

Licensing VirtualCenter and ESX Server

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This chapter describes licensing options for VMware VirtualCenter and ESX Server. It describes the licensing models available with ESX Server and VirtualCenter, and provides procedures for redeeming license files and configuring license options.

This chapter contains the following sections:

- [“VirtualCenter and ESX Server Licensing Model”](#) on page 33
- [“License Key Functionality”](#) on page 38
- [“Obtaining License Files”](#) on page 41
- [“Setting Up License Server-Based Licensing”](#) on page 42
- [“Setting Up Host-Based Licensing”](#) on page 49
- [“ESX Server License Types”](#) on page 52
- [“License File”](#) on page 54
- [“Installing a Standalone License Server”](#) on page 60
- [“Troubleshooting Licensing”](#) on page 61

VirtualCenter and ESX Server Licensing Model

Software licenses are required for most operations in VirtualCenter and ESX Server, such as powering on a virtual machine. However, you can install, launch, and configure VirtualCenter version 2 and ESX Server version 3 without a software license. See [“License Key Functionality”](#) on page 38 for a list of how specific features are licensed.

Customer Licensing Process

After you purchase VMware Infrastructure software, do the following to obtain and use your licenses:

- 1 Decide which licensing mode to employ.

VMware now uses the industry-standard FLEXnet licensing, which offers a choice of licensing modes: license server-based, host-based, or mixed. See [“Host-Based and License Server-Based License Modes”](#) on page 35 for more information.

- 2 Register your purchase.

If you purchased VMware Infrastructure 3 from a VMware partner, you must register your purchase to your VMware store account. See [“Obtaining License Files”](#) on page 41 for more information.

If you purchased VMware Infrastructure 3 directly from VMware, your purchase is already registered to your account. Proceed to [Step 3](#).

- 3 Obtain license files.

After your purchase has been registered (if necessary) and you have received one or more license activation codes, use the Web-based license activation portal to generate and download license files appropriate to the licensing mode you chose in [Step 1](#). See [“Obtaining License Files”](#) on page 41.

- 4 Install and configure software.

Install VirtualCenter and ESX Server. Configure your licensing according to the licensing mode you chose in [Step 1](#):

- To configure license server-based licensing, see [“Setting Up License Server-Based Licensing”](#) on page 42.
- To configure host-based licensing, see [“Setting Up Host-Based Licensing”](#) on page 49.
- To configure a mixed license environment, see [“Host-Based and License Server-Based Machines in the Same Environment”](#) on page 50.

Some terms you might encounter during the license redemption and configuration process are defined below:

- **License activation code** – A license activation code is a unique code that is associated with one or more VMware products purchased. You receive this code after your order is processed, unless you have purchased your products from a VMware partner, in which case you receive your license activation code after you have registered your partner activation code to your VMware account.

- **License redemption portal** – The license redemption portal is a self-service Web portal which you can use to redeem your license activation codes and download license files for VMware Infrastructure 3.
- **Partner activation code** – A partner activation code is a unique code identifying orders placed through VMware partners. If you have purchased VMware Infrastructure 3 from a VMware partner, you use this code to register your purchase to your VMware store account and obtain a license activation code.
- **Partner activation portal** – A partner activation portal is a self-service Web portal used to register a purchase made from a VMware partner to your VMware store account. You enter your partner activation code into the portal, and receive a license activation code.

If you require assistance with licensing, contact VMware for support as follows:

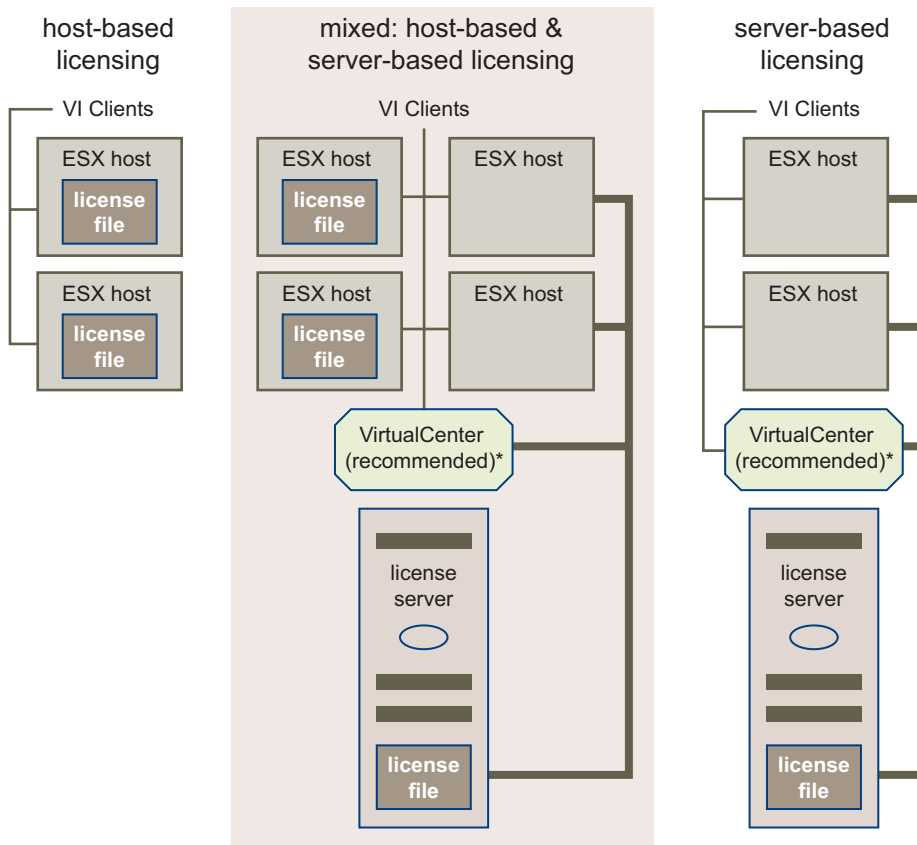
- If you have not yet received license activation codes for your VI3 purchase or have difficulties in using your license activation codes to obtain license files, email vi-hotline@vmware.com.
- If you have already obtained license files and have difficulties in configuring or troubleshooting licensed features, file a support request through <http://www.vmware.com/support>.

Host-Based and License Server-Based License Modes

VirtualCenter and ESX Server support two modes of licensing: license server-based and host-based. In host-based licensing mode, the license files are stored on individual ESX Server hosts. In license server-based licensing mode, licenses are stored on a license server, which makes these licenses available to one or more hosts. You can run a mixed environment employing both host-based and license server-based licensing.

VirtualCenter and features that require VirtualCenter, such as VMotion™, must be licensed in license server-based mode. ESX Server-specific features can be licensed in either license server-based or host-based mode.

[Figure 3-1](#) illustrates the three types of license environments.



* Some features, such as VMotion and VMware HA, require VirtualCenter.

Figure 3-1. License File Locations in Host-Based, Mixed, and License Server-Based Environments

License Server-Based Licensing

License server-based licensing simplifies license management in large, dynamic environments by allowing a VMware license server to administer licenses. With license server-based licensing, you maintain all your VirtualCenter Management Server and ESX Server licenses from one console.

Server-based licensing is based on industry-standard FLEXnet mechanisms. With server-based 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 for that entitlement is checked out from the license

pool. License keys are released back to the pool when they are no longer being used and are available again to any host.

The advantages of license server-based licensing include:

- You administer all licensing from a single location.
- New licenses are allocated and reallocated using 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 as needed. 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, although new licenses cannot be issued, existing VirtualCenter Server licensed functionality continues to operate indefinitely and existing ESX Server licensed functionality continues to operate within a 14-day grace period. See [“License Server Availability”](#) on page 45 for more information.

VMware recommends using the license server-based licensing mode for large, changing environments.

Host-Based Licensing

The host-based licensing mode is similar to the licensing mode of previous releases. With host-based licensing, your total entitlement for purchased features is divided on a per-machine basis, divided among separate license files residing on ESX Server hosts and the VirtualCenter Server.

With host-based licensing, when someone activates a licensed feature, the feature for that entitlement must reside in the license file on that host. With host-based licensing, you maintain separate license files on each ESX Server host. Distribution of unused licenses is not automatic, and there is no dependence on an external connection for licensing. Host-based license files are placed directly on individual ESX Server hosts and replace the serial numbers used by previous versions of ESX Server version 2.x.

The advantages of host-based licensing include:

- Host-based files require no license server to be installed for ESX Server host-only environments.
- In a VirtualCenter and license server environment, host-based licensing allows ESX Server host licenses to be modified during periods of license server

unavailability. For example, with host-based licensing you can manually move virtual SMP license keys between hosts without a license server connection.

License Key Functionality

Specific entitlement to run VMware software is determined by license keys. You purchase such keys based on the numbers of processors and on the functionality you want in your entitlement.

Most licensing for ESX Server and VirtualCenter features is on a per-processor basis, meaning that a host requires a feature license for each of its processors in order to activate a feature. Other features are licensed on a per-feature basis, meaning that a single license is required to activate a single instance of the feature, regardless of how many processors it uses.

Licensed features also differ in their operation based on whether they are considered to be ESX Server or VirtualCenter features. ESX Server features can be licensed using either host-based or license server-based licensing mechanisms. They do not require VirtualCenter or a license server to use. VirtualCenter features require license server-based licensing. ESX Server features and VirtualCenter features also differ in their behavior when the license server is not available. See [“License Server Availability”](#) on page 45 for more information.

[Table 3-1](#) summarizes the license feature types for VMware Infrastructure 3.

Table 3-1. Summary of License Feature Types

| Feature | ESX Server or VirtualCenter | Per-Processor or Per-Feature |
|------------------------------------|-----------------------------|------------------------------|
| ESX Server (Starter or Standard) | ESX Server | Per-Processor |
| VirtualCenter Management Server | VirtualCenter | Per-Feature |
| VirtualCenter Agent for ESX Server | VirtualCenter | Per-Processor |
| VMware Consolidated Backup (VCB) | ESX Server | Per-Processor |
| VMotion | VirtualCenter | Per-Processor |
| VMware HA | VirtualCenter | Per-Processor |
| VMware DRS | VirtualCenter | Per-Processor |

Per-Processor Licensing

Most ESX Server licensing is on a per-processor basis for each host, meaning that an ESX Server host with two processors requires two license keys to activate a given feature, and a four-processor host requires four license keys to activate the feature. This

per-processor licensing applies to basic features, as well as add-on functionality. Special considerations include:

- Dual-core and quad-core processors count as one processor.
- You cannot partially license a multiprocessor machine.

For example, imagine that your virtual infrastructure includes four dual-processor machines, and you want to use migration with VMotion between two of these machines. You can buy a license for one instance of VirtualCenter Server, eight processor licenses for ESX Server, and four processor licenses for VMotion. (If you wanted to use VMotion between all four machines, instead of between two machines, eight processor licenses for VMotion would be required.)

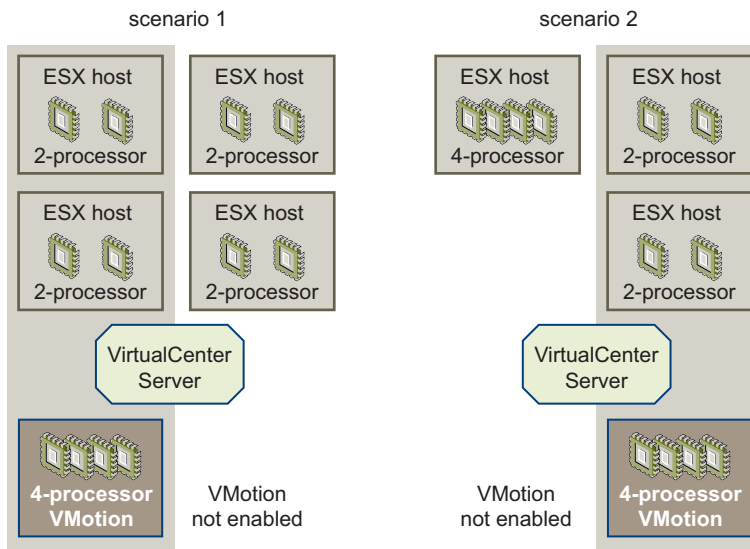


Figure 3-2. Two Example Licensing Scenarios Showing Different Uses for the Same Licenses

Scenario 1 displays four VMotion processor licenses enabling a cluster of two dual-processor machines. In the figure, the licenses have been applied to the two ESX Server hosts contained in the shaded box. You can change the machines on which your VMotion licenses reside, allowing you to put any pair of your dual-processor machines into a VMotion cluster. However, you cannot perform VMotion with a machine from which you have removed a VMotion license keys.

Scenario 2 adds one 4-processor machine, requiring you to retire two dual-processor machines to enable the new hardware with the same licenses. Possible alternatives (not diagrammed) include the following:

- If you do not want to retire any machines, four more ESX Server processor license purchases are required.
- If you want to add the 4 processor machine to the VMotion cluster, you need four additional licenses for a total of eight processor licenses for VMotion.
- If you want to keep all four dual-processor hosts, add the 4-processor host, and license them all for VMotion, you need twelve total ESX Server processor licenses and twelve total VMotion processor licenses.

NOTE Refer to [Table 2-1, “Supported Processor Configurations,”](#) on page 28 for details on the maximum number of supported processors per host.

The following features are licensed on a per-processor basis:

- **ESX Server license type** – To power on a virtual machine, a host must have licensing on a per-processor basis. This means a dual-processor host requires two matching ESX Server licenses. A four-processor machine requires four matching ESX Server licenses. For a description of ESX Server license types, see [“ESX Server License Types”](#) on page 52.
- **VMware Consolidated Backup (VCB)** – To leverage the new Consolidated Backup capabilities—and backup of all virtual machines running on an ESX Server host—a VCB license key must be available for each processor within that host. Refer to the *Virtual Machine Backup Guide* for a description of this feature.
- **VirtualCenter Agent for ESX Server** – This agent is installed on a ESX Server host when it is added to your VirtualCenter Management Server. You must have one agent license key for each ESX Server processor to be added to your VirtualCenter Server.
- **VMotion** – To migrate a powered-on virtual machine between hosts, each ESX Server processor involved must have a VMotion license key. For example, if you use VMotion from a dual-processor ESX Server host to another dual-processor host, you must have four VMotion licenses. Refer to the *SAN Configuration Guide* for a description of this feature. Refer to *Basic System Administration* for a description of virtual machine configuration.
- **VMware HA** – To automatically restart virtual machines whose ESX Server host has failed, the VirtualCenter Server must have an HA license key for each ESX Server processor in the HA cluster. Refer to the *Resource Management Guide* for a description of this feature.

- **VMware DRS** – To provide automatic load balancing of virtual machines among hosts, the VirtualCenter Server must have a DRS license key for each ESX Server processor in the DRS cluster. Refer to the *Resource Management Guide* for a description of this feature.

NOTE As a prerequisite, DRS requires appropriate VMotion license keys for all hosts in the DRS cluster.

Per-Feature Licensing

Features that are licensed on a per-feature basis require only one license key per feature instance, regardless of the number of processors used. The VirtualCenter Management Server is currently the only feature licensed on a per-feature basis.

Obtaining License Files

The process of obtaining license files varies slightly depending on how your purchase of VMware Infrastructure 3 was made. The first step in obtaining license files is to obtain one or more license activation codes, which you receive in one of three ways:

- If you purchased VMware Infrastructure 3 from a VMware partner, such as Dell, Hewlett-Packard, or IBM, you receive an email containing one or more partner activation codes and a link to a partner activation portal. Enter these codes into the partner activation portal to register your purchase to your VMware store account. After you register the purchase, you receive an email containing a license activation code.
- For other new purchases of VMware Infrastructure 3, you receive an email containing a license activation code.
- If you receive upgrade entitlements for VMware Infrastructure 3 through a service and support subscription, you receive one or more emails containing license activation codes. Typically, you receive one license activation code per line item on your original ESX Server 2.x/VirtualCenter 1.x order.

When you have received the email containing your license activation codes, follow the instructions in the email to access the Web-based license activation portal and generate license files.

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

Setting Up License Server-Based Licensing

You can configure license server-based licensing at installation time. After installation, you can make changes to licensing through the Virtual Infrastructure Client. This section discusses:

- [“Installing the License File”](#) on page 42
- [“Location of the License Server”](#) on page 42
- [“Configuring License Server-Based Licensing”](#) on page 43
- [“Changing the Default License Server Ports”](#) on page 45
- [“License Server Availability”](#) on page 45
- [“Changing from Host-Based to License Server-Based Licensing”](#) on page 48
- [“Using an Existing FLEXnet License Server”](#) on page 49

Installing the License File

Save your license file as a plain text file. Use the name `vmware.lic` on a file system you can access from your license server machine.

NOTE The file extension `.lic` is required.

You can then import this file into your license server during installation:

- See [“Installing the VirtualCenter Server”](#) on page 71 for instructions regarding the recommended license server installation.
- See [“Installing a Standalone License Server”](#) on page 60 for instructions on the standalone license server.

The license server can only use one license file at a time. If you have obtained multiple license files (for example, from separate orders) and you want to manage all of these licenses from a single license server, you must use a text editor to combine these files into a single license file. See [“Editing the License File”](#) on page 57 for more information.

Location of the License Server

VMware strongly recommends that you follow the default installation and place your license server on the same machine as your VirtualCenter Server. This has the advantage of simplicity of setup, as well as guaranteeing VirtualCenter-to-license server communications. Change this only if you have a good reason, such as an existing FLEXnet license server. To access the license server documentation, choose:

Start > Programs > VMware > VMware License Server > VMware License Server User Guide.

Configuring License Server-Based Licensing

The first procedure in this section describes VirtualCenter license server-based licensing configuration. If your environment used the default VirtualCenter installation, or if you have no VirtualCenter Server, go directly to [“To configure license server-based licensing for an ESX Server host”](#) on page 44.

To configure license server-based licensing for VirtualCenter Server

- 1 From the VI Client, choose **Administration > Server Settings**.
- 2 Click **License Server** in the list on the left.
- 3 Select the **Use the Following License Server** radio button.
- 4 Enter the machine name and, optionally, a port in the field.

If you do not specify a port, the default port, 27000, is used.

For example, with the default license server port 27000 on a license server called `license`, your entry might look like this:

```
license.vmware.com:27000
```

- 5 (Optional) If you do not want VirtualCenter to override the host’s current license setting, deselect the check box for **Change host license server settings to match VirtualCenter’s setting when they are added to inventory**.

Selecting this check box causes VirtualCenter Server to override the host’s current license setting and instead use the license server used by VirtualCenter.

- 6 Click **OK** to save your changes.

You do not have to change any other settings to enable license server-based licensing.

The total number of licenses consumed and available on the license server are summarized on the **Licenses** tab in the **Admin** view of the VI Client connected to the VirtualCenter Server. This tab was labeled "License Viewer" in earlier versions of VirtualCenter.

NOTE If you did not select the check box for the optional setting, follow the procedure in the next section to manually configure ESX Server hosts to use license server-based licensing.

To configure license server-based licensing for an ESX Server host

- 1 From the VI Client, select the host in the inventory.
- 2 Click the **Configuration** tab.
- 3 To set the license server:
 - a Click **Edit** to the right of **License Sources**.
The License Sources dialog box appears.
 - b Select the radio button for **Use License Server**.
This is the default configuration.
 - c Enter the license server machine name and, optionally, a port into the **Address** field. If you do not specify a port, the default port, 27000, is used.
For example, with the default license server port 27000 on a license server called `license-1`, your entry might look like this:
`license-1.vmware.com:27000`
 - d Click **OK** to close the dialog box and save your changes.
- 4 Set the ESX Server License Type:
 - a Click **Edit** to the right of **ESX Server License Type**.
The ESX Server License Type dialog box appears.
 - b Select either **Starter** or **Standard** license types, or select **Unlicensed** to release this host's licenses back to the license server.
For more information on license types, see ["ESX Server License Types"](#) on page 52.
 - c Click **OK** to close the dialog box and save your changes.
- 5 To configure add-on licenses:
 - a Click **Edit** to the right of **Add-Ons**.
The Add-Ons dialog box appears.
 - b Select the add-ons you want to license, and click **OK**.

The total number of licenses consumed and available on the license server are summarized on the **Licenses** tab in the **Admin** view of the VI Client connected to the VirtualCenter Server. This tab was labeled "License Viewer" in earlier versions of VirtualCenter.

Changing the Default License Server Ports

By default, VirtualCenter and ESX Server software is configured to use TCP/IP ports 27000 and 27010 to communicate with the license server. If you did not use the default ports during license server installation, you must update the configuration on each ESX Server host.

If you change the default ports for the license server, log on to the ESX Server host service console and open the ports you want.

To open a specific port in the service console firewall

- 1 Log on to the service console as the root user.
- 2 Execute this command:

```
esxcfg-firewall --openport <portnumber>,tcp
```

License Server Availability

The license server-based licensing mechanisms used by VMware software are designed to prevent the license server from being a single point of failure. The license server acts primarily as a license distribution mechanism. If your license server becomes unavailable, you cannot issue any new licenses to enable new hosts or new features. However, all licensed functionality currently operating at the time the license server becomes unavailable continues to operate as follows:

- All VirtualCenter licensed features continue to operate indefinitely, relying on a cached version of the license state. This includes not only basic VirtualCenter Server operation, but licenses for VirtualCenter add-ons, such as VMotion and DRS.
- For ESX Server licensed features, there is a 14-day grace period during which hosts continue operation, relying on a cached version of the license state, even across reboots. After the grace period expires, certain ESX Server operations, such as powering on virtual machines, become unavailable.

During the ESX Server grace period, when the license server is unavailable, the following operations are unaffected:

- **Virtual machines** continue to run. Virtual Infrastructure Clients can configure and operate virtual machines.
- **ESX Server hosts** continue to run. You can connect to any ESX Server host in the VirtualCenter inventory for operation and maintenance. Connections to the VirtualCenter Server remain. VI Clients can operate and maintain virtual machines from their host even if the VirtualCenter Server connection is also lost.

During the grace period, restricted operations include:

- Adding ESX Server hosts to the VirtualCenter inventory. You cannot change host VirtualCenter agent licenses.
- Adding or removing hosts from a cluster. You cannot change host membership for the current VMotion, HA, or DRS configuration.
- Adding or removing license keys.

When the grace period has expired, cached license information is no longer stored. As a result, the following operations are affected:

- **Virtual machines** can no longer be powered on. Running virtual machines continue to run but cannot be rebooted.

When the license server becomes available again, hosts automatically reconnect to the license server. No rebooting or manual action is required to restore license availability. The grace period timer is automatically reset whenever the license server becomes available again.

[Table 3-2](#) displays ESX Server licensed operations permitted while the license server is unavailable. Operations that are not permitted are operations that require the acquisition of new licenses from the license server.

Table 3-2. Permitted ESX Server Operations When the License Server Is Unavailable

| Component | Attempted Action | During Grace Period | After Grace Period Expires |
|-----------------|--|---------------------|----------------------------|
| Virtual machine | Power on | Permitted | Not Permitted |
| | Create/delete | Permitted | Permitted |
| | Suspend/resume | Permitted | Permitted |
| | Configure virtual machine with VI Client | Permitted | Permitted |
| ESX Server host | Continue operations | Permitted | Permitted |
| | Power on/power off | Permitted | Permitted |
| | Configure ESX Server host with VI Client | Permitted | Permitted |
| | Modify license file for host-based licensing | Permitted | Permitted |
| | Restart virtual machines within the failed host's HA cluster | Permitted | Not Permitted |
| Any component | Add or remove license keys | Not Permitted | Not Permitted |

Table 3-3 lists VirtualCenter licensed operations that are permitted when the license server is unavailable. Operations that are not permitted are operations that require the acquisition of new licenses from the license server.

Table 3-3. Permitted VirtualCenter Operations When the License Server is Unavailable

| Component | Attempted Action | When License Server is Unavailable |
|----------------------|--|------------------------------------|
| VirtualCenter Server | Remove an ESX Server host from inventory (see next entry) | Permitted |
| | Add an ESX Server host to inventory | Not Permitted |
| | Connect/reconnect to an ESX Server host in inventory | Permitted |
| | Move a powered-off virtual machine between hosts in inventory (cold migration) | Permitted |
| | Move an ESX Server host among folders in inventory | Permitted |
| | Move an ESX Server host out of a VMotion-DRS-HA cluster (see next entry) | Permitted |
| | Move an ESX Server host into a VMotion-DRS-HA cluster | Not Permitted |
| | Configure VirtualCenter Server with VI Client | Permitted |
| | Start VMotion between hosts in inventory | Permitted |
| | Continue load balancing within a DRS cluster | Permitted |
| Any component | Add or remove license keys | Not Permitted |



CAUTION If you release licenses for licensed features while the license server is unavailable, the released licenses cannot be redistributed until the license server becomes available again. For example, if you remove the network adapter associated with VMotion while the license server is unavailable, that VMotion license is released and is unavailable until the license server is available again. Removing a host from the VirtualCenter inventory or removing a host from a cluster has a similar effect.

VirtualCenter Server uses a “heartbeat” mechanism to check whether the license server is reachable and to see if there have been any changes in the license file. The heartbeat interval is five minutes. Therefore, it might take VirtualCenter Server as long as five minutes to detect if there are license changes or if the license server has become unavailable.

When the license server becomes unavailable, or if a change in the license file causes a checked-out license to be removed, VirtualCenter Server marks the affected licenses as “Unlicensed Use”, and the licensed features continue to operate as described above. When the license server becomes available again, or when licenses are re-added to the license file, VirtualCenter Server checks out the licenses again and reverts them to the Licensed state. If a license cannot be checked out, the license remains in the Unlicensed Use state.

If license server availability is a particular concern in your environment, consider one of the following strategies:

- Install the license server on the same machine as the VirtualCenter Server. This is the default option provided by the VirtualCenter installer.
- Install the license server in a virtual machine, and place that virtual machine in an HA cluster. VMware HA will automatically restart the license server machine on another ESX Server host in case of failure.
- Use host-based license files on ESX Server hosts.

Changing from Host-Based to License Server-Based Licensing

You can change your ESX Server hosts from host-based licensing to license server-based licensing. In order to do this, you must generate a new license file, install a license server (if you do not already have one installed), and configure your hosts to use the new licensing mode.

To change ESX Server hosts from host-based licensing to license server-based licensing

- 1 Use the VMware license redemption portal to generate and download a new license server-based license file containing all the licenses for your ESX Server hosts and any associated VirtualCenter server features.

The license redemption portal allows you to generate both host-based and server-based license files from the same license activation code.

- 2 If you have not already installed a license server, do so as follows:
 - To install a license server as part of a VirtualCenter installation, see [Chapter 4, “Installing VMware VirtualCenter,”](#) on page 65.
 - To install a standalone license server, see [“Installing a Standalone License Server”](#) on page 60.
 - To use an existing FLEXnet license server already installed in your environment, see [“Using an Existing FLEXnet License Server”](#) on page 49.

- 3 Configure your VirtualCenter Server and ESX Server hosts as described in [“Configuring License Server-Based Licensing”](#) on page 43.

Using an Existing FLEXnet License Server

In most cases, VMware recommends installing the license server on the same machine as VirtualCenter Server. However, if you already have a FLEXnet license server in your environment providing licenses for other products, you might want to install the VMware license server on that system.

NOTE The VMware license server is supported only on Windows operating systems. You cannot install the VMware license server on a Linux-based FLEXnet server. See [“License Server Software Requirements”](#) on page 24 for more information.

To install the VMware license server on your existing FLEXnet server, use the standalone license server installer as described in [“Installing a Standalone License Server”](#) on page 60. This installs VMware’s license server vendor daemon, which can coexist with other vendor daemons already installed on the server.

Setting Up Host-Based Licensing

Host-based licensing requires a valid license file on each ESX Server host. This section discusses the following host-based licensing topics:

- [“Configuring an ESX Server Machine for Host-Based Licensing”](#) on page 49
- [“Host-Based and License Server-Based Machines in the Same Environment”](#) on page 50
- [“Configuring Licensing for a Mixed ESX Server 2.x and ESX Server 3.x Environment”](#) on page 51
- [“Changing from License Server-Based to Host-Based Licensing”](#) on page 51

Configuring an ESX Server Machine for Host-Based Licensing

When you receive your license file, rename it to `vmware.lic` and place it on a file system you can access from your Virtual Infrastructure (VI) Client.

NOTE The file extension `.lic` is required.

To use the VI Client to configure host-based licensing

- 1 From the VI Client, select the host in the inventory.
- 2 Click the **Configuration** tab.

- 3 Click **Edit** to the right of **License Sources**.

The License Sources dialog box appears.

- 4 Select the radio button for **Use Host License File**.
- 5 Click **Browse** and locate the license file.

This file must be located on the client machine, not on the ESX Server host.

NOTE Files must have a `.lic` extension appear in the file browser.

- 6 Click **OK** to save your changes.

Host-Based and License Server-Based Machines in the Same Environment

Using host-based licenses for ESX Server features and license server-based licensing for VirtualCenter features in the same environment is permitted. However, doing so requires changes to the default VirtualCenter configuration settings. If you do not change the VirtualCenter settings, the settings can override host-based license files:

- When the VirtualCenter Server restarts
- When the host-based ESX Server machines are added to inventory again

Any host-based license file on the ESX Server machine remains unchanged but ignored.



WARNING If you restore an ESX Server machine to host-based licensing without changing the VirtualCenter default configuration, the VirtualCenter Server settings might override the host-based settings on the ESX Server machine.

To change VirtualCenter settings to allow host-based ESX Server licensing

- 1 From the VI Client, choose **Administration > Server Settings**.
- 2 Click **License Server** in the list on the left.
- 3 Deselect the check box for **Change host license server settings to match VirtualCenter's setting when they are added to inventory**.
- 4 Click **OK** to save your changes.
- 5 **Remove** and **Add** any affected ESX Server machine in the inventory.

Now it is safe to reconfigure host-based licensing on any changed ESX Server machines. See [“Configuring an ESX Server Machine for Host-Based Licensing”](#) on page 49.

Configuring Licensing for a Mixed ESX Server 2.x and ESX Server 3.x Environment

You can use VirtualCenter Server 2.0 to manage a mixed environment of both ESX Server 2.x and ESX Server 3.x hosts. You receive license activation codes with purchases of VMware Infrastructure 3 Standard edition and VMware Infrastructure 3 Enterprise edition that can be redeemed for both ESX Server 2.x serial numbers and for VMware Infrastructure 3 license files.

To configure licensing for the ESX Server 2.x hosts in the mixed environment

- 1 Leave the licensing on existing ESX Server 2.x hosts using serial numbers unchanged.
- 2 For new ESX Server 2.x installations, redeem your license activation code(s) on the license redemption portal for ESX Server 2.x serial numbers. Provide these serial numbers at the time of installation or configuration.
- 3 Redeem your license activation code(s) to generate a license server-based license file containing licenses for VirtualCenter Management Server, VirtualCenter Management Agents, VMotion, and ESX Server 3.x. If necessary, combine multiple generated license files to produce a single file. See [“Editing the License File”](#) on page 57.

Your generated license file can include ESX Server 3.x licenses for the ESX Server 2.x hosts for which you obtained ESX Server 2.x serial numbers in [Step 2](#). This allows you to easily distribute licenses to these hosts if they are later upgraded to ESX Server 3.x.

- 4 Install and configure VirtualCenter Server 2.x to use the license server-based license file you have generated. See [Chapter 4, “Installing VMware VirtualCenter,”](#) on page 65.

Changing from License Server-Based to Host-Based Licensing

You can change your ESX Server hosts from license server-based mode to host-based licensing mode. VirtualCenter Server and additional features such as VMotion, VMware DRS, and VMware HA must remain in license server-based mode. In order to change the licensing mode for your ESX Server hosts, you must generate new license files for each host and configure the hosts to use the new licensing mode.

To change ESX Server hosts from license server-based to host-based licensing mode

- 1 Use the VMware license redemption portal to generate and download new host-based license files for each ESX Server host.

The license redemption portal allows you to generate both host-based and server-based license files from the same license activation code. For host-based licensing, you need one license file for each individual ESX Server host.
- 2 If you are using VirtualCenter Server, change your VirtualCenter Server settings so that VirtualCenter Server does not override host license settings, as described in [“Host-Based and License Server-Based Machines in the Same Environment”](#) on page 50.
- 3 Configure your ESX Server host as described in [“Configuring an ESX Server Machine for Host-Based Licensing”](#) on page 49.

ESX Server License Types

When you purchased your VMware Infrastructure software, you purchased one of three available editions, which are:

- **VMware Infrastructure Starter edition** – Provides virtualization for the small business and branch office environments. Its limited production-oriented features include:
 - NAS or local storage
 - Deployable on a server with up to four physical CPUs and up to 8GB physical memory
- **VMware Infrastructure Standard edition** – Provides an enterprise-class virtualized infrastructure suite for any workload. All standard functionality is enabled, and all optional add-on licenses (purchased separately) can be configured with this edition. Includes all production-oriented features, such as:
 - NAS, iSCSI, and SAN usage
 - Up to four-way Virtual SMP
- **VMware Infrastructure Enterprise edition** – Provides an enterprise-class virtualized infrastructure suite for the dynamic data center. It includes all the features of VMware Infrastructure Standard edition, and also includes all optional add-on licenses: VMotion, VMware HA, VMware DRS, and VMware Consolidated Backup.

These three VMware Infrastructure editions correspond to two license types for ESX Server:

- **ESX Server Standard** – This license type includes full access to the full feature set of ESX Server version 3. All standard functionality is enabled and all optional add-on licenses can be configured with the standard license type. If you have purchased either VMware Infrastructure Standard edition or VMware Infrastructure Enterprise edition, select this license type when configuring your host.
- **ESX Server Starter** – This license type includes limited access to the feature set of ESX Server version 3. Certain standard functionality is disabled or available only with an optional add-on license, at additional cost. Some optional add-on licenses cannot be configured with the starter license type. If you have purchased VMware Infrastructure Starter edition, select this license type when configuring your host.

The following tables compare and describe the specific feature entitlement for each license type.

The exact capabilities of ESX Server software vary by license type. [Table 3-4](#) displays ESX Server features arranged by license type.

Table 3-4. License Type Features for ESX Server Machines

| Feature | ESX Server Standard | ESX Server Starter |
|------------------------------------|------------------------|--------------------|
| Maximum number of virtual machines | Unlimited ¹ | Unlimited |
| SAN support | Yes | Not available |
| iSCSI support | Yes | Not available |
| NAS support | Yes | Yes |
| Virtual SMP™ support | Yes | Not available |
| VMware Consolidated Backup (VCB) | Add-on ² | Not available |

1. The maximum number of virtual machines is not limited by licensing
2. This is an optional feature available at additional cost.

The add-ons available to VirtualCenter software also depend on the ESX Server edition license, as described in [Table 3-5](#).

Table 3-5. VirtualCenter Server Add-Ons by License Type

| Feature | ESX Server Standard | ESX Server Starter |
|--------------------------------|---------------------|---------------------|
| VirtualCenter Management Agent | Yes | Yes |
| VMotion | Add-on ¹ | Add-on ¹ |

Table 3-5. VirtualCenter Server Add-Ons by License Type

| Feature | ESX Server Standard | ESX Server Starter |
|------------|---------------------|---------------------|
| VMware HA | Add-on ¹ | Add-on ¹ |
| VMware DRS | Add-on ¹ | Add-on ¹ |

1. This is an optional feature available at additional cost.

License File

Both server-based and host-based operation require license files. This section contains the following topics:

- [“License File Contents”](#) on page 54
- [“License File Locations”](#) on page 56
- [“Editing the License File”](#) on page 57
- [“Sample License Files”](#) on page 59

License File Contents

[Example 3-3](#) shows an example license server-based license file. License files are text files containing two types of information: license mode and license keys.

- **License mode** – The first data appearing in a license file is license mode information. Mode determines whether the license keys can be served on a license server or must be stored on a host. See [“Host-Based and License Server-Based License Modes”](#) on page 35. There is no mode section in host-based license files.

This section also specifies the TCP/IP ports used by the license server to communicate with ESX Server hosts. If you want to modify these default ports, you can do so by editing this section.

A license mode header looks similar to the following:

```
SERVER this_host ANY 27000
VENDOR VMWARELM port=27010
USE SERVER
```

- **License key** – After the mode data, the file contains encrypted license keys, one for each feature to which you are entitled. [Table 3-6](#) lists the available license keys.

Table 3-6. License Keys

| Feature Name | License File Key | License Mode Available |
|---------------------------------|------------------|------------------------------------|
| ESX Server Starter edition | PROD_ESX_STARTER | license server-based or host-based |
| ESX Server Standard edition | PROD_ESX_FULL | license server-based or host-based |
| VMware Consolidated Backup | ESX_FULL_BACKUP | license server-based or host-based |
| VirtualCenter Management Server | PROD_VC | license server-based only |
| VirtualCenter Management Agent | VC_ESXHOST | license server-based only |
| VMware VMotion | VC_VMOTION | license server-based only |
| VMware DRS | VC_DRS | license server-based only |
| VMware HA | VC_DAS | license server-based only |

License server-based files and host-based files can be differentiated by two distinguishing features:

- Host-based license files contain no license mode section. License server-based files contain a license mode section as the file header.
- Host-based license files contain the string 'licenseType=Host' as part of each license key block in the file. License server-based license files contain the string 'licenseType=Server' as part of each license key block in the file, as shown in the examples below.

[Example 3-1](#) shows a typical host-based license key, with the license type string highlighted.

Example 3-1. Host-Based License Key, Showing License Type String

```
VENDOR_STRING=licenseType=Host;capacityType=cpuPackage;gp=14;exclude=BACKUP;count=2 \
HOSTID=ANY ISSUED=22-Jun-2006 NOTICE=FulfillmentId=1202 \
SIGN="CD1A 101F 853C 465A 2771 N905 25A5 8AE3 28F5 8EE2 78F2 \
D078 7125 2408 28BE 0A92 7B23 89FC 45F1 3B11 7704 1C83 82B7 \
37CF E7BE 6E4D 91F5 449C 484B 35F4"
```

[Example 3-2](#) shows a typical license server-based license key, with the license type string highlighted.

Example 3-2. License Server-Based License Key, Showing License Type String

```
INCREMENT ESX_FULL_BACKUP VMWARELM 2005.05 22-dec-2010 32 \
VENDOR_STRING=licenseType=Server;capacityType=cpuPackage \
ISSUED=21-Dec-2005 NOTICE=FulfillmentId=307 SIGN="0354 DA0C \
8DEC 0E06 E589 225C 5C7C BF3D 2CE7 C286 278D 5F5B 72E3 A73A \
130B 1EFC 6830 1D4C 8BD6 331B F962 1854 F345 56AE B3E1 ACA3 \
3F05 0E69 3BC7 D8E2"
```

License File Locations

A license file resides on every license server and every ESX Server machine:

- **Host-based license files** configured through the VI Client are placed at the following location. To add new licenses, edit the license file and re-upload the new file.

```
/etc/vmware/vmware.lic
```

NOTE In license server-based mode, this file exists but contains no license keys.

- **Server-based license files** configured through the VI Client are placed at the following location on the machine running the VMware license server.

```
C:\Program Files\VMware\VMware License Server\vmware.lic
```

NOTE In VirtualCenter 2.0, the default location of the license file was C:\Documents and Settings\All Users\Application Data\VMware\VMware License Server\vmware.lic. This has been changed in VirtualCenter 2.0.1.

You can upload a host-based license file to an ESX Server host using the VI Client.

To upload a host-based license file

- 1 In the VI Client inventory, select the ESX Server host to which you want to upload the file.
- 2 Click the **Configuration** tab.
- 3 Click **Edit** to the right of **License Sources**.
The License Sources dialog box appears.
- 4 Select the radio button for **Use Host License File**.
- 5 Click **Browse** and locate the license file.

You can change the location of your license server-based license file or reload the license file using VMware License Server Tools.

To change the location of or reload the license file

- 1 On the computer on which the license server application is installed, launch VMware License Server Tools by choosing **Start > Programs > VMware > VMware License Server > VMware License Server Tools**.
- 2 Click the **Config Services** tab.
- 3 Click **Browse** next to the Path to license file field, and choose a license file.
- 4 Click the **Start/Stop/Reread** tab.
- 5 Click **Stop**.
- 6 Click **Start**.
- 7 Click **ReRead License File** to load the new license file.

NOTE During license server installation, the installer copies the contents of the license file you select to `C:\Program Files\VMware\VMware License Server\vmware.lic`. If you subsequently use VMware License Server Tools to change the license file, the license server uses the new location specified for the license file. VMware License Server Tools does not copy the new license file to `C:\Program Files\VMware\VMware License Server\vmware.lic`.

To add new licenses, edit the license file and restart the VMware license server.

Refer to [Figure 3-1, “License File Locations in Host-Based, Mixed, and License Server-Based Environments,”](#) on page 36 for a visual representation.

Editing the License File

You can use a plain text editor to edit license files. You can combine license files (for example, to add newly purchased licenses to an existing license file, or to combine entitlements from two separate purchases into a single license file). In some cases, you can split license files apart. You can only combine license files of the same type (host-based or license server-based). You can combine evaluation licenses and production licenses in a single file, but products may require configuration changes when the evaluation licenses expire.

To combine license files

- 1 Copy the license keys from one file and paste them into the other.

If the license file is server-based, do not copy the block of license mode information at the top of the file. See [Example 3-3](#) for a sample license server-based license file with license mode information labeled.

- 2 Save the edited license file as a plain text file using the filename `vmware.lic`.
- 3 Transfer the edited license file to the appropriate location:
 - For license server-based license files, copy the edited license file to `C:\Program Files\VMware\VMware License Server\vmware.lic` on the VirtualCenter Server machine.
 - For host-based license files, upload the license file to the ESX Server host as described in [“To upload a host-based license file”](#) on page 56.
- 4 Activate the edited license file as described in [“Activating an Edited License File”](#) on page 59.

Splitting license files is done a bit differently depending on whether you have host-based or license server-based license files. In a host-based license file, all features are allocated in 2-processor blocks to allow for maximum flexibility in splitting and combining license files. For example, a host-based license file containing an 8 processor entitlement for ESX Server Standard edition contains 4 separate ESX Server Standard license keys. Each key provides licensing for two processors. You could split this file into two license files for two 4-processor hosts, or into four license files for four 2-processor hosts.

In contrast, license server-based license files generally contain a single license key block for each feature. You can split a license server-based file to allocate different features to different license servers, but you cannot split your allotment for a single feature. For example, a license file containing an 8 processor entitlement for ESX Server Standard edition and an 8 processor entitlement for VMotion contains a single ESX Server Standard license key and a single VMotion license key. You could split this file into a file containing the ESX Server Standard allotment and a file containing the VMotion allotment, but you cannot divide either individual allotment between two files.

If you want to divide your purchased allotment for a particular feature among multiple license servers, do this when you generate your license files. The license activation portal allows you to specify a quantity for each license key included in the file.

License-File Editing Tips

When editing your license file, keep in mind the following tips:

- Back up your license file before you edit it.

VMware recommends editing a backup copy of the license file. However, you can always download your original license files from the license redemption portal.
- Do not duplicate or delete the block of license mode information at the top of the file.

- When copying and pasting a license feature into the license file, be sure to select the entire block of feature information, which spans several lines. Incomplete feature entries are ignored.
- Do not edit the license file to change between server-based and host-based licensing. Use the VI Client to reconfigure licensing mode changes.
- Do not combine host-based and license server-based licensing information in a single file. The license file will not work. A single license file can contain either host-based or license server-based license information.
- Save the license file in plain text format.

Activating an Edited License File

To activate an edited license file, you must do one of the following tasks:

- License server-based – Restart the license server Windows service or reload the license file as described in [“To change the location of or reload the license file”](#) on page 57.
- Host-based – Reload the license file with the VI Client as described in [“To upload a host-based license file”](#) on page 56, or reboot the ESX Server host.

To restart the license server Windows Service

The following sequence is for Windows 2000 Professional. The menus and commands for other versions of Windows can vary.

- 1 Choose **Start > Settings > Control Panel**.
- 2 Double-click **Administrative Tools**.
- 3 Double-click **Services**.
- 4 Scroll down until you can right-click **VMware License Server**.
- 5 Choose **Restart** from the pop-up menu.

To restart the ESX Server host

- 1 Log on to the service console or start an ssh session.
- 2 Type `reboot` and press Enter.

Sample License Files

[Example 3-3](#) shows a sample license server-based license file, with the license mode and license key sections labeled. For a table showing which features correspond to which license keys, see [Table 3-6, “License Keys,”](#) on page 55.

Example 3-3. Sample License Server-Based License File

| | |
|---|--|
| <pre>SERVER this_host ANY 27000 VENDOR VMWARELM port=27010 USE_SERVER INCREMENT ESX_FULL_BACKUP VMWARELM 2005.05 22-dec-2010 32 \ VENDOR_STRING=licenseType=Server;capacityType=cpuPackage \ ISSUED=21-Dec-2005 NOTICE=FulfillmentId=307 SIGN="0354 DA0C \ 8DEC 0E06 E589 225C 5C7C BF3D 2CE7 C286 278D 5F5B 72E3 A73A \ 130B 1EFC 6830 1D4C 8BD6 331B F962 1854 F345 56AE B3E1 ACA3 \ 3F05 0E69 3BC7 D8E2"</pre> | <p>License Mode absent in host-based file</p> <p>License Key #1 VMware Consolidated Backup</p> |
| <pre>INCREMENT ESX_FULL_VSMP VMWARELM 2005.05 22-dec-2010 32 \ VENDOR_STRING=licenseType=Server;capacityType=cpuPackage \ ISSUED=21-Dec-2005 NOTICE=FulfillmentId=306 SIGN="01A9 133B \ CE95 2C6F BC0B 655C C338 7DFB 99E0 37E4 50DF 5D34 A2C7 E261 \ 42A2 18C0 3044 D1FC 0B06 7057 EECD A197 892F 25FD 60B4 E8C1 \ C4DC 9030 FC52 F8AD"</pre> | <p>License Key #2 Virtual SMP</p> |
| <pre>INCREMENT VC_DAS VMWARELM 2005.05 22-dec-2010 32 \ VENDOR_STRING=licenseType=Server;capacityType=cpuPackage \ ISSUED=21-Dec-2005 NOTICE=FulfillmentId=312 SIGN="0E67 7096 \ BA2F 4C22 9267 46BB EDD6 B294 189F F590 E787 FD59 50A9 FC59 \ 545C 1AC3 09A9 9DFA EBB1 754A EB8B 2D0E 335F CE15 93AA 1A28 \ 2E6C CC3F 6ACF 9D59"</pre> | <p>License Key #3 VMware HA</p> |
| <pre>INCREMENT VC_DRS VMWARELM 2005.05 22-dec-2010 32 \ VENDOR_STRING=licenseType=Server;capacityType=cpuPackage \ ISSUED=21-Dec-2005 NOTICE=FulfillmentId=311 SIGN="0068 1798 \ 6390 E449 ABBC 7AFE 27AD 4576 D51E 491D 75FB C762 2EAC 8A23 \ F90D 17BE 6335 34F9 1382 A0FD A8D4 8EC3 07DB 3310 DD46 A196 \ 4C51 0914 79D3 538B"</pre> | <p>License Key #4 VMware DRS</p> |

Installing a Standalone License Server

This section describes a standalone installation of the license server. Use this installer for ESX Server host environments that use no VirtualCenter Management Server.

NOTE VMware strongly recommends the default VirtualCenter Server installation in which the license server is automatically installed on the same machine.

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

- Hardware that meets “[System Requirements](#)” on page 21
- A static IP address or machine name to be used by your license server

To install a VirtualCenter license server

- 1 As Administrator on the Windows system, double-click the VMware installation icon or choose **Start > Run** and enter the location of the executable—for example, `VMware-licenseserver.exe`—in the Run window.

A splash screen appears. The VirtualCenter license server installer prepares to install the components.

The Welcome page appears.

- 2 Verify you are installing the license server, and click **Next**.

The License Agreement page appears.

- 3 Read the license agreement, click the **Accept** button, and click **Next**.

The Customer Information page appears.

- 4 Enter your user name and company name. Click **Next**.

The Destination Folder page appears.

- 5 Select the folder in which you want to install the license server. Click **Next**.

The Licensing page appears.

- 6 Select the text file containing your license keys:

- a Locate the email you received from VMware containing your license keys. Save this email as a text file on a drive you can reach from the installer.
- b Type the location of the license file, or click **Browse** to locate this file.
- c Click **Next** to continue.

- 7 Click **Install** to begin the installation.

A progress dialog box appears. Installation might take a few minutes.

- 8 Click **Finish** to complete the license server installation.

Troubleshooting Licensing

This section provides guidelines for troubleshooting your license setup. If you are not able to resolve your problems with licensing using the information given in this section, contact VMware for support as follows:

- If you have not yet received license activation codes for your VI3 purchase or have difficulties in using your license activation codes to obtain license files, email vi-hotline@vmware.com.

- If you have already obtained license files and have difficulties in configuring or troubleshooting licensed features, file a support request through <http://www.vmware.com/support>.

Receiving License Activation Codes

VMware sends license activation codes and licensing information to the license administrator listed for a particular purchase. If you are not the license administrator, contact your organization’s license administrator for your license activation codes.

If you need to change the license administrator for your order, contact vi-hotline@vmware.com. Include the relevant order numbers in your email.

If you purchase VMware Infrastructure 3 from a VMware partner, you must register your purchase using the partner activation code(s) supplied by the partner in order to receive license activation codes.

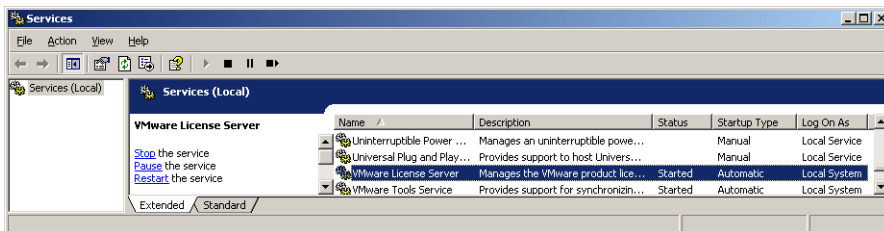
Checking the License Server

If you are having trouble communicating with your license server, check the following:

- Check that the license server Windows service is running.
- Check that license server is listening.
- Check the license server status.

To check that the license server Windows service is running

- 1 On the machine on which the license server is installed, choose **Start > Control Panel > Administrative Tools > Services** to display the Services control panel.
- 2 Verify that the Status column for the VMware License Server entry reads “Started”.
- 3 If the VMware License Server is not started, start it by right-clicking on the service and choosing **Start**.



To check that the license server is listening

- 1 On the machine on which the license server is installed, choose **Start > Command Prompt**.
- 2 Type **netstat -ab** at the command line.
- 3 Verify that the `lmgrd.exe` process is listening on port 27000 and that the `VMWARELM.exe` process is listening on port 27010. If not, the license server might not be installed or might not be started.

| Protocol | Local Address | Foreign Address | State | PID |
|----------|----------------------|-----------------|-----------|--------|
| TCP | LAPTOP27:8085 | LAPTOP27:0 | LISTENING | 416 |
| | [lpxd.exe] | | | |
| TCP | LAPTOP27:8086 | LAPTOP27:0 | LISTENING | 448 |
| | [Tomcat5.exe] | | | |
| TCP | LAPTOP27:8087 | LAPTOP27:0 | LISTENING | 416 |
| | [lpxd.exe] | | | |
| TCP | LAPTOP27:27000 | LAPTOP27:0 | LISTENING | 104484 |
| | [lmgrd.exe] | | | |
| TCP | LAPTOP27:27010 | LAPTOP27:0 | LISTENING | 99812 |
| | [VMWARELM.exe] | | | |
| TCP | LAPTOP27:32219 | LAPTOP27:0 | LISTENING | 388 |
| | [IUStorSvc.exe] | | | |
| TCP | LAPTOP27:netbios-ssn | LAPTOP27:0 | LISTENING | 4 |
| | [System] | | | |
| TCP | LAPTOP27:1036 | LAPTOP27:0 | LISTENING | 2360 |
| | [alg.exe] | | | |

To check the license server status

- 1 On the machine on which the license server is installed, choose **Start > Programs > VMware > VMware License Server > VMware License Server Tools** to launch the LMTOOLS utility.
- 2 Click the **Server Status** tab to display the Server Status page.
- 3 Click **Perform Status Inquiry**.

License server information, including the location of the license file, is displayed at the bottom of the page.

Checking the License File

If your license server is operating properly or if you are using host-based licensing, but you still cannot use licensed features, there might be a problem with your license file. Check the following:

- Ensure that you are using the correct type of license file. If you are using a license server, use a license server-based file. If you are using host-based licensing, make sure that you are using a host-based license file on each host.

License server-based files contain a block of header text at the top, and the string 'VENDOR_STRING=licenseType=Server' appears in each license key in the file. Host-based license files have no header text, and the string 'VENDOR_STRING=licenseType=Host' appears in each license key in the file.

- If you are using a license server-based license file, check that the license mode header information appears only once and at the top of the file.
- Check that the license file contains the correct keys for the features you want to use. See [Table 3-6, "License Keys,"](#) on page 55 for a list of keys.
- If you have edited the license file, check that you have not mixed license server-based and host-based keys in a single file and that you have followed the guidelines in ["License-File Editing Tips"](#) on page 58.

Checking License Configuration

If your license server (if used) appears to be working correctly, and your license file is correct, check that you have correctly configured licensing for your hosts using the VI Client:

- If you are using license server-based licensing, follow the instructions in ["Configuring License Server-Based Licensing"](#) on page 43.
- If you are using host-based licensing, follow the instructions ["Configuring an ESX Server Machine for Host-Based Licensing"](#) on page 49.