

Quick Start Guide

ESX Server 3.5 and VirtualCenter 2.5

Quick Start Guide

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About This Book

This manual, the *Quick Start Guide*, provides an introduction to VMware Infrastructure for new users. It guides you through the steps required to install VMware VirtualCenter and ESX Server, to perform basic configuration, and to create a working virtual machine. It provides a brief introduction to basic administration tasks and to advanced features such as VMware DRS, VMware HA, and VMotion. For more detailed information, the guide provides pointers to other manuals.

The *Quick Start Guide* covers ESX Server 3i version 3.5. To read about ESX Server 3i version 3.5, see http://www.vmware.com/support/pubs/vi_pubs.html.

For ease of discussion, this book uses the following product naming conventions:

- For topics specific to ESX Server 3.5, this book uses the term “ESX Server 3.”
- For topics specific to ESX Server 3i version 3.5, this book uses the term “ESX Server 3i.”
- For topics common to both products, this book uses the term “ESX Server.”
- When the identification of a specific release is important to a discussion, this book refers to the product by its full, versioned name.
- When a discussion applies to all versions of ESX Server for VMware Infrastructure 3, this book uses the term “ESX Server 3.x.”

Intended Audience

This manual is intended for new users of VMware VirtualCenter and ESX Server. The information is targeted at experienced Windows or Linux system administrators who are familiar with datacenter operations.

Document Feedback

VMware welcomes your suggestions for improving our documentation. If you have comments, send your feedback to:

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VMware Infrastructure Documentation

The VMware Infrastructure documentation consists of the combined VMware VirtualCenter and ESX Server documentation set.

Abbreviations Used in Figures

The figures in this manual use the abbreviations listed in [Table 1](#).

Table 1. Abbreviations

Abbreviation	Description
database	VirtualCenter database
datastore	Storage for the managed host
dsk#	Storage disk for the managed host
host <i>n</i>	VirtualCenter managed hosts
SAN	Storage area network type datastore shared between managed hosts
tplt	Template
user#	User with access permissions
VC	VirtualCenter
VM#	Virtual machines on a managed host

Technical Support and Education Resources

The following sections describe the technical support resources available to you. You can access the most current versions of this manual and other books by going to:

<http://www.vmware.com/support/pubs>

Online and Telephone Support

Use online support to submit technical support requests, view your product and contract information, and register your products. Go to <http://www.vmware.com/support>.

Customers with appropriate support contracts should use telephone support for the fastest response on priority 1 issues. Go to http://www.vmware.com/support/phone_support.html.

Support Offerings

Find out how VMware support offerings can help meet your business needs. Go to <http://www.vmware.com/support/services>.

VMware Education Services

VMware courses offer extensive hands-on labs, case study examples, and course materials designed to be used as on-the-job reference tools. For more information about VMware Education Services, go to <http://mylearn1.vmware.com/mgreg/index.cfm>.

Introduction to VMware Infrastructure

1

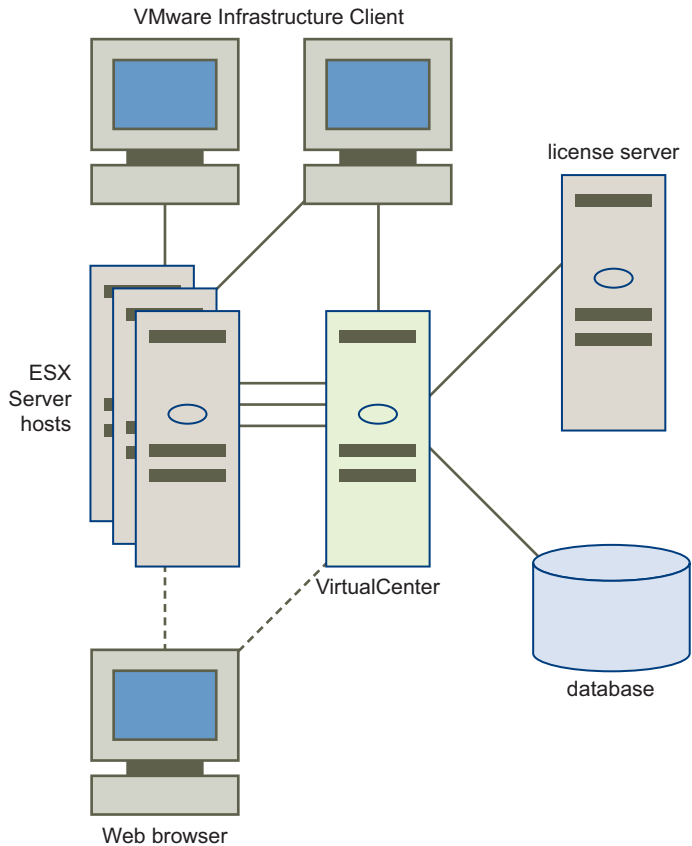
This chapter introduces the VMware® Infrastructure components you install and provides an overview of the prerequisites for successful installation. It contains the following sections:

- [“VMware Infrastructure at a Glance”](#) on page 10
- [“System Requirements”](#) on page 12
- [“Installation Prerequisites”](#) on page 15

VMware Infrastructure at a Glance

Figure 1-1 illustrates the basic components of VMware Infrastructure.

Figure 1-1. VMware VirtualCenter Server Managing Several ESX Server Hosts



One VirtualCenter Server manages multiple VMware ESX Server hosts.

The major components are:

- **ESX Server Host** – ESX Server provides a virtualization layer that abstracts the processor, memory, storage, and networking resources of the physical host into multiple virtual machines. You use ESX Server to run and configure your virtual machines, install operating systems, and run applications.

See [“Installing ESX Server 3”](#) on page 31.

- **VirtualCenter Server** – This server installs on a Windows machine to centrally manage your VMware ESX Server hosts. The VirtualCenter Server allows the use of advanced VMware Infrastructure features such as VMware Distributed Resource Scheduler (DRS), VMware High Availability (HA), and VMotion.

A VMware Software Development Kit (SDK) Web service is automatically installed with VirtualCenter. See [“Installing VMware Infrastructure”](#) on page 21.

- **VirtualCenter Plug-ins** – Optional applications that provide additional capabilities and features to VirtualCenter. Generally, plug-ins are released separately, install on top of VirtualCenter, and can be upgraded independently. You can install server components of plug-ins on the same computer where VirtualCenter resides, or on a separate computer. After the server component of a plug-in is installed, you can activate the plug-in’s client component, which enhances the VI Client with appropriate UI options.

Documentation provided with each plug-in offers information about how server components of plug-ins are installed.

For information about how to install the client component, verify which plug-ins are installed, and how to disable or uninstall plug-ins that you are not using, see *Basic System Administration*.

The following plug-ins are available:

- **VMware Converter** – Enables you to convert physical or virtual machines into ESX Server virtual machines. After converting the virtual machines, you can add them to your VirtualCenter inventory.
- **VMware Update Manager** – Provides security monitoring and patching support for ESX Server hosts and virtual machines.

In addition to an independent server component installation, this release supports the combined installation for VirtualCenter and VMware Update Manager and VMware Converter. For more information about installing these components along with the VirtualCenter Server, see [“Installing VMware Infrastructure”](#) on page 21.

- **VI Client** – The VI Client installs on a Windows machine and is the primary user interface to VMware Infrastructure. The VI Client has two functions:
 - A console to operate virtual machines.
 - An administration interface into VirtualCenter hosts and ESX Server hosts.

The VI Client is downloadable from VirtualCenter and ESX Server hosts. See [“Installing VMware Infrastructure”](#) on page 21.

- **Web Access** – A browser allows you to download the VI Client from the VirtualCenter Server or ESX Server hosts. When you have appropriate login credentials, a Web Access also lets you perform limited management of your VirtualCenter Server and ESX Server hosts by using the VI Web Access user interface.
- **License Server** – This server installs on a Windows system to authorize VirtualCenter hosts and ESX Server hosts appropriately for your licensing agreement. Administrators make changes to software licenses by using the VI Client.
- **Database** – The VirtualCenter Server uses a database to organize all the configuration data for the VMware Infrastructure environment. For small deployments, the bundled Microsoft SQL Server 2005 Express database allows you to set up a limited numbers of hosts and virtual machines (5 hosts and 5 virtual machines) ([SEE UPDATE](#)). VirtualCenter supports several other database products for larger deployments. See [“Preparing the VirtualCenter Server Database”](#) on page 21.

System Requirements

This section briefly describes the hardware and software requirements for installing VMware VirtualCenter and ESX Server. For a more detailed description of hardware requirements, see Chapter 2, “System Requirements,” in the *Installation Guide*.

VirtualCenter Server Requirements

VirtualCenter requires a computer with the following specifications:

- Windows 2000 Server SP4 with Update Rollup 1, Windows XP Pro SP2, Windows 2003 Server SP1 (all releases except 64-bit), Windows 2003 Server R2 installed

For any operating system except Windows Server 2003 SP1, make sure to install Microsoft Windows Installer 3.1. Otherwise your VirtualCenter installation can fail. See <http://support.microsoft.com/?id=893803>.

- 2.0GHz or faster Intel or AMD x86 processor
- 2GB or more of RAM
- A minimum of 560MB disk storage (2GB recommended)
- 10/100 Ethernet adapter (Gigabit recommended)

If you plan to install your VirtualCenter database on the same computer as VirtualCenter, additional storage and processor capacity might be required.

License Server Requirements

VMware recommends installing the license server software on the same computer as the VirtualCenter Server. The license server requires a computer with the following minimum specifications:

- Windows 2000 Server SP4 with Update Rollup 1, Windows XP Pro SP2, Windows 2003 Server SP1 (all releases except 64-bit), Windows 2003 Server R2 installed
- 266MHz or faster Intel or AMD x86 processor
- 256MB RAM minimum, 512MB recommended
- 25MB free disk space required for basic installation
- 10/100 Ethernet adapter (Gigabit recommended)

VirtualCenter Database Requirements

VirtualCenter supports the database formats listed in [Table 1-1](#).

Table 1-1. Supported Database Formats ([SEE UPDATE](#))

Database Type	Service Pack, Patch, and Driver Requirements
Microsoft SQL Server 2000 Standard	SP4
Microsoft SQL Server 2000 Enterprise	For Windows 2000 and Windows XP, apply MDAC 2.8 SP1 to the client. Use SQL Server driver for the client.
Microsoft SQL Server 2005 Enterprise	SP1 or SP2 For Windows 2000 and Windows XP, apply MDAC 2.8 SP1 to the client. Use SQL native client driver for the client.
Microsoft SQL Server 2005 Express SP2	For Windows 2000 and Windows XP, apply MDAC 2.8 SP1 to the client. Use SQL native client driver for the client.
Oracle 9i release 2 Standard Oracle 9i release 2 Enterprise	Apply patch 9.2.0.8.0 to the server and client.
Oracle 10g Standard Release 1 (10.1.0.3.0) Oracle 10g Enterprise Release 1 (10.1.0.3.0)	None
Oracle 10g Standard Release 2 (10.2.0.1.0) Oracle 10g Enterprise Release 2 (10.2.0.1.0)	First apply patch 10.2.0.3.0 to the client and server. Then apply patch 5699495 to the client.

Each database requires some configuration adjustments in addition to the basic installation. See [“Preparing the VirtualCenter Server Database”](#) on page 21.

VI Client Requirements

The VI Client requires a computer with the following specifications:

- A 32-bit version of one of the following operating systems:
 - Windows 2000 Server SP4 with Update Rollup 1
 - Windows XP Pro SP2, Windows 2003 SP1 (all releases except 64-bit)
 - Windows 2003 Server R2
 - Windows Vista Business
 - Windows Vista Enterprise
- .NET framework 2.0 installed (included with the VI Client installer).

- 266MHz or faster Intel or AMD x86 processor.
- 256MB RAM minimum, 512MB recommended.
- 150MB free disk space required for basic installation. Additional storage is required if virtual machine templates are to be saved locally.
- 10/100 Ethernet adapter (Gigabit recommended).

ESX Server 3 Requirements

ESX Server requires a computer with the following specifications:

- At least two processors of one of the following types:
 - 1500MHz Intel Xeon and later, or AMD Opteron (32-bit mode)
 - 1500MHz Intel Viiv or AMD A64 x2 dual-core processors
- 1GB RAM minimum
- One or more Ethernet controllers
- Direct attached or networked storage devices with unpartitioned space

Installation Prerequisites

This section describes additional prerequisites for VMware Infrastructure installation.

VirtualCenter Prerequisites

Make sure that you have the following before installing VirtualCenter:

- Login credentials for an account with administrator privileges on the computer that you intend to install VirtualCenter on.
- The IP address and host name of the computer that you intend to install VirtualCenter on.
- If you do not intend to use the Microsoft SQL Server 2005 Express database, obtain database login credentials and other information from your database administrator. See [“Preparing the VirtualCenter Server Database”](#) on page 21.
- The TCP/IP ports that the VirtualCenter Web service communicates on. The defaults are 80 and 443. Port 443 is the secure (SSL) port. Port 80 is the insecure counterpart. Use the default ports unless these conflict with other applications running in your environment.

- If you don't intend to use VirtualCenter in evaluation mode, you need the following items.
 - A license file containing your purchased VirtualCenter licenses. See ["Redeeming Licenses"](#) on page 21.
 - The IP address or host name and TCP/IP port information for the license server, if you do not intend to install a license server on the same machine as your VirtualCenter Server installation.

ESX Server 3 Prerequisites

Make sure that you have the following before installing ESX Server:

- An IP address and host name for the computer that you intend to install ESX Server on.
- A root password for the ESX Server host, to be provided during installation.
- The VLAN ID for your network, if needed.

Installing VMware Infrastructure Components

2

This chapter provides an overview of how to install VMware Infrastructure components, and contains the following sections:

- [“Running VirtualCenter and ESX Server in Evaluation Mode”](#) on page 17
- [“Licensing VirtualCenter and ESX Server”](#) on page 18
- [“Installing VMware Infrastructure”](#) on page 21
- [“Installing ESX Server 3”](#) on page 31
- [“Installing a License Server”](#) on page 38

Running VirtualCenter and ESX Server in Evaluation Mode

Before purchasing and activating licenses for your ESX Server 3.5 and VirtualCenter 2.5, you can install and run evaluation modes of the software. When run in evaluation mode, intended for demonstration and evaluation purposes, your ESX Server and VirtualCenter are completely operational immediately after installation, do not require any licensing configuration, and provide full functionality of ESX Server and VirtualCenter for 60 days from the time you first activate them.

When run in evaluation mode, VirtualCenter can support a maximum allowed number of clients and ESX Server hosts.

During the 60-day trial, the software notifies you of the time remaining until the evaluation mode expires.

After the 60-day trial period expires, unless you obtain licenses for your software, you cannot perform most operations in ESX Server. For example, you cannot power on virtual machines or use advanced ESX Server features.

If you do not license VirtualCenter before the evaluation period expires, all of the hosts in the VirtualCenter inventory are disconnected.

To continue using the VirtualCenter and ESX Server functionality without interruptions or to restore the features that become unavailable after the 60-day trial, you need to obtain and install license files that activate the features appropriate for the edition of the software you purchased.

For more details on using the ESX Server and VirtualCenter in the evaluation mode, see the *Installation Guide*.

Licensing VirtualCenter and ESX Server

Skip this section if you're planning to install and use evaluating modes of VirtualCenter and ESX Server first. You can read this section later when your 60-day trial period expires and you're ready to configure licensing.

The information in this section helps you decide which licensing model to use, a single-host or a centralized model. After you decide, obtain your license files from the VMware license activation portal before installing your software.

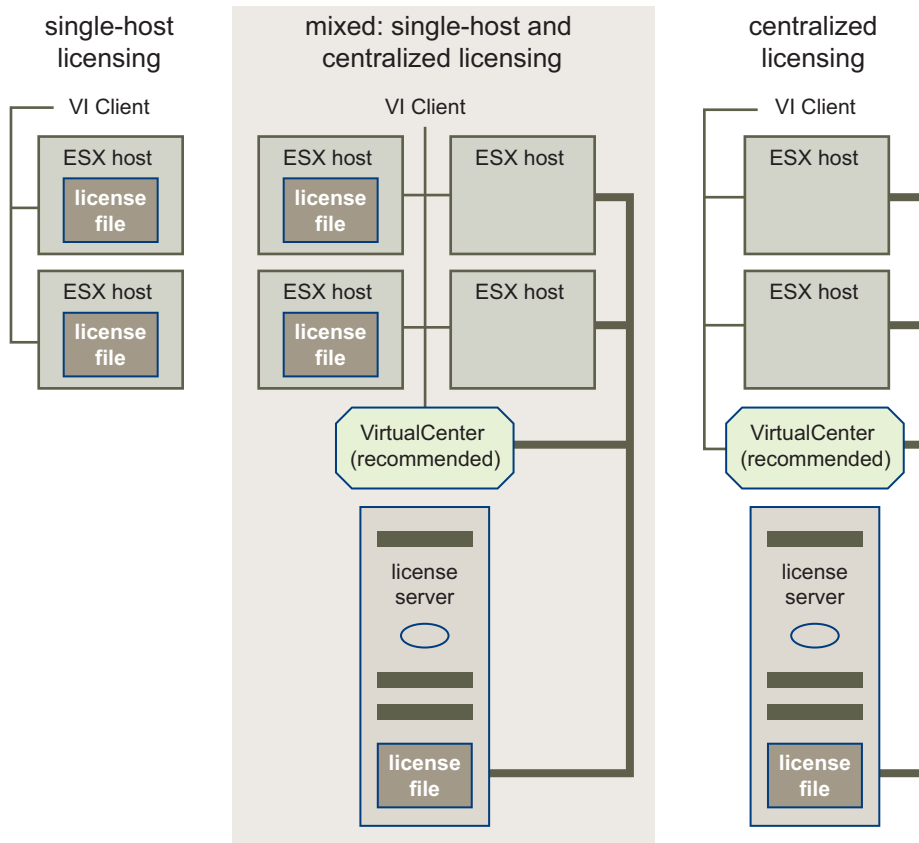
Single-Host and Centralized Licensing

License files have two types: centralized and single-host. In single-host licensing, the license files are stored on individual ESX Server hosts. In centralized licensing, a license file is stored centrally on a license server, which makes these licenses available to one or more hosts. You can run a mixed environment that employs both single-host and centralized licensing.

VirtualCenter and features that require VirtualCenter, such as VMotion, must use centralized licensing. ESX Server features can use either centralized or single-host licensing.

Figure 2-1 illustrates the three types of license environments.

Figure 2-1. License File Locations in Single-Host, Mixed, and Centralized Environments



Centralized Licensing

Centralized licensing simplifies license management in large, dynamic environments. The VMware license server administers the licenses. With centralized licensing, you maintain all your VirtualCenter hosts and all ESX Server hosts from one console.

Centralized licensing is based on FlexNet mechanisms. With centralized licensing, a license server manages a license pool, which is a central repository holding your entire licensed entitlement. When a host requires a particular licensed functionality, the license key for that entitlement is temporarily checked out from the license pool. Unused license keys are released to the pool, becoming available again to any host.

Centralized licensing has the following advantages:

- You administer all licensing from a single location.
- New licenses are allocated and reallocated with any combination of ESX Server form factors. For example, you can use the same 32-processor license for sixteen 2-processor hosts, eight 4-processor hosts, four 8-processor hosts, two 16-processor hosts, or any combination totaling 32 processors.
- Ongoing license management is simplified by allowing licenses to be assigned and reassigned on an as-needed basis. Assignment changes as the needs of an environment change, such as when hosts are added or removed or premium features like VMotion, DRS, or HA are transferred among hosts.
- During periods of license server unavailability, VirtualCenter hosts and ESX Server hosts using centralized licenses are unaffected for a 14-day grace period, relying on cached licensing configurations, even across reboots. However, license configurations cannot be modified while the license server is unavailable. For details about how license server unavailability affects licensed functions, see the *Installation Guide*.

VMware recommends that you use centralized licensing for most environments.

Single-Host Licensing

Single-host licensing is similar to licensing for earlier versions of ESX Server. With single-host licensing, your total entitlement for purchased features is divided on a per-machine basis, split among separate license files residing on ESX Server hosts and the VirtualCenter Server.

With single-host licensing, when someone activates a licensed feature, a key for that entitlement must reside in the license file on that host. With single-host licensing, you maintain separate license files on each ESX Server host. Distribution of unused licenses is not automatic, and you are not dependent on an external connection for licensing. Single-host license files are placed directly on individual ESX Server 3.5 hosts and replace the serial numbers that previous versions of ESX Server version 2.x used.

Single-host files require no license server to be installed for ESX Server host-only environments.

In a VirtualCenter and license server environment with single-host licensing, you can modify ESX Server host licenses during periods of license server unavailability. For example, with single-host licensing you can manually move VMware Consolidated Backup license keys between hosts without a license server connection.

Redeeming Licenses

When you purchase VMware Infrastructure, you receive an email from VMware containing instructions about how to redeem your licenses and obtain license files. Follow the instructions contained in the email to access the Web-based license activation portal and obtain license files.

For additional information about the license activation process, see the license activation portal online Help.

Installing VMware Infrastructure

Installation of VMware Infrastructure includes the following steps:

- Configuring a database for use with VirtualCenter.
- Installing VirtualCenter.
- Installing the VI Client on any computers that you use to manage your VirtualCenter Server installation.

Preparing the VirtualCenter Server Database

The VirtualCenter Server requires a database to store and organize server data. VirtualCenter Server supports Oracle, SQL Server, and SQL Server 2005 Express.

The VirtualCenter Server requires administration credentials (ID and password) to log in to an Oracle or SQL database. Contact your DBA for these credentials, or install the Microsoft SQL Server 2005 Express bundled database.

Microsoft SQL Server 2005 Express is recommended only for small deployments of up to 5 hosts and 5 virtual machines. ([SEE UPDATE](#))

To support the VirtualCenter Database, you must create a database instance and configure it to ensure that all VirtualCenter database tables are placed in the database instance. The following sections describe these procedures for each database type.

Configuring an Oracle 9i or 10g Connection to Work Locally

To use an Oracle database as your VirtualCenter database and have VirtualCenter access the database locally, use the following procedure.

Before you begin this procedure, review the required database patches specified in [Table 1-1, "Supported Database Formats,"](#) on page 14. If you do not prepare your database correctly, the VirtualCenter installer might display error and warning messages.

To prepare an Oracle database to work locally with VirtualCenter

- 1 From the Oracle database machine, install and prepare an Oracle database:
 - a Install Oracle 8i, Oracle 9i, or Oracle 10g, and create a database (VirtualCenter).

Download Oracle ODBC from the Oracle Web site.

Install the Oracle ODBC corresponding driver through the Oracle Universal Installer (directions are provided with the driver).
 - b Increase the number of open cursors for the database by adding the entry `open_cursors = 300` to the `C:\Oracle\ADMIN\VPX\pfile\init.ora` file.
- 2 Connect Oracle locally:
 - a Create a new tablespace specifically for VirtualCenter by using the following SQL statement:


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


```
CREATE USER vpxAdmin IDENTIFIED BY vpxadmin DEFAULT TABLESPACE vpx;
```
 - c 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 any sequence to <user> # For VirtualCenter upgrade only
grant create any table to <user> # For VirtualCenter upgrade only
grant execute on dbms_job to <user>
grant execute on dbms_lock to <user>
grant unlimited tablespace to <user> # To ensure space limitation is
      not an issue
```

- d Create an ODBC connection to the database. The following are example settings:

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

Configuring an Oracle 9i or 10g Connection to Work Remotely

To use an Oracle database as your VirtualCenter database and have VirtualCenter access the database remotely, first set up the database as described in [“Configuring an Oracle 9i or 10g Connection to Work Locally”](#) on page 22. Then use the following procedure.

Before you begin this procedure, review the required database patches specified in [Table 1-1, “Supported Database Formats,”](#) on page 14. If you do not prepare your database correctly, the VirtualCenter installer might display error and warning messages.

To prepare an Oracle database to work remotely with VirtualCenter

- 1 Install the Oracle client on the VirtualCenter Server machine.
- 2 Connect to Oracle remotely:
 - a Download and install the ODBC driver.
 - b Edit the `tnsnames.ora` file located at `Ora9I` or `10g`, as appropriate.

```
C:\Oracle\Ora9i\NETWORK\ADMIN
```

In this example, `xx` is `9I` or `10g`.

- c Use the Net8 Configuration Assistant to add the following entry:

```
VPX =
(DESCRIPTION =
(ADDRESS_LIST =
(ADDRESS=(PROTOCOL=TCP) (HOST=vpxd-Oracle) (PORT=1521))
)
(CONNECT_DATA =
(SERVICE_NAME = VPX)
)
)
HOST =
```

In this example, `HOST` is the managed host the client needs to connect to.

Configuring a SQL Server ODBC Connection

When you install VirtualCenter, you can establish a connection with a SQL Server database. The following procedure describes how to configure a SQL Server ODBC connection. If you use the SQL Server authentication method, supply the same user name, password, and ODBC system data store name (DSN) in the wizard that you used to configure the ODBC.

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

Before you begin this procedure, review the required database patches specified in [Table 1-1, “Supported Database Formats,”](#) on page 14. If you do not prepare your database correctly, the VirtualCenter installer might display error and warning messages.

Microsoft Windows NT authentication is not supported with SQL Server.

For specific instructions regarding configuring the SQL Server ODBC connection, see your Microsoft SQL ODBC documentation.

To prepare a SQL Server database to work with VirtualCenter

- 1 On your Microsoft SQL Server, perform the following tasks:
 - a Create a SQL Server database by using Enterprise Manager on the SQL Server.
 - b Create a SQL Server database user with database operator (DBO) rights.

You defined the default database for the DBO user in [Step a](#).

Make sure the database user has either a sysadmin server role or the db_owner fixed database role on the VirtualCenter database and the MSDB database. ([SEE UPDATE](#))

The **db_owner** role on the MSDB database is required for installation and upgrade only. This role can be revoked after the installation or upgrade process is completed.

- 2 On your VirtualCenter Server system, choose **Settings > Control Panel > Administrative Tools > Data Sources (ODBC)**.
- 3 Click the **System DSN** tab.
- 4 To modify an existing SQL Server ODBC connection:
 - a Select the SQL Server ODBC DSN to modify.
 - b Select the appropriate ODBC connection from the **System Data Source** list and click **Configure**.
 - c Proceed with [Step 6](#).

- 5 To create a SQL Server ODBC connection:
 - a Select **Create New Data Source** and click **Add**.
 - b For SQL Server 2000, select **SQL Server** and click **Finish**.
For SQL Server 2005, select **SQL Native Client** and click **Finish**.
- 6 Type an ODBC DSN name in the **Name** field.
For example, type **VMware VirtualCenter**.
- 7 (Optional) Type an ODBC DSN description in the **Description** field.
- 8 Choose the DSN server name from the **Server** drop-down menu.
Type the SQL Server machine name in the text field if you cannot find it in the drop-down menu.
- 9 Configure the SQL Server authentication page and click **Next**.
- 10 Select one of the authentication methods:
 - If you are using local SQL Server, select **Windows NT authentication**.
 - If you are using remote SQL Server, select **SQL Server authentication**. You can also choose **Windows NT authentication**.

The authentication option you choose for a remote SQL Server must match the local SQL Server.

To identify the authentication type

- 1 Open SQL Server Enterprise Manager.
- 2 Click the **Properties** tab to view Properties.
- 3 Check the connection type.
The connection type indicates either Windows NT or SQL Server authentication.
- 4 Type your SQL Server login name and password.
Ask your database administrator for this information.
- 5 Configure the default database and click **Next**.
- 6 Select a database from the **Change the default database to** menu and click **Next**.
- 7 Click **Finish**.

- 8 From the **ODBC Microsoft SQL Server Setup** menu, select **Test Data Source**.
If the test data source is acceptable, click **OK**. If it is not acceptable, click **Back** to return and reconfigure any incorrect items.
- 9 To close the ODBC Data Source Administrator, click **Close**.
- 10 Ensure that the SQL Agent is running on your database server.
This applies to SQL Server 2000 and SQL Server 2005 editions.

Configuring Microsoft SQL Server 2005 Express

The Microsoft SQL Server 2005 Express database package is installed and configured when you select Microsoft SQL Server 2005 Express as your database during VirtualCenter installation or upgrade. See [“Installing VMware Infrastructure”](#) on page 21. No additional configuration is required.

Microsoft SQL Server 2005 Express is meant to be used only for small deployments of up to 5 hosts and 5 virtual machines. (SEE UPDATE) Microsoft SQL Server 2005 Express replaces MSDE (used in earlier versions of VirtualCenter) as the low-end database.

If Microsoft SQL Server 2005 Express is installed, review the required database patches specified in [Table 1-1, “Supported Database Formats,”](#) on page 14. If you do not prepare your database correctly, the VirtualCenter installer might display error and warning messages.

See <http://www.microsoft.com/sql/editions/express/default.msp>.

Installing VMware Infrastructure Management Software

This section describes how to install management components when you have the VMware Infrastructure Management CD or download package. The VMware Infrastructure Management CD allows you to choose the components to install and installs all selected components in a single procedure.

Components Installed

The VMware Infrastructure Management default installation includes the following components:

- VMware VirtualCenter Server – A Windows service to manage ESX Server hosts.
- VI Client - A client application used to connect directly to an ESX Server or indirectly to an ESX Server through a VirtualCenter Server.
- Microsoft.NET Framework – Software that the VirtualCenter Server, the Database Upgrade wizard, and the VI Client uses.

- Microsoft SQL Server 2005 Express – A free version of the Microsoft SQL Server database for smaller-scale applications. If you enter a path to an existing database, the installer does not install Microsoft SQL Server 2005 Express.
- VMware Update Manager (optional) – A VirtualCenter plug-in that provides security monitoring and patching support for ESX Server hosts and virtual machines.
- VMware Converter Enterprise for VirtualCenter (optional) – A VirtualCenter plug-in that enables you to convert physical machines to virtual machines.
- VMware license server – A Windows service allowing all VMware products to be licensed from a central pool and managed from one console. If you enter a path to an existing license server, the installer does not install a license server.

VirtualCenter Server Installation Procedure

If you choose to install VirtualCenter, first do the following:

- Ensure that your hardware meets [“System Requirements”](#) on page 12.
- Make sure that the system you use for your VirtualCenter installation belongs to a domain rather than a workgroup. If assigned to a workgroup, your VirtualCenter Server is not able to discover all domains and systems available on the network when you are using such features as VirtualCenter Consolidation.
- Create a VirtualCenter database, unless you want to use SQL Server 2005 Express. See [“Preparing the VirtualCenter Server Database”](#) on page 21.
- Obtain and assign a static IP address and host name to the Windows server that will host VirtualCenter and the license server. This IP address must have a valid (internal) DNS registration that resolves properly from all managed ESX Server hosts. For best results, ensure that the Windows server name is exactly the same as the DNS host name.
- You can deploy VirtualCenter behind a firewall. However, make sure there is no Network Address Translation (NAT) firewall between VirtualCenter and the hosts it will manage.

- The installer automatically installs a license server for you, unless you point to an existing license server.
 - If you want to use an existing license server, obtain the host name or IP address.
 - If you are going to allow the installer to install a license server, you need a valid license file.

Because the license server does not support license files on a network share, place your license files in a directory on a system where you are installing the license server.

To install VMware Infrastructure Management

- 1 As Administrator on the Windows system, insert the installation CD.
- 2 When the VMware Infrastructure Management Installer screen appears, click **Next**.

If the VMware Infrastructure Management Installer screen does not appear, double-click the autorun.exe icon.
- 3 Read the Introduction page and click **Next**.
- 4 Select **I accept the terms in the license agreement** and click **Next**.
- 5 Type your user name and company name and click **Next**.
- 6 Select one of the installation types and click **Next**.

The choices are:

- Install the VI Client.
- Install the VirtualCenter Server.
- Choose a custom installation to install multiple components.

- 7 Select the option corresponding with the database you configured.

If you did not configure a supported database, click **Install Microsoft SQL Server 2005 Express**. This database is suitable for small deployments of up to 5 hosts and 5 virtual machines. ([SEE UPDATE](#))

If you configured a supported database, click **Use an existing database** and enter your database connection information:

- a Type the data source name (DSN) associated with your database.
This must be a system DSN.
- b If your database is a local SQL Server database using Windows NT authentication, leave the user name and password fields blank. Otherwise, type the user name and password associated with the datasource name and click **Next**.

If your connection fails, a warning appears. Click **OK** and re-enter your database connection information until you can continue.

- 8 Select one of the following options:

- To use VirtualCenter in evaluation mode, select **I want to evaluate VirtualCenter Server** and click **Next**.

If you choose this option, the enterprise-level edition of VirtualCenter is installed in evaluation mode. The VMware License Server is also installed so that you can switch to licensed mode during or after the evaluation period.

- To use VirtualCenter in licensed mode with an existing license server:
 - i Select **Use an existing License Server**.
 - ii Enter the path to your existing license server.
 - iii Select the VirtualCenter edition that you purchased and click **Next**.

If you choose this option, the VMware License Server is not installed.

- To use VirtualCenter in licensed mode when you do not have an existing license server:
 - i Leave both check boxes unselected.
 - ii Select the VirtualCenter edition that you purchased and click **Next**.

If you choose this option, the VMware License Server is installed.

- 9 Enter the port and proxy information that you want to use or accept the default information shown on screen and click **Next**.

This step applies only to custom installations.

- 10 Enter information about the system that you are installing VirtualCenter on and click **Next**.

Enter:

- The IP address or domain name of the system that you are installing VirtualCenter on.
 - The login and password that you use to login to the system that you are installing VirtualCenter on.
- 11 For VMware Update Manager, you can use the same database that you use for VirtualCenter, or you can use another database. See [Step 7](#).
 - 12 For VMware Update Manager, enter the port and proxy information that you want to use or accept the default information shown on screen.

This step applies only to custom installations.

- 13 For VMware Converter, enter the port information that you want to use or accept the default information shown on screen.

This step applies only to custom installations.

Click **Next** to continue through the deployment options screens.

- 14 Accept the default destination folders and click **Next**.

If you do not want to accept the default destination folders:

- For VMware Infrastructure, click **Change** to select another location and click **Next**.
- For downloading patches, click **Change** to select another location and click **Next**.



CAUTION To install the VMware Infrastructure components on a drive other than the C: drive, verify 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, because of a known issue with Windows Installer, your VMware Infrastructure installation might fail.

- 15 Click **Install**.

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

- 16 Click **Finish** to complete the VMware Infrastructure installation.

Configuring Communication Between VirtualCenter Components

The VirtualCenter Server must send data to every host that VirtualCenter manages and must receive data from each management agent. If you have firewalls between your VMware Infrastructure components, open the ports listed in [Table 2-1](#) to enable communication.

Table 2-1. Ports for VMware Infrastructure Communication

Components	Ports	Traffic Type
VI Client to VirtualCenter	443 80 if you are connecting insecurely by using HTTP instead of HTTPS	TCP
Web Access Client to VirtualCenter	443	TCP
VirtualCenter to ESX Server host	443	TCP
ESX Server host to VirtualCenter	902	UDP
VirtualCenter to License Server	27000 and 27010	TCP

Installing ESX Server 3

The VMware ESX Server 3 version 3.5 installation includes the following components:

- **VMware ESX Server** – Software to manage and serve virtual machines.
- **VMware Web Access** – Software to allow Web browser access to the ESX Server host.

Preparing for Installation

Two installers are available for installing VMware ESX Server software:

- **Graphical installer** – This is a graphical, mouse-based installation program to install or upgrade ESX Server. This is the recommended installation method. This *Quick Start Guide* describes how to install ESX Server by using the graphical installer.
- **Text-mode installer** – This is a text-based interface to install or upgrade ESX Server. Choose this installation method if your video controller, keyboard, or mouse do not function properly when you use the graphical installer. This *Quick Start Guide* does not describe how to install ESX Server by using the text installer. For more information about using the text installer, see the *Installation Guide*.

Using Remote Management Applications

If you use remote management applications—such as Integrated Lights-Out (iLO), Dell Remote Access Card (DRAC), IBM management module (MM), or Remote Supervisor Adapter II (RSA II)—to install ESX Server, be careful when you use the virtual CD feature. You might encounter corruption problems if you use this installation method with systems under load. If you must use this method, run the media test that the ESX Server Installer provides.

If a remote installation from an ISO image fails, carry out the remote installation from the physical CD-ROM media.

Installation on SATA Drives

When installing ESX Server on ISATA drives, keep in mind the following considerations.

- Ensure that your SATA drives are connected through supported SATA/SAS controllers:
 - `mptscsi_pcie`—LSI1068E (LSISAS3442E)
 - `mptscsi_pcix`—LSI1068 (SAS 5)
 - `aacraid_esx30`—IBM serveraid 8k SAS controller
 - `cciss`—Smart Array P400/256 controller
 - `megaraid_sas`—Dell PERC 5.0.1 controller
- Do not use SATA disks to create VMFS datastores shared across multiple ESX Server hosts.

For complete hardware requirements, see “[ESX Server 3 Requirements](#)” on page 15. For a description of partitioning requirements, see the *Installation Guide*.

LUN Requirements

Although ESX Server supports up to 256 LUNs for operation, the installer supports a maximum of 128 iSCSI or SAN LUNs. If you have more than 128 LUNs, connect them after the installation is complete.

The minimum supported LUN capacity for VMFS3 is 1200MB.

An ESX Server host supports only the first 256 LUNs loaded at boot time. Your boot volume must be encountered in the first 256 LUNs, or the ESX Server host can stall at startup. If you have a controller loading 256 LUNs before the boot volume, you must reduce the number of LUNs on that controller to 256 or less.

If you have not yet installed ESX Server software, you can arrange PCI controller cards to determine the desired LUN order. VMware recommends that you do not rearrange drive controllers among PCI slots after you install ESX Server software.

To boot an ESX Server host from a SAN, allocate an entire LUN to each ESX Server host. ESX Server software does not support booting from a shared LUN. If you install ESX Server software onto a shared LUN, you might overwrite the data on the shared LUN. You must determine the status of your available LUNs. The installer cannot determine if a LUN is shared.



CAUTION VMware recommends that you disconnect the SAN before you begin the ESX Server install process. There is one exception: If you are booting from a SAN, only the system LUN should be presented to the ESX Server. All other LUNs should not be presented to the ESX Server during the install process.

Before beginning the installation, zone and mask all SAN LUNs away from your server, except those intended for its use.

For more information about configuring an ESX Server host to boot from a SAN, see the *iSCSI SAN Configuration Guide*.

Installing ESX Server 3

This section describes how to install the ESX Server software on your server machine by using the graphical mode of the installer and default partitioning options. For information about configuring partition options, or about using the text mode of the installer, see the *Installation Guide*.

To install ESX Server

- 1 Verify that the network cable is plugged into the Ethernet adapter that you are using for the service console.

The ESX Server installer needs a live network connection to properly detect certain network settings, such as machine name under DHCP.

- 2 Power on the machine with the VMware ESX Server CD in the CD drive.

The ESX Server begins its boot process until the mode selection page appears.



If this page does not appear:

- a Reboot the machine.
 - b Press the key required to enter your machine's BIOS Setup page.
This key is often F1, F2, or F10.
 - c Set the CD drive as the first boot device.
 - d Reboot the machine.
- 3 Press Enter to start the graphical installer.

A series of installation messages scroll past until the CD Media Test page appears.

- 4 Click **Test** to have the installer inspect the installation CD media for errors.
 - If you click **Skip**, continue with [Step 5](#).
 - If you click **Test**, a progress bar appears. The CD media is being tested for errors. When testing is complete, a Media Check Result dialog box appears. Click **OK**.
- 5 Click **Next**.
- 6 Select your keyboard language from the list and click **Next**.
- 7 Select your mouse.

Mouse configuration is not a critical setting. After ESX Server is installed, the setting is ignored, because the X Window System is not supported from the service console.

The following are some mouse identification hints:

- If the connector is round, your mouse is a PS/2 or a bus mouse.
- If the connector is trapezoidal with nine holes, it is a serial mouse.
- If the connector is a flat rectangle with a slot, it is a USB mouse.

Try to find an exact match – If you cannot find an exact match, choose a mouse type that is compatible with yours. Otherwise, choose the appropriate generic mouse type.

Three-button mouse emulation – During the installation, selecting this box enables you to use middle-mouse button functionality by clicking both mouse buttons at the same time.

After you select your mouse, click **Next**.

- 8 Select the type of installation.

The Select Installation Type dialog box appears only if the installer detects a previous ESX Server installation.

- **Install** – For a clean installation preserving no ESX Server configuration data, select **Install** and click **Next**.
- **Upgrade** – If you are upgrading, see the *Upgrade Guide*. Do not continue with this procedure.

- 9 Accept the VMware license agreement by selecting **I accept the terms of the license agreement** and click **Next**.

If any drives or LUNs are initialized, a warning appears.

If you do not have data on the drive, click **OK** to allow partitioning to occur. You must initialize a drive to use it during installation.

- 10 Click **Recommended** to configure default partitions for you, based on the capacity of the hard drive.
 - a Select a volume to install ESX Server software on.
 - b Deselect **Keep virtual machines and the VMFS**.
 - c Select **Recommended partitioning** and click **Next**.
 - d Click **Yes** in the warning box to continue with your partitioning selection.
 - e You can change the automatic partitioning settings:
 - **New** – Select a disk and click to create a new partition.
 - **Edit** – Select a partition and click to change an existing partition.
 - **Delete** – Select a partition and click to remove an existing partition.
 - **Reset** – Click to restore the default partitioning scheme.

- 11 Select how the ESX Server boots:

- **From a drive (install on the MBR of the drive)** – Use this option for most installations.

This drive must match the first boot device set in the host BIOS. If these settings do not match, the host cannot boot into the ESX Server software.

To boot an ESX Server host from a SAN, choose a SAN-based LUN.

- **From a partition** – Use this option for legacy hardware that stores BIOS information in the MBR.

Do not select an optical drive as the location for the boot loader.

- 12 Configure boot options:
 - **General kernel parameters** – To add default options to the boot command, enter them into the kernel parameters field. Any options you enter are passed to the ESX Server kernel every time it boots.
 - **Force LBA32** – Use this option to exceed the 1024 cylinder limit for the /boot partition. If you have a system that supports the LBA32 extension for booting operating systems above the 1024 cylinder limit, and you want to place your /boot partition above cylinder 1024, select this option. This is usually needed only for legacy hardware.
- 13 Click **Next** to continue the installation.
- 14 Configure the network settings.
 - a Select the network interface for the ESX Server console. If you are using the text installer, click **OK** to proceed.

Virtual machine network traffic shares this network adapter until you configure a virtual switch for another network adapter. You can configure other network adapters at a later time from the VI Client.
 - b Configure the ESX Server host network IP address. If you are using the text installer, click **OK** to proceed.

VMware recommends that you use a static IP address to simplify client access. If you do not have the required network configuration information, see your network administrator for assistance.
 - c Enter the ESX Server host name. Type the complete machine name, including the domain where appropriate.

This option is available only if you opt to use a static IP address.
 - d If your network requires a VLAN ID, enter a VLAN ID.
 - e Select **Create a default network for virtual machines** to create a default port group for virtual machines.

If you select **Create a default network for virtual machines**, your virtual machines will share a network adapter with the service console, which is not the recommended configuration for optimum security. If you do not select this option, create a network connection for your virtual machines.
 - f Click **Next**.

- 15 Set your time zone:
 - a Click the **Map** tab to display the map.
 - b Click the city nearest to your location on the map.
 - c Select the check box for using UTC (Coordinated Universal Time) if appropriate.
 - d Click **Next**.

If you prefer, you can use the **Location** tab to set the time zone by selecting a city from a list or use the **UTC Offset** tab to set the time zone as an offset from Greenwich Mean Time (GMT).

- 16 Enter a root password.

Type the same password into both fields and click **Next**.

The root password must contain at least six characters.

- 17 Confirm your installation configuration and click **Next**.

Progress bars appear to show the status of the installation and a dialog box informs you when the installation is complete.

- 18 Click **Finish** to exit.

See also [“Configuring Network Connections”](#) on page 61.

Postinstallation Considerations

For information about postinstallation activities such as installing additional hardware on your ESX Server host, see the *Installation Guide*.

Installing a License Server

This section describes an independent installation of the license server. Skip this section if you are using the VMware Infrastructure Management installer, as described in [“Installing VMware Infrastructure Management Software”](#) on page 26. The VMware Infrastructure Management installer installs a license server.

To check whether a license server is installed, select **Start > Programs > VMware** and look for **VMware License Server**. If a license server is installed, VMware recommends reinstalling or upgrading the license server to the latest version.

Install the license server on the same machine where the VirtualCenter Server resides, or on a separate machine. To ensure the best license pool availability, VMware recommends installing the license server on the same machine where the VirtualCenter Server resides.

Use this procedure with any installation when you want to have a standalone license server on a machine other than your VirtualCenter Server host.

To install the VMware license server software, you must have:

- Hardware that meets “[System Requirements](#)” on page 12
- A static IP address or machine name your license server uses

The following procedure assumes that you have Administrator privileges on a Windows system.

To install a VMware license server

- 1 Insert the VMware Infrastructure Installation CD.
If the VMware Infrastructure Management Installer appears, click cancel to exit.
- 2 Navigate to the \vpx folder on the installation CD and double-click VMware-licenseserver.exe.
- 3 Verify that you are installing the license server and click **Next**.
- 4 To accept the license agreement, select **I accept the terms in the license agreement** and click **Next**.
- 5 Select the folder in which you want to install the license server and click **Next**.
- 6 Type the full path to your license file or click **Browse** to locate this file and click **Next**.
The license file should be located in a directory you can access from your license server machine.
- 7 Click **Install** to begin the installation.
- 8 Click **Finish** to complete the license server installation.

For information about obtaining and saving your license files, see “[Redeeming Licenses](#)” on page 21.

Creating and Managing VMware Infrastructure Components

3

This chapter provides an introduction to creating and managing VMware Infrastructure components. It contains the following sections:

- [“Starting the VI Client and Logging In”](#) on page 42
- [“Setting Up a Datacenter”](#) on page 43
- [“Creating a Virtual Machine”](#) on page 47
- [“Configuring Permissions for Users”](#) on page 53
- [“Resource Pools”](#) on page 57
- [“Configuring Network Connections”](#) on page 61
- [“Installing Guest Operating Systems”](#) on page 63
- [“Managing Virtual Machines”](#) on page 69
- [“Tasks and Events”](#) on page 73

Starting the VI Client and Logging In

The VI Client is the interface to ESX Server hosts and the VirtualCenter Server. When you start the VI Client, it has a single opening page. When you log in, the VI Client displays only the features and functions that are appropriate to the type of server you logged on to.

To start a VI Client session

- 1 Log in to your Windows system.
- 2 The first time you start the VI Client, log in as the administrator.
 - a If the managed host is not a domain controller, log in as either <local host name>\<user> or <user>, where <user> is a member of the local Administrators group.
 - b If the managed host is a domain controller, you must log in as <domain>\<user>, where <domain> is the domain name for which the managed host is a controller and <user> is a member of that domain's Domain Administrators group. This practice of running on a domain controller is not recommended.

- 3 Launch the VI Client.

Double-click a shortcut or choose the application through **Start > Programs > VMware > VMware Infrastructure Client 2**.

- 4 Log in to the server.

Enter or choose the server name, your user name, and your password for that server. Click **Log In** to continue.

NOTE Only previously typed servers appear in the Server drop-down menu.

If this is the first time you have logged on to the VirtualCenter Server, an empty Inventory screen appears. Add a datacenter and host to begin monitoring and managing your virtual machines through the VMware Infrastructure Client.

Setting Up a Datacenter

When you set up a datacenter, you bring one or more ESX Server hosts under VirtualCenter management, create virtual machines, and determine how to organize virtual machines and manage resources.

When you set up a datacenter, you complete a minimum of three tasks in the following order:

- 1 Create datacenters.
- 2 Bring hosts under VirtualCenter management.
- 3 Create virtual machines.

Creating a Datacenter

You create datacenters as containers for your hosts, virtual machines, resource pools, and clusters. Use datacenters to create organizational structures so that you can dedicate virtual configurations to specific departments, build isolated virtual environments for testing, or otherwise organize your environment.

To create a datacenter

- 1 Click **Inventory** in the navigation bar to display the inventory panel.
- 2 Click the arrow to the right of **Inventory**.
- 3 Choose **Hosts and Clusters**.
- 4 Right-click **Hosts & Clusters** in the inventory panel and choose **New Datacenter**.
A datacenter icon is added to the inventory.
- 5 Type a name for your datacenter.

To further subdivide the datacenter, create folders and folder hierarchies for specific host or resource groups. The method for creating folders is similar to the method you use to create your datacenter—choose **New Folder** instead of **New Datacenter**.

Bringing a Host Under VirtualCenter Management

ESX Server hosts serve as a virtualization platform that supports virtual machines you create. Hosts provide the CPU and memory resources to your virtual machines, give virtual machines access to storage, and offer network connectivity. You manage your hosts through the VI Client, connected either directly to each individual host, or indirectly to a group of hosts through a connection to a VirtualCenter Server.

When you use the VI Client to connect to your ESX Server hosts directly, you manage each of them individually as a standalone host. When you access your host through the VirtualCenter connection, you register each host with VirtualCenter to manage the entire infrastructure of your hosts as a group.

To bring a host under VirtualCenter management, you complete a minimum of three tasks in the following order:

- 1 Add the host to the VirtualCenter inventory.

- 2 Choose a license type.

Skip this task if you are using ESX Server in evaluation mode.

- 3 Configure permissions for users.

In a production environment, you might also configure host settings such as CPU, memory, storage, networking, security, and so forth. For information about these tasks, see the *ESX Server 3 Configuration Guide*.

To add a host to the inventory

- 1 Ensure a communication channel through a firewall, if needed.

If any managed host in the VirtualCenter environment is behind a firewall, ensure that the managed host can communicate with the VirtualCenter Server and with all other hosts on port 902 or another configured port. See the *Installation Guide* for ESX Server 3 or the *Setup Guide* for your ESX Server 3i product, and the *ESX Server 3 Configuration Guide* or *ESX Server 3i Configuration Guide* for additional information.

- 2 Click **Inventory** in the navigation bar.

Expand the inventory as needed and click the appropriate datacenter, folder, or cluster.

- 3 Select the appropriate datacenter or cluster and choose **New Host**.

4 Enter the managed host connection settings.

- a Type the name of the managed host in the **Host** name field.
- b Enter the **Username** and **Password** for a user account that has administrative privileges on the selected managed host.

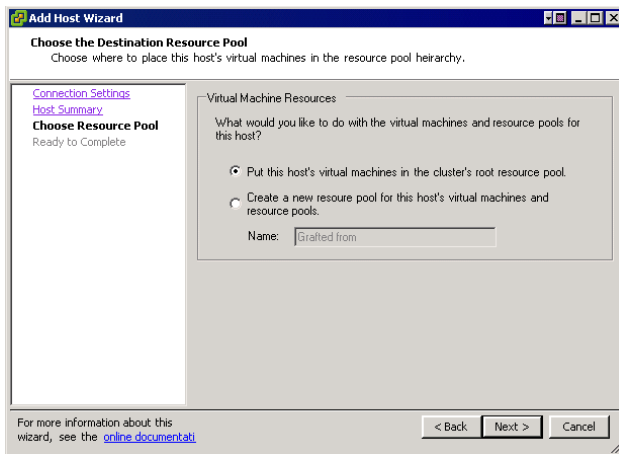
VirtualCenter uses the root account to log in to the system and then creates a special user account. VirtualCenter then uses this account for all future authentication.

- 5 (SEE UPDATE) Optionally select **Enable Lockdown Mode** to disable remote access for the administrator account after VirtualCenter takes control of this host.

Selecting this check box ensures that the host is managed only through VirtualCenter. Certain limited management tasks can be performed while in lockdown mode by logging into the local console on the host. This option is displayed only for ESX Server 3 and ESX Server 3i hosts.

- 6 To confirm the Host Summary information, click **Next**.

7 If you are adding the host to a cluster:



- a Specify what should happen to the resource pools on the host.

The options are:

- Put all of the host's virtual machines into the cluster's root resource pool.
- Create new resource pool for the host's virtual machines. The default resource pool name is derived from the host's name. Type over the text to supply your own name.

- b Click **Next**.

See the *Resource Management Guide* for more information on clusters.

8 If you are adding the host to a datacenter:

- a Identify the location of the host's virtual machines.
- b Select from the list of inventory objects displayed in the **Selection** box.

9 To confirm completing the Add Host wizard, click **Finish**.

When the dialog box is complete and you click **Next**, VirtualCenter does the following tasks:

- Searches the network for the specified managed host and identifies all the virtual machines on the managed host. If you click **Cancel**, the host is removed from the VirtualCenter inventory.
- Connects to the managed host. If the wizard cannot connect to the managed host, the managed host is not added to the inventory.

- Verifies that the managed host is not already being managed. If it is already being managed by another VirtualCenter Server, VirtualCenter displays a message. If the wizard can connect to the managed host but for some reason cannot remain connected to the VirtualCenter Server, the host is added, but is in a disconnected state. This occurs, for example, if the host is already being managed by another VirtualCenter Server.
- Reads the number of processors on the managed host and allocates the appropriate number of licenses. The number of processors is stored in the VirtualCenter database and is verified upon each managed host reconnection and VirtualCenter startup.
- Imports existing virtual machines.

NOTE Newer processors have two CPU cores in each processor package. Systems with dual-core processors must use ESX Server 2.5.2 or later. VirtualCenter licenses are issued by pairs of processor packages, not by processor cores. Therefore, if the system is using two dual-core processors or two single-core processors, the system requires a single 2-processor VirtualCenter license.

To select the license type for the ESX Server host

- 1 Select the host in the inventory panel and click the **Configuration** tab.
- 2 Click **License Features**.
- 3 Click **Edit** next to **ESX Server License Type**.
- 4 Specify the license type for the host.
If you select **Unlicensed**, the host will release its licenses back to the license server.
- 5 Click **Edit** next to **Add Ons**.
- 6 Select from the list any add-on features you licensed and click **OK**.

Creating a Virtual Machine

The VI Client provides a simple and flexible user interface from which you can create new virtual machines through manual configuration, from templates, or by cloning existing virtual machines. All virtual machines are created in place by using a wizard that guides you through the steps to produce a complete and working virtual machine. The typical path shortens the process by skipping some choices that rarely need changing from their defaults.

Figure 3-1 shows the flow of a typical virtual machine creation.

Figure 3-1. Creation of a Virtual Machine by Using the Typical Path

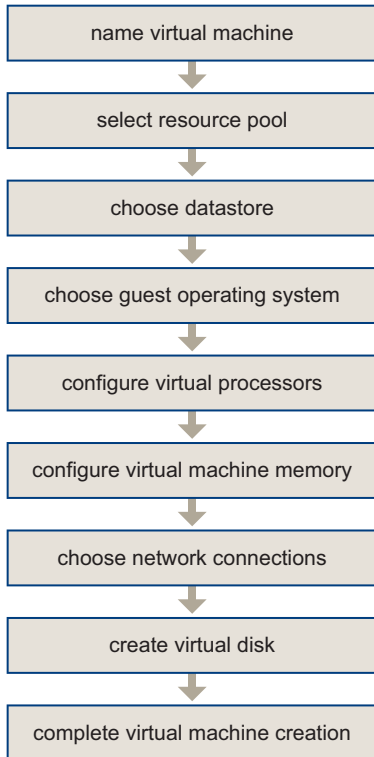
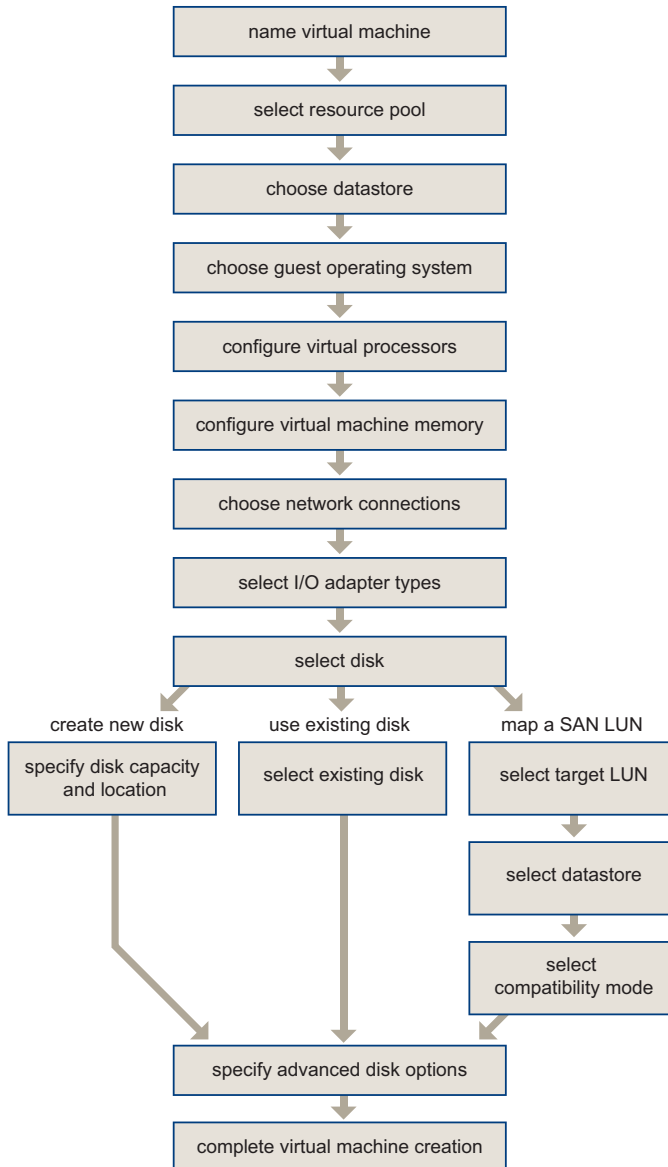


Figure 3-2 shows the flow of a custom virtual machine creation.

Figure 3-2. Creation of a Virtual Machine Using the Custom Path



After you create a datacenter and add a host (clustered or standalone), you can add virtual machines to clusters or hosts using the New Virtual Machine wizard. This guide describes the procedure for adding a virtual machine using the typical path. For more information about creating virtual machines using the custom path, see the *VI Client Online Help*.

To create a virtual machine from the VI Client

- 1 From the VirtualCenter client, click **Inventory** in the navigation bar and expand the inventory as needed.
- 2 In the inventory list, select the managed host to add the new virtual machine to.
- 3 Choose **File > New > Virtual Machine**.
- 4 Select **Typical** and click **Next**.
- 5 Type a virtual machine name and click **Next**.

The name you enter in the **Virtual Machine Name** field is the name that is listed in the VirtualCenter client inventory. It is also used as the name of the virtual machine's files. The name can be up to 80 characters long and may contain alphanumeric characters and the underscore (_) and hyphen (-) characters. This name must be unique within the folder. Names are case-insensitive: the name "my_vm" is identical to "My_Vm".

- 6 Select a folder or the root of a datacenter and click **Next**.
- 7 If the resource pool option is available, expand the tree and select the resource pool to run the virtual machine in and click **Next**.

Resource pools allow you to manage your computing resources within a host or hosts by setting them up in a meaningful hierarchy. Virtual machines and child resource pools share the resources of the parent resource pool. For more information on resource pools, see the *Resource Management Guide*.

- 8 Select a datastore in which to store the virtual machine files and click **Next**.

You should choose a datastore large enough to hold the virtual machine and all of its virtual disk files. For ESX Server hosts, the **Datastore** is configured on that host, including VMFS, NAS, and iSCSI volumes.

- 9 Under **Guest Operating System**, select the operating system family, select the version, and click **Next**.

If you select **Other**, enter a display name for your operating system. You can change this name after the virtual machine is created by opening the Virtual Machine Properties dialog box and editing the **Options** tab > **Advanced** > **General** > **Configuration Parameters** > `guestOSAltName` parameter.

This is the operating system for your virtual machine. Your choice should be based on your planned use of the virtual machine. The selected guest operating system affects the supported devices and number of virtual CPUs available for the virtual machine.

See the *Guest Operating System Installation Guide* for details.

The wizard does not install the guest operating system for you. The New Virtual Machine wizard uses this information to select appropriate default values, such as the amount of memory needed.

- 10 Select the number of virtual processors in the virtual machine and click **Next**.

Licensing for VMware Virtual SMP™ is required to power on multiple-CPU virtual machines. See the *Installation Guide* for ESX Server 3, or the *Setup Guide* for your ESX Server 3i product, more information on licensing.

NOTE The Virtual CPUs page does not appear if the host is single-processor or the guest operating system does not support SMP (for example, NetWare and Windows NT 4.0).

- 11 Configure the virtual machine's memory size by selecting the number of megabytes.

The minimum, recommended, maximum for best performance, and maximum sizes are based on the guest operating system. Regardless of the guest operating system, the minimum memory size is 4MB. The maximum depends on the host, but for ESX Server 3.5 and ESX Server 3i version 3.5 it is 65532MB (64GB minus 4MB). The memory size must be a multiple of 4MB.

The colored triangles along the slider represent these amounts as indicated by the key on the wizard. You can also drag the slider or select the number using the up and down arrows. The maximum for best performance represents the threshold above which the host's physical memory is insufficient to run the virtual machine at full speed. This value fluctuates as conditions on the host change (as virtual machines are powered on or off, for example).

- 12 Click **Next**.

- 13 Choose the networks to connect to and their options.

Select how many network adapters (NICs) to connect to, the names of the networks, and whether you want to connect to them at power on.

The **Network** drop-down menu lists the port groups that are configured for virtual machine use on the host. If no virtual machine port groups are configured, a warning dialog box appears, and you are not allowed to configure any virtual network cards.

NOTE Exercise caution when you configure a virtual machine to connect to multiple networks. Because virtual machines share their physical network hardware with the host, the accidental or malicious bridging of two networks by a virtual machine can occur. Minimum Spanning Tree protocol cannot protect against these occurrences.

- 14 Click **Next**.

- 15 Specify the size of the virtual disk.

Enter the disk size in megabytes (MB) or gigabytes (GB). The default is 4GB. The available space on the selected VMFS volume is listed. You can configure a disk from as small as 1MB to as large as 2TB (2048GB), using a whole number of MB or GB.

The virtual disk should be large enough to hold the guest operating system and all of the software that you intend to install with room for data and growth.

You cannot change the virtual disk's maximum capacity later, but you can install additional virtual disks later by using the Virtual Machine Properties dialog box.

For example, you need about 1GB of actual free space on the file system containing the virtual disk to install Windows Server 2003 and applications, such as Microsoft Office, inside the virtual machine.

- 16 Click **Next**.

- 17 On the Ready to Complete New Virtual Machine page, review your selections.

To open the Virtual Machine Properties dialog box to set further configuration options, such as adding additional disks, click **Edit the virtual machine settings before submitting the creation task** and click **Continue**. Otherwise, click **Finish**.

NOTE Before you can use your new virtual machine, you must install a guest operating system and then install VMware Tools.

For information about performing additional configuration before completion and adding existing virtual machines to your VirtualCenter inventory, see *Basic System Administration* and the *VI Client Online Help*. See also “[Installing Guest Operating Systems](#)” on page 63 and “[VMware Tools](#)” on page 64.

Configuring Permissions for Users

Access to VirtualCenter, its administrative functions, and its resources is granted based on permissions assigned to users. For example, some users’ permissions allow them to create virtual machines on the host, while other users might have permissions that allow them only to power on and use virtual machines.

For VirtualCenter, permissions are defined as access roles that consist of a user and the user’s assigned role for an object such as a virtual machine or ESX Server host. A role is a predefined set of privileges. VirtualCenter provides two types of default roles—system roles and sample roles. Although you cannot change the privileges associated with system roles, you can change sample role privileges. Within each role type, each subsequent role inherits the privileges of the previous role. [Table 3-1](#) contains a list of default roles you can assign to users.

Table 3-1. Default Roles

Role	Role Type	Description User Capabilities
No Access User	system	Cannot view or change the assigned object. VI Client tabs associated with an object display without content. This is the default role for all users except those users in the Administrators group.
Read Only User	system	View the state and details about the object. View all the tab panels in the VI Client except the console tab. Cannot perform any actions through the menus and toolbars.
Administrator	system	All privileges for all objects. Add, remove, and set access rights and privileges for all the VirtualCenter users and all the virtual objects in the VMware Infrastructure environment. This is the default role for all members of the Administrators group.

Table 3-1. Default Roles (Continued)

Role	Role Type	Description User Capabilities
Virtual Machine User	sample	<p>Perform actions on virtual machines only.</p> <p>Interact with virtual machines, but not change the virtual machine configuration. This includes:</p> <ul style="list-style-type: none"> ■ All privileges for the scheduled tasks privileges group. ■ Selected privileges for the global items and virtual machine privileges groups. ■ No privileges for the folder, datacenter, datastore, network, host, resource, alarms, sessions, performance, and permissions privileges groups.
Virtual Machine Power User	sample	<p>Perform actions on the virtual machine and resource objects.</p> <p>Interact and change most virtual machine configuration settings, take snapshots, and schedule tasks. This includes:</p> <ul style="list-style-type: none"> ■ All privileges for scheduled task privileges group. ■ Selected privileges for global items, datastore, and virtual machine privileges groups. ■ No privileges for folder, datacenter, network, host, resource, alarms, sessions, performance, and permissions privileges groups.
Resource Pool Administrator	sample	<p>Perform actions on datastores, hosts, virtual machines, resources, and alarms.</p> <p>Provides resource delegation and is assigned to resource pool inventory objects. This includes:</p> <ul style="list-style-type: none"> ■ All privileges for folder, virtual machine, alarms, and scheduled task privileges groups. ■ Selected privileges for global items, datastore, resource, and permissions privileges groups. ■ No privileges for datacenter, network, host, sessions, or performance privileges groups.
Datacenter Administrator	sample	<p>Perform actions on global items, folders, datacenters, datastores, hosts, virtual machines, resources, and alarms.</p> <p>Set up datacenters, but with limited ability to interact with virtual machines. This includes:</p> <ul style="list-style-type: none"> ■ All privileges for folder, datacenter, datastore, network, resource, alarms, and scheduled task privileges groups. ■ Selected privileges for global items, host, and virtual machine privileges groups. ■ No privileges for session, performance, and permission privileges groups.
Virtual Machine Administrator	sample	<p>Perform actions on global items, folders, datacenters, datastores, hosts, virtual machines, resources, alarms, and sessions. This includes:</p> <ul style="list-style-type: none"> ■ All privileges for all privilege groups, except permissions.

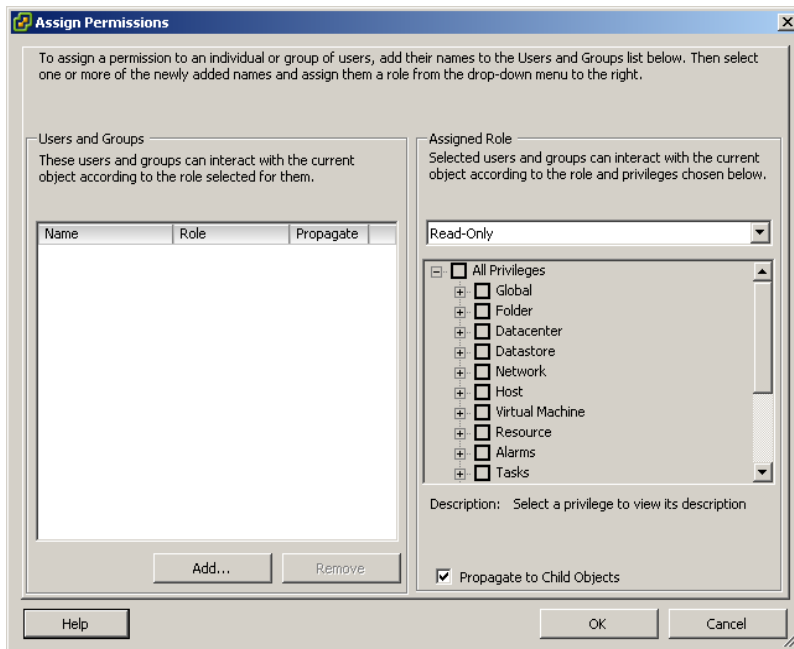
Permissions grant users and user groups the right to perform specific activities and manage VirtualCenter-managed objects such as hosts and virtual machines. For example, to configure memory for an ESX Server host, you must have a permission that grants host-configuration privileges.

To set up permissions for users or user groups

- 1 Log in to the VI Client as a user with the Administrator privileges.
- 2 From the VI Client, click **Inventory** in the navigation bar. Expand the inventory as needed and click the appropriate object.

The objects that can have permissions assigned to them are:

- **In VirtualCenter** – Folders, datacenters, clusters, resource pools, hosts, virtual machines
 - **In ESX Server** – Resource pools, the host, virtual machines
- 3 With the appropriate object selected, click the **Permissions** tab.
 - 4 Choose **Inventory menu > New > Add Permission**.



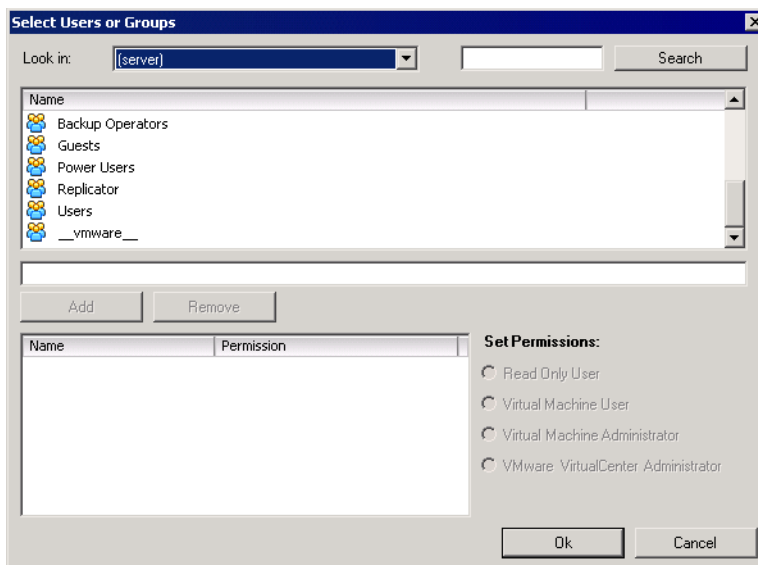
- 5 Choose a role from the **Assigned Role** drop-down menu.

This menu displays all of the roles that have been assigned to that host. When the role is displayed, the privileges granted on the role are listed in the section below the role title for reference purposes.

- 6 (Optional) Select the **Propagate to Child Objects** check box.

If this check box is selected, the role is also applied to all child objects of the selected inventory object. Most of the time selecting this box is appropriate.

- 7 Open the **Select Users or Groups** dialog box. Click **Add**.



- 8 Identify the user or group that is being assigned this role:
 - a Choose the domain where the user or group is located from the **Domain** drop-down menu.
 - b Type a name in the Search box or select a name from the **Name** list.
 - c Click **Add**.

The name is added to either the **Users** or **Groups** list.

- d Repeat step a through [Step c](#) to add additional users or groups.
- e Click **OK** when finished.

If you know the user or group name, you can type it in the **Name** field manually.

- 9 Verify the users and groups are assigned to the appropriate permissions and click **OK**.
- 10 To finish the task, click **OK**.

The server adds the permission to the list of permissions for the object. The list of permissions references all users and groups who have roles assigned to the object and where in the hierarchy those roles are assigned.

For more information about permissions and roles, see *Basic System Administration*.

Resource Pools

You can use resource pools to hierarchically partition available CPU and memory resources.

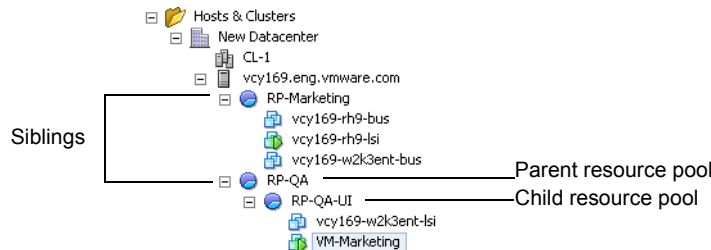
Each standalone host and each DRS cluster has an invisible root resource pool that groups the resources of that host or cluster. The root resource pool is not displayed because the resources of the host or cluster and the root resource pool are always the same. If you don't create child resource pools, only the root resource pools exist.

Users can create child resource pools of the root resource pool or of any user-created child resource pool. Each child resource pool has some of the parent's resources and can, in turn, have a hierarchy of child resource pools to represent successively smaller units of computational capability.

A resource pool can contain child resource pools, virtual machines, or both. This creates a hierarchy of shared resources. The resource pools at a higher level are called parent resource pools, while the resource pools and virtual machines that are at the same level are called siblings.

In [Figure 3-3](#), RP-QA is the parent resource pool for RP-QA-UI. RP-Marketing and RP-QA are siblings. The three virtual machines immediately below RP-Marketing are also siblings.

Figure 3-3. Hierarchical Resource Pools



For each resource pool, you can specify reservation, limit, shares, and whether the reservation should be expandable. The resource pool resources are then available to child resource pools and virtual machines.

Creating Resource Pools

You can create a child resource pool of any host, resource pool, or DRS cluster. If a host is added to a cluster, you can no longer create child resource pools of that host. You can create child resource pools of the cluster if the cluster is enabled for DRS.

When you create a child resource pool, you are prompted for resource pool attribute information. The system uses admission control to make sure you can't allocate resources that aren't available. See the *Resource Management Guide*.

To create a resource pool

- 1 Select the intended parent and choose **File > New > New Resource Pool**.
- 2 In the New Resource Pool dialog box, provide the following information for your resource pool.

Field	Description
Name	Name of the new resource pool.
CPU Resources	
Shares	Number of CPU shares the resource pool has with respect to the parent's total. Sibling resource pools share resources according to their relative share values bounded by the reservation and limit. You can choose Low, Normal, or High, or choose Custom to specify a number that assigns a share value.
Reservation	Guaranteed CPU allocation for this resource pool.
Expandable Reservation	Indicates that, if virtual machines are powered on in this resource pool, and the reservations of the virtual machines combined are larger than the reservation of the resource pool, the resource pool can use a parent's or ancestor's resources. Default is selected.
Limit	Upper limit for the amount of CPU the host makes available to this resource pool. Default is Unlimited . To specify a limit, deselect Unlimited and type in the number.

Field	Description
Memory Resources	
Shares	Number of memory shares the resource pool has with respect to the parent's total. Sibling resource pools share resources according to their relative share values bounded by the reservation and limit. You can choose Low, Normal, or High, or choose Custom to specify a number that assigns a share value.
Reservation	Guaranteed memory allocation for this resource pool.
Expandable Reservation	Use this check box to indicate that more than the specified reservation should be allocated if resources are available in a parent.
Limit	Upper limit for this resource pool's memory allocation. Default is Unlimited . To specify a different limit, deselect Unlimited .

- 3 After you've made all choices, click **OK**.

VirtualCenter creates the resource pool and displays it in the inventory panel.

A yellow triangle indicates that a value is not valid because of limitations on total available CPU and memory. You cannot enter values larger than the valid values. For example, if you have a resource pool with a reservation of 10GB, and you created a child resource pool with a reservation of 6GB, you cannot create a second child resource pool with a reservation of 6GB and Type set to **Fixed**. The two child reservations would total more than the parent reservation.

Adding Virtual Machines to Resource Pools

When you create a new virtual machine, the Virtual Machine wizard allows you to add it to a resource pool as part of the creation process. See [“Creating a Virtual Machine”](#) on page 47. You can also add an existing virtual machine to a resource pool as described in the following procedure.

To add an existing virtual machine to a resource pool

- 1 Select the virtual machine from any location in the inventory.
The virtual machine can be associated with a standalone host, a cluster, or a different resource pool.
- 2 Drag the virtual machine (or machines) to the desired resource pool object.

When you move a virtual machine to a new resource pool:

- The virtual machine's reservation and limit do not change.
- If the virtual machine's shares are high, medium, or low, the software adjusts to reflect the total number of shares in use in the new resource pool.
- If the virtual machine has custom shares assigned, the share value is maintained.
If the virtual machine would receive a very large percentage of total shares, a warning appears.
- The information displayed in the Resource Allocation tab about the resource pool's reserved and unreserved CPU and memory resources changes to reflect the reservations associated with the virtual machine (if any).

NOTE CPU and memory reserved and unreserved change only if the virtual machine is powered on. If the virtual machine was powered off or suspended, it can be moved, but overall available resources for the resource pool are not affected.

If a virtual machine is powered on, and the destination resource pool does not have enough CPU or memory to guarantee the virtual machine's reservation, the move fails because admission control does not allow it. An error dialog box explains the situation. The dialog box compares available and requested resources, so that you can consider whether an adjustment would resolve the issue.

For more information about resource pools, shares, and reservations, see *Basic System Administration* and the *Resource Management Guide*. For more information about managing resources using resource pools and VMware DRS, see the *Resource Management Guide*.

Continue on to the next section to learn about configuring network connections.

Configuring Network Connections

Networking for the service console, which runs the management services, is set up by default during the installation of ESX Server.

If you selected the default option to create a port group for virtual machines during ESX Server installation (see “[Installing ESX Server 3](#)” on page 33), you do not need to configure networking for your virtual machines. However, in this default configuration, virtual machine network traffic shares a network adapter with the service console. For security and other reasons, VMware recommends that virtual machine traffic not share a network adapter with the service console. For more information about network configuration see the *ESX Server 3 Configuration Guide*.

If you did not select the default option to create a port group for virtual machines during ESX Server installation, you must create a virtual network for your virtual machines as described below.

Virtual machines reach physical networks through uplink adapters. A vSwitch is able to transfer data to external networks only when one or more network adapters are attached to it. When two or more adapters are attached to a single vSwitch, they are transparently teamed.

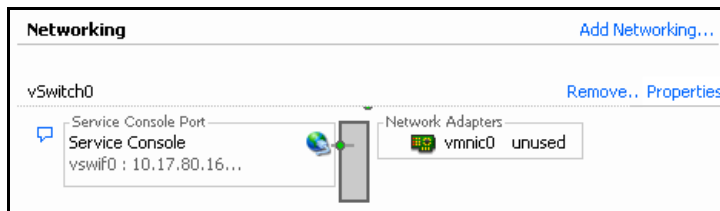
You can create a new vSwitch with or without Ethernet adapters.

If you create a vSwitch without physical network adapters, all traffic on that vSwitch will be confined to that vSwitch. No other hosts on the physical network or virtual machines on other vSwitches can send or receive traffic over this vSwitch. This might be desirable for a group of virtual machines to be able to communicate with each other but not with other hosts or with virtual machines outside the group.

To create or add a virtual network for a virtual machine

- 1 Log in to the VMware VI Client and select the server from the inventory panel.
- 2 Click the **Configuration** tab and click **Networking**.
- 3 On the right side of the screen, click **Add Networking**.

Virtual switches are presented in a layout that shows an overview and details.



- 4 Click **Add Networking** from the **Configuration** tab, or select **Properties** for a vSwitch and click **Add**.

The **Add Networking** wizard is reused for new ports and port groups.

- 5 As a connection type, select **Virtual Machines**, which is the default.

Selecting **Virtual Machines** lets you add a labeled network to handle virtual machine network traffic.

- 6 Click **Next**.

- 7 Select **Create a virtual switch**.

Changes are reflected in the **Preview** pane.

- 8 Click **Next**.

- 9 Under **Port Group Properties**, type a network label that identifies the port group that you are creating.

Use network labels to identify migration-compatible connections common to two or more hosts.

- 10 If you are using a VLAN, in the **VLAN ID** field, type a number between 1 and 4095.

If you are unsure what to enter, leave this blank or ask your network administrator.

- 11 Click **Next**.

- 12 After you have determined that the vSwitch is configured correctly, click **Finish**.

To enable failover (NIC teaming), bind two or more adapters to the same switch. If one outbound adapter is not operational, network traffic is routed to another adapter attached to the switch.

For more information about networking, including networking for the service console, virtual switches for VMotion, and security recommendations for network configuration, see the *Server Configuration Guide*.

Installing Guest Operating Systems

This section describes the basic steps for installing a guest operating system in a virtual machine. For detailed instructions regarding your particular guest operating system, see the *Guest Operating System Installation Guide*.

Basic Installation Steps

To install a guest operating system, you must have a CD-ROM or ISO image containing the installation files.

To install a guest operating system

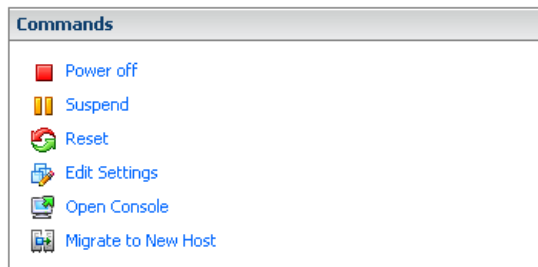
- 1 Start VMware VirtualCenter.
- 2 Insert the installation CD-ROM for your guest operating system, or create an ISO image file from the installation CD-ROM. Use the Virtual Machine Settings editor to connect the virtual machine's CD-ROM drive to the ISO image file and power on the virtual machine.

NOTE You might need to change the boot order in the virtual machine BIOS so that the virtual machine attempts to boot from the CD/DVD device before trying other boot devices. To do so, press **F2** when prompted during virtual machine startup.

Using an ISO image is faster than using a CD-ROM.

- 3 To power on your virtual machine, click **Power On**.

When a virtual machine is powered on, a green right arrow is displayed next to the virtual machine icon in the inventory list, and the options in the **Commands** panel change as shown in the following image:



- 4 Follow the instructions that the operating system vendor provides.

VMware Tools

VMware Tools is a suite of utilities that enhances the performance of the virtual machine's guest operating system and improves management of the virtual machine. Installation of VMware Tools in the guest operating system is important. Although the guest operating system can run without VMware Tools, you lose important functionality and convenience.

To install or upgrade VMware Tools on a Windows Guest

- 1 Open a console to the virtual machine.
- 2 Power on the virtual machine.
- 3 After the guest operating system starts, right-click the virtual machine and choose **Install VMware Tools**.
- 4 From inside the virtual machine, click **OK** to confirm that you want to install VMware Tools and launch the InstallShield wizard.
 - If you have autorun enabled in your guest operating system (the default setting for Windows operating systems), a dialog box appears.
 - If autorun is not enabled, run the VMware Tools installer. Click **Start > Run** and enter **D:\setup.exe**, where D: is your first virtual CD-ROM drive.
- 5 Follow the onscreen instructions.
 - On Windows Server 2003, the SVGA driver is installed automatically, and the guest operating system uses it after it reboots.
 - After you install VMware Tools, Windows 2000 and Windows XP guest operating systems must be rebooted to use the new driver.

To install or upgrade VMware Tools on a Linux guest from X with the RPM installer

- 1 Open a console to the virtual machine.
- 2 Power on the virtual machine.
- 3 After the guest operating system starts, right-click the virtual machine and choose **Install VMware Tools**.

The remaining steps take place inside the virtual machine.

4 Do one of the following tasks:

- If you see a **VMware Tools CD** icon on the desktop, double-click it, and after it opens, double-click the RPM installer in the root of the CD-ROM.
- If you see a file manager window, double-click the RPM installer file.

In some Linux distributions, the **VMware Tools CD** icon might fail to appear. In this case, continue install VMware Tools from the command line.

5 When prompted, enter the root password and click **OK**.

The installer prepares the packages.

6 Click **Continue** when the installer presents a dialog box that shows **Completed System Preparation**.

A dialog box appears with a progress bar. When the installer is done, VMware Tools is installed. There is no confirmation or finish button.

7 In an X terminal, as root (su -), run the following file to configure VMware Tools:

```
vmware-config-tools.pl
```

Respond to the questions the installer displays on the screen. Press Enter to accept the default value.

8 After the upgrade is complete, restart the network by running the following command:

```
/etc/init.d/network restart
```

9 When done, exit from the root account:

```
exit
```

10 In an X terminal, open the VMware Tools Properties dialog box:

```
vmware-toolbox &
```

To install or upgrade VMware Tools on a Linux guest with the tar installer or RPM installer

- 1 Open a console to the virtual machine.
- 2 Power on the virtual machine.
- 3 After the guest operating system starts, right-click the virtual machine and choose **Install VMware Tools**.

The remaining steps take place inside the virtual machine.

- 4 As root (`su -`), mount the VMware Tools virtual CD-ROM image and change to a working directory (for example, `/tmp`), as follows.

NOTE Some Linux distributions automatically mount CD-ROMs. If your distribution uses automounting, do not use the `mount` and `umount` commands described in this procedure. You still must untar the VMware Tools installer to `/tmp`.

Some Linux distributions use different device names or organize the `/dev` directory differently. If your CD-ROM drive is not `/dev/cdrom` or if the mount point for a CD-ROM is not `/mnt/cdrom`, you must modify the following commands to reflect the conventions used by your distribution:

```
mount /dev/cdrom /mnt/cdrom
cd /tmp
```

NOTE If you have a previous installation, delete the previous `vmware-tools-distrib` directory before installing. The location of this directory depends on where you placed it when you did the previous installation. Often it is placed in:

```
/tmp/vmware-tools-distrib
```

- 5 Uncompress the installer and unmount the CD-ROM image.

Depending on whether you are using the tar installer or the RPM installer, do one of the following tasks:

- For the tar installer, at the command prompt, enter:

```
tar xzpf /mnt/cdrom/VMwareTools-5.0.0-<xxxx>.tar.gz
umount /dev/cdrom
```

Where `<xxxx>` is the build/revision number of the Workstation release.

- For the RPM installer, at the command prompt, enter:

```
rpm -Uhv /mnt/cdrom/VMwareTools-5.0.0-<xxxx>.i386.rpm
umount /dev/cdrom
```

Where `<xxxx>` is the build/revision number of the Workstation release.

NOTE If you attempt to install an rpm installation over a tar installation—or the reverse—the installer detects the previous installation and must convert the installer database format before continuing.

- 6 Depending on whether you are using the tar installer or the RPM installer, do one of the following tasks:

- For the tar installer, run the VMware Tools tar installer:

```
cd vmware-tools-distrib
./vmware-install.pl
```

Respond to the configuration questions on the screen. Press Enter to accept the default value.

- For the RPM installer, configure VMware Tools:

```
vmware-config-tools.pl
```

Respond to the questions the installer displays on the screen. Press Enter to accept the default value.

- 7 After the upgrade is complete, restart the network by running the following command:

```
/etc/init.d/network restart
```

- 8 Log off the root account.

```
exit
```

- 9 Start your graphical environment.

- 10 In an X terminal, open the VMware Tools Properties dialog box:

```
vmware-toolbox &
```

To install or upgrade VMware Tools on a Solaris guest

- 1 Open a console to the virtual machine.
- 2 Power on the virtual machine.
- 3 After the guest operating system starts, right-click the virtual machine and choose **Install VMware Tools**.

The remaining steps take place inside the virtual machine.

- 4 Log in as root (`su -`) and, if necessary, mount the VMware Tools virtual CD-ROM image, as follows.

Usually, the Solaris volume manager—`vol`—mounts the CD-ROM under `/cdrom/vmwaretools`. If the CD-ROM is not mounted, restart the volume manager using the following commands:

```
/etc/init.d/volmgt stop
/etc/init.d/volmgt start
```

- 5 After the CD-ROM is mounted, change to a working directory (for example, /tmp) and extract VMware Tools, as follows:

```
cd /tmp
gunzip -c /cdrom/vmwaretools/vmware-solaris-tools.tar.gz | tar xf -
```

- 6 Run the VMware Tools tar installer:

```
cd vmware-tools-distrib
./vmware-install.pl
```

Respond to the configuration questions on the screen. Press Enter to accept the default value.

- 7 Log off of the root account.

```
exit
```

- 8 Start your graphical environment.

- 9 In an X terminal, open the VMware Tools Properties dialog box:

```
vmware-toolbox &
```

To install VMware Tools in a NetWare virtual machine

- 1 Open a console to the virtual machine.
- 2 Power on the virtual machine.
- 3 After the guest operating system starts, right-click the virtual machine and choose **Install VMware Tools**.

The remaining steps take place inside the virtual machine.

- 4 Load the CD-ROM driver so the CD-ROM device mounts the ISO image as a volume.

Do one of the following tasks:

- In the system console for a NetWare 6.5 virtual machine, enter:
LOAD CDDVD
- In the system console for a NetWare 6.0 or NetWare 5.1 virtual machine, enter:
LOAD CD9660.NSS

When the driver finishes loading, you can begin installing VMware Tools, as described in the next step.

- 5 In the system console, enter the following command:

```
vmwtools:\setup.ncf
```

When the installation finishes, the message **VMware Tools for NetWare are now running** appears in the Logger Screen (NetWare 6.5 and NetWare 6.0 guests) or the Console Screen (NetWare 5.1 guests).

For more information about installing guest operating systems and VMware Tools, see the *Guest Operating System Installation Guide*.

Managing Virtual Machines

This section describes the power states of virtual machines, and how to power them on and off.

Understanding Virtual Machine Power States

The basic power state options include:

- **Power on** – Powers on the virtual machine and boots the guest operating system if the guest operating system is installed.
- **Power off** – Powers off the virtual machine. The virtual machine does not attempt to shut down the guest operating system gracefully.
- **Suspend** – Pauses the virtual machine activity. All transactions are frozen until you issue a resume command.
- **Resume** – Allows virtual machine activity to continue and releases the Suspended state.
- **Reset** – Shuts down the guest operating system and restarts it. This operation depends on the operating system being shut down. If shutdown is not automatic for that operating system, VMware Tools must be installed.

The following power options perform extra functions in addition to the basic virtual machine power operations. VMware Tools must be installed in the virtual machine to perform these functions:

- **Shut down guest** – Shuts down the guest operating system gracefully.
- **Standby guest** – Suspends the guest operating system and run VMware tools suspend scripts.
- **Restart guest** – Shuts down and restarts the guest operating system without powering off the virtual machine.

Toolbar power buttons perform as follows:

- **Power off** – Powers off the virtual machine. A power off operation displays a confirmation dialog box indicating that the guest operating system might not shut down properly.
- **Power on** – Powers on a virtual machine when a virtual machine is stopped, or resumes the virtual machine and runs a script when it is suspended and VMware Tools is installed and available. Resumes the virtual machine and does not run a script when VMware Tools is not installed.
- **Suspend** – Suspends the virtual machine without running a script when VMware Tools is not installed, or runs a script, and suspends the virtual machine when VMware Tools is installed and available.
- **Reset** – Resets the virtual machine when VMware Tools is not installed, and restarts the guest operating system when VMware Tools is installed and available. A reset operation displays a confirmation dialog box indicating that the guest operating system is not shut down properly.

NOTE The specific form of the power state action can be modified to include guest operating system shutdowns or not and to include running scripts or not. To configure power operation settings choose host > **Configuration** > **Virtual Machine startup/shutdown**.

Manually Powering a Virtual Machine On and Off

Before changing any power state on a virtual machine, you must have added the virtual machine to your VMware Infrastructure environment.

To manually change the power state of a virtual machine

- 1 Click **Inventory** in the navigation bar.
- 2 Expand the inventory as needed and click the appropriate virtual machine.

- 3 Choose from the following options:
 - Click the **power** option from the toolbar.

NOTE The **Power Off** button on the toolbar, by default, performs a “hard” power off. To perform a graceful shutdown of a guest operating system, use the right-click option or shut down the operating system directly from inside the guest. Alternatively, the behavior of the power button can be changed on a per-virtual machine.

- Right-click the virtual machine and choose a power option.

NOTE The pop-up menu on a virtual machine displays two options: **Power Off** and **Shut Down**. **Power Off**, sometimes called “hard” power off, is analogous to pulling the power cable on a physical machine, and always works. **Shut Down**, or “soft” power off, leverages VMware tools to perform a graceful shutdown of a guest operating system. In certain situations, such as when VMware Tools is not installed or the guest operating system is hung, shutdown might not succeed.

If an option is not currently available, it is greyed and unselectable.

After the power option is selected, VMware Infrastructure Client displays messages in **Recent Tasks** indicating the transition modes.

Using Suspend and Resume

The suspend and resume feature is most useful to save the current state of your virtual machine and pick up work later with the virtual machine in the same state.

After you resume and do additional work in the virtual machine, you cannot return to the state the virtual machine was in at the time you suspended. To preserve the state of the virtual machine so that you can return to the same state repeatedly, take a snapshot. See *Basic System Administration* or the *VI Client Online Help*.

The speed of the suspend and resume operations depends on how much data has changed while the virtual machine was running. In general, the first suspend operation takes longer than later suspend operations do.

When you suspend a virtual machine, a file with a `.vmss` extension is created. This file contains the entire state of the virtual machine. When you resume the virtual machine, its state is restored from the `.vmss` file.

To suspend a virtual machine

- 1 If your virtual machine is running in full-screen mode, return to window mode by pressing the **Ctrl-Alt** key combination.
- 2 Click **Suspend** on the VMware Infrastructure Client toolbar.
When VMware Infrastructure Client completes the suspend operation, it is safe to exit VMware Infrastructure Client.
- 3 Choose **File > Exit**.

To resume a virtual machine that you have suspended

- 1 Start VMware Infrastructure Client and select a virtual machine that you have suspended.
- 2 Click **Power On** on the VMware Infrastructure Client toolbar.

NOTE Applications you were running at the time you suspended the virtual machine are running, and the content is the same as it was when you suspended the virtual machine.

Editing Virtual Machine Settings

In addition to customizing a virtual machine while you create it, you can edit the virtual machine configuration after you create it.

To edit an existing virtual machine configuration

- 1 From the VI Client inventory, select the virtual machine to customize.
- 2 Power off the virtual machine.
You cannot edit most virtual machine properties if the virtual machine is powered on.
- 3 In the **Summary** tab, click **Edit Settings**.
- 4 Select one of the following tabs:
 - **Hardware** – To edit hardware settings such as memory, CPU, and disk drives.
 - **Options** – To edit power management settings and other options.
 - **Resources** – To edit resource settings for this virtual machine.
- 5 Make changes as needed and click **OK**.

For more information about configuring virtual machines, see the *VI Client Online Help*.

Adding Hardware and Devices

You can configure additional virtual hardware for your virtual machine as needed. The following hardware devices can be added:

- Serial port
- Parallel port
- Floppy drive
- DVD/CD-ROM drive
- Ethernet adapter
- Hard disk
- SCSI controller

To add a hardware device

- 1 From the VI Client inventory, select the virtual machine to customize.
- 2 Power off the virtual machine.

You cannot edit most virtual machine properties if the virtual machine is powered on.

- 3 In the **Summary** tab, click **Edit Settings**.
- 4 Click the **Hardware** tab and click **Add**.
- 5 Select the type of device to add and click **Next**.
- 6 Follow the steps in the wizard to add the device.

For additional information about the options for particular device types, see the *VI Client Online Help*.

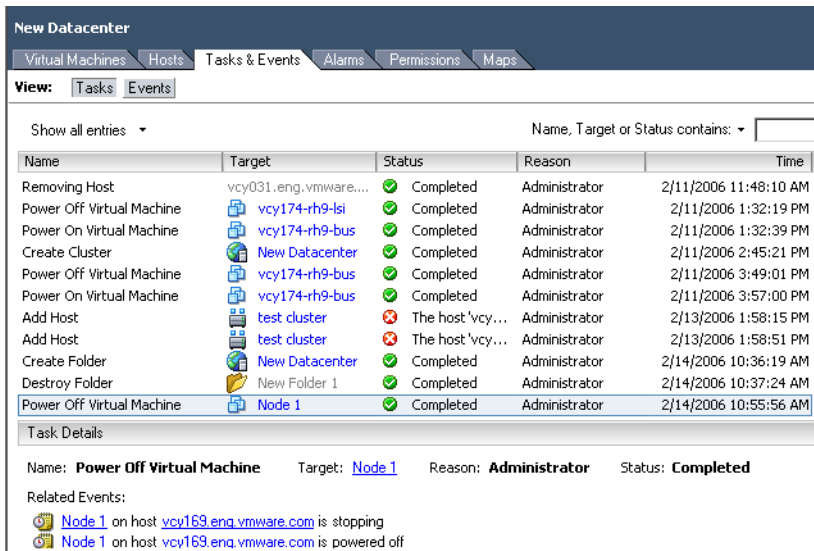
Tasks and Events

This section describes how to monitor the status of VMware Infrastructure by using tasks and events, how to schedule automated tasks, and how to use alarms.

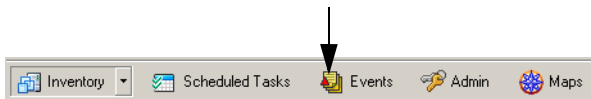
To display tasks and events

- 1 Select a datacenter, host, or virtual machine from the VI Client inventory.
- 2 Click the **Tasks & Events** tab.

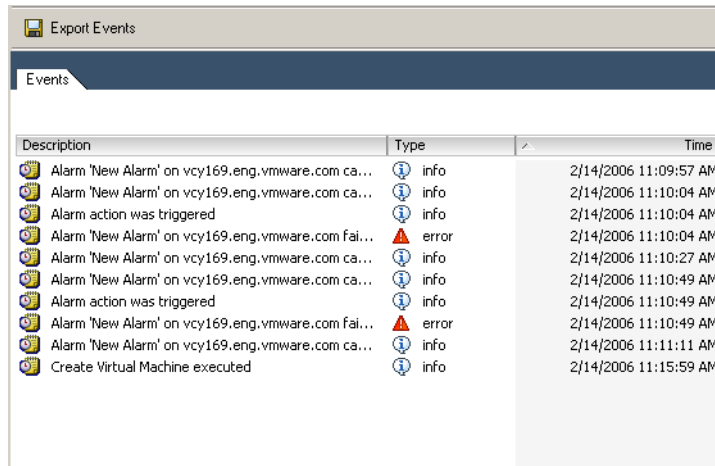
To display either tasks or events, click either **Tasks** or **Events** below the line of tabs. You can then select individual tasks or events to see additional information in the Details pane at the bottom of the window.



- To view events only, click **Events** in the navigation bar.



Selecting **Events** displays alarms or informational messages. You can export them to a file by clicking **Export Events**. See the *VI Client Online Help*.



You can create a scheduled task to perform certain actions at designated times.

To create a scheduled task

- 1 In the VI Client, click **Scheduled Tasks** in the navigation bar.
- 2 Click **New**.
- 3 Choose a task to schedule and click **OK**.
- 4 Follow the remaining steps in the wizard.

For information about configuring particular tasks, see the *VI Client Online Help*.

Alarms

Alarms send notification messages when selected events occur to or on hosts or virtual machines. Alarms indicate the status levels of an object, or collection of objects, in the hierarchy. Alarms can be defined at all hierarchical levels, including folders, datacenters, clusters, resource pools, hosts, and virtual machines.

Alarms are inherited from parent levels and cannot be changed or overridden at a child level. You can add new alarms to any object and contribute to the collection of alarms that are in force at any of its child levels.

When a user creates an alarm, VirtualCenter verifies that the user has permission to perform the actions on the relevant datacenters, hosts, and virtual machines. After the alarm is created, the alarm is performed even if the user who created it no longer has permission to create the alarm.

Alarms are applied to either hosts or virtual machines. Each alarm has a triggering event and a notification method.

There are two kinds of alarm triggers:

- **Percentage** – Monitors host CPU, memory, network, and disk usage.
The triggering options are **Is Above** (percent) and **Is Below** (percent).
- **State** – Monitors host state and virtual machine state.
The triggering options are **Is** (state) and **Is Not** (state).

To view alarms

- 1 Select a datacenter, host, or virtual machine from the VI Client inventory.
- 2 Click the **Alarms** tab.
- 3 To view alarms that have been triggered, click **Triggered Alarms**.
- 4 To view alarms that have been defined, click **Definitions**.

A list of defined alarms appears. You can double-click an alarm definition to display the Alarm Settings dialog box and view or edit the alarm settings.

To define new alarms

- 1 Select a datacenter, host, or virtual machine from the VI Client inventory.
- 2 Click the **Alarms** tab and click **Definitions**.
- 3 Right-click the panel and choose **New Alarm** to display the Alarm Settings dialog box.

You can also right-click an object in the inventory pane and choose **Add Alarm**.

If you start from a folder, datacenter, or cluster, the Alarm Settings dialog box displays the option to create an alarm for either a host or a virtual machine. If you start from a resource pool, host, or virtual machine, the **Monitor a Host** or **Monitor a Virtual Machine** option is preselected and the other option is dimmed.

- 4 In the **General** tab, specify a name for the alarm, the object to be monitored (host or virtual machine), and whether to enable this alarm.

To define the alarm but not make it active, deselect the **Enable** box.

- 5 Click the **Triggers** tab and **Add** to add a trigger.
- 6 Choose the values for the trigger from the **Trigger Type**, **Condition**, **%Warning**, and **%Alert** drop-down lists.

Add all of the triggers you want for this alarm.
- 7 Click the **Reporting** tab and set the Tolerance and Frequency values for the alarm.
- 8 Click the **Actions** tab and click **Add** to define an action that will be taken when the alarm changes state.
- 9 Click **OK** to close the dialog box and save your alarm settings.

For more information about tasks, events, and alarms, see *Basic System Administration*.

There are a number of advanced administration tasks not covered by this guide. See the following VMware Infrastructure manuals:

- For more information about security, see the *ESX Server 3 Configuration Guide*.
- For more information about configuring storage, see the *ESX Server 3 Configuration Guide* and the *iSCSI SAN Configuration Guide*.
- For information about backing up virtual machines, see the *Virtual Machine Backup Guide*.
- For more information about configuring and using VMotion to migrate powered-on virtual machines, see the *iSCSI SAN Configuration Guide*.
- For more information about using VMware DRS to optimize resource use, see the *Resource Management Guide*.
- For more information about using VMware HA to maximize virtual machine uptime, see the *Resource Management Guide*.

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Updates for the Quick Start Guide

Last Updated: August 14, 2009

This document provides updates to the ESX Server 3.5 and VirtualCenter 2.5 version of the *Quick Start Guide*. Updated descriptions, procedures, and graphics are organized by page number so that you can easily locate the areas of the guide that have changes. If the change spans multiple sequential pages, this document provides the starting page number only.

The following is a list of updates to the *Quick Start Guide*:

- [Updates for the VMware Infrastructure at a Glance Section on Page 12](#)
- [Updates for the Table of Supported Database Formats on Page 14](#)
- [Updates for the Preparing the VirtualCenter Server Database Section on Page 21](#)
- [Updates for the To prepare a SQL Server database to work with VirtualCenter Procedure on Page 24](#)
- [Updates for the Configuring Microsoft SQL Server 2005 Express Section on Page 26](#)
- [Updates for the To install VMware Infrastructure Management Procedure on Page 29](#)
- [Updates to the To Add a Host To the Inventory Procedure on Page 45](#)

Updates for the VMware Infrastructure at a Glance Section on [Page 12](#)

The [Database](#) bullet states that the bundled Microsoft SQL Server 2005 Express database allows you to create up to 5 virtual machines. The correct number is 50 virtual machines.

Updates for the Table of Supported Database Formats on Page 14

The following row should appear in [Table 1-1](#):

Microsoft SQL Server 2005 Standard	Install SP1 or SP2 for Microsoft SQL Server 2005. For Windows 2000 and Windows XP, apply MDAC 2.8 SP1 to the client. Use the SQL Native Client driver for the client.
------------------------------------	---

[Table 1-1](#) does not mention support for versions later than 10.2.0.3.0 of Oracle 10g Enterprise Release 2, and the support for two new Oracle patches. The row should appear as follows:

Oracle Database 10g Release 2 (10.2.0.1.0) Standard Edition	After applying patch 10.2.0.3.0 to the client and server, apply patch 5699495 to the client. Also apply patches 6085625 and 6452485 to the server.
Oracle Database 10g Release 2 (10.2.0.1.0) Enterprise Edition	Note: VMware supports 10.2.0.3.0 and later versions of Oracle Database 10g Release 2.

Updates for the Preparing the VirtualCenter Server Database Section on Page 21

In the section [Preparing the VirtualCenter Server Database](#), the text states that Microsoft SQL Server 2005 Express is recommended only for small deployments of up to 5 hosts and 5 virtual machines. The correct number is 50 virtual machines.

Updates for the To prepare a SQL Server database to work with VirtualCenter Procedure on Page 24

The following text should appear in the [To prepare a SQL Server database to work with VirtualCenter](#) section:

Make sure that the database user has the following permissions:

- Microsoft SQL Server 2000** – Make sure that the database user has the db_owner fixed database role on the VirtualCenter database and the MSDB database. The db_owner role on the MSDB database is required for installation and upgrade only. You can revoke this role after the installation or upgrade process is completed. Do not grant the System Administrators server role to the database user. However, if the System Administrators role was previously granted while the database was used with VirtualCenter Server 2.0.x, do not revoke the System Administrators role. Leave it as is.

- **Microsoft SQL Server 2005** – Make sure that the database login has either the sysadmin server role or the db_owner fixed database role on the VirtualCenter database and on the MSDB database. The db_owner role on the MSDB database is required for installation and upgrade only. You can revoke this role after the installation or upgrade process is complete.

Updates for the Configuring Microsoft SQL Server 2005 Express Section on [Page 26](#)

In the section [Configuring Microsoft SQL Server 2005 Express](#), the text states that the Microsoft SQL Server 2005 Express database is suitable for small deployments of up to 5 hosts and 5 virtual machines. The correct number is 50 virtual machines.

Updates for the To install VMware Infrastructure Management Procedure on [Page 29](#)

[Step 7](#) states that Microsoft SQL Server 2005 Express is meant to be used only for small deployments of up to 5 hosts and 5 virtual machines. The correct number is 50 virtual machines.

Updates to the To Add a Host To the Inventory Procedure on [Page 45](#)

[Step 5](#) in the [To add a host to the inventory](#) procedure should contain the following information regarding the Lockdown Mode:

NOTE Lockdown mode, which is available only in ESXi Embedded, is not available in ESX installations. Lockdown Mode disables remote access for the administrator after vCenter Server takes control of the ESXi host. For more details, refer the ESX Server 3i Lockdown mode section in *ESX Server 3i Configuration Guide*.
