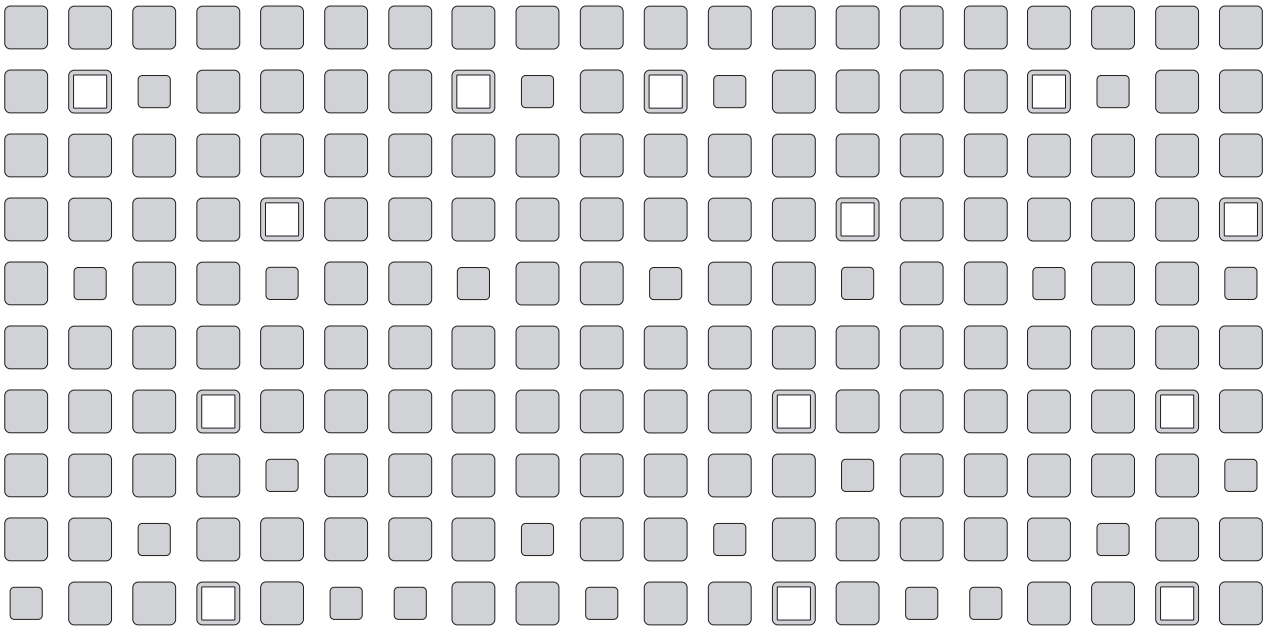


VERSION 2.1

# ESX Server™ 2

Mainframe-Class Virtual Machines for the Most Demanding Environments

## Installation Guide



**VMware, Inc.**

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Palo Alto, CA 94304  
www.vmware.com

**Please note that you will always find the most up-to-date technical documentation on our Web site at <http://www.vmware.com/support/>.**

**The VMwre Web site also provides the latest product updates.**

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# Introduction

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The following sections introduce VMware™ ESX Server™ and provide information about this guide:

- [About This Guide on page 7](#)
- [Technical Support Resources on page 7](#)
  - [The VMware Web Site on page 7](#)
  - [ESX Server Documentation on page 7](#)
  - [VMware Newsgroups on page 7](#)
- [Reporting Problems on page 8](#)

# Welcome to VMware ESX Server

VMware ESX Server is virtual machine software used for consolidating and partitioning servers in high-performance environments. It lets you transform physical computers into a pool of logical computing resources. You can partition physical servers into secure virtual machine servers. You isolate your operating systems and applications in these multiple virtual machine servers that reside on a single piece of hardware. You can then distribute these resources to any operating system or application as needed, when needed.

It is a cost-effective, highly scalable virtual machine platform with advanced resource management capabilities.

Ideally suited for corporate IT and service provider data centers, VMware ESX Server allows you to:

- Implement server consolidation. You can consolidate applications and infrastructure services onto fewer highly scalable, highly reliable enterprise-class servers.
- Deliver high availability and provide for disaster recovery. With a stable, uniform platform, you can deliver more services and deploy new solutions faster and more efficiently. You can store critical data in secure, isolated virtual servers to protect against the vulnerabilities of physical servers.
- Guarantee service levels. Like an internal service provider, your IT department can deliver guaranteed server resources of CPU, memory, disk bandwidth and network bandwidth at optimum performance levels, improving service to customers.
- Streamline development and testing. Your software developers and quality assurance engineers can work effectively with multiple machine environments and build more realistic tests in less time with less hardware.

## How VMware ESX Server Works

VMware ESX Server runs directly on your system hardware to provide a secure, uniform platform for deploying, managing, and remotely controlling multiple operating systems.

With VMware ESX Server, you can:

- Move applications running on dedicated systems into separate virtual machines on a single, more reliable and scalable system.
- Remotely manage servers from any location, simplifying server maintenance.

- Guarantee service levels with advanced resource management controls.
- Script common monitoring and management tasks.
- Increase capacity without adding new physical systems.

## About This Guide

This manual, *ESX Server Installation Guide*, describes how to install and upgrade the ESX 2.1 Server and access the server using the VMware Management Interface.

### Intended Audience

The information written in this manual is for anyone who needs to install the ESX Server and has experience as a Windows or Linux system administrator.

## Technical Support Resources

### The VMware Web Site

The latest documentation and technical support are available on the VMware Web site at [www.vmware.com/support/](http://www.vmware.com/support/). To search for troubleshooting information, use the Knowledge Base.

### ESX Server Documentation

ESX Server documentation consists of the following publications:

- *ESX Server Administrator's Guide*
- *ESX Server Installation Guide*
- *VMware Scripting API User's Manual*
- *ESX Server Systems Compatibility Guide*
- *ESX Server I/O Adapter Compatibility Guide*
- *ESX Server SAN Compatibility Guide*
- *ESX Server Backup Compatibility Guide*

### VMware Newsgroups

The VMware newsgroups are primarily forums for users to help each other. You are encouraged to read and post issues, workarounds and fixes. While VMware personnel may read and post to the newsgroups, they are not a channel for official support. The VMware NNTP news server is at [news.vmware.com](http://news.vmware.com).

The following group is devoted to ESX Server issues:

*vmware.esx-server*

## VMware Community Discussion Forum

The VMware Community is a set of moderated discussion forums hosted on the VMware Web site, and is open to all VMware users. In the forums, VMware Community members come together to exchange information, ask technical questions and share comments. VMware representatives monitor the forum and respond to questions as appropriate. You can join the community discussion forum at [www.vmware.com/community/index.jspa](http://www.vmware.com/community/index.jspa).

## Reporting Problems

These guidelines describe the information you may be asked to provide when you report problems.

Be sure to register your serial number. If you are requesting support directly from VMware, then report your problems using the support request form on the VMware Web site at [www.vmware.com/requestsupport](http://www.vmware.com/requestsupport).

When requesting support from VMware, run the `/usr/bin/vm-support` script on the service console and save the resulting `esx-<date>-<unique-xnumber>.tgz` file. This script collects and packages all relevant ESX Server system, and configuration information and ESX Server log files. This information is used to analyze the problem you are encountering.

- If a virtual machine exits abnormally or crashes, please save the log file (`vmware.log` in the same directory as your `.vmtx` file) and any core files (`core` or `vmware-core` in that directory). Also, please save the virtual machine's configuration (`.vmtx`) file and any other information that might help reproduce the problem.
- Be sure to record a description of your physical hardware and of the software (operating system and applications) that was running in the virtual machine. This information may be required when you request support.

A problem in the VMkernel normally causes the machine to display an error screen for a period of time and then reboot. If you specified a VMware core dump partition when you configured your machine, the VMkernel also generates a core dump and error log. More serious problems in the VMkernel can freeze the machine without an error screen or core dump.

When you report problems directly to VMware, describe the steps you took in the period before this failure. Include this information in your support request, along with the contents of `/var/log/messages` from the service console. Also include the core dump and error log, if any. You can find these in files

named `vmkernel-core.<date>` and `vmkernel-log.<date>` in the `/root` directory after you reboot your machine.



# System Requirements

---

The following sections list the requirements for running ESX Server.

- [Server Hardware Requirements on page 20](#)
  - [Minimum Server Requirements on page 20](#)
  - [Recommended for Enhanced Performance on page 21](#)
- [Maximum Physical Machine Specifications on page 22](#)
- [Remote Management Workstation Requirements on page 23](#)
- [Supported Guest Operating Systems on page 25](#)
  - [Virtual Machine Specifications on page 25](#)
  - [Legacy Devices on page 26](#)

# Server Hardware Requirements

For information on supported hardware, download the *VMware ESX Server Hardware Compatibility Guide* from the VMware Web site at [www.vmware.com/support/](http://www.vmware.com/support/).

## Minimum Server Requirements

You need the following hardware and system resources to install and use ESX Server.

- At least two, and up to sixteen, processors:
  - Intel® 700MHz Pentium® III Xeon and above for ESX Server
  - Intel® 900MHz Pentium® III Xeon and above for Virtual SMP
- 512MB RAM minimum
- Two or more Ethernet controllers. Supported controllers include:
  - Broadcom® NetXtreme 570x Gigabit controllers
  - Intel PRO/100 adapters
  - Intel PRO/1000 adapters
  - 3Com® 9xx based adapters

**Note:** For best performance and security, use separate Ethernet controllers for the service console and the virtual machines.

- A SCSI adapter, Fibre Channel adapter or internal RAID controller.

The basic SCSI adapters supported are Adaptec®, LSI Logic and most NCR™/Symbios™ SCSI adapters. The RAID adapters supported are HP® Smart Array, Dell® PercRAID (Adaptec RAID and LSI MegaRAID), ServeRAID™ and Mylex® RAID devices. The Fibre Channel adapters that are supported are Emulex™ and QLogic™ adapters.

The supported SCSI controllers are Adaptec® Ultra-160 and Ultra-320, LSI Logic Fusion-MPT and most NCR/Symbios™ SCSI controllers. The supported RAID controllers are HP® Smart Array, Dell® PercRAID (Adaptec RAID and LSI MegaRAID), IBM® (Adaptec) ServeRAID and Mylex RAID controllers. The supported Fibre Channel adapters are Emulex™ and QLogic™ host-bus adapters (HBAs).

- A SCSI disk, Fibre Channel LUN or RAID LUN with unpartitioned space. In a minimum configuration, this disk or RAID is shared between the service console and the virtual machines.

## Recommended for Enhanced Performance

- A second disk controller with one or more drives, dedicated to the virtual machines
- Sufficient RAM for each virtual machine and the service console
- Dedicated Ethernet cards for network-sensitive virtual machines

The lists above outline a basic configuration. In practice, you may use multiple physical disks, which may be SCSI disks, Fibre Channel LUNs or RAID LUNs. For best performance, all of the data used by the virtual machines should be on the physical disks allocated to virtual machines. Therefore, these physical disks should be large enough to hold disk images that will be used by all the virtual machines.

Similarly, you should provide enough RAM for all of the virtual machines plus the service console. For background on the service console and how to calculate the amount of RAM you need, refer to the *VMware ESX Server Administration Guide*.

**Note:** To ensure the best possible I/O performance and workload management, VMware ESX Server provides its own drivers for supported devices. Be sure that the devices you plan to use in your server are supported. For additional detail on I/O device compatibility, download the *VMware ESX Server I/O Adapter Compatibility Guide* from the VMware Web site at [www.vmware.com/support/](http://www.vmware.com/support/).

ESX Server virtual machines can share a SCSI disk with the service console, but for enhanced disk performance, you can configure the virtual machines to use a SCSI adapter and disk separate from those used by the service console. You should make sure enough free disk space is available to install the guest operating system and applications for each virtual machine on the disk that they will use.

# Maximum Physical Machine Specifications

## Storage

- 16 host bus adapters per ESX Server system
- 128 logical unit numbers (LUNs) per storage array
- 128 LUNs per ESX Server system

## VMware File System (VMFS)

- 128 VMFS volumes per ESX Server system
- Maximum physical extents per VMFS volume
  - VMFS-2 volumes: 32 physical extents
  - VMFS-1 volumes: 1 physical extent
- 2TB per physical extent
- Maximum size per VMFS volume
  - VMFS-2 volumes: approximately 64TB, with a maximum of 2TB per each physical extent
  - VMFS-1 volumes: approximately 2TB

## CPU

- 16 physical processors per system
- 80 virtual CPUs in all virtual machines per ESX Server system

## Memory

- 64GB of RAM per ESX Server system
- Up to 8 swap files, with a maximum file size of 64GB per swap file

## Adapters

- 64 adapters of all types, including storage and network adapters, per system
- Up to 8 Gigabit Ethernet or 16 10/100 Ethernet ports per system
- Up to 32 virtual machines per virtual network device (`vmnic` or `vmnet` adapter)

# Remote Management Workstation Requirements

The remote workstation is a Windows NT 4.0, Windows 2000, Windows XP or Linux system from which you launch the ESX Server management tools. As an ESX Server administrator, you have two tools to help you set up and maintain an ESX Server system:

- The VMware Management Interface — a graphical interface that uses a Web browser.
- The VMware Remote Console — a stand-alone application that uses a command-line interface.

## Hardware Requirements

- Standard x86-based computer
- 266MHz or faster processor
- 64MB RAM minimum
- 10MB free disk space required for basic installation

## Software for a Windows Remote Workstation

- Windows XP Professional
- Windows 2000 Professional, Server or Advanced Server
- Windows NT 4.0 Workstation or Server, Service Pack 6a
- The VMware Management Interface is designed for these browsers:
  - Internet Explorer 5.5 or 6.0 (6.0 highly recommended for better performance)
  - Netscape Navigator® 7.0
  - Mozilla 1.x

## Software for a Linux Remote Workstation

The remote workstation is compatible with standard Linux distributions with `glibc` version 2 or higher and one of the following:

- For single-processor systems: kernel 2.0.32 or higher in the 2.0.x series, kernel in the 2.2.x series or kernel in the 2.4.x series
- For multiprocessor systems: kernel in the 2.2.x series or kernel in the 2.4.x series
- The VMware Management Interface is designed for these browsers:

- Netscape Navigator 7.0
- Mozilla 1.x

## Supported Guest Operating Systems

The following table lists the supported guest operating systems in ESX Server 2.1. Support for VMware Virtual SMP is marked SMP-capable for dual virtual CPU configurations.

| Guest Operating System  | SMP-Capable |
|---|-------------|
| Windows Server 2003 (Enterprise, Standard and Web Editions)       | Yes         |
| Windows XP Professional (Service Pack 1)                          | No          |
| Windows 2000 Server (Service Pack 3 or 4)                         | Yes         |
| Windows 2000 Advanced Server (Service Pack 3 or 4)                | Yes         |
| Windows NT 4.0 — Service Pack 6a                                  | No          |
| Red Hat Linux 7.2, 7.3 and 8.0                                    | No          |
| Red Hat Linux 9.0   | No          |
| Red Hat Enterprise Linux (AS) 2.1 and 3.0                         | Yes         |
| SuSE Linux 8.2  | No          |
| SuSE Linux Enterprise Server (SLES) 8                             | Yes         |
| Novell NetWare 6.5, 6.0 (Support Pack 3) and 5.1 (Support Pack 6) | No          |

### Virtual Machine Specifications

Each ESX Server machine can host up to 80 virtual CPUs in virtual machines (and up to 200 registered virtual machines) on a single ESX Server, with the following capabilities and specifications.

#### Virtual Storage

- 4 host bus adapters per virtual machine
- 15 targets per host bus adapter
- 60 targets per virtual machine; 256 targets concurrently in all virtual machines

#### Virtual Processor

- Intel Pentium II or later (dependent on system processor)
- One or two processors per virtual machine

**Note:** If you plan to create a dual-virtual CPU virtual machine, then your ESX Server machine must have at least two physical processors and you must have purchased the VMware Virtual SMP for ESX Server product.

**Virtual Chip Set**

- Intel 440BX-based motherboard with NS338 SIO chip

**Virtual BIOS**

- PhoenixBIOS™ 4.0 Release 6

**Virtual Memory**

- Up to 3.6GB per virtual machine

**Virtual SCSI Devices**

- Up to 4 virtual SCSI adapters per virtual machine with up to 15 devices per adapter
- 9TB per virtual disk

**Virtual Ethernet Cards**

- Up to 4 virtual Ethernet adapters per virtual machine

**Note:** Each virtual machine has a total of 5 virtual PCI slots, so the total number of virtual adapters, SCSI plus Ethernet, cannot be greater than 5.

**Virtual Floppy Drives**

- Up to two 1.44MB floppy drives per virtual machine

**Virtual CD-ROM**

- Up to two drives per virtual machine

**Legacy Devices**

Virtual machines may also make use of the following legacy devices. However, for performance reasons, use of these devices is not recommended.

**Virtual Serial (COM) Ports**

- Up to two serial ports per virtual machine

**Virtual Parallel (LPT) Ports**

- One LPT port per virtual machine

# Installing and Configuring ESX Server

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The following sections describe how to install and configure ESX Server:

- [Installing the Software on the Server on page 28](#)
- [Installing VMware ESX Server on page 30](#)
- [Accepting the Security Certificate from ESX Server on page 56](#)
- [Using the System Configuration Wizard to Configure Your Server on page 61](#)
- [Installing Additional Hardware on the Server on page 73](#)
- [Upgrading from a Previous Version of ESX Server on page 75](#)

# Installing the Software on the Server

This installation guide steps you through the process of installing and configuring the VMware ESX Server software on your server.

The *VMware ESX Server Administration Guide* explains how to create and provision virtual machines, how to manage your virtual machines from a remote workstation and how to work with the advanced features of VMware ESX Server.

This section describes the following:

- [Before You Begin on page 28](#)
- [Installing VMware ESX Server on page 30](#)

**Note:** if you are upgrading from a previous version of ESX Server, the process is much faster and simpler than a complete installation. For details, see [Upgrading from a Previous Version of ESX Server on page 75](#).

## Before You Begin

To install VMware ESX Server, you need:

- The VMware ESX Server software CD, which includes the VMware Service Console, VMware ESX Server software and VMware Remote Console software.
- A computer that meets the system requirements for ESX Server. See [Server Hardware Requirements on page 20](#) for details.

The VMware ESX Server installation process installs:

- The service console, which is based on a modified Red Hat Linux 7.2 installation. It is used to configure, start and administer virtual machines.
- The VMkernel, which manages system hardware and the virtual machines running on the server. Users communicate with the VMkernel through the service console.

The VMkernel manages all the operating systems on the machine, including both the service console and the operating systems running in each virtual machine.

- VMkernel modules, which provide support for high-performance device I/O and allow run-time addition of functionality to the VMkernel (for example, network traffic filters).

## Preparing to Install

Be sure you have the network information you need during installation. You need to know:

- The IP address for the server where you are installing ESX Server.
- The host name for the server, including the full domain name for the server, if applicable.
- The netmask for the server's subnet.
- The IP address of the gateway.
- The IP address of the name server.
- Optionally, the addresses of one or two alternate name servers.

In addition, you should have a general idea how many virtual machines you want to run on the server. During installation you must allocate memory to the service console and create swap space. Running more virtual machines on the server requires more memory and swap space.

# Installing VMware ESX Server

There are two installation methods available for installing the VMware ESX Server:

- Graphical installer — a graphical, mouse-based installation program to install or upgrade ESX Server. This is the recommended installation method.
- Text-mode installer — a screen-based interface to install or upgrade ESX Server. Choose this installation method if your system uses a graphics chip not supported by ESX Server, or if your keyboard or mouse do not function properly using the graphical installer.

**Note:** If you choose to install ESX Server using the text-mode installation option, you will need to complete additional configuration steps using the VMware Management Interface once the server is installed. See [Using the System Configuration Wizard to Configure Your Server on page 61](#) for details.

This section describes the following:

- [Performing the Installation Using the Graphical Installer](#)
- [Performing the Installation Using the Text Mode Installer](#)

## Performing the Installation Using the Graphical Installer

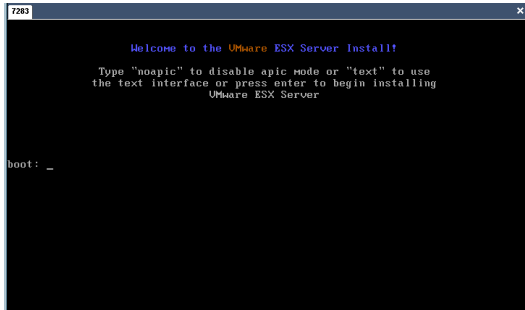
This section describes how to install the ESX Server software on to your server machine using the graphical installer.

**Note:** You can execute all actions in the ESX Server graphical installer interface by pressing the Tab, space bar, directional arrows or the Enter key.

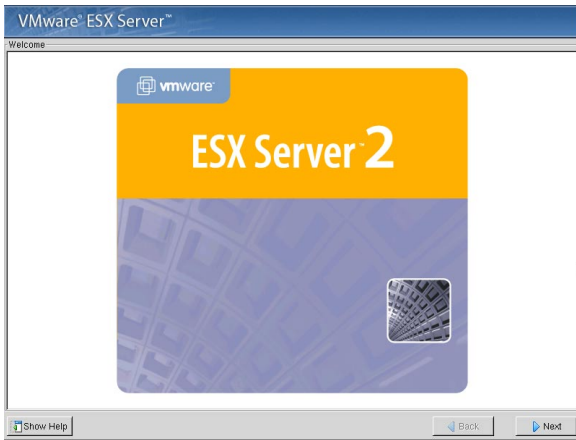
To install the server:

1. Verify the network cable is plugged into the Ethernet adapter that you are using for the service console. The ESX Server installer needs this to properly detect that the machine has a network card.

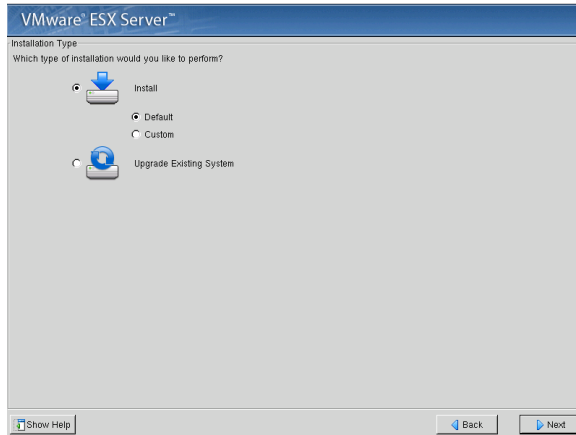
2. Power on the machine with the VMware ESX Server CD in the CD-ROM drive. The ESX Server begins its boot process.



The Welcome screen appears.



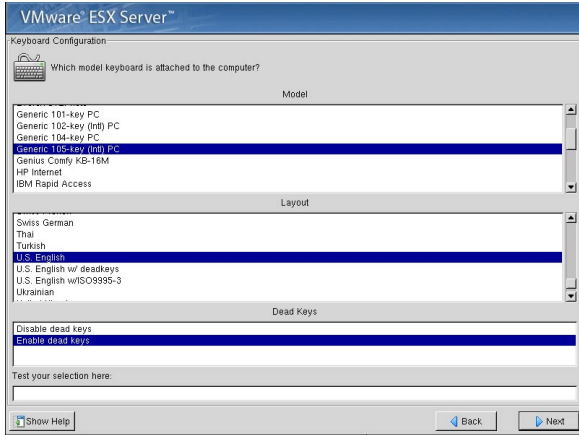
3. Select **Next** to begin the installation. The Installation Type screen appears.



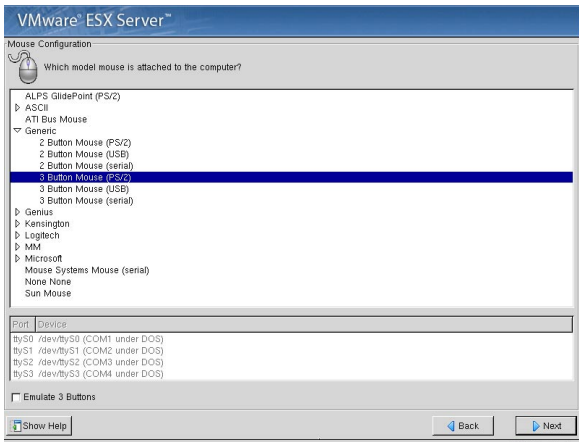
The Welcome screen lists three options:

- **Install Default** — this option performs a full installation and destroys any previously saved information on the selected partitions.
  - **Install Custom** — this option performs a full installation and allows you to select configuration options for your keyboard and mouse.
  - **Upgrade Existing System** — this option upgrades an existing installation of ESX Server.
4. To install ESX Server on a new system, select **Install Default** or **Install Custom**.  
To install ESX Server on a system that contains a previous version of ESX Server, select **Upgrade Existing System**, then follow the steps at [Upgrading from a Previous Version of ESX Server on page 75](#).
  5. If you selected **Install Default**, skip to step 9.

If you selected **Install Custom**, the Keyboard Configuration screen appears.



6. Choose the model, layout, and dead keys settings for your keyboard.
7. Select **Next** to continue. The Mouse Configuration screen appears.

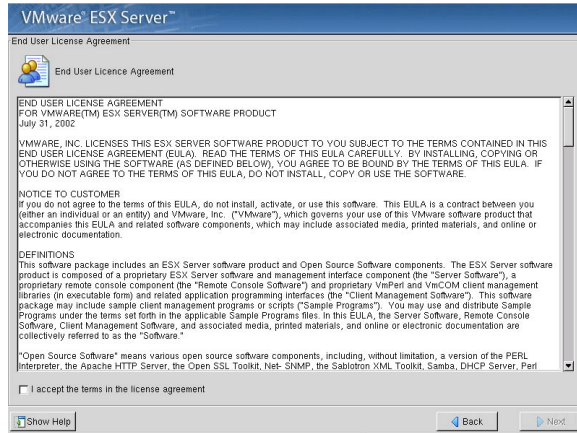


8. Choose the correct mouse type for your system.

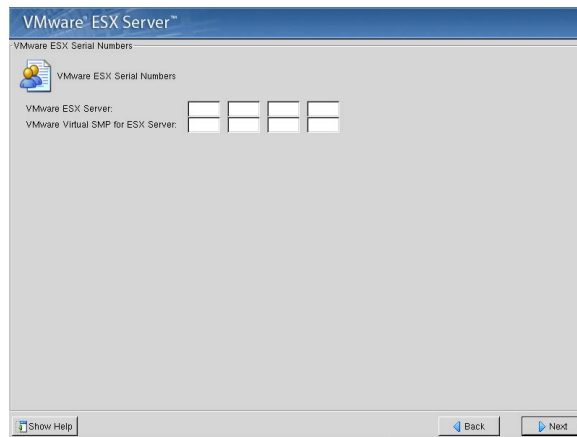
If the connector your mouse plugs into is round, your mouse is a PS/2 or a Bus mouse; if rectangular, it is a serial mouse. Try to find an exact match. If you cannot find an exact match, choose a mouse type which is compatible with yours. Otherwise, choose the appropriate generic mouse type.

In ESX Server, the graphical environment (X Window System) is designed to use a three-button mouse. If you have a two-button mouse, select the **Emulate 3 Buttons** option. After the installation, you can click both mouse buttons at once instead of clicking the middle mouse button.

9. Select **Next** to continue. The End User License Agreement screen appears.



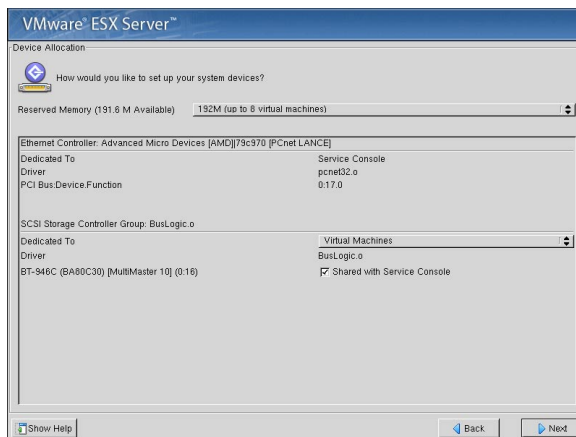
10. Read through the end user license agreement and check **I accept the terms in the license agreement**.
11. Select **Next** to continue. The VMware ESX Serial Numbers screen appears.



12. Enter the ESX Server serial number in the **VMware ESX Server** field.

**Note:** Entering the serial number is not a required step for completing the installation. You may enter it at a later time. If you skip this step, however, you will not be able to start virtual machines in your ESX Server.

13. If you have a license for VMware Virtual SMP for ESX Server, enter that serial number in the **VMware Virtual SMP for ESX Server** field to configure your virtual machines with more than one virtual processor. Entering the serial number installs VMware Virtual SMP for ESX Server.
14. Select **Next** to continue. The Device Allocation screen appears.
15. Define how to set up your system devices.



Configure the service console. This includes reserved memory, SCSI storage controller and Ethernet controllers.

**Reserved Memory** — The default amount of memory reserved for the service console, 192MB, is sufficient for managing up to eight virtual machines concurrently. Change this to 272MB for up to 16 virtual machines, 384MB for up to 32 virtual machines or 512MB for more than 32 virtual machines. Choose 800MB for the maximum number of virtual machines.

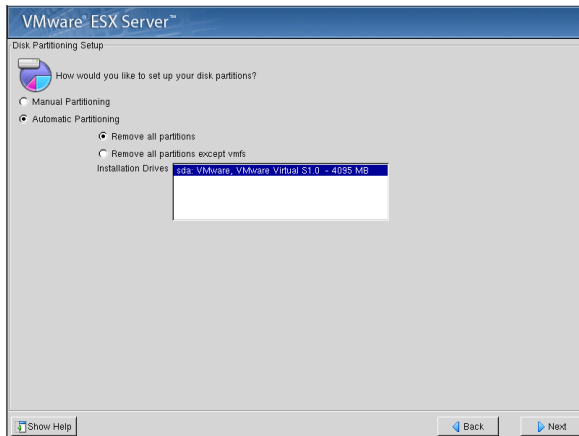
**SCSI Storage Controller** — Allocate storage adapters to be used by the service console and virtual machines on the server. Be sure that both the service console and the virtual machines have access to at least one device. A SCSI or RAID adapter should be shared if you want to use that adapter or array for both the service console and virtual machines. When you are allocating SCSI or RAID devices, the unit of device allocation is a PCI card device. You may connect

multiple SCSI or RAID disks, CD-ROM drives, tape drives and other devices to the SCSI or RAID adapter.

You should give as many SCSI or RAID devices to the virtual machines as possible to ensure that the majority of your mass storage resources are used by your virtual machines. If you do not have any SCSI disks, you may have to allocate at least one IDE disk to the service console, since the service console needs to have a disk from which it and the ESX Server can boot.

**Ethernet Controller** — Allocate network adapters to be used by the service console and virtual machines on the server. Be sure that both the service console and the virtual machines have access to at least one device. It is generally good to give as many network adapters to the virtual machines as possible. Doing so helps ensure that the majority of your network resources are devoted to the virtual machines. Because the service console is intended primarily as a management interface, you should minimize resources allocated to the service console. You need to allocate at least one Ethernet device to the service console in order to manage your ESX Server machine remotely.

16. Select **Next** to continue. The Disk Partitioning Setup screen appears.



Define how to partition your disk(s).

The Disk Partitioning Setup screen lists two choices for the type of disk partition:

**Manual Partitioning** — you manually create each partition. Be sure to delete any existing partitions.

**Automatic Partitioning** — the installer estimates and creates partitions on your disk. You can edit these automatic selections after they are created. Automatic partitioning allows you to have some control concerning what data (if any) is removed from your system.

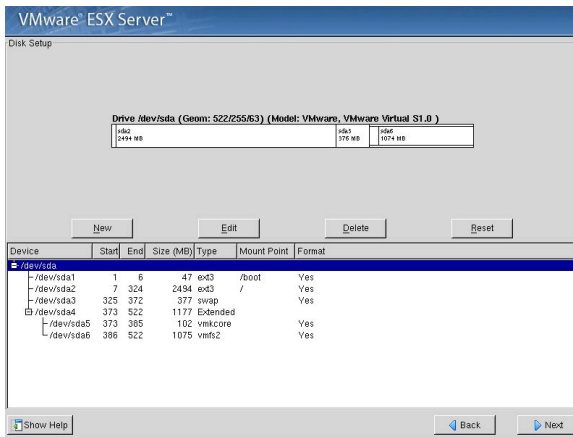
17. Make your selection. Select the type of disk partition: Manual Partitioning or Automatic Partitioning.
18. If you choose automatic partitioning, specify the automatic partitioning options:

**Remove all partitions** — removes all partitions on the system.

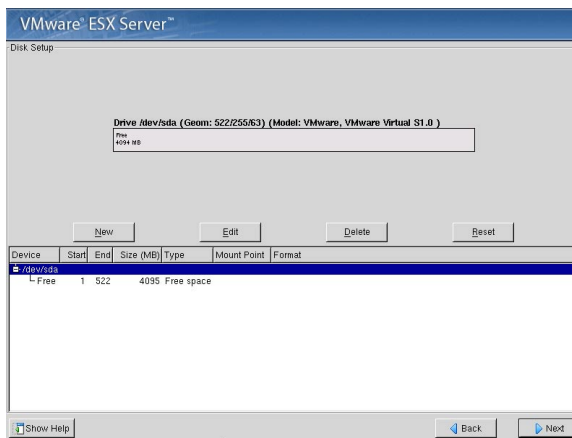
**Remove all partitions except VMFS** — removes all partitions on the system but keeps the VMFS partition. This is where your virtual machines are stored.

**Installation Drives** — lists the hard drive selections available. These are based on the hard drives detected by the ESX Server installer. The service console is installed on the hard drive selected.

19. Select **Next** to continue. If you selected automatic partitioning, the Partitioning screen lists the partitions ESX Server created.



If you selected manual partitioning, the Disk Setup screen lists only the drive and the amount of available space.

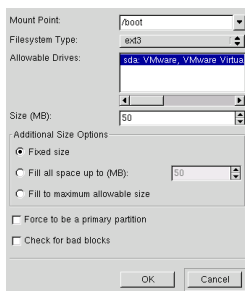


Whether you automatically or manually create partitions, the ESX Server system requires a minimum of three partitions, as described below. You can use the free space to divide a fourth partition into a number of logical partitions.

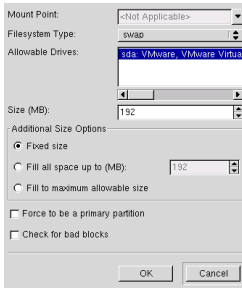
20. To create a partition, select **New**.
21. To modify a partition, use the directional arrows to select the partition to edit. Then select **Edit**.

Do not create partitions on any other disks besides the main boot disk. The Add Partition screen appears. The screen pre-loads the information for selected partition, when you select **Edit**.

22. Create the first partition. Set the mount point of /boot, the type to ext3 and the size to 50MB.



23. Create the second partition. Set no mount point, the type to swap and the size to twice the memory assigned to the service console.

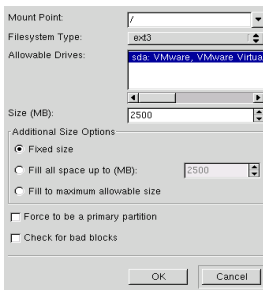


The default amount of memory assigned to the service console is 192MB, which is appropriate for managing up to eight virtual machines. If you plan to use that amount of memory for the service console, set the size of the swap partition to 384MB.

The amount of memory to be reserved for the service console increases to 272MB for 16 virtual machines, 384MB for 32 virtual machines, 512MB for more than 32 virtual machines, and 800MB for the maximum number of virtual machines, so you must adjust the size of the swap partition to 544MB, 768MB, 1024MB, or 1600MB, respectively.

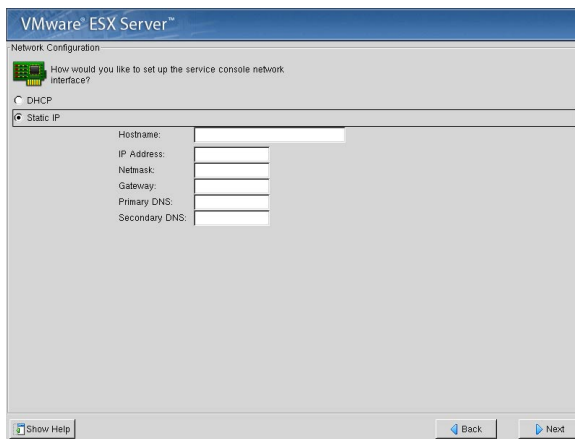
If you decide to run supported applications in the service console, increase the amount of memory reserved for the service console. To determine the sufficient amount of memory, add the memory requirements for each application to the above determined amount reserved for the service console.

24. Create the third partition. Set the mount point to /, the type to ext3 and the size to about 2500MB.



**Note:** If you plan to perform a remote or scripted installation from the ESX Server machine, VMware recommends that you allocate about 2.5GB of disk space to the service console. Running the installation script to copy the contents of the ESX Server installation CD-ROM requires about 460MB of space.

25. Select **OK** on the Add/Edit Partition screen.
26. Select **Next** on the partitioning screen to continue. The Network Configuration screen appears.
27. Enter the network parameters.



The options are:

- **DHCP** — allows this process to determine network settings each time the ESX Server system boots.

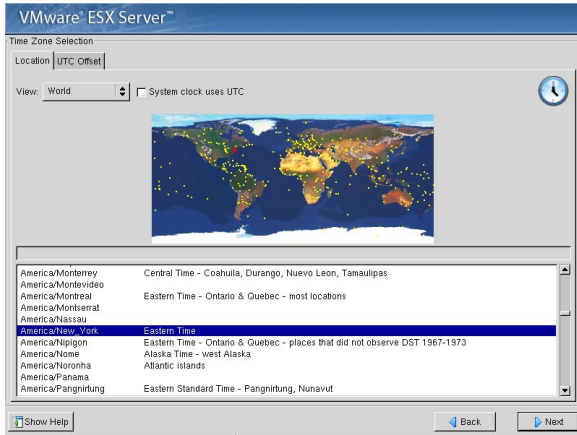
**Caution:** Selecting this option requires that your DNS server is capable of mapping the service console's host name to the dynamically-generated IP address. See [Using DHCP for the Service Console on page 186](#) for instructions and cautions on setting up a DHCP-based service console.

- **IP address block** — enter the host name in the **Hostname** field, IP address in the **IP Address** field, the netmask in the **Netmask** field, the network gateway in the **Gateway** field and the primary and secondary name servers in the **Primary DNS** and **Secondary DNS** fields.

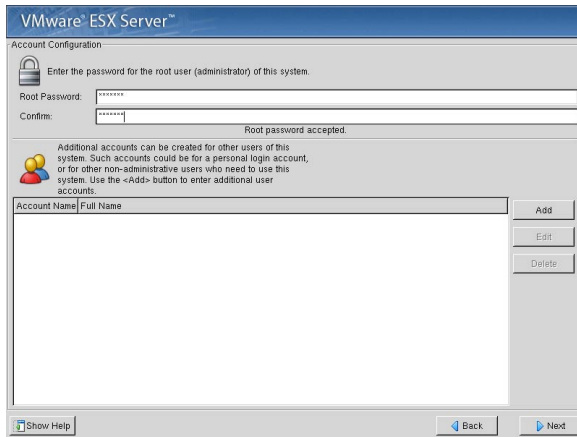
**Note:** Be sure to include the full domain name if you are running with domains.

**Note:** Setup does not ask for network parameters if you do not have a network card. Initially, only the first Ethernet card is enabled. All other network adapters are disabled.

28. Select **Next** to continue. The Time Zone Selection screen appears.



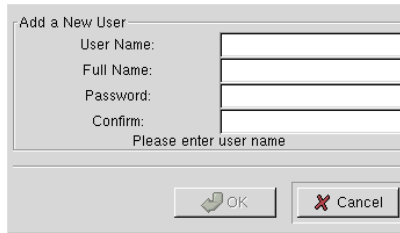
29. Select your time zone.
30. Select **Next** to continue. The Account Configuration screen appears.



31. Specify your desired root password.

Root is the user name for the administrator. Users with administrator privileges log in with this name when using the VMware Management Interface or the service console.

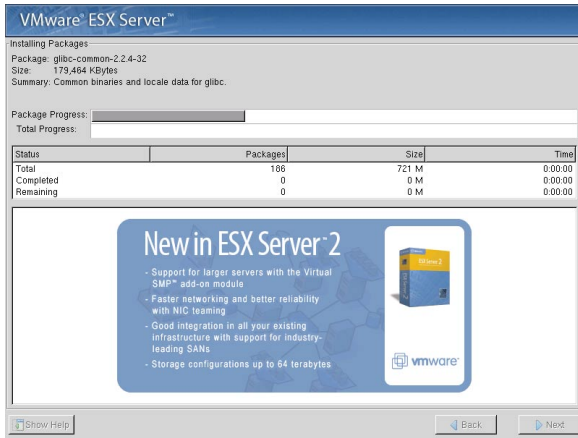
32. To add a user account, select **Add**. The Add User screen appears.



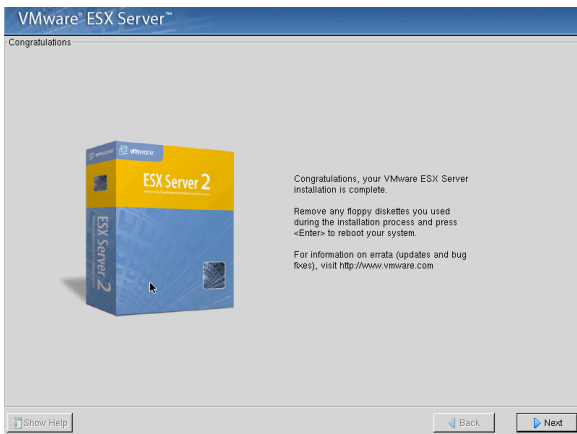
The screenshot shows a dialog box titled "Add a New User". It contains four text input fields labeled "User Name:", "Full Name:", "Password:", and "Confirm:". Below these fields is a message that says "Please enter user name". At the bottom of the dialog are two buttons: "OK" and "Cancel".

33. Add at least one user.  
You need accounts for all users who need to log in to the VMware Management interface to create or run virtual machines. If you wish, you may add those users at this time.
34. Select **OK** to continue. The User Account Setup screen appears. From the User Account Setup screen you can add, delete or edit user accounts.
35. Verify the user account.
36. Select **Next** to continue. The About to Install screen appears and displays the location of the installation log file.

37. Select **Next** to continue. The installer formats the disk and starts installing the packages.



38. Once the packages are installed, the Congratulations, ESX Server Installation Complete screen appears.



39. Select **Next** to reboot from the final screen.

## Performing the Installation Using the Text Mode Installer

This section describes how to install the ESX Server software onto your server machine using the text mode installer. After completing the steps listed below,

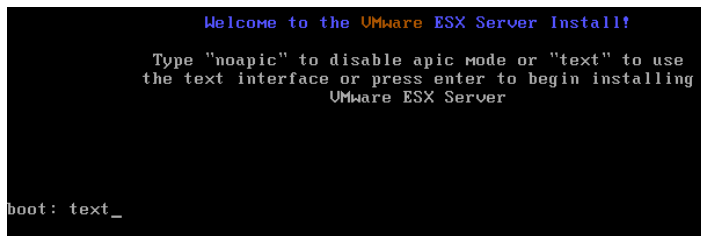
proceed to [Using the System Configuration Wizard to Configure Your Server on page 61](#) to configure your ESX Server machine.

**Note:** For each step in the installation process, the ESX Server installer attempts to make a best guess estimate for your server. The best guess choice is highlighted; however, you may modify any of these selections during the installation process.

**Note:** You can execute all actions in the ESX Server installer interface by pressing the Tab, space bar, directional arrows or the Enter key. In a field, the cursor location is indicated by a slight shift in the underscore. In a check box, the box highlights in a contrasting color.

To install ESX Server:

1. Verify the network cable is plugged into the Ethernet adapter that you are using for the service console. The ESX Server installer needs this to properly detect that the machine has a network card.
2. Power on the machine with the VMware ESX Server CD in the CD-ROM drive. The ESX Server begins its boot process.



```
                Welcome to the VMware ESX Server Install!

                Type "noapic" to disable apic mode or "text" to use
                the text interface or press enter to begin installing
                VMware ESX Server

boot: text_
```

3. If necessary, enter the BIOS Setup screen and set the CD-ROM as the first boot device.
4. At the boot prompt, enter:  
`text`

5. Press Enter to continue. The Welcome screen appears.



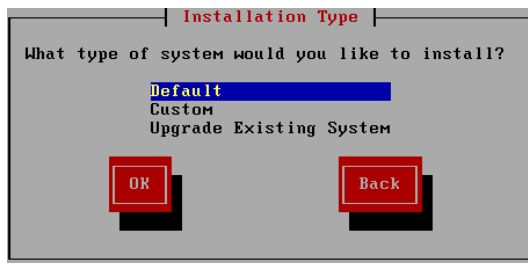
6. If necessary, acknowledge any ESX Server device messages. Select **OK**.

The installer examines all the hardware to determine if the Ethernet and SCSI devices are compatible with VMware ESX Server and displays one of the following messages:

**Unknown PCI devices** — this message indicates that there are Ethernet or SCSI PCI devices installed on the machine that are not supported by the service console, possibly because they are quite new. Contact VMware with details about the device to determine the current level of support for the device.

**PCI devices unusable by virtual machines** — this message indicates that there are Ethernet or SCSI PCI devices installed on the machine that are supported by the service console but cannot be used by virtual machines. These devices may be older, lower-performance devices that are not supported by ESX Server.

The Installation Type screen appears.



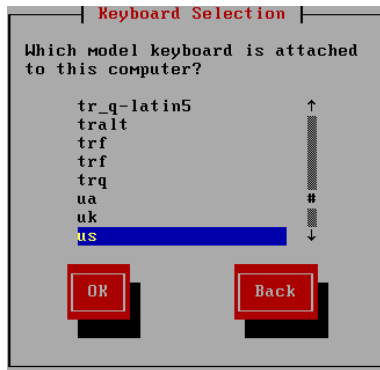
The Installation Type screen lists three choices:

**Default** — this option performs a full installation and destroys any previously saved information on the selected partitions.

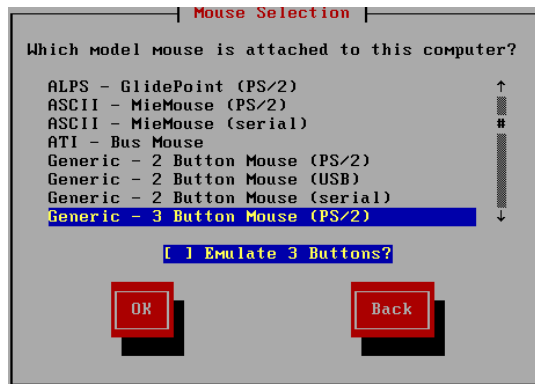
**Custom** — this option performs a full installation and allows you to select configuration options for your keyboard and mouse.

**Upgrade Existing System**— this option upgrades an existing installation of ESX Server. An upgrade preserves existing ESX Server system data.

7. To install ESX Server on a new system, select **Default** or **Custom**.
  - To install ESX Server on a system that contains a previous version of ESX Server, select **Upgrade**, then follow the steps at [Upgrading from a Previous Version of ESX Server on page 75](#).
8. If you selected **Default**, skip to step 12.
  - If you selected **Custom**, the Keyboard Selection screen appears.



9. Choose the layout type for your keyboard.
10. Select **OK** to continue. The Mouse Selection screen appears.

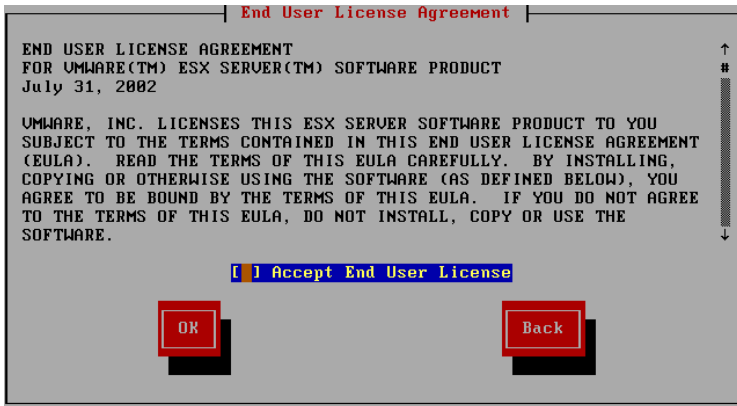


- Choose the correct mouse type for your system.

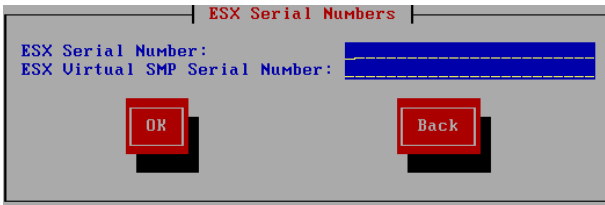
**Note:** If the connector your mouse plugs into is round, your mouse is a PS/2 or a Bus mouse; if rectangular, it is a serial mouse. Try to find an exact match. If you cannot find an exact match, choose a mouse type which is compatible with yours. Otherwise, choose the appropriate generic mouse type.

**Note:** In ESX Server, the graphical environment (X Window System) is designed to use a three-button mouse. If you have a two-button mouse, select the **Emulate 3 Buttons** option. After the installation, you can click both mouse buttons at once instead of clicking the middle mouse button.

- Select **OK** to continue. The End User License Agreement screen appears.



- Read through the end user license agreement and check **Accept End User License** to accept the terms in the license agreement.
- Select **OK** to continue. The ESX Serial Numbers screen appears.



- Enter the ESX Server serial number in the **ESX Serial Number** field.

**Note:** Please include the hyphens when entering the serial number or the serial number will not be accepted.

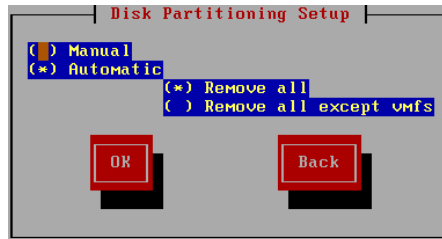
16. If you have a license for VMware Virtual SMP for ESX Server, enter that serial number in the **ESX Virtual SMP Serial Number** field. This license is required if you want to configure your virtual machines with more than one virtual processor.

**Note:** Entering the serial number installs VMware Virtual SMP for VMware ESX Server.

17. Select **OK** to continue. The Disk Partitioning screen appears.
18. If you are installing this ESX Server on an unformatted disk, the following message appears. Select **Yes** or **No** as appropriate.



19. Define how to partition your disk(s).



The Disk Partitioning screen lists two choices for the type of disk partition:

**Manual** — you manually create each partition. Be sure to delete any existing partitions.

**Automatic** — the installer estimates and creates partitions on your disk. You can edit these automatic selections after they are created. Automatic partitioning allows you to have some control concerning what data (if any) is removed from your system.

20. Select the type of disk partition: **Manual** or **Automatic**.
21. If you choose Automatic partitioning, specify the automatic partitioning options:

**Remove all** — removes all partitions on the system.

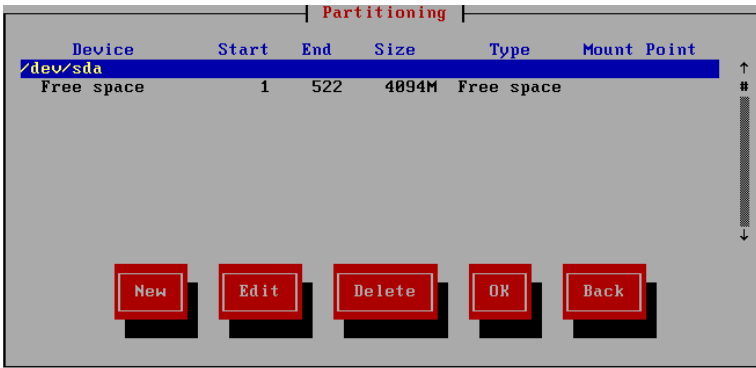
**Remove all partitions except VMFS** — removes all partitions on the system but keeps the VMFS partition. This is where your virtual machines are stored.

22. Select **OK** to continue. If you selected automatic partitions, the Partitioning screen lists the partitions ESX Server created.



23. Verify or define the partitions, as appropriate.

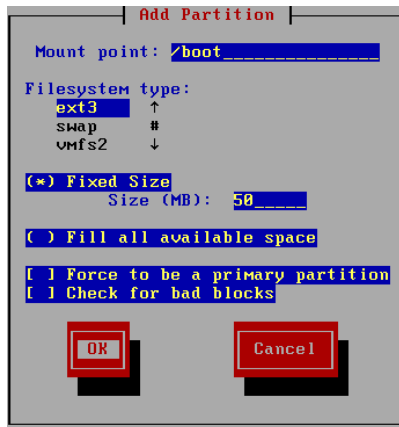
If you selected manual partitions, the Partitioning screen lists only the drive and the amount of available space.



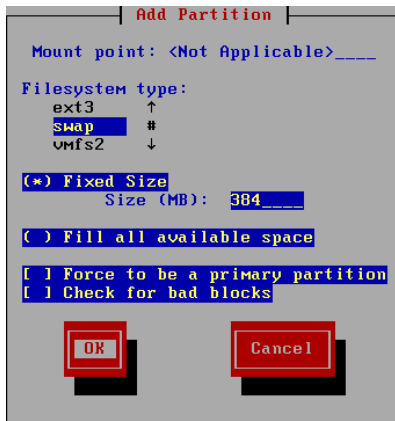
Whether you automatically or manually create partitions, the ESX Server system requires a minimum of three partitions, as described below. You can use the free space to divide a fourth partition into a number of logical partitions.

24. To create a partition, select **New**.

- To modify a partition, select the partition to edit, using the directional arrows. Then select **Edit**.
    - Note:** Do not create partitions on any other disks besides the main boot disk.
  - The Add Partition screen appears. The screen pre-loads the information for a selected partition when you select **Edit**.
25. Create the first partition. Set the mount point of `/boot`, the type to ext3 and the size to 50MB.



26. Create the second partition. Set no mount point, the type to swap and the size to twice the memory assigned to the service console.



You assign memory to the service console in a later step. The default amount, 192MB, is appropriate for managing up to eight virtual machines. If you plan to use that amount of memory for the service console, set the size of the swap partition to 384MB.

The amount of memory to be reserved for the service console increases to 272MB for 16 virtual machines, 384MB for 32 virtual machines, 512MB for more than 32 virtual machines, and 800MB for the maximum number of virtual machines, so you must adjust the size of the swap partition to 544MB, 768MB, 1024MB, or 1600MB, respectively.

If you decide to run supported applications in the service console, increase the amount of memory reserved for the service console. To determine the sufficient amount of memory, add the memory requirements for each application to the above determined amount reserved for the service console.

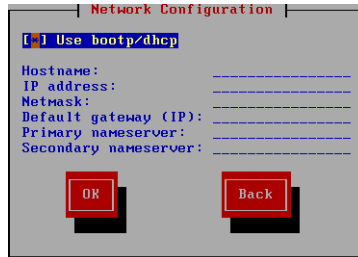
27. Create the third partition. Set the mount point to /, the type to ext3 and the size to about 2500MB.



**Note:** If you plan to perform a remote or scripted installation from the ESX Server machine, VMware recommends that you allocate about 2.5GB of disk space to the service console. Running the installation script to copy the contents of the ESX Server installation CD-ROM requires about 460MB of space.

28. Select **OK** on the Add/Edit Partition screen.

29. Select **OK** on the partitioning screen to continue. The Network Configuration screen appears.



Enter the information for networking. Specify the following:

- Enter the host name in the **Hostname** entry field.

**Note:** Be sure to include the full domain name if you are running with domains.

- **Use bootp/dhcp** — press the space bar to check this box. An asterisk is placed in the box. Using **bootp/dhcp** allows this process to determine network settings each time the ESX Server system boots.

**Caution:** Selecting this option requires that your DNS server is capable of mapping the service console's host name to the dynamically-generated IP address. See the *VMware ESX Server Administration Guide* for instructions and cautions on setting up a DHCP-based service console.

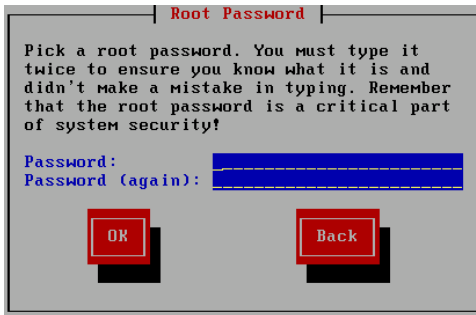
- **IP address block** — enter the IP address in the **IP Address** field, the netmask in the **Netmask** field, the network gateway in the **Default gateway (IP)** field and the primary and secondary domain name servers in the **Primary Nameserver** and **Secondary Nameserver** fields.

**Note:** Setup does not ask for network parameters if you do not have a network card. Initially, only the first Ethernet card is enabled. All other network adapters are disabled.

30. Select **OK** to continue. The Time Zone selection screen appears.



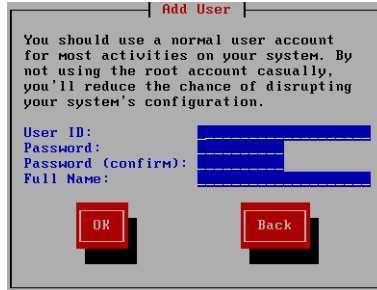
31. Select your time zone.
- Note:** You can type **U** to move quickly to the US time zones or **E** to move quickly to the European time zones.
32. Select **OK** to continue. The Root Password screen appears.
33. Specify your desired root password.



Root is the user name for the administrator. Users with administrator privileges log in with this name when using the VMware Management Interface or the service console.

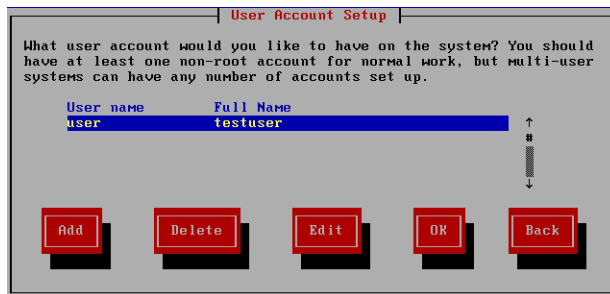
34. Select **OK** to continue. The Add User screen appears.

35. Add at least one user.

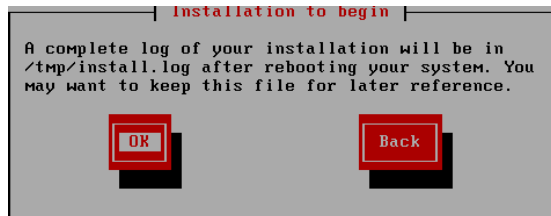


You need accounts for all users who need to log in to the VMware Management interface to create or run virtual machines. If you wish, you may add those users at this time. You may find it more convenient to add them later, however, using the Users and Groups feature through the VMware Management Interface.

36. Select **OK** to continue. The User Account Setup screen appears. From the User Account Setup screen you can add, delete or edit user accounts.
37. Verify the user account.



38. Select **OK** to continue. The Installation to Begin screen appears and displays the location of the installation log file.



39. Select **OK** to continue. The installer formats the disk and starts installing the packages. Once the packages are installed, the Complete screen appears.



40. Click **OK** to reboot from this screen.

**Caution:** When you reboot, the system boots into a uniprocessor Linux kernel with legacy mode interrupts. Some machines may be incompatible with legacy mode interrupts. If the system fails to start after the reboot, restart the machine and boot into the multiprocessor Linux kernel by typing `linux` at the LILO prompt.

## Accepting the Security Certificate from ESX Server

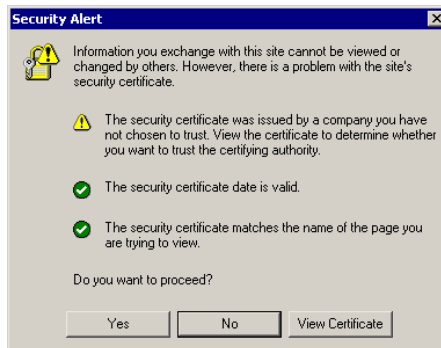
The first time you use a Web browser to make a secure connection to an ESX Server machine — which typically occurs when you configure the server (see [Configuring the ESX Server System on page 61](#)) — a dialog box asks whether you want to accept the security certificate presented by the server. Accepting the certificate allows you to access the server through the VMware Management Interface.

To accept the certificate, follow the steps in the appropriate section below or take the equivalent steps for your browser version.

- [Accepting the Certificate for an Internet Explorer 6.0 Browser on page 56](#)
- [Accepting the Certificate for a Netscape Navigator 7.0 Browser on page 59](#)
- [Accepting the Certificate for a Mozilla 1.x Browser on page 60](#)

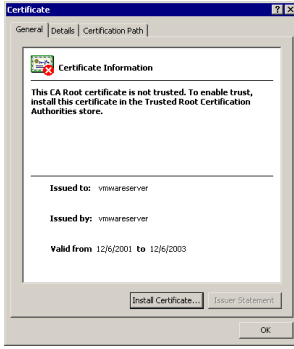
### Accepting the Certificate for an Internet Explorer 6.0 Browser

When you connect to the management interface with an Internet Explorer browser, a Security Alert dialog box appears. To see details of and install the certificate, click **View Certificate**.

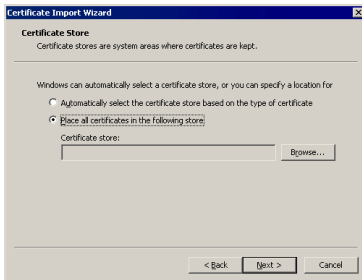


**Note:** If the alert indicates that the name on the certificate is issued by a company you do not trust or does not match the name of the site, you are using a certificate that is not registered to your own domain name. Note that although you receive this alert from your browser, the data is still encrypted and the connection to the server is secure.

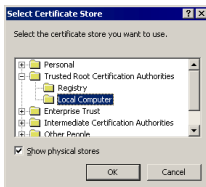
1. To accept the certificate for this session only, click **Yes**. The Certificate Login screen appears.



2. Click **Install Certificate** to launch a wizard that guides you through the process of installing the security certificate.
3. Click **Next** to start the wizard. The Certificate Store screen appears.



4. Choose **Place all certificates in the following store**, then click **Browse**.

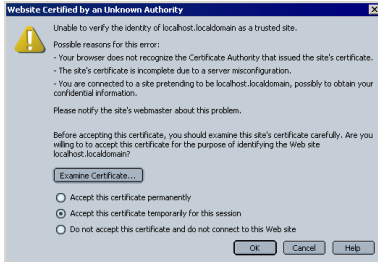


5. Select the **Show physical stores** check box, then expand the **Trusted Root Certification Authorities** folder.
6. Select the **Local Computer** folder and click **OK**.
7. Click **Next** to advance the wizard, then click **Finish**.

8. A message appears, stating that the import was successful. Click **OK** to accept the message, click **OK** again to close the Certificate dialog box, then click **Yes** to accept the certificate. The management interface login page appears.

## Accepting the Certificate for a Netscape Navigator 7.0 Browser

When you connect to the management interface with a Netscape browser, a dialog box appears, indicating the certificate is from an unknown authority.

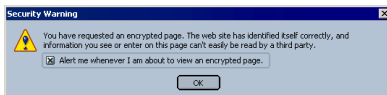


**Note:** If the alert indicates that the name on the certificate is issued by a company you do not trust or does not match the name of the site, you are using a certificate that is not registered to your own domain name. Note that although you receive this alert from your browser, the data is still encrypted and the connection to the server is secure.

1. To view the certificate, click **Examine Certificate**.
2. To avoid having to accept the certificate each time you connect to the server with the management interface, select **Accept this certificate permanently**. Otherwise, you can accept the certificate for the current session only.
3. Click **Continue**. A dialog box appears, warning of a domain name mismatch.



4. You can ignore this message. Click **OK** to continue. Depending upon your browser settings, a security warning message may appear.



5. Click **OK**. The management interface login page appears.

## Accepting the Certificate for a Mozilla 1.x Browser

When you connect to the management interface with a Mozilla browser, a dialog box appears, indicating the certificate is from an unknown authority.

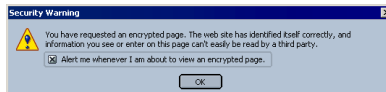


**Note:** If the alert indicates that the name on the certificate is issued by a company you do not trust or does not match the name of the site, you are using a certificate that is not registered to your own domain name. Note that although you receive this alert from your browser, the data is still encrypted and the connection to the server is secure.

1. To view the certificate, click **View Certificate**.
2. To avoid having to accept the certificate each time you connect to the server with the management interface, check **Remember this certificate permanently**.
3. Click **Continue**. A dialog box appears, warning of a domain name mismatch.



4. You can ignore this message. Click **OK** to continue. Depending upon your browser settings, a security warning message may appear.



5. Click **OK**. The management interface login page appears.

## Using the System Configuration Wizard to Configure Your Server

The System Configuration Wizard launches when a root user connects to the ESX Server system with the management interface if ESX Server has been installed or upgraded, but not configured. It also launches if the `vmkernel1` fails to load.

**Note:** If the ESX Server is configured during the installation process, the system configuration wizard will not launch the first time you access the management interface.

The System Configuration Wizard guides you through the steps to configure your server. After you configure the server, you can use the Options page in the management interface to edit your configuration.

You can run the System Configuration Wizard from any computer with network access to your server. The steps that follow require that you use a separate computer as your workstation.

**Note:** If you need secure communications between your management workstations and the server, be sure to choose the appropriate security level when you configure ESX Server. For additional details, see the *VMware ESX Server Administration Guide*.

### Installing VMware Virtual SMP for ESX Server

If you have purchased VMware Virtual SMP for ESX Server, then you can create Symmetric Multiprocessing (SMP) virtual machines, with single or dual virtual processors. You install VMware Virtual SMP for ESX Server when you enter its serial number during your ESX Server configuration.

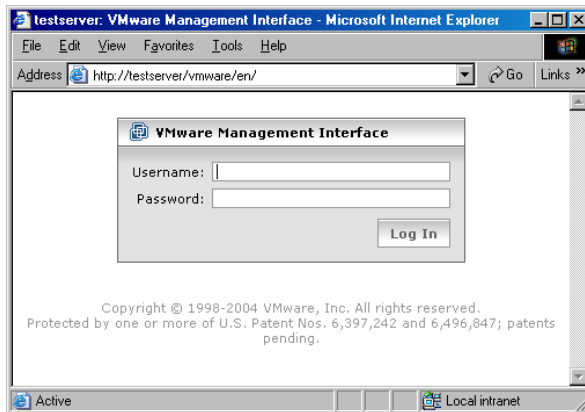
### Configuring the ESX Server System

To configure the ESX Server machine, complete the following steps.

1. Launch a supported Web browser and enter the URL for the VMware Management Interface.  
`http://<hostname>`  
Where `<hostname>` is the name assigned to the server during installation.  
The browser security certificate screen appears.
2. A dialog box asks whether you want to accept the security certificate presented by the server. The specific certificate presented varies depending upon the

browser you are using. For details, see [Accepting the Security Certificate from ESX Server on page 56](#).

3. Accept the security certificate. The VMware Management Interface Login screen appears.
4. Log in to the VMware Management Interface as root.

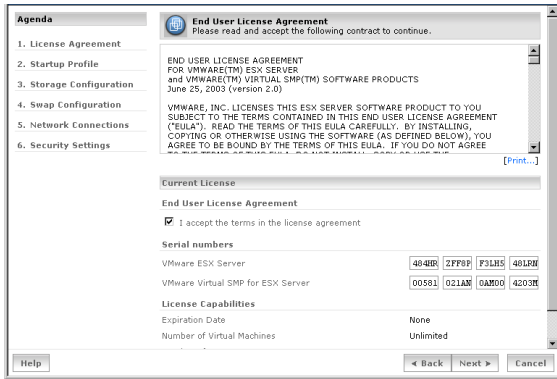


The System Configuration Wizard appears.



Click **Next** to start the wizard. The End User License Agreement screen appears.

5. Read the end user license agreement and check **I Accept the terms of the license agreement.**

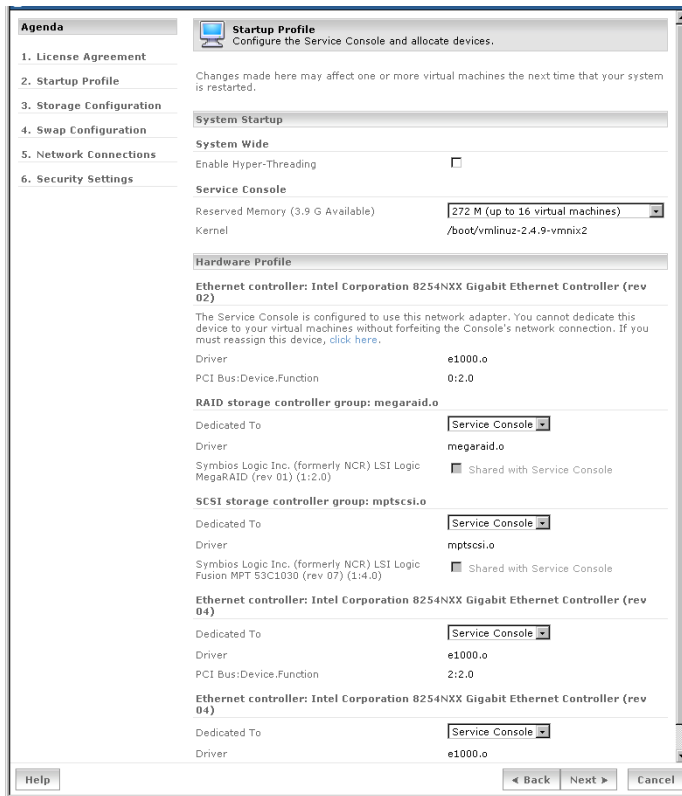


6. Enter the ESX Server serial number in the **VMware ESX Server** field.

If you have a license for VMware Virtual SMP for ESX Server, enter that serial number in the **VMware Virtual SMP for ESX Server** field. This license is required if you want to configure your virtual machines with more than one virtual processor. Entering the serial number installs VMware Virtual SMP for ESX Server.

To print the license agreement, click **Print**.

7. To continue, click **Next**. The Startup Profile screen appears.



8. Configure the service console. Configuration parameters include reserved memory, SCSI storage controller and Ethernet controllers.
9. Select **Hyper-threading** to enable the ESX Server to boot in Hyper-threading mode. This option appears only if the host supports Hyper-threading capabilities.

**Reserved Memory** — The default amount of memory reserved for the service console, 192MB, is sufficient for managing up to eight virtual machines concurrently. Change this to 272MB for up to 16 virtual machines, 384MB for up to 32 virtual machines, or 512MB for more than 32 virtual machines. Choose **Other** to specify a different amount of memory; the dialog box suggests a range. For background on memory, see the *VMware ESX Server Administration Guide*.

**Note:** If you have more than 895MB of RAM installed on your server, the available memory is not reported accurately at this stage. The correct amount of memory is reported after you reboot the server.

**SCSI Storage Controller** — Allocate storage adapters to be used by the service console and virtual machines on the server. Be sure that both the service console and the virtual machines have access to at least one device.

A SCSI or RAID adapter should be shared if you want to use that adapter or array for both the service console and virtual machines. To share the SCSI controller, in the **Dedicated To** list, select **Virtual Machines**, then check **Shared with Service Console**.

When you are allocating SCSI or RAID devices, the unit of device allocation is a PCI card device. You may connect multiple SCSI or RAID disks, CD-ROM drives, tape drives and other devices to the SCSI or RAID adapter.

You should give as many SCSI or RAID devices to the virtual machines as possible to ensure that the majority of your mass storage resources are used by your virtual machines. If you do not have any SCSI disks, you may have to allocate at least one IDE disk to the service console, since the service console needs to have a disk from which it and the ESX Server can boot.

Some adapter cards have multiple functions, which means there are multiple adapters on each card. When you allocate a SCSI or RAID device to the service console or to the VMkernel, you are effectively allocating all the SCSI or RAID disks, CD-ROM drives and other attached devices along with the adapter. As a result, you have only coarse-grained control over how you allocate SCSI and RAID devices.

Consider this example: Suppose your machine has SCSI adapters `vmhba0` and `vmhba1` that are on the same SCSI adapter card. If you choose to share one of the adapters, you must share both. Similarly, if you choose to allocate one of the adapters for use by virtual machines, you must allocate both for use by virtual machines.

**Note:** If you have Fibre Channel adapters, you may have to perform additional configuration of the adapters and the ESX Server system. For more information, see the sections on SANs and multipathing in the *VMware ESX Server Administration Guide*.

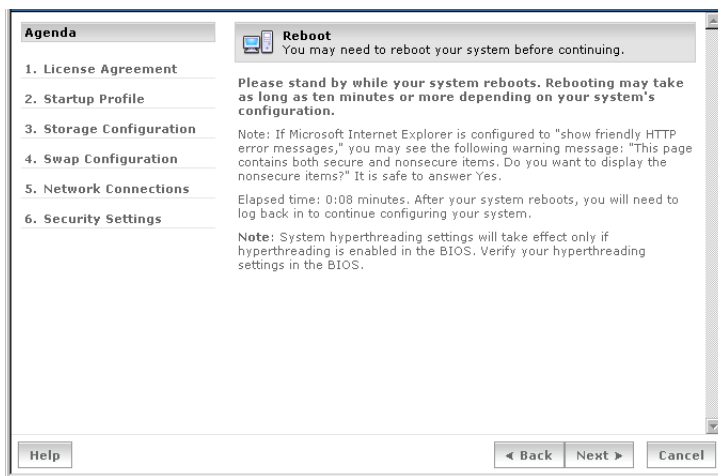
**Ethernet Controller** — Allocate network adapters to be used by the service console and virtual machines on the server. Be sure that both the service console and the virtual machines have access to at least one device.

It is generally best to assign the first Ethernet adapter on the list to the service console and assign the other adapters to the virtual machines. If you assign the first adapter to be used by virtual machines, the service console may try to use an inappropriate driver for its network adapter. Ethernet adapters cannot be shared between the service console and virtual machines.

It is generally good to give as many network adapters to the virtual machines as possible. Doing so helps ensure that the majority of your network resources are devoted to the virtual machines. Because the service console is intended primarily as a management interface, you should minimize resources allocated to the service console. You need to allocate at least one Ethernet device to the service console in order to manage your ESX Server machine remotely.

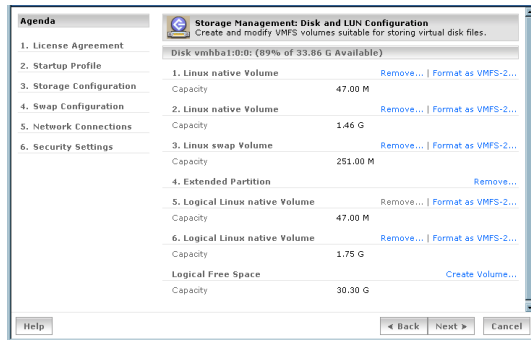
In the likely event that you have fewer Ethernet devices than virtual machines, you can share VMkernel Ethernet adapters among the virtual machines with little performance penalty.

- Click **Next** to continue. The Reboot screen appears.



The ESX Server machine reboots with the configuration you just set up. Rebooting may take ten minutes or more, depending on your system's configuration. A timer indicates the amount of time that has elapsed.

11. You are prompted to log in to the management interface after the reboot. After you log in, the Storage Management screen appears.



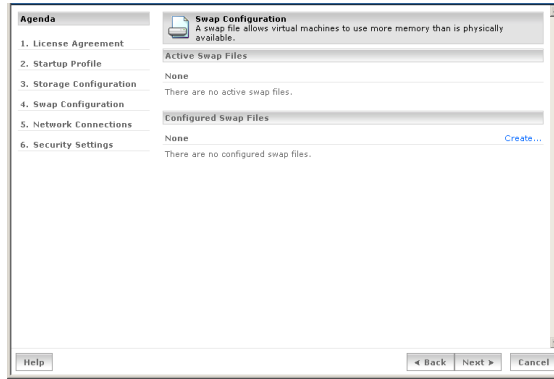
Earlier, you configured file systems and storage for the service console when you installed ESX Server. Now you can create new VMFS-2 partitions to store your virtual machines with any remaining free space, edit existing VMFS volumes or remove any extended partitions. You should consider what partitions you want to format for VMFS-2 before you begin, including whether the partitions are on the local system or on SANs. The ESX Server swap file, to be configured in the next step, must be located on a VMFS-2 partition.

You can also choose not to format a partition for VMFS, if you want to use it as a raw or physical disk for a virtual machine or if the volume is on a SAN that you want to use for other purposes.

You cannot change any partitions that were set up when you installed ESX Server. These include any volumes with a Linux file system or that are used for Linux or service console swap space.

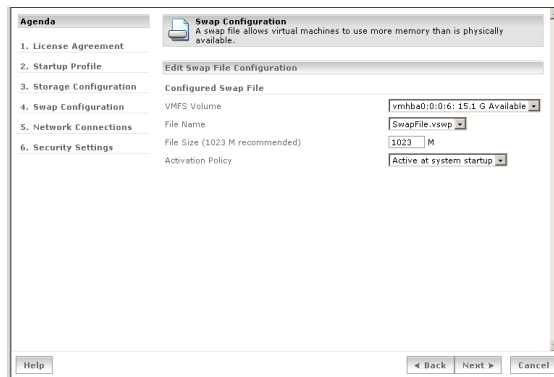
For more information, see the *VMware ESX Server Administration Guide*.

- Click **Next**. The Swap Configuration screen appears.



Earlier, you configured a swap partition for the service console when you installed ESX Server. Now you can set up the swap file that ESX Server uses as part of its memory management features. For background, see the *VMware ESX Server Administration Guide*.

- The default configuration creates a swap file equal to the total amount of memory on the server. To make any needed changes to the swap file configuration, click **Change**. If there is a configured swap file, you can activate it by clicking **Activate**, or you can edit it by clicking **Edit**.
- If there is no active or configured swap file, you can configure one. Click **Create**.



You can choose the following settings when creating or editing a swap file:

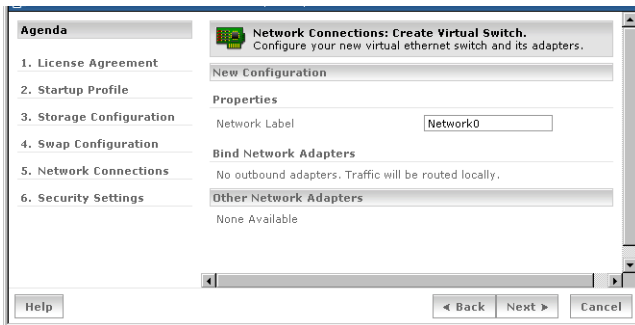
- The volume on which to locate the swap file.

- The name of the swap file, which defaults to `SwapFile.vswp`. To change the name of the swap file, select **Other** from the **File Name** list, then type the name of the swap file. The file must have a `.vswp` extension.
- The capacity of the swap file in MB. A recommended value is provided.
- The activation policy. The swap file can be active when the system boots or it can be activated manually.

**Note:** If you make changes to the amount of swap space after the initial configuration, you must reboot the server before the changes take effect. If the swap file is set to be activated manually, after you reboot, the swap file is not activated. To activate it manually, you must use `vmkfstools -w`.

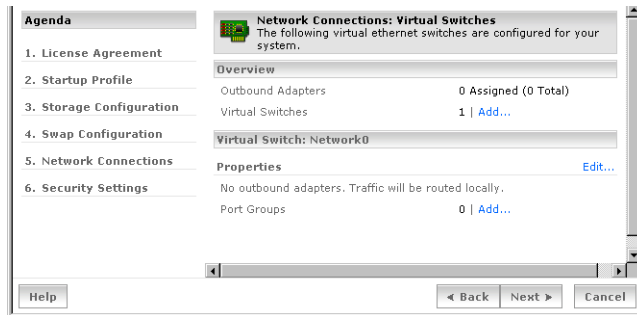
15. If you configured a swap file, click **Activate**. Otherwise, click **Next**. The Network Connections screen appears.

**Note:** If you activated the swap file, the Network Connections screen appears. You do not need to click **Next**.



Use this screen to create a virtual switch that the virtual machines are going to use.

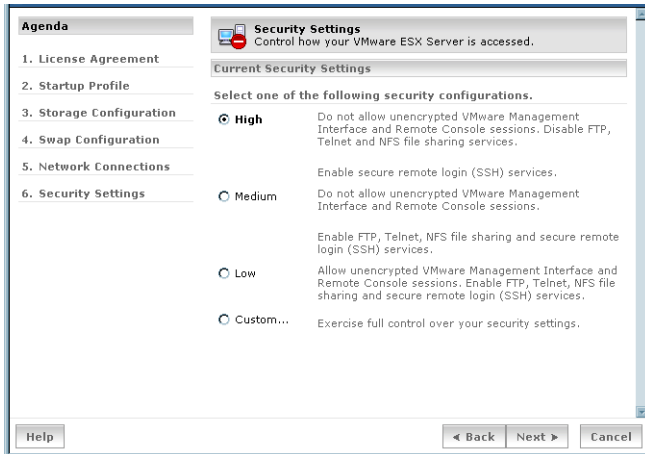
- Click **Next**. The next Network Connection screen appears and displays the virtual switches in your system.



- In the Overview section, click **Add** to create a new virtual switch.
- For an existing virtual switch, click **Add** to create a port group and assign a label and VLAN ID for the new port group. Click **Edit** to configure speed and duplex settings for a virtual switch. In the Configured Speed, Duplex list, keep the default, Autonegotiate, to have ESX Server choose the optimal settings for the switch. Otherwise, if you know the exact setting to use, select 10 Mbps half or full duplex, or 100 Mbps half or full duplex.
 

**Caution:** Some network switches may not autonegotiate speed and duplexity correctly. If this issue occurs, set the speed and duplexity both on the network switch and the ESX Server to a fixed setting. For more information on speed and duplex settings, see the *VMware ESX Server Administration Guide*.
- Click **Next**. The Security Settings screen appears.

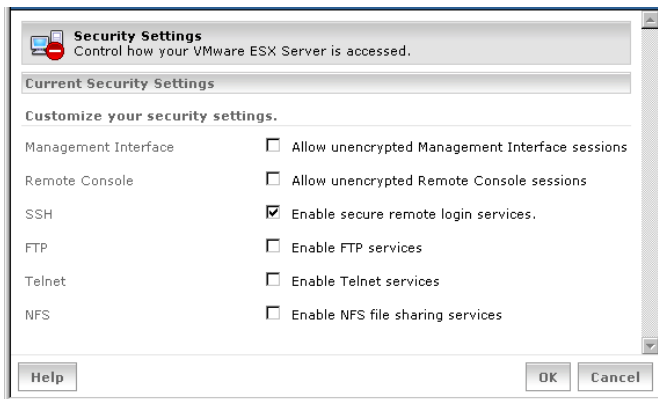
Select the security level for the ESX Server machine and the network traffic generated by ESX Server.



When you configure a more secure machine, you have fewer options for connecting to it, as the less secure methods for connecting to the computer (such as Telnet or FTP) are disabled.

**High** security is selected by default. To change to a different standard security setting, click the setting you want to use.

To select custom settings, click **Custom Security**. The Custom Security Configuration screen appears.



You can customize your settings for encrypting VMware Remote Console and VMware Management Interface connections using the Secure Sockets Layer (SSL) protocol. ESX Server uses OpenSSL.

You may also enable SSH, Telnet, FTP and NFS (portmap) on the service console.

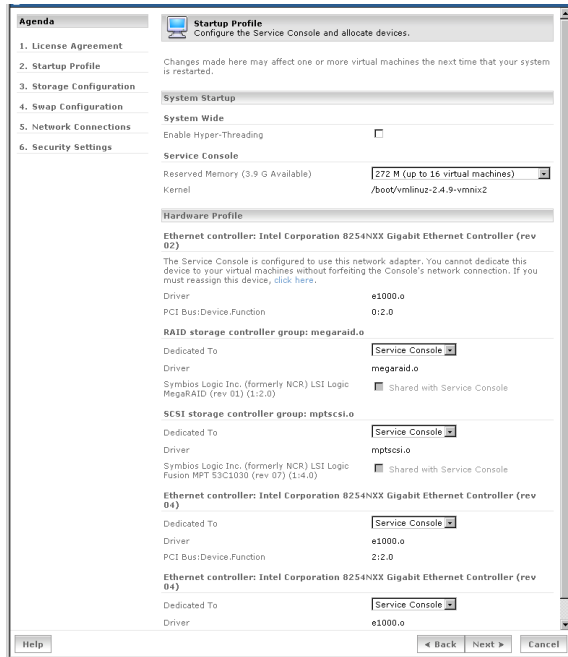
20. After you choose your security settings, click **Next**. A message appears, stating your configuration is complete. Click **OK**. The VMware Management Interface Login page appears.

# Installing Additional Hardware on the Server

## Installing Hardware for Use by Virtual Machines

After you install the new hardware on your system, use the VMware Management Interface to assign the hardware to the virtual machines.

1. Log in to the management interface as root.
2. Click the **Options** tab, then click **Startup Profiles**. The Startup Profile page appears.



3. Assign the new devices to the virtual machines by selecting **Virtual Machines** in the **Dedicated To** list for each device.
4. Click **OK** to save your changes. You need to reboot the server for the changes to take effect.

## Installing Hardware for Use by the Service Console

After you install additional hardware on your system, simply booting or rebooting the machine does not make the service console aware of the newly installed hardware.

To make the service console aware of newly installed hardware, log in to the service console as root, then do one of the following:

- Run the command `kudzu` at a command prompt.
- Manually edit the file `/etc/modules.conf`.

To run `kudzu`:

1. Log in as root on the service console.
2. At a command prompt, type  
`kudzu`
3. The `kudzu` utility detects any new hardware and adds appropriate entries to `/etc/modules.conf`.

If you edit the `/etc/modules.conf` file by hand, add an `alias` line for the new device. For example, if you are adding a new SCSI adapter that uses a driver named `aic7xxx`, add this line:

```
alias scsi_hostadapter aic7xxx
```

# Upgrading from a Previous Version of ESX Server

This section covers the following topics:

- [Before You Install ESX Server 2.1 on page 75](#)
- [Upgrading from ESX Server 1.5.2 or ESX Server 2.0.x on page 77](#)
- [Verifying Your Device Driver Mappings on page 78](#)

## Before You Install ESX Server 2.1

There are a few steps you should take before you install ESX Server 2.1 to ensure the best possible upgrade experience.

### Resume and Shut Down Suspended Virtual Machines

If you plan to use virtual machines created under a previous version of ESX Server, be sure they have been shut down completely before you upgrade.

If the virtual machine is suspended, resume it in the earlier release, shut down the guest operating system, then power off the virtual machine.

**Note:** If you attempt to resume a virtual machine that was suspended under a different VMware product or a different version of ESX Server, a message gives you the choice of discarding or keeping the file that stores the suspended state. To recover the suspended state, you must click **Keep**, then resume the virtual machine under the correct VMware product. If you click **Discard**, you can power on normally, but the suspended state is lost.

### Commit or Discard Changes to Disks in Undoable Mode

If you plan to use existing virtual machines that have disks in undoable mode, commit or discard any changes to the virtual disks before you remove the release you used to create them.

Resume or power on the virtual machine in the earlier release, shut down the guest operating system, power off the virtual machine and either commit or discard changes to the disk when prompted.

### Back Up Virtual Machines

As a precaution, back up the virtual machine files — including the `.disk` and `.vmtx` files — for any existing virtual machines you plan to migrate to ESX Server 2.1.

### Back Up the vm-list File

Before you upgrade, back up the `/etc/vmware/vm-list` file by either renaming it or moving it to a different directory. After the upgrade, rename or move the file back to its original name or location in `/etc`. If you don't back up the file, you must register each of your virtual machines again by using the following command in the service console:

```
vmware-cmd -s register <path/to/configfile>.vmx
```

### New PCI Device Allocation Method

ESX Server 2.1 has a new PCI device allocation system whereby all SCSI storage devices controlled by the same driver must be:

- Allocated to the VMkernel for use by virtual machines,
- Allocated to the service console, or
- Allocated to the VMkernel but shared with the service console.

For example, suppose your ESX Server 1.5 system has two `aic7xxx` cards and you previously allocated one to the service console and one to the VMkernel. For ESX Server 2.1, you must change the configuration so that both controllers are allocated to the service console, the VMkernel (for use by virtual machines) or to the VMkernel but shared with the service console. You must change the configuration if you allocated one controller to the service console and shared the other controller between the service console and the VMkernel.

When you upgrade from ESX Server 1.5, the upgrade script converts any mixed allocation systems as follows:

- If a device was previously allocated to the service console, the device is now shared between the VMkernel and the service console.
- If a device was previously allocated the VMkernel or shared with the service console, the device allocation is not changed by the upgrade script.

You can allocate these devices when you first configure your server in the Startup Profile screen of the System Configuration Wizard. For more information, see [Using the System Configuration Wizard to Configure Your Server on page 61](#).

## Upgrading from ESX Server 1.5.2 or ESX Server 2.0.x

To upgrade from ESX Server 1.5.x or 2.0.x to ESX Server 2.1, use the installation CD-ROM.

**Caution:** Upgrading directly from ESX Server 1.0 or 1.1 to ESX Server 2.1 is not supported.

1. Insert the installation CD into the server's CD-ROM drive.
2. Boot the computer. The system begins booting from the CD-ROM. If it does not boot, change the BIOS setting to allow the system to boot from CD-ROM.
3. At the first installer screen, choose **Upgrade**.
4. You are asked if you have a driver disk provided by VMware for a device that is not handled by drivers in this release of ESX Server.  
If you do not have a driver disk, choose **No** and continue with the installation.  
If you have a driver disk from VMware, put the driver disk into the floppy drive and choose **Yes**.
5. If you do not have enough swap space for the new service console, the installer asks you where to place a new swap partition. Accept the default location unless you have a specific reason for using a different one.
6. At the End User License Agreement screen, accept the terms of the agreement.
7. The installer upgrades your ESX Server installation.
8. When the upgrade completes and displays the final screen, reboot. The machine keeps the device allocations that you previously set up.
9. After the server reboots, the System Configuration Wizard launches. For information on configuring the server, see [Using the System Configuration Wizard to Configure Your Server on page 61](#). As you step through the wizard, ensure that the wizard's settings are appropriate. Note the following:
  - On the Licensing and Serial Numbers screen, enter your ESX Server 2.1 license and, if you have one, your VMware Virtual SMP for ESX Server license.
  - On the Startup Profiles screen, adjust the amount of memory allocated to the service console. If your ESX Server 1.5.2 installation had 128MB allocated to the service console, you must upgrade this amount to 192MB, which is sufficient for managing up to eight virtual machines. Change the number to 272MB for managing up to 16 virtual machines, 384MB for 32 virtual machines or 512MB for more than 32 virtual machines. Choose 800MB for the maximum number of virtual machines.

- Check device allocation for the SCSI controller. If there is only one SCSI adapter, you need to make sure it is shared between the virtual machines and the service console. For the SCSI controller, in the **Dedicated To** list, select **Virtual Machines**, then check **Shared with console operating system**.
  - FTP and Telnet services are automatically disabled during the server upgrade. If you had FTP and Telnet services enabled on your ESX Server machine before performing the upgrade, you need to reset these services. To reset these services, log in to the VMware Management Interface, select the **Options** tab, and use the **Security Settings** control panel to reset the settings.
10. If you want, you can improve virtual machine performance by upgrading the VMFS volume from VMFS-1 to VMFS-2. See the *VMware ESX Server Administration Guide*.

## Verifying Your Device Driver Mappings

During the upgrade, the ESX Server installer renames the `/etc/vmware/vmware-device.map.local` file to `/etc/vmware/vmware-device.map.local.orig`. After the upgrade, compare the `vmware-device.map.local.orig` file with the newly created `vmware-device.map.local` file and make any necessary changes, as the locations of some drivers have changed in ESX Server 2.1. With the addition of new drivers in ESX Server 2.1, further customization of `vmware-device.map.local` may not be necessary.

# CHAPTER 5

## Remote and Scripted Installations

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The following sections describe how to install ESX Server using remote and scripted installations:

- [Scripting Your Installations on page 80](#)
  - [Configuring ESX Server for Scripted Installations on page 80](#)
  - [Setting Up the Script on page 80](#)
- [Performing a Remote Network Installation with a Boot Floppy on page 88](#)

## Scripting Your Installations

Once you install ESX Server on a system, you can quickly deploy or provision more ESX Server systems that share the same or have similar configurations. You can set up a script to aid in the installation. The script consists of the choices you want to make during the installation of the ESX Server software.

If you want all of your servers to have the same configuration as the original ESX Server system, you should make the same choices for the script that you made when you installed ESX Server on the original system.

The installation can run unattended; however, as in the original installation, if the installer encounters an unknown device on the system, a prompt appears and you must respond to it.

Once you set up the script, you can use it to install ESX Server in one of two ways:

- From the ESX Server CD-ROM in the local CD-ROM drive of the new system.
- Across the network, where installation files are hosted.

### Configuring ESX Server for Scripted Installations

To support scripted installations, you need to configure your ESX Server. To set up the server for scripted installations, complete the following steps.

1. As root, connect to the service console on the ESX Server.
2. With the CD-ROM in the ESX Server CD-ROM drive, mount the ESX Server CD-ROM.  

```
mount /mnt/cdrom
```
3. Run the following script.  

```
/usr/bin/scriptedinstall-setup.pl
```

Once the script is installed, you are asked to restart Apache.
4. At the Restart Apache Now prompt, enter **y**. This restarts Apache and logs you out of the VMware Management Interface.

### Setting Up the Script

Once you install ESX Server on one system, you can set up a script necessary for performing a scripted installation of ESX Server on other systems.

When setting up the script, you must choose the networking method for the server on which you will install ESX Server. You can specify unique network identification information, including the static IP address and host name of each system or you can use DHCP initially to quickly set up a number of ESX Server systems.

You can use DHCP initially to create one installation script that is used to deploy new ESX Server systems from the same floppy image. You must then configure each system separately and assign a unique host name and IP address. This is in addition to configuring the server with the management interface wizard.

Otherwise, you can create multiple floppy images, each containing unique network identification information you specify when you set up the script.

You must copy the script and other essential files to a floppy disk at the end of the setup process, so make sure you have a formatted floppy disk handy. You need a program to write the script to the floppy disk, such as `dd`, `rawwritewin` or `rawrite`. Make sure the program works with the operating system of the client on which you are creating the floppy disk.

In addition, you need access to the ESX Server installation files. The files can be on the ESX Server CD-ROM, which you can leave in the CD-ROM drive of the system on which you originally installed ESX Server, or you can use the CD-ROM to install each new system. In addition, the files can be stored on a separate server and accessed across the network.

To set up the script, complete the following steps:

1. Launch a supported Web browser and enter the URL for the VMware Management Interface.  
`http://<hostname>`  
Where `<hostname>` is the name assigned to the server during installation.
2. The Login page appears. Log in to the VMware Management Interface as root. The Status Monitor page appears.
3. Click the **Options** tab. The Options page appears.
4. Click **Scripted Installation**. ESX Server checks your system for the required scripted installation components. If ESX Server is not properly configured, a page appears and displays the steps needed to set up your ESX Server. To learn how to prepare your server, see [Configuring ESX Server for Scripted Installations](#).

- The Scripted Install page appears. Enter the information for the script to use to configure another ESX Server system.

- In the **Installation Type** list, select **Initial Install** if you are going to perform a new installation; select **Upgrade** if you are going to upgrade an existing ESX Server system.
- In the **Installation Method** list, select from the following options:
  - Choose **Network** to perform a network installation from the initial ESX Server system. ESX Server detects and uses the URL from the server. For example, if the initial ESX Server system is `esx21.vmware.com`, the URL is:  
`http://esx21.vmware.com:8555`
  - Choose **Remote** to perform a remote network install from a server separate from the ESX Server system that still contains the ESX Server installation files. In the **Remote Server URL** field, enter the port number along with the name of the server that contains the ESX Server installation files, like this:  
`http://<hostname>:8555/`  
 Where `<hostname>` is the name assigned to the ESX Server.
  - Select **CD-ROM** to install from the CD-ROM on the local CD-ROM drive on the new system.
- In the **Network Method** list, select **DHCP** if the ESX Server system is going to have a dynamic IP address; select **Static IP** if the ESX Server system is going to have a static IP address.

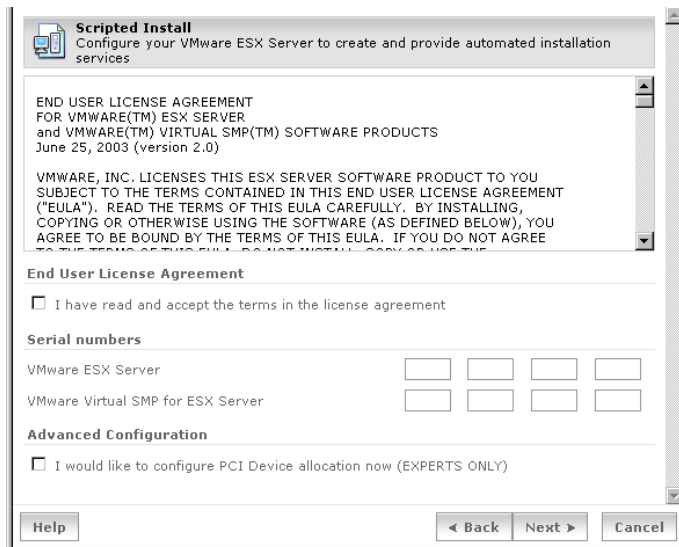
**Note:** VMware recommends each ESX Server system has its own static IP address. However, you can use DHCP to deploy new ESX Server systems from the same floppy image, then configure each system separately and assign a unique host name and IP address. Or you can create multiple floppy images containing the network identification information you specify here.

9. In the **Time Zone** list, select the time zone for the server you are about to install. The list defaults to setting of the original ESX Server machine.
10. In the **Reboot After Installation** list, select **Yes** only if the new system will eject the floppy disk automatically.
11. Under **Root Password**, specify the root password. Enter the root password in the **Password** field. Enter this password a second time in the **Again** field.
12. Click **Next** to continue. If the ESX Server system is going to have a static IP address, the Networking Options page appears.
13. Enter the information for networking.

14. Enter the host name in the **Hostname** field, the IP address in the **IP Address** field, the netmask in the **Netmask** field, the network gateway in the **Gateway** field and the domain name server in the **Nameserver** field.

**Note:** Be sure to include the full domain name if you are running with domains.

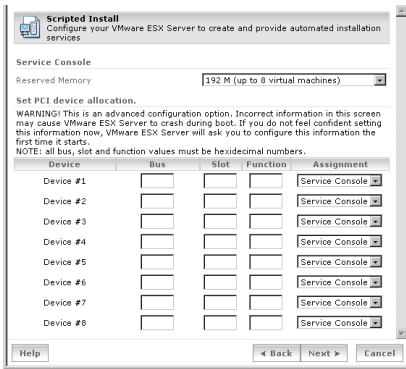
- Click **Next** to continue. The next Scripted Install screen appears.



- Read through the end user license agreement and check **I have read and accept the terms in the license agreement**.
- Enter the ESX Server serial number in the **VMware ESX Server** field.  
If you have a license for VMware Virtual SMP for ESX Server, enter that serial number in the **VMware Virtual SMP for ESX Server** to configure your virtual machines with more than one virtual processor. Entering the serial number installs VMware Virtual SMP for ESX Server.
- Select the **Advanced Configuration** option if you would like to configure PCI device allocation.

**Note:** Configuring PCI devices is not a required step for configuring the ESX Server scripted installation script. If you decide skip this step, you will be prompted to configure PCI devices the first time you log in to the VMware Management Interface.

19. Click **Next** to continue. If you selected to configure PCI device allocation, the Set PCI device allocation page appears.



20. Allocate memory to the service console and select PCI devices assignments.

In the Service Console list, choose the amount of memory reserved for the service console.

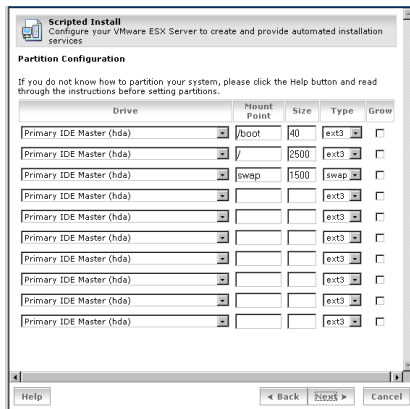
The default amount for memory reserved for the service console, 192MB, is sufficient for managing up to eight virtual machines concurrently. Change this to 272MB for up to 16 virtual machines, 384MB for up to 32 virtual machines or 512MB for more than 32 virtual machines. Choose 800MB if the service console requires additional memory for installations.

Allocate the PCI devices. Specify the following:

- Enter the **Bus**, **Slot**, and **Function** values using hexadecimal numbers.
- Choose the assignment for each device as **Service Console**, **Virtual Machines** or **Shared**.

**Note:** For more information on allocating PCI devices, refer to the *VMware ESX Server Administration Guide*.

21. Select **Next** to continue. The Partition Configuration page appears.



22. Under Partition Configuration, specify the following for each partition in the service console:
- In the **Drive** list, select from the list of disks.
  - In the **Mount Point** field, specify the mount point. You should specify at minimum boot (`/boot`), root (`/`) and swap (`swap`) mount points.
  - In the **Size** field, specify the size of the partition in megabytes (MB).
  - In the **Type** list, select the type of file system. Choose from `ext3` and `swap`. Select **swap** if the partition is a swap partition.
  - Check the **Grow** check box if you want the partition to grow until it fills the disk. VMware recommends you do not make your boot and swap partitions growable.
23. When you are satisfied with your choices, click **Next** to continue. The next Scripted Install screen appears and provides two options:
- **Download Floppy Image** — this option creates a disk image of a VMware ESX Server scripted installation boot disk. It is used to begin an automated, unattended installation of ESX Server on another server machine.
  - **Download Kickstart Image** — choose this option if you use third party deployment tools to create kickstart images.
24. Click **Download Floppy Image** to create a floppy disk image.
- Save the file as an image with a `.img` extension. If you are creating more than one floppy image (for example, you are not using DHCP in the initial

configuration and you want to specify the host name and IP address for each new ESX Server system), change the settings as appropriate and create a new floppy image with a unique name.

- Use the `dd`, `rawwritewin` or `rawrite` program to copy the image file (`.img`) to the floppy disk. For each floppy image you created, create a new floppy disk.

**Note:** The `rawrite` program is available for download from this page. Click the link to begin the download process.

- Now you can put the floppy disk into the floppy drive of another machine, power the machine on and let the installation run.

25. Click **Download Kickstart File** to create a kickstart definition file.

## Performing a Remote Network Installation with a Boot Floppy

If you are installing ESX Server using a remote network installation, you can also create a boot floppy image to run the installation instead of scripting the installation. During the installation, you are asked to specify the location of the ESX Server CD-ROM.

To perform a remote network installation with a boot floppy:

1. Use `dd`, `rawwritewin` or `rawrite` to create a floppy image called `bootnet.img`. This file is located on the ESX Server CD-ROM in the `/images` directory.
2. Put the boot floppy in the system on which you want to install ESX Server, then boot the server. The installation starts.
3. Answer the initial prompts. At the Install Type prompt, choose from:
  - **HTTP** — This is the preferred installation method. Specify the name of the remote machine where the ESX Server CD-ROM is located, the root directory (/) and HTTP port 8555.
  - **NFS** — You must have an NFS server set up. Copy the ESX Server CD-ROM to the NFS server and point the new system to the NFS server.
  - **FTP** — You must have an FTP server set up. Copy the ESX Server CD-ROM to the FTP server and point the new system to the FTP server.
4. Continue with the installation. The installation steps are largely the same as the steps in [Installing the Software on the Server on page 28](#), but some steps are out of order. For instance, you are not asked to configure networking, since you already provided that information.

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