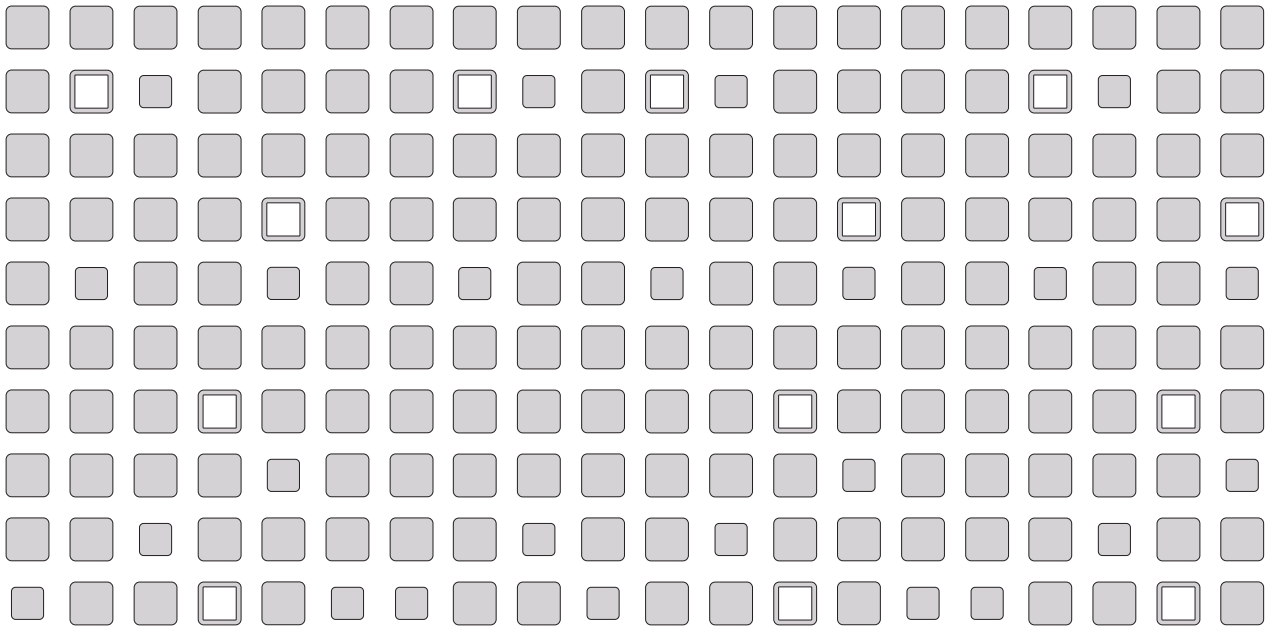


VERSION 2.0

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 VMware Web site also provides the latest product updates.

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1

CHAPTER 1

Introduction and System Requirements

Introduction and System Requirements

The following sections introduce VMware™ ESX Server™ and list the requirements for running it on a server:

- [Welcome to VMware ESX Server on page 7](#)
- [What's New in Version 2.0 on page 8](#)
 - [Supports Virtual SMP Virtual Machines on page 8](#)
 - [Supports Selected IBM and HP Blade Servers on page 8](#)
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Welcome to VMware ESX Server

Thank you for choosing VMware™ ESX Server™, the virtual machine software for consolidating and partitioning servers in high-performance environments. 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 lets you minimize the total cost of ownership of server infrastructure by maximizing server manageability, flexibility and efficiency across the enterprise.

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 simplifies server infrastructure by partitioning and isolating server resources, enabling you to manage these resources remotely and to automate and standardize them.

ESX Server 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, giving you mainframe-class control of your server infrastructure.

What's New in Version 2.0

Supports Virtual SMP Virtual Machines

VMware ESX Server now supports Symmetric Multiprocessing (SMP) virtual machines, with single or dual virtual CPUs.

Note: You only will be able to create dual-virtual CPU virtual machines if you have purchased the VMware Virtual SMP for ESX Server product. In addition, the ESX Server machine must have at least 2 physical processors. You cannot create dual-virtual CPU virtual machines on servers with a single processor.

For more information on the VMware Virtual SMP for ESX Server product, contact VMware or your authorized sales representative.

Supports Selected IBM and HP Blade Servers

ESX Server 2.0 includes support for the following IBM and HP servers:

- IBM eServer BladeCenter
- HP Proliant BL20pG2 and HP Proliant BL40P

Supports NIC Teaming

NIC teaming enables you to group two through ten physical network interface controllers (NICs) into one single virtual network device. By binding all these physical NICs together, you can help ensure network connectivity to the server (fail-over) and improve network performance (load balancing).

Improved SAN Support

ESX Server 2.0 maximizes storage area network (SAN) availability by providing multipathing or automatic path failover in case of HBA, switch or storage controller failure. For information on supported SAN storage devices and configurations, download the *VMware ESX Server SAN Compatibility Guide* from the VMware Web site at www.vmware.com/support/esx2.

Improved VMware ESX Server File System

ESX Server 2.0 includes a new VMFS version 2 (VMFS-2). VMFS-2 has the ability to span multiple partitions and the ability for multiple ESX Servers (and the virtual machines on these servers) to access VMFS-2 concurrently.

Overall, file system operations in the `/vmfs` directory are faster for backup and restore tasks.

New, Improved VMware Management Interface

ESX Server 2.0 introduces a new VMware Management Interface that contains improved navigation, better performance and an easier-to-use interface.

Support for New Guest Operating Systems

ESX Server 2.0 includes support for Microsoft® Windows® XP Professional, Microsoft Windows Server 2003, Red Hat™ Linux® 9.0 and SuSE™ Linux 8.x. ESX Server 2.0.1 includes support for Red Hat Enterprise Linux 3.0 and support for Novell NetWare 6.5 and Novell NetWare 5.1 operating systems.

See [Supported Guest Operating Systems on page 16](#) for a complete list of supported guest operating systems in ESX Server 2.0.

Virtual LSI Logic SCSI Adapter

ESX Server 2.0 supports the LSI Logic SCSI virtual adapter. By default, ESX Server assigns a virtual BusLogic SCSI adapter to Linux, Microsoft Windows NT® 4.0, Windows 2000 or Windows XP Professional guest operating systems. Similarly, ESX Server assigns a virtual LSI Logic SCSI adapter to Windows Server 2003 guests.

You change these default settings by editing the virtual machine's configuration file.

Specify Minimum and Maximum CPU Percentages

You can specify a minimum CPU percentage, a maximum CPU percentage or both for each virtual machine. The minimum CPU percentage represents an absolute fixed lower limit while the maximum CPU percentage represents an absolute fixed upper limit.

For example, if you create a virtual machine and a minimum CPU percentage of 30% and a maximum CPU percentage of 80%, then this virtual machine will always have at least 30%, and never more than 80%, of a physical CPU's resources.

Support for VMware Scripting APIs

ESX Server 2.0 includes support for VMware Scripting APIs.

To download these packages, go to the ESX Server Download page, www.vmware.com/download/esx of the VMware Web site. The API packages are:

- `VMware-VmCOMAPI-2.1.0-<buildnum>.exe` — COM Scripting API for Windows operating systems. Use this package on a Windows client machine.
- `VMware-VmPerlAPI-2.1.0-<buildnum>.exe` — Perl Scripting API for Windows operating systems. Use this package on a Windows client machine.

- `VMware-VmPerlAPI-2.1.0-<buildnum>.tar.gz` — Perl Scripting API for Linux operating systems. Use this package on a Linux client machine.

For more information on these APIs, see www.vmware.com/support/developer.

System Requirements

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/esx2.

Minimum Server Requirements

- Two up to sixteen processors: Intel® 900MHz Pentium® III Xeon and above
- 512MB RAM minimum
- One 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: If ESX Server has two or more Ethernet controllers, 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.

Note: To ensure the best possible performance, always use Fibre Channel cards in dedicated mode. We do not recommend sharing Fibre Channel cards 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, refer to the *VMware ESX Server Administration Guide*. For details on how to calculate the amount of RAM you need, see 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/esx2.

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 2 TB

CPU

- 16 physical processors per system, with 8 virtual CPUs per processor
- 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
- 16 Ethernet ports per system
- Up to 8 Gigabit Ethernet ports or up to 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 VMware Remote Console and access the VMware Management Interface. The VMware Remote Console runs as a standalone application. The VMware Management Interface uses a Web browser.

Hardware Requirements

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

Software — 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 — Linux Remote Workstation

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

In ESX Server 2.0, VMware Virtual SMP for ESX Server is supported on all of the following guest operating systems 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	Yes
Red Hat Linux 7.3 and 8.0	No
Red Hat Linux 9.0	Yes
Red Hat Enterprise Linux (AS) 2.1 and 3.0	Yes
SuSE Linux 8.2	Yes
SuSE Linux Enterprise Server (SLES) 8	Yes
Novell NetWare 6.5 and 5.1 (Patch 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 or up to 8 virtual machines for each CPU, 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 four virtual SCSI adapters per virtual machine with up to 15 devices per adapter
- 9TB per virtual disk

Virtual Ethernet Cards

- Up to four virtual Ethernet adapters per virtual machine

Note: Each virtual machine has a total of 5 virtual PCI slots, therefore 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

Technical Support Resources

The VMware Web Site

The latest technical support and troubleshooting notes are available on the VMware Web site at www.vmware.com/support/.

VMware Newsgroups

The VMware newsgroups are primarily forums for users to help each other. You are encouraged to read and post issues, work-arounds 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.

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.

Reporting Problems

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

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 can be 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 (`.vmx`) 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 requesting 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.

In either of these cases, when reporting problems directly to VMware describe the steps you took in the period before this failure (including any information listed in point 1 above, if applicable). 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. These can be found in files named `vmkernel-core.<date>` and `vmkernel-log.<date>` in the `/root` directory after you reboot your machine.

2

CHAPTER 2

Installing and Configuring ESX Server

Installing and Configuring ESX Server

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

- [Installing the Software on the Server on page 23](#)
 - [Before You Begin on page 23](#)
 - [Installing VMware ESX Server on page 23](#)
- [Accepting the Security Certificate from ESX Server on page 37](#)
 - [Accepting the Certificate for an Internet Explorer 6.0 Browser on page 37](#)
 - [Accepting the Certificate for a Netscape Navigator 7.0 Browser on page 39](#)
 - [Accepting the Certificate for a Mozilla 1.x Browser on page 40](#)
- [Using the System Configuration Wizard to Configure Your Server on page 41](#)
 - [Installing VMware Virtual SMP for ESX Server on page 41](#)
 - [Configuring the ESX Server System on page 41](#)
- [Installing Additional Hardware on the Server on page 52](#)
 - [Installing Hardware for Use by Virtual Machines on page 52](#)
 - [Installing Hardware for Use by the Service Console on page 52](#)
- [Upgrading from a Previous Version of ESX Server on page 54](#)
 - [Before You Install ESX Server 2.0 on page 54](#)
 - [Upgrading from ESX Server 1.5.x or ESX Server 2.0 Beta to ESX Server 2.0 on page 56](#)
 - [Verifying Your Device Driver Mappings on page 57](#)
- [Scripting Your ESX Server Installations on page 60](#)
 - [Setting Up the Script on page 61](#)
 - [Performing a Remote Network Installation with a Boot Floppy on page 65](#)

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.

- [Before You Begin on page 23](#)
- [Installing VMware ESX Server on page 23](#)

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 [System Requirements on page 11](#) for details.

Note: If you are installing ESX Server on an HP blade server, you must install using a remote network installation. For instructions, see [Performing a Remote Network Installation with a Boot Floppy on page 65](#).

Note: If you plan to install ESX Server onto a hard disk that is on a SAN seen through a Fibre Channel adapter, make sure you disconnect the Fibre Channel adapter from the SAN before you install. A disk on a SAN seen through a Fibre Channel adapter is often displayed first in the installer and may cause confusion during the installation of the service console. VMware does not support installing ESX Server on a hard disk that is on a SAN.

Installing VMware ESX Server

The VMware ESX Server installation process installs:

- The service console, which is based on a modified Red Hat Linux 7.2 installation and is called VMnix. 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. What amounts you should use are discussed below.

Note: In order to increase swap space after the initial setup, you must restart the server. If you need to keep the server running without restarts, be sure to configure it with a generous amount of swap space.

Installing the VMware ESX Server Software

This section describes how to install the ESX Server software onto your server machine. After completing the steps listed below, proceed to [Using the System Configuration Wizard to Configure Your Server on page 41](#) 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.

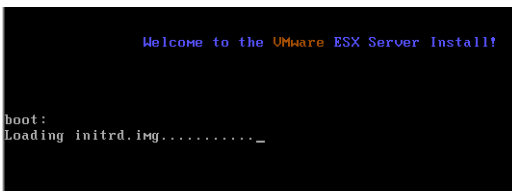
Note: All actions are executed in the ESX Server installer interface by pressing the Tab, directional arrows and/or the Enter key. In fields, cursor location is indicated by a slight shift in the underscore. In check boxes, the box highlights in a contrasting color.

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.



Note: If you are installing ESX Server on an IBM eServer BladeCenter, a Welcome to VMware ESX Server dialog appears. It contains two buttons, **Install** and **Troubleshoot**. Wait at least 10 seconds before making a choice (until all of the necessary USB drivers are loaded), otherwise you may get an error message stating **failed to read /modules/module-info**.

Later, when you reboot the system after you finish installing ESX Server, you must manually eject the CD-ROM from its drive. It is not ejected automatically.

3. If necessary, enter the BIOS Setup screen and set the CD-ROM as the first boot device.

Note: On some HP ProLiant servers, you must also change a setting in the BIOS to ensure that the BIOS correctly populates the PCI IRQ routing entries in the MPS table. On these systems, press **F9** during boot to get into system configuration, choose **Advanced > MPS Table Mode > Full Table APIC**. Save the changes and exit.

4. If necessary, boot from a VMware ESX Server boot floppy.

If the installation screen does not come up properly, your CD-ROM drive may be having trouble booting from the CD.

- Create a boot floppy:

Windows System

- a. Put the ESX Server CD in the CD-ROM drive.
- b. Put a floppy disk in the floppy drive.
- c. Open a DOS command window.
- d. Use the `rawrite` program to copy the disk image to the floppy disk. If your CD-ROM drive is not `d:`, substitute the correct drive letter.

```
D:\dosutils\rawrite -f d:\images\boot.img -d a
```

Linux System

- a. Put the ESX Server CD in the CD-ROM drive.
- b. As root, mount the CD.

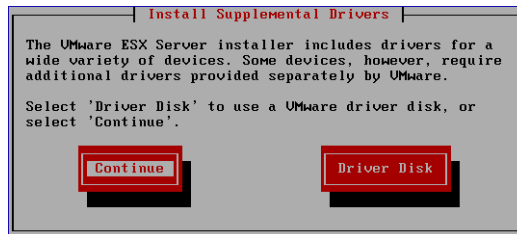

```
mount /dev/cdrom /mnt/cdrom
```
- c. Put a floppy disk in the floppy drive.
- d. Copy the boot image from the CD to the floppy.


```
dd if=/mnt/cdrom/images/boot.img of=/dev/fd0 bs=1474560 count=1
```

- Insert the ESX Server boot floppy disk into the floppy drive and reboot.

If necessary, change the floppy drive to the first boot device through the BIOS Setup screen. Leave the ESX Server CD in the CD-ROM drive.

5. Select for supplemental drivers.



Specify if you want to install additional device drivers from a VMware provided disk.

Continue — proceeds with the installation without searching for additional drivers.

Driver Disk — installs additional drivers from the VMware driver disk. Put the driver disk into the floppy drive then choose this option.

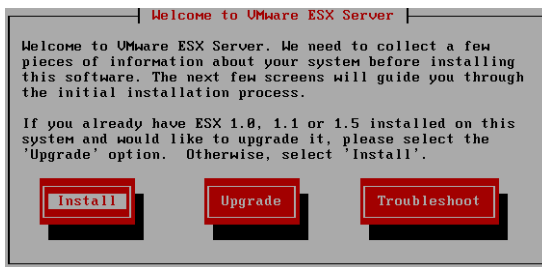
- Select **Continue** or **Driver Disk**.
 - If you selected **Driver Disk**, the Devices Confirmation screen appears. Select **OK**.
 - The Welcome screen appears.
6. If necessary, acknowledge any ESX Server device messages. Select **OK**.

The installer examines all the hardware to determine if the Ethernet and SCSI devices are compatible with VMware ESX Server.

Unknown PCI devices — this messages 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.

7. Select **Install**.



The Welcome screen lists three choices:

Install — this option performs a full installation.

Upgrade — this option upgrades an existing installation of ESX Server.

Troubleshoot — if you have already attempted an installation and failed, select this option.

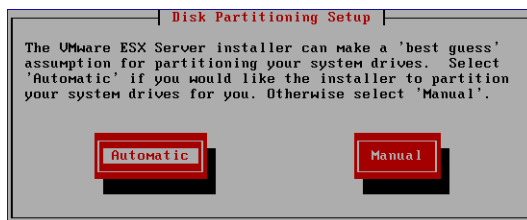
- To install ESX Server on a new system, select **Install**.

- 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 54](#).
- If you have tried to install ESX Server and have had problems, select **Troubleshoot**. The installer asks you to insert a blank floppy disk into the floppy disk drive. Select **OK**. The installer copies useful information into a `troubleshoot.out` file that you can send to VMware customer support for help in troubleshooting your installation.

If you selected **Install** or **Troubleshoot**, the Disk Partitioning screen appears.

Note: If you are installing ESX Server on an IBM eServer BladeCenter, you should wait at least 10 seconds before making your selection; otherwise you may get an error message stating `failed to read /modules/module-info`.

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



The Disk Partitioning screen lists two choices:

Automatic — the installer estimates and creates partitions on your disk. You can edit these automatic selections after they are created.

Note: If you have disks connected via an Emulex Fibre Channel adapter or a QLogic QLA-2300 Fibre Channel adapter, they may not appear when using **Automatic** partitioning. However, they are visible during configuration of the server, when you assign disk space for storage of virtual machine files.

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

Make your selection. Select **Automatic** or **Manual**, as desired.

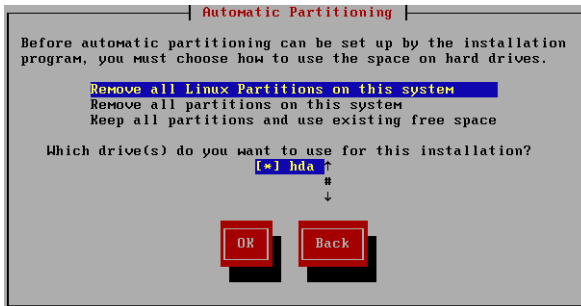
9. If you are installing this ESX Server on an unformatted disk, the following message appears. Select **Yes** or **No** as appropriate.



10. If you selected Automatic partitions, specify how you want the space on your hard disk to be allocated to the service console.

Note: In these steps, you are setting up partitions for use by the service console. Later, when you are configuring the ESX Server system, you set up VMFS-2 partitions, which is where your virtual machines are stored. For more information, see [Configuring the ESX Server System on page 41](#).

The options appear on the Automatic Partitioning screen.



The hard disk allocation options are:

- Remove all Linux Partitions on this system
- Remove all partitions on this system
- Keep all partitions and use existing free space

The hard drive selection options are based on the hard drives detected by the ESX Server installer. The service console is installed on the hard drive selected.

- Make your partition handling selection.
- Make your hard drive selection.
- Select **OK** to process your selections.

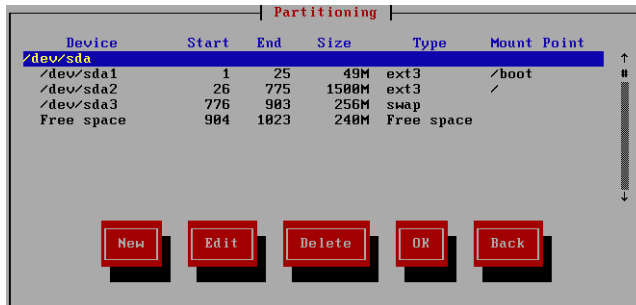
- If you choose to delete existing partitions, select **Yes**, to confirm partition deletion.



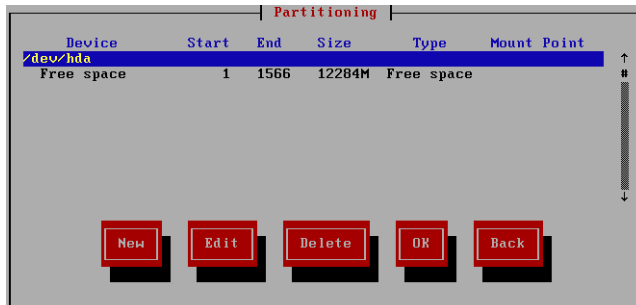
The Partitioning screen appears.

11. Verify or define the partitions, as appropriate.

If you selected Automatic partitions, the Partitioning screen lists the partitions ESX Server created.



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



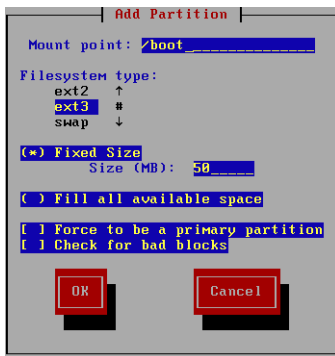
Whether you automatically or manually create partitions, the ESX Server system requires a minimum of three partitions, as described below. You can use the free space to divide a fourth partition into a number of logical partitions.

- 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 is displayed. The screen pre-loads the information of a selected partition, when Edit is selected.

First partition — set the mount point of `/boot`, the type to ext3 and the size to 50MB.



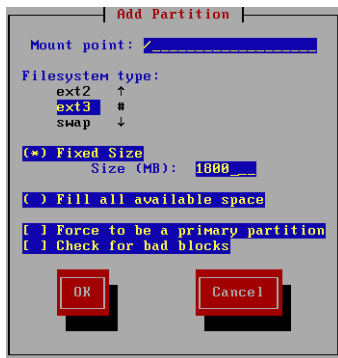
Second partition — set no mount point, the type to swap and the size to twice the memory assigned to the service console.



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 or 512MB for more than 32 virtual machines, so you must adjust the size of the swap partition to 544MB, 768MB or 1024MB, respectively.

Third partition — set the mount point to `/`, the type to `ext3` and the size to about 1800MB.



The third partition holds your root file system and most of the Linux and service console files. The service console should be installed on your first IDE disk (`hda`), if you have one; otherwise, use your first SCSI disk (`sda`)

- Select **OK** on the Add/Edit Partition screen.
- Select **OK** on the partitioning screen.

The Boot Loader screen appears.

12. Select the location for the boot loader.



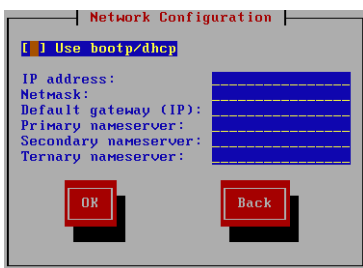
The installer asks you if you want to put the boot loader in the master boot record (MBR) of the boot disk or the boot sector of the first partition of the disk.

In most cases, you should choose the default of installing on the MBR.

However, if you have an older Compaq server — such as the DL360 — with Compaq SmartStart utilities, choose the boot sector of the first partition of the disk. On the Compaq server, the MBR contains the code to allow starting the SmartStart utilities using the **F10** key. If the **F10** key is not pressed, the server will automatically try to boot from the first partition.

The Network Configuration screen appears.

13. Enter the network parameters.



The options are:

bootp/dhcp — press the **spacebar** 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.

IP address block — press **Tab**, without the first box selected. The IP address block is available for input.

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. See the *VMware ESX Server Administration Guide* for instructions and cautions on setting up a DHCP-based service console.

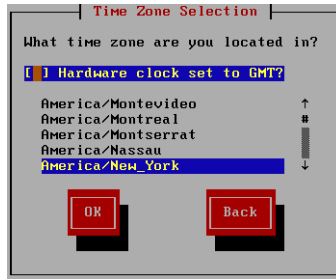
The Hostname Configuration screen appears.

14. Enter the host name in Hostname Configuration.

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

The Time Zone screen appears.

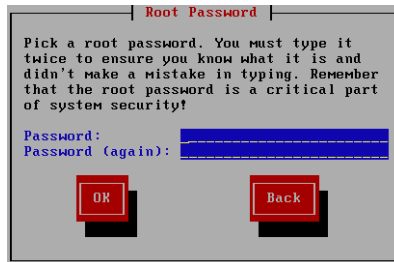
15. Select your time zone.



You can type **U** to move quickly to the US time zones or **E** to move quickly to the European time zones.

The Root Password screen appears.

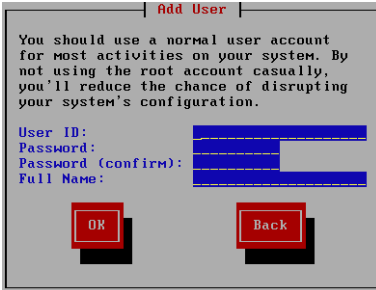
16. Specify your desired root password.



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.

The Add User screen appears.

17. 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. However, you may find it more convenient to add them later with the service console's `useradd` command or by copying the `/etc/passwd` file from another machine.

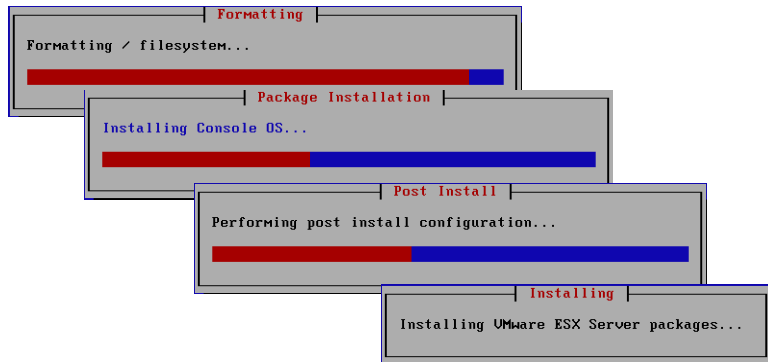
The User Account Setup screen appears.

18. Verify the user account.



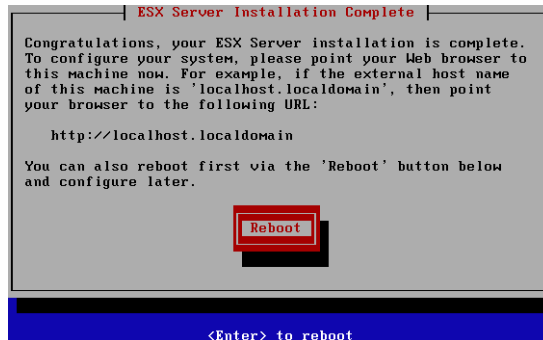
From the User Account Setup screen you can add, delete or edit user accounts.

When all the parameters are entered, the installer formats the disk and starts installing the packages.



The ESX Server Installation Complete screen appears.

19. Reboot from the final screen and continue to configure your server.



Caution: When you reboot, the system boots into a uniprocessor Linux kernel with legacy mode interrupts. Some machines, notably the Dell 8450 and the IBM x440 in 16-way configurations, 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.

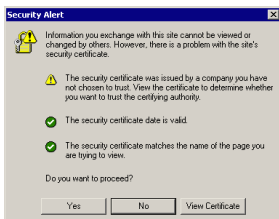
Accepting the Security Certificate from ESX Server

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 41](#)) — a dialog box asks whether you want to accept the security certificate presented by the server.

To do so, follow the steps below or take the equivalent steps for your browser version.

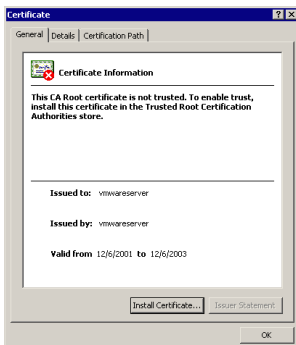
- [Accepting the Certificate for an Internet Explorer 6.0 Browser on page 37](#)
- [Accepting the Certificate for a Netscape Navigator 7.0 Browser on page 39](#)
- [Accepting the Certificate for a Mozilla 1.x Browser on page 40](#)

Accepting the Certificate for an Internet Explorer 6.0 Browser

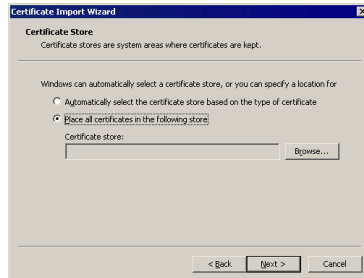


1. A security Alert dialog box appears. To see details of and install the certificate, click **View Certificate**, then go to step 2.

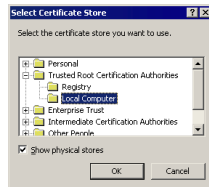
To accept the certificate for this session only, click **Yes**. The VMware Management Interface Login screen appears.



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

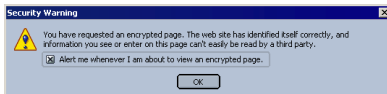
When you connect to the management interface with a Netscape browser, a dialog box appears, indicating the certificate is from an unknown authority.



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

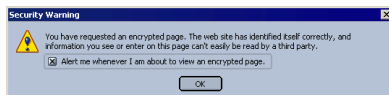
When you connect to the management interface with a Mozilla browser, a dialog box appears, indicating the certificate is from an unknown authority.



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 `vmkernel` fails to load.

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

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 Network Security section in the technical note 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>`

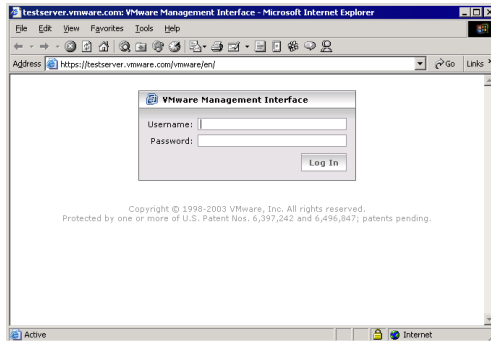
Where `<hostname>` is the name assigned to the server during installation.

The browser security certificate screen appears.

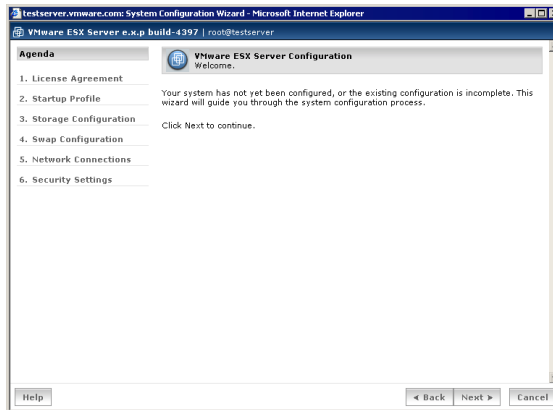
2. A dialog box asks whether you want to accept the security certificate presented by the server. The specific certificate presented varies depending upon the browser you are using. For details, see [Accepting the Security Certificate from ESX Server on page 37](#).

Accept the security certificate. The VMware Management Interface Login screen appears.

3. Login to the VMware Management Interface as root.

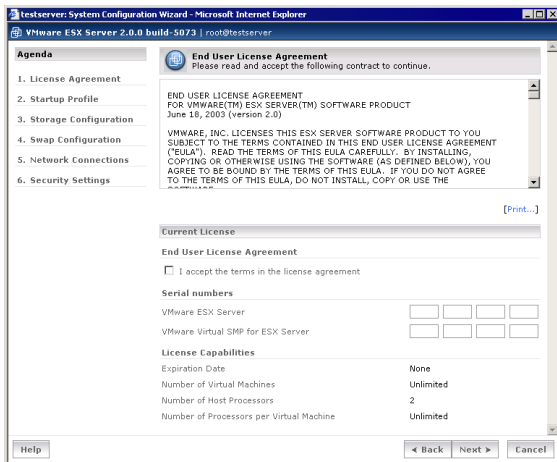


The System Configuration Wizard appears.



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

4. Read the end user license agreement and check **Accepted**.



Enter the ESX Server serial number in the **VMware ESX Server** entry fields.

If you have a license for VMware Virtual SMP for ESX Server, enter that serial number in the **VMware Virtual SMP for ESX Server** entry fields. 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**.

Entering Serial Numbers Through the Service Console

You can also enter your ESX Server and VMware Virtual SMP product serial numbers through the service console, as the root user.

To enter your ESX Server serial number, type:

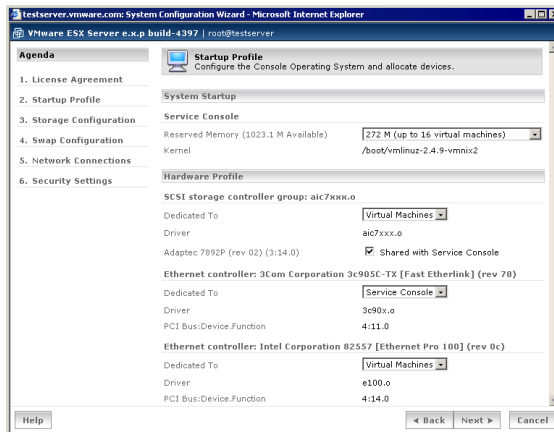
```
vmware --new-sn <serial_number>
```

To enter your Virtual SMP product serial number, type:

```
vmware --new-smp-sn <SMP_serial_number>
```

Log out, then log back into the VMware Management Interface, to see your changes.

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



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 **Other** to specify a different amount of memory; a range is suggested in the dialog box that appears. 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 IDE disks, you may have to allocate at least one SCSI or RAID device to the service console, since the service console needs to have a disk from which it and the VMkernel 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.

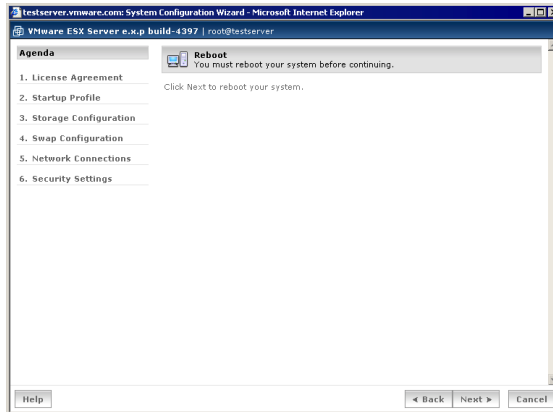
It is generally best to assign the first Ethernet adapter on the list to the service console and set the other adapters to be used by virtual machines. If you assign the first adapter to be used by virtual machines, the service console may try to use an inappropriate driver for its network adapter. Ethernet 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.

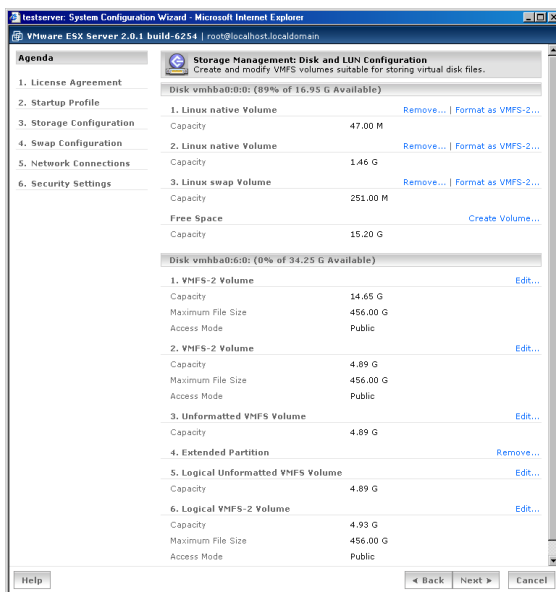
In the likely event that you have fewer Ethernet devices than virtual machines, you can share VMkernel Ethernet adapters among the virtual machines with little performance penalty.

6. 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.

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

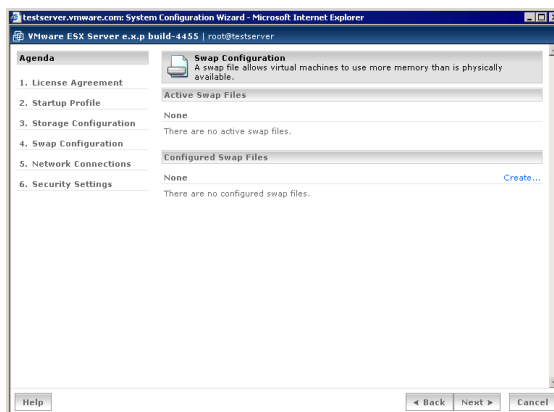


Earlier, you configured file systems and storage for the service console when you installed ESX Server. Now you can create new VMFS-2 partitions to store your virtual machines with any remaining free space, edit existing VMFS volumes or remove any extended partitions. You should consider what partitions 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, in case 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.

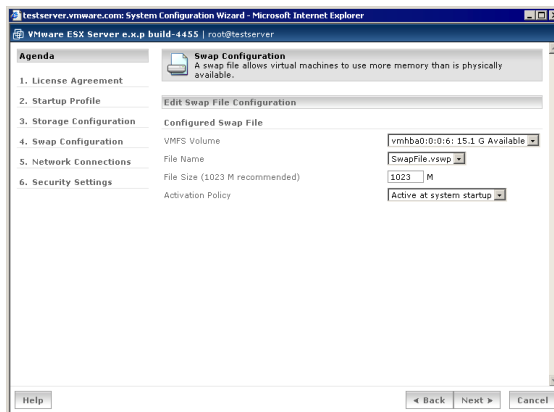
- Click **Next**. The Swap Configuration screen appears.



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*.

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.

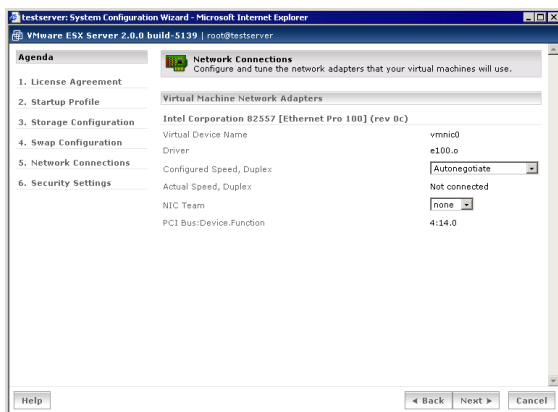
Caution: Do not place your swap file on a SAN-connected disk. If the swap file is placed on a SAN-connected disk, then ESX Server would become unstable if the server became disconnected from the SAN.

- 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`.

9. 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**.



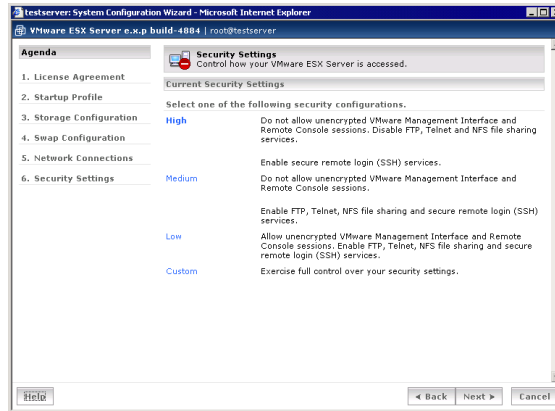
Use this screen to configure the network adapter that the virtual machines are going to use.

Configure speed and duplex settings for the network adapter. In the **Configured Speed, Duplex** list, keep the default, **Autonegotiate**, to have ESX Server choose the optimal settings for the adapter. Otherwise, if you know the exact setting to use, select 10 Mbps half or full duplex, or 100 Mbps half or full duplex.

Decide whether to use NIC teaming with the network adapter. In the **NIC Team** list, select the bond to use. For more information, see the *VMware ESX Server Administration Guide*.

10. Click **Next**. The Security Settings screen appears.

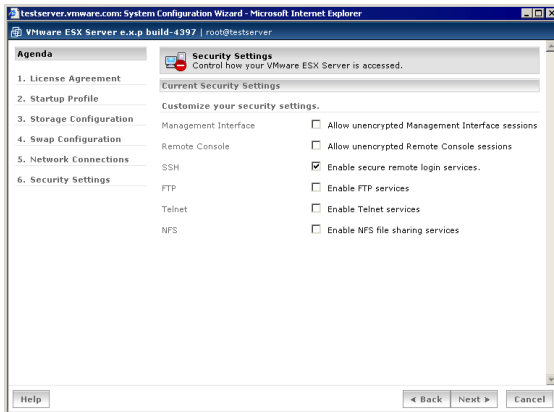
Select the security level for the ESX Server machine and the network traffic generated by ESX Server.



When you configure a more secure machine, you have fewer options for connecting to it, as 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.

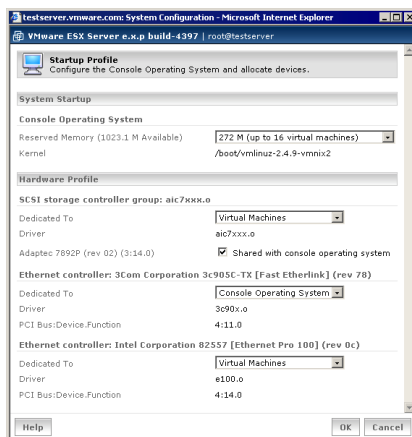
11. After you choose your security settings, click **Next**. A message appears, stating your configuration is complete. Click **OK**. The VMware Management Interface Login page appears.

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, enter
`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 2.0 on page 54](#)
- [Upgrading from ESX Server 1.5.x or ESX Server 2.0 Beta to ESX Server 2.0 on page 56](#)
- [Verifying Your Device Driver Mappings on page 57](#)

Before You Install ESX Server 2.0

There are a few steps you should take before you install ESX Server 2.0 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 `.vmx` files — for any existing virtual machines you plan to migrate to ESX Server 2.0.

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`. Otherwise, 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 2.0 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, your ESX Server 1.5 system has 2 `aic7xxx` cards and you previously allocated one to the service console and one to the `vmkernel`. For ESX Server 2.0, 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 41](#).

Upgrading from ESX Server 1.5.x or ESX Server 2.0 Beta to ESX Server 2.0

To upgrade from ESX Server 1.5.x or a beta version of ESX Server 2.0 to ESX Server 2.0, use the installation CD-ROM.

Caution: Upgrading directly from ESX Server 1.0 or 1.1 to ESX Server 2.0 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. The installer upgrades your ESX Server installation.
7. When the upgrade completes and displays the final screen, reboot. The machine keeps the device allocations that you previously set up.
8. 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 41](#). 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 2.0 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, this amount must be upgraded 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. For background, see the *VMware ESX Server Administration Guide*.

Also, check device allocation for the SCSI controller. If there is only one SCSI adapter the 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**.

9. 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 2.0. With the addition of new drivers in ESX Server 2.0, further customization of `vmware-device.map.local` may not be necessary.

Upgrading Default Speed/Duplex Setting for NICs for a Previous ESX Server Release

The default speed/duplex setting for ESX Server NICs has changed from “100/1000/full” in ESX Server 1.5.x to “autonegotiate” in ESX Server 2.0.1. If you are upgrading from ESX Server 1.5.x, then you may need to alter your switch's setting to “autonegotiate”, for ports connected to the ESX Server machine, or you may force the NICs to full duplex in the NIC configuration page. (Log into the VMware Management Interface as the root user, click the **Options** tab, click **Network Connections**, then click **Physical Adapters**.)

Note: It is important that both the switch port and the NIC are either both set to autonegotiate, or both forced to the same speed/duplex setting

Upgrading SNMP from a Previous ESX Server Release

If you are upgrading from an ESX Server 1.5.x release, then SNMP, and possibly other system management agents, will not work properly. Save and copy onto another machine all SNMP files that were used to set up read/write community names, trapsinks, and trapcommunity names.

Complete the following steps.

1. Save and copy onto another machine the following files:
 - ESX Server 1.5 and 1.5.1:

- a. `/usr/share/snmp/snmpd.conf` — Save this file, but remove the last section that starts with “# VMware ESX Server SNMP modules -- Edit this section at your own risk”. We'll call this file Alpha.
 - b. (Optional) `/etc/snmp/snmpd.conf` — If you have this file, and made changes to it or if you have installed third-party system management software on ESX Server, then save this file. We'll call this file Beta.
- ESX Server 1.5.2:
 - a. `/etc/vmware/vmware-snmpd.conf` — Save this file, but remove the last section that starts with “# VMware ESX Server SNMP modules -- Edit this section at your own risk”. We'll call this file Alpha.
 - b. (Optional) `/etc/snmp/snmpd.conf` — If you have this file, and made changes to it or if you have installed third-party system management software on ESX Server, then save this file. We'll call this file Beta.
2. If you've created only an Alpha file, then rename it to MAIN. If you've created Alpha and Beta, then merge your customizations into a single file, called MAIN. Be sure to eliminate any duplicate configuration items in the MAIN file.
 3. Follow the instructions in *Upgrading from a Previous Version of ESX Server*.
 4. If you are upgrading from ESX Server 1.5 or 1.5.1, then install the `ucd-snmp-4.2.3-1.i386.rpm` and `ucd-snmp-utils-4.2.3-1.i386.rpm` files from the ESX Server CD. Log in as the root user and type `rpm -Uhv <snmp_file>` for each of these files. If you are upgrading from ESX Server 1.5.2, then you do not do this step.
 5. Complete one of the following, depending on whether you are only using VMware ESX Server SNMP or if you are using VMware ESX Server SNMP with third-party system management agents:
 - Only using VMware ESX Server SNMP
 - a. Take the MAIN file you created and rename it on ESX Server as `/etc/snmp/snmpd.conf`.
 - b. Use the VMware Management Interface to configure the `vmware-snmpd` agent and restart SNMP services. See *Configuring the ESX Server Agent through the VMware Management Interface*.
 - Using VMware ESX Server SNMP with third-party system management agents
 - a. Upgrade or reinstall your third-party system management agents. Refer to your management application documentation.

- b. Take the MAIN file you created and rename it on ESX Server as `/etc/snmp/snmpd.conf`.
- c. Use the VMware Management Interface to configure the vmware-snmpd agent and restart SNMP services. See *Configuring the ESX Server Agent through the VMware Management Interface*.
- d. Restart the third-party system management agents according to the vendor's procedures.

Upgrading a Previous ESX Server Release with an existing vmware-device.map.local File

During the ESX Server 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 2.0. With the addition of new drivers in ESX Server 2.0, customization of `vmware-device.map.local` may not be necessary.

Scripting Your ESX Server 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 the script is set up, you can use it to install ESX Server two ways:

- From the ESX Server CD-ROM in the local CD-ROM drive of the new system.
- Across the network, where the ESX Server CD-ROM is in the CD-ROM drive of the original ESX Server system or the installation files are hosted on a separate server.

Note: Remote installations also can be done using a boot floppy. For more information, see [Performing a Remote Network Installation with a Boot Floppy on page 65](#).

After you install the software on a new system, you must configure that server. See [Configuring the ESX Server System on page 41](#).

Setting Up the Script

Once you install ESX Server on one system, you can set up a script necessary for performing a scripted install 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 install script that will be 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.

The script and other essential files must be copied 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`, `rawritewin` 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.

As you create the script, the ESX Server CD-ROM must be in the CD-ROM drive of the original ESX Server system.

To set up the script, complete the following steps.

1. On a client machine, connect to the service console on the ESX Server system using SSH.
2. With the CD-ROM in the ESX Server CD-ROM drive, mount the ESX Server CD-ROM.
`mount /mnt/cdrom`
3. Change to the following directory.
`/usr/lib/vmware-mui/apache/htdocs/vmware/webconfig`
4. Run the following setup script.
`./setup.pl`

- Once a shell prompt appears, open a browser and point it to `<yourESXServerSystem>/vmware/webconfig/webconfig.cgi`, where `<yourESXServerSystem>` is the name of the ESX Server system. The Scripted Installs page appears.

The screenshot shows the 'Scripted Installs' web page with the following configuration details:

- Installation:**
 - Installation Type: `install`
 - Installation Method: `cdrom`
 - Remote Server URL: (empty)
 - Boot Loader: `mbr`
 - Boot Loader Location: (empty)
 - Time Zone: `America/Los_Angeles`
 - Reboot After Installation:
- IP Address:**
 - Network Method: `dhcp`
 - Hostname: `myhost.mydomain.com`
 - IP Address: (empty)
 - Netmask: (empty)
 - Gateway: (empty)
 - Nameserver: (empty)
- Root Password:**
 - Password: (empty)
 - Again: (empty)
- Partitions:**

Drive	Mount Point	Size	Type	Grow
primary	/boot	40	ext3	<input type="checkbox"/>
primary	/	1500	ext3	<input type="checkbox"/>
primary	swap	256	swap	<input type="checkbox"/>
primary			ext2	<input type="checkbox"/>
primary			ext2	<input type="checkbox"/>
primary			ext2	<input type="checkbox"/>
primary			ext2	<input type="checkbox"/>
primary			ext2	<input type="checkbox"/>
primary			ext2	<input type="checkbox"/>
primary			ext2	<input type="checkbox"/>

- Enter the information for the script to use to configure another ESX Server system.

Under Installation, specify the following:

- In the **Installation Type** list, select `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 **lan** to install ESX Server from files on the initial ESX Server system. This is the recommended way to perform a scripted install.

Otherwise, select **cdrom** to install from the CD-ROM on the local CD-ROM drive on the new system; or select **remote** to remote network install from a server separate from the ESX Server system that still contains the ESX Server installation files.

- If you decided to perform a remote network install, in the **Remote Server URL** entry field, enter the name of the server that contains the ESX Server installation files.
- In the **Boot Loader** list, select the location of the boot loader.
Select **mbx** if you want the boot loader in the master boot record (MBR).
Select **custom** if you want the boot loader in a different location. Specify that location in the **Boot Loader Location** entry field.
- 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.
- Check the **Reboot After Installation** check box only if the new system does not eject the floppy disk automatically.

Under IP Address, specify the following:

- In the **Network Method** list, select **dhcp** if the ESX Server system is going to have a dynamic IP address; select **static** 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.

- If the ESX Server system is going to have a static IP address, specify the host name in the **Hostname** entry field, the IP address in the **IP Address** entry field, the netmask in the **Netmask** entry field, the network gateway in the **Gateway** entry field and the domain name server in the **Nameserver** entry field.

Under Root Password, specify the root password. Enter the root password in the **Password** entry field. Enter this password a second time in the **Again** entry field.

Under Partitions, specify the following for each partition in the service console:

- In the **Drive** list, select **primary**.

- In the **Mount Point** entry field, specify the mount point. You should specify at minimum boot (`/boot`), root (`/`) and swap (**swap**) mount points.
 - In the **Size** entry field, specify the size of the partition in megabytes (MB).
 - In the **Type** list, select the type of file system. Choose from **ext2**, **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.
7. When you are satisfied with your choices, save the choices to the local system. Click **Save Disk**. 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.

If you want to create a new script, click **Default Settings**. This restores the defaults on page.

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

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

Performing a Remote Network Installation with a Boot Floppy

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

1. Use `dd`, `rawwrite` or `rawrite` to create a floppy image called `bootnet.img`. This file is located on the ESX Server CD-ROM in the `/images` directory. You do not use run the `webconfig.cgi` script in the management interface to set up the floppy image.
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 23](#), but some steps are out of order. For instance, you are not asked to configure networking, since that information was already provided.

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