

# ESXi Installable and vCenter Server Setup Guide

ESXi 4.1 Installable  
vCenter Server 4.1

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# Updated Information

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This *ESXi Installable 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 Installable and vCenter Server Setup Guide*.

Revision	Description
EN-000306-03	<ul style="list-style-type: none"><li>■ In the topic <a href="#">“vCenter Server Software Requirements,”</a> on page 17, added a link to the vSphere Compatibility Matrixes Guide.</li><li>■ In the topic <a href="#">“vSphere Client Software Requirements,”</a> on page 17, added a link to the vSphere Compatibility Matrixes Guide.</li><li>■ In the topic <a href="#">Chapter 9, “vCenter Server Databases,”</a> on page 69, added a link to the vSphere Compatibility Matrixes Guide.</li></ul>
EN-000306-02	In the topic <a href="#">“Enable the Scratch Partition,”</a> on page 57, corrected details in the code of the procedure.
EN-000306-01	<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 4.1 Installable host is a physical server that contains an ESX image installed on a local hard drive" to "An ESXi 4.1 Installable host is a physical server that contains an ESXi image installed on a local hard drive"</li><li>■ In the topic <a href="#">“Default ks.cfg Script,”</a> on page 36, several typos were corrected in the script code. The text "# Set the network to DHCP on teh first network adapaternetwork -- bootproto=dhcp --device=vmnic0# A sample post-install script%post -- unsupported -- interpreter=python -- ignorefailure=trueimport time" was changed to "# Set the network to DHCP on the first network adapaternetwork --bootproto=dhcp -- device=vmnic0# A sample post-install script%post --unsupported -- interpreter=python --ignorefailure=trueimport time"</li><li>■ Added a note on Automated Availability Manager to the topic <a href="#">“Restart the Management Agents,”</a> on page 54</li></ul>
EN-000306-00	Initial release.





# About This Book

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The *Installation Guide* describes how to install new configurations of VMware® vCenter Server and ESXi Installable. This installation information covers ESXi Installable and vCenter Server only. It does not include setup or installation information for ESX or ESXi Embedded.

## Intended Audience

This book is intended for anyone who needs to install vCenter Server, and install and set up ESXi 4.1 Installable.

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

## VMware Technical Publications Glossary

VMware Technical Publications provides a glossary of terms that might be unfamiliar to you. For definitions of terms as they are used in VMware technical documentation, go to <http://www.vmware.com/support/pubs>.

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## VMware vSphere Documentation

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

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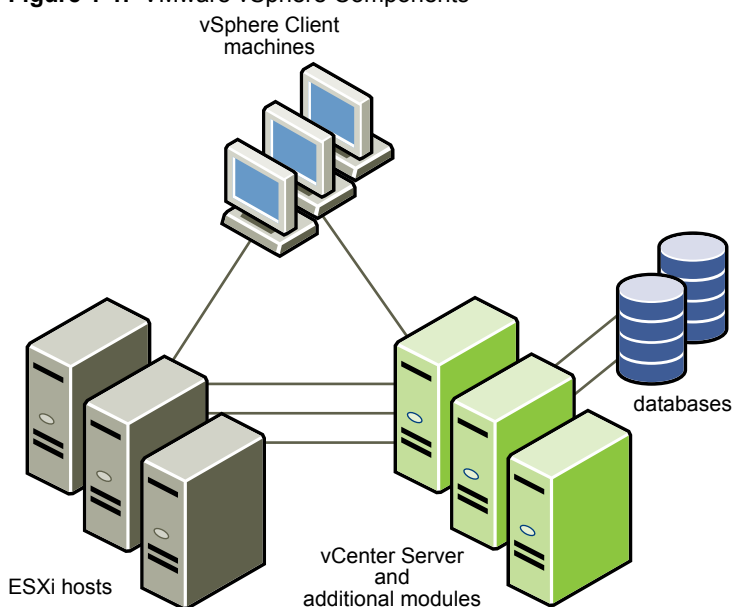
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# Introduction to VMware vSphere

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 ESXi hosts. You can run the vSphere Client and vSphere Web Access on multiple workstations.

The major VMware vSphere components are:

**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.

**vCenter Server** A service that acts as a central administration point 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.

**vCenter Server  
additional modules**

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.

**vSphere Client**

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 ESXi hosts.

The vSphere Client is downloadable from the vCenter Server system and ESXi hosts. The vSphere Client includes documentation for administrators and console users.

**Databases**

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 4.1 Installable host is a physical server that contains an ESXi image installed on a local hard drive.

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 hosts
- Setting up administrative access
- Troubleshooting

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

# System Requirements

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Systems running vCenter Server and ESX/ESXi instances must meet specific hardware and operating system requirements.

This chapter includes the following topics:

- “ESXi Hardware Requirements,” on page 13
- “vCenter Server and the vSphere Client Hardware Requirements,” on page 15
- “vCenter Server Software Requirements,” on page 17
- “vSphere Client Software Requirements,” on page 17
- “Support for 64-Bit Guest Operating Systems,” on page 17
- “Requirements for Creating Virtual Machines,” on page 17
- “Required Ports,” on page 18
- “Supported Remote Management Firmware Versions,” on page 19

## ESXi Hardware Requirements

Make sure the host meets the minimum hardware configurations supported by ESXi 4.1.

You need the following hardware and system resources to install and use ESXi 4.1:

- Supported server platform (for a list of supported platforms, see the *Systems Compatibility Guide*)
- VMware ESXi 4.1 will install and run only on servers with 64-bit x86 CPUs.
- Known 64-bit processors:
  - All AMD Opterons support 64 bit.
  - All Intel Xeon 3000/3200, 3100/3300, 5100/5300, 5200/5400, 7100/7300, and 7200/7400 support 64 bit.
  - All Intel Nehalem (no Xeon brand number assigned yet) support 64 bit.
- 2GB RAM minimum. For upgrades, 3GB RAM is required if the ESXi host is managed by vCenter Server.
- One or more Gigabit or 10Gb Ethernet controllers. For a list of supported network adapter models, see the *Hardware Compatibility Guide* at <http://www.vmware.com/resources/compatibility>.
- One or more of the following controllers (any combination can be used):
  - Basic SCSI controllers – Adaptec Ultra-160 or Ultra-320, LSI Logic Fusion-MPT, or most NCR/Symbios SCSI.
  - RAID controllers – Dell PERC (Adaptec RAID or LSI MegaRAID), HP Smart Array RAID, or IBM (Adaptec) ServeRAID controllers.

- SCSI disk or a local (non-network) RAID LUN with unpartitioned space for the virtual machines.
- For Serial ATA (SATA), a disk connected through supported SAS controllers or supported on-board SATA controllers.

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**NOTE** You cannot connect a SATA CD-ROM device to a virtual machine on an ESXi 4.1 host. To use the SATA CD-ROM device, you must use IDE emulation mode.

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ESXi 4.1 Installable supports installing on and booting from the following storage systems:

- SATA disk drives – SATA disk drives connected behind supported SAS controllers or supported on-board SATA controllers.

Supported SAS controllers include:

- LSI1068E (LSISAS3442E)
- LSI1068 (SAS 5)
- IBM ServeRAID 8K SAS controller
- Smart Array P400/256 controller
- Dell PERC 5.0.1 controller

Supported on-board SATA include:

- Intel ICH9
- NVIDIA MCP55
- ServerWorks HT1000

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**NOTE** Sharing VMFS datastores on SATA disks across multiple ESXi 4.1 hosts is not supported.

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- Serial Attached SCSI (SAS) disk drives – Supported for installing ESXi 4.1 and for storing virtual machines on VMFS partitions.
- Fibre Channel or iSCSI

## Recommendation for Enhanced ESXi Performance

To enhance performance, VMware recommends that you install ESXi on a robust system with more RAM than the minimum required and with multiple physical disks.

Consider the following recommendations for enhanced performance:

- RAM – ESXi 4.1 hosts require more RAM than typical servers. An ESXi 4.1 host must be equipped with sufficient RAM to run concurrent virtual machines.

For example, operating four virtual machines with Red Hat Enterprise Linux or Windows XP requires at least 3GB of RAM for baseline performance. This includes approximately 1024MB for the virtual machines (256MB minimum for each operating system as recommended by vendors).

Running these four virtual machines with 512MB RAM requires that the ESXi 4.1 host be equipped with approximately 4GB RAM, which includes 2048MB for the virtual machines.

These calculations do not take into account possible memory savings from using variable overhead memory for each virtual machine. See the *Resource Management Guide*.

- Dedicated Fast Ethernet adapters for virtual machines – Place the management network and virtual machine networks on different physical network cards. Dedicated Gigabit Ethernet cards for virtual machines, such as Intel PRO 1000 adapters, improve throughput to virtual machines with high network traffic.

- Disk location – Place all data used by your virtual machines on physical disks allocated specifically to virtual machines. Performance is better when you do not place your virtual machines on the disk containing the ESXi 4.1 Installable boot image. Use physical disks that are large enough to hold disk images used by all the virtual machines.
- VMFS3 partitioning – The ESXi 4.1 installer creates the initial VMFS volumes automatically on blank local disks. To add disks or modify the original configuration, use the vSphere Client. This application ensures that the starting sectors of partitions are 64K-aligned, which improves storage performance.

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**NOTE** For SAS-only environments, the installer might not format the disks. For some SAS disks, it is difficult to identify whether the disks are local or remote. After the installation, you can use the vSphere Client to set up VMFS.

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- Processors – Faster processors improve ESXi 4.1 performance. For certain workloads, larger caches improve ESXi 4.1 performance.
- Hardware compatibility – Use devices in your server that are supported by ESXi 4.1 drivers. See the *Hardware Compatibility Guide* at <http://www.vmware.com/resources/compatibility>.

## 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 must meet specific requirements. Also make sure that the vSphere Client machines meet the hardware requirements.

### Minimum Requirements for vCenter Server

- CPU – Two 64-bit CPUs or one 64-bit dual-core processor.
- 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 512MB to 4.4GB of additional memory. The maximum Webservices JVM memory can be specified during the installation depending on the inventory size.
- Disk storage – 3GB. 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.

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**NOTE** Installing vCenter Server on a network drive or USB flash drive is not supported.

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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 – 500MHz or faster Intel or AMD processor (1GHz recommended)
- Memory – 1GB RAM

- Disk Storage – 1.5GB free disk space for a complete installation, which includes the following components:
  - Microsoft .NET 2.0
  - Microsoft .NET 3.0 SP1
  - Microsoft Visual J#
 

Remove any previously installed versions of Microsoft Visual J# on the system where you are installing the vSphere Client.
  - vSphere Client 4.1
 

If you do not have any of these components already installed, you must have 400MB free on the drive that has the %temp% directory.

If you have all of the components already installed, 300MB of free space is required on the drive that has the %temp% directory, and 450MB is required for vSphere Client 4.1.
- Networking – Gigabit connection recommended

## System Recommendations for Performance Based on Deployment Size

The number of hosts and powered-on virtual machines in your environment affects performance. The following system requirements should be used as minimum guidelines for reasonable performance. For increased performance, you can configure systems in your environment with values greater than those listed here.

Processing requirements are listed in terms of hardware CPU cores. Only physical cores are counted. In hyper-threaded systems, logical CPUs do not count as separate cores.

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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 500 Powered-On Virtual Machines

Product	Cores	Memory	Disk
vCenter Server	2	4GB	5GB
vSphere Client	1	200MB	1.5GB

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

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

Product	Cores	Memory	Disk
vCenter Server	4	8GB	10GB
vSphere Client	1	500MB	1.5GB

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

**Table 2-3.** Up to 1000 Hosts and 10000 Powered-On Virtual Machines

Product	Cores	Memory	Disk
vCenter Server	8	16GB	10GB
vSphere Client	2	500MB	1.5GB



## Requirements for Installing vCenter Server on a Custom Drive

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

- 1GB 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++ 2008 Redistributable
- 375MB for the custom drive %temp% directory

## vCenter Server Software Requirements

Make sure that your operating system supports vCenter Server. vCenter Server requires a 64-bit operating system, and the 64-bit system DSN is required for vCenter Server to connect to its database.

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.

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.

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. The .NET 3.0 SP1 software might require Internet connectivity to download additional files.

## Support for 64-Bit Guest Operating Systems

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

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

Hosts running virtual machines with 64-bit guest operating systems have the following 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 processor, 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 processors. For a four-processor virtual machine, your ESXi machine must have at least four physical processors.
Virtual chip set	Intel 440BX-based motherboard with NS338 SIO chip
Virtual BIOS	PhoenixBIOS 4.0 Release 6

## Required Ports

The VMware 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 Server 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 <code>http://server</code> instead of <code>https://server</code> .
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. 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 <code>&lt;ip-address&gt;:&lt;port&gt;</code> 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. 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.
8080	Web Services HTTP. Used for the VMware VirtualCenter Management Webservices.

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

Port	Description
8443	Web Services HTTPS. Used for the VMware VirtualCenter Management Webservices.
60099	Web Service change service notification port

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

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

## Supported Remote Management Firmware Versions

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

[Table 2-6](#) lists the remote management firmware versions that are supported for installing ESXi 4.1 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
	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
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



# Introduction to Installing ESXi

---

Installations of ESXi Installable can be interactive or scripted, and several options are available to boot the installer and access the installation media.

This chapter includes the following topics:

- [“Overview of the Installation Process,”](#) on page 21
- [“About ESXi Evaluation Mode,”](#) on page 22
- [“Options for Accessing the Installation Media, Booting the Installer, and Running the Installer,”](#) on page 22
- [“Required Information for ESXi Installation,”](#) on page 23

## Overview of the Installation Process

ESXi installations have different modes, options for accessing the installation media, and options for booting the installer.

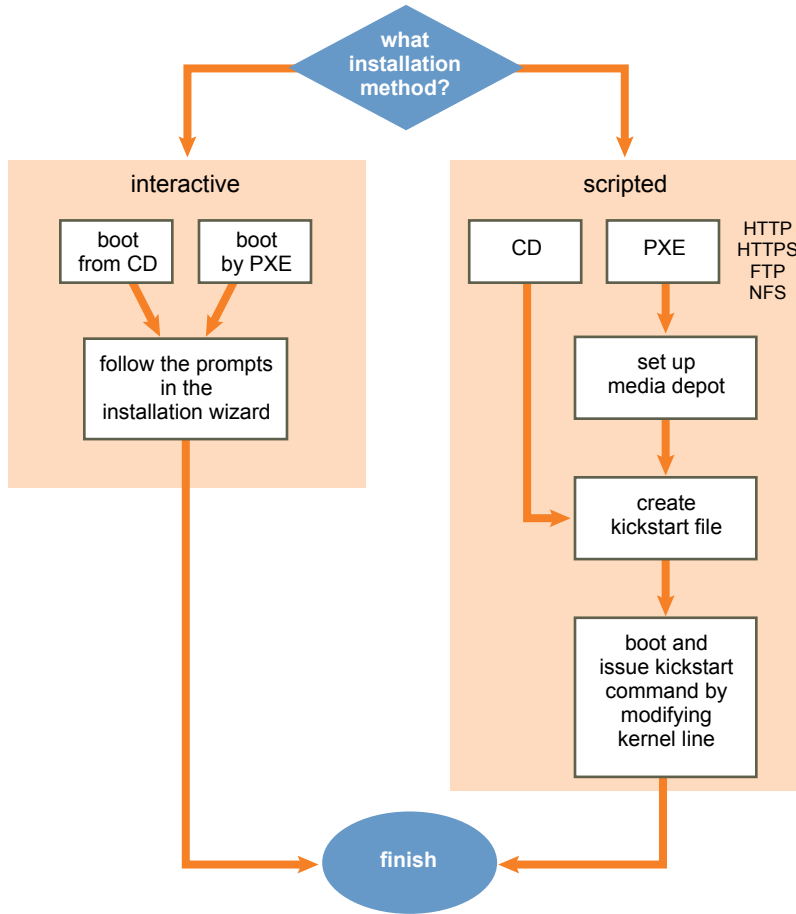
Understanding the different installation options available, will help you prepare for installing ESXi.

The following modes are available for installing VMware ESXi software:

- Interactive mode – This is the recommended method for small deployments (less than 5 hosts).
- Scripted mode – An efficient way to deploy multiple hosts. See [“Installing ESXi Using Scripted Mode,”](#) on page 35.

Depending on the installation mode you choose, different options are available for accessing the installation media and booting the installer. [Figure 3-1](#) shows the necessary steps for the installation paths that are available.

**Figure 3-1.** Installation Overview



## About ESXi Evaluation Mode

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

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

ESXi Installable is always installed in evaluation mode.

## Options for Accessing the Installation Media, Booting the Installer, and Running the Installer

When you install ESXi, you have several options that allow you to customize the process to meet the needs of your environment.

These options include how to store and access the installation media, how to boot the installer, and which mode (interactive or scripted) to use when you run the installer.

By default, when you boot the ESXi installer from a CD/DVD, the CD/DVD uses the interactive mode and uses itself as the source of the installation media. You can modify the default installation process in the following ways:

## ESXi Installation Media Locations

- CD (default) or DVD
- Media depot, which can be accessed by FTP, HTTP/HTTPS, or NFS. HTTPS with a proxy server is not supported.
- USB flash drive

## Installation Script Locations (for scripted installations only)

- Default installation script
- FTP
- HTTP/HTTPS
- NFS
- USB flash drive
- CDROM

## Options for Booting the Installer

- CD/DVD (default)
- PXE
- USB flash drive

## Options for Running the Installer

- Interactive
- Scripted

## Required Information for ESXi Installation

You will be prompted for system information if you are performing an interactive installation, or this information must be supplied in the installation script if you are running a scripted installation.

[Table 3-1](#) lists the information that you are prompted for during the installation. For future use, note the values you use during the installation. These notes are useful if you ever need to reinstall ESXi and reenter the values that you originally chose.

**Table 3-1.** Data for ESXi Installation

Data	Required or Optional	Default	Comments
Keyboard layout	Required	U.S. English	
VLAN ID	Optional	None	Range: 0 through 4095
IP address	Optional	DHCP	You can allow DHCP to configure the network during installation. After installation, you can change the network settings.
Subnet mask	Optional	Calculated based on the IP address	
Gateway	Optional	Based on the configured IP address and subnet mask	
Primary DNS	Optional	Based on the configured IP address and subnet mask	

**Table 3-1.** Data for ESXi Installation (Continued)

<b>Data</b>	<b>Required or Optional</b>	<b>Default</b>	<b>Comments</b>
Secondary DNS	Optional	None	
Host name	Required for static IP settings	None	vSphere Clients can use either the host name or the IP address to access the ESXi host.
Install location	Required	None	Must be at least 5GB if you install the components on a single disk.
Datastore	Required in advanced setup	In the basic setup, the installer creates the <code>/vmfs</code> partition for the datastore.	A datastore is a partition that ESXi uses to store virtual machines. This datastore must on a VMFS datastore that is resident on a host's local disk or on a SAN disk that is masked and zoned to that particular host only. The datastore cannot be shared between hosts.
Root password	Required	None	The root password must be between 6 and 64 characters.



## Preparing to Install ESXi

---

Before you install ESXi, you must select a location for the installation media, setup the PXE configuration file if you will PXE boot the installer, and configure the installation script (kickstart file) if you are performing a scripted installation.

This chapter includes the following topics:

- [“Location of the ESXi Installation Media,”](#) on page 25
- [“Format a USB Flash Drive to Boot the ESXi Installation,”](#) on page 26
- [“PXE Booting the ESXi Installer,”](#) on page 27
- [“Installing ESXi Using Scripted Mode,”](#) on page 35

### Location of the ESXi Installation Media

The installation media must be accessible to the system on which you are installing ESXi.

The following locations are supported for the installation media:

- Local DVD
- Local USB
- USB CD/DVD drive. This is useful if you cannot burn a CD/DVD image or the host does not have a CD/DVD drive.
- USB flash drive
- Remote media (See [“Using Remote Management Applications,”](#) on page 35).
- Remote location (media depot), accessible by HTTP/HTTPS, FTP, or NFS

### Download the ESXi ISO Image and Burn the Installation CD/DVD

If you do not have an ESXi installation CD/DVD, you can create one.

#### Procedure

- 1 Download the ISO image for ESXi from the VMware download page at <http://www.vmware.com/download/>.
- 2 Burn the ISO image onto CD or DVD media.

## Creating a Media Depot

The media depot is a network-accessible location that contains the ESXi installation media. You can use HTTP/HTTPS, FTP, or NFS to provide access to the depot. The depot must be populated with the entire contents of the ESXi installation DVD.

For a scripted installation, you must point to the media depot in the script by including the `install` command with the `nfs` or `url` option.

The following code snippet from an ESXi installation script demonstrates how to format the pointer to the media depot if you are using HTTP:

```
install http://example.com/VMware/ESXi
```

## Create a USB Flash Drive for Storing the ESXi Installation Media and Script

A USB flash drive is one of the location options for storing the ESXi installation media and installation script that will be used during scripted installation of ESXi.

When multiple USB flash drives are present on the installation machine, the installation software searches for the installation media and the installation script on all attached USB flash drives.

---

**NOTE** Do not use the same USB flash drive as the storage location for the installation media and as the installation boot device.

---

### Prerequisites

You must have the following files and hardware to create the USB with ESXi installation media and script:

- ISO image for ESXi
- Installation script (kickstart file)
- USB flash drive

### Procedure

- 1 Attached the USB flash drive to the installation machine.
- 2 Format the USB flash drive as Fat32 by running `mkfs.vfat -F 32 USB device name` at the command line.
- 3 Create a partition on the USB flash drive as Fat32 by running `fdisk USB device name =>n=>p=>1=>default=>t=>4=>w` at the command line.
- 4 Mount the USB flash drive by running `mount USB device name esxi_usb` at the command line.
- 5 Copy the ESXi ISO image and installation script (kickstart file) to the USB flash drive.
- 6 Unmount the USB flash drive.

The USB flash drive contains the installation media and installation script for ESXi.

### What to do next

When you boot the ESXi installer, point to this location for the installation media and script.

## Format a USB Flash Drive to Boot the ESXi Installation

You can format a USB flash drive to boot the ESXi installation.

---

**NOTE** Do not use the same USB flash drive as the storage location for the installation media and as the installation boot device.

---

## Prerequisites

You must have the following files and hardware to create the USB with ESXi installation media and script:

- `initrid.img`, `vmlinuz`, and `isolinux.cfg` from the ESXi ISO image
- USB flash drive

## Procedure

- 1 Attached the USB flash drive to the installation machine.
- 2 Verify that the installation machine has detected the USB flash drive by running `lsusb` at the command line.
- 3 (Optional) Determine the name of the USB flash drive by running `fdisk -l` at the command line.
- 4 Format the USB flash drive by running `mkfs.vfat -F 16 -n USB USB device name -I` at the command line.
- 5 (Optional) Verify that the USB flash drive is formatting by running `fdisk -l USB device name` at the command line.
- 6 Run `syslinux USB device name -I` at the command line.
- 7 Partition the USB flash drive by running `fdisk USB device name -I` at the command line.
- 8 Mount the USB flash drive by running `mount USB device name /usbdisk -I` at the command line.
- 9 Copy the files `initrid.img`, `vmlinuz`, and `isolinux.cfg` to the USB flash drive.
- 10 Run `mv isolinux.cfg syslinux.cfg` at the command line.
- 11 Unmount the USB flash drive.

The USB flash drive can now boot the ESXi installer.

## What to do next

Install ESXi using scripted mode.

## PXE Booting the ESXi Installer

The preboot execution environment (PXE) is an environment to boot computers using a network interface independently of available data storage devices or installed operating systems. These topics discuss the PXELINUX and gPXE methods of PXE booting the ESXi installer.

PXE uses DHCP and Trivial File Transfer Protocol (TFTP) to boot an operating system (OS) over a network.

Network booting with PXE is similar to booting with a DVD, but it requires some network infrastructure and a machine with a PXE-capable network adapter. Most machines that are capable of running ESXi have network adapters that are able to PXE boot. After the ESXi installer is booted, it works like a DVD-based installation, except that you must specify the location of the ESXi installation media (the contents of the ESXi DVD).

A host first makes a DHCP request to configure its network adapter and then downloads and executes a kernel and support files. PXE booting the installer provides only the first step to installing ESXi. To complete the installation, you must provide the contents of the ESXi DVD either locally or on a networked server through HTTP/HTTPS, FTP, or NFS. (See [Chapter 4, “Preparing to Install ESXi,”](#) on page 25.)

## About the TFTP Server, PXELINUX, and gPXE

TFTP is a light-weight version of the FTP service, and is typically used only for network booting systems or loading firmware on network devices such as routers.

Most Linux distributions come with a copy of the tftp-hpa server. You can also obtain one at <http://www.kernel.org/pub/software/network/tftp/>.

If your TFTP server will run on a Microsoft Windows host, use tftpd32 version 2.11 or later. See <http://tftpd32.jounin.net/>. Previous versions of tftpd32 were incompatible with PXELINUX and gPXE.

The PXELINUX and gPXE environments allow your target machine to boot the ESXi Installer. PXELINUX is part of the SYSLINUX package, which can be found at <http://www.kernel.org/pub/linux/utils/boot/syslinux/>, although many Linux distributions include it. Many versions of PXELINUX also include gPXE. Some distributions, such as Red Hat Enterprise Linux version 5.3, include older versions of PXELINUX that do not include gPXE.

If you do not use gPXE, you might experience issues while booting the ESXi installer on a heavily loaded network. This is because TFTP is not a robust protocol and is sometimes unreliable for transferring large amounts of data. If you use gPXE, only the `gpxelinux.0` binary and configuration file are transferred via TFTP. gPXE enables you to use a Web server for transferring the kernel and ramdisk required to boot the ESXi installer. If you use PXELINUX without gPXE, the `pxelinux.0` binary, the configuration file, and the kernel and ramdisk are transferred via TFTP.

---

**NOTE** VMware tests PXE booting with PXELINUX version 3.63. This is not a statement of limited support.

---

## Conceptual Overview for PXE Booting the ESXi Installer

An overview shows you how all the pieces fit together when you PXE boot the ESXi installer.

The network infrastructure for PXE booting the installer includes the following services.

- DHCP server
- TFTP server
- PXELINUX/gPXE (SYSLINUX)
- Network Server (NFS, HTTP or FTP)

[Figure 4-1](#) shows the flow of the interaction between the components if you are using PXELINUX with gPXE. The scripts depot and the media depot are optional. You do not need them if you are performing an interactive installation with installation media that is stored locally on a DVD or USB.

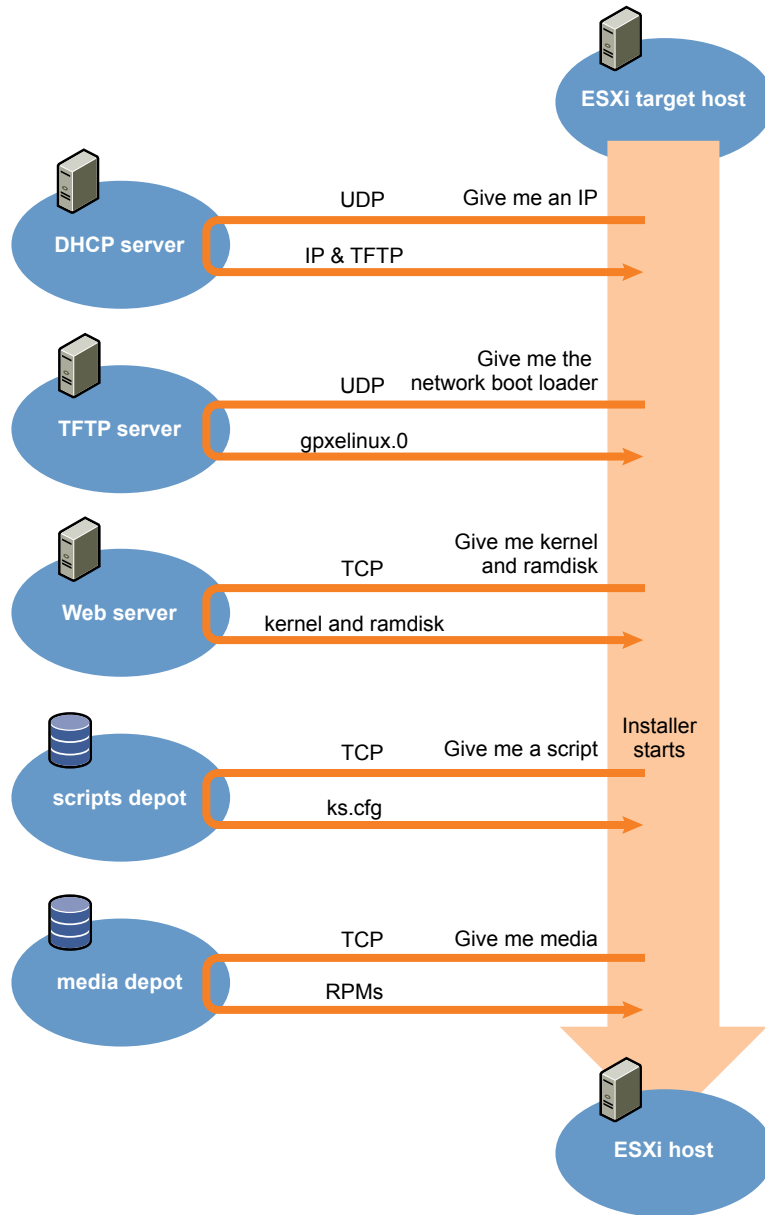
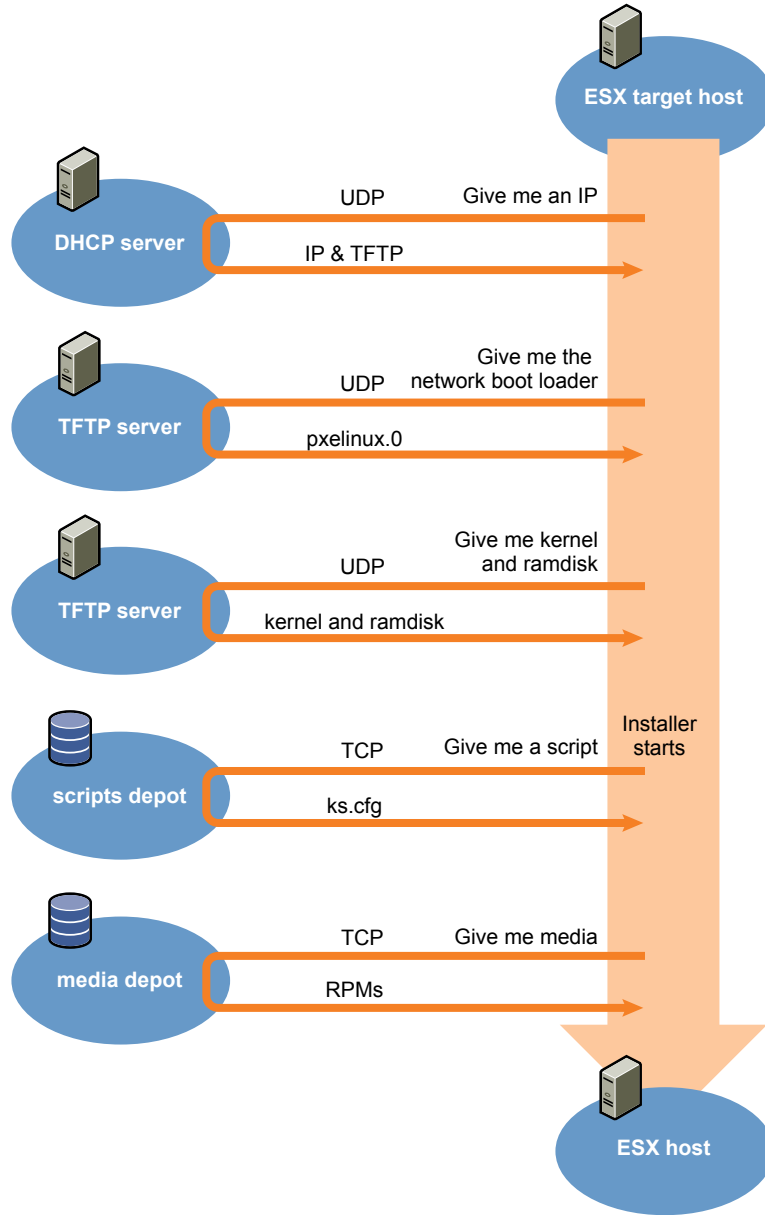
**Figure 4-1.** Overview for PXE Booting the ESXi Installer Using PXELINUX with gPXE

Figure 4-2 shows the flow of the interaction between the components if you are using PXELINUX without gPXE. The scripts depot and the media depot are optional. You do not need them if you are performing an interactive installation with installation media that is stored locally on a DVD or USB.

**Figure 4-2.** Overview for PXE Booting the ESXi Installer Using PXELINUX without gPXE



In the case presented in the illustrations, PXE works as follows:

- 1 The target ESXi host (the PXE client) is booted.
- 2 The target ESXi host makes a DHCP request.
- 3 The DHCP server responds with the IP information and provides information about the location of a TFTP server.
- 4 When the client receives the information, it contacts the TFTP server requesting the file that the DHCP server specified (in this case, the network boot loader).
- 5 The TFTP server sends the network boot loader, and the client executes it.
- 6 PXELINUX or gPXE searches for a configuration file on the TFTP server, and boots a kernel according to that configuration file. In this case, the configuration file instructs PXE to load the kernel (`vmlinux`) and a ramdisk (`initrd.img`).

- 7 The client downloads the files it needs and then loads them.
- 8 The system boots the ESXi installer.
- 9 The installer runs interactively or scripted, as directed by the PXE configuration file.
- 10 The installer uses the installation media, either from a media depot stored on the network, or locally using DVD or USB.
- 11 ESXi is installed.

## PXE Boot the ESXi Installer

You can use a TFTP server to PXE boot the ESXi installer.

### Prerequisites

Verify that your environment has the following components:

- TFTP server that supports PXE boot
- PXELINUX
- (Optional) gPXE, which is part of the SYSLINUX package. If you have a newer version of SYSLINUX, gPXE is already built. If you are building gPXE from source, you can unpack it on most Linux machines and run the `make` command.
- For gPXE, a Web server that is accessible by your target ESXi hosts
- DHCP server configured for PXE booting
- (Optional) ESXi installation script
- Network adapter with PXE support on the target ESXi host
- IPv4 networking (IPv6 is not supported for PXE booting.)

### Procedure

- 1 On a Linux machine, install TFTP server software that supports PXE booting.

If your environment does not have a TFTP server, you can use one of the packaged appliances on the VMware Marketplace. If you do this, note that certain functions, such as correct operation of the text menu system, are operating system dependent.

- 2 Put the `menu.c32` file in an accessible place in a supported location.

- For gPXE, put the `menu.c32` file on a Web server. For example, you can use the `httpd` package in RHEL5, which contains Apache. The HTML documents are placed in `/var/www/html`, which is where you can copy `menu.c32`.
- For PXELINUX without gPXE, put the `menu.c32` file on a TFTP server.

- 3 On the Linux machine, install PXELINUX.

PXELINUX is included in the SYSLINUX package. Extract the files, locate the file `pxelinux.0` or `gpxelinux.0`, and copy it to the `/tftpboot` directory on your TFTP server.

- 4 Configure the DHCP server.

The DHCP server sends the following information to your client hosts:

- The name or IP address of your TFTP server.
- The name of your initial boot file. This is `pxelinux.0` or `gpxelinux.0`.

- 5 Copy the following files from the directory on the ESXi installation DVD to a supported location: `menu.c32`, `mboot.c32`, `vmkboot.gz`, `vmkernel.gz`, `sys.vgz`, `cim.vgz`, `ienvion.vgz`, and `install.vgz`.
    - Web server, if you are using gPXE.
    - `/var/lib/tftpboot` directory on the TFTP server, if you are using PXELINUX without gPXE.
  - 6 Create the `/tftpboot/pxelinux.cfg` directory on your TFTP server.
  - 7 Create a PXE configuration file.
 

This file defines how the host boots when no operating system is present.

The PXE configuration file references the boot files.

For more information and an example, see [“Creating a PXE Configuration File,”](#) on page 34.
  - 8 Save the PXE configuration file in `/tftpboot/pxelinux.cfg` on the TFTP server.
- You now have an environment that you can use for PXE booting the ESXi installer.

## Sample DHCP Configuration

To PXE boot the ESXi installer, the DHCP server must send the address of the TFTP server and a pointer to the `pxelinux.0` or `gpxelinux.0` directory.

The DHCP server is used by the target machine to obtain an IP address. The DHCP server needs to know whether the target machine is allowed to boot and the location of PXELINUX binary (which usually resides on a TFTP server). When the target machine first boots, it broadcasts a packet across the network requesting this information to boot itself. The DHCP server responds.



**CAUTION** VMware does not recommend setting up a new DHCP server if your network already has one. If multiple DHCP servers respond to DHCP requests, machines can obtain incorrect or conflicting IP addresses, or can fail to receive the proper boot information. Talk to a network administrator before setting up a DHCP server.

---

Many DHCP servers are capable of PXE booting hosts. The following examples are for ISC DHCP version 3.0, which is included with many Linux distributions. If you are using a version of DHCP for Microsoft Windows, refer to the DHCP server documentation to determine how to pass the `next-server` and `filename` arguments to the target machine.

### gPXE Example

This sample shows how to configure the ISC DHCP server to enable gPXE.

```
allow booting;
allow bootp;
# gPXE options
option space gpxe;
option gpxe-encap-opts code 175 = encapsulate gpxe;
option gpxe.bus-id code 177 = string
class "pxeclients" {
    match if substring(option vendor-class-identifier, 0, 9) = "PXEClient";
    next-server <TFTP server address>;
    if not exists gpxe.bus-id {
        filename "/gpxelinux.0";
    }
}
```



```

subnet <Network address> netmask <Subnet Mask> {
    range <Starting IP Address> <Ending IP Address>;
}

```

When a machine attempts to PXE boot, the DHCP server provides an IP address and the location of the `pxelinux.0` binary on the TFTP server. The IP address assigned will be in the range defined in the subnet section of the configuration file.

### PXELINUX (without gPXE) Example

This sample shows how to configure the ISC DHCP server to enable PXELINUX.

```

#
# DHCP Server Configuration file.
# see /usr/share/doc/dhcp*/dhcpd.conf.sample
#
ddns-update-style ad-hoc;
allow booting;
allow bootp;
class "pxeclients" {
    match if substring(option vendor-class-identifier, 0, 9) = "PXEClient";
    next-server xxx.xxx.xx.xx;
    filename = "pxelinux.0";
}
subnet 192.168.48.0 netmask 255.255.255.0 {
    range 192.168.48.100 192.168.48.250;
}

```

When a machine attempts to PXE boot, the DHCP server provides an IP address and the location of the `pxelinux.0` binary on the TFTP server. The IP address assigned will be in the range defined in the subnet section of the configuration file.

### Kernel Image and Ramdisk Directory

The kernel image and ramdisk directory contains files that that must be loaded across the network to enable PXE booting of the ESXi installer.

The following files are used for booting.

- menu.c32
- mboot.c32
- vmkboot.gz
- vmkernel.gz
- sys.vgz
- cim.vgz
- ienviron.vgz
- install.vgz

These files come from the ESXi installation CD/DVD, under the root directory.

You reference the files from the PXE configuration file. The following code snippet shows how you reference the files in the PXE configuration script:

```
label 1
kernel esxi/mboot.c32
append esxi/vmkernel.gz ks=http://xx.xx.xxx.xxx/kickstart/ks.cfg --- esxi/vmkernel.gz ---
esxi/sys.vgz --- esxi/cim.vgz --- esxi/ienvirom.vgz --- esxi/install.vgz
```

## Creating a PXE Configuration File

The PXE configuration file defines the menu displayed to the target ESXi host as it boots up and contacts the TFTP server. You need a PXE configuration file for PXE booting the ESXi installer.

The TFTP server is always listening for PXE clients on the network. When it detects that a PXE client is asking for PXE services, it sends the client a network package that contains this boot menu.

### Example: PXELINUX without gPXE

Following is an example of a PXE configuration file that you might use for PXELINUX without gPXE. See also the `/isolinux/isolinux.cfg` file on the ESXi installation CD.

In this example, the path to the required files `test/` is relative to `/tftpboot`. The actual path is `/tftpboot/test/` on the TFTP server.

```
default 1
prompt 1
menu title VMware VMvisor Boot Menu
timeout 50

label 1
kernel esxi/mboot.c32
append esxi/vmkernel.gz ks=http://xx.xx.xxx.xxx/kickstart/ks.cfg --- esxi/vmkernel.gz ---
esxi/sys.vgz --- esxi/cim.vgz --- esxi/ienvirom.vgz --- esxi/install.vgz

label 0
localboot 0x80
```

### Required Files

In the PXE configuration file, you must include paths to the following files:

- `mboot.c32` is the boot loader kernel code.
- The following files are needed for booting the installer: `menu.c32`, `vmkernel.gz`, `sys.vgz`, `cim.vgz`, `ienvirom.vgz`, and `install.vgz`

### Installation Mode

`ks=http://xx.xx.xxx.xx/ks.cfg` is the path to the ESXi installation script. In a scripted installation, your script includes all the necessary responses to complete the script, including the location of the installation media. All of the responses must be filled ifor the scripted installation to work.

In an interactive installation, omit the `ks=` option.

## Filename for the PXE Configuration File

For the filename of the PXE configuration file, choose one of the following:

- `01-mac_address_of_target_ESXi_host`. For example, `01-23-45-67-89-0a-bc`
- The target ESXi host IP address in hexadecimal notation.
- `default`

The initial boot file, `pxelinux.0` (or `gpxelinux.0`) tries to load a PXE configuration file. It tries with the MAC address of the target ESXi host, prefixed with its ARP type code (01 for Ethernet). If that fails, it tries with the hexadecimal notation of target ESXi system IP address. Ultimately, it tries to load a file named `default`.

## File Location for the PXE Configuration File

Save the file in `var/lib/tftpboot/pxelinux.cfg/` on the TFTP server.

For example, you might save the file on the TFTP server at `/tftpboot/pxelinux.cfg/01-00-21-5a-ce-40-f6`. The MAC address of the network adapter on the target ESXi host is `00-21-5a-ce-40-f6`.

## Using Remote Management Applications

Remote management applications allow you to install ESXi on server machines that are in remote locations.

Remote management applications supported for installation include HP Integrated Lights-Out (iLO), Dell Remote Access Card (DRAC), IBM management module (MM), and Remote Supervisor Adapter II (RSA II). For a list of currently supported server models and remote management firmware versions, see [“Supported Remote Management Firmware Versions,”](#) on page 19.

Administrators use remote management applications to perform GUI-based, remote installations of ESXi. However, you can use a remote management application for scripted installations as well.

If you use remote management applications to install ESXi, the virtual CD might encounter corruption problems with systems or networks under load. If a remote installation from an ISO image fails, complete the installation from the physical CD media.

## Installing ESXi Using Scripted Mode

You can quickly deploy ESXi hosts using scripted, unattended installations. Scripted installations provide an efficient way to deploy multiple hosts.

The installation script contains the installation settings for ESXi. You can apply the script to all your hosts that will have a similar configuration.

Scripted installations include the following steps:

- 1 Create a script using the supported commands.
- 2 Edit the installation script as needed to change settings that are unique for each host.
- 3 Run the scripted installation.

The installation script can reside in one of the following locations:

- Default installation script
- FTP
- HTTP/HTTPS
- NFS



```
# A sample post-install script
%post --unsupported --interpreter=python --ignorefailure=true
import time
stampFile = file('/finished.stamp', mode='w')
stampFile.write( time.asctime() )
```

## Installation Script Commands

To modify the default installation script or create your own script, use supported commands. Use the following commands in the installation script (kickstart file), which you specify with a boot command when you boot the installer.

### accepteula or vmaccepteula (required)

Accepts the ESXi license agreement.

### autopart (required)

Compared to kickstart, the behavior of the ESXi 4.1 `autopart` command is significantly different. Carefully edit the `autopart` command in your existing scripts.

Specifies the disk onto which ESXi is installed. Clears the specified disk and creates the default partitions, including a VMFS datastore that occupies all available space after the other partitions are created.

<code>--disk=</code> or <code>--drive=</code>	Specifies the disk to partition.
<code>--firstdisk=</code> <code>&lt;disk-type1&gt;</code> , <code>[&lt;disk-type2&gt;, ...]</code>	Partitions the first non-USB disk found. This is the same disk as found by the <code>clearpart --firstdisk</code> command.  You can add an optional string argument to the <code>--firstdisk</code> flag to select the disk types. You can use the following strings : <ul style="list-style-type: none"> <li>■ local</li> <li>■ remote</li> <li>■ Device driver name in the vmkernel</li> </ul> <p>You can combine multiple values in a comma-separated list to concatenate other matches onto the list of matches. For example, <code>--firstdisk=local,remote</code> selects the first detected local disk or, if none are available, the first remote disk. This is the default behavior. To prefer a disk with the device driver named <code>mptspi</code> over any other local disks, use <code>--firstdisk=mptspi,local</code>.</p>
<code>--overwritevmfs</code>	Required if a VMFS partition exists on the disk before installation.

### clearpart (optional)

Compared to kickstart, the behavior of the ESXi 4.1 `clearpart` command is significantly different. Carefully edit the `clearpart` command in your existing scripts.

Removes partitions from the system before creating new partitions.

<code>--drives=</code>	Specifies which drives to clear partitions from.
<code>--alldrives</code>	Ignores the <code>--drives=</code> requirement and allows clearing of partitions on every drive.
<code>--ignoredrives=</code>	Removes partitions on all drives except those specified. Required unless the <code>--drives=</code> or <code>--alldrives</code> flag is specified.

<code>--overwritevmfs</code>	Overwrites VMFS partitions on the specified drives. Required if the disk contains a VMFS partition.
<code>--initlabel</code>	Initializes the disk label to the default for your architecture.
<code>--firstdisk= &lt;disk-type1&gt;, [&lt;disk-type2&gt;,...]</code>	<p>Clears partitions on the first non-USB disk found. This is the same disk as found by <code>autopart --firstdisk</code> command.</p> <p>You can add an optional string argument to the <code>--firstdisk</code> flag to select the disk types. You can use the following strings:</p> <ul style="list-style-type: none"> <li>■ local</li> <li>■ remote</li> <li>■ Device driver name in the <code>vmkernel</code></li> </ul> <p>You can combine multiple values in a comma-separated list to concatenate other matches onto the list of matches. For example, <code>--firstdisk=local,remote</code> selects the first detected local disk or, if none are available, the first remote disk. This is the default behavior. To prefer a disk with the device driver named <code>mptspi</code> over any other local disks, use <code>--firstdisk=mptspi,local</code>.</p>

### dryrun (optional)

Parses and checks the installation script. Does not perform the installation.

### install (required)

Specifies that this is a fresh installation. (All scripted installations are fresh installations.)

<code>&lt;cdrom nfs url&gt; &lt;cdrom usb nfs url&gt;</code>	<p>Specifies the type of installation. The values are:</p> <ul style="list-style-type: none"> <li>■ <code>cdrom</code> installs from the DVD-ROM drive. For example: <code>install cdrom</code></li> <li>■ <code>nfs</code>. Installs from the specified NFS server. For example: <code>install nfs --server=example.com --dir=/nfs3/VMware/ESXi/41</code></li> <li>■ <code>usb</code> Installs from the first USB media found to contain the installation image. For example: <code>install usb</code></li> </ul>
<code>--server=</code>	Specifies which NFS server to connect to. Use with <code>nfs</code> .
<code>--dir=</code>	Specifies which directory on the NFS server to mount. Use with <code>nfs</code> .
<code>&lt;url&gt;</code>	Defines the location of the runtime environment. Use with <code>url</code> ( <code>http/https/ftp/nfs</code> ).

## keyboard (optional)

Sets the keyboard type for the system.

<code>&lt;keyboardType&gt;</code>	Specifies the keyboard map for the selected keyboard type. <code>keyboardType</code> must be one of the following types.
	<ul style="list-style-type: none"> <li>■ Default</li> <li>■ French</li> <li>■ German</li> <li>■ Japanese</li> <li>■ Russian</li> </ul>

## serialnum or vmserialnum (optional)

Configures licensing. If not included, ESXi installs in evaluation mode.

<code>--esx=&lt;license-key&gt;</code>	Specifies the vSphere license key to use. The format is 5 five-character groups (XXXXX-XXXXX-XXXXX-XXXXX-XXXXX).
--	--

## network (optional)

Configures network information for the system.

<code>--bootproto=[dhcp static]</code>	Specifies network settings.
<code>--device=</code>	Specifies either the MAC address of the network card or the device name, as in <code>vmnic0</code> .
<code>--ip=</code>	Sets an IP address for the machine to be installed. Required with the <code>--bootproto=static</code> option.
<code>--gateway=</code>	Designates the default gateway as an IP address. Required with the <code>--bootproto=static</code> option.
<code>--nameserver=</code>	Designates the primary name server as an IP address. Used with the <code>--bootproto=static</code> option. Omit this option if you do not intend to use DNS.  The <code>--nameserver</code> option can accept two IP addresses. For example: <code>--nameserver="10.126.87.104,10.126.87.120"</code>
<code>--netmask=</code>	Specifies the subnet mask for the installed system. Used with the <code>--bootproto=static</code> option. If you omit this option, the default is the standard netmask for the given IP address.
<code>--hostname=</code>	Specifies the host name for the installed system. Only works with <code>--bootproto=static</code> .
<code>--vlanid=&lt;vlanid&gt;</code>	Specifies a VLAN to use for networking. Set to an integer between 0 and 4095.
<code>--addvmportgroup=(0 1)</code>	Specifies whether to add the VM Network port group, which is used by virtual machines. The default value is 1.

**paranoid (optional)**

Causes any warning messages to interrupt the installation. If you omit this command, warning messages are logged.

**part or partition (optional)**

Compared to kickstart, the behavior of the ESXi 4.1 `part` or `partition` command is significantly different. Carefully edit the `part` or `partition` command in your existing scripts.

Creates an additional VMFS datastore on the system. Only one datastore per disk can be created. Cannot be used on the same disk as `autopart`, because `autopart` automatically creates a datastore on its disk.

<code>&lt;datastore name&gt;</code>	Specifies the name for the datastore.
<code>--size=</code>	Defines the minimum partition size in megabytes.
<code>--grow</code>	Allows the partition to grow to fill any available space or up to the maximum size setting.
<code>--maxsize=</code>	Specifies the maximum size in megabytes for a partition to grow.
<code>--ondisk=</code> or <code>--ondrive=</code>	Specifies the disk on which partitions are created.
<code>--onfirstdisk=</code>	Partitions the first non-USB disk found. This is the same disk as found by the <code>autopart --firstdisk</code> command.
<code>&lt;disk-type1&gt;</code> , <code>[&lt;disk-type2&gt;, ...]</code>	You can add an optional string argument to the <code>--firstdisk</code> flag to select the disk types. The strings that you can use are as follows: <ul style="list-style-type: none"> <li>■ local</li> <li>■ remote</li> <li>■ Device driver name in the vmkernel</li> </ul> <p>You can combine multiple values in a comma-separated list to concatenate other matches onto the list of matches. For example, <code>--firstdisk=local,remote</code> selects the first detected local disk or, if none are available, the first remote disk. This is the default behavior. To prefer a disk with the device driver named <code>mptspi</code> over any other local disks, use <code>--firstdisk=mptspi,local</code>.</p>
<code>--fstype=</code>	Sets the file system type for the partition. Only for VMFS3.

**rootpw (required)**

Sets the root password for the system. Can be between 6 and 64 characters.

<code>--iscrypted</code>	Specifies that the password is encrypted.
<code>&lt;password&gt;</code>	Specifies the password value.

**%include or include**

Specifies an additional installation script to parse. You can add several include commands to your script. When you use the `%include` command, put the `<filename>` argument on the same line as the command.

<code>&lt;filename&gt;</code>	For example: <code>%include part.cfg</code>
-------------------------------	---



## %pre (optional)

Specifies a script to be executed before the kickstart configuration is evaluated. For example, a %pre script can generate include files, as shown here:

```
# Partitioning
%include part.cfg
...


```

%pre --unsupported
cat > /tmp/part.cfg <<EOF
part datastore2 --fstype=vmfs3 --size=20000 --onfirstdisk="remote"
part datastore3 --fstype=vmfs3 --size=10000 --grow --ondisk="mpx.vmhba1:C0:T0:L0"
EOF

```


```

- interpreter** `=[python|busybox]` Specifies an interpreter to use. The default is busybox.
- unsupported(required)** Required argument that acknowledges the command is unsupported.

## %post (optional)

Executes the specified script after package installation has been completed. If you specify multiple %post sections, they are executed in the order they appear in the installation script. For example:

```
%post --unsupported
MY_MAC=`esxcfg-nics -l | tail -1 | awk '{print $7}'` CONF_URL="http://example.com/$MY_MAC"
python -c "import urllib; urllib.urlretrieve('$CONF_URL', '/tmp/myconfig.sh')"
sh /tmp/myconfig.sh

```

- interpreter** `=[python|busybox]` Specifies an interpreter to use. The default is busybox.
- timeout=secs** Specifies a timeout for executing the script. If the script has not finished when the timeout expires, the script is forcefully terminated.
- ignorefailure** `=[true|false]` If true, the installation is considered a success even if the %post script terminated with an error.
- unsupported(required)** Required argument that acknowledges the command is unsupported.

## %firstboot

Creates an init script which executes during the first boot only. If you specify multiple %firstboot sections, assign the order of execution by setting the --level argument.

- interpreter** `=[python|busybox]` Specifies an interpreter to use. The default is busybox.
- level=level** Determines the order that the init script will be executed in. Set the level high enough so that other init scripts, such as loading drivers, can run first. The default is 999.
- unsupported(required)** Required argument that acknowledges the command is unsupported.

---

**NOTE** There is no way to check the semantics of %firstboot script until the system boots for the first time. If the script contains errors, they will not be exposed until after the installation is complete.

---

## Disk Device Names

Installation script commands such as `autopart` require the use of disk device names.

[Table 4-1](#) lists the supported disk device names.

**Table 4-1.** Disk Device Names

Format	Examples	Description
MPX	<code>mpx.vmhba0:C0:T0:L0</code>	The vmkernel device name.
VML	<code>vml.0000000000766d686261313a303a30</code>	

## Installing ESXi 4.1

The installer reformats and partitions the target disk and installs the ESXi 4.1 boot image.

All data located on this drive is overwritten, including hardware vendor partitions, operating system partitions, previous versions of ESXi, and associated data. To ensure that you do not lose any data, migrate the data to another machine before you install ESXi 4.1.

This chapter includes the following topics:

- [“Boot Commands,”](#) on page 43
- [“Install ESXi 4.1 Using the Interactive Mode,”](#) on page 44
- [“Install ESXi 4.1 Using the Scripted Mode,”](#) on page 45

### Boot Commands

Before the ESXi installer Welcome screen appears, the installer displays a boot prompt where you can enter boot commands to pass arguments to the installer.

When the mode selection screen appears, quickly press Tab to stop the timeout counter. If the mode selection screen times out, the default interactive mode is launched. Boot commands must be entered after the file `vmkboot.gz` rather than at the end of the line. For example,

```
append vmkboot.gz ks=http://00.00.00.00/kickstart/ks-osdc-pdp101.cfg nameserver=00.00.0.0
ip=00.00.00.000 netmask=255.255.255.0 gateway=00.00.00.000 --- vmkernel.gz --- sys.vgz ---
cim.vgz --- ienviron.vgz --- install.vgz
```

The supported bootstrap commands and subcommands are listed in [Table 5-1](#).

**Table 5-1.** Bootstrap Commands for ESXi Installation

Command	Description
<code>BOOTIF=&lt;hwtype&gt;-&lt;MAC address&gt;</code>	Accepts the format for the boot network adapter as supplied by PXELINUX.
<code>gateway=&lt;ip address&gt;</code>	Sets this network gateway as the default gateway during the install.
<code>ip=&lt;ip address&gt;</code>	Specifies a static IP address to be used for downloading the script and the installation media. The IPAPPEND option is also supported if you PXE boot the installer.
<code>ks=cdrom: /&lt;path&gt;</code>	Performs a scripted installation with the script at <path>, which resides on the CD in the CD-ROM drive.
<code>ks=file: //&lt;path&gt;</code>	Performs a scripted installation with the script at <path>, which resides inside the initial ramdisk image.

**Table 5-1.** Bootstrap Commands for ESXi Installation (Continued)

Command	Description
ks=<protocol>://<server><path>	Performs a scripted installation with a script located at the given URL. <protocol> can be http, https, ftp, or nfs.
ks=usb	Performs a scripted installation with the default script (ks.cfg file), which resides on USB.
ks=usb:/<path>	Performs a scripted installation with the script file at specified path, which resides on USB.
ksdevice=<device>	Same as netdevice
nameserver=<ip address>	Specifies a domain name server as the nameserver during the install.
netdevice=<device>	Tries to use a network adapter <device> when looking for an installation script and installation media. Specify as a MAC address (for example, 00:50:56:C0:00:01). This can also be a vmnicNN name. If not specified and files need to be retrieved over the network, the installer defaults to the first discovered network adapter.
netmask=<subnet mask>	Specifies subnet mask for the network interface that downloads the installation media.

## Install ESXi 4.1 Using the Interactive Mode

You use the ESXi 4.1 CD/DVD to install the ESXi 4.1 software onto a SAS, SATA, or SCSI hard drive.

### Prerequisites

- You must have the ESXi 4.1 Installable ISO file on CD or DVD media. If you do not have the installation CD/DVD, you can create one. See [“Download the ESXi ISO Image and Burn the Installation CD/DVD,”](#) on page 25.
- Verify that the server hardware clock is set to UTC. This setting is in the system BIOS.
- Verify that a keyboard and monitor are attached to the machine on which the ESXi software will be installed.
- Consider disconnecting your network storage. This action decreases the time it takes the installer to search for available disk drives.
- ESXi Embedded must not be on the host. ESXi Installable and ESXi Embedded cannot exist on the same host.

### Procedure

- 1 Insert the ESXi 4.1 Installable CD/DVD into the CD/DVD-ROM drive.
- 2 Restart the machine.
- 3 Set the BIOS to boot from the CD-ROM device.  
See your hardware vendor documentation for information on changing boot order.
- 4 On the Welcome screen, press Enter to continue with the installation.
- 5 Read the VMware end-user license agreement and accept it by pressing F11.

- 6 In the Select a Disk screen, select the disk drive on which to install ESXi 4.1 and press Enter.  
Press F1 for information about the selected disk.

---

**NOTE** Do not rely on the disk order in the list to select a disk. The disk order is determined by the BIOS and might be out of order. This might occur on systems where drives are continuously being added and removed.

---

If the disk you selected contains data, the Confirm Disk Selection screen displays.

- 7 Press F11 to start the installation.
- 8 When the installation is complete, remove the installation CD/DVD.
- 9 Press Enter to reboot the host.  
During the reboot operation, VFAT scratch and VMFS partitions are created on the disk.
- 10 Set the first boot device to be the drive on which you installed ESXi (in [Step 6](#)).  
See your hardware vendor documentation for information on changing boot order.

After the installation is complete, you can migrate existing VMFS data to the ESXi 4.1 Installable host.

You can boot a single machine from each ESXi image. Booting multiple devices from a single shared ESXi image is not supported.

## Install ESXi 4.1 Using the Scripted Mode

This procedure describes the steps for running a custom or default script.

### Prerequisites

Before running a scripted installation, verify that the following prerequisites have been met:

- The system on which you are installing the product meets the hardware requirements for the installation.
- You have the installation media on the installation CD/DVD or the installation media is accessible to the system on a media depot or USB flash drive.
- If you are PXE booting the installer, the correct PXE configuration file is defined. See [“Creating a PXE Configuration File,”](#) on page 34.
- The default installation script (`ks.cfg`) or a custom installation script is accessible to the system.
- You have selected a boot command to run the scripted installation. See [“Boot Commands,”](#) on page 43 for a complete list of boot commands.

### Procedure

- 1 Boot the installer using one of the following methods.
  - Boot from the CD/DVD using the local CD/DVD-ROM drive.
  - PXE boot the installer.
- 2 When the mode selection page appears, press Tab.

- 3 In the line following the file `vmkboot.gz` in the command line, enter a boot command (`ks=`) that calls the default script (kickstart) file or a script file that you created.

The table shows the basic boot commands.

<b>ks= Option</b>	<b>Description</b>
<b>ks=cdrom:/ks.cfg</b>	Installation script is located on the DVD-ROM drive attached to the machine.
<b>ks=file://&lt;path&gt;/ks.cfg</b>	Installation script is at <path> which resides inside the initial ramdisk image.
<b>ks=ftp://&lt;server&gt;/&lt;path&gt;/ks.cfg</b>	Installation script is located at the given URL.
<b>ks=http://&lt;server&gt;/&lt;path&gt;/ks.cfg</b>	Installation script is located at the given URL.
<b>ks=nfs://&lt;server&gt;/&lt;path&gt;/ks.cfg</b>	Installation script is located at <path> on a given NFS server.
<b>ks=usb:/ks.cfg</b>	Installation script is located on the local USB.

- 4 Press Enter.

The installation runs using the options that you specified.

## Setting Up ESXi

---

These topics provide information about using the direct console user interface and configuring defaults for ESXi 4.1.

This chapter includes the following topics:

- [“Network Access to Your ESXi Host,”](#) on page 48
- [“Configure the Network Settings on a Detached Host,”](#) on page 48
- [“Direct Console User Interface,”](#) on page 48
- [“Configure the Keyboard Layout,”](#) on page 49
- [“Create a Security Banner for the Direct Console,”](#) on page 49
- [“Configuring the BIOS Boot Settings,”](#) on page 49
- [“Change the BIOS Boot Setting for ESXi,”](#) on page 50
- [“Configure the Boot Setting for Virtual Media,”](#) on page 50
- [“Configuring Network Settings,”](#) on page 51
- [“Storage Behavior,”](#) on page 56
- [“Recording the ESXi License Key,”](#) on page 57
- [“View System Logs,”](#) on page 58
- [“Redirect System Log Files to a Remote Host,”](#) on page 58
- [“Set the Password for the Administrator Account,”](#) on page 58
- [“Configure Lockdown Mode,”](#) on page 59
- [“Configure Troubleshooting Services with the Direct Console User Interface,”](#) on page 59
- [“Reset the System Configuration,”](#) on page 60
- [“Managing ESXi Remotely,”](#) on page 60
- [“Convert an ESXi Host to Evaluation Mode,”](#) on page 61
- [“Remove All Custom Packages on ESXi,”](#) on page 61
- [“Disable ESXi,”](#) on page 61

## Network Access to Your ESXi 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 6-1](#) summarizes the network configuration scenarios that ESXi supports.

**Table 6-1.** 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 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 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 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 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 48.

## 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 6-2](#) lists the keys you can use to navigate and perform actions in the direct console.



**Table 6-2.** 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 in which mode your server boots. Generally, the CD-ROM device is listed first. 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 Embedded 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 disk on which you installed the ESXi software and move it to the first position in the list.  
The host boots into ESXi. If the host does not boot into ESXi, you might need to repair the ESXi image, as described in [“Recover the ESXi 4.1 Installable Software,”](#) on page 67.

## 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 Embedded 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 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 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 host.

### Set the VLAN ID

You can set the virtual LAN (VLAN) ID number of the ESXi 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. No outbound traffic is allowed through the assigned IP address. The assigned IP address appears on the direct console. If you do not have physical monitor 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 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 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 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 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.

When you reboot the ESXi host after installing the ESXi image, the host configures the system storage devices with defaults. By default, all visible blank internal disks are formatted with VMFS, 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 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 56.
- One VMFS3 partition on the remaining free space.

The VFAT scratch partition is created only on the disk from which the ESXi host is booting. On the other disks, the software creates a VMFS3 partition on each disk spanning the whole disk.

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.

During ESXi installation, the installer creates a 110MB diagnostic partition for core dumps.

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 install ESXi and 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 Installable, the partition is created during installation and is thus selected. VMware recommends that you leave it unchanged.



## 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 License Key

All ESXi 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 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 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 58.

## 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 58.

## 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 host is root. By default, the administrative password is not set.

### Procedure

- 1 From the direct console, select **Configure Password**.
- 2 (Optional) If a password is already set up, type the password in the **Old Password** line and press Enter.
- 3 In the **New Password** line, type a new password and press Enter.
- 4 Retype the new password and press Enter.

## Configure Lockdown Mode

To increase the security of your ESXi hosts, you can put them in lockdown mode.

When you enable lockdown mode, no users other than `vpuser` have authentication permissions, nor can they perform operations against the host directly. Lockdown mode forces all operations to be performed through vCenter Server.

When a host is in lockdown mode, you cannot run vCLI commands from an administration server, from a script, or from vMA against the host. External software or management tools might not be able to retrieve or modify information from the ESXi host.

---

**NOTE** The root user is still authorized to log in to the direct console user interface when lockdown mode is enabled.

---

Enabling or disabling lockdown mode affects which types of users are authorized to access host services, but it does not affect the availability of those services. In other words, if Local Tech Support Mode, Remote Tech Support Mode (SSH), or the Direct Console User Interface services are enabled, they will continue to run whether or not the host is in lockdown mode.

You can enable lockdown mode using the Add Host wizard to add an ESXi host to vCenter Server, using the vSphere Client to manage a host, or using the direct console.

Lockdown mode is only available on ESXi hosts that have been added to vCenter Server.

### Procedure

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

## Configure Troubleshooting Services with the Direct Console User Interface

Use the direct console user interface to enable troubleshooting services.

### Procedure

- 1 From the direct console user interface, press F2 to access the System Customization menu.
- 2 Select **Troubleshooting Options** and press Enter.
- 3 From the Troubleshooting Mode Options menu, select a troubleshooting service to enable or disable.
  - **Local Tech Support Mode**
  - **Remote Tech Support Mode**

- 4 Press Enter.
- 5 (Optional) Set the timeout for Tech Support Mode.

By default, the timeout for Tech Support Mode is 0 (disabled).

The timeout setting is the number of minutes that can elapse before you must log in after Tech Support Mode is enabled. After the timeout period, if you have not logged in, Tech Support Mode is disabled.

---

**NOTE** If you are logged in when the timeout period elapses, your session will persist. However, Tech Support Mode will be disabled, preventing other users from logging in.

---

- a From the Troubleshooting Mode Options menu, select **Modify Tech Support timeout** and press Enter.
- b Enter the timeout in minutes.
- c 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 Remotely

After the ESXi 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 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 host or use the vCenter Server installation DVD.

## 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 ESXi 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 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 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

---

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 63
- [“Licensing the Host,”](#) on page 63

## 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, which is the IP address or host name.

The system must have an Internet connection.

### Procedure

- 1 From a Windows machine, open a Web browser.
- 2 Enter the URL or IP address for the host.  
For example, `http://exampleserver.example.com` or `http://xxx.xxx.xxx.xxx`.
- 3 Click **Download the vSphere Client** under Getting Started.
- 4 Click **Save** to download the vSphere Client installer.

The vSphere Client installer is downloaded to the system.

### What to do next

Install the vSphere Client.

## Licensing the Host

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

For more information, see the *Datacenter Administration Guide*.





# Backing Up and Restoring ESXi 4.1

---

You can back up and restore the ESXi 4.1 configuration and recover the ESXi 4.1 boot image if it becomes damaged. In addition, you can remove ESXi 4.1 from the host.

This chapter includes the following topics:

- [“About Backing Up and Restoring an ESXi 4.1 Configuration,”](#) on page 65
- [“Considerations When Using the vSphere CLI Virtual Appliance,”](#) on page 65
- [“Back Up ESXi 4.1 Configuration Data,”](#) on page 66
- [“Restore ESXi 4.1 Configuration Data,”](#) on page 66
- [“Recover the ESXi 4.1 Installable Software,”](#) on page 67

## About Backing Up and Restoring an ESXi 4.1 Configuration

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

You can back up the ESXi 4.1 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 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 4.1 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 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 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 4.1 Configuration Data

You can restore the ESXi 4.1 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 <ESXi_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 4.1 Installable Software

You can restore the ESXi Installable software by running the ESXi installation CD in repair mode.

If the host does not boot into ESXi, the file partitions or master boot record on the installation disk might be corrupted. To resolve this problem, you can restore the software by running the installation CD in repair mode. (No separate Recovery CD is available for ESXi 4.1 Installable.) Run the installer in repair mode only when directed to do so by VMware Customer Service.

When you run the installer in repair mode, all host configuration data is overwritten by system defaults. If you backed up the configuration, you can restore it after you perform the repair operation.



**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.

During the repair operation, your existing ESXi 4.1 Installable VMFS datastore is preserved if it is in its original location on the ESXi 4.1 boot disk, or if it is located on another disk (separate from the boot disk).

If you changed the VMFS location on the boot disk, it is preserved if it is located beyond the 900MB partition. In situations where the partition table is corrupt, the VMFS cannot be recovered automatically by the repair operation. In this case, call VMware customer service for help in recovering your VMFS.

If you do not have the original installation CD, contact your hardware vendor for help obtaining the appropriate ISO file. After you obtain the ISO file, you can burn it onto a blank CD.

### Procedure

- 1 Insert the ESXi 4.1 Installable installation CD into an ESXi 4.1 Installable host CD-ROM drive.
- 2 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 installation Welcome screen appears.

- 3 Press R to repair ESXi 4.1.
- 4 Read the VMware end-user license agreement and accept it by pressing F11.  
You cannot reinstall this product unless you accept the license agreement.

- 5 From the Select A Disk screen, choose the disk drive that contained the original installation of ESXi 4.1.

---

**NOTE** If you do not choose the same installation disk, the damaged ESXi 4.1 image is not fixed and a new image is installed.

---

- a Use the up and down arrow keys to navigate in the disk list.
- b Highlight the row containing the disk.
- c Press Enter.

The Confirm Disk Selection screen displays, warning you that the data on the selected disk is about to be overwritten. If you did not change the default partitions created during the ESXi 4.1 installation, the data existing in the third and fourth primary partitions is preserved. This includes your VMFS datastore.

- 6 Do one of the following:
  - To confirm the disk you chose for repair, press Enter.
  - To change the target disk, press Backspace and repeat [Step 5](#).
- 7 In the Confirm Repair screen, confirm you are ready to install ESXi 4.1.



**CAUTION** This is your last opportunity to cancel the reinstallation. If you continue, the installer reformats the disk and installs the ESXi 4.1 software.

---

Press F11 to start the recovery.

- 8 When the operation is complete, one of the following screens displays.

Option	Description
<b>Repair Complete</b>	The ESXi 4.1 image was repaired successfully and the partition table was restored. The installer recreated the partition table to recover your VMFS partitions or custom partitions. The repair operation added these entries in the partition table.
<b>Repair Incomplete</b>	The ESXi 4.1 image was repaired successfully, but the partition table could not be restored. The installer could not recreate the partition table to recover your VMFS partitions or custom partitions. You must manually add the partition entries to the partition table to recover your data. Call VMware support for help.

- 9 Remove the installation CD from the CD drive.
- 10 Press Enter to reboot the machine.

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. See the *ESXi Configuration Guide*.

If your storage area is not visible, the ESXi 4.1 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.

## vCenter Server Databases

---

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

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 databases, which have 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.

You do not need to install a new database server for the vCenter Server installation to work. During installation, you can point the vCenter Server system to any existing supported database. vCenter Server supports IBM DB2, Oracle, and Microsoft SQL Server databases. vCenter Update Manager 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 *vSphere Upgrade Guide*.

---

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

This chapter includes the following topics:

- [“vCenter Server Database Patch and Configuration Requirements,”](#) on page 69
- [“Create a 64-Bit DSN,”](#) on page 71
- [“Configure vCenter Server to Communicate with the Local Database After Shortening the Computer Name to 15 Characters or Fewer,”](#) on page 71
- [“About the Bundled Microsoft SQL Server 2005 Express Database Package,”](#) on page 72
- [“Maintaining a vCenter Server Database,”](#) on page 72
- [“Configure DB2 Databases,”](#) on page 72
- [“Configure Microsoft SQL Server Databases,”](#) on page 81
- [“Configure Oracle Databases,”](#) on page 85

### 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.

vCenter Server databases require a UTF codeset.

Table 9-1 lists the configuration and patch requirements for the databases that are supported with vCenter Server.

Contact your DBA for the appropriate database credentials.

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

**Table 9-1.** Configuration and Patch Requirements

Database Type	Patch and Configuration Requirements
IBM DB2 9.5	<p>If the database is not local to the vCenter Server system, install the IBM Data Server Runtime Client.</p> <p>Install the IBM DB2 native client according to the IBM instructions for your DB2 version.</p> <p>If you are not running DB2 with DB2 9.5 fix pack 5, install Hotfix 22318 for DB2 9.5.0 on the system where you are installing vCenter Server.</p> <p>Ensure that C:\Program Files\IBM\SQLLIB\BIN is in the system path. DB2 might be installed at a different location.</p> <p>You might need to restart the Microsoft Windows machine for the service to recognize the change in the environment variable.</p> <p>Ensure that the machine has a valid ODBC data source name (DSN) entry.</p>
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>
Microsoft SQL Server 2005	<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>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. Then apply patch 5699495 to the client.</p> <p>Ensure that the machine has a valid ODBC DSN entry.</p> <p>For the Oracle Instant client, copy ojdbc14.jar to the vCenter Server tomcat directory (&lt;vCenter install location&gt;\Infrastructure\tomcat\lib)</p> <p>The Oracle 10g client comes with ojdbc14.jar (&lt;Oracle client install location&gt;\oracle\product\10.2.0&lt;instance_name&gt;\jdbc\lib). The vCenter Server installer copies the file from the Oracle client install location to the vCenter Server tomcat directory (&lt;vCenter install location&gt;\Infrastructure\tomcat\lib)</p> <p>If the ojdbc14.jar 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 ojdbc14.jar to the vCenter Server tomcat directory (&lt;vCenter install location&gt;\Infrastructure\tomcat\lib)</p> <p>The Oracle 11g client comes with ojdbc14.jar (&lt;Oracle client install location&gt;\app\Administrator\product\11.1.0&lt;instancename&gt;\sqldeveloper\jdbc\lib). The vCenter Server installer copies the file from the Oracle client install location to the vCenter Server tomcat directory (&lt;vCenter install location&gt;\Infrastructure\tomcat\lib)</p> <p>If the ojdbc14.jar 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 64-Bit DSN

The vCenter Server system must have a 64-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 64-bit database ODBC drivers on your Microsoft Windows system.  
The default installation location is `C:\Program Files\VMware\Infrastructure\VirtualCenter Server`.
- 2 Click **Control Panel > Administrative Tools > Data Sources (ODBC)**.
- 3 Use the application to create a system DSN and test the connectivity.

The system now has a DSN that is compatible with vCenter Server. When the vCenter Server installer prompts you for a DSN, select the 64-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 on which vCenter Server will be installed, 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.

### Prerequisites

- Make sure the database server is running.
- 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.

### Procedure

- 1 Update the data source information, as needed.
- 2 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 the bundled 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.

The standard database maintenance processes include the following:

- 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 DB2 Databases

If you use a DB2 database for your vCenter Server repository, you need to configure your database to work with vCenter Server.

### Procedure

- 1 [Configure an IBM DB2 Database User and Group](#) on page 73  
To use an IBM DB2 database when you install vCenter Server, you must configure the database user and group.
- 2 [Add the Database Instance Registry Variables](#) on page 74  
After connecting to the server as DB2 instance owner, you can configure the DB2 registry variables on the database server.
- 3 [Add the Client Instance Registry Variable](#) on page 75  
After connecting to the server as DB2 instance owner, you can configure the DB2 registry variables on the vCenter Server.
- 4 [Use a Script to Create a DB2 Database](#) on page 75  
When you use a DB2 database with vCenter Server, the database must have certain buffer pools, table spaces, and privileges. To simplify the process of creating the database, you can run a DB2 script.
- 5 [Use a Script to Create the DB2 Database Schema \(Optional\)](#) on page 77  
The vCenter Server installer creates the schema during installation. Experienced database administrators who need more control over schema creation due to environmental constraints can optionally use a script to create their database schema.



- 6 [Configure a Connection to a Local DB2 Database on Microsoft Windows](#) on page 79  
You can configure a DB2 database for vCenter Server locally on the same Microsoft Windows machine as vCenter Server.
- 7 [Configure a Connection to a Remote DB2 Database on Linux, UNIX, or Microsoft Windows](#) on page 80  
You can configure a DB2 database for vCenter Server remotely on a network-connected Microsoft Windows, Linux, or UNIX host.

## Configure an IBM DB2 Database User and Group

To use an IBM DB2 database when you install vCenter Server, you must configure the database user and group.

You can configure a DB2 database for vCenter Server either locally on the same Microsoft Windows machine as vCenter Server or remotely on a network-connected Linux, UNIX, or Windows host.

### Prerequisites

- Review the software requirements for vCenter Server with DB2.
- Verify that a DB2 instance is created and configured for incoming TCP connections. See the DB2 documentation Web site.
- Make sure that you created a user called `vcx`.
- The DB2 database server must use codeset UTF-8.

### Procedure

- 1 Create an initial user on the operating system.  
By default, DB2 uses the operating system authentication for all its database users.
- 2 If the database is hosted on a Microsoft Windows machine, add the user `vcx` as a member of the group `DB2USERS`.
- 3 Create a user group called `DBSYSMON` and add the user `vcx` as a member.
- 4 Open a DB2 command window or Command Line Processor (CLP) as the DB2 instance owner.
  - On Microsoft Windows, select **Start > IBM DB2 > DB2Copy1 > Command Line Tools > Command Window**.
  - On Linux or UNIX, open a terminal and switch your user to the DB2 instance owner.
- 5 In the DB2 command window, run the following command to add the group `DBSYSMON` to the group of users capable of database system monitoring:

```
db2 update dbm cfg using sysmon_group dbsysmon
```

This command affects all databases in this instance.

You now have a DB2 database user that you can reference in the vCenter Server installer.

### What to do next

Add the database instance registry variables.

## Add the Database Instance Registry Variables

After connecting to the server as DB2 instance owner, you can configure the DB2 registry variables on the database server.

### Prerequisites

Make you that you configure an IBM DB2 database user and group.

### Procedure

- 1 Open a DB2 Command window or Command Line Processor (CLP) as the DB2 instance owner.
  - On Microsoft Windows, select **Start > IBM DB2 > DB2Copy1 > Command Line Tools > Command Window**.
  - On Linux or UNIX, open a terminal and switch your user to the DB2 instance owner.
- 2 Start the DB2 instance.
 

```
db2start
```
- 3 Enable the DB2 administrative task scheduler.
 

```
db2set DB2_ATS_ENABLE=YES
```
- 4 Enable the DB2 database system to ignore uncommitted insertions.
 

```
db2set DB2_SKIPINSERTED=ON
```
- 5 Enable the table or index access scans to defer or avoid row locking until a data record is known to satisfy predicate evaluation.
 

```
db2set DB2_EVALUNCOMMITTED=ON
```
- 6 Enable the DB2 database system to skip deleted keys during index access and skip deleted rows during table access.
 

```
db2set DB2_SKIPDELETED=ON
```
- 7 Stop and restart the database instance.
 

```
db2stop force
db2start
```

These commands affect all databases in this instance.

All the required registry variables are set up.

### What to do next

Add the client instance registry variable.

## Add the Client Instance Registry Variable

After connecting to the server as DB2 instance owner, you can configure the DB2 registry variables on the vCenter Server.

### Prerequisites

- Configure an IBM DB2 database user and group.
- Add the database instance registry variables.
- Make sure that the DB2 runtime client is installed on the Windows machine that will host vCenter Server. If the database server and the vCenter Server are running on the same machine, you do not have to install the runtime client separately.

### Procedure

- 1 Open a DB2 Command window or Command Line Processor (CLP) as the DB2 instance owner.
  - On Microsoft Windows, select **Start > IBM DB2 > DB2Copy1 > Command Line Tools > Command Window**.
  - On Linux or UNIX, open a terminal and switch your user to the DB2 instance owner.
- 2 To configure the vSphere Client to behave as a Unicode application, set the DB2CODEPAGE registry variable to 1208.

```
db2set DB2CODEPAGE=1208
```

---

**NOTE** If you are configuring the DB2 database on the same machine as the one that is running vCenter Server, you need to run the db2set command after connecting to the database server (which is the same as the vCenter Server host).

---

### What to do next

Create the DB2 database, including all necessary buffer pools, table spaces, and privileges.

## Use a Script to Create a DB2 Database

When you use a DB2 database with vCenter Server, the database must have certain buffer pools, table spaces, and privileges. To simplify the process of creating the database, you can run a DB2 script.

### Prerequisites

- Configure an IBM DB2 database user and group.
- Add the database instance registry variables.
- Add the client instance registry variable.

**Procedure**

- 1 Copy the following DB2 script into a text editor and save it with a descriptive filename, such as `vcdbcreate.sql`.

The script is located in the `<installation directory>/vpx/dbschema/db2_prereq_connection_configuration.txt` vCenter Server installation package file.

```
CREATE DATABASE VCDB
AUTOMATIC STORAGE YES ON 'C:\'
DBPATH ON 'C:\' USING CODESET UTF-8
TERRITORY US
COLLATE USING SYSTEM PAGESIZE 4096;

UPDATE DB CFG FOR VCDB USING AUTO_MAINT ON;
UPDATE DB CFG FOR VCDB USING AUTO_TBL_MAINT ON;
UPDATE DB CFG FOR VCDB USING AUTO_RUNSTATS ON;
UPDATE DB CFG FOR VCDB USING logprimary 32 logsecond 6 logfilsiz 2048;
UPDATE ALERT CFG FOR DATABASE ON VCDB USING db.db_backup_req SET THRESHOLDSCHECKED YES;
UPDATE ALERT CFG FOR DATABASE ON VCDB USING db.tb_reorg_req SET THRESHOLDSCHECKED YES;
UPDATE ALERT CFG FOR DATABASE ON VCDB USING db.tb_runstats_req SET THRESHOLDSCHECKED YES;

CONNECT TO VCDB;
grant select on sysibmadm.applications to user vcx;
CREATE BUFFERPOOL VCBP_8K IMMEDIATE SIZE 250 AUTOMATIC PAGESIZE 8K;
CREATE LARGE TABLESPACE VCTS_8k PAGESIZE 8K MANAGED BY AUTOMATIC STORAGE EXTENTSIZE 32
OVERHEAD 12.67 PREFETCHSIZE 32 TRANSFERRATE 0.18 BUFFERPOOL VCBP_8K;
CREATE BUFFERPOOL VCBP_16K IMMEDIATE SIZE 250 AUTOMATIC PAGESIZE 16K;
CREATE LARGE TABLESPACE VCTS_16k PAGESIZE 16K MANAGED BY AUTOMATIC STORAGE EXTENTSIZE 32
OVERHEAD 12.67 PREFETCHSIZE 32 TRANSFERRATE 0.18 BUFFERPOOL VCBP_16K;
CREATE BUFFERPOOL VCBP_32K IMMEDIATE SIZE 250 AUTOMATIC PAGESIZE 32K;
CREATE LARGE TABLESPACE VCTS_32k PAGESIZE 32K MANAGED BY AUTOMATIC STORAGE EXTENTSIZE 32
OVERHEAD 12.67 PREFETCHSIZE 32 TRANSFERRATE 0.18 BUFFERPOOL VCBP_32K;
CREATE TABLESPACE SYSTOOLSPACE IN IBMCATGROUP MANAGED BY AUTOMATIC STORAGE EXTENTSIZE 4;
CREATE USER TEMPORARY TABLESPACE SYSTOOLSTMPSPACE IN IBMCATGROUP MANAGED BY AUTOMATIC STORAGE
EXTENTSIZE 4;
CREATE SYSTEM TEMPORARY TABLESPACE VCTEMPTS_8K PAGESIZE 8K MANAGED BY AUTOMATIC STORAGE
BUFFERPOOL VCBP_8K;
CREATE SYSTEM TEMPORARY TABLESPACE VCTEMPTS_16K PAGESIZE 16K MANAGED BY AUTOMATIC STORAGE
BUFFERPOOL VCBP_16K;
CREATE SYSTEM TEMPORARY TABLESPACE VCTEMPTS_32K PAGESIZE 32K MANAGED BY AUTOMATIC STORAGE
BUFFERPOOL VCBP_32K;

GRANT USE OF TABLESPACE VCTS_16K TO USER vcx WITH GRANT OPTION;
GRANT USE OF TABLESPACE VCTS_32K TO USER vcx WITH GRANT OPTION;
GRANT USE OF TABLESPACE VCTS_8K TO USER vcx WITH GRANT OPTION;

commit work;
connect reset;
terminate;
```

- 2 Customize the following values in the script.
  - Database name: VCDB. You must use the same value for the ODBC setup.
  - Database path: C:\ for Microsoft Windows, or a UNIX path with sufficient permissions.
  - User name: vcx. You must use the same value for the ODBC setup.

Do not modify the script in any other way. Changing the setup for table spaces or buffer pools might prevent successful installation of vCenter Server.

- 3 Run the script in a DB2 Command window.

```
db2 -svtf vcdbcreate.sql
```

You now have a DB2 database that you can use with vCenter Server.

### What to do next

Configure a connection to a local or remote database.

## Use a Script to Create the DB2 Database Schema (Optional)

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

To have the vCenter Server installer create your schema for you, see [“Configure a Connection to a Local DB2 Database on Microsoft Windows,”](#) on page 79 or [“Configure a Connection to a Remote DB2 Database on Linux, UNIX, or Microsoft Windows,”](#) on page 80, depending on your environment.

### Prerequisites

Create the DB2 database and user. You can create the DB2 database manually or by using scripts.

**Procedure**

- 1 Open a DB2 Command Editor window and log in as the user that you created on the vCenter Server database.
  - a Open DB2 Control Center.
  - b Select the database.
  - c Right-click the database and select **Menu > Query**.
- 2 In the directory of the vCenter Server installation package /<installation directory>/vpx/dbschema, locate the dbschema scripts.
- 3 In the DB2 Command Editor window, open the SQL files one at a time and press Ctrl+Enter to run each SQL file query in the order shown here.

VCDB\_db2.sql

TopN\_DB\_db2.sql

For the following files, change the statement termination character from ; to @.

load\_stats\_proc\_db2.sql  
 purge\_stat1\_proc\_db2.sql  
 purge\_stat2\_proc\_db2.sql  
 purge\_stat3\_proc\_db2.sql  
 purge\_usage\_stats\_proc\_db2.sql  
 stats\_rollup1\_proc\_db2.sql  
 stats\_rollup2\_proc\_db2.sql  
 stats\_rollup3\_proc\_db2.sql  
 cleanup\_events\_db2.sql  
 delete\_stats\_proc\_db2.sql  
 upsert\_last\_event\_proc\_db2.sql  
 load\_usage\_stats\_proc\_db2.sql  
 calc\_topn1\_proc\_db2.sql  
 calc\_topn2\_proc\_db2.sql  
 calc\_topn3\_proc\_db2.sql  
 calc\_topn4\_proc\_db2.sql  
 clear\_topn1\_proc\_db2.sql  
 clear\_topn2\_proc\_db2.sql  
 clear\_topn3\_proc\_db2.sql  
 clear\_topn4\_proc\_db2.sql  
 rule\_topn1\_proc\_db2.sql  
 rule\_topn2\_proc\_db2.sql  
 rule\_topn3\_proc\_db2.sql  
 rule\_topn4\_proc\_db2.sql  
 job\_schedule1\_db2.sql  
 job\_schedule2\_db2.sql  
 job\_schedule3\_db2.sql  
 job\_cleanup\_events\_db2.sql  
 job\_topn\_past\_day\_db2.sql  
 job\_topn\_past\_week\_db2.sql  
 job\_topn\_past\_month\_db2.sql  
 job\_topn\_past\_year\_db2.sql

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

### What to do next

Perform the following tasks:

- 1 On the machine on which you intend to install vCenter Server, create a data source name (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 the vCenter Server to 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 109.)
  - b When prompted, provide the database user login.

## Configure a Connection to a Local DB2 Database on Microsoft Windows

You can configure a DB2 database for vCenter Server locally on the same Microsoft Windows machine as vCenter Server.

### Prerequisites

- Configure a user and group for the database.
- Add the database instance registry variables.
- Add the client instance registry variable.
- Create the database with the required buffer pools, table spaces, and privileges.

### Procedure

- 1 On the Microsoft Windows machine that will host vCenter Server, click **Start > Run** to open the Microsoft ODBC Administrator utility.
- 2 Enter **odbcad32.exe**.
- 3 On the **System DSN** tab, click **Add**.
- 4 Select the driver that corresponds to your database (for example, **IBM DB2 ODBC Driver - VCDB2Add**) and click **Finish**.
- 5 Enter a name for the DSN (for example, **VCDB2**) and select your database from the menu.
- 6 To make sure that the database connection works, select the DSN and click **Configure**.
- 7 Enter the database user name (for example, **vcx**) and password.
 

You do not need to save the user name and password.
- 8 Click **Connect**.

The DB2 database is configured.

### What to do next

You can now install vCenter Server. When the vCenter Server installer prompts you for a DSN, point to the DSN that you created in this procedure.

## Configure a Connection to a Remote DB2 Database on Linux, UNIX, or Microsoft Windows

You can configure a DB2 database for vCenter Server remotely on a network-connected Microsoft Windows, Linux, or UNIX host.

### Prerequisites

- Download the IBM Data Server Driver for ODBC and CLI at <http://www-01.ibm.com/software/data/db2/express/>.
- Install Hotfix 22318 on the DB2 9.5.0 client machine.
- On the remote machine, configure a database user and group.
- On the remote machine, create the database with the required buffer pools, table spaces, and privileges.
- On the remote machine, add the database instance registry variables.
- On the machine where vCenter Server will be installed, add the client instance registry variable.
- On the machine where vCenter Server will be installed, make sure that the IBM Data Server Runtime Client is installed.
- On the machine where vCenter Server will be installed, catalog the server node and the database.
  - a In the command window, run the following command:  
`db2 catalog tcpip node name remote DB Server host name or IP Address server Port number used`
  - b In the command window, run the following command:  
`db2 catalog db database name at node name authentication SERVER`

### Procedure

- 1 On the Microsoft Windows machine that will host vCenter Server, select **Start > Run** and enter **odbcad64.exe** to open the Microsoft ODBC Administrator utility.
- 2 On the **System DSN** tab, click **Add**.
- 3 Select the driver that corresponds to your database (for example, IBM DB2 ODBC Driver - VCDB2\_remote) and click **Finish**.
- 4 In the IBM DB2 Driver Add dialog box, configure the database values.
  - Database name. The default value is vcdb.
  - Database alias. The database alias can be the same as the database name.
  - DSN name. For example, VCDB2.

You have completed the DB2 database configuration.

### What to do next

You can now install vCenter Server. When the vCenter Server installer prompts you for a DSN, point to the DSN that you created in this procedure.



## Configure Microsoft SQL Server Databases

If you use a Microsoft SQL database for your vCenter Server repository, you need to 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 81  
To simplify the process of creating the SQL Server database, users, and privileges, you can run a script. You also can create the database manually.
- 2 [Use a Script to Create the Microsoft SQL Server Database Schema \(Optional\)](#) on page 82  
The vCenter Server installer creates the schema during installation. For experienced database administrators who need more control over schema creation because of environmental constraints, you can optionally use a script to create your database schema.
- 3 [Configure a SQL Server ODBC Connection](#) on page 84  
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 85  
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. You also 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. 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. 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 during installation. For experienced database administrators who need more control over schema creation because of 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 a SQL Server ODBC Connection,”](#) on page 84.

**Prerequisites**

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
load_stats_proc_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
load_usage_stats_proc_mssql.sql
TopN_DB_mssql.sql
calc_topn1_proc_mssql.sql
calc_topn2_proc_mssql.sql
calc_topn3_proc_mssql.sql
calc_topn4_proc_mssql.sql
clear_topn1_proc_mssql.sql
clear_topn2_proc_mssql.sql
clear_topn3_proc_mssql.sql
clear_topn4_proc_mssql.sql
rule_topn1_proc_mssql.sql
rule_topn2_proc_mssql.sql
rule_topn3_proc_mssql.sql
rule_topn4_proc_mssql.sql

```

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

```

job_schedule1_mssql.sql
job_schedule2_mssql.sql
job_schedule3_mssql.sql
job_cleanup_events_mssql.sql
job_topn_past_day_mssql.sql
job_topn_past_week_mssql.sql
job_topn_past_month_mssql.sql
job_topn_past_year_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 109.)
  - 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.

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.

**Prerequisites**

- Review the required database patches specified in [“vCenter Server Database Patch and Configuration Requirements,”](#) on page 69. 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.

**Procedure**

- 1 On your vCenter Server system, select **Settings > Control Panel > Administrative Tools > Data Sources (ODBC)**.
- 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

For SQL Server 2005 and SQL Server 2008 editions, test the data source by selecting **Test Data Source** and clicking **OK** from the **ODBC Microsoft SQL Server Setup** menu. Ensure that the SQL Agent is running on your database server.

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

#### Procedure

- 1 Select **Start > All Programs > Microsoft SQL Server > Configuration Tool > 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 need to configure your database to work with vCenter Server.

#### Procedure

- 1 [Use a Script to Create a Local or Remote Oracle Database](#) on page 86  
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. You also can create the database manually.

- 2 [Configure an Oracle Database User](#) on page 86  
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 87  
The vCenter Server installer creates the schema during installation. For experienced database administrators who need more control over schema creation because of environmental constraints, you can optionally use a script to create your database schema.
- 4 [Configure an Oracle Connection for Local Access](#) on page 89  
Configure a connection for local access if you install vCenter Server on the same system as the Oracle database.
- 5 [Configure an Oracle Connection for Remote Access](#) on page 89  
A vCenter Server system can access the database remotely.
- 6 [Connect to an Oracle Database Locally](#) on page 90  
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. You also can create the database manually.

When using 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.

### 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 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 create materialized view to VPXADMIN;
grant execute on dbms_lock to VPXADMIN;
grant execute on dbms_job 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 during installation. For experienced database administrators who need more control over schema creation because of 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 89 or [“Configure an Oracle Connection for Remote Access,”](#) on page 89, depending on your environment.

**Prerequisites**

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>/load_stats_proc_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
@<path>/load_usage_stats_proc_oracle.sql
@<path>/TopN_DB_oracle.sql
@<path>/calc_topn1_proc_oracle.sql
@<path>/calc_topn2_proc_oracle.sql
@<path>/calc_topn3_proc_oracle.sql
@<path>/calc_topn4_proc_oracle.sql
@<path>/clear_topn1_proc_oracle.sql
@<path>/clear_topn2_proc_oracle.sql
@<path>/clear_topn3_proc_oracle.sql
@<path>/clear_topn4_proc_oracle.sql
@<path>/rule_topn1_proc_oracle.sql
@<path>/rule_topn2_proc_oracle.sql
@<path>/rule_topn3_proc_oracle.sql
@<path>/rule_topn4_proc_oracle.sql
```

- 4 For all supported editions of Oracle Server, run these 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
@<path>/job_topn_past_day_oracle.sql
@<path>/job_topn_past_week_oracle.sql
@<path>/job_topn_past_month_oracle.sql
@<path>/job_topn_past_year_oracle.sql
```

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

### 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 109.)

- b When prompted, provide the database user login.



## Configure an Oracle Connection for Local Access

Configure a connection for local access if you install vCenter Server on the same system as the Oracle database.

### Prerequisites

Review the required database patches specified in [“vCenter Server Database Patch and Configuration Requirements,”](#) on page 69. 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.
- 2 Install Oracle 10g or Oracle 11g, and create a database.
- 3 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.

The database is configured for local access.

## Configure an Oracle Connection for Remote Access

A vCenter Server system can access the database remotely.

### Prerequisites

Review the required database patches specified in [“vCenter Server Database Patch and Configuration Requirements,”](#) on page 69. 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 statement.

```
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 create sequence to <user>
grant create table to <user>
grant create materialized view to <user>
grant execute on dbms_lock to <user>
grant execute on dbms_job 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 statement.

```
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 create sequence to <user>
grant create table to <user>
grant create materialized view to <user>
grant execute on dbms_lock to <user>
grant execute on dbms_job 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

# 10

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 93
- [“Using a User Account for Running vCenter Server with SQL Server,”](#) on page 94
- [“About Installing vCenter Server on IPv6 Machines,”](#) on page 95
- [“Configure the URLs on a Standalone vCenter Server System,”](#) on page 95
- [“Running the vCenter Server and vSphere Client Installers from a Network Drive,”](#) on page 95
- [“vCenter Server Components,”](#) on page 96
- [“Required Data for Installing vCenter Server,”](#) on page 96

## 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 15 and the required ports must be open, as discussed in [“Required Ports,”](#) on page 18.
- Your database must meet the database requirements. See [“vCenter Server Database Patch and Configuration Requirements,”](#) on page 69 and [Chapter 9, “vCenter Server Databases,”](#) on page 69.
- 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*.

---

- No Network Address Translation (NAT) must exist 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 must 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 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 NETWORK SERVICE account is required on the folder in which vCenter Server is installed and on the HKLM registry.
- 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 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 13, “Creating vCenter Server Linked Mode Groups,”](#) on page 107.
- 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 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 problem, 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 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**.
- 3 Click **Advanced Settings**.
- 4 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`.
- 5 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`.
- 6 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, 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 ESXi 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 set of tools to manage your virtual IT environment. The vCenter Server performs a silent installation of vCenter Orchestrator. vCenter Orchestrator module is not supported on IPv6-only operating systems. If you install vCenter Server in a mixed environment (both IPv4 and IPv6 enabled), the vCenter Orchestrator module can 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 choose to use 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 ESXi host or indirectly to an ESXi host through a vCenter Server.
<b>vCenter Converter for vCenter Server</b>	vCenter Server module that enables you to convert your physical machines to virtual machines.
<b>vCenter Guided Consolidation</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 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 10-1](#) lists the information that you are prompted for during the installation. Keep a record of the values entered, in case you must reinstall vCenter Server. VMware Knowledge Base article 1010023 contains a linked worksheet that complements [Table 10-1](#).

**Table 10-1.** Data Required for vCenter Server Installation

Data	Default	Comments
Setup Language	English	Chinese (Simplified) English (United States) French (France) German (Germany) Japanese (Japan)
User name and organization	Your organization's name	Follow your organization's policy.



**Table 10-1.** Data Required for vCenter Server Installation (Continued)

<b>Data</b>	<b>Default</b>	<b>Comments</b>
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	C:\Program Files\VMware	Varies depending on your operating system.
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 18.
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 94.
HTTPS Web services	443	See <a href="#">"Required Ports,"</a> on page 18.
HTTP Web services	80	
Web Service change service notification port	60099	
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

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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 99
- [“Install vCenter Server in a Virtual Machine,”](#) on page 99
- [“Install vCenter Server,”](#) on page 100

## 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 vCenter Server from the VMware product page at <http://www.vmware.com/products/>.  
The installer filename is `VMware-VIMSetup-xx-4.1.0-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 93.

**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 93.

**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.
- 4 When the Welcome screen appears, click **Next**.
- 5 Review the End-User Patent Agreement and click **Next**.
- 6 Read the license agreement. If you agree to the terms, select **I agree to the terms in the license agreement** and click **Next**.
- 7 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.

- 8 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)** and enter the password of the Windows user that will be the vCenter Server administrator.  
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 *vSphere Upgrade Guide*.

- 9 Set the login information for vCenter Server.
- If you are using a non-bundled database, enter the administrator name and password that you use when you log in to the system on which you are installing vCenter Server and click **Next**.
  - If you are using the bundled SQL Server database, select **Use SYSTEM Account** and click **Next**.

You need the user name and password entered here to log in to vCenter Server after you have installed it.

- 10 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.

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- 11 (Optional) Choose the VPX agent upgrade option you want to use.

A VPX agent upgrade is required if vCenter Server will manage hosts that have been managed by older versions of vCenter Server. If this installation of vCenter Server will use a database upgraded from an older installation of vCenter Server that managed hosts, then the VPX agents will need to be upgraded.

- Select **Automatic** if you want vCenter Server to automatically upgrade the VPX agents for the hosts.
- Select **Manual** if you want to manually upgrade the VPX agents for hosts.

- 12 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 13, “Creating vCenter Server Linked Mode Groups,”](#) on page 107.

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

- 13 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.

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

See [“Required Ports,”](#) on page 18.

- 15 Select the amount of memory to allocate to the vCenter JVM in Tomcat, according to the number of hosts in your environment.

You can adjust this setting after installation if the number of hosts in your environment changes.

- 16 Click **Install**.

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

- 17 Click **Finish**.

### What to do next

See [Chapter 12, “Post-Installation Considerations for vCenter Server,”](#) on page 103.



# Post-Installation Considerations for vCenter Server

# 12

After you install vCenter Server, consider the postinstallation options that you might want address before adding inventory for the vCenter Server to manage.

- 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 the vSphere 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 104
- [“Uninstall VMware vSphere Components,”](#) on page 105

## Install the vSphere Client

The vSphere Client enables you to connect to an 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 system.
- The system must have an Internet connection.

### 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-build number.exe` file.
- 2 Choose a language for the installer and click **OK**.

This selection controls the language only for the installer.
- 3 In the Welcome screen, click **Next**.
- 4 Review the End-User Patent Agreement and click **Next**.
- 5 If you agree to the terms of the license agreement, select **I agree to the terms in the license agreement** and click **Next**.
- 6 Type your user name and organization name and click **Next**.
- 7 Select the installation location.
  - Accept the default installation location and click **Next**.
  - 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 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.

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**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.

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**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.

- 3 Click **Login**.

If you cannot connect to the vCenter Server system, start the VMware VirtualCenter Management Webservices 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.

- 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).

## 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 VMware vCenter Server.



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

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



# Creating vCenter Server Linked Mode Groups

# 13

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 is running. The remote machine can be any vCenter Server 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

---

**NOTE** vCenter Server 4.0, vCenter Server 4.0 Update 1, and vCenter Server 4.1 can be joined in the same Linked Mode group, but both vSphere Client 4.0 and vSphere 4.1 are required to log in to the Linked Mode group.

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This chapter includes the following topics:

- [“Linked Mode Prerequisites,”](#) on page 107
- [“Linked Mode Considerations,”](#) on page 108
- [“Configure the URLs on a Linked Mode vCenter Server System,”](#) on page 108
- [“Joining to a Linked Mode Group During and After Installation,”](#) on page 109
- [“Join a Linked Mode Group After Installation,”](#) on page 109
- [“Isolate a vCenter Server Instance from a Linked Mode Group,”](#) on page 110
- [“Linked Mode Troubleshooting,”](#) on page 111

## 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 93.

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 25 to vCenter Server 4.1. You can join after the upgrade to vCenter Server is complete. See the *vSphere 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 vCenter Server machine/sdk`.
- For the `Virtualcenter.VimWebServicesUrl` key, the default value is `https://FQDN of vCenter Server 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 110.
- 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 address: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 109.

## 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 4.1. 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 or higher, you can join the machine to a Linked Mode group.

### Prerequisites

See [“Linked Mode Prerequisites,”](#) on page 107 and [“Linked Mode Considerations,”](#) on page 108.

### 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>	<p>Click <b>Next</b>.</p> <p>The role on the joining system is renamed to <i>vcenter_name role_name</i>, where <i>vcenter_name</i> is the name of the vCenter Server system that is joining the Linked Mode group, and <i>role_name</i> is the name of the original role.</p>
<b>No, I'll resolve the conflicts myself</b>	<p>To resolve the conflicts manually:</p> <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> <p>The installation continues without conflicts.</p>

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 the *VMware vSphere Datacenter Administration Guide*.

## 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**.

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

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).
- If the domain controller is unreachable, vCenter Server might be unable to start. You might be unable to make changes to the Linked Mode configuration of the affected vCenter Server system.

If this occurs, resolve the problem with the domain controller and restart vCenter Server. If resolving the problem with the domain controller is not possible, you can restart vCenter Server by removing the vCenter Server system from the domain and isolating the system from its current Linked Mode group.

- 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 108.

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.

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

vCenter Server 4.1 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 [“Configure Firewall Access by Opening Selected Ports,”](#) on page 112.

### 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**.

## Configure Firewall Access by Opening Selected Ports

vCenter Server 4.1 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

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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 115
- [“Install VMware vCenter Update Manager,”](#) on page 116
- [“Install VMware vCenter Converter,”](#) on page 117

### 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

Download the software installer and install vCenter Server 4.1 on the local machine or on a machine that is reachable by the local machine.

vCenter Guided Consolidation must be installed on a 64-bit machine.

#### Procedure

- 1 In the software installer directory, double-click the `autorun.exe` file at `C:\<vc-installer location>\`.
- 2 Click **vCenter Guided Consolidation**.
- 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 4.1 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, except that DB2 is not supported. 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 Review the End-User Patent Agreement and click **Next**.
- 6 Read the license agreement. If you agree to the terms, select **I agree to the terms in the license agreement** and click **Next**.

- 7 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.
- 8 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**.
- 9 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.
- 10 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.
- 11 Enter the port numbers that you want to use or accept the default port numbers.
- 12 (Optional) Select **Yes, I have an Internet connection, and I want to configure proxy settings now**.
- 13 Click **Next**.
- 14 Enter the proxy server name and port number.  
If the local machine has proxy settings configured, the installer uses these settings by default.
- 15 (Optional) Select **Authenticate proxy using the credentials below**, and enter the user name and password to use for authentication.
- 16 Accept the default installation location or click **Change** to select a different location.
- 17 Accept the default location for patch downloads or click **Change** to select a different location, and click **Next**.
- 18 Click **Install** to begin the installation.
- 19 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 4.1 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 of the vCenter Server instance.
  - b Enter the port number that vCenter Server is configured to use. By default, vCenter Server uses port number 80.
  - 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*.

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