

# ESXi Embedded and vCenter Server Setup Guide

ESXi 4.0 Embedded  
vCenter Server 4.0

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# Updated Information

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This *ESXi Embedded and vCenter Server Setup Guide* is updated with each release of the product or when necessary.

This table provides the update history of the *ESXi Embedded and vCenter Server Setup Guide*.

Revision	Description
EN-000115-05	<ul style="list-style-type: none"><li>Removed the text "No outbound traffic is allowed through the assigned IP address" from <a href="#">"Configuring IP Settings for ESXi,"</a> on page 24.</li><li>Minor change in <a href="#">"vCenter Server Prerequisites,"</a> on page 59.</li></ul>
EN-000115-04	<ul style="list-style-type: none"><li>In the topic <a href="#">"vCenter Server Software Requirements,"</a> on page 15, added a link to the vSphere Compatibility Matrixes guide.</li><li>In the topic <a href="#">"vSphere Client Software Requirements,"</a> on page 15, added a link to the vSphere Compatibility Matrixes guide.</li><li>In the introduction to <a href="#">Chapter 7, "Preparing the vCenter Server Databases,"</a> on page 45, added a link to the vSphere Compatibility Matrixes guide.</li></ul>
EN-000115-03	In the topic <a href="#">"Enable the Scratch Partition,"</a> on page 29, corrected details in the code of the procedure.
EN-000115-02	<ul style="list-style-type: none"><li>In the topic <a href="#">"About ESXi,"</a> on page 12, in the paragraph on vSphere Client, changed "An ESXi 4.0 Embedded host is a physical server that contains an ESX image" to "An ESXi Embedded host is a physical server that contains an ESXi"</li><li>Removed the redundant chapter "Post-Setup Considerations for ESXi".</li></ul>
EN-000115-01	<ul style="list-style-type: none"><li><a href="#">"Enable the Scratch Partition,"</a> on page 29 now states that the -g parameter gets the current state of the scratch partition instead of the -s parameter.</li><li>In <a href="#">"vCenter Server Database Patch and Configuration Requirements,"</a> on page 45, <a href="#">Table 7-1</a> now contains information that the patch version is updated to 10.2.0.4 for Oracle 10g database.</li><li><a href="#">"vCenter Server Prerequisites,"</a> on page 59 now contains information that to use vCenter Linked Mode, multiple vCenter Server systems should be added to a domain.</li></ul>
EN-000115-00	Initial release.



# About This Book

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The *ESXi Embedded and vCenter Server Setup Guide* covers ESXi Embedded and VMware® vCenter Server only. It does not include information on ESX or ESXi Installable.

## Intended Audience

This book is intended for anyone who needs to install vCenter Server and set up ESXi 4.0 Embedded.

The information is written for experienced Windows or Linux system administrators who are familiar with virtual machine technology and datacenter operations.

## Document Feedback

VMware welcomes your suggestions for improving our documentation. If you have comments, send your feedback to [docfeedback@vmware.com](mailto:docfeedback@vmware.com).

## VMware vSphere Documentation

The vSphere documentation consists of the combined VMware vCenter Server and ESX/ESXi documentation set.

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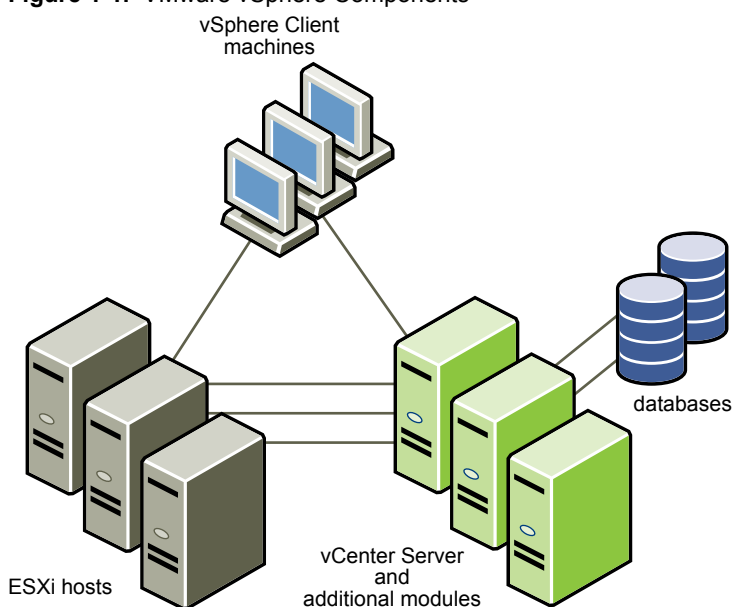
Services provides offerings to help you assess, plan, build, and manage your virtual environment. To access information about education classes, certification programs, and consulting services, go to <http://www.vmware.com/services>.

# Introduction to VMware vSphere

These topics describe VMware vSphere.

The following figure illustrates the basic components of VMware vSphere.

**Figure 1-1.** VMware vSphere Components



Each vCenter Server system manages multiple ESX hosts. You can run the vSphere Client and vSphere Web Access on multiple workstations.

The major VMware vSphere components are:

- VMware ESXi Embedded** Provides a virtualization layer that abstracts the processor, memory, storage, and networking resources of the physical host into multiple virtual machines. You do not need to install ESXi Embedded because it is embedded as firmware on hardware that you purchase from a vendor.
- VMware ESXi Installable** Provides a virtualization layer that abstracts the processor, memory, storage, and networking resources of the physical host into multiple virtual machines. You can install ESXi Installable on any hard drive on your server.

<b>vCenter Server</b>	A service that acts as a central administrator for ESX/ESXi hosts connected on a network. This service directs actions on the virtual machines and the hosts. The vCenter Server is the working core of vCenter. You can have multiple vCenter Server systems joined to a Linked Mode group. This allows you to log in to any single instance of vCenter Server and view and manage the inventories of all the vCenter Server systems in the group.
<b>vCenter Server additional modules</b>	Provide additional capabilities and features to vCenter Server. Generally, additional modules (sometimes called plug-ins) are released separately, install on top of vCenter Server, and can be upgraded independently. You can install additional modules on the same computer as the vCenter Server system or on a separate one. After the additional module is installed, you can activate the module's client component, which enhances the vSphere Client with user interface (UI) options. Additional modules include vCenter Update Manager, vCenter Converter, and vCenter Guided Consolidation Service.
<b>vSphere Client</b>	<p>Installs on a Windows machine and is the primary method of interaction with VMware vSphere. The vSphere Client acts as a console to operate virtual machines and as an administration interface into the vCenter Server systems and ESX hosts.</p> <p>The vSphere Client is downloadable from the vCenter Server system and ESX hosts. The vSphere Client includes documentation for administrators and console users.</p>
<b>Databases</b>	Organize all the configuration data for the VMware vSphere environment. For small deployments, the bundled Microsoft SQL Server 2005 Express database lets you set up to 5 hosts and 50 virtual machines. vCenter Server supports other database products for larger deployments. vCenter Update Manager also requires a database. VMware recommends that you use separate databases for vCenter Server and vCenter Update Manager.

## About ESXi

ESXi differs from ESX in several ways.

An ESXi Embedded host is a physical server that contains an ESXi image preinstalled as firmware in the factory or burned onto an external USB key. (Moving ESXi Embedded USB keys from one server to another is not supported.)

When you power on the ESXi host for the first time or after resetting the configuration defaults, the host enters an autoconfiguration phase during which system network and storage devices are configured with defaults.

By default, Dynamic Host Configuration Protocol (DHCP) configures IP, and all visible blank internal disks are formatted with the virtual machine file system (VMFS) so that virtual machines can be stored on the disks.

ESXi has an interface called the direct console. You can use the direct console for initial configuration and troubleshooting. Connect a keyboard and monitor to the host to use the direct console. After the host completes the autoconfiguration phase, the direct console appears on the monitor. You can examine the default network configuration and change any settings that are not compatible with your network environment.

Key operations available to you in the direct console include:

- Configuring host defaults
- Setting up administrative access
- Troubleshooting

You can also use vSphere client applications to manage the host.

# System Requirements

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Hosts running vCenter Server and ESX must meet specific hardware and operating system requirements.

This chapter includes the following topics:

- [“vCenter Server and the vSphere Client Hardware Requirements,”](#) on page 13
- [“vCenter Server Software Requirements,”](#) on page 15
- [“vSphere Client Software Requirements,”](#) on page 15
- [“Support for 64-Bit Guest Operating Systems,”](#) on page 15
- [“Requirements for Creating Virtual Machines,”](#) on page 15
- [“Required Ports,”](#) on page 16
- [“DNS Requirements for vSphere,”](#) on page 17
- [“Supported Remote Management Firmware Versions,”](#) on page 17

## vCenter Server and the vSphere Client Hardware Requirements

The vCenter Server system is a physical machine or virtual machine with access to a supported database. The vCenter Server system and the vSphere Client machines must meet specific requirements.

### Minimum Requirements for vCenter Server

- CPU – 2 CPUs
- Processor – 2.0GHz or faster Intel or AMD processor. Processor requirements might be higher if the database runs on the same machine.
- Memory – 3GB RAM. Memory requirements might be higher if the database runs on the same machine.  
vCenter Server includes a service called VMware VirtualCenter Management Webservices. This service requires 128MB to 1.5GB of additional memory. The VirtualCenter Management Webservices process allocates the required memory at startup.
- Disk storage – 2GB. Disk requirements might be higher if the database runs on the same machine.
- Microsoft SQL Server 2005 Express disk requirements – Up to 2GB free disk space to decompress the installation archive. Approximately 1.5GB of these files are deleted after the installation is complete.
- Networking – Gigabit connection recommended.

See your database documentation for the hardware requirements of your database. The database requirements are in addition to the vCenter Server requirements if the database and vCenter Server run on the same machine.

## Minimum Requirements for the vSphere Client

- CPU – 1 CPU
- Processor – 266MHz or faster Intel or AMD processor (500MHz recommended).
- Memory – 200MB RAM
- Disk Storage – 1GB free disk space for a complete installation, which includes the following components:
  - Microsoft .NET 2.0
  - Microsoft .NET 3.0 SP1
  - Microsoft Visual J#
  - vSphere Client 4.0
  - vSphere Host Update Utility 4.0

You must also have 400MB free on the drive that has your %temp% directory.

If all of the prerequisites are already installed, 300MB of free space is required on the drive that has your %temp% directory, and 450MB is required for the vSphere Client 4.0.

- Networking – Gigabit connection recommended.

## 32-Bit or 64-Bit Operating System for vCenter Server

When you have up to 200 hosts, you can use a 32-bit Windows operating system, but a 64-bit Windows operating system is preferred. When you have 200–300 hosts, a 64-bit Windows operating system is required.

## Recommendations for Optimal Performance

Depending on the number of ESX hosts and virtual machines in your environment, the following system requirements should be used as guidelines for optimal performance.

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**IMPORTANT** The recommended disk sizes assume default log levels. If you configure more granular log levels, more disk space is required.

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[Table 2-1](#) summarizes the requirements for a medium deployment.

**Table 2-1.** Up to 50 Hosts and 250 Powered-On Virtual Machines

Product	CPU	Memory	Disk
vCenter Server	2	4GB	3GB
vSphere Client	1	200MB	1GB

[Table 2-2](#) summarizes the requirements for a large deployment.

**Table 2-2.** Up to 200 Hosts and 2000 Powered-On Virtual Machines

Product	CPU	Memory	Disk
vCenter Server	4	4GB	3GB
vSphere Client	1	500MB	1GB

[Table 2-3](#) summarizes the requirements for an extra-large deployment.

vCenter Server must be hosted on a 64-bit Windows operating system for this configuration.

**Table 2-3.** Up to 300 Hosts and 3000 Powered-On Virtual Machines

Product	CPU	Memory	Disk
vCenter Server	4	8GB	3GB
vSphere Client	1	500MB	1GB

## Requirements for Installing vCenter Server on a Custom Drive

If you install vCenter Server on the E:\ drive or on any custom drive, note the following space requirements.

- 601MB on the custom drive for vCenter Server
- 1.13GB on the C:\ drive for Microsoft .NET 3.0 SP1, Microsoft ADAM, Microsoft SQL Server 2005 Express (optional), and Microsoft Visual C++ 2005 Redistributable
- 375MB for the custom drive %temp% directory

## vCenter Server Software Requirements

Make sure that your operating system supports vCenter Server.

For a list of supported operating systems, see the *vSphere Compatibility Matrixes* at [http://www.vmware.com/pdf/vsphere4/r40/vsp\\_compatibility\\_matrix.pdf](http://www.vmware.com/pdf/vsphere4/r40/vsp_compatibility_matrix.pdf) on the VMware vSphere documentation Web site.

## vSphere Client Software Requirements

Make sure that your operating system supports the vSphere Client.

The vSphere Client requires the Microsoft .NET 3.0 SP1 Framework. If your system does not have it installed, the vSphere Client installer installs it.

For a list of supported operating systems, see the *vSphere Compatibility Matrixes* at [http://www.vmware.com/pdf/vsphere4/r40/vsp\\_compatibility\\_matrix.pdf](http://www.vmware.com/pdf/vsphere4/r40/vsp_compatibility_matrix.pdf) on the VMware vSphere documentation Web site.

## Support for 64-Bit Guest Operating Systems

ESX offers support for several 64-bit guest operating systems.

See the *Guest Operating System Installation Guide* for a complete list.

64-bit guest operating systems have specific hardware requirements:

- For AMD Opteron-based systems, the processors must be Opteron Rev E and later.
- For Intel Xeon-based systems, the processors must include support for Intel Virtualization Technology (VT). Many servers that include CPUs with VT support might ship with VT disabled by default, so you must enable VT manually. If your CPUs support VT but you do not see this option in the BIOS, contact your vendor to request a BIOS version that lets you enable VT support.

To determine whether your server has 64-bit VMware support, you can download the CPU Identification Utility at the VMware downloads page: [http://www.vmware.com/download/shared\\_utilities.html](http://www.vmware.com/download/shared_utilities.html).

## Requirements for Creating Virtual Machines

To create a virtual machine, the ESX/ESXi host must be able to support a virtual process, a virtual chip set, and a virtual BIOS.

Each ESX/ESXi machine has the requirements shown in [Table 2-4](#).

**Table 2-4.** Requirements for Creating Virtual Machines

Component	Requirements
Virtual processor	One, two, four, or eight processors per virtual machine <b>NOTE</b> If you create a two-processor virtual machine, your ESXi machine must have at least two physical core in processor.
Virtual chip set	Intel 440BX-based motherboard with NS338 SIO chip
Virtual BIOS	PhoenixBIOS 4.0 Release 6

## Required Ports

vCenter Server requires certain ports to send and receive data.

The vCenter Server system must be able to send data to every managed host and receive data from every vSphere Client. To enable migration and provisioning activities between managed hosts, the source and destination hosts must be able to receive data from each other.

VMware uses designated ports for communication. Additionally, the managed hosts are listening for data from the vCenter Server system on designated ports. If a firewall exists between any of these elements and Windows firewall service is in use, the installer opens the ports during the installation. For custom firewalls, you must manually open the required ports. If you have a firewall between two managed hosts and you want to perform source or target activities, such as migration or cloning, you must configure a means for the managed hosts to receive data.

**NOTE** In Microsoft Windows 2008, a firewall is enabled by default.

[Table 2-5](#) lists the default ports that are required for communication between components.

**Table 2-5.** Required Ports

Port	Description
80	vCenter Server requires port 80 for direct HTTP connections. Port 80 redirects requests to HTTPS port 443. This is useful if you accidentally use http://server instead of https://server.
389	This port must be open on the local and all remote instances of vCenter Server. This is the LDAP port number for the Directory Services for the vCenter Server group. The vCenter Server system needs to bind to port 389, even if you are not joining this vCenter Server instance to a Linked Mode group. If another service is running on this port, it might be preferable to remove it or change its port to different port. If needed, you can run the LDAP service on any port from 1025 through 65535. If this instance is serving as the Microsoft Windows Active Directory, change the port number from 389 to an available port from 1025 through 65535.
443	The default port that the vCenter Server system uses to listen for connections from the vSphere Client. To enable the vCenter Server system to receive data from the vSphere Client, open port 443 in the firewall. The vCenter Server system also uses port 443 to listen for data transfer from the vSphere Web Access Client and other SDK clients. If you use another port number for HTTPS, you must use <ip-address>:<port> when you log in to the vCenter Server system.
636	For vCenter Linked Mode, this is the SSL port of the local instance. If another service is running on this port, it might be preferable to remove it or change its port to different port. If needed, you can run the SSL service on any port from 1025 through 65535.
902	The default port that the vCenter Server system uses to send data to managed hosts. Managed hosts also send a regular heartbeat over UDP port 902 to the vCenter Server system. This port must not be blocked by firewalls between the server and the hosts, or between hosts.
902/903	Ports 902 and 903 must not be blocked between the vSphere Client and the hosts. These ports are used by the vSphere Client to display virtual machine consoles.

**Table 2-5.** Required Ports (Continued)

Port	Description
8080	Web Services HTTP. Used for the VMware VirtualCenter Management Webservices.
8443	Web Services HTTPS. Used for the VMware VirtualCenter Management Webservices.

If you want the vCenter Server system to use a different port to receive vSphere Client data, see *Basic System Administration*.

To tunnel the vSphere Client data through the firewall to the receiving port on the vCenter Server system, see *Basic System Administration*. VMware does not recommend this method because it disables the vCenter Server console function.

For a discussion of firewall configuration, see the *Server Configuration Guide*.

## DNS Requirements for vSphere

You can install vCenter Server, like any other network server, on a machine with a fixed IP address and well-known DNS name, so that clients can reliably access the service.

Assign a static IP address and host name to the Windows server that will host the vCenter Server system. This IP address must have a valid (internal) domain name system (DNS) registration.

Ensure that the ESXi host management interface has a valid DNS resolution from the vCenter Server and all vSphere Clients and vSphere Web Clients. Ensure that the vCenter Server has a valid DNS resolution from all ESXi hosts and all vSphere Clients and vSphere Web Clients. Ensure that the vCenter Server is installed on a machine that has a resolvable fully qualified domain name (FQDN).

If you use DHCP instead of a static IP address for vCenter Server, make sure that the vCenter Server computer name is updated in the domain name service (DNS). Ping the computer name to test the connection. For example, if the computer name is `host-1.company.com`, you can ping the name by running the following command in the Windows command prompt:

```
ping host-1.company.com
```

If you can ping the computer name, the name is updated in DNS.

## Supported Remote Management Firmware Versions

You can use remote management applications for installing ESX or for remote management of ESX/ESXi.

[Table 2-6](#) lists the remote management firmware versions that are supported for installing ESX 4.0 remotely.

**NOTE** If you are using a remote management application to access the ESXi direct console, consider enabling high-contrast mode in the direct console by pressing F4.

**Table 2-6.** Supported Remote Management Server Models and Firmware Versions

Remote Controller Make and Model	Firmware Version	Java	ActiveX
DRAC 5	1.4	Not applicable	1.4.2_19
	1.45 (08.10.06)	2.1,0,14	1.6.0.50
	1.40 (08.08.22)	2,1,0,14	1.6.0_11
	1.20 (07.03.02)	1.4.2_06	2,1,0,13
	1.33	1.6.0_07	2,1,0,14
	1.32 (07.12.22)	1.4.2_13	2,1,0,13
	1.0 (06.05.12)	1.4.2_13	2,1,0,13

**Table 2-6.** Supported Remote Management Server Models and Firmware Versions (Continued)

<b>Remote Controller Make and Model</b>	<b>Firmware Version</b>	<b>Java</b>	<b>ActiveX</b>
	1.32	1.6.0_11	2,1,0,14
	1.2	1.6.0_11	2,1,0,14
	1.45 (09.01.16)	1.6.0_11	2,1,0,14
	1.3	1.6.0_11	2,1,0,14
	1.33	1.6.0_11	2,1,0,13
DRAC 4	1.7	1.4.2_06	2,1,0,14
ILO	.26	1.6.0_11	2,1,0,14
	1.7	1.4.2_19	Not applicable
ILO2	1.91 (07/26/2009)	1.6.0_07	2,1,0,14
	1.29 (2/28/2007)	1.4.2_13	Not applicable
RSA	1.09	1.6.0_11	2,1,0,14
	1.06	1.6.0_11	2,1,0,14

## Setting Up ESXi

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These topics provide information about using the direct console user interface and configuring defaults for ESXi 4.0.

This chapter includes the following topics:

- [“Network Access to Your ESXi 4.0 Host,”](#) on page 20
- [“Configure the Network Settings on a Detached Host,”](#) on page 20
- [“Direct Console User Interface,”](#) on page 20
- [“Configure the Keyboard Layout,”](#) on page 21
- [“Create a Security Banner for the Direct Console,”](#) on page 21
- [“Configuring the BIOS Boot Settings,”](#) on page 21
- [“Change the BIOS Boot Setting for ESXi,”](#) on page 22
- [“Configure the Boot Setting for Virtual Media,”](#) on page 22
- [“Configuring Network Settings,”](#) on page 23
- [“Storage Behavior,”](#) on page 28
- [“Recording the ESXi 4.0 License Key,”](#) on page 29
- [“View System Logs,”](#) on page 30
- [“Redirect System Log Files to a Remote Host,”](#) on page 30
- [“Set the Password for the Administrator Account,”](#) on page 30
- [“Configure Lockdown Mode,”](#) on page 31
- [“Reset the System Configuration,”](#) on page 31
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- [“Remove All Custom Packages on ESXi,”](#) on page 32
- [“Disable ESXi,”](#) on page 32

## Network Access to Your ESXi 4.0 Host

The default behavior for networking is for DHCP to configure IP. You can override the default behavior after it takes effect. You can also change any settings that are not compatible with your network environment.

[Table 3-1](#) summarizes the network configuration scenarios that ESXi 4.0 supports.

**Table 3-1.** Network Configuration Scenarios

Scenario	Approach
You want to accept the DHCP-configured IP settings.	Note the IP address that DHCP assigns and use the vSphere Client or another desktop client interface to connect to the ESXi 4.0 host.
One of the following is true: <ul style="list-style-type: none"> <li>■ You do not have a DHCP server.</li> <li>■ The ESXi 4.0 host is not connected to a DHCP server.</li> <li>■ Your connected DHCP server is not functioning properly.</li> </ul>	<p>During the autoconfiguration phase, the software assigns the link local IP address, which is in the subnet 169.254.x.x/16. The assigned IP address appears on the direct console.</p> <p>You can override the link local IP address by configuring a static IP address using the direct console.</p>
The ESXi 4.0 host is connected to a functioning DHCP server, but you do not want to use the DHCP-configured IP address.	<p>During the autoconfiguration phase, the software assigns a DHCP-configured IP address.</p> <p>You can make the initial connection by using the DHCP-configured IP address. Then you can configure a static IP address.</p> <p>If you have physical access to the ESXi 4.0 host, you can override the DHCP-configured IP address by configuring a static IP address using the direct console.</p>
Your security deployment policies do not permit unconfigured hosts to be powered on the network.	Follow the setup procedure in <a href="#">“Configure the Network Settings on a Detached Host,”</a> on page 20.

## Configure the Network Settings on a Detached Host

Some highly secure environments do not permit unconfigured hosts to be powered on the network. You can configure the host before you attach the host to the network.

### Procedure

- 1 Make sure that no network cables are connected to the host.
- 2 Power on the host.
- 3 Use the direct console to configure the password for the administrator account (root).
- 4 Use the direct console to configure a static IP address.
- 5 Connect a network cable to the host.
- 6 Use the vSphere Client to connect to a vCenter Server system.
- 7 Add the host to the vCenter Server inventory.

## Direct Console User Interface

The direct console is similar to the BIOS of a computer in that it has a keyboard-only user interface.

[Table 3-2](#) lists the keys you can use to navigate and perform actions in the direct console.

**Table 3-2.** Navigating in the Direct Console

Action	Key
View and change the configuration	F2
Change the user interface to high-contrast mode	F4
Shut down or restart the host	F12
Move the selection between fields	Arrow keys
Select a menu item	Enter
Toggle a value	Spacebar
Confirm sensitive commands, such as resetting configuration defaults	F11
Save and exit	Enter
Exit without saving	Esc
Exit system logs	q

## Configure the Keyboard Layout

You can configure the layout for the keyboard that you use with the direct console.

### Procedure

- 1 From the direct console, select **Configure Keyboard** and press Enter.
- 2 Select the layout to use.
- 3 Press the spacebar to toggle selections on and off.
- 4 Press Enter.

## Create a Security Banner for the Direct Console

A security banner is a message that is displayed on the direct console Welcome screen.

### Procedure

- 1 Log in to the host from the vSphere Client.
- 2 From the **Configuration** tab, select **Advanced Settings**.
- 3 From the Advanced Settings window, select **Annotations**.
- 4 Enter a security message.

The message is displayed on the direct console Welcome screen.

## Configuring the BIOS Boot Settings

If your server has multiple drives, you might need to configure the BIOS settings.

The BIOS boot configuration determines whether your server boots into the ESXi 4.0 boot device or another boot device. Generally, the USB flash device is listed first in the BIOS boot settings on the machine that hosts ESXi. You can change the boot setting by configuring the boot order in the BIOS during startup or by selecting a boot device from the boot device selection menu.

When you change the boot order in the BIOS, the new setting affects all subsequent reboots. When you select a boot device from the boot device selection menu, the selection affects the current boot only.

Some servers do not have a boot device selection menu, in which case you must change the boot order in the BIOS even for one-time boots, and then change it back again during a subsequent reboot.

---

**NOTE** The boot device selection menu discussed here is different from the system boot options that you can configure in the vSphere Client.

---

The vSphere Client boot options allow you to configure the boot sequence for floppy, CD-ROM, and hard disk drives only. For some servers, the system BIOS has two options. One is for the boot sequence (floppy, CD-ROM, hard disk) and another for the hard disk boot order (USB key, local hard disk). When you are using the vSphere Client, the boot options correspond to the BIOS boot sequence (floppy, CD-ROM, hard disk).

## Change the BIOS Boot Setting for ESXi

Configure the BIOS boot setting for ESXi if you want the server to boot into ESXi by default.

### Prerequisites

ESXi Installable must not be on the host. ESXi Installable and ESXi Embedded cannot exist on the same host.

### Procedure

- 1 While the ESXi host is powering on, press the key required to enter your host's BIOS setup.  
Depending on your server hardware, the key might be a function key or Delete. The option to enter the BIOS setup might be different for your server.
- 2 Select the USB flash device and move it to the first position in the list.  
The host powers on in ESXi mode. If the host does not boot into ESXi, you might need to reimage the USB flash as described in ["Recover the ESXi Embedded Software,"](#) on page 37.

## Configure the Boot Setting for Virtual Media

If you are using remote management software to set up ESXi, you might need to configure the boot setting for virtual media.

Virtual media is a method of connecting a remote storage media such as CD-ROM, USB mass storage, ISO image, and floppy disk to a target server that may be anywhere on the network. The target server has access to the remote media, and can read from and write to it as if it were physically connected to the server's USB port.

### Prerequisites

ESXi Installable must not be on the host. ESXi Installable and ESXi Embedded cannot exist on the same host.

### Procedure

- 1 Connect the media to the virtual device.  
For example, if you are using a Dell server, log in to the Dell Remote Access Controller (DRAC) or a similar remote management interface and select a physical floppy or CD-ROM drive, or provide a path to a floppy image or CD-ROM image.
- 2 Reboot the server.
- 3 While the server is powering on, enter the device selection menu.  
Depending on your server hardware, the key might be a function key or Delete.
- 4 Follow the instructions to select the virtual device.

The server boots from the configured device once and goes back to the default boot order for subsequent boots.

## Configuring Network Settings

A working IP address is required for ESXi to be fully operational. To configure basic network settings, use the vSphere Client or the direct console.

Use the vSphere Client in the following cases:

- You are satisfied with the DHCP IP address.
- You are allowed to use the DHCP IP address temporarily. In this case, connect to this address with the vSphere Client. Then use the vSphere Client to configure any networking changes.

Use the direct console in the following cases:

- You are not satisfied with the DHCP IP address.
- You are not allowed to use the DHCP IP address.
- ESXi does not have an IP address. This could happen if the autoconfiguration phase did not succeed in configuring DHCP.
- The wrong network adapter was autoselected during autoconfiguration phase.

### Choose Network Adapters for the Management Network

Traffic between an ESXi 4.0 host and any external management software is routed through an Ethernet network adapter on the host. You can use the direct console to choose the network adapters that are used by the management network.

Examples of external management software include the vSphere Client, vCenter Server, and SNMP client. Network adapters on the host are named `vmnic<N>`, where N is a unique number identifying the network adapter (for example, `vmnic0`, `vmnic1`, and so forth).

During the autoconfiguration phase, the ESXi 4.0 host chooses `vmnic0` for management traffic. You can override the default choice by manually choosing the network adapter that carries management traffic for the host. In some cases, you might want to use a Gigabit Ethernet network adapter for your management traffic. Another way to help ensure availability is to select multiple network adapters. Using multiple network adapters enables load balancing and failover capabilities.

#### Procedure

- 1 From the direct console, select **Configure Management Network** and press Enter.
- 2 Select **Network Adapters** and press Enter.
- 3 Select a network adapter and press Enter.

After the network is functional, you can use the vSphere Client to connect to the ESXi 4.0 host.

### Set the VLAN ID

You can set the virtual LAN (VLAN) ID number of the ESXi 4.0 host.

#### Procedure

- 1 From the direct console, select **Configure Management Network** and press Enter.
- 2 Select **VLAN** and press Enter.
- 3 Enter a VLAN ID number from 1 through 4095.

## Configuring IP Settings for ESXi

By default, DHCP sets the IP address, subnet mask, and default gateway.

For future reference, write down the IP address.

For DHCP to work, your network environment must have a DHCP server. If DHCP is not available, the host assigns the link local IP address, which is in the subnet 169.254.x.x/16. The assigned IP address appears on the direct console. If you do not have physical access to the host, you can access the direct console using a remote management application.

When you have access to the direct console, you can optionally configure a static network address. The default subnet mask is 255.255.0.0.

### Configure IP Settings from the Direct Console

If you have physical access to the host or remote access to the direct console, you can use the direct console to configure the IP address, subnet mask, and default gateway.

#### Procedure

- 1 Select **Configure Management Network** and press Enter.
- 2 Select **IP Configuration** and press Enter.
- 3 Select **Set static IP address and network configuration**.
- 4 Enter a the IP address, subnet mask, and default gateway and press Enter.

### Configure IP Settings from the vSphere Client

If you do not have physical access to the host, you can use the vSphere Client to configure static IP settings if you are on the same physical subnet and you configure the vSphere Client IP to be on the 169.254.x.x network.

#### Procedure

- 1 Select the host in the inventory.
- 2 Select the **Configuration** tab and click **Networking**.
- 3 Click **Properties** next to Virtual Switch: vSwitch0.
- 4 Select **Management Network** and click **Edit**.
- 5 On the **General** tab, click **Use the following IP settings**.
- 6 Enter a static IP address, subnet mask, and default gateway and click **OK**.

## Configuring DNS for ESXi

You can select either manual or automatic DNS configuration of the ESXi 4.0 host.

The default is automatic. For automatic DNS to work, your network environment must have a DHCP server and a DNS server.

In network environments where automatic DNS is not available or not desirable, you can configure static DNS information, including a host name, primary name server, secondary name server, and DNS suffixes.

## Configure DNS Settings from the Direct Console

If you have physical access to the host or remote access to the direct console, you can use the direct console to configure DNS information.

### Procedure

- 1 Select **Configure Management Network** and press Enter.
- 2 Select **DNS Configuration** and press Enter.
- 3 Select **Use the following DNS server addresses and hostname**.
- 4 Enter the primary server, an alternate server (optional), and the host name.

## Configure DNS Settings from the vSphere Client

If you do not have physical access to the host, you can use the vSphere Client to configure DNS information.

### Procedure

- 1 Select the host in the inventory.
- 2 Select the **Configuration** tab and click **Networking**.
- 3 Click **Properties** next to Virtual Switch: vSwitch0.
- 4 Select **Management Network** and click **Edit**.
- 5 On the **General** tab, click **Use the following IP settings**.
- 6 Click **Edit** next to VMkernel Default Gateway.
- 7 On the **DNS Configuration** tab, enter a static primary server, alternate server, host name, and DNS suffixes and click **OK**.

## Configure DNS Suffixes

If you have physical access to the host, you can use the direct console to configure DNS information. By default, DHCP acquires the DNS suffixes.

### Procedure

- 1 From the direct console, select **Configure Management Network**.
- 2 Select **Custom DNS Suffixes** and press Enter.
- 3 Enter new DNS suffixes.

## Test the Management Network

You can use the direct console to perform some simple network connectivity tests.

The direct console performs the following tests:

- Pings the default gateway
- Pings the primary DNS nameserver
- Pings the secondary DNS nameserver
- Resolves the configured host name

### Procedure

- 1 From the direct console, select **Test Management Network** and press Enter.

- 2 Press Enter to start the test.

## Restart the Management Agents

The management agents synchronize VMware components and let you access the ESXi 4.0 host through the vSphere Client or vCenter Server. They are installed with the vSphere software. You might need to restart the management agents if remote access is interrupted.

Restarting the management agents restarts all management agents and services that are installed and running in `/etc/init.d` on the ESXi host. Typically, these agents include `hostd`, `ntpd`, `sfcdbd`, `slpd`, `wsman`, and `vobd`. The software also restarts the Automated Availability Manager (AAM) if it is installed.

---

**NOTE** Automated Availability Manager (VMware HA agent) is installed on individual hosts when you configure HA using vCenter Server. The HA agent runs a heartbeat mechanism on each host in a cluster to signal that the host is running and is a part of the cluster.

---

Users accessing this host through the vSphere Client or vCenter Server lose connectivity when you restart management agents.

### Procedure

- 1 From the direct console, select **Restart Management Agents** and press Enter.
- 2 Press F11 to confirm the restart.

The ESXi 4.0 host restarts the management agents and services.

## Restart the Management Network

Restarting the management network interface might be required to restore networking or to renew a DHCP lease.

Restarting the management network will result in a brief network outage that might temporarily affect running virtual machines.

If a renewed DHCP lease results in a new network identity (IP address or host name), remote management software will be disconnected.

### Procedure

- 1 From the direct console, select **Restart Management Network** and press Enter.
- 2 Press F11 to confirm the restart.

## Disable the Management Network

The management network synchronizes VMware components and lets you access the ESXi 4.0 host through the vSphere Client or vCenter Server. It is installed with the vSphere software. You might need to disable the management network to isolate a host from the vCenter Server inventory.

Users accessing this host through the vSphere Client or vCenter Server lose connectivity when you disable the management network.

One scenario under which you would disable the management network is if you want to isolate an ESXi host from an HA and DRS cluster, but you do not want to lose your static IP and DNS configurations or reboot the host.

This operation does not require downtime for virtual machines. The virtual machines continue to run while the host is disconnected from vCenter Server and the vSphere Client.

**Procedure**

- 1 From the direct console, select **Disable Management Network** and press Enter.
- 2 Press F11 to confirm.

**Restoring the Standard Switch**

A vNetwork Distributed Switch functions as a single virtual switch across all associated hosts. This allows virtual machines to maintain a consistent network configuration as they migrate across multiple hosts. If you migrate an existing standard switch (virtual adapter) to a vNetwork Distributed Switch and the vNetwork Distributed Switch becomes unnecessary or stops functioning, you can restore the standard switch to ensure that the host remains accessible.

When you restore the standard switch, a new virtual adapter is created and the management network uplink that is currently connected to vNetwork Distributed Switch is migrated to the new virtual switch.

You might need to restore the standard switch for the following reasons:

- The vNetwork Distributed Switch is no longer needed or is not functioning.
- The vNetwork Distributed Switch needs to be repaired to restore connectivity to vCenter Server. In the meantime, the hosts need to remain accessible, so the standard switch is needed.
- You no longer want the host to be managed by vCenter Server. When the host is not connected to vCenter Server, most vNetwork Distributed Switch features are unavailable to the host.

**Prerequisites**

Your management network must be connected to a vNetwork Distributed Switch.

**Procedure**

- 1 From the direct console, select **Restore Standard Switch** and press Enter.  
If the host is already on a standard switch, this selection is grayed-out, and you cannot select it.
- 2 Press F11 to confirm.

**Test Connectivity to Devices and Networks**

You can use the direct console to perform some simple network connectivity tests. In addition to the management network, you can specify other devices and networks.

**Procedure**

- 1 From the direct console, select **Test Management Network** and press Enter.
- 2 Type addresses to ping or another DNS host name to resolve.
- 3 Press Enter to start the test.

## Storage Behavior

When you power on ESXi, the host enters an autoconfiguration phase during which system storage devices are configured with defaults.

By default, all visible blank internal disks with VMFS are formatted, so you can store virtual machines on the disks.



**CAUTION** ESXi overwrites any disks that appear to be blank. Disks are considered to be blank if they do not have a valid partition table or partitions. If you are using software that makes use of such disks, in particular if you are using logical volume manager (LVM) instead of (or in addition to) conventional partitioning schemes, ESXi could cause local LVM to be reformatted. Be sure to back up your system data before you power on ESXi for the first time.

On the hard drive or USB device from which the ESXi 4.0 host is booting, the disk-formatting software retains existing diagnostic partitions that are created by the hardware vendor. In the remaining space, the software creates these partitions:

- One 4GB VFAT scratch partition for system swap, if this partition is not present on another disk. See [“About the Scratch Partition,”](#) on page 28.
- One 110MB diagnostic partition for core dumps, if this partition is not present on another disk.
- One VMFS3 partition on the remaining free space.

When you install on a disk, the installer overwrites the entire disk. When the installer autoconfigures storage, the installer does not overwrite hardware vendor partitions.

The VFAT scratch and diagnostic partitions are created only on the disk from which the ESXi host is booting. On other disks, the software creates one VMFS3 partition per blank disk, using the whole disk. Only blank disks are formatted.

You might want to override this default behavior if, for example, your policy is to use shared storage devices instead of local storage. To prevent automatic disk formatting, detach the local storage devices from the host before you power on the host for the first time (or before you power on the host after you reset the host to the configuration defaults).

Automatic disk formatting occurs the first time you power on the host and when you power on the host after you reset the host to the configuration defaults. For subsequent reboots, you do not need to detach the local storage devices. If automatic disk formatting already occurred and you want to override the VMFS formatting, you can remove the datastore. See the *Server Configuration Guide*.

### About the Scratch Partition

During the autoconfiguration phase, a 4GB VFAT scratch partition is created if the partition is not present on another disk.

When ESXi boots, the system tries to find a suitable partition on a local disk to create a scratch partition.

The scratch partition is not required. It is used to store vm-support output, which you need when you create a support bundle. If the scratch partition is not present, vm-support output is stored in a ramdisk. This might be problematic in low-memory situations, but is not critical.

For ESXi Embedded, if a partition is not found but an empty local disk exists, the system formats it and creates a scratch partition. If no scratch partition is created, you can configure one, but you do not need to. You can also override the default configuration. In particular, you might want to create the scratch partition on a remote NFS mounted directory.

## Enable the Scratch Partition

If a scratch partition is not present, you might want to create one, especially if you are concerned about low-memory situations.

### Prerequisites

To enable the scratch partition, you must use the VMware vSphere command-line interface (vSphere CLI). You can install the vSphere CLI on your Microsoft Windows or Linux system or import the vSphere Management Assistant (vMA) virtual appliance onto your ESX/ESXi host. For information about importing or installing the vSphere CLI, see the *vSphere Command-Line Interface Installation and Reference Guide*.

### Procedure

- 1 To get the current state of the scratch partition, use the following command.

```
vicfg-advcfg --server <ip-address> --username username --password <password> -g
ScratchConfig.ConfiguredScratchLocation
```

- 2 To set the scratch location, use the following command.

```
vicfg-advcfg --server <ip-address> --username username --password <password> -s <path to
folder> ScratchConfig.ConfiguredScratchLocation
```

- 3 Reboot the host for the changes to take effect.

## Recording the ESXi 4.0 License Key

All ESXi 4.0 editions have associated license keys. VMware recommends that you write down the license key and tape it to the server, if possible, or put the license key in a secure, easily accessible location.

You can access the license key from the direct console or the vSphere Client. If the host becomes inaccessible or unbootable, it is important that you have a record of the license key.

### Access the ESXi 4.0 License Key from the Direct Console

If you have physical access to the host or remote access to the direct console, you can use the direct console to access the ESXi license key.

#### Procedure

- ◆ From the direct console, select **View Support Information**.

The license key appears in the form XXXX-XXXX-XXXX-XXXX.

The physical machine serial number also appears. Do not confuse the license key with the physical machine serial number.

### Access the ESXi 4.0 License Key from the vSphere Client

If you need to locate the ESXi license key, you can access it from the vSphere Client. This is the recommended method if you are not local to the host and cannot access the direct console.

#### Procedure

- 1 From the vSphere Client, select the host in the inventory.
- 2 Select the **Configuration** tab and click **Licensed Features**.

The license key appears in the form XXXX-XXXX-XXXX-XXXX.

## View System Logs

System logs provide detailed information about system operational events.

### Procedure

- 1 From the direct console, select **View System Logs**.
- 2 Press a corresponding number key to view a log.  
vCenter Server Agent (vpxa) logs appear if you add the host to vCenter Server.
- 3 Press Enter or the spacebar to scroll through the messages.
- 4 Perform a regular expression search.
  - a Press the slash key (/).
  - b Type the text to find.
  - c Press Enter.

The found text is highlighted on the screen.
- 5 Press q to return to the direct console.

### What to do next

See also [“Redirect System Log Files to a Remote Host,”](#) on page 30.

## Redirect System Log Files to a Remote Host

System logs provide detailed information about system operational events. You can use the vSphere Client to redirect system log files to a remote host.

### Procedure

- 1 From the vSphere Client, select a host in the inventory.
- 2 Select the **Configuration** tab and click **Advanced Settings**.
- 3 Click **Syslog**.
- 4 For **Syslog.Remote.Hostname**, enter a host name to which log files can be forwarded.

### What to do next

See also [“View System Logs,”](#) on page 30.

## Set the Password for the Administrator Account

You can use the direct console to set the password for the administrator account (root).

The administrative user name for the ESXi 4.0 host is root. By default, the administrative password is not set.

### Procedure

- 1 From the direct console, select **Configure Password**.
- 2 Enter a new password.
- 3 Retype the new password and press Enter.

## Configure Lockdown Mode

Lockdown mode prevents remote personnel from logging in to the ESXi host by using the root login name.

By default, lockdown mode is disabled. If you enable lockdown mode and do not configure other local host user accounts to have standalone host access through the vSphere Client, the root user does not have access through the vSphere API and CLI. Users can still access the host through the direct console or through an authorized, centralized management application, such as vCenter Server.

When lockdown mode is enabled, you can create a user with administrator privileges to connect to a standalone host. Do not use this approach in environments with numerous hosts, because maintaining separate user password databases for each host might be difficult.

To enable lockdown mode, the host must be in the vCenter Server inventory. You can either enable lockdown mode in the Add Host wizard when you add the host to the vCenter Server inventory or afterwards from the direct console. This procedure describes how to enable lockdown mode from the direct console.

### Procedure

- 1 Select **Configure Lockdown Mode** and press Enter.
- 2 Press the spacebar to select **Enable Lockdown Mode** and press Enter.
- 3 Press Enter.

## Reset the System Configuration

If you are having trouble with your ESXi host, one troubleshooting option is to reset the system configuration.

When you reset the configuration, the software overrides all your configuration changes, deletes the password for the administrator account (root), and reboots the host. Configuration changes made by your hardware vendor, such as IP address settings and license configuration, might also be deleted.

Resetting the configuration does not remove virtual machines on the ESXi host. Virtual machines are stored on the datastore, not on the USB flash. After you reset the configuration defaults, the virtual machines are not visible, but you can retrieve them by reconfiguring storage and reregistering the virtual machines.



**CAUTION** When you reset the configuration defaults, users accessing the host lose connectivity.

---

### Prerequisites

Before resetting the configuration, back up your ESXi configuration in case you want to restore your configuration.

### Procedure

- 1 (Recommended) Back up the configuration using the vSphere CLI `vicfg-cfgbackup` command.
- 2 From the direct console, select **Reset System Configuration** and press Enter.
- 3 Press F11 to confirm.

The system reboots after all settings are reset to the default values.

## Managing ESXi 4.0 Remotely

After the ESXi 4.0 host is booted, you can manage the host by using the vSphere Client and vCenter Server.

The applications must be installed on a computer serving as a management station with network access to the ESXi 4.0 host. You can install vCenter Server in licensed mode or in evaluation mode.

You can download vCenter Server from <http://www.vmware.com> or use the vCenter Server installation DVD. You can download the vSphere Client directly from the ESXi 4.0 host or use the vCenter Server installation DVD.

## About ESXi Evaluation Mode

Evaluation mode gives you access to the most robust edition of ESXi. You can use VMotion, HA, DRS, and other useful features.

The evaluation period is 60 days and begins as soon as you power on the ESXi machine, even if you start in license mode initially. To make full use of the evaluation period, decide as soon as possible on whether to use evaluation mode.

ESXi Embedded comes from your hardware vendor preinstalled on an internal USB device. It might be in evaluation mode or prelicensed by your hardware vendor.

## Convert an ESXi Host to Evaluation Mode

If ESXi has a license, you can switch to evaluation mode to explore the full functionality of ESXi.

### Procedure

- 1 From the vSphere Client, select the host in the inventory.
- 2 Click the **Configuration** tab.
- 3 Under Software, click **Licensed Features**.
- 4 Click **Edit** next to ESX License Type.
- 5 Click **Product Evaluation**.
- 6 Click **OK** to save your changes.

## Remove All Custom Packages on ESXi

After adding custom packages, you might decide to remove them.

### Prerequisites

Before you remove custom packages, shut down or migrate running virtual machines off of the ESXi host.

### Procedure

- 1 Reboot the ESXi 4.0 host.
- 2 In the direct console, select **Remove Custom Extensions** and press F11 to confirm.
- 3 Reboot the host.

All custom packages are removed.

## Disable ESXi

If you do not want your server to be an ESXi host, you can deactivate the ESXi 4.0 setup.

### Procedure

- 1 Remove VMFS datastores on the internal disks so that the internal disks are no longer set up to store virtual machines.
- 2 Change the boot setting in the BIOS so that the host no longer boots into ESXi.
- 3 Install another operating system in its place.

## Post-Setup Considerations for ESXi

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After ESXi is set up, you must consider host management through the vSphere Client, licensing, and adding and removing custom extensions.

This chapter includes the following topics:

- [“Download the vSphere Client,”](#) on page 33
- [“Licensing the Host,”](#) on page 33

### Download the vSphere Client

The vSphere Client is a Windows program that you can use to configure the host and to operate its virtual machines. You can download vSphere Client from any host.

#### Prerequisites

You must have the URL of the host. This is the IP address or host name.

#### Procedure

- 1 From a Windows machine, open a Web browser.
- 2 Enter the URL for the host.  
For example, `http://testserver.vmware.com` or `http://10.20.80.176`.  
The welcome page appears.
- 3 Click **Download the vSphere Client** under Getting Started.
- 4 Click **Yes** in the security warning dialog box that appears.

#### What to do next

Install the vSphere Client.

### Licensing the Host

After you purchase a host license, VMware provides a vSphere license key.

See [Chapter 13, “Managing ESX/ESXi and vCenter Server Licenses,”](#) on page 83.



# Backing Up and Restoring ESXi 4.0

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You can back up and restore the ESXi 4.0 configuration and recover the ESXi 4.0 boot image if it becomes damaged. In addition, you can remove ESXi 4.0 from the host.

This chapter includes the following topics:

- [“About Backing Up and Restoring an ESXi 4.0 Configuration,”](#) on page 35
- [“Considerations When Using the vSphere CLI Virtual Appliance,”](#) on page 35
- [“Back Up ESXi 4.0 Configuration Data,”](#) on page 36
- [“Restore ESXi 4.0 Configuration Data,”](#) on page 36
- [“Recover the ESXi Embedded Software,”](#) on page 37

## About Backing Up and Restoring an ESXi 4.0 Configuration

After you configure an ESXi host, it is important to back up your configuration.

You can back up the ESXi 4.0 host configuration data after preliminary tasks are completed. Always back up your host configuration after you change the configuration or upgrade the ESXi image.

When you perform a configuration backup, the serial number is backed up with the configuration and is restored when you restore the configuration. The serial number is not preserved when you run the Recovery CD (ESXi Embedded) or perform the repair operation (ESXi Installable). For this reason, the recommended procedure is to first back up the configuration, run the Recovery CD or repair operation, and then restore the configuration.

You perform the backup by using the `vicfg-cfgbackup` command, which you run from the vSphere CLI. You can install the vSphere CLI on your Microsoft Windows or Linux system or import the vSphere Management Assistant (vMA). For information about importing or installing the vSphere CLI, see the *vSphere Command-Line Interface Installation and Reference Guide*.

## Considerations When Using the vSphere CLI Virtual Appliance

When you restore a host configuration, you must perform the operation from a remote host.

When you back up the host configuration, you can run the `vicfg-cfgbackup` command from a vSphere CLI virtual appliance that is running on the target host (the host that you are backing up or restoring), or on a remote host. To restore a configuration on the target host, you must run the vSphere CLI virtual appliance from a remote host.

When you restore the configuration, the target host must be in maintenance mode, which means all virtual machines (including the vSphere CLI virtual appliance) must be powered off.

For example, suppose you have two ESXi 4.0 hosts (host1 and host2) and you import the virtual appliance into both hosts. To back up the host1 configuration, run the `vicfg-cfgbackup` command in the vSphere CLI on either host1 or host2 and point to host1 in the `--server` command-line option.

Likewise, to back up the host2 configuration, run the `vicfg-cfgbackup` command in the vSphere CLI on either host1 or host2 and point to host2 in the `--server` command-line option.

To restore the host1 configuration, run the `vicfg-cfgbackup` command in the vSphere CLI on host2 and point to host1 in the `--server` command-line option. To restore the host2 configuration, run the `vicfg-cfgbackup` command in the vSphere CLI on host1 and point to host2 in the `--server` command-line option.

## Back Up ESXi 4.0 Configuration Data

After you configure your ESXi host, you might want to create a backup of the configuration.

The following procedure describes how to back up your ESXi 4.0 configuration data.

The `--portnumber` and `--protocol` options are optional. If you exclude them, the defaults are port 443 and protocol HTTPS.

If your administrative password includes special characters, such as `$` or `&`, you must include a backslash escape character (`\`) before each special character.

For the backup filename, include the build number that is currently running on the host that you are backing up. If you are running the vSphere CLI as a virtual appliance, the backup file is saved locally on the virtual appliance. Local storage for backup files is safe because virtual appliances are stored in the `/vmfs/volumes/<datastore>` directory, which is separate from the ESXi 4.0 image and configuration files.

### Procedure

- 1 Start the vSphere CLI.
- 2 Run the `vicfg-cfgbackup` command with the `-s` flag to save the host configuration to the specified backup filename.

```
vicfg-cfgbackup --server <ESXi-host-ip> --portnumber <port_number> --protocol <protocol_type>
--username username --password <password> -s <backup-filename>
```

## Restore ESXi 4.0 Configuration Data

You can restore the ESXi 4.0 host configuration data if you have created a backup.

The `--portnumber` and `--protocol` options are optional. If you exclude them, the defaults are port 443 and protocol HTTPS.

If your administrative password includes special characters, such as `$` or `&`, you must include a backslash escape character (`\`) before each special character.

### Procedure

- 1 Power off any virtual machines that are running on the host that you want to restore.
- 2 (Optional) Restore the host to the ESXi build that was running when you created the configuration backup.
 

When you restore configuration data, the build number currently running on the host must be the same as the build number that was running when you created the backup file. You can override this requirement by including the `-f` (force) flag with the `vicfg-cfgbackup` command.
- 3 On a host other than the host that you are restoring, start the vSphere CLI virtual appliance.

- 4 Run the `vicfg-cfgbackup` command with the `-l` flag to load the host configuration from the specified backup file.

```
vicfg-cfgbackup --server <ESX_host_IP> --portnumber <port_number> --protocol <protocol_type>--
username username --password <password> -l <backup_filename>
```

The host you are restoring reboots and the backup configuration is restored.

## Recover the ESXi Embedded Software

You can restore the ESXi Embedded software by running the ESXi Recovery CD.

If the host does not boot up in ESXi mode, even though the BIOS is configured to boot from the USB flash, the file partitions on the USB flash might be corrupted. To resolve this problem, you can restore the software by running the ESXi Recovery CD (if you have one). Your hardware vendor might provide instructions for recovering your ESXi 4.0 or include a Recovery CD with the server platform. If you do not have a Recovery CD, contact your hardware vendor to obtain the appropriate ISO file. After you obtain the ISO file, you can burn it onto a blank CD.

Running the Recovery CD overwrites all configuration data with most of the system defaults. The serial number that your hardware vendor installed is lost when you run the Recovery CD. When you perform a configuration backup, the serial number is backed up with the configuration and is restored when you restore the configuration. For this reason, the recommended procedure is to first back up the configuration, run the Recovery CD, and then restore the configuration. You cannot back up the configuration unless the host boots into ESXi at least once, so it is not always possible to follow the recommended procedure. When there is no configuration backup, call your hardware vendor's technical support to retrieve the serial number.




---

**CAUTION** If your system uses logical volume management (LVM) instead of (or in addition to) conventional partitioning schemes, ESXi recovery could cause local LVM to be reformatted. Be sure to back up your system data before you recover ESXi. Before you run the repair operation, back up your existing VMFS as a precaution.

---

### Procedure

- 1 Detach all USB devices from the host.

The Recovery CD installs the ESXi image on the first USB memory device that it discovers. Unplug all USB devices before you use the Recovery CD to rebuild the ESX image on the internal USB device.

- 2 For Dell servers with DRAC 5 firmware, disable the Virtual Flash drive.
- 3 Insert the Recovery CD into the ESXi host.
- 4 Use the system BIOS to change the boot order so that the CD-ROM drive is listed first. To modify the boot sequence:
  - a Reboot the host.
  - b While the host is powering on, press a function key or Delete to open the BIOS setup.
  - c Select the CD-ROM drive and move it to the first position in the list.

The option to open the BIOS setup might be different for your server. You might need to open the BIOS configuration screens to modify the boot setting.

As the host continues to power on, the Recovery CD Welcome screen appears.

- 5 Press Enter to continue through the screens.

To cancel the recovery operation, press the Esc key. If you press the Esc key, the host reboots and the data contained on your server's embedded USB flash remains intact.

If you press Enter through all the screens and the recovery operation begins, you cannot cancel or undo the recovery.

- 6 Press Enter to reboot the host.
- 7 Remove the CD from the CD-ROM drive.
- 8 Reopen the system BIOS to change the boot order so that the USB flash is listed first.
- 9 Verify that the host boots into ESXi.

After the reboot, a new ESXi software build is installed and all configuration data is lost. If you backed up the ESXi configuration, you can restore it. When you perform a configuration backup, the serial number is backed up with the configuration and is restored when you restore the configuration. To restore configuration data, first upgrade to the ESXi build that was running when you created the backup. Then use the vSphere CLI to run the `vicfg-cfgbackup` command.

After you restore the host firmware, virtual machines on that host might not be listed in the host inventory. This does not mean that the virtual machines are lost or destroyed. Any virtual machines that you added to the host remain in the VMFS datastore, unless you explicitly remove them. For information about returning a virtual machine to the vCenter Server inventory, see the *Basic System Administration Guide*.

Your disk storage area might have changed during the reboot and your virtual machines might not be visible in the vSphere Client Inventory. If your storage area is visible but your virtual machines are not visible, do one of the following:

- Reregister the virtual machines with vSphere Client. See the vSphere Client Help.
- Restore your host configuration data. This option is available only if you backed up your host configuration data.

If your storage area is not visible, the ESXi 4.0 repair operation did not complete successfully. Do not try to recreate your data storage area because this might overwrite existing data and could destroy your virtual machines. Call VMware support for help in recovering your existing datastore.

# Installing, Removing, and Updating Third-Party Extensions

# 6

A third-party extension is designed to be incorporated into ESX/ESXi in order to enhance, or extend, the functions of ESX/ESXi. For example, an extension might be a VMkernel module, a driver, or a CIM provider.

VMware provides the following tools for installing, removing, and updating extensions to ESX/ESXi hosts:

<b>vSphere Host Update Utility</b>	Graphical utility for ESXi only. See the <i>Upgrade Guide</i> .
<b>vCenter Update Manager</b>	For ESX and ESXi, automates patching and updating of extensions. See the <i>vCenter Update Manager Administration Guide</i> .
<b>vihostupdate</b>	Command-line utility for ESX and ESXi.
<b>esxupdate</b>	Command-line utility for ESX only. See the <i>Patch Management Guide</i> .

This chapter includes the following topics:

- [“About Patching Hosts with vSphere Host Update Utility,”](#) on page 39
- [“About the vihostupdate Command-Line Utility,”](#) on page 40
- [“Update an ESX/ESXi Host Using Offline Bundles with the vihostupdate Utility,”](#) on page 40
- [“Update an ESX/ESXi Host Using a Depot with the vihostupdate Utility,”](#) on page 41
- [“Remove Custom Packages on ESX Using the Service Console,”](#) on page 42
- [“Remove Selected Custom Packages on ESX/ESXi Using the vSphere Command Line,”](#) on page 42

## About Patching Hosts with vSphere Host Update Utility

With vSphere Host Update Utility, you can download and install maintenance and patch releases, which provide security, stability, and feature enhancements for ESXi hosts.

You can use vSphere Host Update Utility to check for new release updates and patches that are applicable to the ESXi hosts registered in the vSphere Host Update Utility. vSphere Host Update Utility builds the host list by tracking the hosts that you connect to directly through the vSphere Client. You can also add hosts to the list manually.

## About the vihostupdate Command-Line Utility

The vihostupdate command applies software updates to ESX/ESXi hosts and installs and updates ESX/ESXi extensions such as VMkernel modules, drivers, and CIM providers.

---

**IMPORTANT** Run vihostupdate on ESX 4.0/ESXi 4.0 hosts. Run vihostupdate35 on ESX 3.5/ESXi 3.5 hosts.

---

**NOTE** The esxupdate utility is supported as well. It is for ESX only. See the *Patch Management Guide*.

---

The vihostupdate command works with bulletins. Each bulletin consists of one or more vSphere bundles and addresses one or more issues.

Towards the end of a release, bulletins include a large number of other bulletins. Bulletins are available in offline bundles and in a depot with associated metadata.zip files.

- If you use offline bundles, all patches and corresponding metadata are available as one ZIP file.
- If you use a depot, the metadata.zip file points to metadata, which describes the location of the files.

The command supports querying installed software on a host, listing software in a patch, scanning for bulletins that apply to a host, and installing all or some bulletins in the patch. You can specify a patch by using a bundle ZIP file or a depot's metadata ZIP file.

vihostupdate supports https://, http://, and ftp:// downloads. You can specify the protocols in the download URL for the bundle or metadata file. vihostupdate also supports local paths. See [“Update an ESX/ESXi Host Using Offline Bundles with the vihostupdate Utility,”](#) on page 40. To search a local depot where the vSphere CLI is installed, use /local/depot/metadata.zip without of the file:/// parameter.

## Update an ESX/ESXi Host Using Offline Bundles with the vihostupdate Utility

You can use the vihostupdate utility in conjunction with offline bundles or with a depot. This topic describes the procedure using offline bundles.

### Prerequisites

Before you can update or patch an ESX/ESXi host from the command line, you must have access to a machine on which you can run the VMware vSphere Command-Line Interface (vSphere CLI). You can install the vSphere CLI on your Microsoft Windows or Linux system or import the VMware vSphere Management Assistant (vMA) virtual appliance onto your ESX/ESXi host. For information about importing or installing the vSphere CLI, see the *VMware vSphere Command-Line Interface Installation and Reference Guide*.

### Procedure

- 1 Power off any virtual machines that are running on the host and place the host into maintenance mode.
- 2 Find out which bulletins are applicable to the ESX/ESXi host.

- Search an offline HTTP server:

```
vihostupdate.pl --server <server> --scan --bundle http://<webserver>/rollup.zip
```

- Search the local machine:

```
vihostupdate.pl --server <server> --scan --bundle <local_path>/rollup.zip
```

The --server argument is the ESX/ESXi host name or IP address.

Do not specify more than one bundle ZIP file at the command line each time you run the command. If you specify --bundle more than once, the command processes only the last file that was specified.

- 3 (Optional) List all the bulletins that are available in the bundle.

- Search an offline HTTP server:

```
vihostupdate.pl --server <server> --list --bundle http://<webserver>/rollup.zip
```

- Search the local machine:

```
vihostupdate.pl --server <server> --list --bundle <local_path>/rollup.zip
```

This command lists all the bulletins contained in the bundle, even those that do not apply to the host.

- 4 Install bulletins from the bundle on the ESX/ESXi host.

- Install from an offline HTTP server:

```
vihostupdate.pl --server <server> --install --bundle http://<webserver>/rollup.zip --bulletin bulletin1,bulletin2
```

- Install from the local machine:

```
vihostupdate.pl --server <server> --install --bundle <local_path>/rollup.zip --bulletin bulletin1,bulletin2
```

If you omit the `--bulletin` argument, this command installs all the bulletins in the bundle.

- 5 Verify that the bulletins are installed on your ESX/ESXi host.

```
vihostupdate.pl --server <server> --query
```

- 6 (Optional) Remove individual bulletins.

```
vihostupdate.pl --server <server> --remove --bulletin bulletin1
```

Use this option only for removing bulletins that are third-party or VMware extensions. Do not remove bulletins that are VMware patches or updates. `vihostupdate` can remove only one bulletin at a time.

## Update an ESX/ESXi Host Using a Depot with the `vihostupdate` Utility

You can use the `vihostupdate` utility in conjunction with bundles or with a depot. This topic describe the procedure using depots.

### Prerequisites

Before you can update or patch an ESX/ESXi host from the command line, you must have access to a machine on which you can run the VMware vSphere Command-Line Interface (vSphere CLI). You can install the vSphere CLI on your Microsoft Windows or Linux system or import the VMware vSphere Management Assistant (vMA) virtual appliance onto your ESX/ESXi host. For information about importing or installing the vSphere CLI, see the *VMware vSphere Command-Line Interface Installation and Reference Guide*.

### Procedure

- 1 Power off any virtual machines that are running on the host and place the host into maintenance mode.
- 2 Scan the depot for bulletins that are applicable to the host:

```
vihostupdate.pl --server <server> --scan --metadata http://<webserver>/depot/metadata.zip
```

The `--server` argument is the ESX/ESXi host name or IP address.

Do not specify more than one ZIP file at the command line each time you run the command. If you specify `--metadata` more than once, the command processes only the last file that was specified.

- 3 (Optional) List all bulletins in the depot at the metadata.zip file location:

```
vihostupdate.pl --list --metadata http://<webserver>/depot/metadata.zip
```

This command lists all the bulletins in the depot, even those that do not apply to the host.

- 4 Install bulletins in the depot on the host:

```
vihostupdate.pl --install --metadata http://<webserver>/depot/metadata.zip --bulletin
bulletin1,bulletin2
```

If you omit the `--bulletin` argument, this command installs all the bulletins in the bundle.

- 5 Verify that the bulletins are installed on your ESX/ESXi host.

```
vihostupdate.pl --server <server> --query
```

- 6 (Optional) Remove individual bulletins.

```
vihostupdate.pl --server <server> --remove --bulletin bulletin1
```

Use this option only for removing bulletins that are third-party or VMware extensions. Do not remove bulletins that are VMware patches or updates. `vihostupdate` can remove only one bulletin at a time.

## Remove Custom Packages on ESX Using the Service Console

After adding custom packages, you might decide to remove them. One way to remove custom packages is to use the service console and the `esxupdate` command.

Do not remove bulletins that are VMware patches or updates.

For detailed information about the `esxupdate` command, see the *Patch Management Guide*.

### Prerequisites

Before you remove a custom package, shut down or migrate running virtual machines off of the ESX host.

### Procedure

- 1 Open the ESX service console.
- 2 Run the `esxupdate query` command to display a list of the installed bulletins.
- 3 Run `esxupdate -b <bulletinID> remove` command, where `<bulletinID>` is the bulletin for the extension to remove.

The specified custom package is removed.

## Remove Selected Custom Packages on ESX/ESXi Using the vSphere Command Line

After adding custom packages, you might decide to remove them. One way to remove custom packages is to use the vSphere CLI and the `vihostupdate` command.

Do not remove bulletins that are VMware patches or updates.

For detailed information about the `vihostupdate` command, see the *VMware vSphere Command-Line Interface Installation and Reference Guide*.

### Prerequisites

Before you remove a custom package, shut down or migrate running virtual machines off of the ESX/ESXi host.

### Procedure

- 1 Determine which bulletins are installed on your ESX/ESXi host.

```
vihostupdate.pl --server <server> --query
```

Note the bundle ID for the bundle to uninstall.

- 2 Run the `vihostupdate` command.

```
vihostupdate --server <server> --remove --bulletin <bulletin ID>
```

`vihostupdate` can remove only one bulletin at a time.

The specified custom package is removed.

For ESXi, which has the concept of boot banks, this procedure modifies the standby boot bank, not the current boot bank. If you change your mind about the removal, you can reboot into the old bank instead of reinstalling the custom package.



# Preparing the vCenter Server Databases

# 7

vCenter Server and vCenter Update Manager require databases to store and organize server data.

You do not need to install a new database for the vCenter Server installation to work. During installation, you can point the vCenter Server system to any existing supported database. vCenter Server supports Oracle and Microsoft SQL Server databases. vCenter Update Manager also supports Oracle and Microsoft SQL Server databases. For a list of supported database server versions, see the *vSphere Compatibility Matrixes* at [http://www.vmware.com/pdf/vsphere4/r40/vsp\\_compatibility\\_matrix.pdf](http://www.vmware.com/pdf/vsphere4/r40/vsp_compatibility_matrix.pdf) on the VMware vSphere documentation Web site.



**CAUTION** If you have a VirtualCenter database that you want to preserve, do not perform a fresh installation of vCenter Server. See the *Upgrade Guide*.

VMware recommends using separate databases for vCenter Server and vCenter Update Manager. However, for a small deployments, a separate database for vCenter Update Manager might not be necessary.

Each vCenter Server instance must have its own database. vCenter Server instances cannot share the same database schema. Multiple vCenter Server databases can reside on the same database server, or they can be separated across multiple database servers. For Oracle, which has the concept of schema objects, you can run multiple vCenter Server instances in a single database server if you have a different schema owner for each vCenter Server instance, or use a dedicated Oracle database server for each vCenter Server instance.

This chapter includes the following topics:

- “vCenter Server Database Patch and Configuration Requirements,” on page 45
- “Create a 32-Bit DSN on a 64-Bit Operating System,” on page 46
- “Configure vCenter Server to Communicate with the Local Database After Shortening the Computer Name to 15 Characters or Fewer,” on page 47
- “About the Bundled Microsoft SQL Server 2005 Express Database Package,” on page 48
- “Maintaining a vCenter Server Database,” on page 48
- “Configure Microsoft SQL Server Databases,” on page 48
- “Configure Oracle Databases,” on page 52

## vCenter Server Database Patch and Configuration Requirements

After you choose a database type, make sure you understand the configuration and patch requirements for the database.

**Table 7-1** lists the configuration and patch requirements for the databases that are supported with vCenter Server.

Contact your DBA for the appropriate database credentials, or install the bundled Microsoft SQL Server 2005 Express database.

For a complete list of database versions supported with vCenter Server, see the *Compatibility Matrixes* on the VMware vSphere documentation Web site.

**Table 7-1.** Configuration and Patch Requirements

Database Type	Patch and Configuration Requirements
Microsoft SQL Server 2005 Express	<p>Bundled database that you can use for small deployments of up to 5 hosts and 50 virtual machines.</p> <p>If the machine has Microsoft SQL Native Client installed, remove it before installing vCenter Server with the bundled database.</p> <p>If the machine has MSXML Core Services 6.0 installed, remove it before installing vCenter Server with the bundled database. If you cannot remove it using the Add or Remove Programs utility, use the Windows Installer CleanUp utility. See <a href="http://support.microsoft.com/kb/968749">http://support.microsoft.com/kb/968749</a>.</p>
Microsoft SQL Server 2005	<p>For Microsoft Windows XP, apply MDAC 2.8 SP1 to the client. Use the SQL Native Client driver (version 9.x) for the client.</p> <p>Ensure that the machine has a valid ODBC DSN entry.</p> <p>If Microsoft SQL Server 2005 is not already installed and the machine has MSXML Core Services 6.0 installed, remove MSXML Core Services 6.0 before installing Microsoft SQL Server 2005. If you cannot remove it using the Add or Remove Programs utility, use the Windows Installer CleanUp utility. See <a href="http://support.microsoft.com/kb/968749">http://support.microsoft.com/kb/968749</a>.</p>
Microsoft SQL Server 2008	<p>For Microsoft Windows XP, apply MDAC 2.8 SP1 to the client. Use the SQL Native Client driver (version 10.x) for the client.</p> <p>Ensure that the machine has a valid ODBC DSN entry.</p>
Oracle 10g	<p>If necessary, first apply patch 10.2.0.4 (or later) to the client and server.</p> <p>Ensure that the machine has a valid ODBC DSN entry.</p> <p>For the Oracle Instant client, copy <code>ojdbc14.jar</code> to the vCenter Server tomcat directory (<code>&lt;vCenter install location&gt;\Infrastructure\tomcat\lib</code>)</p> <p>The Oracle 10g client comes with <code>ojdbc14.jar</code> (<code>&lt;Oracle client install location&gt;\oracle\product\10.2.0\&lt;instance_name&gt;\jdbc\lib</code>). The vCenter Server installer copies the file from the Oracle client install location to the vCenter Server tomcat directory (<code>&lt;vCenter install location&gt;\Infrastructure\tomcat\lib</code>)</p> <p>If the <code>ojdbc14.jar</code> file is not found in the Oracle 10g client location, the vCenter Server installer prompts you to copy the file manually. You can download the file from <a href="http://www.oracle.com/technology/software/tech/java/sqlj_jdbc/htdocs/jdbc101040.html">http://www.oracle.com/technology/software/tech/java/sqlj_jdbc/htdocs/jdbc101040.html</a>.</p>
Oracle 11g	<p>Ensure that the machine has a valid ODBC DSN entry.</p> <p>For the Oracle Instant client, copy <code>ojdbc14.jar</code> to the vCenter Server tomcat directory (<code>&lt;vCenter install location&gt;\Infrastructure\tomcat\lib</code>)</p> <p>The Oracle 11g client comes with <code>ojdbc14.jar</code> (<code>&lt;Oracle client install location&gt;\app\Administrator\product\11.1.0\&lt;instancename&gt;\sqldeveloper\jdbc\lib</code>). The vCenter Server installer copies the file from the Oracle client install location to the vCenter Server tomcat directory (<code>&lt;vCenter install location&gt;\Infrastructure\tomcat\lib</code>)</p> <p>If the <code>ojdbc14.jar</code> file is not found in the Oracle 11g client location, the vCenter Server installer prompts you to copy the file manually. You can download the file from <a href="http://www.oracle.com/technology/software/tech/java/sqlj_jdbc/htdocs/jdbc101040.html">http://www.oracle.com/technology/software/tech/java/sqlj_jdbc/htdocs/jdbc101040.html</a>.</p>

## Create a 32-Bit DSN on a 64-Bit Operating System

You can install or upgrade to vCenter Server on both 32-bit and 64-bit operating systems.

Even though vCenter Server is supported on 64-bit operating systems, the vCenter Server system must have a 32-bit DSN. This requirement applies to all supported databases. By default, any DSN created on a 64-bit system is 64 bit.

**Procedure**

- 1 Install the ODBC drivers.
  - For Microsoft SQL Server database servers, install the 64-bit database ODBC drivers on your Microsoft Windows system. When you install the 64-bit drivers, the 32-bit drivers are installed automatically.
  - For Oracle database servers, install the 32-bit database ODBC drivers on your Microsoft Windows system.

---

**NOTE** The default install location on 64-bit operating systems is C:\VMware.

---

- 2 Run the 32-bit ODBC Administrator application, located at [WindowsDir]\SysWOW64\odbcad32.exe.
- 3 Use the application to create your DSN.

You now have a DSN that is compatible with vCenter Server. When the vCenter Server installer prompts you for a DSN, select the 32-bit DSN.

## Configure vCenter Server to Communicate with the Local Database After Shortening the Computer Name to 15 Characters or Fewer

The machine on which you install or upgrade to vCenter Server must have a computer name that is 15 characters or fewer. If your database is located on the same machine that vCenter Server will be installed on and you have recently changed the name of this machine to comply with the name-length requirement, make sure the vCenter Server DSN is configured to communicate with the new name of the machine.

Changing the vCenter Server computer name impacts database communication if the database server is on the same computer with vCenter Server. If you have changed the machine name, verify that communication remains intact by completing the following procedure.

The name change has no impact on communication with remote databases. You can skip this procedure if your database is remote.

---

**NOTE** The name-length limitation applies to the vCenter Server system. The data source name (DSN) and remote database systems can have names with more than 15 characters.

---

Check with your database administrator or the database vendor to make sure all components of the database are working after you rename the server.

**Procedure**

- 1 Make sure the database server is running.
- 2 Make sure that the vCenter Server computer name is updated in the domain name service (DNS).

One way to test this is by pinging the computer name. For example, if the computer name is `host-1.company.com`, run the following command in the Windows command prompt:

```
ping host-1.company.com
```

If you can ping the computer name, the name is updated in DNS.

- 3 Update the data source information, as needed.
- 4 Verify the data source connectivity.

## About the Bundled Microsoft SQL Server 2005 Express Database Package

The bundled Microsoft SQL Server 2005 Express database package is installed and configured when you select Microsoft SQL Server 2005 Express as your database during vCenter Server installation or upgrade.

If the machine has Microsoft SQL Native Client installed, remove it before installing vCenter Server with the bundled database.

## Maintaining a vCenter Server Database

After your vCenter Server database instance and vCenter Server are installed and operational, perform standard database maintenance processes.

These include:

- Monitoring the growth of the log file and compacting the database log file, as needed. See the documentation for the database type you are using.
- Scheduling regular backups of the database.
- Backing up the database before any vCenter Server upgrade. See your database documentation for information on backing up your database.

## Configure Microsoft SQL Server Databases

If you use a Microsoft SQL database for your vCenter Server repository, you must configure your database to work with vCenter Server.

### Procedure

- 1 [Use a Script to Create a Local or Remote Microsoft SQL Server Database](#) on page 48  
To simplify the process of creating the SQL Server database, users, and privileges, you can run a script. If you do not use this script, you can create the database manually.
- 2 [Use a Script to Create the Microsoft SQL Server Database Schema \(Optional\)](#) on page 50  
The vCenter Server installer creates the schema automatically during installation. Experienced database administrators who need more control over schema creation due to environmental constraints can optionally use a script to create a database schema.
- 3 [Configure a SQL Server ODBC Connection](#) on page 51  
When you install the vCenter Server system, you can establish a connection with a SQL Server database.
- 4 [Configure Microsoft SQL Server TCP/IP for JDBC](#) on page 52  
If the Microsoft SQL Server database has TCP/IP disabled and the dynamic ports are not set, the JDBC connection remains closed. This causes the vCenter Server statistics to malfunction. You can configure the server TCP/IP for JDBC.

## Use a Script to Create a Local or Remote Microsoft SQL Server Database

To simplify the process of creating the SQL Server database, users, and privileges, you can run a script. If you do not use this script, you can create the database manually.

In the script, you can customize the location of the data and log files.

The user created by this script does not follow any security policy. The passwords are provided only for convenience. Change the passwords as appropriate.

To prepare a SQL Server database to work with vCenter Server, you generally need to create a SQL Server database user with database operator (DBO) rights. When you do this, make sure that the database user login has the **db\_owner** fixed database role on the vCenter Server database and on the MSDB database. The **db\_owner** role on the MSDB database is required for installation and upgrade only, and you can revoke it after installation.

If you run this script as well as the script to create the database schema, you do not have to grant DBO permissions on the vCenter Server database. For environments in which the vCenter Server database user cannot have DBO permissions, these scripts are especially useful. The user created by this script has DBO privileges on both VCDB and MSDB databases. To change this, remove the two occurrences of this line:

```
sp_addrolemember @rolename = 'db_owner', @membername = 'vpxuser'
```

---

**IMPORTANT** If you remove these lines, you must also run the script that creates the vCenter Server database schema, instead of allowing the vCenter Server installer to create the schema.

---

### Procedure

- 1 Log in to a Query Analyzer session as the sysadmin (SA) or a user account with **sysadmin** privileges.
- 2 Run the following script.

The script is located in the vCenter Server installation package <installation directory>\vpx\dbschema\DB\_and\_schema\_creation\_scripts\_MSSQL.txt file.

```
use [master]
go
CREATE DATABASE [VCDB] ON PRIMARY
(NAME = N'vcdb', FILENAME = N'C:\VCDB.mdf', SIZE = 2000KB, FILEGROWTH = 10% )
LOG ON
(NAME = N'vcdb_log', FILENAME = N'C:\VCDB.ldf', SIZE = 1000KB, FILEGROWTH = 10%)
COLLATE SQL_Latin1_General_CP1_CI_AS
go
use VCDB
go
sp_addlogin @loginame=[vpxuser], @passwd=N'vpxuser!0', @defdb='VCDB',
@deflanguage='us_english'
go
ALTER LOGIN [vpxuser] WITH CHECK_POLICY = OFF
go
CREATE USER [vpxuser] for LOGIN [vpxuser]
go
sp_addrolemember @rolename = 'db_owner', @membername = 'vpxuser'
go
use MSDB
go
CREATE USER [vpxuser] for LOGIN [vpxuser]
go
sp_addrolemember @rolename = 'db_owner', @membername = 'vpxuser'
go
```

You now have a Microsoft SQL Server database that you can use with vCenter Server.

### What to do next

You can run the script to create the database schema.

## Use a Script to Create the Microsoft SQL Server Database Schema (Optional)

The vCenter Server installer creates the schema automatically during installation. Experienced database administrators who need more control over schema creation due to environmental constraints can optionally use a script to create a database schema.

To have the vCenter Server installer create your schema for you, see [“Configure a SQL Server ODBC Connection,”](#) on page 51.

### Prerequisites

Before you use this script, create the SQL Server database. You can create the SQL Server database manually or by using a script.

### Procedure

- 1 Create a vCenter Server database user with the **db\_datawriter** and **db\_datareader** permissions.
- 2 Open a query analyzer window with a user having DBO rights on the vCenter Server and MSDB databases.
- 3 Locate the dbschema scripts in the vCenter Server installation package `<installation directory>/vpx/dbschema` directory.
- 4 Run the scripts in sequence on the database.

The DBO user must own the objects created by these scripts. Open the scripts one at a time in the Query Analyzer window and press F5 to execute each script in the order shown here.

```
VCDB_mssql.SQL
purge_stat1_proc_mssql.sql
purge_stat2_proc_mssql.sql
purge_stat3_proc_mssql.sql
purge_usage_stats_proc_mssql.sql
stats_rollup1_proc_mssql.sql
stats_rollup2_proc_mssql.sql
stats_rollup3_proc_mssql.sql
cleanup_events_mssql.sql
delete_stats_proc_mssql.sql
upsert_last_event_proc_mssql.sql
```

- 5 For all supported editions of Microsoft SQL Server (except Microsoft SQL Server 2005 Express), ensure that the SQL Server Agent service is running by using these additional scripts to set up scheduled jobs on the database.

```
job_schedule1_mssql.sql
job_schedule2_mssql.sql
job_schedule3_mssql.sql
job_cleanup_events_mssql.sql
```

### What to do next

- 1 On the machine on which you intend to install vCenter Server, create a DSN that points to the database server with the schema.
- 2 Run the vCenter Server installer.
  - a If a database reinitialization warning message appears in the vCenter Server installer, select **Do not overwrite, leave my existing database in place** and continue the installation.

This message appears if you are using a database that has vCenter Server tables created by a previous installation. The message does not appear if the database is clean.

If you leave your existing database in place, you cannot join a Linked Mode group during the installation. You can join after the installation is complete. (See [“Join a Linked Mode Group After Installation,”](#) on page 75.)

- b When prompted, provide the database user login.

## Configure a SQL Server ODBC Connection

When you install the vCenter Server system, you can establish a connection with a SQL Server database.

If you use SQL Server for vCenter Server, do not use the master database.

See your Microsoft SQL ODBC documentation for specific instructions regarding configuring the SQL Server ODBC connection.

### Prerequisites

- Review the required database patches specified in [“vCenter Server Database Patch and Configuration Requirements,”](#) on page 45. If you do not prepare your database correctly, the vCenter Server installer displays error and warning messages.
- Create a database using SQL Server Management Studio on the SQL Server.
- Create a database user with database operator (DBO) rights.

The default database for the DBO user is the one that you created using SQL Server Management Studio.

Make sure that the database login has the **db\_owner** fixed database role on the vCenter Server database and on the MSDB database. The **db\_owner** role on the MSDB database is required for installation and upgrade only. You can revoke this role after installation.

- If you are using a named instance of Microsoft SQL Server 2008 Standard Edition with vCenter Server, do not name the instance MSSQLSERVER. If you do, the JDBC connection does not work, and certain features, such as Performance Charts, are not available.

### Procedure

- 1 On your vCenter Server system, open the Microsoft Windows ODBC Data Source Administrator.
  - On a 32-bit system, select **Settings > Control Panel > Administrative Tools > Data Sources (ODBC)**.
  - On a 64-bit system, open `C:\WINDOWS\SYSWOW64\odbc32.exe`.
- 2 Select the **System DSN** tab and do one of the following.
  - To modify an existing SQL Server ODBC connection, select the connection from the System Data Source list and click **Configure**.
  - To create a new SQL Server ODBC connection, click **Add**, select **SQL Native Client**, and click **Finish**.
- 3 Type an ODBC datastore name (DSN) in the **Name** text box.  
For example, VMware vCenter Server.
- 4 (Optional) Type an ODBC DSN description in the **Description** text box.
- 5 Select the server name from the **Server** drop-down menu and click **Next**.  
Type the SQL Server host name in the text box if it is not in the drop-down menu.
- 6 Select one of the authentication methods.
- 7 If you selected SQL authentication, type your SQL Server login name and password and click **Next**.

- 8 Select the database created for the vCenter Server system from the **Change the default database to** menu and click **Next**.
- 9 Click **Finish**.

### What to do next

To test the data source, from the **ODBC Microsoft SQL Server Setup** menu, select **Test Data Source** and click **OK**. Ensure that the SQL Agent is running on your database server.

This applies to SQL Server 2005 and SQL Server 2008 editions.

## Configure Microsoft SQL Server TCP/IP for JDBC

If the Microsoft SQL Server database has TCP/IP disabled and the dynamic ports are not set, the JDBC connection remains closed. This causes the vCenter Server statistics to malfunction. You can configure the server TCP/IP for JDBC.

This procedure applies to remote Microsoft SQL Server database servers. You can skip this procedure if your database is local.

### Procedure

- 1 Start the SQL Server Configuration Manager by selecting **Start > All Programs > Microsoft SQL Server > Configuration Tools > SQL Server Configuration Manager**.
- 2 Select **SQL Server Network Configuration > Protocols for<Instance name>**.
- 3 Enable TCP/IP.
- 4 Open TCP/IP Properties.
- 5 On the **Protocol** tab, make the following selections.
  - Enabled: **Yes**
  - Listen All: **Yes**
  - Keep Alive: **30000**
- 6 On the **IP Addresses** tab, make the following selections.
  - Active: **Yes**
  - TCP Dynamic Ports: **0**
- 7 Restart the SQL Server service from **SQL Server Configuration Manager > SQL Server Services**.
- 8 Start the SQL Server Browser service from **SQL Server Configuration Manager > SQL Server Services**.

## Configure Oracle Databases

If you use an Oracle database for your vCenter Server repository, you must configure your database to work with vCenter Server.

### Procedure

- 1 [Use a Script to Create a Local or Remote Oracle Database](#) on page 53  
When you use an Oracle database with vCenter Server, the database must have certain table spaces and privileges. To simplify the process of creating the database, you can run a script. If you do not use this script, you can create the database manually.
- 2 [Configure an Oracle Database User](#) on page 53  
If you plan to use an Oracle database when you install vCenter Server, you must configure the database user.

- 3 [Use a Script to Create the Oracle Database Schema \(Optional\)](#) on page 54  
The vCenter Server installer creates the schema automatically during installation. For experienced database administrators who need more control over schema creation due to environmental constraints, you can optionally use a script to create your database schema.
- 4 [Configure an Oracle Connection for Local Access](#) on page 55  
VMware recommends that the vCenter Server database be located on the same system as vCenter Server.
- 5 [Configure an Oracle Connection for Remote Access](#) on page 55  
A vCenter Server system can access the database remotely.
- 6 [Connect to an Oracle Database Locally](#) on page 56  
A vCenter Server system can access the database locally.

## Use a Script to Create a Local or Remote Oracle Database

When you use an Oracle database with vCenter Server, the database must have certain table spaces and privileges. To simplify the process of creating the database, you can run a script. If you do not use this script, you can create the database manually.

When using the script, you can customize the location of the data and log files.

---

**NOTE** The user created by this script does not follow any security policy. The passwords are provided only for convenience. Change the passwords as appropriate.

---

### Procedure

- 1 Log in to a SQL\*Plus session with the system account.
- 2 Run the following script.

The script is located in the vCenter Server installation package `<installation directory>/vpx/dbschema/DB_and_schema_creation_scripts_oracle.txt` file.

```
CREATE SMALLFILE TABLESPACE "VPX" DATAFILE '/u01/app/oracle/oradata/vcdb/vpx01.dbf'
SIZE 1G AUTOEXTEND ON NEXT 10M MAXSIZE UNLIMITED LOGGING EXTENT MANAGEMENT LOCAL SEGMENT
SPACE MANAGEMENT AUTO;
```

For a Windows installation, change the directory path to the `vpx01.dbf` file.

You now have an Oracle database that you can use with vCenter Server.

### What to do next

You can also run a script to create the database schema.

## Configure an Oracle Database User

If you plan to use an Oracle database when you install vCenter Server, you must configure the database user.

You can configure an Oracle database for vCenter Server either locally on the same Microsoft Windows machine as vCenter Server or remotely on a network-connected Linux, UNIX or Microsoft Windows host.

### Prerequisites

Review the software requirements for vCenter Server with Oracle.

### Procedure

- 1 Log in to a SQL\*Plus session with the system account.

- 2 Run the following SQL command to create a vCenter Server database user with the correct permissions.

The script is located in the vCenter Server installation package `<installation directory>/vpx/dbschema/DB_and_schema_creation_scripts_oracle.txt` file.

In this example, the user name is VPXADMIN.

```
CREATE USER "VPXADMIN" PROFILE "DEFAULT" IDENTIFIED BY "oracle" DEFAULT TABLESPACE
"VPX" ACCOUNT UNLOCK;
grant connect to VPXADMIN;
grant resource to VPXADMIN;
grant create view to VPXADMIN;
grant create sequence to VPXADMIN;
grant create table to VPXADMIN;
grant execute on dbms_lock to VPXADMIN;
grant unlimited tablespace to VPXADMIN;
```

By default, the **RESOURCE** role has the **CREATE PROCEDURE**, **CREATE TABLE**, and **CREATE SEQUENCE** privileges assigned. If the **RESOURCE** role does not have these privileges, explicitly grant them to the vCenter Server database user.

You now have an Oracle database user that you can reference in the vCenter Server installer.

### What to do next

Create the Oracle database, including all necessary table spaces and privileges.

## Use a Script to Create the Oracle Database Schema (Optional)

The vCenter Server installer creates the schema automatically during installation. For experienced database administrators who need more control over schema creation due to environmental constraints, you can optionally use a script to create your database schema.

To have the vCenter Server installer create your schema for you, see [“Configure an Oracle Connection for Local Access,”](#) on page 55 or [“Configure an Oracle Connection for Remote Access,”](#) on page 55, depending on your environment.

### Prerequisites

Before you use this script, create the Oracle database and user. You can create the Oracle database and user manually or by using scripts.

### Procedure

- 1 Open a SQL\*Plus window with a user that has schema owner rights on the vCenter Server database.
- 2 Locate the dbschema scripts in the vCenter Server installation package `<installation directory>/vpx/dbschema` directory.
- 3 In SQL\*Plus, run the scripts in sequence on the database.

`<path>` is the directory path to the `<installation directory>/vpx/dbschema` folder.

```
@<path>/VCDB_oracle.SQL
@<path>/purge_stat1_proc_oracle.sql
@<path>/purge_stat2_proc_oracle.sql
@<path>/purge_stat3_proc_oracle.sql
@<path>/purge_usage_stats_proc_oracle.sql
@<path>/stats_rollup1_proc_oracle.sql
```

```
@<path>/stats_rollup2_proc_oracle.sql
@<path>/stats_rollup3_proc_oracle.sql
@<path>/cleanup_events_oracle.sql
@<path>/delete_stats_proc_oracle.sql
```

- 4 For all supported editions of Oracle Server, run these additional scripts to set up scheduled jobs on the database.

```
@<path>/job_schedule1_oracle.sql
@<path>/job_schedule2_oracle.sql
@<path>/job_schedule3_oracle.sql
@<path>/job_cleanup_events_oracle.sql
```

You now have a database schema that is compatible with vCenter Server 4.0.

### What to do next

- 1 On the machine where you are installing vCenter Server, create a DSN that points to the database server with the schema.
- 2 Run the vCenter Server installer.

- a If a database reinitialization warning message appears in the vCenter Server installer, select **Do not overwrite, leave my existing database in place** and continue the installation.

This message appears if you are using a database that has vCenter Server tables created by a previous installation. The message does not appear if the database is clean.

If you leave your existing database in place, you cannot join a Linked Mode group during the installation. You can join after the installation is complete. (See [“Join a Linked Mode Group After Installation,”](#) on page 75.)

- b When prompted, provide the database user login.

## Configure an Oracle Connection for Local Access

VMware recommends that the vCenter Server database be located on the same system as vCenter Server.

### Prerequisites

Before configuring an Oracle connection, review the required database patches specified in [“vCenter Server Database Patch and Configuration Requirements,”](#) on page 45. If you do not prepare your database correctly, the vCenter Server installer displays error and warning messages.

### Procedure

- 1 Download Oracle 10g or Oracle 11g from the Oracle Web site, install it, and create a database.
- 2 Configure the TNS Service Name option in the ODBC DSN. The TNS Service Name is the net service name for the database to which you want to connect. You can find the net service name in the `tnsnames.ora` file located in the `NETWORK\ADMIN` folder in the Oracle database installation location.

## Configure an Oracle Connection for Remote Access

A vCenter Server system can access the database remotely.

### Prerequisites

Before configuring an Oracle connection, review the required database patches specified in [“vCenter Server Database Patch and Configuration Requirements,”](#) on page 45. If you do not prepare your database correctly, the vCenter Server installer displays error and warning messages.

**Procedure**

- 1 Install the Oracle client on the vCenter Server system machine.
- 2 Download and install the ODBC driver.
- 3 Create a new tablespace for a vCenter Server system using a SQL statement such as the following.  

```
CREATE TABLESPACE "VPX" DATAFILE 'C:\Oracle\ORADATA\VPX\VPX.dat' SIZE 1000M AUTOEXTEND ON NEXT 500K;
```
- 4 Create a user, such as vpxAdmin, for accessing the tablespace through ODBC.  

```
CREATE USER vpxAdmin IDENTIFIED BY vpxadmin DEFAULT TABLESPACE vpx;
```
- 5 Either grant **dba** permission to the user, or grant the following permissions to the user.  

```
grant connect to <user>
grant resource to <user>
grant create view to <user>
grant unlimited tablespace to <user> # To ensure space is sufficient
```

By default, the **RESOURCE** role has the **CREATE PROCEDURE**, **CREATE TABLE**, and **CREATE SEQUENCE** privileges assigned. If the **RESOURCE** role does not have these privileges, explicitly grant them to the vCenter Server database user.
- 6 Use a text editor or the Net8 Configuration Assistant to edit the `tnsnames.ora` file located in the directory `C:\Oracle\Oraxx\NETWORK\ADMIN`, where `xx` is either `10g` or `11g`.  

Add the following entry, where `HOST` is the managed host to which the client must connect.

```
VPX =
(DESCRIPTION =
(ADDRESS_LIST =
(ADDRESS=(PROTOCOL=TCP)(HOST=vpxd-Oracle)(PORT=1521))
)
(CONNECT_DATA =
(SERVICE_NAME = VPX)
)
)
```
- 7 Configure the TNS Service Name option in the ODBC DSN.  

The TNS Service Name is the net service name for the database to which you want to connect, in this case, `VPX`. You can find the net service name in the `tnsnames.ora` file.

**Connect to an Oracle Database Locally**

A vCenter Server system can access the database locally.

**Procedure**

- 1 Create a new tablespace for a vCenter Server system using a SQL statement such as the following.  

```
CREATE TABLESPACE "VPX" DATAFILE 'C:\Oracle\ORADATA\VPX\VPX.dat' SIZE 1000M AUTOEXTEND ON NEXT 500K;
```
- 2 Create a user, such as vpxAdmin, for accessing the tablespace through ODBC.  

```
CREATE USER vpxAdmin IDENTIFIED BY vpxadmin DEFAULT TABLESPACE vpx;
```

- 3 Either grant **dba** permission to the user, or grant the following permissions to the user.

```
grant connect to <user>
grant resource to <user>
grant create view to <user>
grant unlimited tablespace to <user> # To ensure space is sufficient
```

By default, the **RESOURCE** role has the **CREATE PROCEDURE**, **CREATE TABLE**, and **CREATE SEQUENCE** privileges assigned. If the **RESOURCE** role does not have these privileges, explicitly grant them to the vCenter Server database user.

- 4 Create an ODBC connection to the database.

These are example settings.

```
Data Source Name: VMware vCenter Server TNS Service Name: VPX User Id: vpxAdmin
```

You now have a database that you can connect to locally.

### **What to do next**

Install vCenter Server.



# Introduction to Installing vCenter Server

# 8

You can install vCenter Server on a physical system or on a virtual machine running on an ESX host.

This chapter includes the following topics:

- [“vCenter Server Prerequisites,”](#) on page 59
- [“Using a User Account for Running vCenter Server with SQL Server,”](#) on page 60
- [“About Installing vCenter Server on IPv6 Machines,”](#) on page 61
- [“Configure the URLs on a Standalone vCenter Server System,”](#) on page 61
- [“Running the vCenter Server and vSphere Client Installers from a Network Drive,”](#) on page 61
- [“vCenter Server Components,”](#) on page 62
- [“Required Data for Installing vCenter Server,”](#) on page 62

## vCenter Server Prerequisites

Before installing vCenter Server, review the prerequisites.

- You must have the installation DVD or download the installation ISO image.
- Your hardware must meet the requirements listed in [“vCenter Server and the vSphere Client Hardware Requirements,”](#) on page 13 and the required ports must be open, as discussed in [“Required Ports,”](#) on page 16.
- Your database must meet the database requirements. See [“vCenter Server Database Patch and Configuration Requirements,”](#) on page 45 and [Chapter 7, “Preparing the vCenter Server Databases,”](#) on page 45.
- If the machine on which you are installing vCenter Server has VirtualCenter installed, you might want to upgrade instead of performing a fresh installation of vCenter Server.

---

**IMPORTANT** If you want to keep your existing VirtualCenter configuration, see the *Upgrade Guide*.

---

- There must be no Network Address Translation (NAT) between the vCenter Server system and the hosts it will manage.
- Create a vCenter Server database, unless you plan to install the bundled SQL Server 2005 Express.

- The system that you use for your vCenter Server installation will belong to a domain rather than a workgroup. If assigned to a workgroup, the vCenter Server system is not able to discover all domains and systems available on the network when using such features as vCenter Guided Consolidation Service. To use vCenter Linked Mode, multiple vCenter Server systems should be added to a domain. To determine whether the system belongs to a workgroup or a domain, right-click **My Computer** and click **Properties** and the **Computer Name** tab. The Computer Name tab displays either a Workgroup label or a Domain label.
- During the installation, the connection between the machine and the domain controller must be working.
- The computer name cannot be more than 15 characters.
- The DNS name of the machine must match the actual computer name.
- Make sure the system on which you are installing vCenter Server is not an Active Directory domain controller.
- On each system that is running vCenter Server, make sure that the domain user account has the following permissions:
  - Member of the Administrators group
  - **Act as part of the operating system**
  - **Log on as a service**
- Assign a static IP address and host name to the Windows server that will host the vCenter Server system. This IP address must have a valid (internal) domain name system (DNS) registration that resolves properly from all managed ESX hosts.
- If you install vCenter Server on Windows Server 2003 SP1, the disk for the installation directory must have the NTFS format, not the FAT32 format.
- Consider whether the vCenter Server instance will be standalone or in a Linked Mode group. See [Chapter 11, “Creating vCenter Server Linked Mode Groups,”](#) on page 73.
- vCenter Server, like any other network server, should be installed on a machine with a fixed IP address and well-known DNS name, so that clients can reliably access the service. If you use DHCP instead of a static IP address for vCenter Server, make sure that the vCenter Server computer name is updated in the domain name service (DNS). One way to test this is by pinging the computer name. For example, if the computer name is `host-1.company.com`, run the following command in the Windows command prompt:
 

```
ping host-1.company.com
```

If you can ping the computer name, the name is updated in DNS.

## Using a User Account for Running vCenter Server with SQL Server

You can use the Microsoft Windows built-in system account or a user account to run vCenter Server. With a user account, you can enable Windows authentication for SQL Server, and it also provides more security.

The user account must be an administrator on the local machine. In the installation wizard, you specify the account name as `DomainName\Username`. You must configure the SQL Server database to allow the domain account access to SQL Server.

The Microsoft Windows built-in system account has more permissions and rights on the server than the vCenter Server system needs, which can contribute to security problems. Even if you do not plan to use Microsoft Windows authentication for SQL Server or you are using an Oracle database, you might want to set up a local user account for the vCenter Server system. In this case, the only requirement is that the user account is an administrator on the local machine.

For SQL Server DSNs configured with Windows authentication, use the same user account for the VMware VirtualCenter Management Webservices service and the DSN user.

If you install an instance of vCenter Server as a local system account on a local SQL Server database with Integrated Windows NT Authentication and you add an Integrated Windows NT Authentication user to the local database server with the same default database as vCenter Server, vCenter Server might not start. To resolve this issue, remove the Integrated Windows NT Authentication user from the local SQL database server, or change the default database for the local system user account to the vCenter Server database for the SQL Server user account setup.

## About Installing vCenter Server on IPv6 Machines

If the system on which you install vCenter Server is configured to use IPv6, vCenter Server uses IPv6. When you connect to that vCenter Server system or install additional modules, you must specify the server address in IPv6 format, unless you use the fully qualified domain name.

## Configure the URLs on a Standalone vCenter Server System

If you are joining a standalone vCenter Server system to a Linked Mode group, the domain name of the system must match the machine name. If you change either name to make them match, you must also configure the vCenter Server URLs to make them compatible with the new domain name and machine name.

If you do not update the URLs, remote instances of vCenter Server cannot reach the vCenter Server system, because the default vCenter Server URL entries are no longer accurate. The vCenter Server installer configures default URL entries as follows:

- For the `VirtualCenter.VimApiUrl` key, the default value is `http(s)://<FQDN of VC machine>/sdk`.
- For the `Virtualcenter.VimWebServicesUrl` key, the default value is `https://<FQDN of VC machine>:<installed-webservices-port>/vws`.

### Procedure

- 1 From the vSphere Client, connect directly to the vCenter Server instance on which you have changed the domain or host name.
- 2 Select **Administration > vCenter Server Settings** and click **Advanced Settings**.
- 3 For the `Virtualcenter.VimApiUrl` key, change the value to point to the location where the vSphere Client and SDK clients can access the vCenter Server system.  
  
For example: `http(s)://<machine-name/ip>:<vc-port>/sdk`.
- 4 For the `Virtualcenter.VimWebServicesUrl` key, change the value to point to the location where vCenter Server Webservices is installed.  
  
For example: `https://<machine-name/ip>:<webservices-port>/vws`.
- 5 For the `Virtualcenter.InstanceName` key, change the value so that the modified name appears in the vCenter Server inventory view.

## Running the vCenter Server and vSphere Client Installers from a Network Drive

You can run the installers from a network drive, but you cannot install the software on a network drive.

In Windows, you can map a network drive, run the installers from the network drive, and install the software on the local machine.

## vCenter Server Components

When you install vCenter Server, some additional components are also installed. In some cases, you can control which components are installed.

The vCenter Server installer installs the following components:

<b>VMware vCenter Server</b>	Windows service to manage ESX hosts.
<b>Microsoft.NET 3.0 SP1 Framework</b>	Software used by the Database Upgrade wizard and the vSphere Client. Also used by vCenter Server if you are using the bundled database.
<b>VMware vCenter Orchestrator</b>	vCenter Server module that provides a comprehensive set of tools to efficiently manage your virtual IT environment. The vCenter Server performs a silent installation of vCenter Orchestrator. If you install vCenter Server on an IPv6 operating system, the vCenter Orchestrator module is not supported. If you install vCenter Server in a mixed environment (both IPv4 and IPv6 enabled), the vCenter Orchestrator module can only be configured using IPv4. See the <i>vCenter Orchestrator Administration Guide</i> .
<b>Microsoft SQL Server 2005 Express (optional)</b>	Free, bundled version of the Microsoft SQL Server database for smaller scale applications. If you enter a path to an existing database, the installer does not install the bundled database.

The vCenter Server `autorun.exe` application includes links to install the following optional components:

<b>vSphere Client</b>	Client application used to connect directly to an ESX host or indirectly to an ESX host through a vCenter Server.
<b>vCenter Converter Enterprise for vCenter Server</b>	vCenter Server module that enables you to convert your physical machines to virtual machines.
<b>vCenter Guided Consolidation Service</b>	vCenter Server module that discovers physical systems and analyzes them for preparation to be converted into virtual machines.
<b>vCenter Update Manager</b>	vCenter Server module that provides security monitoring and patching support for ESX hosts and virtual machines.

## Required Data for Installing vCenter Server

Prepare for the installation by recording the values that the vCenter Server system requires.

[Table 8-1](#) lists the information that you are prompted for during the installation. Note the values entered in case you need to reinstall vCenter Server and want to use the same values. VMware Knowledge Base article 1010023 contains a linked worksheet that complements [Table 8-1](#).

**Table 8-1.** Data Required for vCenter Server Installation

Data	Default	Comments
User name and organization	Your organization's name	Follow your organization's policy.
vCenter Server license key	None	If you omit the license key, vCenter Server is installed in evaluation mode. After you install vCenter Server, you can enter the vCenter Server license in the vSphere Client.
vCenter Server install location	Depends on your operating system	

**Table 8-1.** Data Required for vCenter Server Installation (Continued)

<b>Data</b>	<b>Default</b>	<b>Comments</b>
Standalone or join group	Standalone	Join a Linked Mode group to enable the vSphere Client to view, search, and manage data across multiple vCenter Server systems.
Fully qualified domain name of Directory Services for the vCenter Server group	None	Required if this instance of vCenter Server is joining a group. This is the name of a remote instance of vCenter Server. The local and remote instances will be members of a Linked Mode group.
LDAP port for the Directory Services for the remote vCenter Server instance	389	Required if this instance of vCenter Server is joining a Linked Mode group. This is the remote instance's LDAP port. See <a href="#">"Required Ports,"</a> on page 16.
Data source name (DSN)	None	Required to use an existing database. Not required if you are using the bundled database.
Database user name	None	
Database password	None	
vCenter Server account information Can be the Microsoft Windows system account or a user-specified account	Microsoft Windows system account	Use a user-specified account if you plan to use Microsoft Windows authentication for SQL Server. See <a href="#">"Using a User Account for Running vCenter Server with SQL Server,"</a> on page 60.
HTTPS Web services	443	See <a href="#">"Required Ports,"</a> on page 16.
HTTP Web services	80	
Heartbeat (UDP) used for sending data to ESX/ESXi hosts	902	
LDAP port for the Directory Services for the local vCenter Server instance	389	
SSL port for the Directory Services for the local vCenter Server instance	636	
VMware VirtualCenter Management Webservices	8080	
VMware VirtualCenter Management Webservices	8443	



# Installing vCenter Server

---

After you install vCenter Server and the vSphere Client, you can configure communication between them.

This chapter includes the following topics:

- [“Download the vCenter Server Installer,”](#) on page 65
- [“Install vCenter Server in a Virtual Machine,”](#) on page 65
- [“Install vCenter Server,”](#) on page 66

## Download the vCenter Server Installer

You must download the installer for vCenter Server, the vSphere Client, and the additional modules.

### Procedure

- 1 Download the zip file for the vCenter Server from the VMware product page at <http://www.vmware.com/products/>.  
The installer filename is `VMware-VIMSetup-xx-4.0.0-yyyyy.zip`, where `xx` is the two-character language code and `yyyyy` is the build number.
- 2 Extract the files from the zip archive.

## Install vCenter Server in a Virtual Machine

You can install vCenter Server in a Microsoft Windows virtual machine, which runs on an ESX host.

Deploying the vCenter Server system in the virtual machine has the following advantages:

- Rather than dedicating a separate server to the vCenter Server system, you can place it in a virtual machine running on the same ESX host where your other virtual machines run.
- You can provide high availability for the vCenter Server system by using VMware HA.
- You can migrate the virtual machine containing the vCenter Server system from one host to another, enabling maintenance and other activities.
- You can create snapshots of the vCenter Server virtual machine and use them for backups, archiving, and so on.

### Prerequisites

See [“vCenter Server Prerequisites,”](#) on page 59.

### Procedure

- 1 On a standalone server, install ESX.

- 2 On any machine that has network access to your ESX host, install the vSphere Client.
- 3 Using the vSphere Client, access the ESX host directly to create the virtual machine for hosting vCenter Server.
- 4 In the virtual machine, install vCenter Server.

## Install vCenter Server

vCenter Server allows you to centrally manage hosts from either a physical or virtual Windows machine, and enables the use of advanced features such as VMware Distributed Resource Scheduler (DRS), VMware High Availability (HA), and VMware VMotion.

### Prerequisites

See “[vCenter Server Prerequisites](#),” on page 59.

### Procedure

- 1 In the software installer directory, double-click the `autorun.exe` file at `C:\<installer location>\.`
- 2 Click **vCenter Server**.
- 3 Choose a language for the installer and click **OK**.

This selection controls the language for only the installer. When you use the vSphere Client to connect to the vCenter Server system, the vSphere Client appears in the language associated with the locale setting on your machine. You can alter this behavior with a command-line instruction or by changing the locale in the registry of the machine. See *Basic System Administration*.

- 4 When the Welcome screen appears, click **Next**.
- 5 Select **I agree to the terms in the license agreement** and click **Next**.
- 6 Type your user name, organization, and vCenter Server license key, and click **Next**.

If you omit the license key, vCenter Server will be in evaluation mode, which allows you to use the full feature set. After installation, you can convert vCenter Server to licensed mode by entering the license key using the vSphere Client.

- 7 Choose the type of database that you want to use.
  - If you want to use the bundled database, click **Install SQL Server 2005 Express instance (for small-scale deployments)**.

This database is suitable for deployments of up to 5 hosts and 50 virtual machines.

- If you want to use an existing database, click **Use an existing supported database** and select your database from the list of available DSNs. Enter the user name and password for the DSN and click **Next**.

If your database is a local SQL Server database using Windows NT authentication, leave the user name and password fields blank.

If you specify a remote SQL Server database that uses Windows NT authentication, the database user and the logged-in user on the vCenter Server machine must be the same.

A dialog box might appear warning you that the DSN points to an older version of a repository that must be upgraded. If you click **Yes**, the installer upgrades the database schema, making the database irreversibly incompatible with previous VirtualCenter versions. See the *Upgrade Guide*.

- 8 Choose the account type.

If you want to use Windows authentication for SQL Server, specify an account that is an administrator on the local machine. As a best practice, type the account name as `<DomainName>\<Username>`. Type the account password, retype the password, and click **Next**.

- 9 Either accept the default destination folders or click **Change** to select another location, and click **Next**.

The installation path cannot have commas (,) or periods (.).

---

**NOTE** To install the vCenter Server on a drive other than C:, verify that there is enough space in the `C:\WINDOWS\Installer` folder to install the Microsoft Windows Installer .msi file. If you do not have enough space, your vCenter Server installation might fail.

---

- 10 Select **Create a standalone VMware vCenter Server instance** or **Join Group** and click **Next**.

Join a Linked Mode group to enable the vSphere Client to view, search, and manage data across multiple vCenter Server systems. See [Chapter 11, "Creating vCenter Server Linked Mode Groups,"](#) on page 73.

This option does not appear if you are upgrading the VirtualCenter database schema. If it does not appear, you can join a Linked Mode group after the installation is complete.

- 11 If you join a group, enter the fully qualified domain name and LDAP port number of any remote vCenter Server system and click **Next**.

In some cases, you can enter the IP address instead of the fully qualified domain name. To help ensure connectivity, the best practice is to use the fully qualified domain name. For IPv6, unless both the local and the remote machine are in IPv6 mode, you must enter the fully qualified domain name of the remote machine instead of the IPv6 address. If the local machine has an IPv4 address and the remote machine has an IPv6 address, the local machine must support IPv4 and IPv6 mixed mode. The domain name server must be able to resolve both IPv4 and IPv6 addresses if your environment has both addressing types in a single Linked Mode group.

- 12 Enter the port numbers that you want to use or accept the default port numbers and click **Next**.

See ["Required Ports,"](#) on page 16.

- 13 Click **Install**.

Installation might take several minutes. Multiple progress bars appear during the installation of the selected components.

- 14 Click **Finish**.

### What to do next

See [Chapter 10, "Postinstallation Considerations for vCenter Server,"](#) on page 69.



# Postinstallation Considerations for vCenter Server

# 10

After you install vCenter Server, consider the postinstallation options and requirements.

- Install the vSphere Client and make sure that you can access the vCenter Server instance.
- Check the license server configuration. A license server is required if this vCenter Server is managing ESX 3.x/ESXi 3.5 hosts. For information about installing the VMware License Server, see the documentation for VMware Infrastructure 3.
- For environments that require strong security, VMware recommends that you replace the default certificates on your vCenter Server system with certificates signed by a commercial Certificate Authority (CA). See vSphere 4.0 technical note *Replacing vCenter Server Certificates* at <http://www.vmware.com/resources/techresources/>.
- When vCenter Server and the database are installed on the same machine, after rebooting the machine, the VMware VirtualCenter Management Webservices service might not start. To start the service manually, select **Settings > Control Panel > Administrative Tools > Services > VMware VirtualCenter Management Webservices** and start the service. The machine might require several minutes to start the service.
- For Oracle databases, note the following:
  - For the Oracle Instant client, copy ojdbc14.jar to the vCenter Server tomcat directory (<vCenter install location>\Infrastructure\tomcat\lib)
  - The Oracle 10g client and Oracle 11g client come with ojdbc14.jar (<Install location>\oracle\product\10.2.0\<instance\_name>\jdbc\lib or <Install location>\app\Administrator\product\11.1.0\<instance\_name>\sqldeveloper\jdbc\lib). The vCenter Server installer copies the file from the Oracle client install location to the vCenter Server tomcat directory (<vCenter install location>\Infrastructure\tomcat\lib)
  - If the ojdbc14.jar file is not found in the Oracle 10g or Oracle 11g client location, the vCenter Server installer prompts you to copy the file manually. You can download the file from [http://www.oracle.com/technology/software/tech/java/sqlj\\_jdbc/htdocs/jdbc101040.html](http://www.oracle.com/technology/software/tech/java/sqlj_jdbc/htdocs/jdbc101040.html).

This chapter includes the following topics:

- “Install the vSphere Client,” on page 70
- “Install the vSphere Host Update Utility,” on page 71
- “Uninstall VMware vSphere Components,” on page 72

## Install the vSphere Client

The vSphere Client enables you to connect to an ESX/ESXi host and to a vCenter Server system.

### Prerequisites

- You must have the vCenter Server installer or the vSphere Client installer.
- You must be a member of the Administrators group on the machine.

### Procedure

- 1 Run the vSphere Client installer.
  - In the vCenter Server installer, double-click the `autorun.exe` file at `C:\<vc-installer location>\` and click **VMware vSphere Client**.
  - If you downloaded the vSphere Client, double-click the `VMware-viclient.exe` file.
- 2 Choose a language for the installer and click **OK**.
 

This selection controls the language only for the installer. When you use the vSphere Client, the vSphere Client appears in the language associated with the locale setting on the machine. You can alter this behavior with a command-line instruction or by changing the locale in the registry of the machine. See *Basic System Administration*.
- 3 When the Welcome screen appears, click **Next**.
- 4 Select **I agree to the terms in the license agreement** and click **Next**.
- 5 Type your user name and company name and click **Next**.
- 6 Select **Install VMware vSphere Host Update Utility** to manage host patches, updates, and upgrades from this machine and click **Next**.
 

For large deployments and for environments with clustered hosts, VMware recommends that you use vCenter Update Manager instead of the vSphere Host Update Utility.
- 7 Accept the default installation location and click **Next**, or click **Change** to select a different location and click **Next**.
- 8 Click **Install** to begin the installation.
- 9 Click **Finish** to complete the installation.

You can use the vSphere Client to connect to an ESX/ESXi host or to connect to a vCenter Server system.

## Start the vSphere Client

After you install the vSphere Client, you can connect to an ESX/ESXi host and to a vCenter Server system.

---

**NOTE** Do not use the Windows built-in Guest account to start the vSphere Client. By default, the Guest Account is disabled. When you use the Guest account to log in to Windows, you cannot access the applications that are already installed on the computer.

---

### Procedure

- 1 Select **Start > Programs > VMware > VMware vSphere Client**.

- 2 In the vSphere Client login window, log in to an ESX/ESXi host as root or as a normal user, or log in to a vCenter Server system as the administrator.
  - a Enter the IP address or host name.
  - b Enter your user name and password.

When you connect to the vCenter Server, use the vCenter Server IP address with your Windows login user name and password. Use the login credentials appropriate to the Windows machine on which vCenter Server is installed. The vCenter Server user name and password might be different than the user name and password that you use for ESX/ESXi.

- 3 Click **Login**.

If you cannot connect to the vCenter Server system, you might need to start the VMware VirtualCenter Management Webservices service manually. To do this, select **Settings > Control Panel > Administrative Tools > Services > VMware VirtualCenter Management Webservices** and start the service. The machine might require several minutes to start the service.

- 4 To ignore the security warnings that appear, click **Ignore**.

Security warning messages appear because the vSphere Client detects certificates signed by the ESX/ESXi host or vCenter Server system (default setting). For highly secure environments, certificates generated by a trusted third-party are recommended.

## Install the vSphere Host Update Utility

The vSphere Host Update Utility is for updating and patching ESXi 4.0 hosts and upgrading ESX 3.x/ESXi 3.5 hosts to ESX 4.0/ESXi 4.0.

The vSphere Host Update Utility is bundled with the vSphere Client. You can install the utility when you install the vSphere Client. If the vSphere Client is already installed and the vSphere Host Update Utility is not, use this procedure to install vSphere Host Update Utility.

### Prerequisites

To use vSphere Host Update Utility, you must have the following:

- Workstation or laptop with the vSphere Client installed.
- Network connection between the ESX/ESXi host and the workstation or laptop.
- Internet connectivity to download patch and update bundles or upgrade images from VMware.com if you do not have a local depot.

### Procedure

- 1 Open a command window by selecting **Start > Run** and then entering **cmd**.
- 2 Navigate to the folder that contains `VMware-viclient.exe`.

This executable is in the `\vpx` subfolder of the vCenter Server installation package.

- 3 Run the following command.

```
VMware-viclient.exe /S /V" /qr INSTALL_VIUPDATE=1 /L*v %temp%\vim-viu-launch.log"
```

The vSphere Host Update Utility is installed.

### What to do next

Scan hosts and apply available updates or upgrade a host.

## Uninstall VMware vSphere Components

The VMware vSphere components are uninstalled separately, even if they are on the same machine. You must have administrator privileges to uninstall the vCenter Server component.



**CAUTION** Uninstalling a vCenter Server system while it is running disrupts the vSphere Client connections, which can cause data loss.

---

Uninstalling vCenter Server or the vSphere Client does not uninstall any of the other components, such as the bundled database or Microsoft .NET Framework. Do not uninstall the other components if other applications on your system depend on them.

### Procedure

- 1 If you are uninstalling the vCenter Server, unlicense the vCenter Server and the hosts, and remove the license keys from the license inventory.
- 2 If you are uninstalling the vCenter Server, remove the hosts from the Hosts and Clusters inventory.
- 3 As Administrator on the Microsoft Windows system, select **Start > Settings > Control Panel > Add/Remove Programs**.
- 4 Select the component to remove from the list and click **Remove**.
- 5 Click **Yes** to confirm that you want to remove the program and click **Finish**.

# Creating vCenter Server Linked Mode Groups

# 11

A Linked Mode group allows you to log in to any single instance of vCenter Server and view and manage the inventories of all the vCenter Server systems in the group.

You can join multiple vCenter Server systems to form a Linked Mode group. You can configure a Linked Mode group during vCenter Server installation or after vCenter Server is installed.

To join a vCenter Server group, you enter the fully qualified domain name (or IP address) of a remote machine on which vCenter Server 4.0 is running. The remote machine can be any vCenter Server 4.0 instance that is or will become a member of the Linked Mode group.

You must also provide the Lightweight Directory Access Protocol (LDAP) port number of the remote vCenter Server instance.

vCenter Server instances in a group replicate shared global data to the LDAP directory. The global data includes the following information for each vCenter Server instance:

- Connection information (IP and ports)
- Certificates
- Licensing information
- User roles

This chapter includes the following topics:

- [“Linked Mode Prerequisites,”](#) on page 73
- [“Linked Mode Considerations,”](#) on page 74
- [“Configure the URLs on a Linked Mode vCenter Server System,”](#) on page 74
- [“Joining to a Linked Mode Group During and After Installation,”](#) on page 75
- [“Join a Linked Mode Group After Installation,”](#) on page 75
- [“Isolate a vCenter Server Instance from a Linked Mode Group,”](#) on page 76
- [“Linked Mode Troubleshooting,”](#) on page 76

## Linked Mode Prerequisites

Prepare the system for joining a Linked Mode group.

All the requirements for standalone vCenter Server systems apply to Linked Mode systems. See [“vCenter Server Prerequisites,”](#) on page 59.

The following requirements apply to each vCenter Server system that is a member of a Linked Mode group:

- DNS must be operational for Linked Mode replication to work.

- The vCenter Server instances in a Linked Mode group can be in different domains if the domains have a two-way trust relationship. Each domain must trust the other domains on which vCenter Server instances are installed.
- When adding a vCenter Server instance to a Linked Mode group, the installer must be run by a domain user who is an administrator on both the machine where vCenter Server is installed and the target machine of the Linked Mode group.
- All vCenter Server instances must have network time synchronization. The vCenter Server installer validates that the machine clocks are not more than 5 minutes apart.

## Linked Mode Considerations

There are several considerations to take into account before you configure a Linked Mode group.

- Each vCenter Server user sees the vCenter Server instances on which they have valid permissions.
- When first setting up your vCenter Server Linked Mode group, you must install the first vCenter Server as a standalone instance because you do not yet have a remote vCenter Server machine to join. Subsequent vCenter Server instances can join the first vCenter Server or other vCenter Server instances that have joined the Linked Mode group.
- If you are joining a vCenter Server to a standalone instance that is not part of a domain, you must add the standalone instance to a domain and add a domain user as an administrator.
- The vCenter Server instances in a Linked Mode group do not need to have the same domain user login. The instances can run under different domain accounts. By default, they run as the LocalSystem account of the machine on which they are running, which means they are different accounts.
- During vCenter Server installation, if you enter an IP address for the remote instance of vCenter Server, the installer converts it into a fully qualified domain name.
- You cannot join a Linked Mode group during the upgrade procedure when you are upgrading from VirtualCenter 2.x to vCenter Server 4.0. You can join after the upgrade to vCenter Server is complete. See the *Upgrade Guide*.

## Configure the URLs on a Linked Mode vCenter Server System

If you connect a vCenter Server system to a Linked Mode group and the vCenter Server system has a machine name that does not match the domain name, several connectivity problems arise. This procedure describes how to correct this situation.

If you do not update the URLs, remote instances of vCenter Server cannot reach the vCenter Server system, because the default vCenter Server URL entries are no longer accurate. The vCenter Server installer configures default URL entries as follows:

- For the `Virtualcenter.VimApiUrl` key, the default value is `http(s)://<Fully qualified domain name (FQDN) of VC machine>/sdk`.
- For the `Virtualcenter.VimWebServicesUrl` key, the default value is `https://<FQDN of VC machine>:<installed-webservices-port>/vws`.

### Procedure

- 1 Isolate the vCenter Server system from the Linked Mode group.  
See [“Isolate a vCenter Server Instance from a Linked Mode Group,”](#) on page 76.
- 2 Change the domain name or the machine name to make them match.
- 3 From the vSphere Client, connect directly to the vCenter Server instance on which you have changed the domain or machine name.

- 4 Select **Administration > vCenter Server Settings** and click **Advanced Settings**.
- 5 For the `Virtualcenter.VimApiUrl` key, change the value to point to the location where the vSphere Client and SDK clients can access the vCenter Server system.  
For example: `http(s)://<machine-name/ip>:<vc-port>/sdk`.
- 6 For the `Virtualcenter.VimWebServicesUrl` key, change the value to point to the location where vCenter Server Webservices is installed.  
For example: `https://<machine-name/ip>:<webservices-port>/vws`.
- 7 For the `Virtualcenter.InstanceName` key, change the value so that the modified name appears in the vCenter Server inventory view.
- 8 Rejoin the vCenter Server system to the Linked Mode group.  
See [“Join a Linked Mode Group After Installation,”](#) on page 75.

## Joining to a Linked Mode Group During and After Installation

You can join a system to a Linked Mode group during or after installing vCenter Server.

For example, suppose you have three machines on which you want to install vCenter Server. You want the three instances to be members of a Linked Mode group.

- 1 On Machine 1, you install vCenter Server as a standalone instance because you do not yet have a remote vCenter Server machine to join.
- 2 On Machine 2, you install vCenter Server, choose to join a Linked Mode group, and provide the fully qualified domain name of Machine 1.
- 3 On Machine 3, you upgrade to vCenter Server 4.0. After the upgrade, you configure Machine 3 to join either Machine 1 or Machine 2. Machine 1, Machine 2, and Machine 3 are now members of a Linked Mode group.

## Join a Linked Mode Group After Installation

If you have a system that is already running vCenter Server 4.0, you can join the machine to a Linked Mode group.

### Prerequisites

See [“Linked Mode Prerequisites,”](#) on page 73 and [“Linked Mode Considerations,”](#) on page 74.

### Procedure

- 1 Select **Start > All Programs > VMware > vCenter Server Linked Mode Configuration**.
- 2 Click **Next**.
- 3 Select **Modify linked mode configuration** and click **Next**.
- 4 Click **Join this vCenter Server instance to an existing linked mode group or another instance** and click **Next**.
- 5 Enter the server name and LDAP port number of a remote vCenter Server instance that is a member of the group and click **Next**.

If you enter an IP address for the remote server, the installer converts it into a fully qualified domain name.

- 6 If the vCenter Server installer detects a role conflict, select how to resolve the conflict.

Option	Description
<b>Yes, let VMware vCenter Server resolve the conflicts for me</b>	Click <b>Next</b> . The role on the joining system is renamed to <code>&lt;vcenter_name&gt; &lt;role_name&gt;</code> , where <code>&lt;vcenter_name&gt;</code> is the name of the vCenter Server system that is joining the Linked Mode group, and <code>&lt;role_name&gt;</code> is the name of the original role.
<b>No, I'll resolve the conflicts myself</b>	To resolve the conflicts manually: <ol style="list-style-type: none"> <li>Using the vSphere Client, log in to one of the vCenter Server systems using an account with <b>Administrator</b> privileges.</li> <li>Rename the conflicting role.</li> <li>Close the vSphere Client session and return to the vCenter Server installer.</li> <li>Click <b>Back</b> and click <b>Next</b>.</li> </ol> The installation continues without conflicts.

A conflict results if the joining system and the Linked Mode group each contain a role with the same name but with different privileges.

- 7 Click **Finish**.

vCenter Server restarts. Depending on the size of your inventory, the change to Linked Mode might take from a few seconds to a few minutes to complete.

The vCenter Server instance is now part of a Linked Mode group. After you form a Linked Mode group, you can log in to any single instance of vCenter Server and view and manage the inventories of all the vCenter Servers in the group. It might take several seconds for the global data (such as user roles) that are changed on one machine to be visible on the other machines. The delay is usually 15 seconds or less. It might take a few minutes for a new vCenter Server instance to be recognized and published by the existing instances, because group members do not read the global data very often.

#### What to do next

For information about configuring and using your Linked Mode group, see *Basic System Administration*.

## Isolate a vCenter Server Instance from a Linked Mode Group

You can isolate a vCenter Server instance from a Linked Mode group.

#### Procedure

- Select **Start > All Programs > VMware > vCenter Server Linked Mode Configuration**.
- Click **Modify linked mode configuration** and click **Next**.
- Click **Isolate this vCenter Server instance from linked mode group** and click **Next**.
- Click **Continue** and click **Finish**.

The vCenter Server instance is no longer part of the Linked Mode group.

## Linked Mode Troubleshooting

If you are having trouble with your Linked Mode group, consider the following points.

- When you have multiple vCenter Server instances, each instance must have a working relationship with the domain controller and not conflict with another machine that is in the domain. Conflicts can occur, for example, when you clone a vCenter Server instance that is running in a virtual machine and you do not use sysprep or a similar utility to ensure that the cloned vCenter Server instance has a globally unique identifier (GUID).

- The DNS name of the machine must match with the actual machine name. Symptoms of machine names not matching the DNS name are data replication issues, ticket errors when trying to search, and missing search results from remote instances.
- There is correct order of operations for joining a Linked Mode group.
  - a Verify that the vCenter Server domain name matches the machine name. If they do not match, change one or both to make them match.
  - b Update the URLs to make them compatible with the new domain name and machine name.
  - c Join the vCenter Server system to a Linked Mode group.

If you do not update the URLs, remote instances of vCenter Server cannot reach the vCenter Server system, because the default vCenter Server URL entries are no longer accurate. See [“Configure the URLs on a Linked Mode vCenter Server System,”](#) on page 74.

If a vCenter Server instance is no longer reachable by remote instances of vCenter Server, the following symptom might occur:

- Clients logging in to other vCenter Server systems in the group cannot view the information that belongs to the vCenter Server system on which you changed the domain name because the users cannot log in to the system.
- Any users that are currently logged in to the vCenter Server system might be disconnected.
- Search queries do not return results from the vCenter Server system.

To resolve this issue, make sure that the `Virtualcenter.VimApiUrl` key points to the location where the vSphere Client and SDK clients can access the vCenter Server system, and the `Virtualcenter.VimWebServicesUrl` key points to the location where vCenter Server Webservices is installed. For the `Virtualcenter.InstanceName` key, change the value so that the modified name appears in the vCenter Server inventory view.

- If you cannot join a vCenter Server instance, you can resolve the problem with the following actions:
  - Ensure that the machine is grouped into the correct organizational unit in the corresponding domain controller.
  - When you install vCenter Server, ensure that the logged in user account has administrator privileges on the machine.
  - To resolve trust problems between a machine and the domain controller, remove the machine from the domain and then add it to the domain again.
  - To ensure that the Windows policy cache is updated, run the `gpupdate /force` command from the Windows command line. This command performs a group policy update.
- If the local host cannot reach the remote host during a join operation, verify the following:
  - Remote vCenter Server IP address or fully qualified domain name is correct.
  - LDAP port on the remote vCenter Server is correct.
  - VMwareVCMSDS service is running.
- Make sure your Windows and network-based firewalls are configured to allow Linked Mode.

## Configuring a Windows Firewall to Allow a Specified Program Access

vCenter Server 4.0 uses Microsoft ADAM/AD LDS to enable Linked Mode, which uses the Windows RPC port mapper to open RPC ports for replication. When you install vCenter Server in Linked Mode, the firewall configuration on the local machine must be modified.

Incorrect configuration of firewalls can cause licenses and roles to become inconsistent between instances.

### Prerequisites

- The Windows version must be an earlier than Windows Server 2008. For Windows Server 2008, Windows automatically configures the firewall to permit access.
- There must be no network-based firewalls between vCenter Server Linked Mode instances. For environments with network-based firewalls, see “[Configuring Firewall Access by Opening Selected Ports](#),” on page 78.

### Procedure

- 1 Select **Start > Run**.
- 2 Type **firewall.cpl** and click **OK**.
- 3 Make sure that the firewall is set to allow exceptions.
- 4 Click the **Exceptions** tab.
- 5 Click **Add Program**.
- 6 Add an exception for **C:\Windows\ADAM\dsamain.exe** and click **OK**.
- 7 Click **OK**.

## Configuring Firewall Access by Opening Selected Ports

vCenter Server 4.0 uses Microsoft ADAM/AD LDS to enable Linked Mode, which uses the Windows RPC port mapper to open RPC ports for replication. When you install vCenter Server in Linked Mode, the firewall configuration on any network-based firewalls must be modified.

Incorrect configuration of firewalls can cause licenses and roles to become inconsistent between instances.

### Procedure

- ◆ Configure Windows RPC ports to generically allow selective ports for machine-to-machine RPC communication.

Choose one of the following methods.

- Change the registry settings. See <http://support.microsoft.com/kb/154596/en-us>.
- Use Microsoft's **RPCcfg.exe** tool. See <http://support.microsoft.com/kb/908472/en-us>.

## Install Additional Modules

---

You can install additional modules on the same machine that hosts vCenter Server or on remote machines.

This chapter includes the following topics:

- [“Install VMware vCenter Guided Consolidation,”](#) on page 79
- [“Install VMware vCenter Update Manager,”](#) on page 80
- [“Install VMware vCenter Converter,”](#) on page 81

### Install VMware vCenter Guided Consolidation

The vCenter Guided Consolidation service is an extension to vCenter Server. vCenter Guided Consolidation enables you to migrate from physical servers to virtual infrastructure using a wizard that identifies physical servers for consolidation, converts them to virtual machines, and places them onto ESX/ESXi hosts.

This procedure describes how to install vCenter Guided Consolidation as an additional module (sometimes called a plug-in) on the same machine that hosts vCenter Server or on a remote machine.

The VMware vCenter Guided Consolidation service includes the following components:

**vCenter Collector service** This service discovers computers in your network and collects performance data. To enable this service, the installer prompts you to enter a user name and password for an administrative account on the local machine. This account can be a domain user account specified as `DomainName\UserName`. The vCenter Collector service uses port 8181 and 8182, by default.

**vCenter Web Server** Uses ports 8080 and 8443, by default.

#### Prerequisites

Before you install vCenter Guided Consolidation, download the software installer and install vCenter Server 4.0 on the local machine or on a machine that is reachable by the local machine.

#### Procedure

- 1 In the software installer directory, double-click the `autorun.exe` file at `C:\<vc-installer location>\`.
- 2 Click **vCenter Guided Consolidation Service**.
- 3 Choose a language for the installer and click **OK**.
- 4 When the Welcome screen appears, click **Next**.
- 5 Select **I agree to the terms in the license agreement** and click **Next**.
- 6 Accept the default installation location, or click **Change** to select a different location, and click **Next**.

- 7 Type an administrative user name and password and click **Next**.
- 8 Enter the port numbers that you want to use or accept the default port numbers and click **Next**.
- 9 Enter the location of the vCenter Server system.
  - Enter an IP address or fully qualified domain name of the remote vCenter Server system to which the vCenter Guided Consolidation service will be an extension.
  - Enter **localhost** if you are installing the vCenter Guided Consolidation service on the same system on which you installed vCenter Server.
- 10 Enter the port number that the vCenter Server system uses for secure HTTP (HTTPS) communication. The default port is 443.
- 11 Enter the user name and password for the vCenter Server system and click **Next**. The user account must have extension registration privileges on the vCenter Server system.
- 12 Select the server identity from the drop-down menu and click **Next**.
- 13 Click **Install** to begin the installation.
- 14 Click **Finish** to complete the installation.

The vCenter Guided Consolidation Service is installed.

## Install VMware vCenter Update Manager

vCenter Update Manager is for environments with vCenter Server. Using vCenter Update Manager, you can orchestrate steps of an upgrade process sequentially, based on compliance baselines at the host, virtual machine, and datastore level.

This procedure describes how to install vCenter Update Manager as an additional module (sometimes called a plug-in) on the same machine that hosts vCenter Server or on a remote machine.

### Prerequisites

Before you install vCenter Update Manager, download the software installer and install vCenter Server 4.0 on the local machine or on a machine that is reachable by the local machine.

vCenter Update Manager requires a supported database. The database requirements are the same as vCenter Server. You can use a supported database that is configured to work with vCenter Update Manager, or you can install the Microsoft SQL Server 2005 Express database that is bundled with vCenter Update Manager. vCenter Update Manager can use the same database as vCenter Server, but VMware recommends that you have separate databases for vCenter Server and vCenter Update Manager.

### Procedure

- 1 In the software installer directory, double-click the `autorun.exe` file at `C:\<vc-installer location>\`.
- 2 Click **vCenter Update Manager**.
- 3 Choose a language for the installer and click **OK**.
- 4 When the Welcome screen appears, click **Next**.
- 5 Select **I agree to the terms in the license agreement** and click **Next**.

- 6 Enter the connection information for the vCenter Server system to which vCenter Update Manager will be an extension.
  - a Enter the IP address. By default, the IP address is that of the local host.
  - b Enter the port number that the vCenter Server system is configured to use for HTTP. By default, vCenter Server uses port 80.
  - c Enter the user name and password for the vCenter Server system.
- 7 Choose the type of database that you want to use for vCenter Update Manager.
  - To use the bundled database, click **Install a Microsoft SQL Server 2005 Express instance** and click **Next**.  
This database is suitable for small deployments of up to 5 hosts and 50 virtual machines.
  - To use an existing database, click **Use an existing supported database**, select your database from the list of available DSNs, and click **Next**.
- 8 If you chose to use an existing database, enter the user name and password for the DSN and click **Next**.  
If your database is a local SQL Server database using Microsoft Windows NT authentication, leave the user name and password fields blank.
- 9 Select the fully qualified domain name or IP address to identify this instance of vCenter Update Manager on the network.  
Make sure that the fully qualified domain name is accessible by the vCenter Server system and by all the ESX/ESXi hosts managed by the vCenter Server system.
- 10 Enter the port numbers that you want to use or accept the default port numbers.
- 11 (Optional) Select **Yes, I have an Internet connection, and I want to configure proxy settings now**.
- 12 Click **Next**.
- 13 Enter the proxy server name and port number.  
If the local machine has proxy settings configured, the installer uses these settings by default.
- 14 (Optional) Select **Authenticate proxy using the credentials below**, and enter the user name and password to use for authentication.
- 15 Accept the default installation location or click **Change** to select a different location.
- 16 Accept the default location for patch downloads or click **Change** to select a different location, and click **Next**.
- 17 Click **Install** to begin the installation.
- 18 Click **Finish** to complete the installation.

The vCenter Update Manager is installed.

#### **What to do next**

Install the Update Manager client plug-in. See the *vCenter Update Manager Administration Guide*.

## **Install VMware vCenter Converter**

vCenter Converter enables you to automate and simplify physical to virtual machine conversions as well as conversions between virtual machine formats.

This procedure describes how to install vCenter Converter as an additional module (sometimes called a plug-in) on the same machine that hosts vCenter Server or on a remote machine.

## Prerequisites

Before you install vCenter Converter, download the software installer and install vCenter Server 4.0 on the local machine or on a machine that is reachable by the local machine.

## Procedure

- 1 In the software installer directory, double-click the `autorun.exe` file at `C:\<vc-installer location>\`.
- 2 Click **vCenter Converter**.
- 3 Choose a language for the installer and click **OK**.
- 4 When the Welcome screen appears, click **Next**.
- 5 Select **I agree to the terms in the license agreement** and click **Next**.
- 6 Accept the default installation location and click **Next**, or click **Change** to select a different location and click **Next**.
- 7 Select the installation mode.
  - Select **Typical (Recommended)** to install the most common components.
  - Select **Custom** to choose the components to install.
- 8 Enter the connection information for the vCenter Server system to which vCenter Converter will be an extension.
  - a Enter the IP address. By default, the IP address is that of the local host.
  - b Enter the port number that the vCenter Server system is configured to use for secure HTTP (HTTPS). By default, vCenter Server uses port 443.
  - c Enter an administrative user name and password for the vCenter Server system.
- 9 Enter the port numbers that you want to use or accept the default port numbers and click **Next**.
- 10 Select the vCenter Server identity from the drop-down menu and click **Next**.
- 11 Click **Install** to begin the installation.
- 12 Click **Finish** to complete the installation.

vCenter Converter is installed.

## What to do next

Install the Converter client plug-in. See the *vCenter Converter Administration Guide*.

License reporting and management are centralized.

If you upgrade all your hosts, you no longer need a license server or host-based license files. All product licenses are encapsulated in 25-character license keys that you can manage and monitor from vCenter Server.

Each host requires a license, and each vCenter Server instance requires a license. You cannot assign multiple license keys to a host or to a vCenter Server system. You can license multiple hosts with one license key if the key has enough capacity for more than one host. Likewise, you can license multiple vCenter Server instances with one license key if the key has a capacity greater than one. When you apply a minor upgrade or patch the ESX/ESXi or vCenter Server software, you do not need to replace the existing license key with a new one. If you upgrade the edition of the license (for example, from standard to enterprise), you must replace the existing license key in the inventory with a new upgraded license key.

This chapter includes the following topics:

- [“About License Key Capacity,”](#) on page 84
- [“About vSphere and vCenter Server License Keys,”](#) on page 84
- [“About Using a License Server to Manage ESX 3.x/ESXi 3.5 Hosts,”](#) on page 84
- [“About the License Portal,”](#) on page 85
- [“About License Inventories,”](#) on page 86
- [“Controlling License Permissions,”](#) on page 87
- [“View License Information,”](#) on page 87
- [“Add a License Key to the License Inventory and Assign It to an Asset,”](#) on page 88
- [“Add Multiple License Keys to the License Inventory,”](#) on page 89
- [“Assign a License Key to Multiple Assets,”](#) on page 89
- [“Export Report Data,”](#) on page 90
- [“License a Host Without vCenter Server,”](#) on page 91
- [“License a Host When Adding It to the vCenter Server Inventory,”](#) on page 91
- [“View Which Features Are Licensed on a Host,”](#) on page 91
- [“Set an ESX/ESXi Host to Evaluation Mode,”](#) on page 91
- [“Troubleshooting Licensing,”](#) on page 92

## About License Key Capacity

License keys have a certain amount of capacity. Capacity is based on the number of processors in the host or the number of instances of the software asset.

### Licensing for Each Processor

For most vSphere products, when you purchase vSphere licenses, you must consider the total number of processors, not hosts, that will run the products. You can assign and reassign the processor capacity to any combination of hosts. For example, suppose you purchase a 10-processor vSphere license key. You can assign the 10-processor license key to any of the following combinations of hosts:

- Five 2-processor hosts
- Three 2-processor hosts and one 4-processor host
- Two 4-processor hosts and one 2-processor host
- One 8-processor host and one 2-processor host

Special considerations include:

- Dual-core and quad-core processors, such as Intel processors that combine two or four independent CPUs on a single chip, count as one processor.
- You cannot partially license a multiprocessor host. For example, a 4-CPU host requires 4-processors of vSphere license key capacity.

---

**IMPORTANT** From the ESX/ESXi license perspective, a CPU is a processor with a physical processor in it. When you purchase a license, you select the edition, the number of CPUs, and the maximum number of cores per CPU. For example, if you purchase an enterprise license with 100 CPUs, you must also choose the maximum number of cores per CPU. For example, you might select a maximum of 2 cores per CPU, 6 cores per CPU, or 12 cores per CPU. The choice depends on the type of hardware on which you are installing ESX/ESXi.

---

### Licensing for Each Asset Instance

Products for which you purchase a license for each instance require a single unit of license key capacity, regardless of the number of processors in the machine. The vCenter Server is an example of a product that requires this type of license. If you purchase a vCenter Server license key with a capacity greater than one, you assign one unit of the capacity to each instance of vCenter Server.

## About vSphere and vCenter Server License Keys

The terms vSphere and vCenter Server are used for licenses.

**vSphere Licenses**                      For ESX/ESXi.

**vCenter Server Licenses**          For vCenter Server (formerly, VirtualCenter).

## About Using a License Server to Manage ESX 3.x/ESXi 3.5 Hosts

vCenter Server 4.0 does not require a license server to manage ESX 4.0/ESXi 4.0 hosts. vCenter Server 4.0 requires a license server to manage ESX 3.x/ESXi 3.5 hosts.

If you do not have a license server installed and you need one, download the VMware License Server from the VMware Web site.

The License Server installation requires no downtime. No virtual machines, servers, hosts, or clients need to be powered off for the installation of the license server.

## Configure vCenter Server to Use a License Server

To manage ESX 3.x/ESXi 3.5 hosts, you must configure vCenter Server to use a license server.

### Procedure

- 1 In vCenter Server, select **Administration > vCenter Server Settings**.
- 2 In the License Server text box, enter the port number and license server machine name, as in port@host.  
For example: 27000@license-3.companyname.com
- 3 If you want the hosts and vCenter Server to use the same license server, select the **Reconfigure ESX 3 hosts using license servers to use this server** check box.
- 4 Click **OK**.

## About the License Portal

Use the license portal to get upgraded license keys, downgrade license keys, combine the capacity of multiple license keys, divide the capacity of a single license key, view the change history of your license keys, and find lost license keys.

### Getting Upgraded License Keys

If you have VMware Infrastructure 3 license keys and you have been provided upgrades to vSphere 4.0, use the license portal to retrieve the new license keys and deactivate the old licenses. After you retrieve the license keys, enter them into the vCenter Server license inventory.

### Downgrading License Keys

If you have vSphere 4.0 license keys but you need to license VMware Infrastructure 3 assets, use the license portal to downgrade the license keys. When you do this, your vSphere 4.0 license keys remain valid. When you are ready to upgrade your assets, you can stop using the VMware Infrastructure licenses and start using the vSphere 4.0 license keys by entering them into the vCenter Server license inventory and assigning them to your upgraded assets.

### Combining the Capacity of License Keys

If your license inventory contains multiple license keys, each with a small amount of capacity, you might want to combine them into one large-capacity license key. This is useful when the total available capacity across license keys is large enough to accommodate an asset, but no single license key is large enough to accommodate the asset.

After you use the license portal to combine license keys, you must add the new license key to the vCenter Server license inventory and remove the old license keys.

### Dividing the Capacity of License Keys

If you have a large-capacity license key, you might want to divide the capacity to create multiple smaller-capacity license keys. This is useful for managing license keys in different vCenter Server inventories or assigning different license keys to groups in your organization.

### Viewing the Change History of License Keys

The license portal tracks the complete history of license key upgrades, downgrades, combinations, and divisions for your organization.

## Finding Lost License Keys

If a license key is misplaced, you can search for it in the license portal using the following criteria:

- Date range
- License key
- Order number
- Transaction type

## About License Inventories

The license inventories that are maintained by a vCenter Server system work slightly differently, depending on whether you have Linked Mode groups or standalone systems.

### Example: Uninstallation Scenarios

- 1 You uninstall vCenter Server without first unlicensing and removing the hosts.
- 2 The hosts remain licensed.
- 3 You add the licensed hosts to another vCenter Server instance.
- 4 The license keys are transferred with the hosts.

Here is a slightly different scenario:

- 1 You uninstall vCenter Server without first unlicensing the hosts.
- 2 You reinstall vCenter Server and make it part of a different Linked Mode group.
- 3 The host license keys from the previous group are not transferred to the new group.
- 4 You add hosts that were licensed by the previous vCenter Server group to the new group.
- 5 The host license keys are transferred to the new group.
- 6 The host license keys now belong to two Linked Mode groups. If the total assignment of the key exceeds the key's capacity, this scenario is not supported and causes your license usage to be out of compliance.

### Example: Standalone Scenario

Each vCenter Server instance maintains its own license inventory. If you add an ESX/ESXi host to vCenter Server and add the same host to another vCenter Server instance, the host license key moves from the first inventory to the second inventory.

- 1 You have two vCenter Server instances that are standalone.
- 2 You assign a license to a host in one vCenter Server instance.
- 3 You add the host to another vCenter Server instance and choose to retain the license when you perform the Add Host operation.
- 4 The host license key belongs to two separate license inventories. If the total assignment of the key exceeds the key's capacity, this scenario is not supported and causes your license usage to be out of compliance.

### Example: Linked Mode Scenario

- 1 You have two vCenter Server instances that belong to the same Linked Mode group.
- 2 You assign a license to a host in one vCenter Server instance.
- 3 The two vCenter Server instances share a single license inventory.

- 4 When you add a license key, the key becomes available to all the vCenter Server systems within the same Linked Mode group. The license keys are shared, and each system in the group has the same inventory view, although this might not always seem so because of replication delays.

## Controlling License Permissions

You can control which users are able to view and manage license resources.

The following permission types are supported.

<b>Global.licenses</b>	If you have global permission at the root folder, you can view and modify all licenses in the vCenter Server inventory. This includes other vCenter Server systems in a Linked Mode group.
<b>Read-only</b>	If you have read-only permission on a host, the vCenter Server displays the first and last five characters of the license key assigned to the host, the features present in the license, and the expiration date for the license.

If you have neither of these permissions but you can add a host to vCenter Server, you can add a license to the inventory and assign a license to the host when you perform the add host operation.

## View License Information

You can see all the licenses assigned or available in your vSphere inventory using the licensing view.

### Procedure

- 1 From a vSphere Client host that is connected to a vCenter Server system, click **Home > Licensing**.
- 2 (Optional) Click **Refresh**.
- 3 On the licensing page, select the view.
  - To view the available licenses listed by product, select **Product**.
  - To view the available licenses listed by license key, select **License key**.
  - To view licenses listed by the asset (host or vCenter Server system) to which they are assigned, select **Asset**.

From these report views, you can right-click entities to add, assign, and remove license keys and copy license information to your clipboard.

### Example: Use the Product View to Add and Assign a License Key

In this example, you select the **Product** view in the Licensing Report window. In the Evaluation Mode list, right-click a vCenter Server instance and select **Change license key**. You can then assign a license key that is in the license inventory or add a new license key and assign it in a single operation.

**Licensing** Manage vSphere Licenses...

**Report** View by:  Product  License key  Asset Refresh | Export...

Product	Assigned	Capacity	Label	Expires
License Server (license-3.eng.vmware.com)				
Evaluation Mode	3	Unlimited		
(No License Key)	3	Unlimited		
10.20.80.176				6/1/2009
10.6.104.226				6/5/2009
10.6.104.227				6/5/2009
vCenter Server (TECHDIRS.WC)	0 instances	8 instances		
00H26-402	0 instances	8 instances		Never
vSphere 4 Enterprise (10 cores per CPU)	0 CPUs	100 CPUs		
vSphere 4 Enterprise Plus (1-12 cores per CPU)	4 CPUs	Unlimited CPUs		

### What to do next

If you have a license with zero assigned capacity, as seen in the Assigned column of the License Report, ask yourself the following questions:

- Did I forget to assign this license key to an asset?
- Did I forget to remove this license key from the inventory?

Remove the license key in the following cases:

- The license key has expired.
- You use the license portal to combine the capacities of multiple small-capacity license keys to create a larger-capacity license key. Then you remove the old license keys and add the new license key to the vCenter Server inventory.
- You have upgraded your licenses, and you must remove the legacy licenses.

## Add a License Key to the License Inventory and Assign It to an Asset

After you purchase an asset, you can add the license key to the inventory and assign it to the asset. Use this procedure to add one license key and assign it to one asset.

### Prerequisites

The vSphere Client must be connected to the vCenter Server system.

### Procedure

- 1 From a vSphere Client host that is connected to a vCenter Server system, select **Home > Licensing**.
- 2 For the report view, select **Asset**.
- 3 Right-click an asset and select **Change license key**.
- 4 Select **Assign a new license key** and click **Enter Key**.
- 5 Enter the license key, enter an optional label for the key, and click **OK**.
- 6 Click **OK**.

## Add Multiple License Keys to the License Inventory

After you purchase assets, you can add the license keys to the license inventory. You can add multiple license keys at the same time.

### Prerequisites

The vSphere Client must be connected to the vCenter Server system.

### Procedure

1 From a vSphere Client host that is connected to a vCenter Server system, select **Home > Licensing**.

2 Click **Manage vSphere Licenses**.

3 In the Add License Keys text area, enter license keys one per line.

You can paste a list of keys in one operation.

4 (Optional) Type a brief description of the keys.

5 Click **Add License Keys**.

If any of the keys are invalid, an error message lists the invalid keys. You can correct the invalid keys and try adding them again, or delete them.

6 If you are not ready to assign license keys to assets, click **Next** through the remaining wizard screens and click **Finish** to save your changes.

## Assign a License Key to Multiple Assets

You can assign licenses to single or multiple assets, individually or in batches.

---

**NOTE** After you assign a license to a host, the software might update the license report before the license assignment operation is complete. If the host becomes disconnected immediately after you assign the license, the license report might not accurately reflect the host license state. The report might show the host as licensed, even though the license assignment operation is not yet complete. When the host is reconnected to a vCenter Server system, the license assignment operation continues, and the host becomes licensed as shown in the report.

---

### Prerequisites

To assign a license to a host, the host must be connected to a vCenter Server system.

### Procedure

1 From a vSphere Client host that is connected to a vCenter Server system, select **Home > Licensing**.

2 Click **Manage vSphere Licenses**.

3 Click **Next** to go to the Assign Licenses page.

4 Click the **ESX** or **vCenter Server** tab to display the available assets.

5 Click **Show Unlicensed assets**, **Show licensed assets**, or **Show all**.

6 In the Asset window, select one or more assets to license.

To select multiple assets, use Ctrl-click or Shift-click.

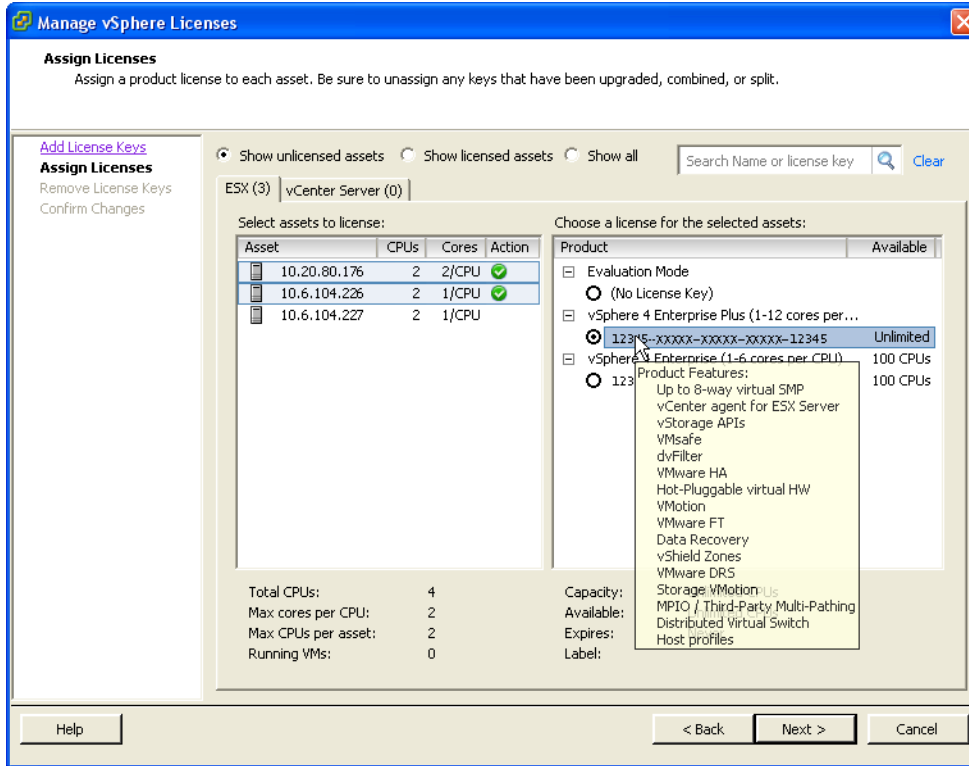
7 In the Product window, select an appropriate license key and click **Next**.

The capacity of the license key must be greater than or equal to the sum of the asset CPUs.

- 8 If you are not ready to remove any license keys, click **Next** to skip the Remove License Keys page and click **Finish** to save your changes.

### Example: Assign a License Key to Two ESX Hosts

In this example, Shift-click to select two 2-CPU ESX hosts and then assign a vSphere Enterprise license key to the hosts. Before the assignment, the license key has an available capacity of 98 CPUs. After the assignment, the license key has an available capacity of 94 CPUs. The pop-up tool tip lists the product features included in the vSphere Enterprise license edition.



### Export Report Data

You can export license data to a file that you can open in a third-party application.

#### Procedure

- 1 From a vSphere Client host that is connected to a vCenter Server system, select **Home > Licensing**.
- 2 Select the view that you want to export.
  - **Product**
  - **License key**
  - **Asset**
- 3 From the report screen, click **Export**.
- 4 In the Save As dialog box, select a folder, a filename, and a format for the exported license data and click **Save**.

## License a Host Without vCenter Server

If you are directly connected to the host through the vSphere Client, you can license the host.

### Procedure

- 1 From the vSphere Client, click the **Configuration** tab.
- 2 Under Software, click **Licensed Features**.
- 3 Click **Edit**.
- 4 Assign a license key.
  - Select **Assign an existing license key to this host** and select a license key from the Product list.
  - Select **Assign a new license key to this host**, click **Enter Key**, and enter a license key and an optional label for the license key.
- 5 Click **OK**.

## License a Host When Adding It to the vCenter Server Inventory

When you add a host to the vCenter Server inventory, you can license the host.

### Prerequisites

You must have a communication channel through a firewall before adding a host.

### Procedure

- 1 Click **Inventory** in the navigation bar.
- 2 Expand the inventory as needed and click the appropriate datacenter, folder, or cluster.
- 3 Right-click the datacenter or cluster and select **Add Host**.
- 4 When prompted by the Add Host wizard, assign an existing vSphere license key or add a new vSphere license key.

## View Which Features Are Licensed on a Host

You can view which features a host is licensed to use.

If you try to configure features that are not included in the host license, the vSphere Client displays an error message.

### Procedure

- 1 From the vSphere Client, select the host in the inventory.
- 2 Click the **Configuration** tab.
- 3 Under Software, click **Licensed Features**.

The Licensed Features window displays the list of features that you can configure on the host.

## Set an ESX/ESXi Host to Evaluation Mode

If you entered a license for ESX, you can switch to evaluation mode to explore the full functionality of ESX.

### Procedure

- 1 From the vSphere Client, select the host in the inventory.

- 2 Click the **Configuration** tab.
- 3 Under Software, click **Licensed Features**.
- 4 Click **Edit** next to ESX License Type.
- 5 Click **Product Evaluation**.
- 6 Click **OK** to save your changes.

## Troubleshooting Licensing

These topics provide guidelines for troubleshooting your license setup for environments with only ESX 4.0/ESXi 4.0 hosts and environments that have a mixture of ESX 4.0/ESXi 4.0 and legacy ESX 3.x/ESXi 3.5 hosts.

If you cannot resolve the problem, contact VMware for support as follows:

- If you have difficulties in configuring licensed features, file a support request at <http://www.vmware.com/support>.
- To license vCenter Server, you must apply a vCenter Server license key.
- To license ESX/ESXi, you must apply a vSphere license key.
- If you downgrade your license from evaluation mode to a license that does not support the features that you configured while using evaluation mode, the features might stop working without warning.
- If a licensing-related error message appears when you try to configure a feature, check the licensed features on the host and on the vCenter Server system to make sure that the host or vCenter Server system is licensed to use the feature that you are trying to configure.
- If all the hosts in a vCenter Server system inventory become disconnected, this might be because the vCenter Server license is expired or the 60-day evaluation period has expired.
- If you cannot power on the virtual machines that reside on a host, this might be because the host license is expired or the 60-day evaluation period is expired.
- If an ESX/ESXi host is managed by a vCenter Server system, changes made to the host license via direct connection to the host do not persist, because the changes are overwritten by the license key assigned via vCenter Server. See “[About Overriding the Host License Configuration](#),” on page 93.
- If vCenter Server is managing ESX 3.x/ESXi 3.5 hosts, vCenter Server must check out vCenter Server Agent licenses from a license server. If vCenter Server is having trouble communicating with your license server, do the following:
  - Check that the license server Microsoft Windows service is running.
  - Check that the license server is listening.
  - Check the license server status.

If your license server is operating properly, you might have a problem with your license file.

If your license server is working correctly and your license file is correct, check that you correctly configured centralized or single-host licensing, as appropriate to your environment.

For detailed troubleshooting and configuration instructions, see the licensing documentation in the *Installation Guide* or the *Setup Guide* for VMware Infrastructure 3.

## Applying Licenses

If you cannot apply a license to an asset, the license might not match the currently configured features and resources. When you assign a license to an asset, the license must be compatible with all the configured resources and features.

For example, suppose you add 10 ESX hosts to the vCenter Server inventory during the evaluation period. After the evaluation period expires, you try to assign a Foundation edition license to a vCenter Server system. The assignment operation fails because the Foundation edition allows a vCenter Server system to manage up to three hosts only. To correct this issue, you can upgrade the edition or you can remove seven hosts from the inventory.

As another example, suppose that you configure VMotion and DRS on a cluster of Enterprise edition hosts. Later, you try to assign Standard license keys to the hosts. This operation fails because the Standard edition does not include VMotion and DRS. You must assign Enterprise licenses to the ESX hosts or disable VMotion and DRS. For detailed information about how to disable features, see the VMware Knowledge Base.

Also, make sure you are applying the correct license key, as follows:

- To license vCenter Server assets, you must apply a vCenter Server license key.
- To license ESX/ESXi assets, you must apply a vSphere license key.

## About Overriding the Host License Configuration

If the host is managed by vCenter Server, use either the **Home > Licensing** interface or the Add Host operation to configure host licensing.

If you use the **Configuration > Licensed Features > Edit** operation, the host license configuration is overridden by any license assignment operation that you perform in vCenter Server.

## License Expiration

Upon license expiration, the vCenter Server software and the ESX/ESXi software continue to run, but certain operations stop working.

If a vCenter Server license expires, the managed hosts become disconnected from the vCenter Server inventory, and you cannot add hosts to the inventory. The hosts and the virtual machines on the hosts continue to run. By using the vSphere Client to connect directly to the host, you can power on or reset the virtual machines.

After you assign a valid vCenter Server license, you can reconnect all the hosts at once as follows:

- 1 From the vCenter Server inventory, select the datacenter.
- 2 Select the **Hosts** tab.
- 3 Shift-click or Ctrl-click to select the hosts.
- 4 Right-click and select **Connect**.

If an ESX/ESXi host license expires, the virtual machines that reside on the host continue to run, but you cannot power on the virtual machines or reset them.

## Licensing vCenter Server and ESX/ESXi After Evaluation

After the 60-day evaluation period expires, you are no longer able to perform some operations in vCenter Server and ESX/ESXi. If you want to continue to have full use of ESX/ESXi and vCenter Server operations, you must acquire a license.

Without a license, you are able to perform some operations, but you cannot power on or reset your virtual machines. All hosts are disconnected from the vCenter Server system if the evaluation period expires before you assign a license to the vCenter Server system. Any single ESX/ESXi host is disconnected from the vCenter Server system if the ESX/ESXi evaluation period expires before you assign a license to the host.

When you switch your vCenter Server system and ESX from evaluation mode to licensed mode, consider the following:

- If a vCenter Server system is managing VMware Infrastructure 3 hosts (for example, ESX 3.x or ESXi 3.5), the vCenter Server system must have access to a license server. You can download the VMware License Server from the VMware Web site.
- To license vCenter Server, you must apply a vCenter Server license key.
- To license ESX/ESXi, you must apply a vSphere license key.
- When you assign a license to a machine on which a VMware vSphere component is installed, the license must be compatible with all resources and features that you configure during the evaluation period.

For example, suppose you add 10 ESX hosts to the vCenter Server system inventory during the evaluation period. After the evaluation period expires, you try to assign an edition license that limits the number of hosts that can be managed by a vCenter Server system. The assignment operation fails because the edition allows a vCenter Server system to manage fewer than 10 hosts. To correct this issue, you can upgrade your license key to a higher edition or you can remove hosts from the inventory.

As another example, if you configure a cluster of ESX hosts to use Fault Tolerance and DRS during the evaluation period, you can only assign a license that allows the use of those features. Hence, the assignment of a higher edition license succeeds. To assign a lower edition license, you must first disable Fault Tolerance and DRS.

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