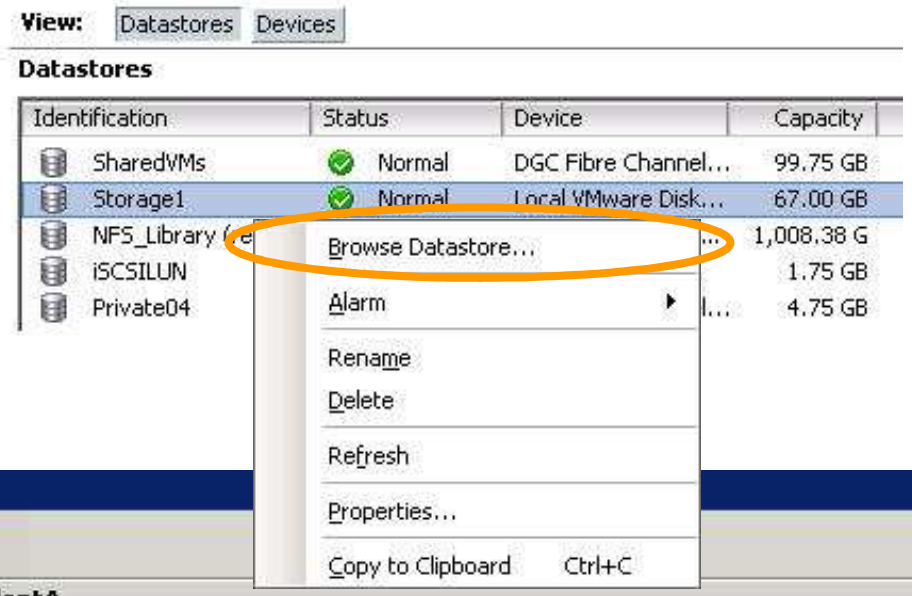
What Files Make Up a Virtual Machine?

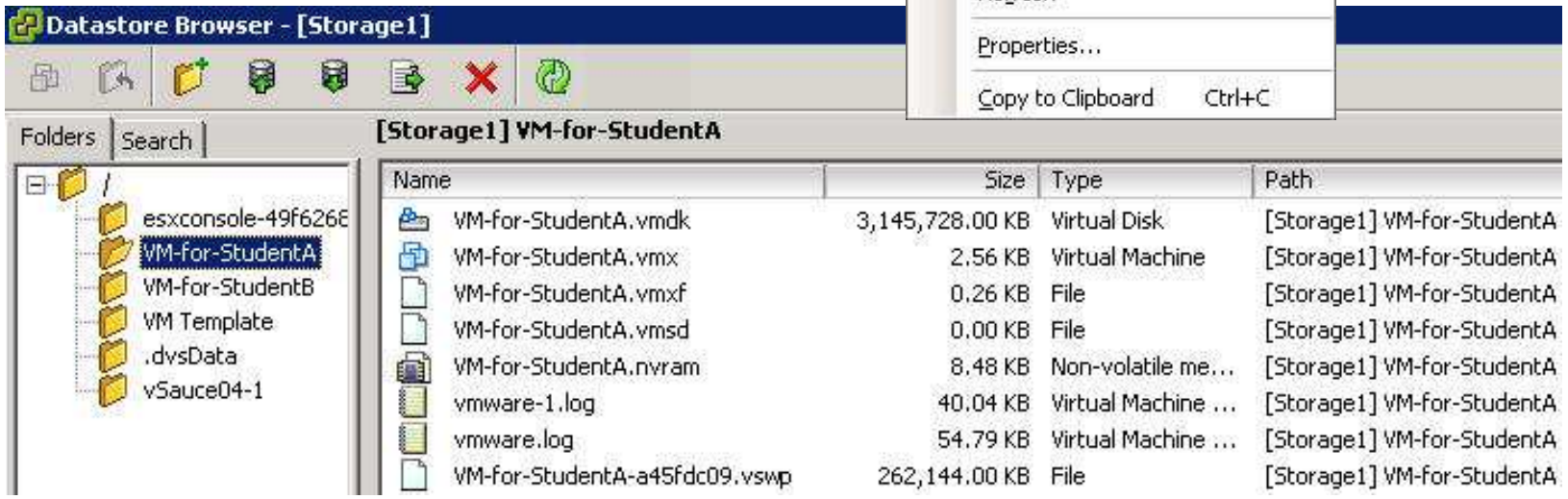
File name	Description
<VM_name>.vmx	**Virtual machine configuration file**
<VM_name>.vmdk	**File describing virtual disk characteristics**
<VM_name>-flat.vmdk	**Preallocated virtual disk file that contains the data**
<VM_name>.nvram	**Virtual machine BIOS**
vmware.log	**Virtual machine log file**
vmware-#.log *(where # is number starting with 1)*	**Files containing old virtual machine log entries**
<VM_name>.vswp	**Virtual machine swap file**
<VM_name>.vmsd	**File that describes virtual machine's snapshots**
Additional files can exist if snapshots are taken or raw disk mappings are added (to be discussed later).	

Displaying a Virtual Machine's Files

Click the Storage **link in the** Configuration **tab.**

Right-click a datastore to browse its files.

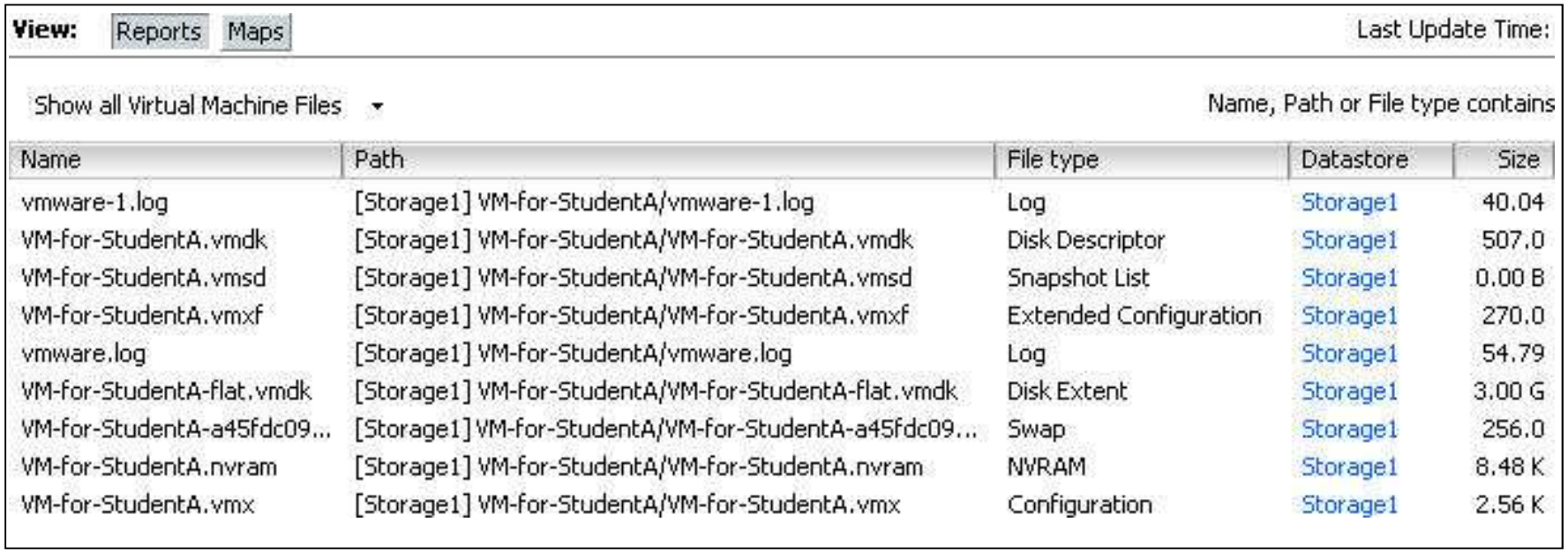




Displaying Files Using the Storage Views Tab

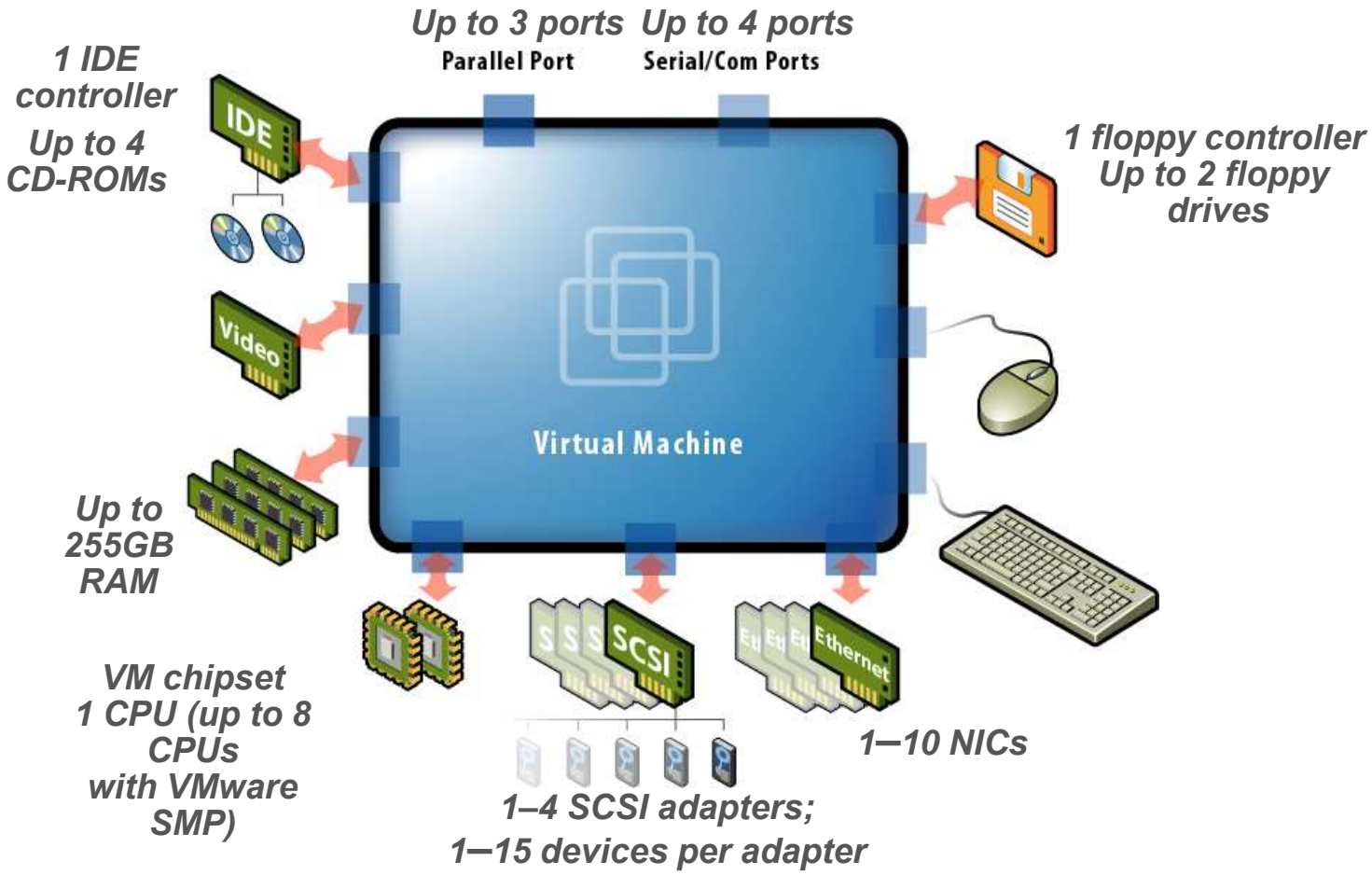
Click the Storage Views **tab.**

Select Show All Virtual Machine Files **from the menu.**



Name	Path	File type	Datastore	Size
vmware-1.log	[Storage1] VM-for-StudentA/vmware-1.log	Log	Storage1	40.04
VM-for-StudentA.vmdk	[Storage1] VM-for-StudentA/VM-for-StudentA.vmdk	Disk Descriptor	Storage1	507.0
VM-for-StudentA.vmsd	[Storage1] VM-for-StudentA/VM-for-StudentA.vmsd	Snapshot List	Storage1	0.00 B
VM-for-StudentA.vmxf	[Storage1] VM-for-StudentA/VM-for-StudentA.vmxf	Extended Configuration	Storage1	270.0
vmware.log	[Storage1] VM-for-StudentA/vmware.log	Log	Storage1	54.79
VM-for-StudentA-flat.vmdk	[Storage1] VM-for-StudentA/VM-for-StudentA-flat.vmdk	Disk Extent	Storage1	3.00 G
VM-for-StudentA-a45fdc09...	[Storage1] VM-for-StudentA/VM-for-StudentA-a45fdc09...	Swap	Storage1	256.0
VM-for-StudentA.nvram	[Storage1] VM-for-StudentA/VM-for-StudentA.nvram	NVRAM	Storage1	8.48 K
VM-for-StudentA.vmx	[Storage1] VM-for-StudentA/VM-for-StudentA.vmx	Configuration	Storage1	2.56 K

Virtual Machine Hardware



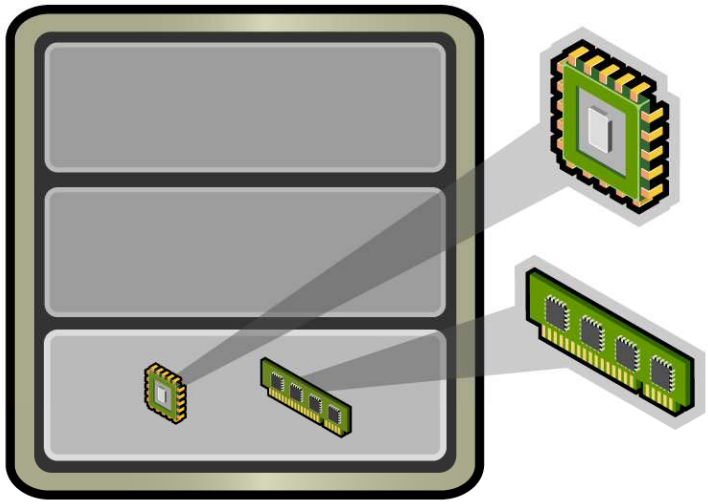
CPU and Memory

Up to eight virtual CPUs (VCPUs)

- Virtual SMP license required
- Also depends on number of licensed CPUs on a host and the number of processors supported by a guest operating system

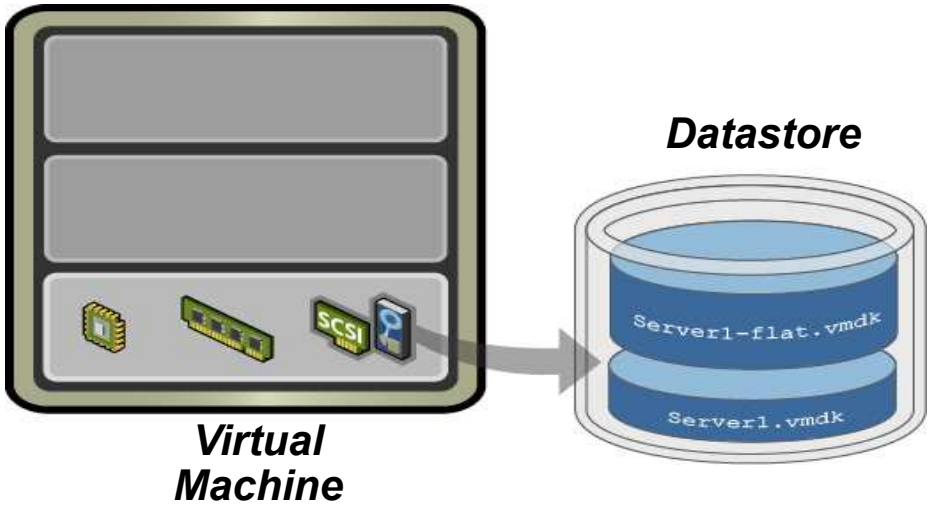
Maximum memory size (up to 255GB)

- Amount the guest operating system will be told it has



Virtual Machine

Virtual Disk

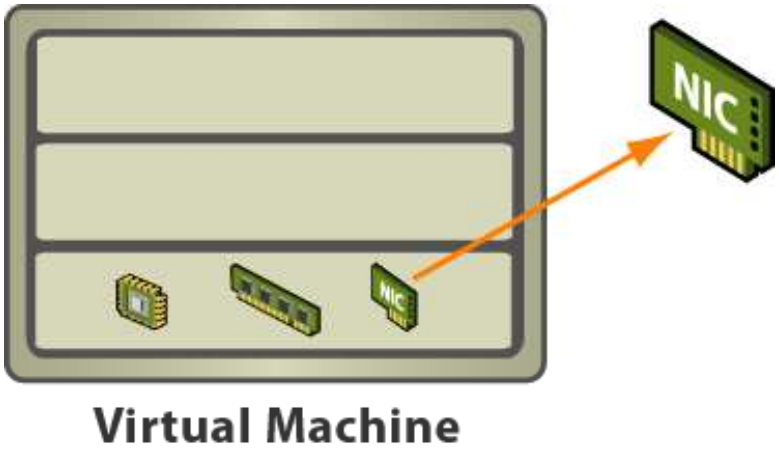


Parameter	Sample value
Virtual disk size	**4GB**
Datastore	**MyVMFS**
Virtual disk node	**0:0**
Virtual storage adapter	**LSILogic (or BusLogic)**
Virtual disk files	`<VM_name>.vmdk` **and <** `VM_name>-flat.vmdk`
Advanced setting: Mode	**Independent – Persistent or nonpersistent**

Virtual NIC

The following network adapters might be available for your virtual machine:

- vlance – Also called PCNet32, supported by most 32-bit guest operating systems
- vmxnet – Provides significantly better performance than vlance
- Flexible – Can function as either a vlance or vmxnet adapter
- e1000 – High-performance adapter available only for some guest operating systems
- Enhanced vmxnet – vmxnet adapter with enhanced performance
- vmxnet3 – Builds on the Enhanced vmxnet adapter



Other Devices

CD-ROM drive

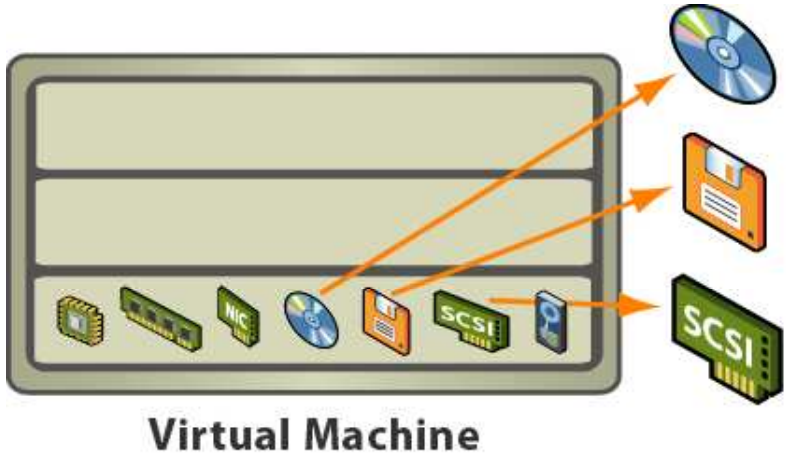
- Connect to CD-ROM or ISO image.

Floppy drive

- Connect to floppy or floppy image.

Generic SCSI devices (such as tape libraries)

- Can be connected to additional SCSI adapters



Virtual Machine Console

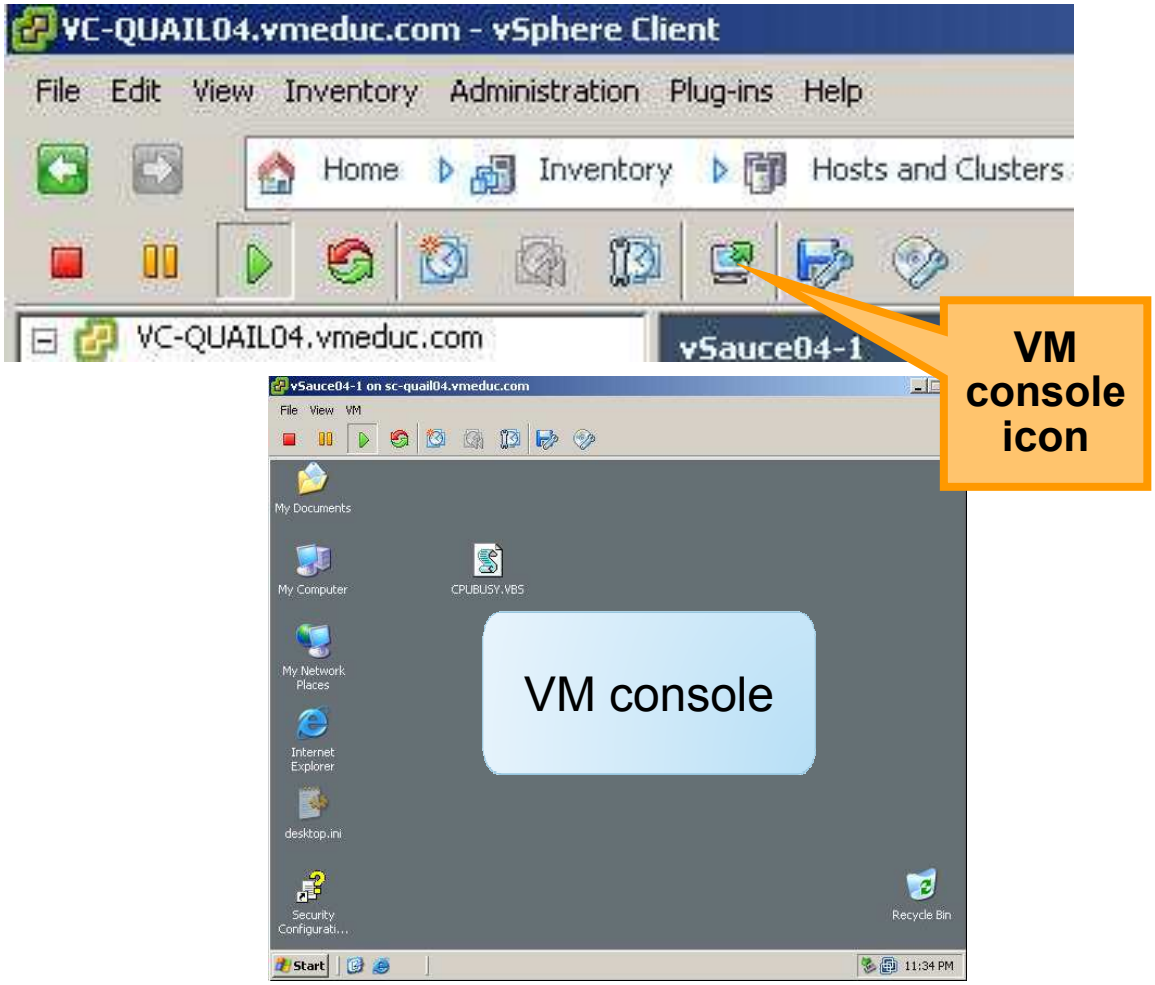
Send power changes to virtual machine.

Access virtual machine's guest operating system.

Send Ctrl+Alt+Del to guest operating system.

- Press Ctrl+Alt+Ins in virtual machine console.

Press Ctrl+Alt to release cursor from virtual machine console.

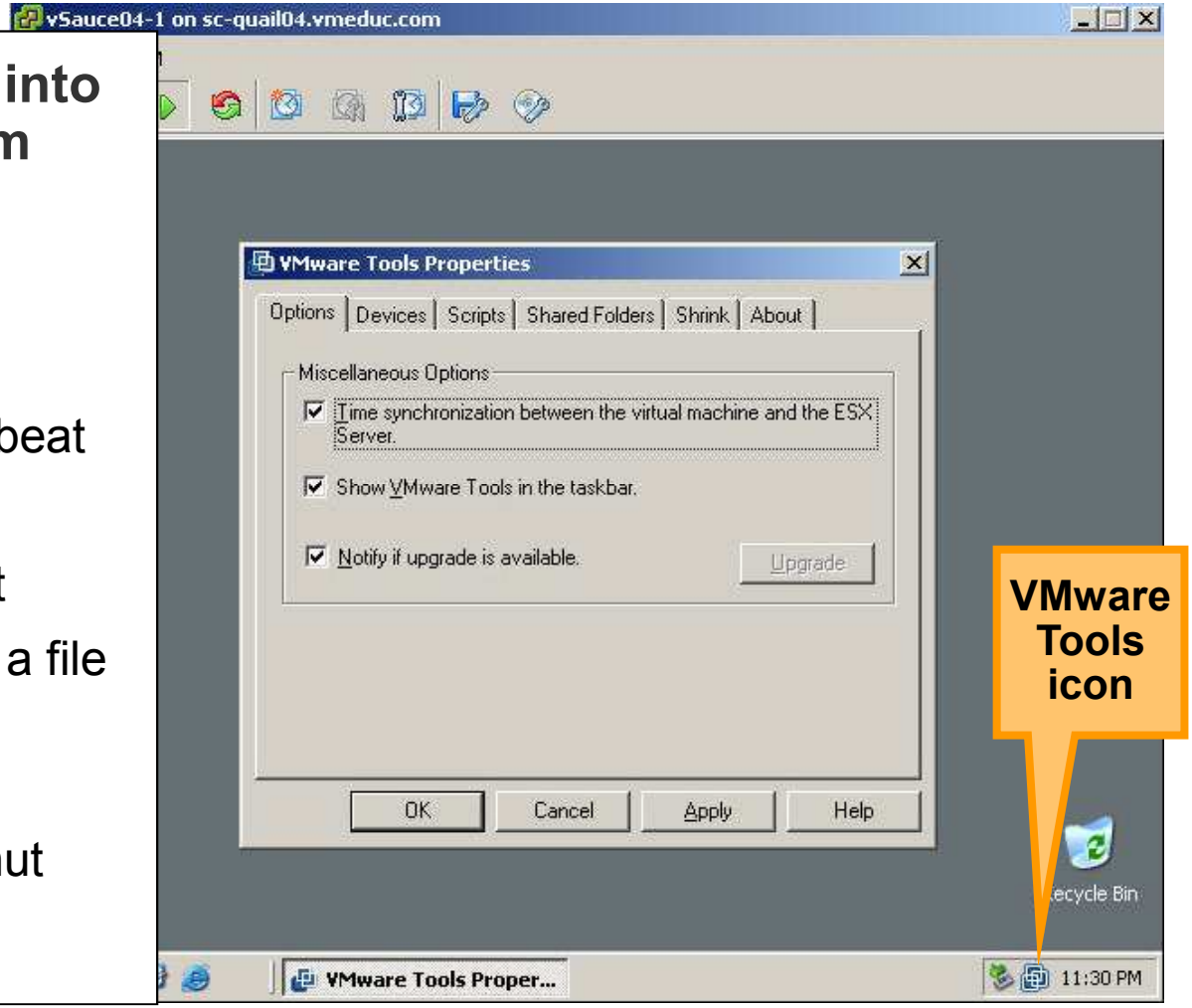


VMware Tools

VMware Tools installs into guest operating system like an application.

Features include:

- Device drivers
- Virtual machine heartbeat
- Improved mouse
- Memory management
- Support for quiescing a file system
- Time synchronization
- Ability to gracefully shut down virtual machine



Provisioning a Virtual Machine

Several methods for creating virtual machines:

- Use the Create New Virtual Machine wizard.
- Import a virtual appliance.
- Deploy a virtual machine from template.
- Clone a virtual machine.
- Use VMware vCenter™ Converter.
- Use VMware vCenter Guided Consolidation.

VMware Products for Provisioning Virtual Machines

VMware vCenter Lifecycle Manager

VMware Lab Manager

- Allows you to create and manage a library of commonly used configurations and dynamically provision them in seconds

Lesson Summary

- A virtual machine is a discrete set of files that is located in a datastore.
- Display a virtual machine's files using the host's Configuration tab or Storage Views tab.
- VMware Tools provides features such as enhanced device drivers, improved mouse movement, and a virtual machine heartbeat.

Lesson 2:
Creating a Virtual Machine

Lesson Objectives

- Provision a virtual machine
  - Create the virtual machine
  - Install the guest operating system into the virtual machine
  - Install VMware Tools into the guest operating system
- Describe how to import a virtual appliance

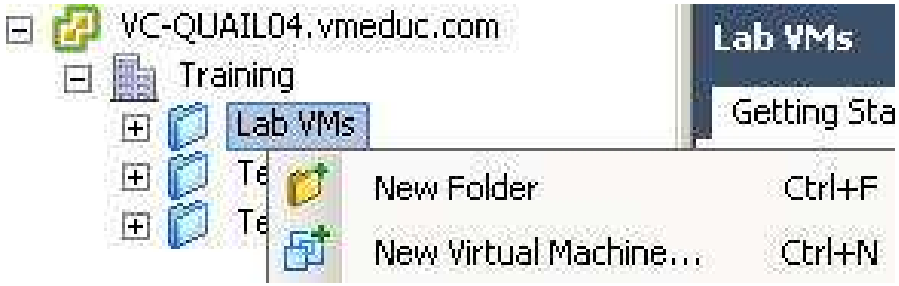
Creating a Virtual Machine: Launch Wizard

Create a new virtual machine in the VMware vCenter Server inventory.

- In the Hosts and Clusters view, select a datacenter, cluster, or host.
- In the VMs and Templates view, select a datacenter or folder.

Launch the Create New Virtual Machine wizard.

- Perform a “typical” or “custom” configuration.



Choosing the Typical Configuration

Information needed for a typical configuration:

- Virtual machine name and inventory location
- Location in which to place the virtual machine (cluster, host, resource pool)
- Datastore on which to store virtual machine's files
- Guest operating system and version
- Disk parameters for creating a new virtual disk:
  - Disk size
  - Disk-provisioning settings:
    - **Allocate and commit space on demand (Thin Provisioning)**
    - **Support clustering features such as Fault Tolerance**

Choosing the Custom Configuration

Additional information needed for a custom configuration:

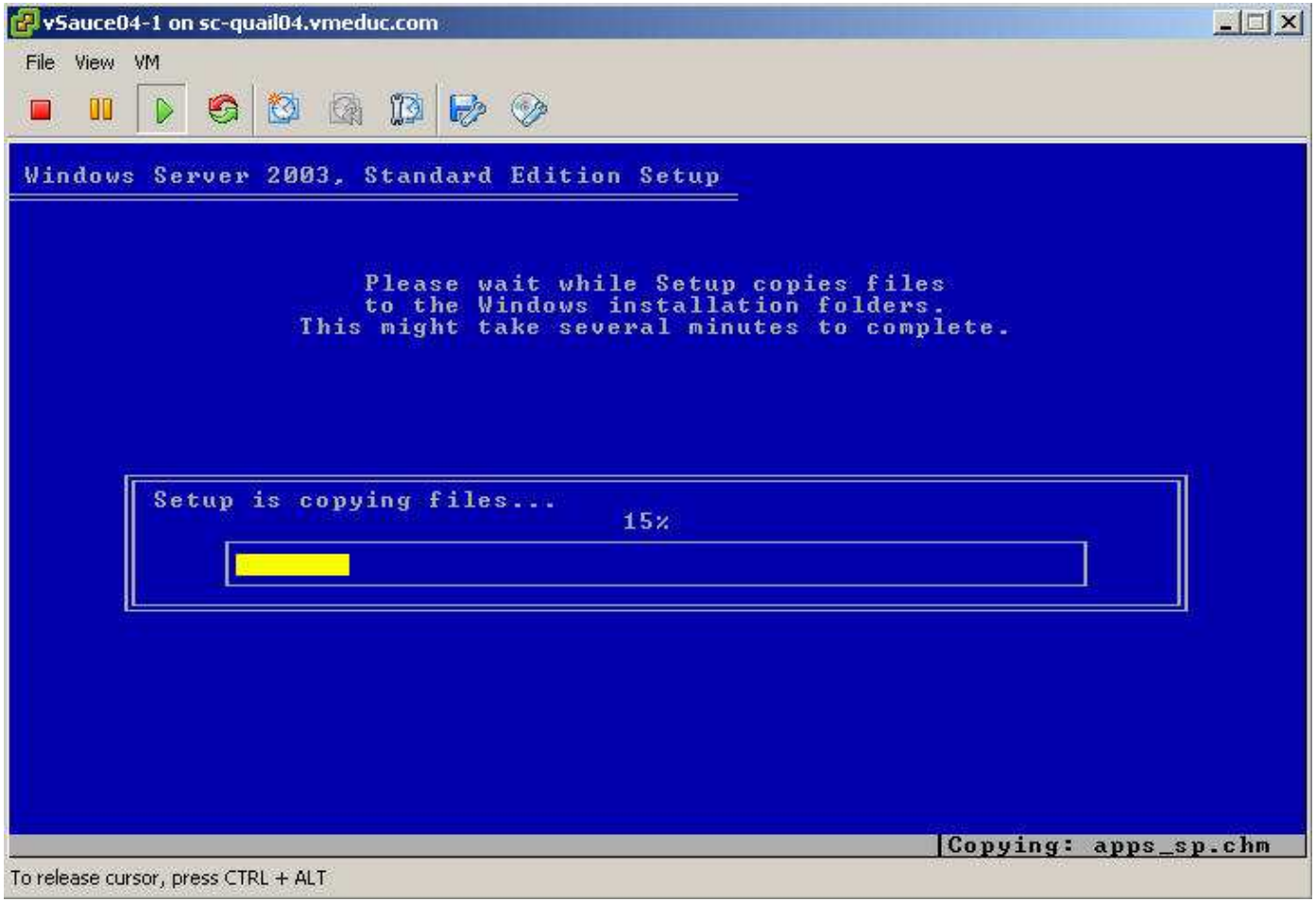
- Virtual machine version (version 7 is the latest)
- Number of CPUs and size of memory
- Number of NICs, network to connect to, and network adapter type
- SCSI controller type
- Whether to create a new disk, use an existing disk, use an RDM, or use no disk
- Additional disk-provisioning settings:
  - Store virtual disk with virtual machine or in a different datastore
  - Virtual device node (for example, SCSI(0:0))
  - Mode-independent (persistent and nonpersistent)

You can also edit the virtual machine settings before completing the creation task.

- For example, attach an ISO image to the virtual CD-ROM device.

Installing the Guest Operating System

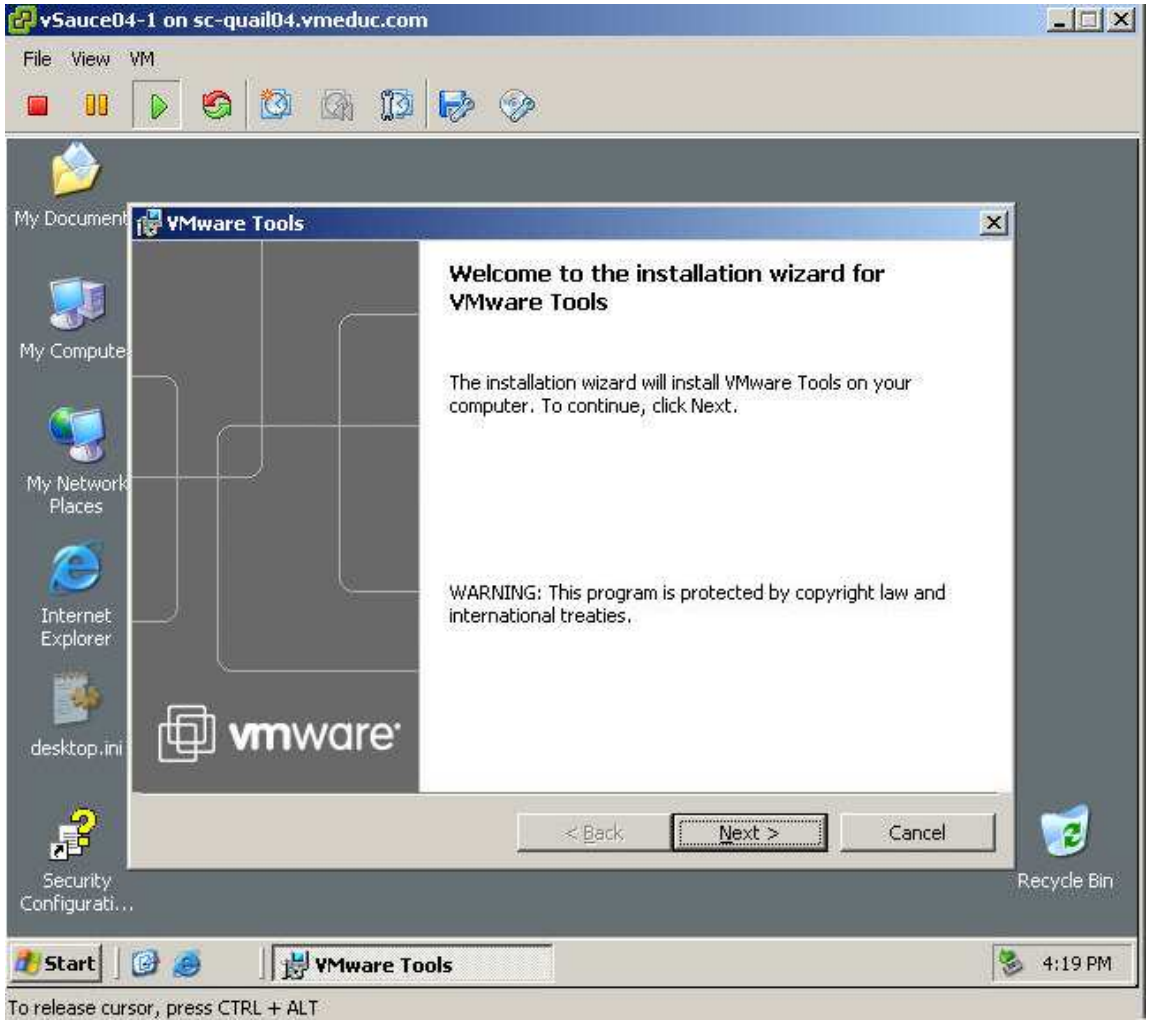
Install the guest operating system into the virtual machine.



Installing VMware Tools

Install VMware Tools.

- Right-click virtual machine in the inventory, then choose **Guest** > **Install/Update VMware Tools**.



Virtual Appliances

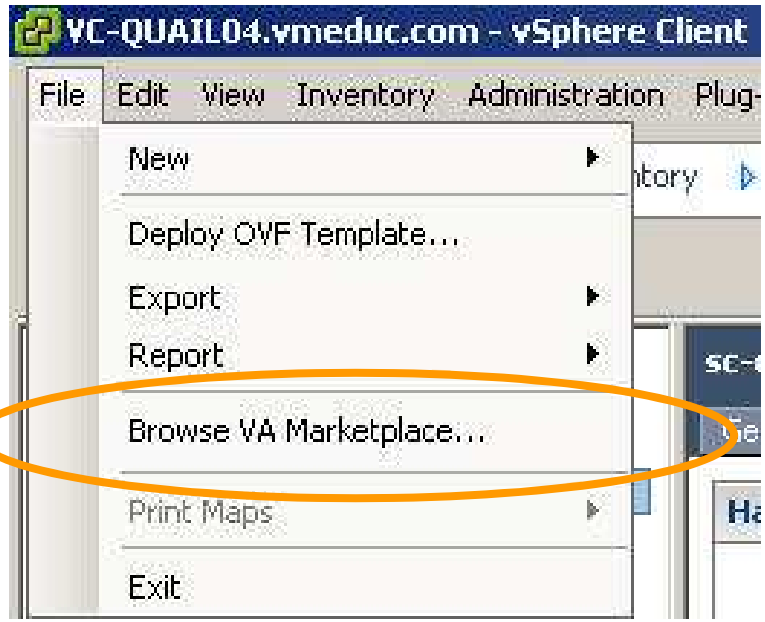
Preconfigured virtual machines:

- Usually designed for a single purpose (for example, a safe browser or firewall)
- Deployed as an OVF template

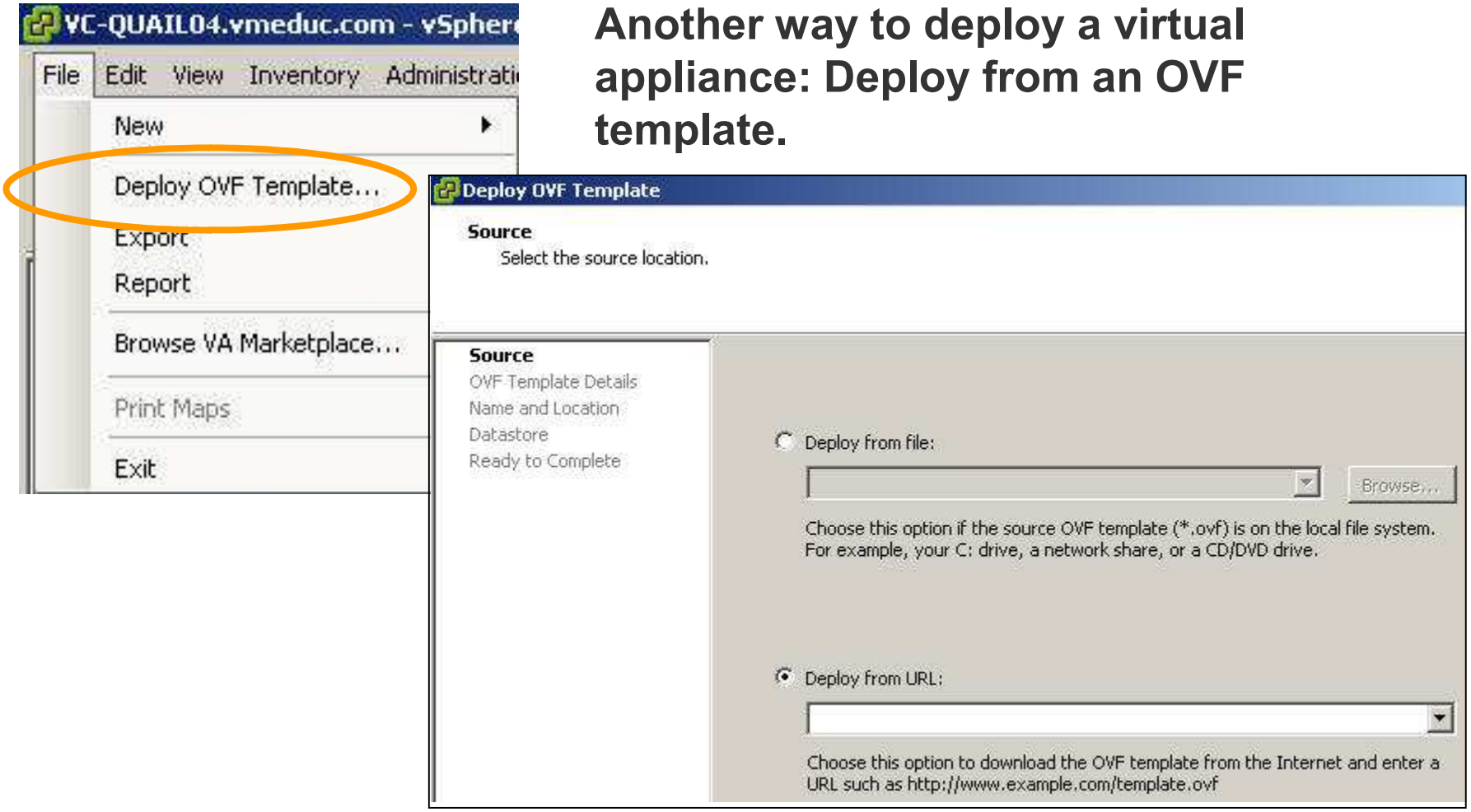
Available from the VMware Virtual Appliance Marketplace

- http://www.vmware.com/appliances

Upload into vCenter Server using the vSphere Client.



Deploy OVF Template



Another way to deploy a virtual appliance: Deploy from an OVF template.

Lab 9

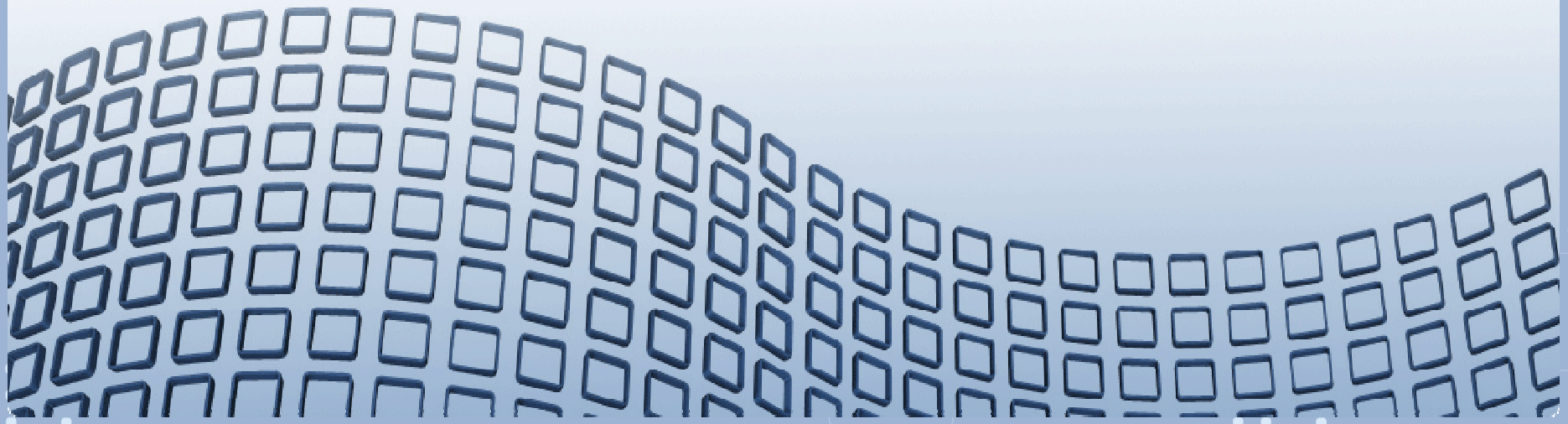
In this lab, you will create a virtual machine using the Create Virtual Machine wizard.

1. Create a virtual machine.
2. Install a guest operating system in a virtual machine.
3. Create a virtual machine on an iSCSI VMFS datastore.
4. Import a virtual machine into the inventory.
5. Install VMware Tools into a Windows guest operating system.
6. Enable time synchronization between the virtual machine and the host.
7. Copy class lab files to your virtual machine.

Lesson Summary

- Using the Create Virtual Machine wizard is one way to create a virtual machine.
- Always install VMware Tools into a virtual machine.
- Virtual appliances are preconfigured virtual machines and can be imported from Web sites like the Virtual Appliance Marketplace.

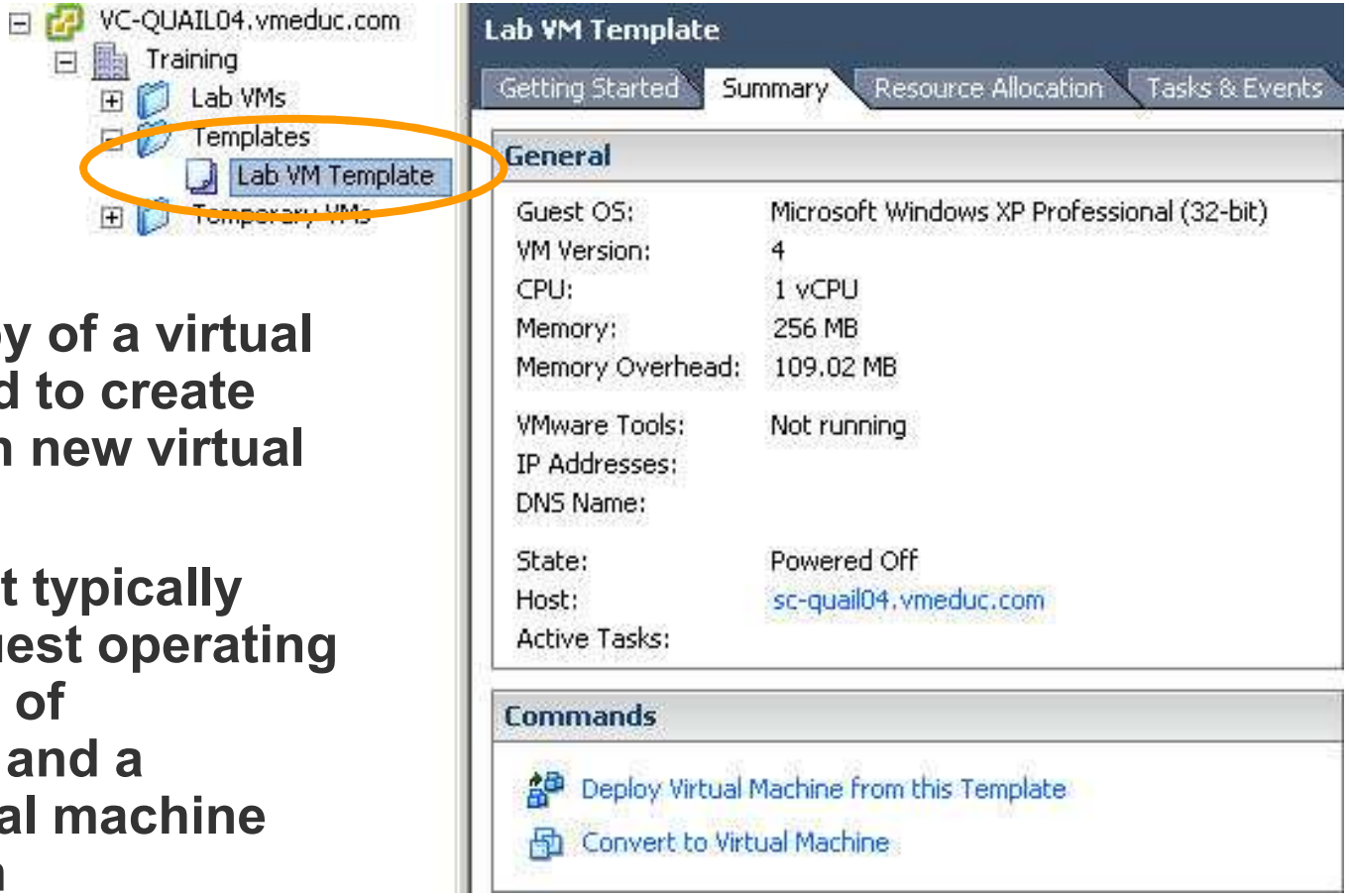
Lesson 3: Creating Templates and Clones



Lesson Objectives

- Create a template
- Deploy a virtual machine from a template
- Clone a virtual machine
- Allow guest operating system customization by vCenter Server

What Is a Template?

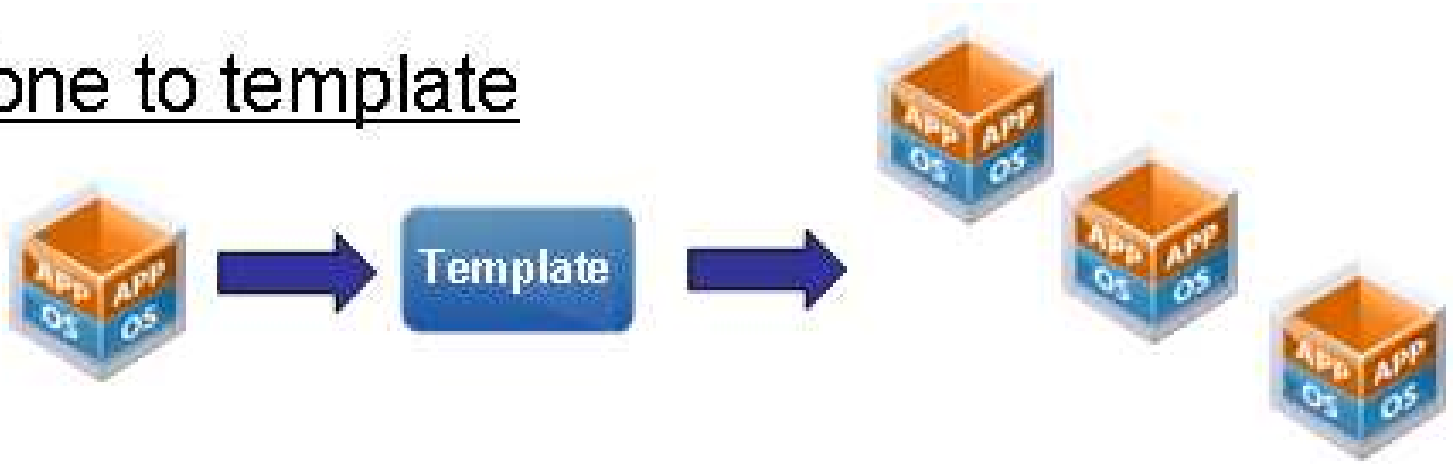


A master copy of a virtual machine used to create and provision new virtual machines

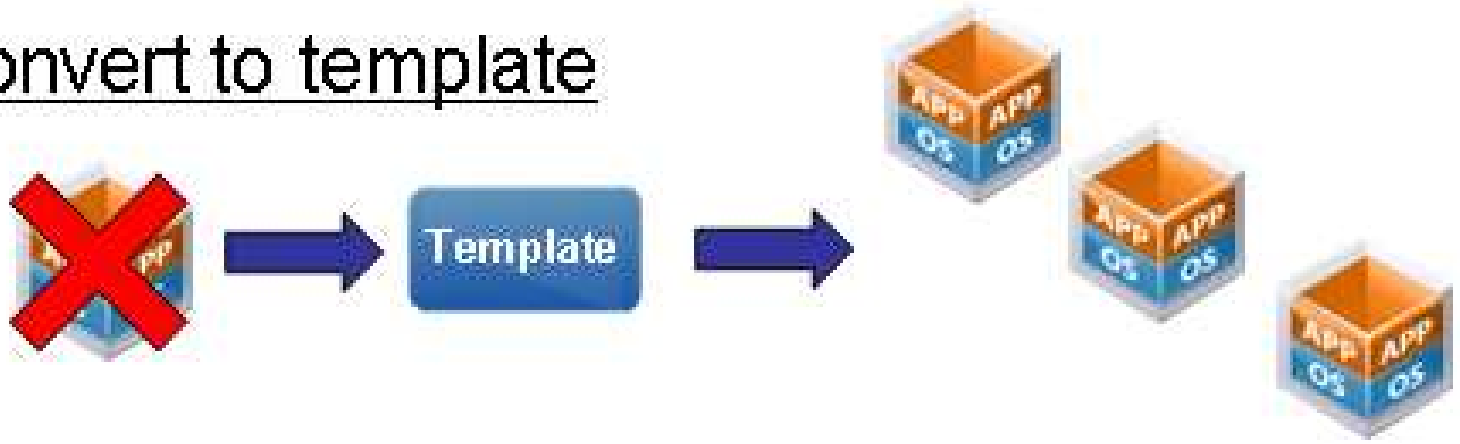
An image that typically includes a guest operating system, a set of applications, and a specific virtual machine configuration

Creating a Template

Clone to template



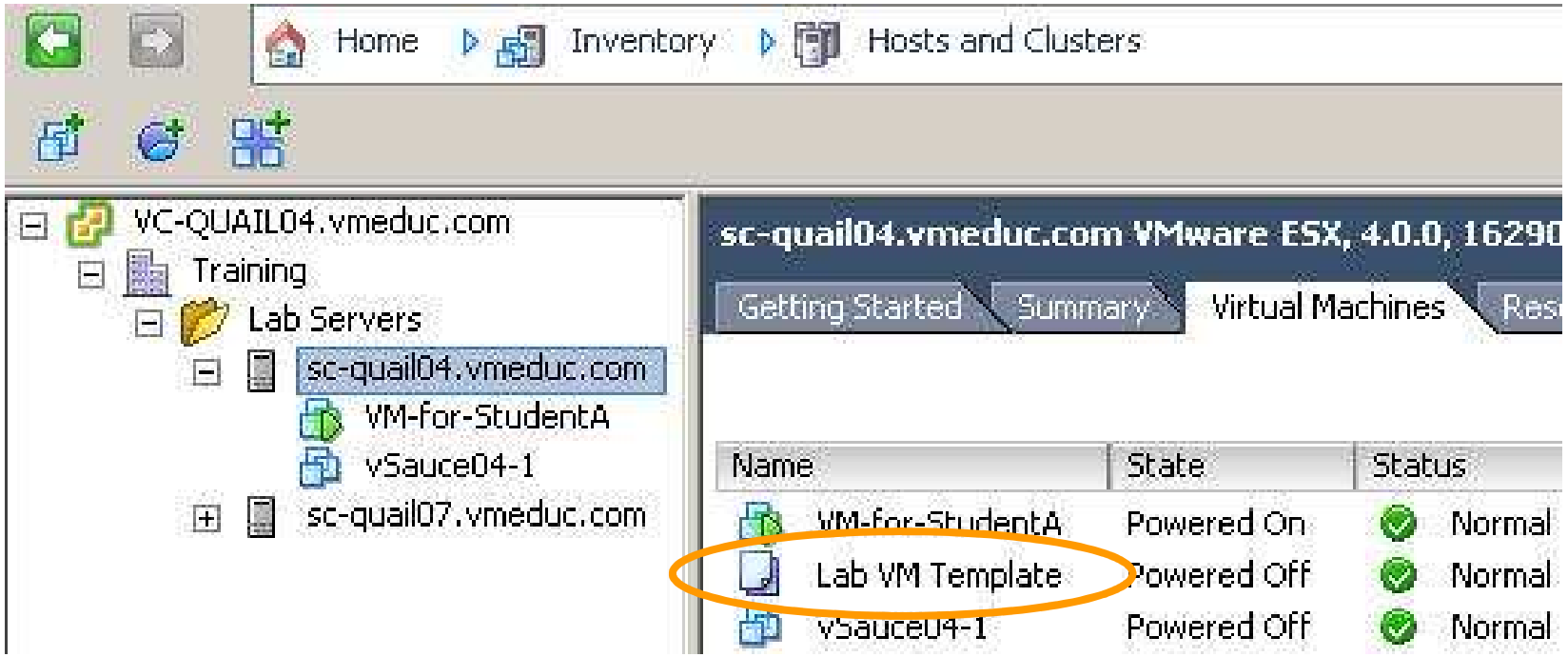
Convert to template



Viewing Templates

There are two ways to view templates:

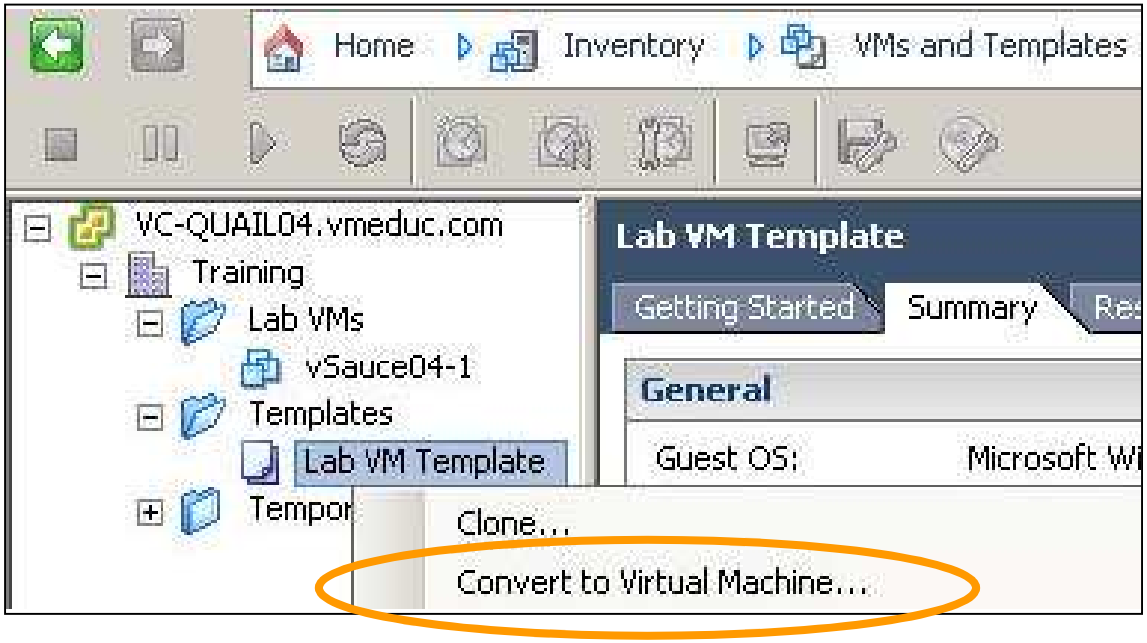
- Use the VMs and Templates inventory view.
- Use the Virtual Machines tab in the Hosts and Clusters inventory view.



Updating a Template

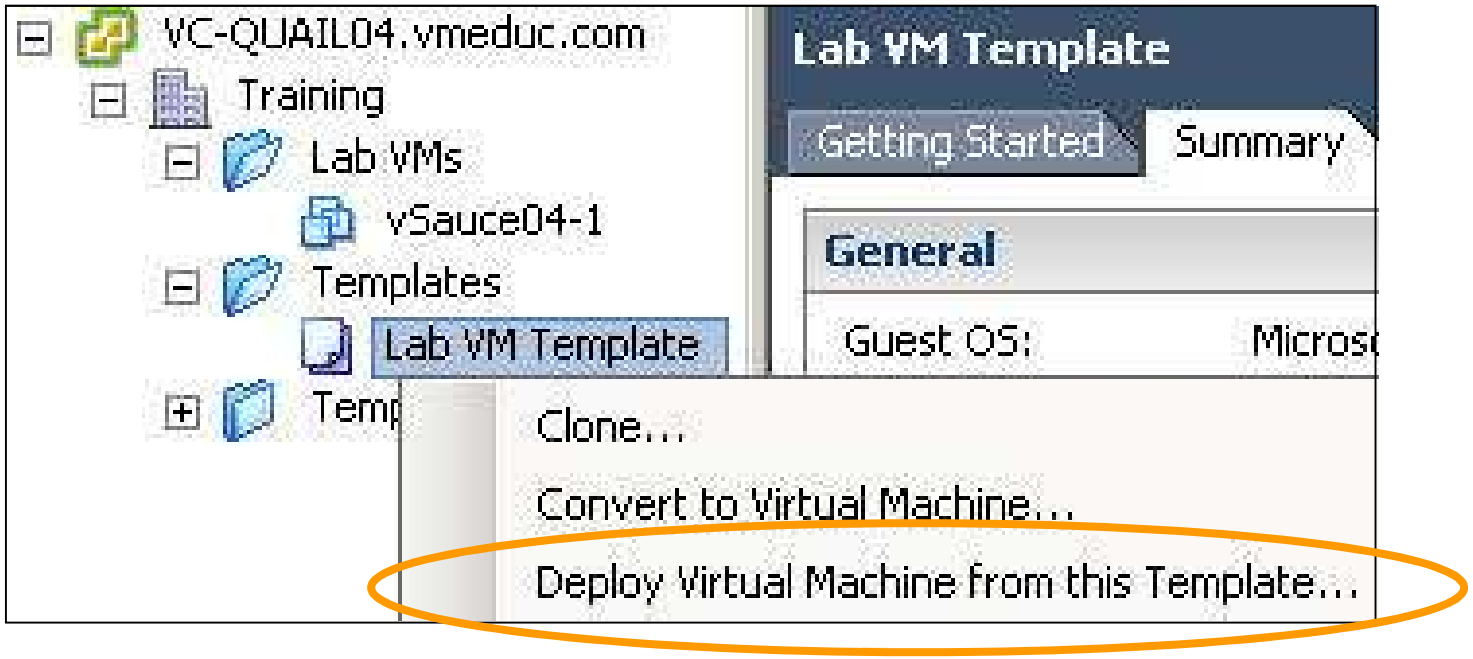
To update a template:

- Convert the template to a virtual machine.
- Place the virtual machine on an isolated network to prevent user access.
- Make appropriate changes to the virtual machine.
- Convert the virtual machine back to a template.



Deploying a Virtual Machine from Template

To deploy a virtual machine, provide such information as virtual machine name, inventory location, host, datastore, and guest operating system customization data.

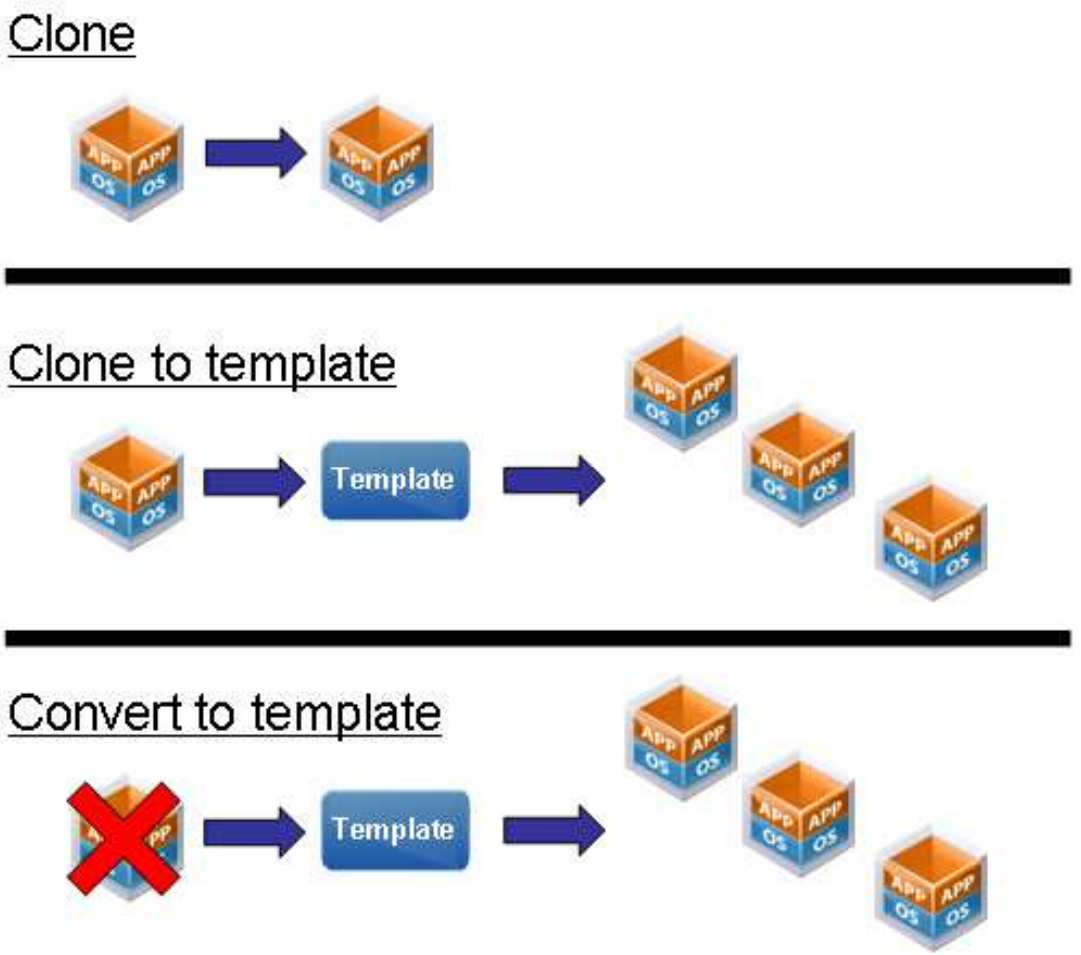


Cloning a Virtual Machine

Cloning is an alternative to deploying a virtual machine.

A clone is an exact copy of the virtual machine.

The virtual machine being cloned can either be powered on or powered off.



Customizing the Guest Operating System

During cloning or deploying from template, you have the option of running the Guest Customization wizard.

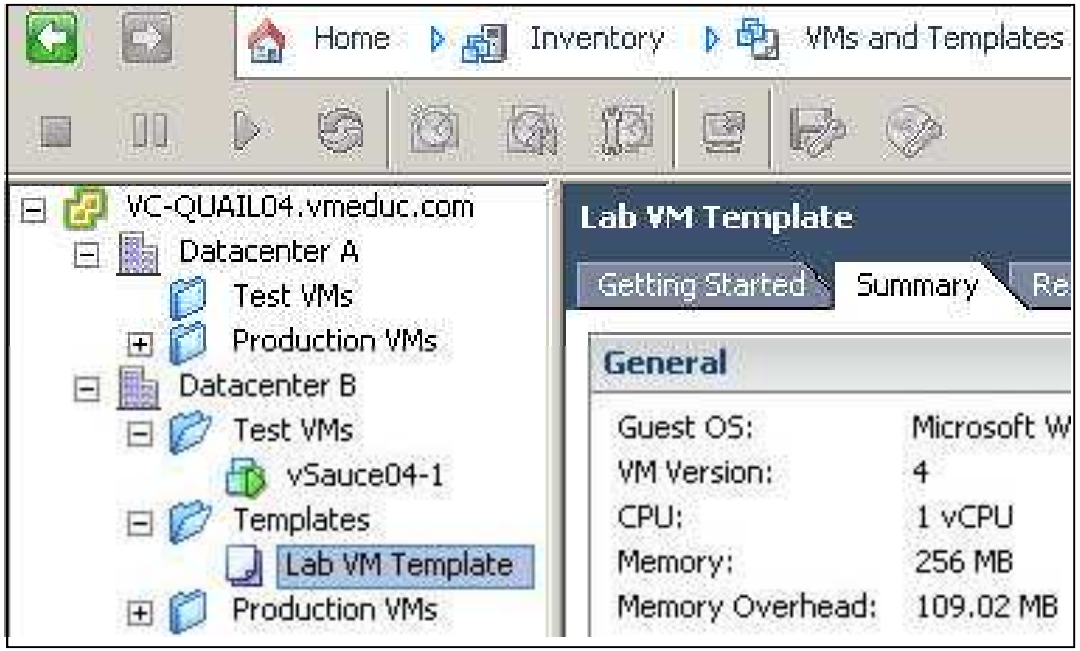
- The wizard lets you create a specification you can use to prepare the guest operating systems of virtual machines.
- Specifications can be stored in the database.
- You can edit existing specifications using the Customization Specifications Manager.

Customization of a clone's guest is recommended to prevent software and network conflicts.

Deploying Virtual Machines Across Datacenters

Virtual machine deployment is allowed across datacenters.

- Clone a virtual machine from one datacenter to another.
- Deploy from a template located in one datacenter to a virtual machine in a different datacenter.



Lab 10

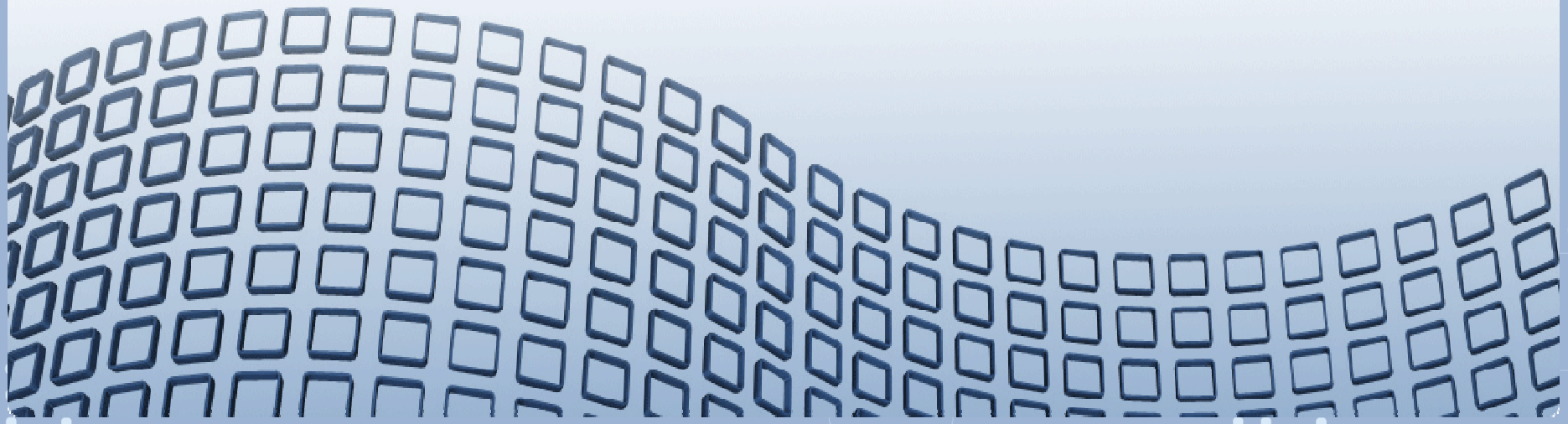
In this lab, you will deploy a virtual machine from a template and clone a virtual machine.

1. Configure guest operating system customization on vCenter Server system.
2. Create a template.
3. Deploy a virtual machine from a template.
4. Clone a virtual machine that is powered on.

Lesson Summary

- A template is a master copy of a virtual machine used to create and provision new virtual machines.
- Deploying a virtual machine from template should be the preferred method for provisioning virtual machines, over creating a virtual machine using the Create Virtual Machine wizard.
- Another way to provision a virtual machine is to clone a virtual machine that is either powered on or powered off.

Lesson 4:
VMware vCenter Converter



Lesson Objectives

- Describe the capabilities of vCenter Converter
- Import a system into vCenter Server
- Describe hot cloning and cold cloning

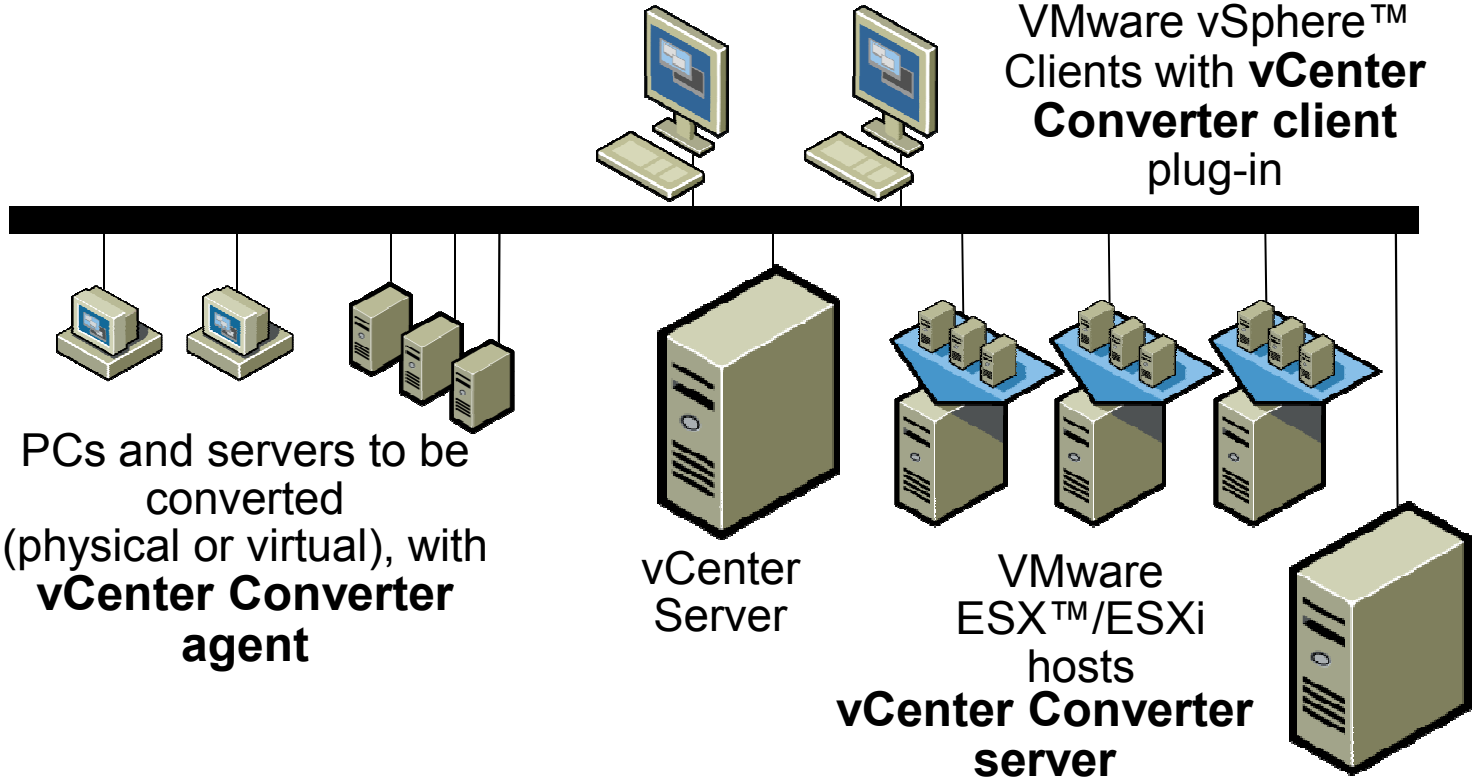
vCenter Converter Capabilities

vCenter Converter is a vCenter Server additional module used to import, export, or reconfigure physical or virtual machines or system images.

- Convert the following types of systems to virtual machines and import them into vCenter Server:
  - Physical machines
  - Virtual machines, such as VMware Workstation, Microsoft Virtual Server 2005, and Windows Server 2008 Hyper-V
  - Third-party backups or disk images
- Restore VMware Consolidated Backup images to virtual machines.
- Export vCenter Server virtual machines to other VMware virtual machine formats.
- Customize virtual machines (for example, change the host name or network settings).

A standalone version of vCenter Converter is also available.

vCenter Converter Components



vCenter Converter Requirements

Install vCenter Converter on the vCenter Server system or on a separate system.

Allocate disk space for the various vCenter Converter components:

- vCenter Converter server files, vCenter Converter CLI, vCenter Converter agent files, vCenter Converter client files, and the installers
- Approximately 300MB of disk space is needed for all components.

Memory requirements depend on whether hot or cold cloning is performed

- Hot cloning – 350MB of memory is required on source physical machine.
- Cold cloning – At least 264MB of memory is required on source physical machine; 364MB or more is preferred.

Importing a Physical System

Cloning and system reconfiguration steps are used to create and reconfigure the virtual machine.

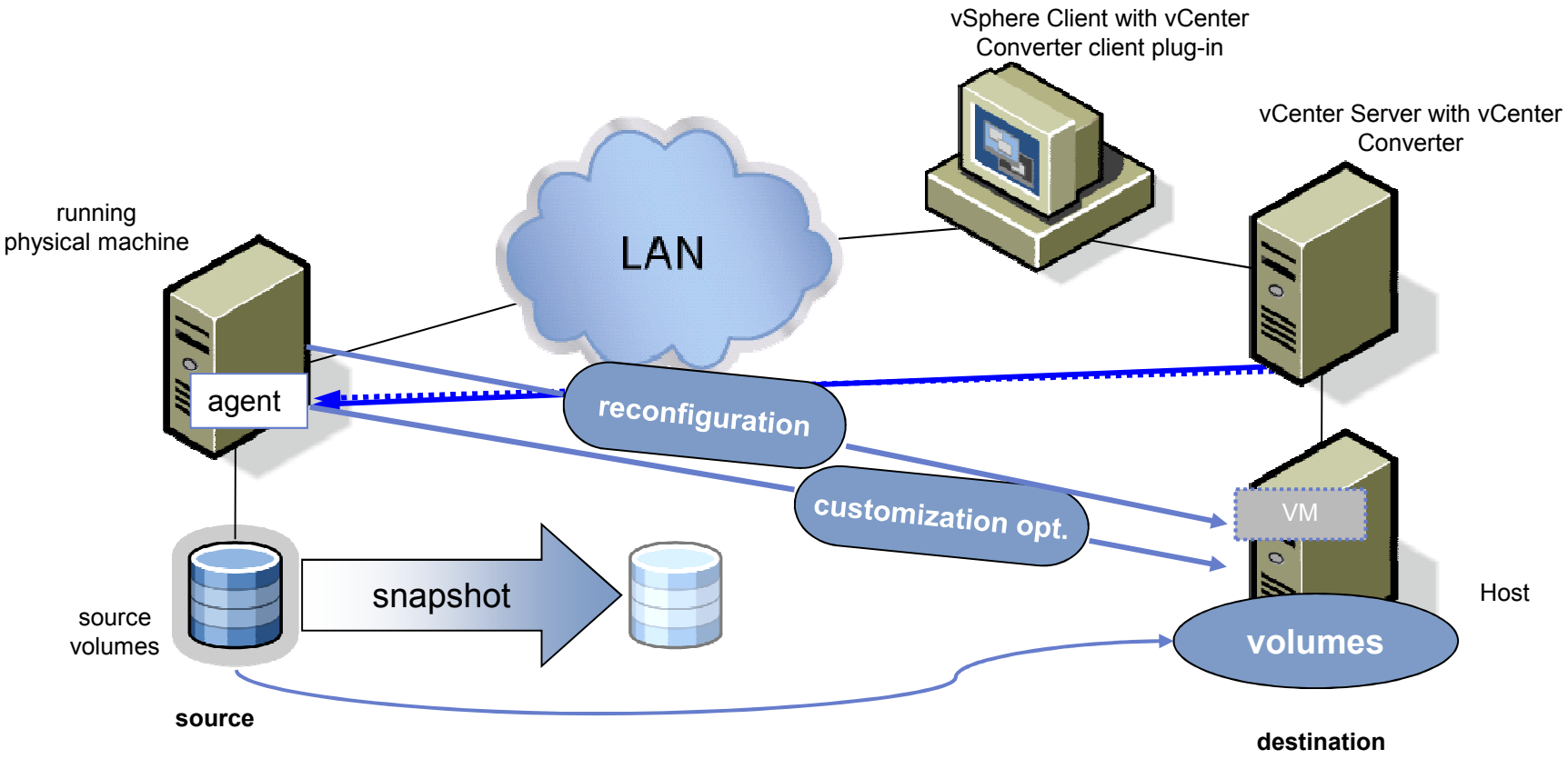
- Cloning – Create a cloned disk, where the cloned disk is a virtual disk that is an exact copy of the source physical disk.
- System reconfiguration – Adjust the migrated operating system to enable it to function on virtual hardware.

vCenter Converter supports hot cloning and cold cloning:

- Hot cloning – Clone a source machine while the operating system is running. The source machine can be accessed remotely.
- Cold cloning – Clone the source machine when the operating system is not running. Cloning can be performed locally, where Converter runs on the source machine.

Remote Hot Cloning of a Physical Machine

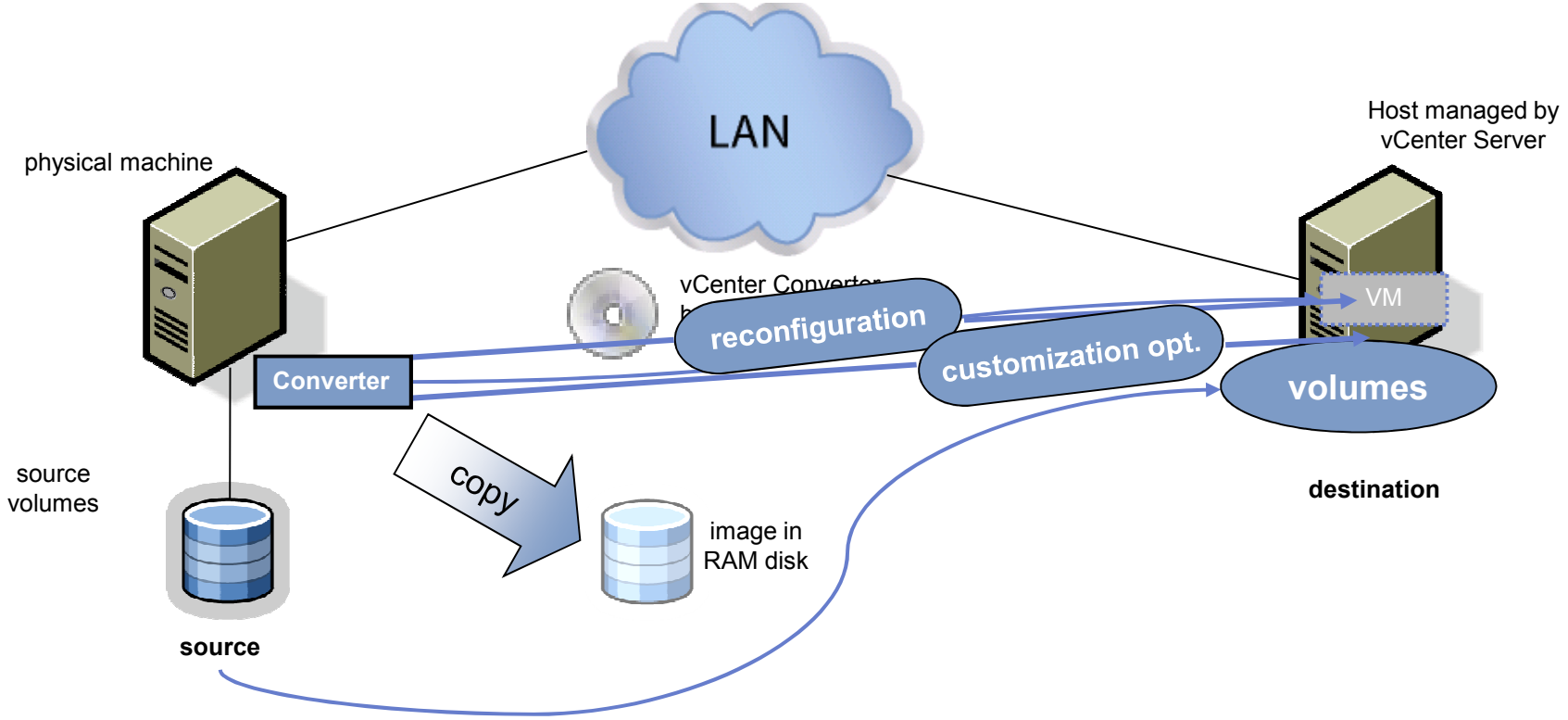
Stage 4: Cleaning Up



vCenter Converter agent removes all traces from the source machine.

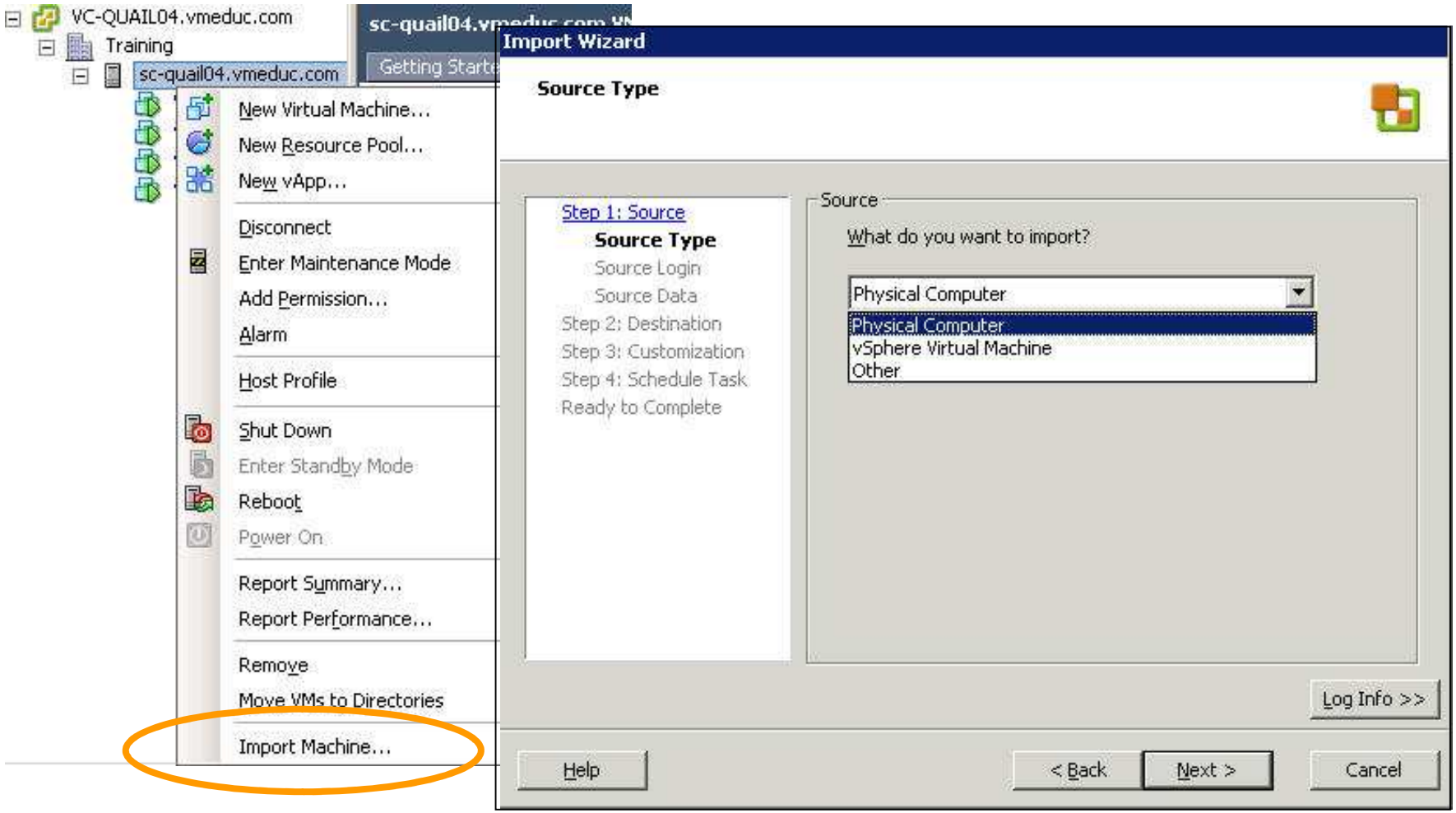
Local Cold Cloning of a Physical Machine

Stage 4: Cleaning Up



User removes boot CD and reboots the source physical machine. The virtual machine is ready to run.

Importing a Physical System



Cloning Modes: Disk-Based and Volume-Based

Disk-based cloning

- Transfers all sectors from all disks and preserves all volume metadata. It supports all basic and dynamic disks.
- Used for cold cloning and importing existing virtual machines

Volume-based cloning

- Creates all volumes in the destination virtual machine as basic volumes, regardless of type of corresponding source volume
- Used for hot and cold cloning and for importing existing virtual machines
- Performed at the file or block level, depending on your size selections

Changes to Virtual Hardware

Most applications function correctly.

Watch for applications that depend on:

- Specific hardware characteristics
- Different serial numbers
- Software licensed to MAC addresses
- Special graphics cards

Lab 11 and eLearning Activity

In this lab, you will use vCenter Converter to create a virtual machine from an existing system.

1. Prepare a system for hot cloning.
2. Hot-clone a system.

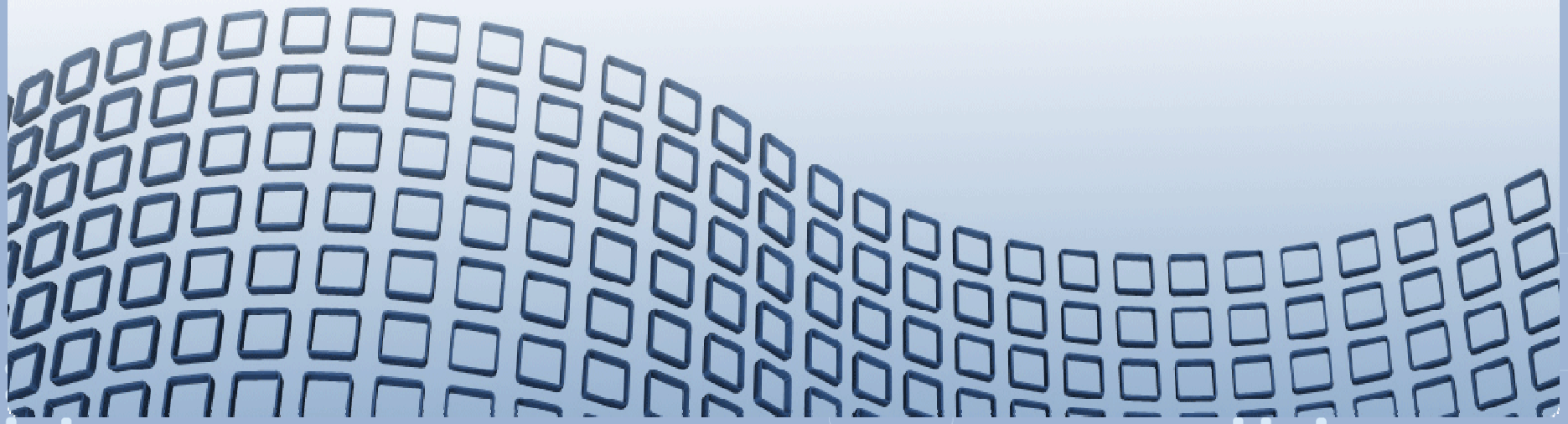
In this eLearning activity, you will view a self-paced demonstration on how to convert a physical machine to a virtual machine using the vCenter Converter boot CD.

- Ask your instructor for access to the eLearning module.

Lesson Summary

- vCenter Converter is a vCenter Server additional module used to import, export, or reconfigure physical or virtual machines or system images.
- vCenter Converter can also be used to restore Consolidated Backup images to virtual machines.
- Cloning of a physical machine can be done in a hot mode, while the physical machine continues to run.

Lesson 5:
vCenter Guided Consolidation



Lesson Objectives

- Describe the Guided Consolidation architecture
- Understand how Guided Consolidation works
  - Find physical systems
  - Analyze physical systems
  - Convert physical systems to virtual machines

Guided Consolidation

Guided Consolidation enables you to streamline your datacenter by transforming your physical machines, running business applications, into virtual machines.

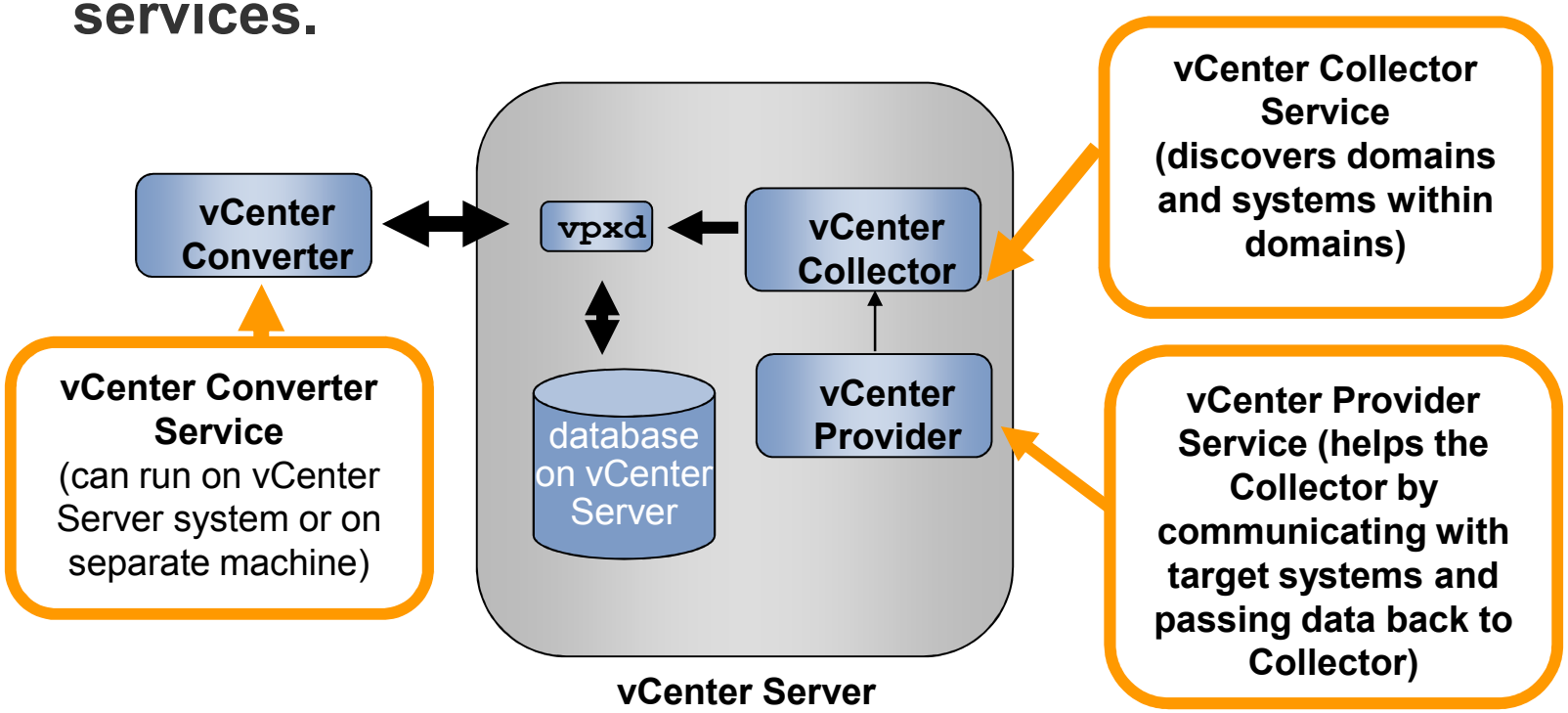
- Recommended for small IT environments

Consolidating your datacenter involves the following:

- Find – Search for and select physical systems that you want analyzed.
- Analyze – Analyze the physical systems and collect performance data.
- Consolidate – Compare performance to available host resources, convert physical systems to virtual machines, and import virtual machines into vCenter Server.

Guided Consolidation Architecture

Guided Consolidation depends on the vCenter Collector, vCenter Provider, and vCenter Converter services.

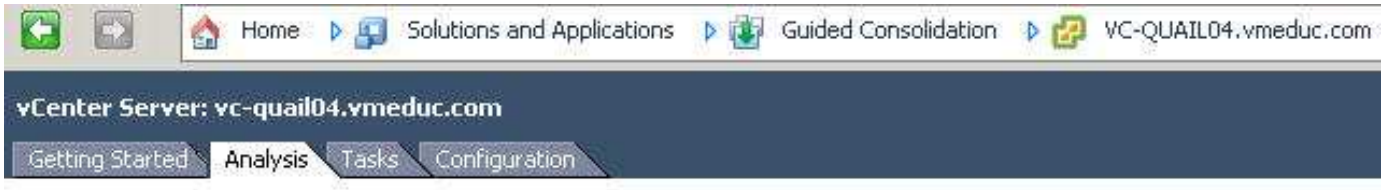


Guided Consolidation Prerequisites

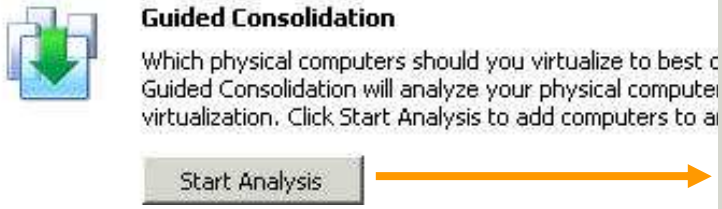
Guided Consolidation requires that your VMware vSphere is populated and that you provide credentials to the target physical systems.

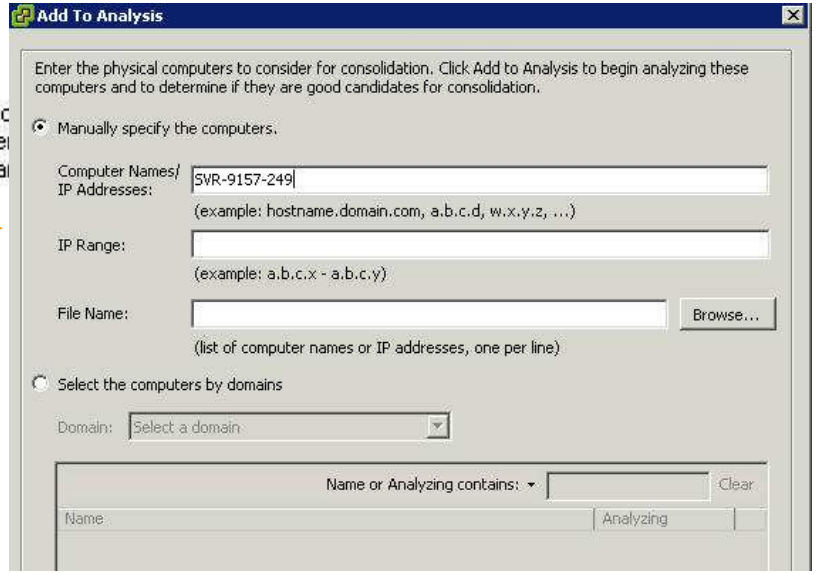
Ensure that vCenter Converter and Guided Consolidation plug-ins are installed and enabled in the vSphere Client.

Finding Physical Systems to Consolidate



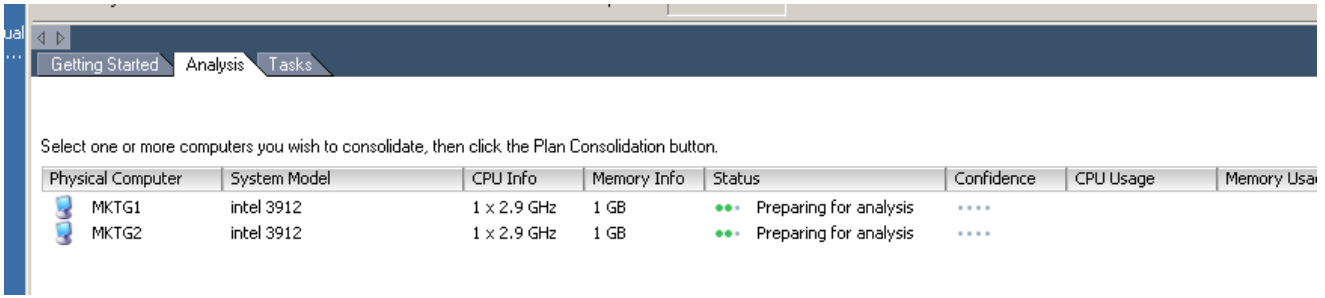
Click **Start Analysis** to find systems on the network to analyze.





Search for systems by computer name or IP address, or within a domain.

Analyzing Potential Candidates



Statistics are collected on each host.

- 10–12 metrics total: CPU, memory, disk, network
- Columns populated as information obtained

Data is compared to host resources to get recommendation.

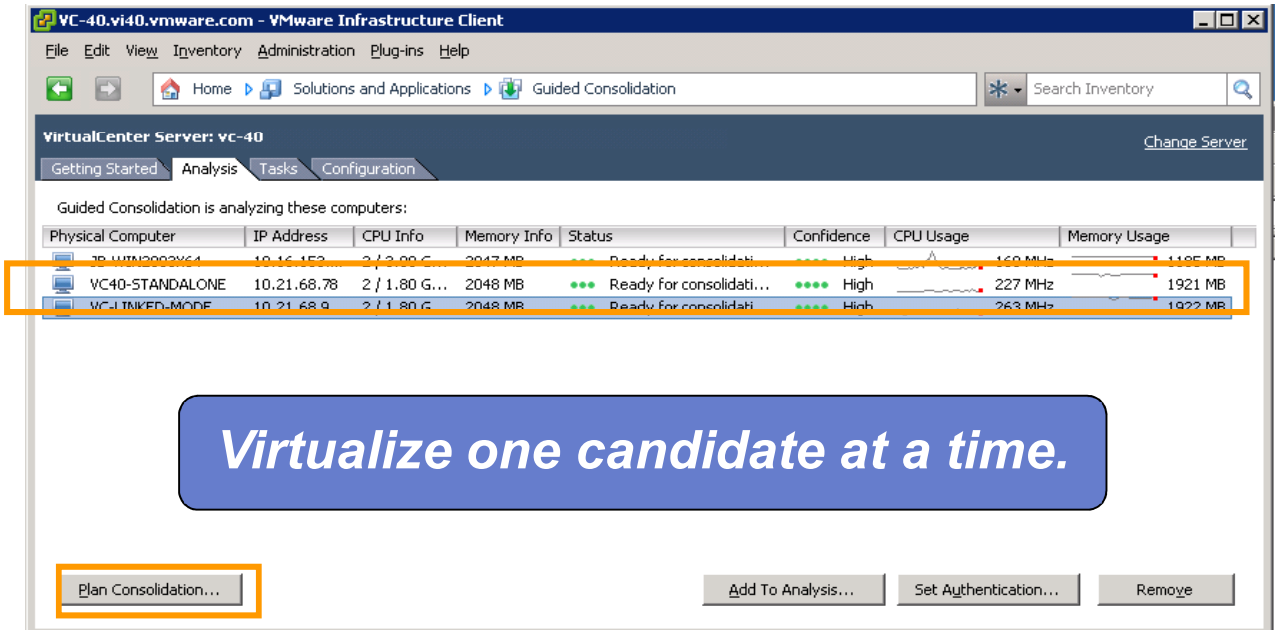
Confidence metric is calculated.

- Refers to the reliability of the recommendation
- Recommendations based on longer periods of analysis, and therefore more performance data, receive a higher level of confidence

Consolidating Candidates

After analysis, select the systems you want to convert.

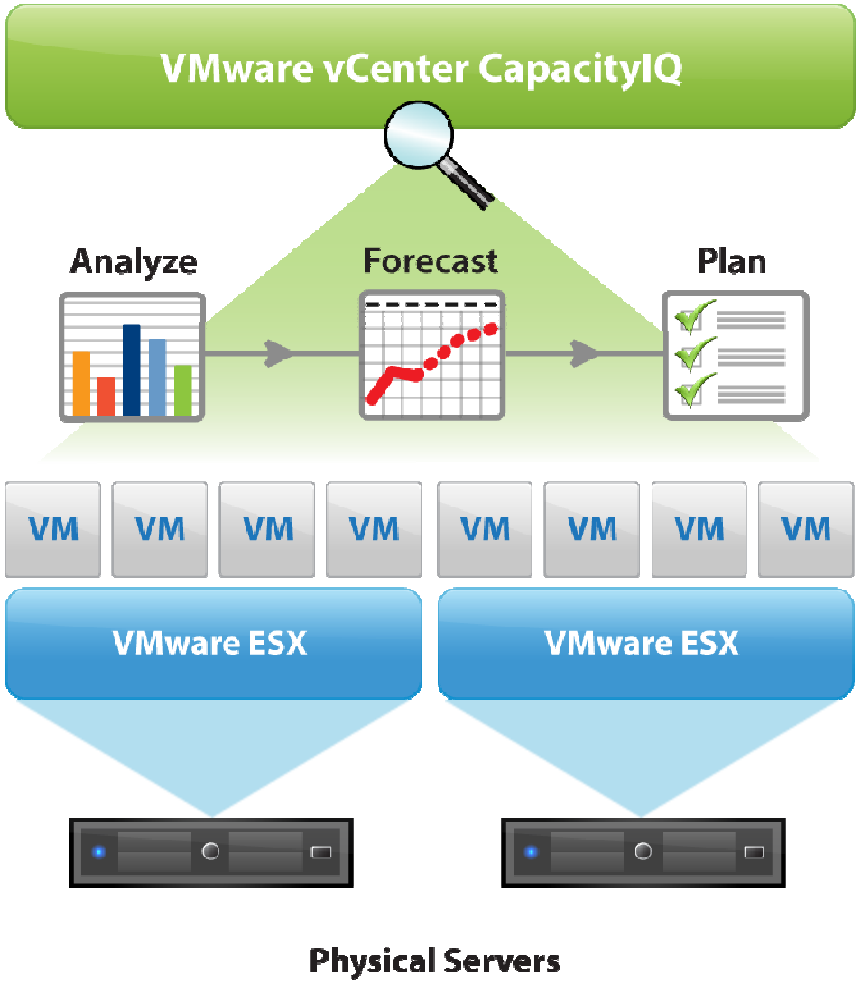
vCenter Server selects appropriate destinations and configuration parameters for each resulting virtual machine.



Capacity Planning with vCenter CapacityIQ

CapacityIQ allows you to:

- Perform "what if" impact analysis to model the effect of capacity changes
- Identify and reclaim inefficient, unused capacity
- Forecast timing of capacity shortfalls and bottlenecks



eLearning Activity

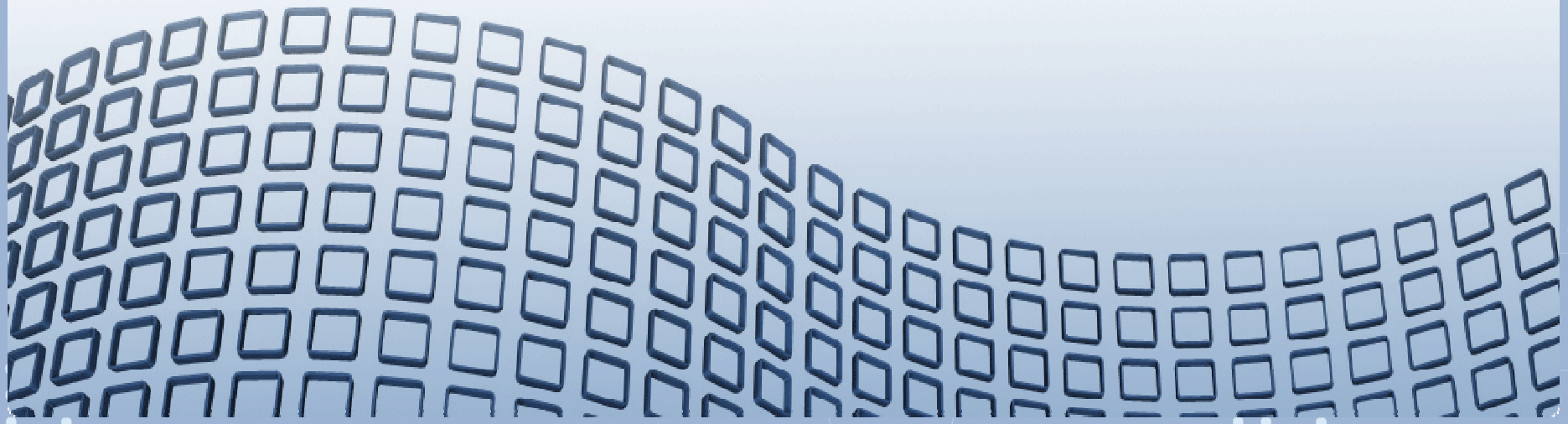
In this eLearning activity, you will view a self-paced demonstration of how to analyze a physical machine and convert the physical machine to a virtual machine using Guided Consolidation.

- Ask your instructor for access to the eLearning module.

Lesson Summary

- Guided Consolidation allows you to consolidate your datacenter by
  - Finding physical systems in one or more domains
  - Analyzing these physical systems for potential consolidation candidates
  - Converting the best candidates to virtual machines and importing them into vCenter Server

Lesson 6:
Modifying Virtual Machines



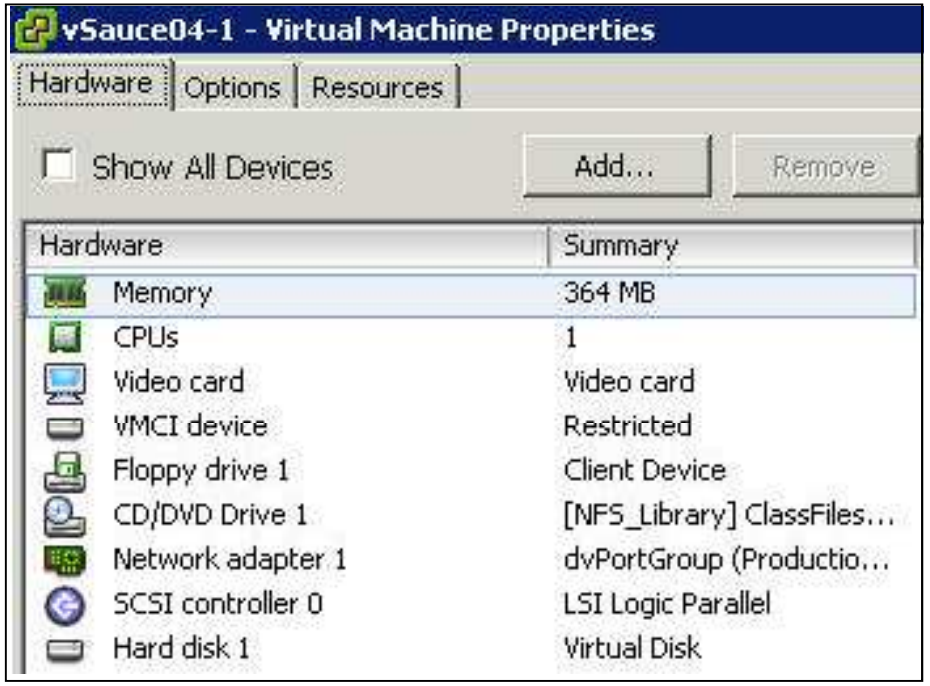
Lesson Objectives

- Understand the various virtual machine settings and options
- Add a hot-pluggable device
- Increase the size of a virtual disk using Hot Extend
- Add an RDM

Modifying Virtual Machine Settings

A virtual machine's configuration can be modified using its Properties dialog box.

- Add virtual hardware.
  - Some hardware can be added while the virtual machine is powered on.
- Remove virtual hardware.
- Set virtual machine options.
- Control a virtual machine's CPU and memory resources.



Hot-Pluggable Devices

Hot-pluggable devices are USB controllers, Ethernet adapters, hard disks, and SCSI devices.

CPU and memory can also be added while the virtual machine is powered on.

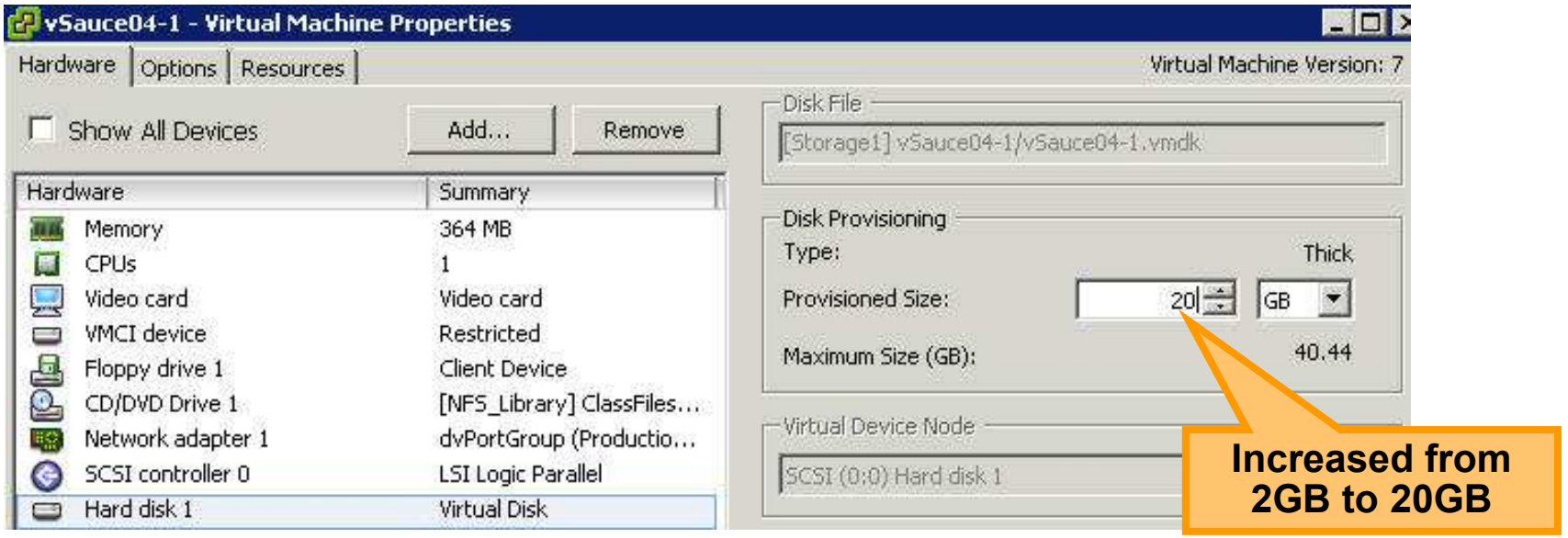
Increasing Virtual Disk Size: Hot Extend Feature

Hot Extend

- Is used to increase the size of a virtual disk
- Is supported for vStorage VMFS flat virtual disks in persistent mode and without any virtual machine snapshots.

Using appropriate tools, the guest operating system can dynamically grow the file system to use this new allocated disk space.

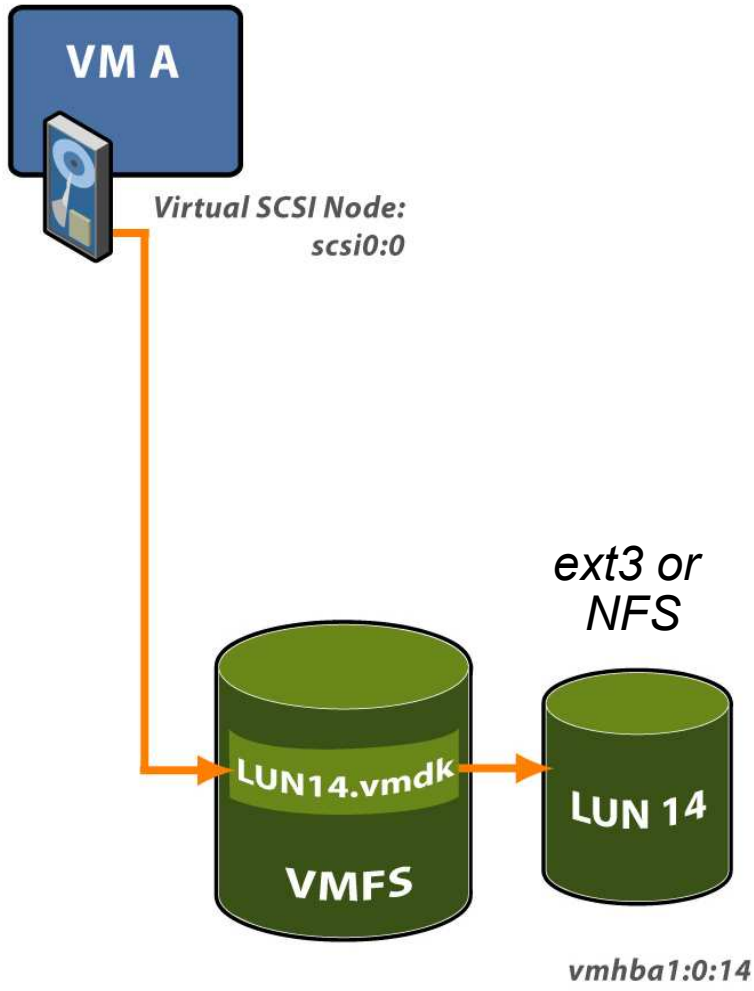
Hot Extend Example



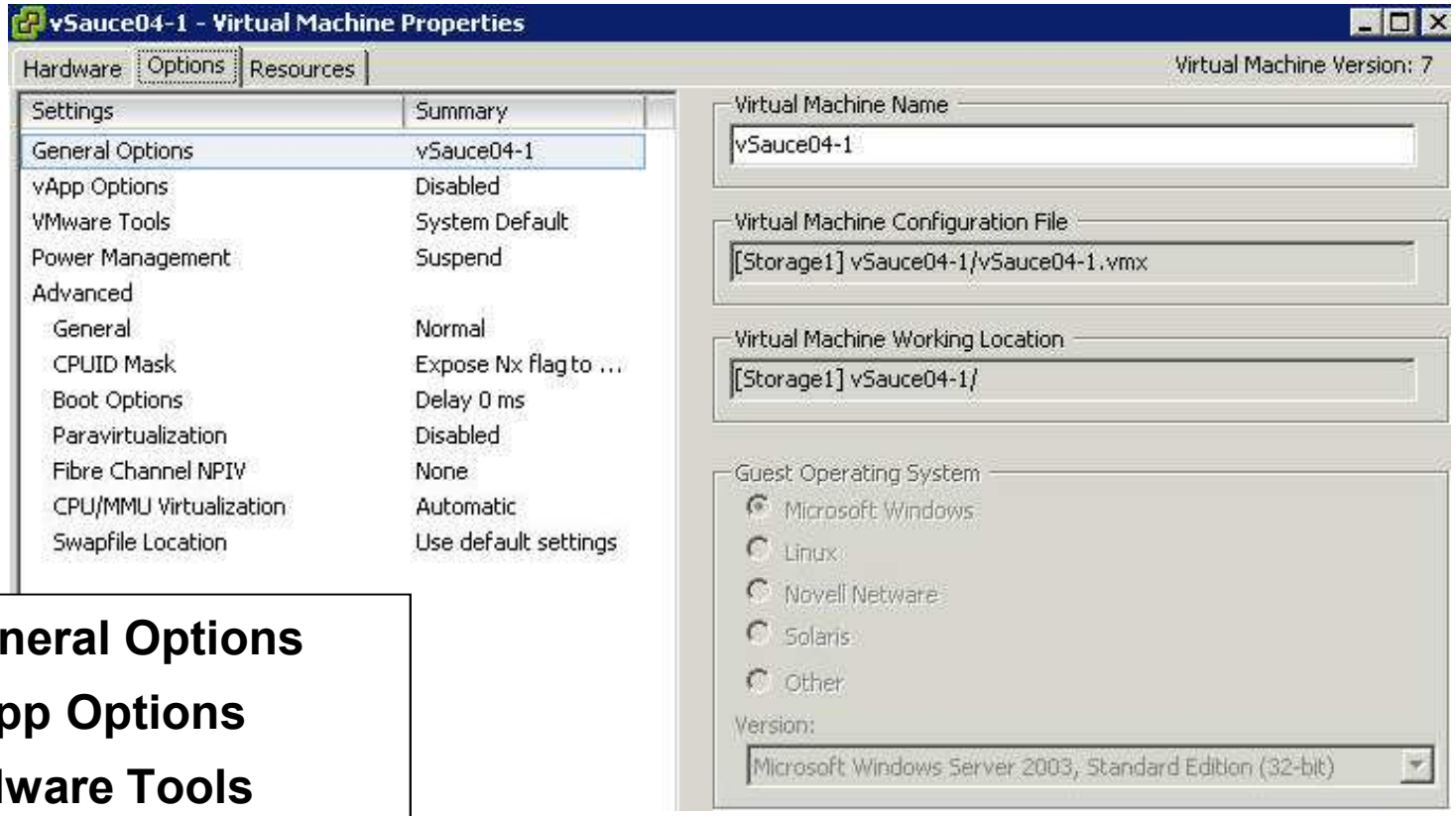
Format new space within the guest operating system.

Creating a Raw Device Mapping

To create an RDM, go to the virtual machine's Properties dialog box and add a hard disk device of type raw device mappings.

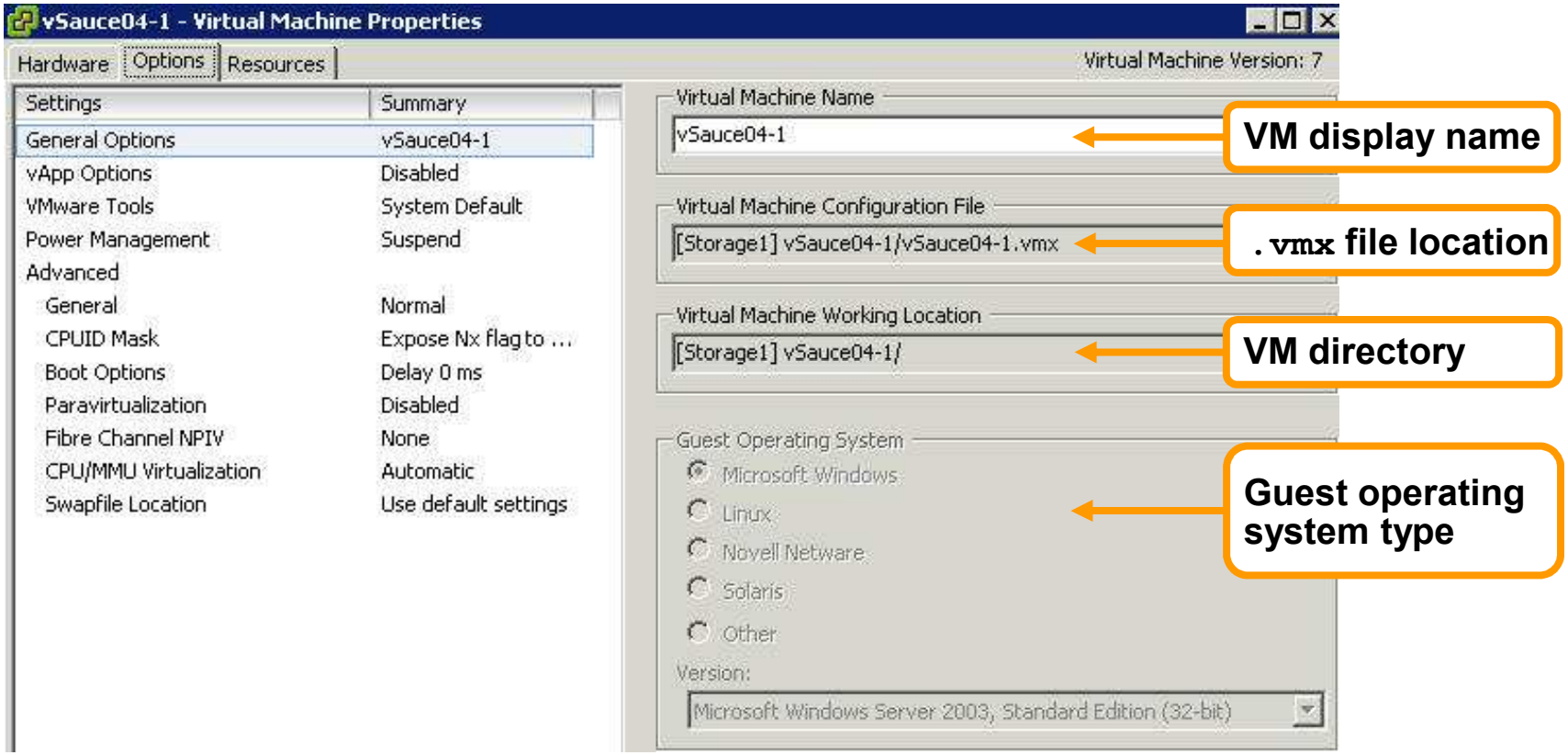


Virtual Machine Options

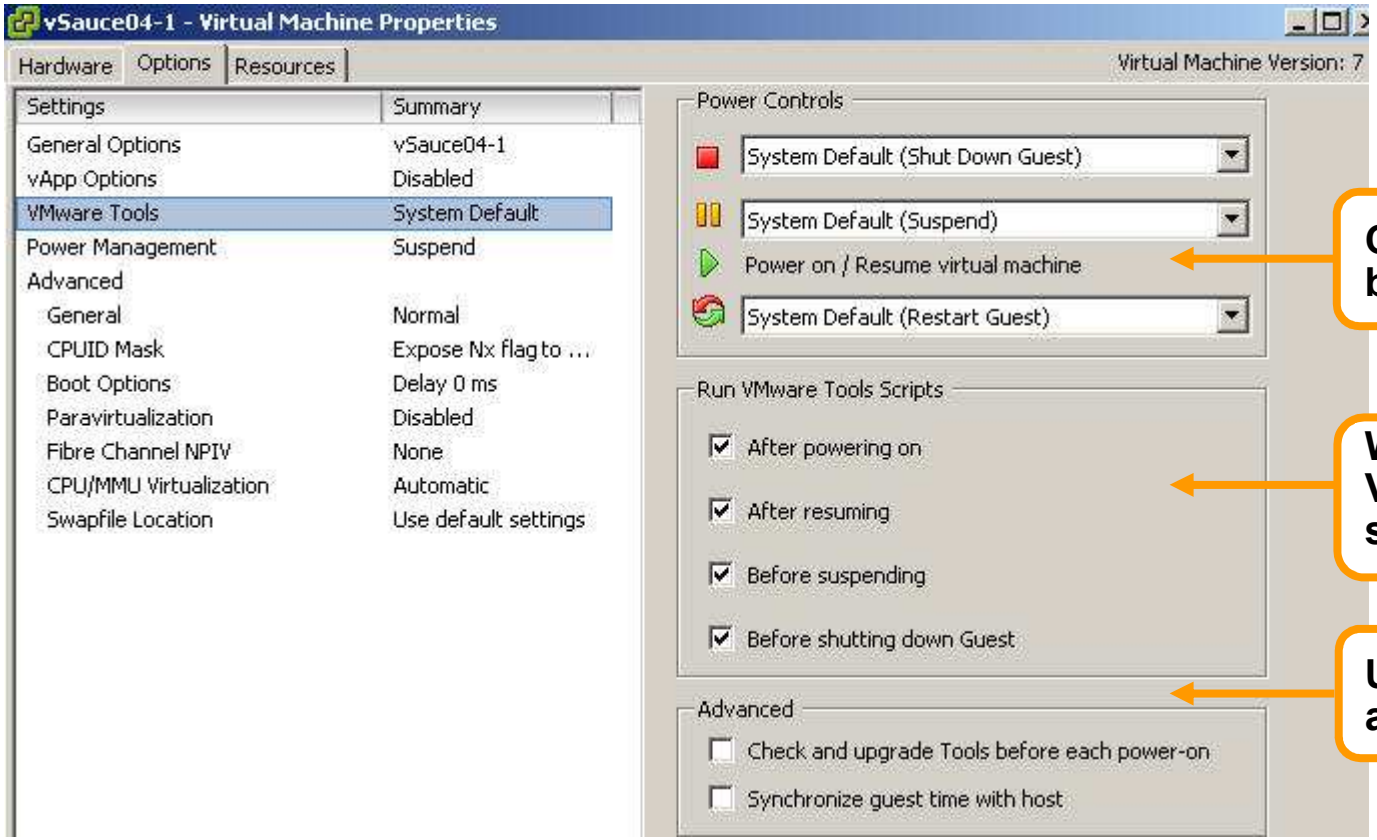


- General Options
- vApp Options
- VMware Tools
- Power Management
- Advanced

Options: General Options



Options: VMware Tools

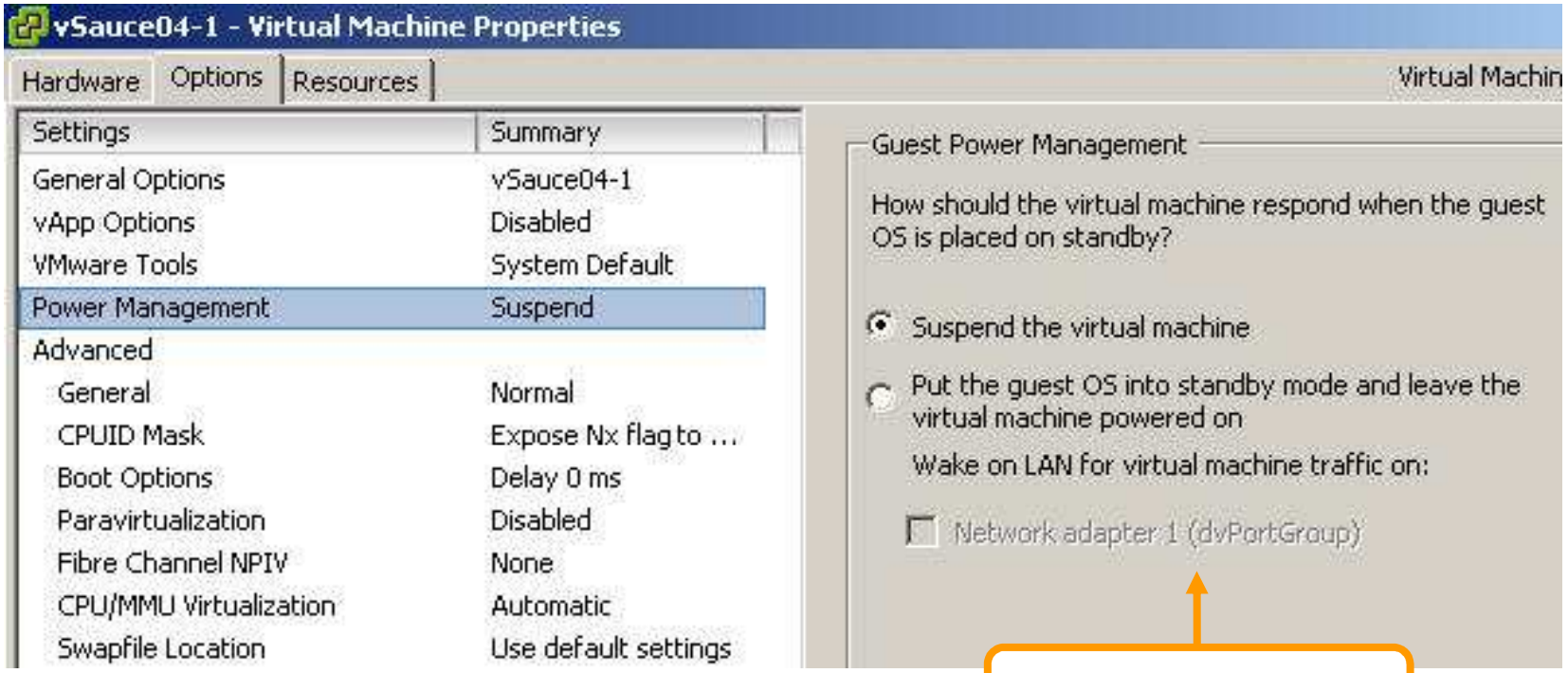


Customize power button actions.

When to run VMware Tools scripts

Update checks and time sync.

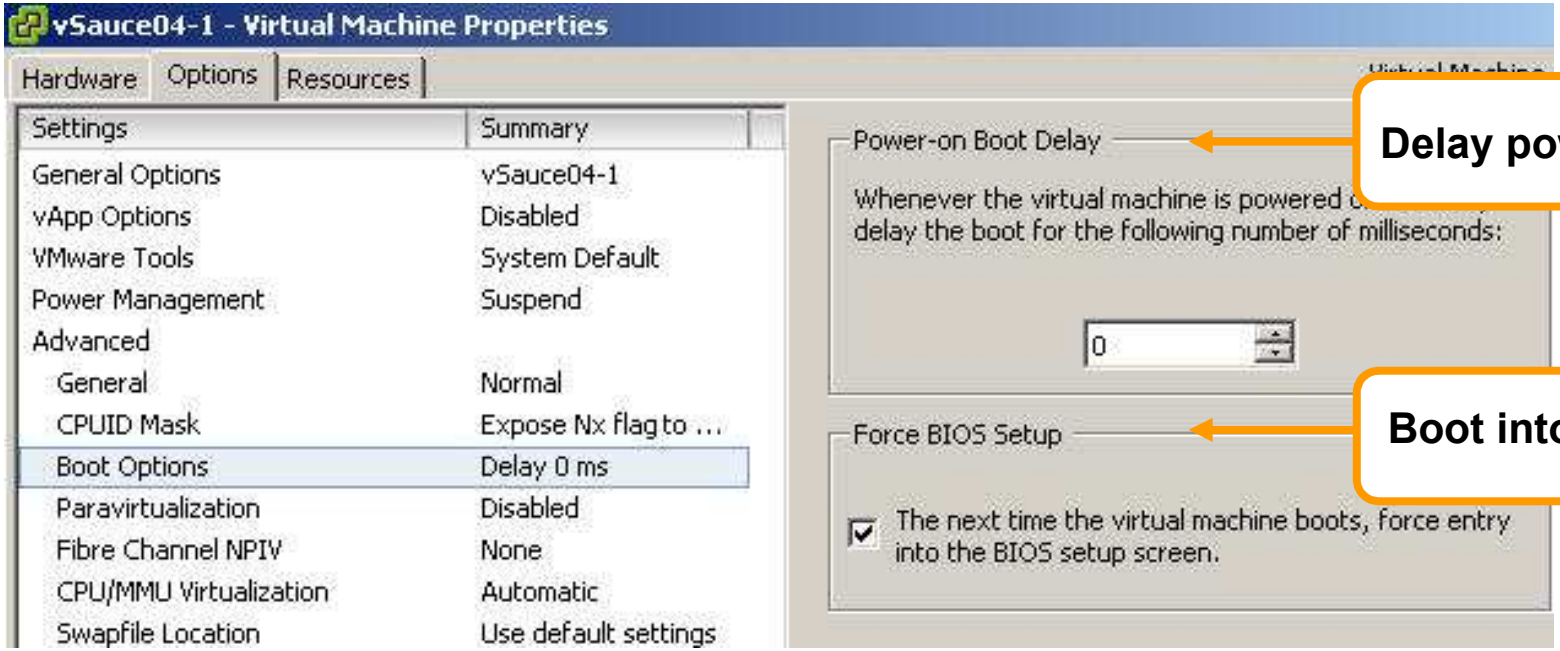
Options: Power Management



Suspend or standby the guest operating system gracefully.

Wake on LAN.

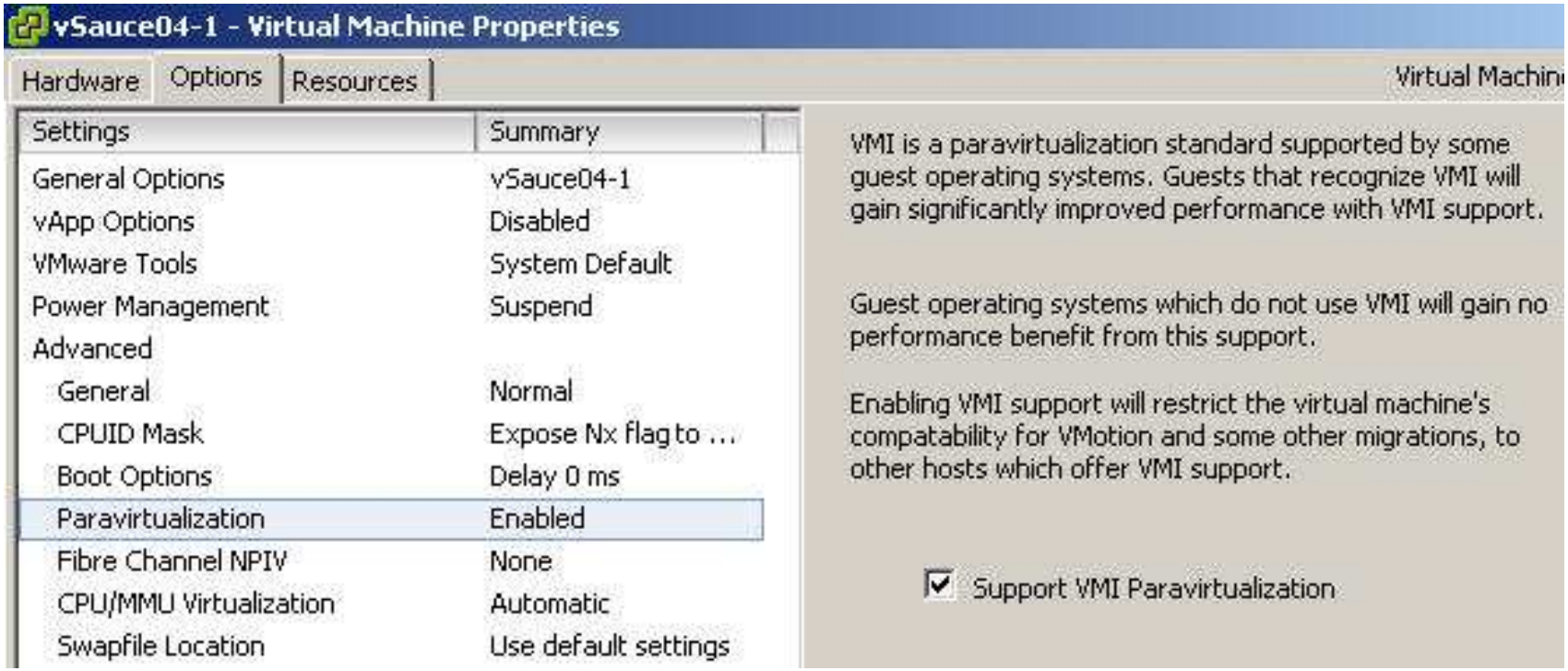
Advanced: Boot Options



Advanced options usually do not need to be set.

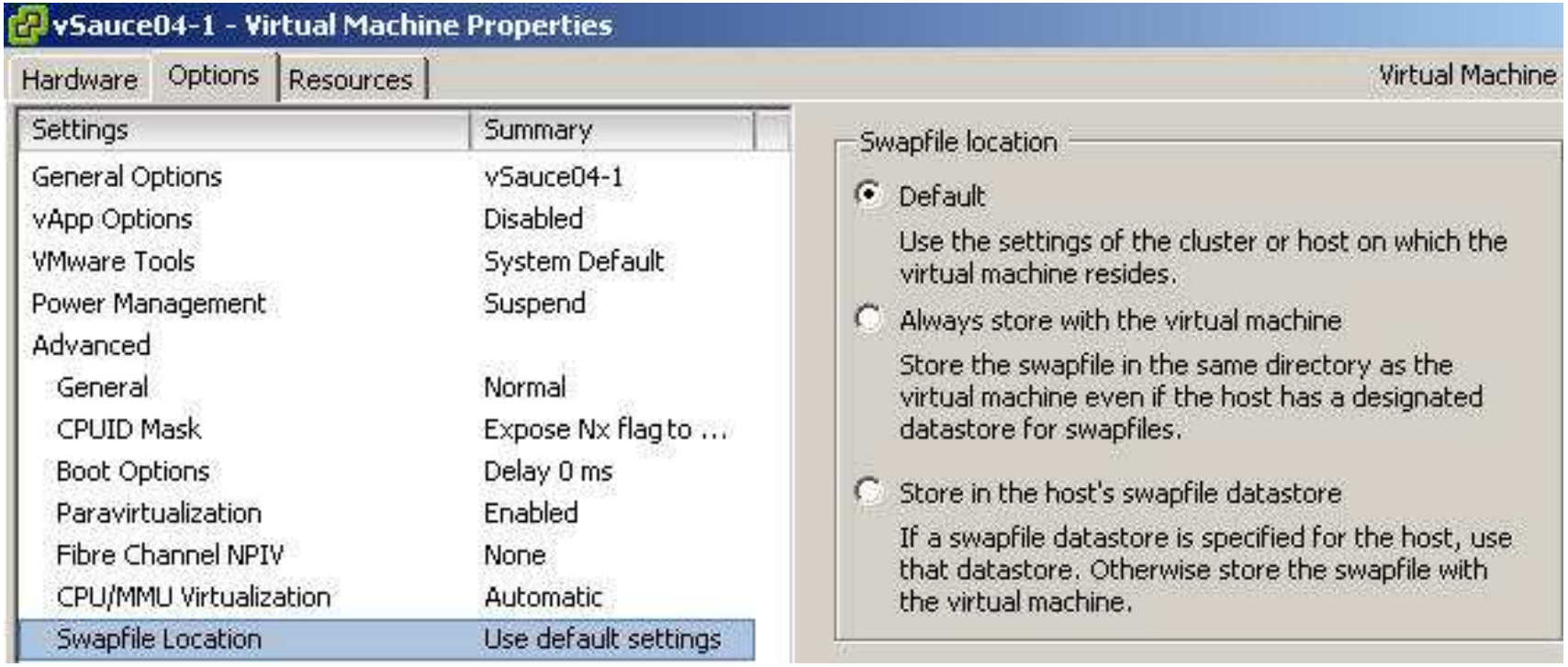
Advanced: Paravirtualization

Paravirtualization, supported by some guest operating systems, makes a guest operating system aware that it is running inside a virtual machine rather than on physical hardware.



Swap File Location

Each host or cluster can have a custom swap file datastore location defined.



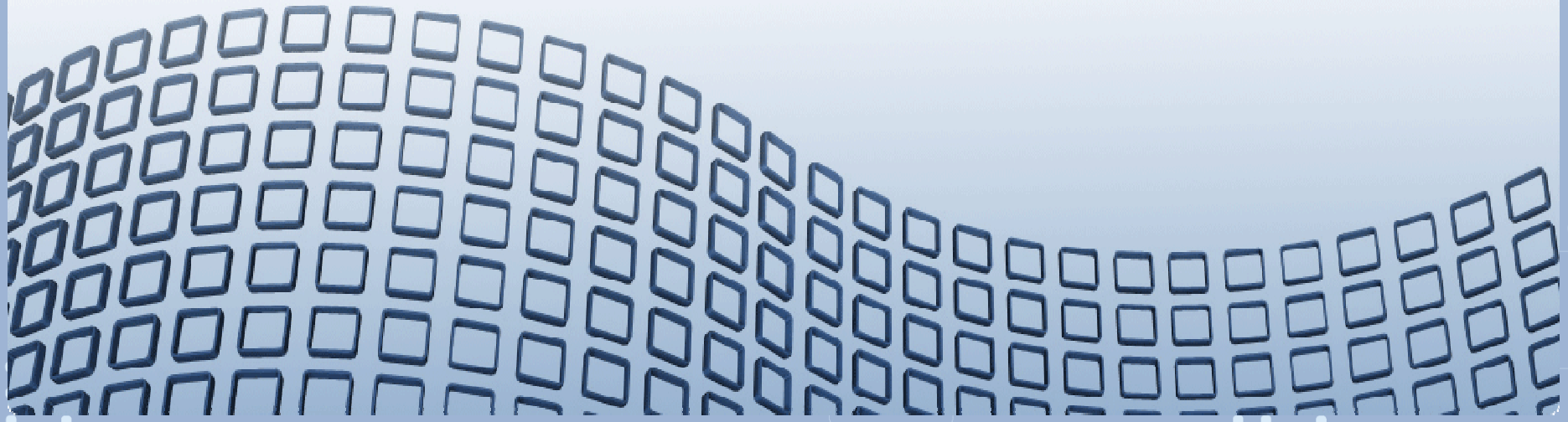
Lab 12

In this lab, you will modify a virtual machine's hardware and add a raw LUN to a virtual machine.

1. Modify a virtual machine's disk, memory, and name.
2. Add a raw LUN to an existing virtual machine and verify that the guest operating system sees the new disk.

Lesson Summary

- USB controllers, Ethernet adapters, and hard disks can be added to a virtual machine while it is powered on.
- The size of virtual machine's disk, such as the C: drive, can be increased while the virtual machine is powered on.
- When a raw LUN is added to a virtual machine, an RDM pointing to the raw LUN is create in the specified VMFS datastore.



Lesson 7:
Managing Virtual Machines

Lesson Objectives

- Snapshot a virtual machine and manage multiple snapshots
- Remove a virtual machine from the vCenter Server inventory and completely from disk
- Describe the different types of migration
- Perform a migration using VMware Storage VMotion

Virtual Machine Snapshots

Snapshots allow you to preserve the state of the virtual machine so that you can return to the same state repeatedly.

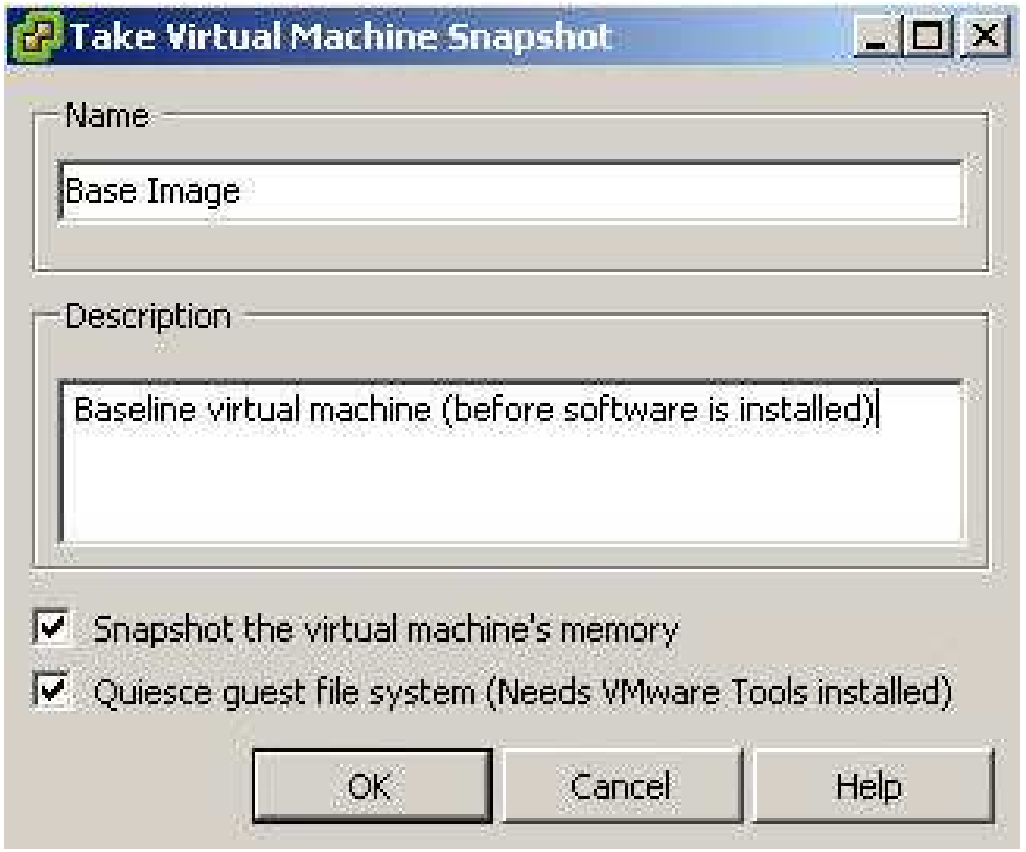
For example, if you are testing software, snapshots allow you to back out of these changes.

Taking a Snapshot

You can take a snapshot while a virtual machine is powered on, powered off, or suspended.

A snapshot captures the entire state of the virtual machine:

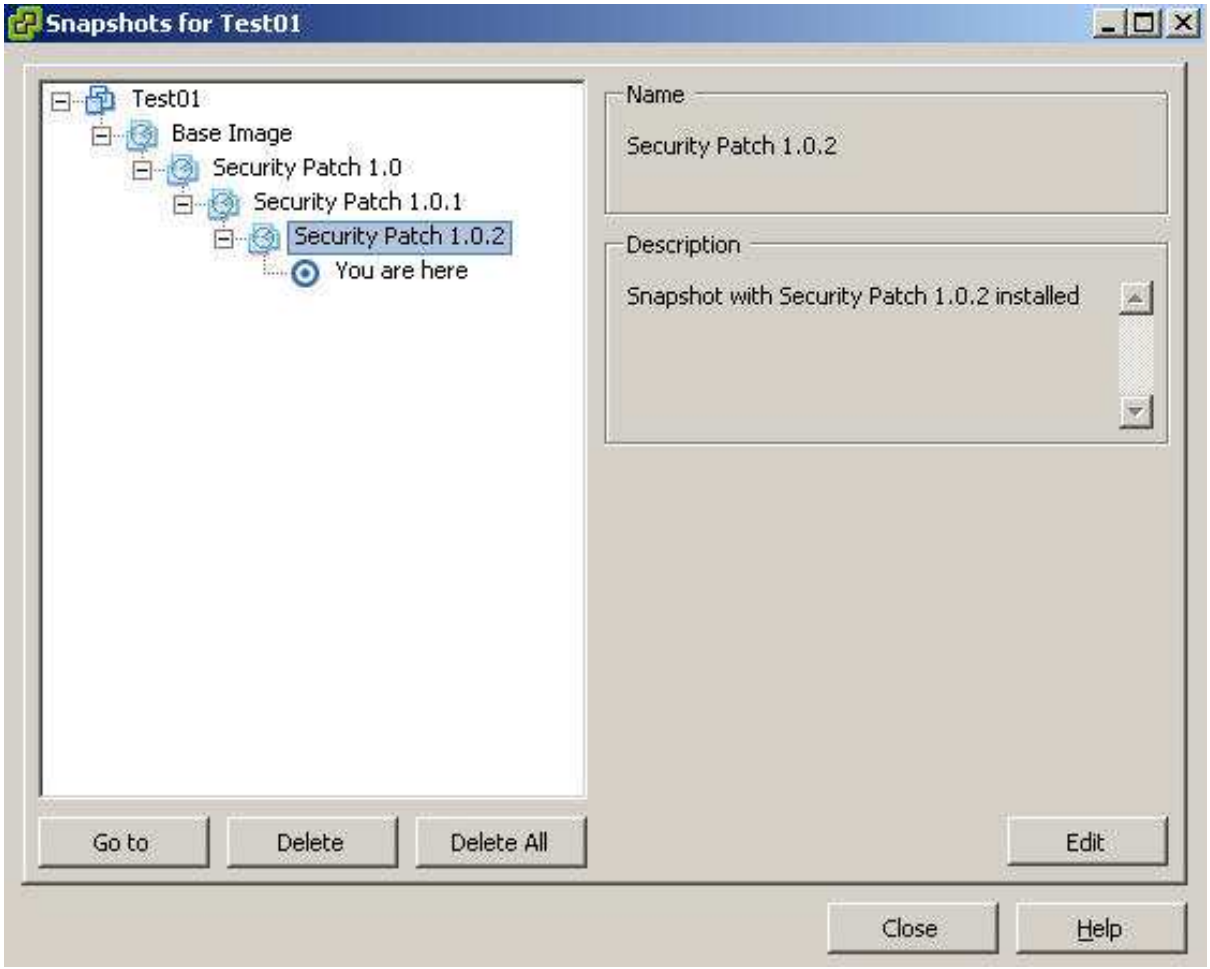
- Memory state, settings state, and disk state



Managing Snapshots

The Snapshot Manager lets you review all snapshots for the active virtual machine and act on them directly.

- Revert to a snapshot.
- Delete one or all snapshots.



Virtual Machine Snapshot Files

A snapshot consists of a set of files: the memory state (.vmsn), the description file (-00000#.vmdk), and the delta file (-00000#-delta.vmdk).

The snapshot list file (.vmsd) keeps track of the virtual machine's snapshots.

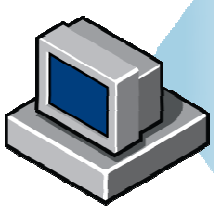
View: Reports Maps

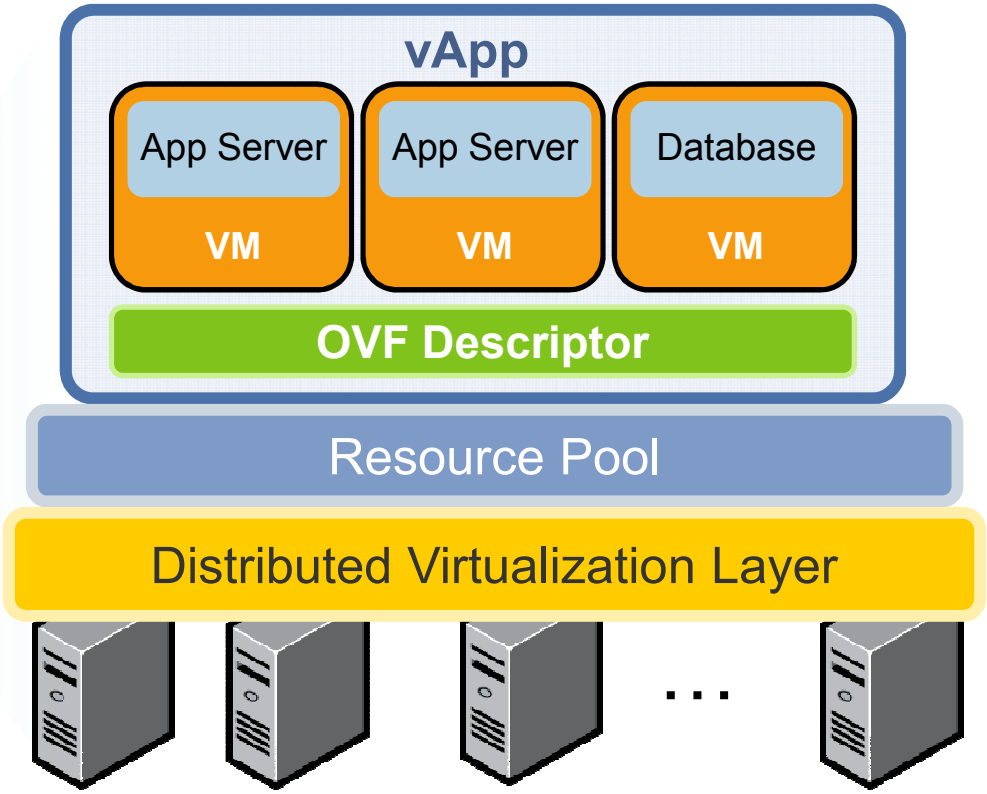
Show all Virtual Machine Files

Name	Path	File type	Datastore	Size
vmware-1.log	[Local06] Carla07-4/vmware-1.log	Log	Local06	148.46 KB
Carla07-4-Snapshot1.vmsn	[Local06] Carla07-4/Carla07-4-Snapshot1.vmsn	Snapshot Data	Local06	381.19 MB
Carla07-4-000001.vmdk	[Local06] Carla07-4/Carla07-4-000001.vmdk	Disk Descriptor	Local06	243.00 B
Carla07-4.vmdk	[Local06] Carla07-4/Carla07-4.vmdk	Disk Descriptor	Local06	443.00 B
Carla07-4.vmsd	[Local06] Carla07-4/Carla07-4.vmsd	Snapshot List	Local06	480.00 B
Carla07-4.vmxf	[Local06] Carla07-4/Carla07-4.vmxf	Extended Configuration	Local06	264.00 B
vmware.log	[Local06] Carla07-4/vmware.log	Log	Local06	113.99 KB
Carla07-4.nvram	[Local06] Carla07-4/Carla07-4.nvram	NVRAM	Local06	8.48 KB
Carla07-4.vmx	[Local06] Carla07-4/Carla07-4.vmx	Configuration	Local06	2.99 KB
Carla07-4-000001-delta.vmdk	[Local06] Carla07-4/Carla07-4-000001-delta.vmdk	Disk Extent	Local06	16.01 MB
Carla07-4-flat.vmdk	[Local06] Carla07-4/Carla07-4-flat.vmdk	Disk Extent	Local06	1019.00 MB
Carla07-4-a6a81051.vswp	[Local06] Carla07-4/Carla07-4-a6a81051.vswp	Swap	Local06	364.00 MB

Managing Virtual Machines Using vApp

A VMware vApp is a multitier application service that you can manage as a single inventory item.



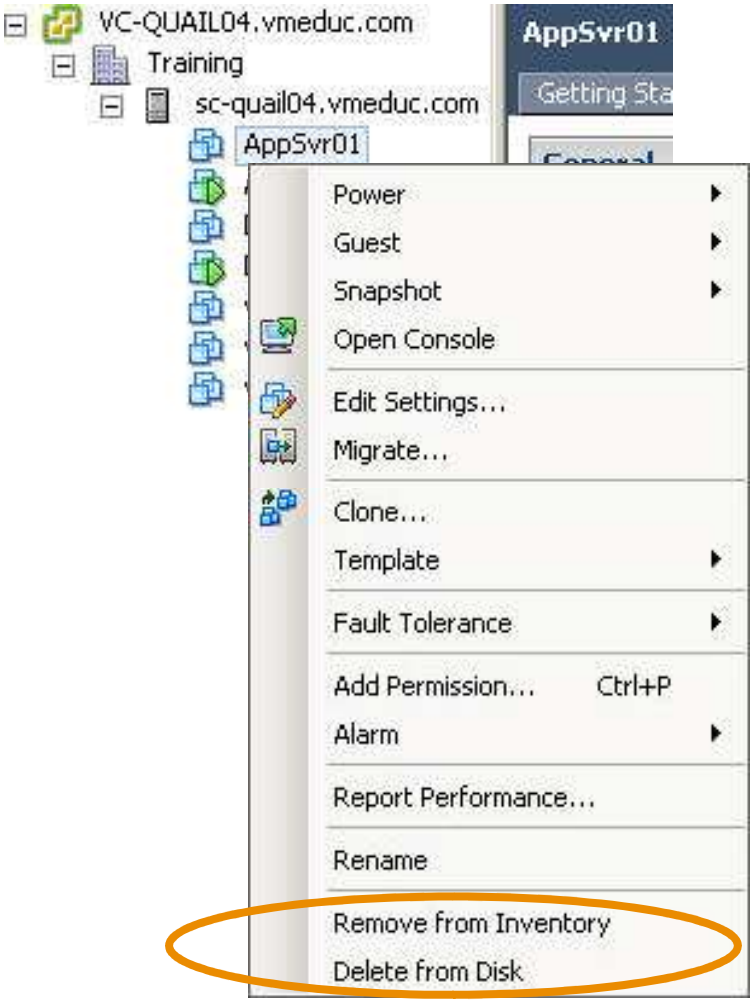


A vApp has the same basic operations as a virtual machine, but it contains multiple virtual machines.

Removing a Virtual Machine

There are two ways to remove a virtual machine:

- Remove a virtual machine from the inventory.
  - The virtual machine's files still remain on disk.
  - The virtual machine can be re-added to the inventory at a later time.
- Delete a virtual machine from disk.
  - The virtual machine is removed from the inventory, and its files are permanently deleted from disk.



Migrating Virtual Machines

Migration is the process of moving a virtual machine from one host or storage location to another. Types of migrations:

- Cold – Migrate a virtual machine that is powered off.
- Suspend – Migrate a virtual machine that is suspended.
- VMware VMotion™ – Migrate a virtual machine that is powered on.
- Storage VMotion – Migrate just a virtual machine's files, while the virtual machine is powered on, to a different datastore.

A main use of migration is to improve overall hardware utilization.

VMotion has additional uses:

- It allows continued virtual machine operation while accommodating scheduled hardware downtime.
- It allows VMware Distributed Resource Scheduler to balance virtual machines across hosts.

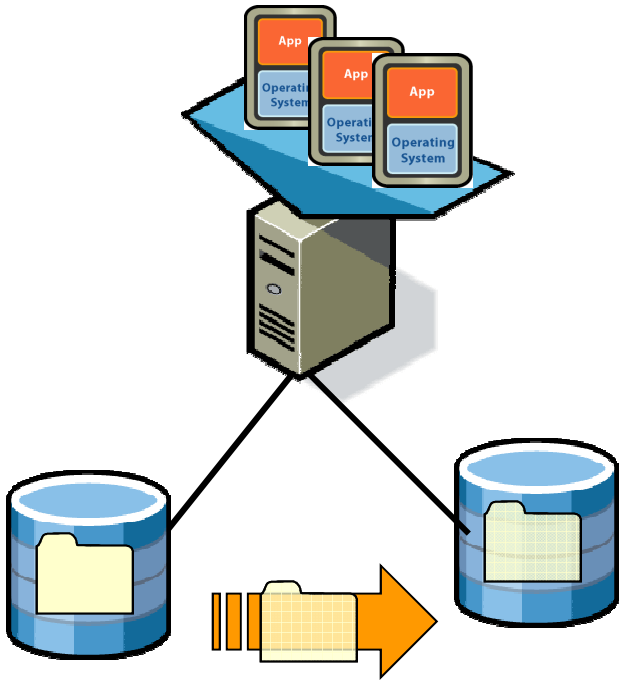
Comparison of Migration Types

Migration type	Power state	Change host/ datastore ?	Across datacenters ?	Shared storage required?	CPU compatibility?
Cold	Off	Host or datastore or both	Yes	No	Different CPU families allowed
Suspended VM	Suspended	Host or datastore or both	Yes	No	Must meet CPU compatibility requirements
VMotion	On	Host	No	Yes	Must meet CPU compatibility requirements
Storage VMotion	On	Datastore	No	No	N/A

Benefits of Storage VMotion

Migration with Storage VMotion:

- Performing storage maintenance and reconfiguration
- Redistributing storage load
- Evacuating physical storage about to be retired
- Storage tiering
- Upgrading ESX/ESXi hosts without virtual machine downtime

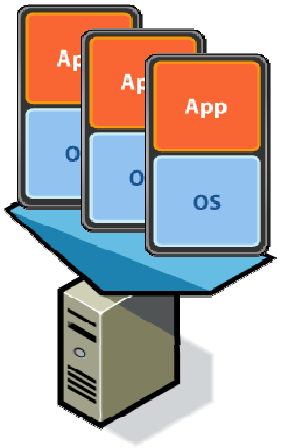


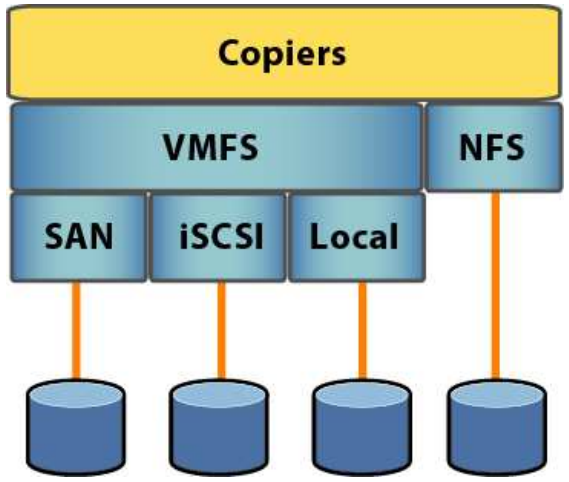
Storage Type Independency

Storage VMotion is storage type–independent.

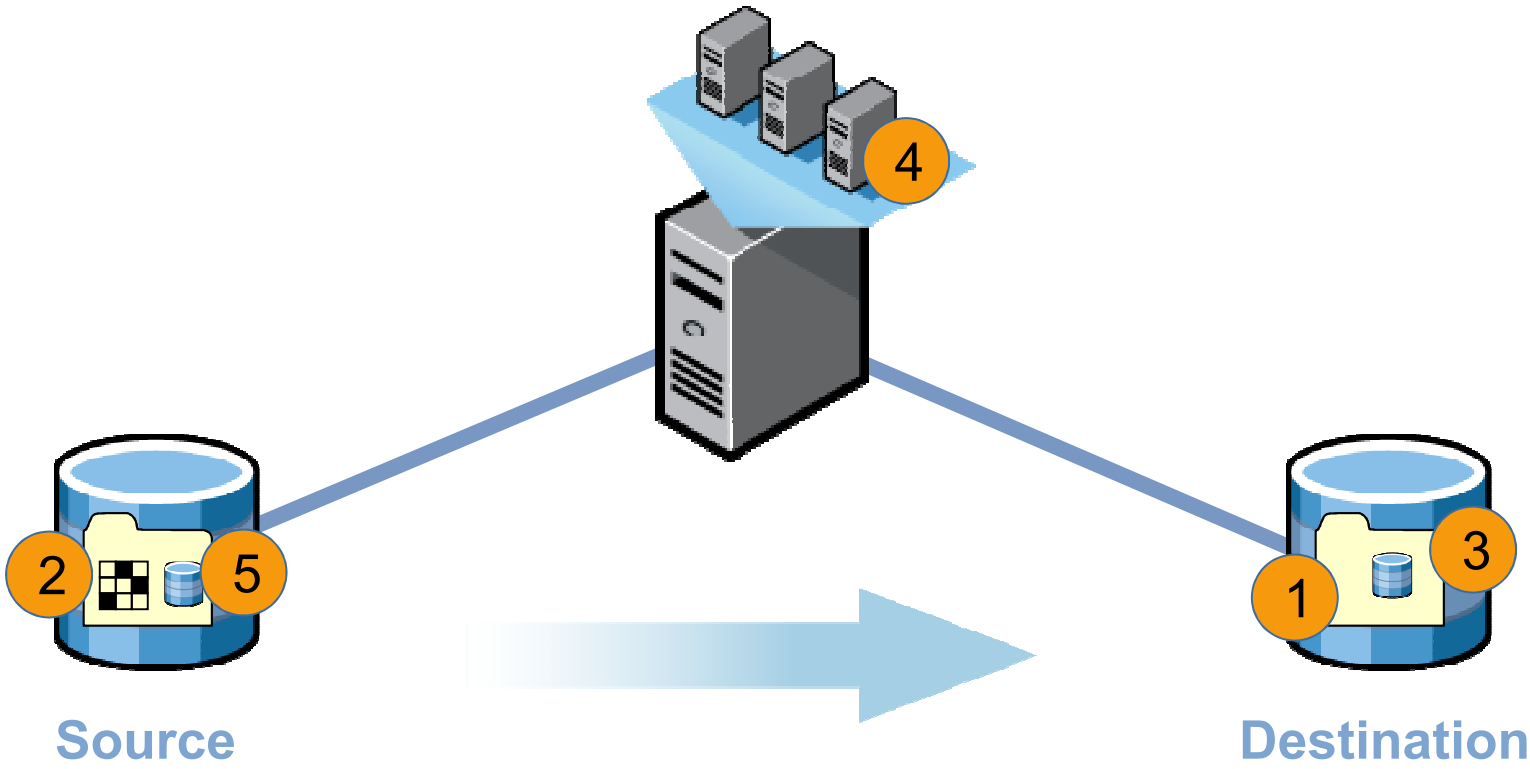
- Virtual machine disks are moved with snapshot technology.
- Virtual machine home files are copied using a network file copier.
- Copiers are not storage type–specific, located “above” the file system layer.

Source and destination can be different storage types.



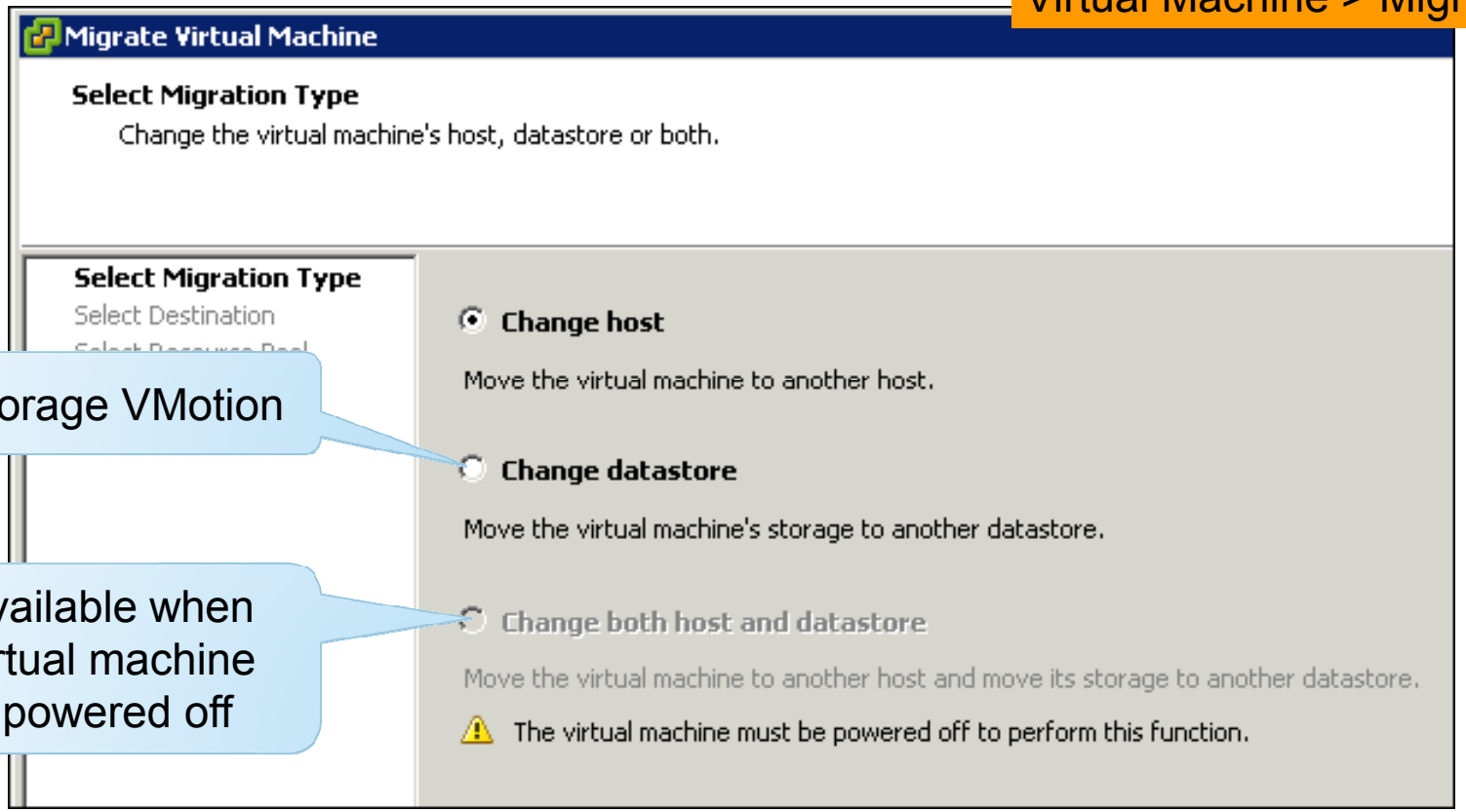


Storage VMotion In Action



Migrating Using Storage VMotion

Virtual Machine > Migrate



Storage VMotion

Available when virtual machine is powered off

Storage VMotion Guidelines and Limitations

Guidelines:

- Spend time planning and coordinating with administrators.
- Perform during off-peak hours.
- Ensure that source host has access both to source and target datastores.

Limitations:

- Virtual machines with snapshots cannot be migrated.
- The virtual machine must be powered off to concurrently migrate to another host and datastore.
- Up to four concurrent Storage VMotion migrations can occur.

Lab 13

In this lab, you will perform several virtual machine management tasks.

1. Remove a virtual machine from the vCenter Server inventory.
2. Re-add the virtual machine and verify that it appears in the inventory.
3. Delete a virtual machine from disk and verify that it can no longer be accessed.
4. Take snapshots of a virtual machine.
5. Revert to a snapshot.
6. Migrate a virtual machine using Storage VMotion.

Lesson Summary

- The Snapshot Manager allows you to revert back to a snapshot and delete one or more of a virtual machine's snapshots.
- A virtual machine that is removed from the vCenter Server inventory can be returned to the inventory because its files are not deleted from disk.
- Storage VMotion allows you to migrate a virtual machine from one datastore to another while the virtual machine is powered on.

Key Points

- There are various methods to create a virtual machine. Choose the method that best fits your needs.
- Deploying virtual machines from a template allows you to easily create many virtual machines.
- vCenter Server provides useful features for provisioning virtual machines, such as vCenter Converter and Guided Consolidation.