



# Sun Blade™ X6440 Server Module Operating System Installation Guide

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Sun Microsystems, Inc.  
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# Preface

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This *Sun Blade X6440 Server Module Operating System Installation Guide* contains operating system installation and initial software configuration procedures for bringing the Sun Blade X6440 server module to a configurable and usable state.

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## Product Updates

For product updates that you can download for the Sun Blade X6440 server module, visit the following web site:

<http://www.sun.com/download/>

Locate the Hardware Drivers section and click x64 Servers & Workstations. The Sun Blade X6440 server module site contains updates for firmware and drivers, as well as CD-ROM .iso images.

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## Related Documentation

For a description of the document set for the Sun Blade X6440 server module, see the *Sun Blade X6440 Getting Started Guide* (820-3960) that is packed with your server module and also posted at the product's documentation site. Go to the following URL, then navigate to the Sun Blade X6440 product documentation:

<http://docs.sun.com/>

The documents listed in the following table are available at that site.

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**Note** – The last two digits of the documentation part number identify the latest version of the product documentation that is available for download (or viewing online). For example: 820-xxxx-XX.

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<b>Title</b>	<b>Content</b>	<b>Part Number</b>	<b>Format</b>
<i>Sun Blade X6440 Server Module Product Notes</i>	Late-breaking information about the server module.	820-3965	PDF HTML
<i>Sun Blade X6440 Server Module Getting Started Guide</i>	Basic installation information for setting up the server module.	820-3960	PDF Print
<i>Sun Blade X6440 Server Module Installation Guide</i>	Detailed installation information for setting up the server module.	820-3961	PDF HTML Print option
<i>Sun Blade X6440 Server Module Operating System Installation Guide</i>	Installation instructions for the Solaris and Linux operating systems.	820-3962	PDF HTML
<i>Sun Blade X6440 Server Module Windows Operating System Installation Guide</i>	Installation instructions for the Windows Server operating system.	820-3963	PDF HTML
<i>Sun Blade X6440 Server Module Service Manual</i>	Information and procedures for maintaining and upgrading the server module.	820-3964	PDF HTML
<i>Sun Integrated Lights Out Manager 2.0 User's Guide</i>	ILOM features and tasks that are common to servers and server modules that support ILOM.	820-1188	PDF HTML
<i>Sun Integrated Lights Out Manager Supplement for Sun Blade X6440 Server Module</i>	ILOM information that is specific to the server module.	820-3967	PDF HTML
<i>Sun Blade X6440 Server Module Safety and Compliance Manual</i>	Hardware safety and compliance information for the server module.	820-4412	PDF
<i>Important Safety Information for Sun Hardware Systems</i>	Multilingual hardware safety and compliance information for all Sun hardware systems.	816-7190	Print

Translated versions of some of these documents are available at the web site described above in French, Simplified Chinese, Traditional Chinese, Korean, and Japanese. English documentation is revised more frequently and might be more up-to-date than the translated documentation.

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# Support and Training

Sun Function	URL
Support	<a href="http://www.sun.com/support/">http://www.sun.com/support/</a>
Training	<a href="http://www.sun.com/training/">http://www.sun.com/training/</a>

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# Using UNIX Commands

This document might not contain information about basic UNIX<sup>®</sup> commands and procedures such as shutting down the system, booting the system, and configuring devices. Refer to the following for this information:

- The software documentation that you received with your system.
- The Solaris<sup>™</sup> Operating System documentation at <http://docs.sun.com>.

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# Third-Party Web Sites

Sun is not responsible for the availability of third-party web sites mentioned in this document. Sun does not endorse and is not responsible or liable for any content, advertising, products, or other materials that are available on or through such sites or resources. Sun will not be responsible or liable for any actual or alleged damage or loss caused by or in connection with the use of or reliance on any such content, goods, or services that are available on or through such sites or resources.

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# Shell Prompts

Shell	Prompt
C shell	<i>machine-name%</i>
C shell superuser	<i>machine-name#</i>
Bourne shell and Korn shell	\$
Bourne shell and Korn shell superuser	#

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# Typographic Conventions

Typeface*	Meaning	Examples
AaBbCc123	The names of commands, files, and directories; on-screen computer output	Edit your <code>.login</code> file. Use <code>ls -a</code> to list all files. % You have mail.
<b>AaBbCc123</b>	What you type, when contrasted with on-screen computer output	% <b>su</b> Password:
<i>AaBbCc123</i>	Book titles, new words or terms, words to be emphasized. Replace command-line variables with real names or values.	Read Chapter 6 in the <i>User's Guide</i> . These are called <i>class</i> options. You <i>must</i> be superuser to do this. To delete a file, type <code>rm filename</code> .

\* The settings on your browser might differ from these settings.

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# Sun Welcomes Your Comments

Sun is interested in improving its documentation and welcomes your comments and suggestions. You can submit your comments by going to:

<http://www.sun.com/hwdocs/feedback/>

Please include the title and part number of your document with your feedback:

*Sun Blade X6440 Server Module Operating System Installation Guide, 820-3962-11*





# Overview

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This chapter provides an overview of the operating system (OS) installation process for the Sun Blade X6440 server module. It contains the following sections:

- [“About Installing an Operating System on a Sun Blade X6440 Server Module” on page 1](#)
- [“Supported Operating Systems” on page 2](#)
- [“Installation Methods” on page 2](#)
- [“Installation Prerequisites” on page 3](#)
- [“Things You Must Decide” on page 3](#)
- [“What to Do Next” on page 4](#)

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**Note** – This document only covers supported Solaris™, OpenSolaris, Linux, and VMware operating system installations. For instructions on installing the Windows Server 2003/2008 operating systems onto the Sun Blade X6440 server module, see the *Sun Blade X6440 Server Modules Windows Operating System Installation Guide* (820-3963).

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## About Installing an Operating System on a Sun Blade X6440 Server Module

The Sun Blade X6440 server module does not contain internal hard disks. Therefore, to boot the server module and bring it to an operational state, you must install the operating system (OS) to one of the following installation locations:

- Internal Compact Flash (CF) card (limited OS support).
- Sun Blade 6000 Storage Module accessible via the chassis NEM+.

- Storage Area Network (SAN) accessible via the chassis PCI EM and Fibre Channel.

Each of the above options requires specific hardware, and the installation procedure for each will vary depending on the choice of OS.

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## Supported Operating Systems

The Sun Blade X6440 server module supports the following operating systems:

- Solaris 10 5/08 and later
- OpenSolaris 2009.06 and later
- Red Hat Enterprise Linux (RHEL) 4.6, 32-bit and 64-bit
- RHEL 5.1, 32-bit and 64-bit
- SUSE Linux Enterprise Server (SLES) 10 SP2, 64-bit
- VMware ESX Server 3.5 Update 1
- Microsoft Windows Server 2003 Enterprise R2 SP2, 32-bit and 64-bit
- Microsoft Windows Server 2008 Enterprise and Datacenter 32-bit and 64-bit

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**Note** – For instructions on installing the Windows operating systems onto the Sun Blade X6440 server module, see the *Sun Blade X6440 Server Module Windows Operating System Installation Guide* (820-3963).

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## Installation Methods

- Direct with a locally attached CD/DVD
- Remote keyboard, video, mouse (RKVM) redirect
- PXE/network-based (diskless) installation
- Sun Installation Assistant (SIA) using a locally attached CD/DVD
- SIA using RKVM redirect

---

**Tip** – Using the Sun Installation Assistant (SIA) to install the Red Hat Enterprise Linux and the SUSE Linux Enterprise Server operating systems is the recommended installation method. SIA is a convenient, front-end application designed to assist you in installing these operating systems on your server. SIA supplements the standard installation utilities and procedures that ship with the operating system; it does not replace them. For more information, refer to the *Sun Installation Assistant User's Guide* (820-3357).

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## Installation Prerequisites

You must complete the following prerequisite steps before you can begin installing an OS.

- Install the server hardware.
- (Optional) Configure the service processor.
- Gather needed information, such as IP address and netmask.
- (Linux only) Create a driver CD or use the Sun Installation Assistant (recommended procedure). See the documentation for your particular Linux OS or the *Sun Installation Assistant User's Guide*.

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## Things You Must Decide

You must decide the following:

- Which of the supported operating systems are you installing?
- Where are you installing the OS?

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Installation Location	Question to Answer
Sun Blade 6000 Storage Module/NEM+	Does my chassis have a Sun Blade 6000 Storage Module and NEM+?
SAN/PCI EM FC	Does this option exist for my environment?
CF Card	Will my OS fit on a CF card? (See next question.)

---

- Which installation method will you use?

Installation Method	Operating System Compatibility					
	Solaris	Open Solaris	Red Hat	SLES	VMware	Windows
Preinstalled on disk	YES	Yes	NO	NO	NO	NO
Install from distribution media (CD/DVD) on the server module via USB-attached external CD/DVD drive	YES	Yes	YES	YES	YES	YES
Install from distribution media (CD/DVD) via RKVMS*	YES	Yes	YES	YES	YES	YES
Install from network	YES	Yes	YES	YES	YES	YES
Install on internal CF card	YES	Yes	YES	YES	NO	YES

\* The Sun Blade X6440 server module supports industry-standard KVMs with devices connected to it through a USB port or through redirection via the ILOM Remote Console application. For more information on setting up USB connections to your system, see your server hardware documentation. For more information on setting up a remote KVMs connection to your server with the ILOM Remote Console application, see the *Sun Blade X6440 Server Module Installation Guide*, (820-3961).

- Are you configuring the server for diskless booting?

Operating System	Relevant Documentation on Diskless Configurations
Solaris 10	See <a href="#">“About the Solaris 10 Installation” on page 42</a> or <i>Solaris 10 Installation Guide: Network-Based Installations</i> at <a href="http://docs.sun.com/app/docs/doc/817-5504">http://docs.sun.com/app/docs/doc/817-5504</a>
Red Hat Linux	See <i>Red Hat Enterprise Linux System Administration Guide</i> at <a href="https://www.redhat.com/docs/manuals/enterprise/">https://www.redhat.com/docs/manuals/enterprise/</a>

## What to Do Next

The chapters in this guide provide detailed OS installation information, see the appropriate chapter for your OS.

You should also gather the installation, administration, and configuration documentation distributed with the operating system. These documents generally accompany the distribution media as printed manuals, or are included as PDF files on the media itself. In many cases, the latest versions of such documents can be downloaded from the web site of the OS vendor.

# Installing Red Hat Enterprise Linux

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This chapter provides information about installing the Red Hat Enterprise Linux operating system on a Sun Blade X6440 server module.

This chapter contains the following sections:

- [“About the Red Hat Enterprise Linux Installation” on page 5](#)
- [“Preparing to Install the RHEL Operating System” on page 8](#)
- [“Installing the RHEL Operating System From Local Distribution Media” on page 8](#)
- [“Installing the RHEL Operating System Using the Remote Console Application” on page 10](#)
- [“Installing the RHEL Operating System Using PXE” on page 12](#)
- [“Updating the RHEL Operating System” on page 20](#)

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## About the Red Hat Enterprise Linux Installation

If you have installed Red Hat Enterprise Linux (RHEL) operating system (OS) on other Intel or AMD Opteron servers, you are already familiar with how to install it on a Sun Blade X6440 server module. The two most common methods of installing the RHEL OS on your server are as follows:

- Using the RHEL OS distribution media
- Using the automatic KickStart installation from RHEL OS (installation tree) stored on a Preboot Execution Environment (PXE) network server

You can also use the Integrated Lights Out Manager (ILOM) Remote Console application to install the RHEL OS.

For more information about the installation, see the following topics:

- “Red Hat Enterprise Linux Installation and Administration Documentation” on page 6
- “Task Map for the RHEL Installation” on page 7

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**Tip** – Using the Sun Installation Assistant (SIA) to install the RHEL operating system is the recommended installation method. SIA is a convenient, front-end application designed to assist you in installing RHEL on your server module. SIA supplements the standard installation utilities and procedures that ship with RHEL; it does not replace them. For more information, refer to the *Sun Installation Assistant User’s Guide* (820-3357).

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## Red Hat Enterprise Linux Installation and Administration Documentation

Before you install the RHEL OS on a Sun Blade X6440 server module, consult the following RHEL documentation.

**TABLE 2-1** Sources for RHEL Documentation

Document	Description	Where to Find
README file	Contains late-breaking information about system requirements and system configuration for your version of the RHEL OS.	On the RHEL CD #1, and online from <a href="http://www.redhat.com/docs/">http://www.redhat.com/docs/</a>
<i>Red Hat Enterprise Linux Quick Installation Guide</i>	Brief printed guide containing useful information to assist you during the installation the of RHEL OS.	Included with the RHEL distribution media
<i>Red Hat Enterprise Linux Installation Guide</i>	Full version of the printed <i>Quick Installation Guide</i> .	Included on the Red Hat Documentation CD, and available for download from <a href="http://www.redhat.com/docs/">http://www.redhat.com/docs/</a>
<i>Red Hat Enterprise Linux Introduction to System Administration</i>	Introductory information for RHEL OS system administrators.	Available for download from <a href="http://www.redhat.com/docs/manuals/enterprise/">http://www.redhat.com/docs/manuals/enterprise/</a>

**TABLE 2-1** Sources for RHEL Documentation (*Continued*)

Document	Description	Where to Find
<i>Red Hat Enterprise Linux System Administration Guide</i>	Information on customizing the RHEL OS.	Available for download from <a href="http://www.redhat.com/docs/manuals/enterprise/">http://www.redhat.com/docs/manuals/enterprise/</a>
<i>System Administration for Diskless Booting</i>	Information on configuring your server module and the RHEL OS for diskless booting.	Available for download as the <i>Red Hat Enterprise Linux Installation Guide for the x86, Itanium™, and AMD64 Architectures</i> at <a href="http://www.redhat.com/docs/manuals/enterprise/">http://www.redhat.com/docs/manuals/enterprise/</a>
<i>Red Hat Enterprise Linux Security Guide</i>	Guide for securing the RHEL OS.	Available for download from <a href="http://www.redhat.com/docs/manuals/enterprise/">http://www.redhat.com/docs/manuals/enterprise/</a>

## Task Map for the RHEL Installation

Consult [TABLE 2-2](#) to determine which topics documented in this guide are relevant to the installation tasks that you want to perform.

**TABLE 2-2** Task Map for Installing RHEL

Installation Task	Relevant Topic
Collect information about your system and network.	<a href="#">“Preparing to Install the RHEL Operating System” on page 8</a>
Install the RHEL OS using one of the following methods:	
<ul style="list-style-type: none"> <li>From distribution media using a local CD or DVD drive.</li> </ul>	<a href="#">“Installing the RHEL Operating System From Local Distribution Media” on page 8</a>
<ul style="list-style-type: none"> <li>Using the Remote Console application.</li> </ul>	<a href="#">“Installing the RHEL Operating System Using the Remote Console Application” on page 10</a>
<ul style="list-style-type: none"> <li>Using the Preboot Execution Environment (PXE).</li> </ul>	<a href="#">“Installing the RHEL Operating System Using PXE” on page 12</a>
Update the RHEL OS files and drivers.	<a href="#">“Updating the RHEL Operating System” on page 20</a>

---

# Preparing to Install the RHEL Operating System

You can install the RHEL OS from a local CD/DVD or from the network. However, you will need to collect some information about your system and your network before you proceed with any of these installation methods. Before you begin installing the RHEL OS, review the procedures provided in this chapter that apply to your installation method.

## Obtaining Updated RHEL Operating System Media Kits

The Sun Blade X6440 server module supports the latest versions of the RHEL OS: RHEL 4.6 and RHEL 5.1. To install either of these versions on the server module, you have to obtain either the RHEL 4.6 or RHEL 5.1 Update Media Kit, available at <http://rhn.redhat.com>.

To download the updated RHEL ISO images, you need your Red Hat Enterprise account information. An Enterprise account is an account that the customer creates to access Red Hat's support network after purchasing the RHEL Update Media Kit.

## Installing RHEL Operating System Updates and Patches

After installing the RHEL OS on the server module, you may also need to update the operating system with updates or patches. For more information, see [“Updating the RHEL Operating System”](#) on page 20.

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# Installing the RHEL Operating System From Local Distribution Media

The RHEL OS provides both a text mode and graphical user interface for installing and configuring the OS from local distribution media. At the boot prompt, you can select the interface that you want to use. Both options are shown later in this section.



# Before You Begin

Installing the RHEL operating system from CD-ROMs consists of the following procedures:

1. Download the RHEL OS Update Media Kit from <http://rhn.redhat.com>.  
See “Obtaining Updated RHEL Operating System Media Kits” on page 8.
2. Install the RHEL OS.
3. Update the RHEL OS with latest updates and patches.  
See “Updating the RHEL Operating System” on page 20.

## Required Items

Installation from local distribution media requires the following items:

- Sun Blade X6440 server module equipped with the following four items:
  - USB keyboard and mouse
  - USB CD/DVD drive
  - Monitor
  - Multi-port dongle cable to connect to the front of the Sun Blade X6440 server module
- RHEL OS CD media set

## ▼ To Install RHEL From Local Distribution Media

1. **Connect the multi-port dongle cable to the connector on the front of the Sun Blade X6440 server module.**  
For more information, refer to the *Sun Blade X6440 Server Module Installation Guide* (820-3961).
2. **Connect the USB connector of the CD/DVD drive to the USB port of the dongle cable.**
3. **Power on the system.**

4. **Insert the RHEL Distribution CD #1 into the CD/DVD drive connected to the dongle cable and reboot the server.**

The server will boot from the CD and display a `boot :` prompt.

If the installation process does not recognize the CD-ROM, refer to the *Sun Blade X6440 Server Module Product Notes* (820-3965).

5. **At the boot prompt, select one of the following:**
  - For text mode, enter the following command:  
`boot: linux text`
  - For graphical mode, press **Enter**.
6. **Refer to the *Red Hat Enterprise Linux Installation Guide* to guide you through the remainder of the installation process.**
7. **After completing the operating system installation, proceed to [“Updating the RHEL Operating System”](#) on page 20.**

---

## Installing the RHEL Operating System Using the Remote Console Application

This section explains how to install the RHEL OS on your Sun Blade X6440 server module using the Sun Integrated Lights Out Manager (ILOM) Remote Console application.

Use the following procedure to install the RHEL 4.6 (or later) OS using the ILOM Remote Console application.

---

**Note** – For more information on using the ILOM service processor web interface to redirect the console, refer to the *Sun Integrated Lights Out Manager 2.0 User’s Guide* (820-1188).

---

### ▼ To Install RHEL Using the ILOM Remote Console Application

1. **Locate your RHEL installation CD/DVD or the equivalent ISO images.**
2. **Connect to the ILOM service processor web interface.**

3. **Select the Remote Control tab, then select the Mouse Mode Settings tab.**
4. **If necessary, change the mouse mode to Relative Mouse Mode.**

See the “Remote Console Application” chapter of the *Sun Integrated Lights Out Manager 2.0 User’s Guide* for further instructions.
5. **Select the Redirection tab.**
6. **Click the Launch Redirection button to start the JavaRConsole application.**
7. **Log in to the JavaRConsole.**
8. **Select Keyboard and Mouse in the Devices menu to start keyboard and mouse redirection.**
9. **Start CD/DVD redirection.**

From the JavaRConsole Devices menu, you can redirect the CD in one of two ways:

  - If you are installing a physical CD-ROM into the remote console CD drive, insert the CD-ROM into the drive and select CD-ROM.
  - If you are using an ISO image installed on the remote console, select CD-ROM image and provide the location of the ISO file.
10. **Power on the server using the ILOM web interface.**
11. **Configure the BIOS to have CD/DVD as the boot device.**
  - a. **Press Ctrl-E to enter the BIOS Setup utility.**
  - b. **Select the Boot menu.**
  - c. **Select CD/DVD Drives.**
  - d. **Set AMI Virtual CD as the first boot device.**
  - e. **Press F10 to save changes and exit.**
  - f. **Reboot.**
  - g. **Press Ctrl-P to select CD/DVD as the boot device.**
12. **When the `boot:` prompt appears, type `linux text`.**
13. **When prompted to test the CD media before installation, select Skip if you do not want the media test to run.**
14. **Refer to the *Red Hat Enterprise Linux Installation Guide* to guide you through the remainder of the installation process.**

---

# Installing the RHEL Operating System Using PXE

The on-board network interface card (NIC) in your Sun Blade X6440 server module supports the Preboot Execution Environment (PXE) network booting protocol. The system BIOS and network interface BIOS on the server module automatically query the network for a Dynamic Host Configuration Protocol (DHCP) server. If a DHCP server on the network has been configured to support the PXE protocol and PXE image servers on the same network, then the BIOS on the server module can be used to install a bootable RHEL image.

---

**Tip** – PXE is a powerful and convenient solution for setting up a number of Sun Blade X6440 server modules with identical configurations.

---

## Task Map for RHEL Installation Using PXE

If you do not have PXE set up on your network and you would like to take advantage of PXE to install the RHEL OS on your network, perform the following tasks.

**TABLE 2-3** Task Map for RHEL Installation Using PXE

Installation Task	Relevant Topic
Obtain the Update Media Kit at <a href="http://rhn.redhat.com">http://rhn.redhat.com</a> .	“Obtaining Updated RHEL Operating System Media Kits” on page 8.
Set up your Linux network and PXE server.	“Preconfiguring a Network to Support PXE Installation of RHEL” on page 13.
Reboot the PXE server	“Rebooting the PXE/DHCP Server” on page 18
Install the RHEL operating system images on the PXE server.	“Creating a PXE Install Image on the PXE Server” on page 19.
Install the RHEL OS from the PXE server.	“Installing the RHEL Operating System From a PXE Server” on page 19.

# Preconfiguring a Network to Support PXE Installation of RHEL

This section describes how to preconfigure a network running the RHEL OS to support PXE installation of the RHEL OS on a server module. These procedures assume that you already have a bootable server that is running a version of the RHEL OS to use as a PXE server.

Perform the following procedures to preconfigure your network for PXE installation:

- Configure a DHCP Server.  
See [“To Configure a DHCP Server” on page 14.](#)
- Install Portmap.  
See [“To Install Portmap on a DHCP Server” on page 14.](#)
- Configure the TFTP Service.  
See [“To Configure the TFTP Service on the DHCP Server” on page 15.](#)
- Install and Configure the neopxe Boot Server Daemon.  
See [“To Install and Configure the neopxe Boot Server Daemon” on page 15.](#)
- Configure the NFS Service.  
See [“To Configure the NFS Service on the DHCP Server” on page 17.](#)
- Disable the Firewall.  
See [“To Disable the Firewall” on page 18.](#)
- Reboot the PXE/DHCP server.  
See [“Rebooting the PXE/DHCP Server” on page 18.](#)

## Required Items

Preconfiguring your network for PXE installation requires the following items:

- RHEL server equipped with:
  - Dongle cable
  - USB CD/DVD drive connected to the server module through a dongle cable
  - USB keyboard
  - Monitor
- RHEL operating system CD media set
- Tools and Drivers DVD (708-0347)

## ▼ To Configure a DHCP Server

Complete the following steps to configure the server that will be the DHCP server.

1. Turn on the server and log in as a superuser.
2. Determine whether the DHCP server package is already installed on the server. Type the following command:

```
# rpm -qa | grep dhcp-
```

3. If the DHCP server package is not listed, insert the RHEL OS media CD #5 into the CD/DVD drive of the DHCP/PXE server.

4. Type the following commands to install the DHCP server:

```
# mount /dev/cdrom /mnt/cdrom
# rpm -Uvh /mnt/cdrom/RedHat/RPMS/dhcp-*.rpm
# umount /mnt/cdrom
```

5. Remove the CD from the CD/DVD drive.

6. Set up your DHCP configuration file (for example, `/etc/dhcpd.conf`) so that only PXEclient requests receive PXEclient responses.

Type the following entry to the DHCP configuration file. Refer to the `dhcpd.conf` man page for more information.

```
class "PXE" {match if substring(option vendor-class-
identifier, 0, 9) ="PXEclient"; option vendor-class-
identifier "PXEclient"; vendor-option-space PXE;}
```

---

**Note** – If the server does not already have a `dhcpd.conf` file in its `/etc` directory, you can copy the `dhcpd.conf` file from the sample DHCP configuration file in the `/tmp/rhel4-pxefiles` or the `/tmp/rhel5-pxefiles` directory.

---

7. To start the DHCP service, type:

```
# service dhcpd start
```

8. To configure the server to always start DHCP, type:

```
# chkconfig dhcpd on
```

## ▼ To Install Portmap on a DHCP Server

1. Determine whether the portmap server package is already installed on the DHCP server. Type:

```
# rpm -qa | grep portmap
```

2. If portmap is not listed, insert RHEL CD #2 into the CD/DVD drive of the DHCP/PXE server and install the portmap service by typing the following commands:

```
# mount /dev/cdrom /mnt/cdrom
# rpm -Uvh /mnt/cdrom/RedHat/RPMS/portmap-*
# umount /mnt/cdrom
```

3. Remove the CD from the DHCP/PXE server.

## ▼ To Configure the TFTP Service on the DHCP Server

1. Determine whether the TFTP server package is already installed on the server. Type:

```
# rpm -qa | grep tftp-server
```

2. If the TFTP server package is not listed, insert RHEL CD #4 into the CD/DVD drive of the DHCP/PXE server and install the TFTP service by typing the following commands:

```
# mount /dev/cdrom /mnt/cdrom
# rpm -Uvh /mnt/cdrom/RedHat/RPMS/tftp-server*
# umount /mnt/cdrom
```

3. Remove the CD from the server.

4. Edit and save the `/etc/xinetd.d/tftp` file.

Make the following changes:

- Change the `-s /tftpboot` entry to `-v -s /home/pxeboot`.
- Change the `disable` attribute to `no`.

5. Restart the `inetd` server. Type:

```
# service xinetd restart
```

## ▼ To Install and Configure the neopxe Boot Server Daemon

Complete the following steps on the DHCP server to install and configure the neopxe boot server. The neopxe server is designed for use with a DHCP server that is running on the same system.

1. Install the `neopxe` boot server daemon onto the system that is the DHCP server. Type:

```
# cd /tmp/rhel4-pxefiles/neopxe-0.2.0
# ./configure
# make
# make install
```

2. Append the path `/usr/local/sbin/neopxe` to the `rc.local` file by typing the following command, making sure to use two greater-than signs:

```
# echo "/usr/local/sbin/neopxe" >> /etc/rc.d/rc.local
```

3. Copy the PXE Linux image from the `/tmp/` directory. Type:

```
# mkdir /home/pxeboot
# cp /tmp/rhel4-pxefiles/pxelinux.0 /home/pxeboot
```

4. Configure the PXE Linux image. Type:

```
# mkdir /home/pxeboot/pxelinux.cfg/
# touch /home/pxeboot/pxelinux.cfg/default
```

5. Edit the `/usr/local/etc/neopxe.conf` configuration file, which is read by `neopxe` at startup.

- If the `neopxe.conf` file is not in the `/usr/local/etc` directory, copy it from the `/tmp/rhel4-pxefiles/neopxe-0.2.0/` directory.
- A valid configuration file must have entries for each of the following lines, including at least one service line.

```
ip_addr=n.n.n.n
prompt=boot-prompt-string
prompt_timeout=timeout
service=service-number,boot-server,boot-file,label
```

Where:

- `n.n.n.n` is the IP address of your PXE server.
- `boot-prompt-string` is the character string displayed during a network boot that prompts the user to press the F8 key for a boot menu.
- `timeout` is the number of seconds the prompt is displayed before the server defaults to the first service for booting.
- `service-number` is an integer in the range of 1 to 254 that identifies the boot service.
- `boot-server` is the IP address of the boot server for that boot service.
- `boot-file` is the name of the boot file that is read from your `/home/pxeboot` directory.



- *label* is the text string that is displayed when the boot menu is invoked by pressing the F8 key.

For example:

```
ip_addr=192.168.0.1
prompt=Press [F8] for menu.
prompt_timeout=10
service=1,192.168.0.1,pxelinux.0,Linux
service=2,192.169.0.1,nbp.unknown,Solaris
```

---

**Note** – Refer to the `neopxe.conf` man page for more information.

---

6. Start the `neopxe` daemon. Type:

```
# /usr/local/sbin/neopxe
```

## ▼ To Configure the NFS Service on the DHCP Server

1. Determine whether the NFS service package is already installed on the server.

Type:

```
# rpm -qa | grep nfs-utils
```

2. If the NFS service package is not listed, insert RHEL CD #2 in to the CD/DVD drive of the DHCP server and install the NFS service by typing the following commands:

```
# mount /dev/cdrom /mnt/cdrom
# rpm -Uvh /mnt/cdrom/RedHat/RPMS/nfs-utils-*
# umount /mnt/cdrom
```

3. Remove the CD from the DHCP server.

4. Edit and save the `/etc/exports` file to add the following line:

```
/home/pxeboot *(no_root_squash,no_subtree_check,insecure)
```

5. Start the NFS service. Type:

```
# service nfs start
```

6. Configure the server to always start the NFS service. Type:

```
# chkconfig nfs on
# chkconfig nfslock on
```

---

**Note** – If you are using a DNS server, verify that DNS entries exist for the range of addresses defined in the PXE subnet dynamic-bootp entry in the `dhcpd.conf` file. If you are not using a DNS server, edit the `/etc/hosts` file to add the range of host addresses found in the PXE subnet dynamic-bootp entry in the `dhcpd.conf` file.

---

## ▼ To Disable the Firewall



---

**Caution** – Security vulnerability. When you disable the firewall protection on the system that is your PXE server, the security of the data on that server cannot be ensured. If this server is networked outside of your local intranet, be sure to re-enable the firewall after downloading software to PXE clients.

---

If you enabled firewall security when you installed the RHEL OS on the system that will be your PXE server, complete the following steps to disable the firewall so that PXE clients can download from the server.

**1. Stop the ipchains service. Type:**

```
# service ipchains stop
```

**2. Stop the iptables service. Type:**

```
# service iptables stop
```

**3. Stop the ipchains service from starting when you restart the server. Type:**

```
# chkconfig ipchains off
```

**4. Stop the iptables service from starting when you restart the server. Type:**

```
# chkconfig iptables off
```

---

**Note** – You might encounter error messages if the ipchains service is not installed on the server. You can safely ignore these messages.

---

## Rebooting the PXE/DHCP Server

When you have completed all the previous configuration steps, reboot the PXE/DHCP server and proceed to the next section, [“Creating a PXE Install Image on the PXE Server” on page 19.](#)

# Creating a PXE Install Image on the PXE Server

This procedure describes how to create a Preboot Execution Environment (PXE) install image on the DHCP server so that it can also act as your PXE server. The PXE server provides the operating system files to your PXE client.

## Before You Begin

Before you install a RHEL image on the PXE server, you must configure your Linux network to support PXE images. If you have not done so, see [“Preconfiguring a Network to Support PXE Installation of RHEL”](#) on page 13.

## Required Items

The PXE installation procedure requires the following items:

- CD/DVD drive on the DHCP server
- USB CD/DVD drive connected to the server module
- RHEL 4.6 (or later) CD media kit (see [“Obtaining Updated RHEL Operating System Media Kits”](#) on page 8)
- Tools and Drivers DVD (707-0347)

## Installing the RHEL Operating System From a PXE Server

This procedure describes how to configure your Sun Blade X6440 server module to initiate the request to download RHEL the OS boot image file from the PXE/DHCP server and how to install the boot image onto your Sun Blade X6440 server module.

## Before You Begin

Before you install the RHEL OS from a PXE server, you need to complete the following tasks:

- Configured your Linux network to support a PXE server. See [“Preconfiguring a Network to Support PXE Installation of RHEL”](#) on page 13.
- Installed a RHEL operating system boot image on that PXE server. See [“Creating a PXE Install Image on the PXE Server”](#) on page 19.
- Reboot the PXE Server. See [“Rebooting the PXE/DHCP Server”](#) on page 18.

## ▼ To Install a RHEL Operating System From a PXE Server

1. **Connect the PXE client to the same network as the PXE server, and power on the PXE client.**

The PXE client is the target Sun Blade X6440 server module on which you are installing RHEL OS.

2. **When the PXE client prompts you for a network boot, press the F12 key.**

The PXE client connects to the PXE server and attempts to obtain an IP address from the DHCP server.

3. **When prompted, press the F8 key to begin downloading the PXE boot image.**

4. **At the `boot:` prompt, enter in the label you gave the RHEL image when you installed it on the PXE server (`rhel14` in the example above).**

The RHEL install image downloads onto the target Sun Blade X6440 server module.

5. **To configure the RHEL operating system for your server, refer to the manual that is shipped with your RHEL Update Media Kit.**

6. **Update the RHEL OS files.**

See [“Updating the RHEL Operating System”](#) on page 20

---

## Updating the RHEL Operating System

Because software is constantly being updated, your distribution media might not contain the most up-to-date versions of the operating system. This procedure describes how to update the RHEL OS.

---

**Note** – The following procedure assumes that you have already installed the RHEL OS on the Sun Blade X6440 server module.

---

## ▼ To Update the RHEL Operating System

This procedure assumes that your server module has access to the internet.

1. **Set up the `up2date` program on the server module.**

Refer to the documentation included with your RHEL Update Media Kit for details.

**2. Run the `up2date` program.**

Select the kernel packages in the available package updates section.



# Installing SUSE Linux Enterprise Server 10

---

This chapter provides information about installing SUSE Linux Enterprise Server (SLES) 10 operating system (OS) on a Sun Blade X6440 server module.

This chapter contains the following sections:

- [“About SUSE Linux Enterprise Server Installation” on page 23](#)
  - [“Installing the SLES 10 Operating System” on page 24](#)
  - [“Preconfiguring the Network to Support PXE Installation of SLES 10” on page 28](#)
  - [“Installing the SLES 10 Operating System Using PXE” on page 34](#)
  - [“Updating the SLES 10 Operating System” on page 38](#)
- 

## About SUSE Linux Enterprise Server Installation

The most common methods for installing the SLES OS on your server module are:

- Installation from your SLES Distribution CD (local or remote).
- Installation from the network, either from a Preboot Execution Environment (PXE) image stored on a PXE server on your local network or from an image stored elsewhere on your network.

---

**Tip** – Using the Sun Installation Assistant (SIA) to install the RHEL operating system is the recommended installation method. SIA is a convenient, front-end application designed to assist you in installing SLES on your server. SIA supplements the standard installation utilities and procedures that ship with SLES; it does not replace them. For more information, refer to the *Sun Installation Assistant Windows and Linux User's Guide* (820-3357).

---

---

## Installing the SLES 10 Operating System

This section describes how to install the SLES 10 OS.

### SLES 10 Installation and Configuration Documentation

Before you install the SLES 10 OS on your server module, consult the following SLES 10 documentation.

**TABLE 3-1** Sources for SLES 10 Documentation

Document	Description	Where to Find
README file	This file contains late-breaking information about system requirements and system configuration for your version of SLES 10.	On the SLES 10 CD #1
Release Notes	Product release notes.	On the SLES 10 CD #1 under the docu directory
<i>SUSE Linux Enterprise Server 10 Start-Up Guide</i>	This short manual provides a quick introduction to the installation.	On the SLES 10 CD #1 under the docu directory, as the file <code>startup.pdf</code> under the appropriate language directory.
SLES 10 support sites	SUSE provides considerable technical information about the SLES OS at its product and support web sites.	See the SLES 10 home page at <a href="http://www.novell.com/products/server/">http://www.novell.com/products/server/</a> for additional support information.



# Task Map for the SLES 10 Installation

Consult the following table to determine the procedures that are relevant to the installation task(s) that you need to perform.

**TABLE 3-2** Task for the SLES 10 Installation

Installation Task	Relevant Topic
Install the SLES 10 OS from local or remote CD/DVD drive.	<a href="#">“Preparing to Install the SLES 10 Operating System” on page 25.</a>
Install SLES 10 from local or remote CD/DVD drive or PXE server.	<i>SUSE Linux Enterprise Server 10 Installation Manual</i>
Install the SLES 10 OS from an image stored on a networked system.	<a href="#">“Preconfiguring the Network to Support PXE Installation of SLES 10” on page 28.</a>
Install the SLES 10 OS from a PXE server.	<a href="#">“Installing the SLES 10 Operating System Using PXE” on page 34</a>
Update the SLES 10 OS SO.	<a href="#">“Updating the SLES 10 Operating System” on page 38</a>

## Preparing to Install the SLES 10 Operating System

You can install the SLES 10 OS from a local CD/DVD drive, remote CD/DVD drive, or the network; however, you need to collect some information about your system before you proceed with any one of these installation methods.

Before installing SLES 10 on your server, verify or collect the following information:

- Dynamic Host Configuration Protocol (DHCP) server name
- MAC address on system label
- SLES 10 SP2 media CD set

## Installing the SLES 10 Operating System From Distribution Media

The SLES 10 OS provides an easy-to-use graphical interface for installing and configuring the OS. Regardless of whether you are using distribution CDs to install the SLES 10 OS from a locally attached CD/DVD drive or from a remote CD/DVD drive attached via KVMs, the installation procedure is fundamentally the same.

## Required Items

- Sun Blade X6440 server module set up with:
  - USB keyboard and mouse.
  - USB CD/DVD drive.
  - Monitor.
  - Multi-port dongle cable to connect to the front of the Sun Blade X6440 server module. Refer to the *Sun Blade X6440 Server Module Installation Guide* (820-3961).
- SLES 10 SP2 CD or DVD media kit.

## ▼ To Install the SLES 10 Operating System From Distribution Media

1. **Connect the multi-port dongle cable to the connector on the front of the Sun Blade X6440 server.**
2. **Connect the USB CD/DVD to the USB port on the dongle.**
  1. **Power on the system.**
  2. **Press F8 and select CDROM when prompted.**
  3. **Insert SLES 10 CD #1 (or DVD) into your local CD/DVD drive.**
  4. **Follow the installation instructions provided with the SLES 10 Installation Guide to complete the installation.**

## Installing SLES 10 Using the Remote Console Application

This topic explains how to install the SLES 10 OS on your Sun Blade X6440 server module using the ILOM Remote Console application.

## ▼ To Install SLES 10 Using the Remote Console Application

1. **Locate your SLES 10 OS installation CD/DVD or the equivalent ISO images.**

**2. Connect to the ILOM service processor web interface.**

See the topic that describes how to log in to the Sun ILOM web interface in the *Sun Integrated Lights Out Manager 2.0 User's Guide* (820-1188).

---

**Note** – There are multiple versions of ILOM. Be sure to refer to the guide that matches your server's installed version of ILOM.

---

**3. Select the Remote Control tab, then select the Mouse Mode Settings tab.**

**4. If necessary, change the mouse mode to Relative Mouse Mode.**

See the "Remote Console Application" chapter of the *Sun Integrated Lights Out Manager 2.0 User's Guide* (820-1188) for further instructions.

**5. Select the Redirection tab.**

**6. Click the Launch Redirection button to start the JavaRConsole application.**

**7. Log in to the JavaRConsole.**

**8. Start keyboard and mouse redirection.**

Select Keyboard and Mouse in the Devices menu.

**9. Start CD/DVD redirection.**

From the JavaRConsole Devices menu, you can redirect the CD/DVD drive in two ways:

- If you are installing a physical CD into the remote console CD/DVD drive, insert the CD into the drive and select CD-ROM.
- If you are using an ISO image installed on the remote console, select CD-ROM image and provide the location of the ISO file.

**10. Power on the server using the ILOM web interface.**

**11. Configure the BIOS to use CD/DVD as the boot device.**

- a. Press Ctrl-E to enter the BIOS Setup utility.
- b. Select the Boot menu.
- c. Select CD/DVD Drives.
- d. Set AMI Virtual CD as the first boot device.
- e. Press F10 to save changes and exit.
- f. Reboot and press Ctrl-P to select CD/DVD as the boot device.

**12. When the SLES 10 OS installation menu appears, use the arrow keys to select Installation and press Enter.**

**13. Proceed with the SLES 10 OS installation as usual.**

---

# Preconfiguring the Network to Support PXE Installation of SLES 10

These procedures describe how to preconfigure your network to support Preboot Execution Environment (PXE) installation of SLES OS on your Sun Blade X6440 server module. These procedures assume that you already have a bootable server that is running a version of the SLES 10 OS.

Preconfiguring your network for PXE installation involves the following procedures:

- [“Configuring the DHCP Server” on page 28](#)
- [“Installing Portmap” on page 30](#)
- [“Configuring the TFTP Service” on page 30](#)
- [“Installing and Configuring the neopxe Boot Server Daemon” on page 31](#)
- [“Configuring the NFS Service” on page 33](#)
- [“Disabling the Firewall” on page 34](#)

## Required Items

Preconfiguring your network for PXE installation requires the following items:

- SLES 10 server equipped with:
  - CD/DVD drive
  - USB keyboard
  - Monitor (optional)
- SLES 10 media kit
- Tools and Drivers DVD (708-0347)

## Configuring the DHCP Server

Complete the following steps on the server that will be the DHCP server.

## ▼ To Configure the DHCP Server

1. Power on the server and log in as superuser.
2. Determine whether the DHCP server package is already installed on the server. Type the following command:

```
# rpm -qa | grep dhcp-server
```

3. If the DHCP server package is not listed, install the package using YaST. Type the following command:

```
# yast -i dhcp-server
```

4. Set up the DHCP configuration file (for example, `/etc/dhcpd.conf`) so that only PXEclient requests receive PXEclient responses.

Add the following entry to the DHCP configuration file (refer to the `dhcpd.conf` man page for more information).

```
class "PXE" {match if substring(option vendor-class-  
identifier, 0,9) = "PXEclient"; option vendor-class-  
identifier "PXEclient"; vendor-option-space PXE; next-server  
n.n.n.n;}
```

Where `n.n.n.n` is the IP address of the server.

---

**Note** – You can start with a sample DHCP configuration file in the `/tmp/sles10-pxefiles` directory.

---

5. In the DHCP configuration file, edit the `server-identifier` entry:

```
server-identifier n.n.n.n
```

Where `n.n.n.n` is the PXE/DHCP server's IP address.

6. In the DHCP configuration file, find the subnet entry fields:

```
subnet 1.2.3.0 netmask 255.255.255.0 {  
    range dynamic-bootp 1.2.3.100 1.2.3.200;  
    option routers 1.2.3.1;  
    option broadcast-address 1.2.3.225;  
}
```

7. Edit the `subnet`, `range`, `router` and `broadcast-address` entries according to the PXE/DHCP server's network configuration.

8. Edit the `/etc/sysconfig/dhcpd` file and verify that the `DHCPD_INTERFACE` is set run on the network on which you are planning to run the PXE server.

For example, if you are using Ethernet interface 0, the `DHCPD_INTERFACE` variable should be set as follows:

```
DHCPD_INTERFACE="eth0"
```

9. Start the DHCP service. Type the following command:

```
# /etc/init.d/dhcpd start
```

10. Configure the server to always start DHCP. Type the following command:

```
# chkconfig dhcpd on
```

## Installing Portmap

Complete the following steps on the DHCP server to install the portmap server package.

### ▼ To Install Portmap

1. Determine whether the portmap server package is already installed on the server. Type the following command:

```
# rpm -qa | grep portmap
```

2. If portmap is not listed, install the package using YaST. Type the following command:

```
# yast -i portmap
```

## Configuring the TFTP Service

Complete the following steps on the DHCP server to configure the TFTP service.

### ▼ To Configure the TFTP Service

1. Determine whether the TFTP server package is already installed on the server. Type the following command:

```
# rpm -qa | grep tftp
```

2. If the TFTP server package is not listed, install the package using YaST. Type the following command:

```
# yast -i tftp
```

3. Edit and save the `/etc/xinetd.d/tftp` file. Make the following changes:

- Change the `-s /tftpboot` entry to `-v -s /home/pxeboot`
- Change the `disable` attribute to `no`

4. Restart the `inetd` server. Type the following command:

```
# /etc/init.d/xinetd restart
```

## Installing and Configuring the neopxe Boot Server Daemon

Complete the following steps on the DHCP server to configure the neopxe boot server. The neopxe server is designed for use with a DHCP server that is running on the same system.

### ▼ To Install and Configure the neopxe Boot Server Daemon

1. If a compiler is not installed on the server, use YaST to install `gcc` with the following commands:

```
# yast -i gcc
```

```
# yast -i make
```

2. Install the neopxe boot server daemon onto your system that is your DHCP server. Depending on your OS version, type the following command:

```
# cd /tmp/sles10-pxefiles/neopxe-0.2.0
```

3. Type the following commands:

```
# ./configure
```

```
# make
```

```
# make install
```

4. Append the path `/usr/local/sbin/neopxe` to the `rc.local` file by typing the following command, making sure to use two greater-than signs:

```
# echo "/usr/local/sbin/neopxe" >> /etc/rc.d/boot.local
```

5. Copy the PXE Linux image from the `/tmp/` directory. Type the following commands:

```
# mkdir /home/pxeboot
```

6. Depending on your OS version, type the following command:

```
# cp /tmp/sles10-pxefiles/pxelinux.0 /home/pxeboot
```

7. Configure the PXE Linux image. Type the following commands:

```
# mkdir /home/pxeboot/pxelinux.cfg/
```

```
# touch /home/pxeboot/pxelinux.cfg/default
```

8. Edit the `/usr/local/etc/neopxe.conf` configuration file, which is read by `neopxe` at startup.

If the `/usr/local/etc/` directory does not exist, create it with the following command:

```
# mkdir /usr/local/etc
```

If you need to create the `neopxe.conf` file, you can copy it from the `/tmp/sles10-pxefiles/neopxe-0.2.0/` directory.

A valid configuration file must have entries for each of the following lines, including at least one service line.

```
ip_addr=n.n.n.n
```

```
prompt=boot-prompt-string
```

```
prompt_timeout=timeout
```

```
service=service-number, boot-server, boot-file, label
```

Where:

- *n.n.n.n* is the IP address of your PXE server.
- *boot-prompt-string* is the character string displayed during a network boot that prompts the user to press the F8 key for a boot menu.
- *timeout* is the number of seconds the prompt is displayed before the server defaults to the first service for booting.
- *service-number* is an integer in the range of 1 to 254 that identifies the boot service.
- *boot-server* is the IP address of the boot server for that boot service.
- *boot-file* is the name of the boot file that is read from your `/home/pxeboot` directory.
- *label* is the text string that is displayed when the boot menu is invoked by pressing the F8 key.

For example:

```
ip_addr=192.168.0.1
```



```
prompt=Press [F8] for menu...
prompt_timeout=10
service=1,192.168.0.1,pxelinux.0,Linux
service=2,192.169.0.1,nbp.unknown,Solaris
```

---

**Note** – Refer to the `neopxe.conf` man page for more information.

---

9. Start the `neopxe` daemon. Type the following command:

```
# /usr/local/sbin/neopxe
```

## Configuring the NFS Service

Complete the following steps on the DHCP server to configure the NFS service.

### ▼ To Configure the NFS Service

1. Determine whether the NFS service package is already installed on the server. Type the following command:

```
# rpm -qa | grep nfs-utils
```

2. If the NFS service package is not listed, install the package using YaST. Type the following command:

```
# yast -i nfs-utils
```

3. Edit and save the `/etc/exports` file to add the following line to it:

```
/home/pxeboot *(sync,no_root_squash,no_subtree_check,insecure)
```

4. Start the NFS service. Type the following command:

```
# /etc/init.d/nfsserver start
```

5. Configure the server to always start the NFS service. Type the following commands:

```
# chkconfig nfslock on
```

```
# chkconfig nfsserver on
```

---

**Note** – If you are using a DNS server, verify that DNS entries exist for the range of addresses defined in the PXE subnet `dynamic-bootp` entry in the `dhcpd.conf` file. If you are not using a DNS server, edit the `/etc/hosts` file to add the range of host addresses found in the PXE subnet `dynamic-bootp` entry in the `dhcpd.conf` file.

---

## Disabling the Firewall

If a firewall is enabled on your PXE/DHCP server, you must disable it before attempting to install a PXE image onto the client system.



---

**Caution** – Network security vulnerability. When you disable the firewall protection on the system that is your PXE server, the security of the data on that server cannot be ensured. If this server is networked outside of your local intranet, be sure to re-enable the firewall after downloading OS to PXE clients.

---

### ▼ To Disable the Firewall

1. **Execute the YaST command. Type the following command:**  
`yast`
2. **Select Security & Users.**
3. **Select Firewall.**
  - Select none to disable the firewall for all network interfaces.
  - Select specific interfaces to enable the firewall on only those interfaces.

---

# Installing the SLES 10 Operating System Using PXE

PXE is a powerful and convenient solution for setting up a number of Sun Blade X6440 server modules so that their configurations are identical.

# Before You Begin

The network interface card (NIC) in your Sun Blade X6440 server module supports the PXE network booting protocol. The system BIOS and network interface BIOS on your server module automatically query the network for a DHCP server.

## Task Map for SLES 10 Installation

Before you can perform PXE installations on your network, you need to complete the following tasks.

**TABLE 3-3** Task Map for Installing SLES 10 Using PXE

Task	Related Topic
Set up your Linux network and PXE server.	<a href="#">“Preconfiguring the Network to Support PXE Installation of SLES 10” on page 28</a>
Install SLES 10 images on that PXE server.	<a href="#">“Configuring a SLES 10 PXE Installation Image on the PXE Server” on page 35</a>
Configure your server to boot from or to install from a SLES 10 image on a PXE server.	<a href="#">“Installing SLES 10 From a PXE Server” on page 37</a>

## Required Items

The PXE installation procedure requires the following items:

- The DHCP server that you set up when you preconfigured your network to support PXE installation equipped with a CD/DVD drive
- SLES 10 media CD set
- Tools and Drivers DVD (708-0347)

## Configuring a SLES 10 PXE Installation Image on the PXE Server

This procedure describes how to configure a PXE install image on the DHCP server so that it can act as your PXE server. The PXE server provides the OS files to your PXE client.

Perform the following procedures to create an SLES 10 image on the PXE server:

- [“Setting Up and Copying SLES 10 Operating System to a Directory” on page 36](#)
- [“Creating Links to SLES 10 PXE Files” on page 36](#)

## Setting Up and Copying SLES 10 Operating System to a Directory

The following procedure describes how to create and set up the directory that will contain the SLES 10 files for PXE installation and how to copy the SLES 10 OS to the directory.

### ▼ To Set Up and Copy SLES 10 Operating System to a Directory

---

**Note** – You can use a different target directory than the `/home/pxeboot/sles10/` directory shown. The examples in this procedure use this directory.

---

1. Set up the directory structure that will hold the SLES 10. Type the following commands:

```
# mkdir -p /home/pxeboot/sles10/CD1
# mkdir -p /home/pxeboot/sles10/CD2
# mkdir -p /home/pxeboot/sles10/CD3
# mkdir -p /home/pxeboot/sles10/CD4
```

2. Insert SLES 10 CD #1 into your server and copy its content to your PXE server. Type the following command:

```
# mount /dev/cdrom /mnt/cdrom
# cp -r /mnt/cdrom/* /home/pxeboot/sles10/CD1/
# umount /mnt/cdrom
```

3. Remove SLES 10 CD #1 from the server.

4. Repeat the above procedure for copying CD #2, #3 and #4 to their corresponding directories in `/home/pxeboot/sles10/` as given below:

```
# cp -r /mnt/cdrom/* /home/pxeboot/sles10/CD2/
# cp -r /mnt/cdrom/* /home/pxeboot/sles10/CD3/
# cp -r /mnt/cdrom/* /home/pxeboot/sles10/CD4/
```

## Creating Links to SLES 10 PXE Files

Perform the following procedure to create links to the PXE files.

## ▼ To Create Links to the SLES 10 PXE Files

1. Copy the `autoinst.xml` file from the `/tmp/sles10/` directory to the root of the PXE image. Type the following command:

```
# cp /tmp/sles10/autoinst.xml /home/pxeboot/sles10/
```

2. On your PXE server, modify the file `home/pxeboot/pxelinux.cfg/default` adding the following entry to it:

---

**Note** – Type the text block from `append` through `autoinst.xml` below as one continuous line with no returns.

---

```
default sles10
label sles10
kernel sles10/CD1/boot/x86_64/loader/linux
append textmode=1 initrd=sles10/CD1/boot/x86_64/loader/initrd
install=nfs://n.n.n.n/home/pxeboot/sles10/CD1
autoyast=nfs://n.n.n.n/home/pxeboot/sles10/autoinst.xml
```

Where `n.n.n.n` is the IP address of your PXE server.

3. Save and exit the file.

## Installing SLES 10 From a PXE Server

This procedure describes how to configure your Sun Blade X6440 server module to initiate the request to download the boot image file from the PXE/DHCP server and how to install the SLES 10 boot image onto your Sun Blade X6440 server module.

### Before You Begin

Before continuing with this procedure you must have done the following:

- Configured your Linux network to support a PXE server. See [“Installing the SLES 10 Operating System Using PXE”](#) on page 34.
- Installed a SLES 10 image on that Linux PXE server. See [“Configuring a SLES 10 PXE Installation Image on the PXE Server”](#) on page 35.

## ▼ To Install SLES 10 From a PXE Server

1. **Connect the PXE client to the same network as the PXE server.**

The PXE client is the target Sun Blade X6440 server module to which you are installing the SLES 10 OS.

2. **Power on the PXE client and press F12 to select network boot.**
3. **When you are prompted at the `boot:` prompt, type in the label you gave the SLES 10 image when you installed it the SLES 10 image on the PXE server (`sles10` in the example above).**
4. **To configure your SLES 10 Linux server, refer to the Installation and Administration Guide on SLES 10 CD #1.**
5. **Perform an Online Software Update to update the OS files (see [“Updating the SLES 10 Operating System”](#) on page 38).**

---

## Updating the SLES 10 Operating System

The SLES OS installation media might not contain the most up-to-date versions of the SUSE software. This procedure describes how to update the SLES OS on your server after you have installed it from a PXE server or distribution CDs.

## ▼ To Update the SLES Operating System

1. **Log in as superuser.**
2. **Enter the following command to run the YaST Online Update:**  

```
# you
```

Note that YaST can operate in both text and graphical modes. These directions apply to both.
3. **If you are behind a network firewall and need to use a proxy server in order to access the internet, you must first configure YaST with the correct proxy information.**
  - a. **Select the Network Services tab on the left, then the proxy screen on the right. Enter the correct proxy URLs in both the HTTP and HTTPS fields.**

---

**Note** – In order for the online update service to function correctly through a network HTTP proxy, the following additional configuration step must be performed.

---

**b. Exit the YaST utility and run the following command:**

```
rug set-prefs proxy-url <Proxy URL>
```

Where <Proxy URL> is the fully qualified URL of your proxy server (for example, `http://proxy.yourdomain:3128/`).

**c. After successfully running the command, launch YaST again.**

**4. Register with the Novell Customer Center.**

---

**Note** – You will need your Novell Customer Center user name and password, as well as a SLES product activation code.

---

**a. Select the Software tab on the left.**

**b. Select Novell Customer Center Configuration and follow the directions.**

**5. Once registered, select the Online Update tab to perform the software update.**





## Installing Solaris 10

---

This chapter provides information about installing the Solaris 10 5/08 Operating System (Solaris 10 OS) on a Sun Blade X6440 server module.

This chapter contains the following sections:

- [“About the Solaris 10 Installation” on page 42](#)
- [“System Requirements” on page 42](#)
- [“Download Solaris OS” on page 43](#)
- [“Solaris Documentation” on page 43](#)
- [“Installation Methods” on page 44](#)
- [“Task Map for Solaris 10 Installation” on page 45](#)
- [“Preparing to Install the Solaris OS” on page 46](#)
- [“Booting a Server in a GRUB-Based Environment” on page 48](#)
- [“Booting a Server Over the Network Using PXE” on page 48](#)
- [“Installing the Solaris OS From Distribution Media” on page 50](#)
- [“Installing the Solaris Operating System Using a Serial Console” on page 51](#)

---

**Note** – This topic is intended for experienced system administrators who are familiar with using the Solaris Operating System on an x86 platform.

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# About the Solaris 10 Installation

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**Note** – This chapter contains information about installing the Solaris 10 OS from the network or media. If you want to configure the preinstalled Solaris 10 5/08 OS that is shipped on the compact flash card in the Sun Blade X6440 server module, refer to the *Sun Blade X6440 Server Module Installation Guide* (820-3961).

---

The sections in this chapter describe what you need to know to install the Solaris 10 OS on a Sun Blade X6440 server module. However, to complete the installation you will need to frequently reference procedures in other Solaris 10 OS documentation. A list of the necessary additional documentation is provided in the section “[Preparing to Install the Solaris OS](#)” on page 46.

---

**Note** – In this chapter the term “x86” refers to the Intel 32-bit family of microprocessors and compatible 64-bit and 32-bit microprocessors made by AMD. For supported systems, see the Solaris Hardware Compatibility List at <http://www.sun.com/bigadmin/hcl>.

---

---

## System Requirements

[TABLE 4-1](#) summarizes the system requirements for installing Solaris 10 on a Sun Blade X6440 server module.

**TABLE 4-1** System Requirements

Requirement	Description
Hardware requirements	The server hardware and the initial service processor configuration must be installed before you install the Solaris OS.
Minimum Solaris OS	Solaris 10 5/08 OS.
Memory to install	Memory size is between 64 GB to 128 GB.
Disk space	12 GB or greater.

**TABLE 4-1** System Requirements (Continued)

Requirement	Description
Swap area	512 MB is the default size.
x86/x64 processor requirements	x86/x64 120-MHz or faster processor is recommended. Hardware floating point support is required.
BIOS	Industry standard x86/x64 BIOS (resident in FLASH). The BIOS must be able to boot from CD or DVD media.

---

## Download Solaris OS

- You can download or order the media for the Solaris OS at <http://www.sun.com/servers/blades/downloads.jsp>.
- Additional software is shipped separately on a Tools and Drivers DVD (708-0347). Contact your Sun service provider if you need to order the Solaris OS or if you are missing the Tools and Drivers DVD.
- For updates on Solaris 10 OS versions and hardware compatibility, go to <http://www.sunsolve.sun.com>.

---

**Note** – The Solaris 10 5/08 OS is shipped with the CD and DVD media and documentation that you will need to install the Solaris OS software for both SPARC and x86 platforms. For a Sun Blade X6440 server module, use the media for x86 platforms.

---

---

## Solaris Documentation

Solaris OS documentation is available from the web at <http://docs.sun.com/>.

- For the Solaris 10 installation guides, see <http://docs.sun.com/app/docs/coll/1236.8>
- For the Solaris 10 administration guides, see <http://docs.sun.com/app/docs/coll/47.16>
- For information about upgrading your system, see <http://docs.sun.com/app/docs/doc/820-4041>
- For troubleshooting information, see Appendix A at <http://docs.sun.com/app/docs/doc/820-4040>

---

**Note** – The Solaris installation guides are provided as a collection of installation related documents. The URL for the installation guides listed above points to the installation collection for Solaris 10 5/08. A listing of installation collections for different versions of Solaris (including more recent versions if available) is provided at <http://docs.sun.com/app/docs/prod/solaris.10>

---

Solaris 10 5/08 documentation is also available on the Solaris Documentation DVD included with your Solaris OS software.

---

## Installation Methods

The Sun Blade X6440 server module supports the following Solaris OS installation methods:

- Boot from the preinstalled Solaris 10 OS image on the compact flash card.

---

**Note** – If you want to configure the preinstalled Solaris 10 5/08 OS that is shipped on the compact flash card in the Sun Blade X6440 server module, refer to the *Sun Blade X6440 Server Module Installation Guide* (820-3961).

---

- Install one server from DVD or CD-ROM media interactively with the Solaris Installation Program. The Solaris Installation Program is available on the Solaris 10 media and includes the Solaris Device Configuration Assistant. You can run the Solaris Installation Program with either a graphical user interface (GUI) or as an interactive text installer in a console session.
- Install one or several servers over the network with Preboot Execution Environment (PXE) technology and the following installation methods:
  - Solaris installation program over the network from remote DVD or CD images
  - JumpStart™ installation
  - Serial console installation
  - Diskless boot installation

TABLE 4-2 summarizes the installation methods and provides pointers to the installation instructions.

TABLE 4-2 Installation Methods

Installation Method	Description	Instructions
Boot from the preinstalled image.	The Solaris OS 5/08 image is preinstalled on the Sun Blade X6440 server module compact flash card.	<i>Sun Blade X6440 Server Module Installation Guide</i> (820-3961)
Install from DVD or CD-ROM media.	Use the Solaris Installation Program on the CD or DVD media to install one server interactively.	<a href="#">“Installing the Solaris OS From Distribution Media” on page 50</a>
Install from the network using PXE.	Use PXE to install the Solaris OS over the network from remote DVD or CD images or to automate the installation process and install several systems with a JumpStart installation. To boot over the network using PXE, you need to set up an install server and a DHCP server, and configure the BIOS on each server to boot from the network.	To set up for a PXE installation, see “x86: Guidelines for Booting with PXE,” in the <i>Solaris 10 Installation Guide: Network-Based Installations</i> To boot by using PXE, see <a href="#">“Booting a Server Over the Network Using PXE” on page 48</a>
Install from a serial console.	Use a serial console to install the Solaris OS in a PXE-based network installation.	<a href="#">“Installing the Solaris Operating System Using a Serial Console” on page 51</a>
Perform a diskless boot.	Boot the Solaris OS on a Sun Blade X6440 server module without a hard drive. Use this method with a PXE-based network installation.	“x86: Booting and Installing Over the Network PXE,” in the <i>Solaris10 Installation Guide: Network-Based Installations</i>

---

**Note** – The Solaris OS provides additional programs for installation, such as booting over a wide area network (WAN), but Sun Blade X6440 server modules support only those methods listed in this guide.

---

## Task Map for Solaris 10 Installation

Use TABLE 4-3 to preview the installation process defined as a series of tasks. The table defines each task, describes it, and provides pointers to the instructions for that task.

**TABLE 4-3** Task Map for Initial Solaris OS Installation

Task	Description	Instructions
Set up your server.	Install your server hardware and configure the service processor.	<i>Sun Blade X6440 Server Module Installation Guide</i> (820-3961)
Review the <i>Sun Blade X6440 Server Module Product Notes</i> .	The product notes contain late-breaking news about the Solaris OS software and patches.	<i>Sun Blade X6440 Server Module Product Notes</i> (820-3965)
Review the system requirements.	Verify that your server meets the minimum system requirements.	TABLE 4-1
Gather the information you need to install the Solaris OS.	The type of information you need to collect depends on your environment and the method you choose to install the Solaris OS.	“About the Solaris 10 Installation” on page 42
Locate the Solaris OS documentation.	The Solaris OS documentation included with your software contains most of what you need to know about installation.	“Solaris Documentation” on page 43
Install the Solaris OS.	Choose an installation method and locate the installation instructions.	TABLE 4-2
Install additional software, if necessary.	The Solaris OS drivers for the server are bundled in the Solaris OS. However, you may need to install additional software from the Tools and Drivers DVD.	<i>Sun Blade X6440 Server Module Product Notes</i> (820-3965)
Install patches, if necessary.	Patches are available from the SunSolve Patch Portal at <a href="http://www.sunsolve.sun.com">http://www.sunsolve.sun.com</a> .	<i>Sun Blade X6440 Server Module Product Notes</i> (820-3965)

---

## Preparing to Install the Solaris OS

You need to gather information about your system before you install the Solaris OS. The amount of planning and initial set up that you need to perform depends on whether you are preparing for a local installation from CD/DVD, or you are preparing for a PXE-based network installation.

You also need to obtain the appropriate media for your installation.

**TABLE 4-4** Installation Media

Media	Title
DVD	Solaris 10 5/08 OS DVD
CD-ROM	Solaris 10 5/08 OS Software CDs Solaris 10 5/08 Languages for x86 Platforms CD Tools and Drivers DVD (708-0347)
Patches	See the <i>Sun Blade X6440 Server Module Product Notes</i> for information about patches.

## Installation Prerequisites

You must complete the following tasks before you install the Solaris OS.

- 1. Verify that your system meets the minimum system requirements (see “System Requirements” on page 42).**
- 2. If you are using the Solaris Installation Program GUI or text installer, you need a local CD/DVD drive or a network connection, a keyboard, and a monitor. You will also need the multi-port dongle cable to connect to the front of the server module. For more information, see the *Sun Blade X6440 Server Module Installation Guide* (820-3961).**
- 3. Gather the information you need to install the Solaris OS.**
  - See the “Checklist for Installation,” in Chapter 1 in *Solaris 10 Installation Guide: Basic Installations* at <http://docs.sun.com/app/docs/doc/817-0544>.
  - For Solaris 10 installations go to <http://docs.sun.com/app/docs/doc/819-5775>.
  - For a non-networked system, you need to know the host name of the system you are installing and the language and the locales that you intend to use on the system.
  - For a networked system, use the checklist to gather the following information:
    - Host name of the system that you are installing
    - Language and locales that you intend to use on the system
    - IP address of the name server
    - Subnet mask
    - Type of name service (for example, DNS, NIS, or NIS+)
    - IP address of gateway

- Domain name
  - Host name of the name server
  - IP address of the name server
  - Root password
4. If you are installing the Solaris OS over the network, you need to set up a PXE-based network installation before you install the Solaris OS.

For information about setting up a PXE-based network installation, see “[Booting a Server Over the Network Using PXE](#)” on page 48.

---

**Note** – Consult the appropriate platform guide that ships with Solaris 10 for detailed information about remote installation via USB. If USB-based installation is not supported, use PXE.

---

---

## Booting a Server in a GRUB-Based Environment

Starting with the Solaris 10 1/06 (Solaris 10 version 1/06) release, x86-based systems use the open-source GNU Grand Unified Bootloader (GRUB). GRUB is the boot loader that is responsible for loading a boot archive into a system's memory. The boot archive contains the kernel modules and configuration files that are required to boot the system. For more information on GRUB, refer to the `grub(5)` man page.

For information on how to boot a Sun Blade X6440 server module that is running Solaris 10 in a GRUB-based environment, refer to the *Solaris 10 System Administration Guide: Basic Administration* at <http://docs.sun.com/app/docs/coll/47.16>.

---

## Booting a Server Over the Network Using PXE

Use this procedure along with the instructions in *Solaris 10 Installation Guide: Network-Based Installations* at <http://docs.sun.com/app/docs/doc/820-4040>.

The Sun Blade X6440 server module implements the PXE specification required for a PXE network boot. PXE technology provides the server module with the capability to boot the Solaris OS over the network using the Dynamic Host Configuration



Protocol (DHCP). Using a PXE-based network installation, you can install the Solaris OS onto a server module from the network with remote CD or DVD images. You can also automate the installation process and install the Solaris OS on several Sun Blade X6440 server modules using a JumpStart scenario.

A PXE network boot is a direct network boot. No boot media is required on the Sun Blade X6440 server module.

## Before You Begin

Before you can boot over the network using PXE, you must complete the following tasks:

1. Set up an installation server.
2. Add the Sun Blade X6440 server module clients to be installed.
3. Set up a DHCP server.

To boot over the network, perform the following procedure.

## ▼ To Boot a Server Over the Network Using PXE

- 1. Perform the tasks in “Guidelines for Booting with PXE,” located in *Solaris 10 Installation Guide: Network-Based Installations*, at <http://docs.sun.com/app/docs/doc/820-4040>.**

If you have already set up the systems you need for a PXE boot, review the Task Map (TABLE 4-3) to verify that you have performed all the steps.

- 2. Boot the server over the network by using PXE.**
  - a. Complete the steps in *Solaris 10 Installation Guide: Network-Based Installations* at <http://docs.sun.com/app/docs/doc/820-4040>.**
  - b. Follow the instructions on the screen.**
  - c. When the BIOS screen appears, press F12 to perform a network boot from the PXE server.**

---

# Installing the Solaris OS From Distribution Media

Use this procedure to install the Solaris OS onto a Sun Blade X6440 server module from CD/DVD media. This procedure describes an interactive installation using the Solaris Installation Program.

The Solaris Installation Program on the Solaris 10 OS media can be run with a GUI or as an interactive text installer in a console session. The GUI or command-line interface (CLI) uses screens to guide you step-by-step through installing the OS.

---

**Note** – The Solaris 10 5/08 OS is preinstalled on the compact flash card on the Sun Blade X6440 server module. Therefore, you do not have to use this procedure unless you are installing a newer OS version. Instructions for installing the Solaris 10 5/08 OS from the compact flash card are provided in the *Sun Blade X6440 Server Module Installation Guide* (820-3961).

---

## ▼ To Install the Solaris OS From Distribution Media

---

**Note** – Before starting this procedure, perform the tasks described in [“Preparing to Install the Solaris OS”](#) on page 46.

---

1. **Power down the server module.**
2. **Connect the multi-port dongle cable to the connector on the front of the server.**
3. **Connect a USB CD/DVD drive to the USB connector on the multi-port dongle cable.**
4. **Power on to boot the server module.**  
The server module BIOS supports booting from a CD/DVD.
5. **Insert the Solaris 10 OS CD/DVD into the CD/DVD drive.**

6. Continue the installation procedure by performing the steps in the procedure: “x86: To Install or Upgrade with the Solaris Installation Program,” in Chapter 2 at <http://docs.sun.com/app/docs/doc/817-0544>.

Start the procedure at Step 4. When prompted, answer the configuration questions to complete the installation.

You can accept the default values on the screens to format the entire hard disk, use auto-layout file systems, and install a preselected set of software. Alternately, you can customize the installation to modify the hard disk layout, modify a Solaris `fdisk` partition, and select the software that you want to install.

---

## Installing the Solaris Operating System Using a Serial Console

The Solaris text installer enables you to type information in to a terminal or a console window to interact with the Solaris OS Installation Program. You can use this procedure to install the Solaris 10 OS over the network using PXE.

PXE is a powerful and convenient solution for setting up a number of Sun Blade X6440 servers so that their configurations are identical.

### Before You Begin

The network interface card (NIC) in your Sun Blade X6440 server supports the PXE network booting protocol. The system BIOS and network interface BIOS on your server module automatically query the network for a DHCP server.

Before you set up the serial console, you need to set up the following systems for a PXE-based network installation:

- DHCP server configured to support PXE-based network installations
- PXE server configured to support installation of the Solaris 10 OS.

To set up these systems, see *Solaris 10 Installation Guide: Network-Based Installations* at <http://docs.sun.com/app/docs/doc/820-4040>.

## ▼ To Install the Solaris Operating System Using a Serial Console

---

**Note** – For more information on Steps 1 through 3 of this procedure, see *Solaris 10 Installation Guide: Network-Based Installations* at <http://docs.sun.com/app/docs/doc/820-4040>.

---

### 1. Connect a terminal to the serial port on the service processor.

You can connect a terminal, a PC running terminal emulation software, or a terminal server.

### 2. Set the terminal to receive at 9600 baud.

### 3. Add an x86 install client to an install server and specify a boot device to use during the installation.

If you specify the boot device when you set up the install client, you are not prompted for this information by the Device Configuration Assistant during the installation.

The examples below use the following values:

- Client MAC address: 00:07:e9:04:4a:bf
- Server IP address (GRUB only): 192.168.0.123
- Client macro name (GRUB only): 01000039FCF2EF

Enter the commands specified in the example below for the Solaris OS version that you are using:

---

**Tip** – See the man pages for these commands for more information on usage.

---

- For a Solaris 10 5/08 system with GRUB booting:

```
# cd /export/boot/Solaris_10/Tools
# ./add_install_client -d -e "00:07:e9:04:4a:bf" \
-b "consolatory" i86pc
# datum -A -m 01000039FCF2EF \
-d ":BootSrvA=192.168.0.123:BootFile=01000039FCF2EF:"
# pntadm -f 01 -A $CLIENT_IP -i 01000039FCF2EF \
-m 01000039FCF2EF $CLIENT_NET
```

### 4. Log in to the service processor as an Administrator.

5. Type the following command to use the serial console:

```
start /SP/console
```

6. Boot the Sun Blade X6440 server module.

Refer to the instructions in *Solaris 10 Installation Guide: Network-Based Installations* at <http://docs.sun.com/app/docs/doc/820-4040>.

7. When prompted, press F12 at the BIOS menu.

8. After the Solaris OS is installed, log in to the system, and type the following `eeprom` command to change `bootenv.rc`:

```
eeprom input-console=ttya
```



# Installing OpenSolaris

---

This chapter provides information about installing the OpenSolaris Operating System (OpenSolaris OS) on a Sun Blade X6440 server module.

This chapter includes the following sections:

- [“About the OpenSolaris Installation” on page 55](#)
- [“System Requirements” on page 56](#)
- [“Download OpenSolaris” on page 57](#)
- [“OpenSolaris Documentation” on page 57](#)
- [“Installation Methods” on page 57](#)
- [“Task Map for OpenSolaris Installation” on page 58](#)
- [“Installing OpenSolaris OS Using Local or Remote Media” on page 59](#)
- [“Post OpenSolaris Installation Tasks” on page 67](#)

---

## About the OpenSolaris Installation

This chapter contains information about installing the OpenSolaris OS from the network or from local or remote media. If you want to configure the preinstalled OpenSolaris OS that is shipped on the compact flash card in the Sun Blade X6440 server module, refer to the *Sun Blade X6440 Server Module Installation Guide* (820-3961).

The sections in this chapter describe what you need to know to install the OpenSolaris OS on a Sun Blade X6440 server module. However, to complete the installation you will need to reference procedures in other OpenSolaris OS documentation. Refer to [“OpenSolaris Documentation” on page 57](#).

---

**Note** – In this chapter the term “x86” refers to the Intel 32-bit family of microprocessors and compatible 64-bit and 32-bit microprocessors made by AMD.

---

---

## System Requirements

TABLE 5-1 summarizes the system requirements for installing OpenSolaris on a Sun Blade X6440 server module.

**TABLE 5-1** System Requirements

Requirement	Description
Hardware requirements	The server hardware and the initial service processor configuration must be installed before you install the OpenSolaris OS.
Minimum OpenSolaris OS	OpenSolaris 2009.06
Memory to install	Memory size is between 64 GB to 128 GB.
Disk space	12 GB or greater.
Swap area	512 MB is the default size.
x86/x64 processor requirements	x86/x64 120-MHz or faster processor is recommended. Hardware floating point support is required.
BIOS	Industry standard x86/x64 BIOS (resident in FLASH). The BIOS must be able to boot from CD or DVD media.



---

# Download OpenSolaris

You can download the OpenSolaris OS at the following sites.

- To download the OpenSolaris OS, go to:  
<http://opensolaris.org/os/TryOpenSolaris/>
- To download patches, go to:  
<http://www.sunsolve.sun.com>

---

# OpenSolaris Documentation

Instructions for using the OpenSolaris Installation program are available at the following web site:

<http://dlc.sun.com/osol/docs/content/2009.06/getstart/index.html>

---

# Installation Methods

TABLE 5-2 summarizes the installation methods and provides pointers to the installation instructions.

**TABLE 5-2** Installation Methods

Installation Method	Description	Instructions
Boot from the preinstalled image.	The OpenSolaris image is preinstalled on the Sun Blade X6440 server module compact flash card.	<i>Sun Blade X6440 Server Module Installation Guide</i> (820-3961)
Install from DVD or CD-ROM media.	Use the OpenSolaris Installation Program on the CD or DVD media to install one server interactively.	"Installing OpenSolaris OS Using Local or Remote Media" on page 59

# Task Map for OpenSolaris Installation

Use [TABLE 5-1](#) to preview the installation process defined as a series of tasks. The table identifies and describes the tasks required, and provides pointers to the instructions for performing that task.

**TABLE 5-1** Task Map for the OpenSolaris Installation

Step	Task	Description	Relevant Topic(s)
1	Review installation prerequisites.	Verify that all applicable requirements are met for installing an operating system to a Sun Blade X6440 server module.	<ul style="list-style-type: none"><li>• <a href="#">“Installation Prerequisites” on page 59</a></li></ul>
2	Choose an installation method.	Evaluate and select an installation method that meets the needs of your infrastructure.	<ul style="list-style-type: none"><li>• <a href="#">“Installation Methods” on page 57</a></li></ul>
3	Ensure that the BIOS factory defaults are set.	Verify that the factory default settings in the BIOS are set prior to performing the operating system installation.	<ul style="list-style-type: none"><li>• <i>Sun Blade X6440 Server Module Installation Guide</i></li></ul>
4	Gather OpenSolaris 2009.06 installation media.	The OpenSolaris OS is shipped with the CD and DVD media and documentation that you will need to install the OpenSolaris OS for both SPARC and x86 platforms. For the Sun Blade X6440 server module, use the media for x86 platforms.	<ul style="list-style-type: none"><li>• You can download or order the media for the OpenSolaris OS at: <a href="http://opensolaris.org/os/downloads/">http://opensolaris.org/os/downloads/</a></li></ul>
5	Perform the OpenSolaris OS installation.	The installation instructions in this chapter describe the initial steps for booting the installation media and launching the OpenSolaris Installation Program. For further information about installing OpenSolaris, refer to the Getting Started with OpenSolaris 2009.06 web site at: <a href="http://dlc.sun.com/osol/docs/content/2009.06/getstart/">http://dlc.sun.com/osol/docs/content/2009.06/getstart/</a>	<ul style="list-style-type: none"><li>• <a href="#">“Installing OpenSolaris OS Using Local or Remote Media” on page 59</a></li></ul>
6	Install driver(s), post installation, if necessary.	If the OpenSolaris OS does not include the necessary device drivers to support your system, you might need to install additional device drivers.	<ul style="list-style-type: none"><li>• <a href="#">“Install System Device Drivers to Support Additional Hardware” on page 67</a></li></ul>
7	Install SRUs, post installation, if necessary.	If necessary, download and install OpenSolaris Support Repository Updates (SRUs). SRUs provide critical fixes to the OpenSolaris OS.	<ul style="list-style-type: none"><li>• <a href="#">“Install Support Repository Updates” on page 67</a></li></ul>

---

# Installing OpenSolaris OS Using Local or Remote Media

The following procedure describes how to boot the OpenSolaris Operating System installation from local or remote media. It assumes that you are booting the installation media from one of the following sources:

- OpenSolaris 2009.06 (or subsequent release) Live CD/DVD (internal or external CD/DVD)
- OpenSolaris 2009.06 (or subsequent release) Live CD ISO image (network repository)

## Installation Prerequisites

You must complete the following tasks before you install the OpenSolaris OS.

1. **Verify that your system meets the minimum system requirements** (see [“System Requirements” on page 56](#)).
2. **If you are using the OpenSolaris Installation Program GUI, you need a local CD/DVD drive or a network connection, a keyboard, and a monitor. You will also need the multi-port dongle cable to connect to the front of the server module. For more information, see the *Sun Blade X6440 Server Module Installation Guide* (820-3961).**
3. **Gather the information you need to install the OpenSolaris OS.**
  - For a non-networked system, you need to know the host name of the system you are installing and the language and the locales that you intend to use on the system.
  - For a networked system, use the checklist to gather the following information:
    - Host name of the system that you are installing
    - Language and locales that you intend to use on the system
    - IP address of the name server
    - Subnet mask
    - Type of name service (for example, DNS, NIS, or NIS+)
    - IP address of gateway
    - Domain name
    - Host name of the name server
    - IP address of the name server
    - Root password

Note that the following procedure explains the initial steps for booting the install media and launching the OpenSolaris Installation Program.

After completing this procedure, you should review and perform the required post installation tasks described later in this chapter. For more details, see [“Post OpenSolaris Installation Tasks” on page 67](#).

## ▼ To Install OpenSolaris OS Using Local or Remote Media

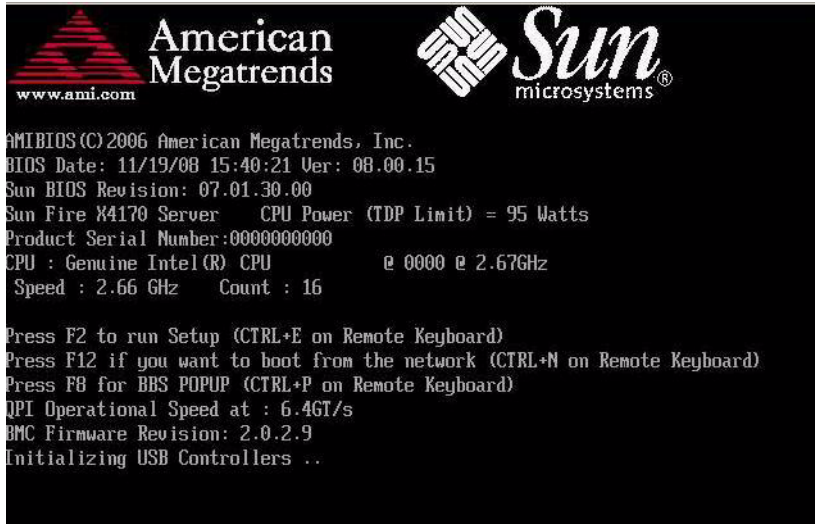
1. **Power down the server module.**
2. **Connect the multi-port dongle cable to the connector on the front of the server.**
3. **Connect a USB CD/DVD drive to the USB connector on the multi-port dongle cable.**
4. **Ensure that the install media is available to boot.**
  - **For distribution CD/DVD.** Insert the OpenSolaris 2009.06 Distribution Media (CD labeled 1 or the single DVD) into the local or remote CD/DVD-ROM drive.
  - **For ISO image.** Ensure that the ISO images are available and that the Sun ILOM Remote Console application is aware of the first ISO image location.
5. **Reset the power on the server.**

For example:

- **From the ILOM web interface,** select the Remote Control --> Remote Power Control tab, then select the Power Cycle option from the Host action drop-down list box.
- **From the local server,** press the Power button (approximately 1 second) on the front panel of the server module to turn the server module off, then press the Power button again to power on the server module.
- **From the ILOM CLI on the server module SP,** type: **reset /SYS**
- **From the ILOM CLI on the CMM,** type **reset /CH/BLn/SYS**

Where *n* is the slot number of the server module in the chassis.

The BIOS screen appears.



---

**Note** – The next events occur very quickly; therefore, focused attention is needed for the following steps. Watch carefully for these messages as they appear on the screen for a brief time. You might want to enlarge the size of your screen to eliminate scroll bars.

---

**6. In the BIOS power-on self-test screen, press F8 to specify a temporary boot device for the OpenSolaris installation.**

The Please Select Boot Device menu appears.



**7. In the Boot Device menu, select either the external or virtual CD/DVD device as the first (temporary) boot device, then press Enter.**

In the sample Boot Device menu shown in [Step 6](#), the virtual CDROM device is specified as the first boot device.

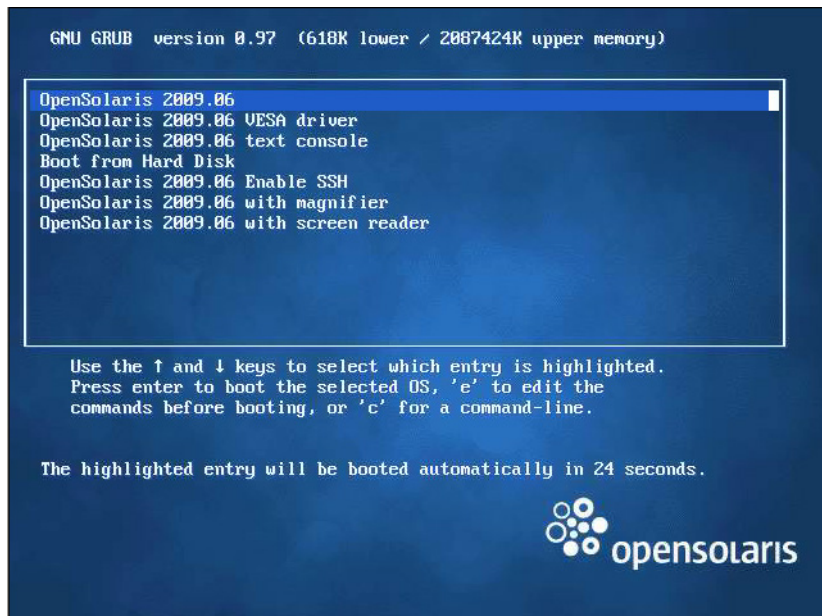
The device strings listed on the Boot Device menu are in the format of: *device type: slot indicator: product ID string*.

---

**Note** – If you are performing the OpenSolaris installation from the Sun ILOM Remote Console application, select the AMI Virtual CDROM, or CDROM image as the first boot device.

---

The GRUB menu appears.



**8. In the GRUB menu, select OpenSolaris 2009.06, then press Enter.**

---

**Note** – In the GRUB menu, if you want to redirect the install output to a serial console, press “e” to edit the GRUB menu to support a serial console (-B console = ttya).

---

The system loads the OpenSolaris disk image into memory. This process can take several minutes.

The system discovers and configures the devices and interfaces. If the system discovers a keyboard, the Configure Keyboard Layout menu appears.

```

Done mounting Live image
USB keyboard
 1. Albanian
 2. Belarusian
 3. Belgian
 4. Brazilian
 5. Bulgarian
 6. Canadian-Bilingual
 7. Croatian
 8. Czech
 9. Danish
10. Dutch
11. Finnish
12. French
13. French-Canadian
14. Hungarian
15. German
16. Greek
17. Icelandic
18. Italian
19. Japanese-type6
20. Japanese
21. Korean
22. Latin-American
23. Lithuanian
24. Latvian
25. Macedonian
26. Malta_UK
27. Malta_US
28. Norwegian
29. Polish
30. Portuguese
31. Russian
32. Serbia-And-Montenegro
33. Slovenian
34. Slovakian
35. Spanish
36. Swedish
37. Swiss-French
38. Swiss-German
39. Traditional-Chinese
40. TurkishQ
41. TurkishF
42. UK-English
43. US-English
To select the keyboard layout, enter a number [default 43]:

```

9. In the Configure Keyboard Layout menu, select the appropriate keyboard layout, then press Enter to continue.

The system configures the keyboard layout selection and searches for configuration files. The Select Desktop Language menu appears.

```

22. Latin-American
To select the keyboard layout, enter a number [default 43]:

 1. Arabic
 2. Chinese - Simplified
 3. Chinese - Traditional
 4. Czech
 5. Dutch
 6. English
 7. French
 8. German
 9. Greek
10. Hebrew
11. Hungarian
12. Indonesian
13. Italian
14. Japanese
15. Korean
16. Polish
17. Portuguese - Brazil
18. Russian
19. Slovak
20. Spanish
21. Swedish
To select desktop language, enter a number [default is 6]:

```

10. In the Select Desktop Language menu, select the appropriate desktop language, then press Enter to continue.

After a few moments the OpenSolaris 2009.06 desktop screen appears.



**11. In the OpenSolaris desktop, double-click the Install OpenSolaris icon to begin the OS installation.**

The OpenSolaris Installer Welcome screen appears.





**12. In the Welcome screen, click Next to begin the installation.**

The OpenSolaris installation program will display several configuration screens.

**13. Follow the on-screen instructions to complete the OpenSolaris installation.**

For additional information, refer to the Getting Started with OpenSolaris 2009.06 web site at:

<http://dlc.sun.com/osol/docs/content/2009.06/getstart>

---

**Note** – If you did not configure the system to automatically reboot when the installation completes, you must manually reboot the system.

---

**14. Proceed to the section “Post OpenSolaris Installation Tasks” on page 67 to perform the post OpenSolaris configuration tasks.**

---

# Post OpenSolaris Installation Tasks

After completing the OpenSolaris installation and rebooting the operating system, review the following post installation tasks and, if necessary, perform the tasks that are applicable to your system.

- “Install System Device Drivers to Support Additional Hardware” on page 67
- “Install Support Repository Updates” on page 67
- “Enable the Option for Wake On LAN” on page 67 (optional)

## Install System Device Drivers to Support Additional Hardware

The Device Driver Utility enables you to connect to the Image Packaging System (IPS) and use it to search for device drivers for the devices on your system that do not have a driver attached with them.

To start the Device Driver Utility, click the Device Driver Utility icon on the OpenSolaris desktop.

## Install Support Repository Updates

A Support Repository Update (SRU) contains the latest released bug fixes for your OpenSolaris release.

Directions for accessing and installing SRUs can be found at:

<http://sunsolve.sun.com/show.do?target=opensolaris>

## Enable the Option for Wake On LAN

After installing the operating system, you might want to consider enabling the Wake On LAN (WOL) option in the BIOS Setup utility. This feature enables you to power on the server from another location over the network.





# Installing VMware ESX Server 3.5 Software

---

This chapter explains the procedure for installing VMware ESX Server 3.5 Update 1 on the Sun Blade X6440 server module. It contains the following sections:

- [“Before You Begin” on page 69](#)
- [“VMware ESX Server 3.5 Update 1 Installation Overview” on page 71](#)
- [“Downloading the VMware ESX Server 3.5 ISO Image” on page 72](#)
- [“Installing VMware ESX Server 3.5 From a Remote CD or Remote ISO Image” on page 73](#)
- [“Installing VMware ESX Server 3.5 From a Local CD” on page 75](#)
- [“Updating the VMware Server 3.5 Software With Updates and Patches” on page 77](#)

---

## Before You Begin

Review the following sections:

- [“Task Map for VMware ESX Server 3.5 Installation” on page 70](#)
- [“VMware Installation and Administration Documentation” on page 70](#)
- [“Planning Network Interfaces” on page 71](#)
- [“Select an Installation Method” on page 71](#)

# Task Map for VMware ESX Server 3.5 Installation

The following table maps out the installation task order and points to the relevant section where you can find more information.

**TABLE 6-1** Task Map for VMware ESX Server 3.5 Installation

Installation Task	Relevant Section
Collect information about your system.	<a href="#">“VMware Installation and Administration Documentation” on page 70.</a>
Plan your network interface.	<a href="#">“Planning Network Interfaces” on page 71</a>
Choose an installation method.	<a href="#">“Select an Installation Method” on page 71</a>
Download ISO image and burn to CD.	<a href="#">“Downloading the VMware ESX Server 3.5 ISO Image” on page 72.</a>
Identify a specific network interface.	<a href="#">“Planning Network Interfaces” on page 71</a>
Complete the VMware ESX Server 3.5 software installation.	Refer to <a href="http://www.vmware.com/support/pubs/vi_pubs.html">http://www.vmware.com/support/pubs/vi_pubs.html</a> .
Update the VMware ESX Server 3.5 software if necessary.	<a href="#">“Updating the VMware Server 3.5 Software With Updates and Patches” on page 77</a>

## VMware Installation and Administration Documentation

Before you begin installing VMware ESX Server 3.5 software on a Sun Blade X6440 server module, collect the necessary information pertinent to your situation by consulting the following required documents at [http://www.vmware.com/support/pubs/vi\\_pubs.html](http://www.vmware.com/support/pubs/vi_pubs.html).

- Introduction to VMware Infrastructure
- Quick Start Guide
- Installation and Upgrade Guide
- Basic System Administration
- Virtual Infrastructure Web Access Administrator’s Guide
- Server Configuration Guide

## Planning Network Interfaces

- The Virtual Infrastructure 3 service console and management interface is dependent on a network interface. The service console does not automatically use the first interface with a live connection. A live interface must be associated with the service console for host management.

Refer to the *Sun Blade X6440 Server Module Service Manual* for detailed information concerning network interface cabling and the BIOS considerations of these interfaces.

- By default, `vmnic0` is assigned for service console communications.

## Select an Installation Method

The most common methods for installing VMware on your server are to use:

- A remote ISO image downloaded from the VMware website, redirected through the ILOM Remote Console application (JavaRConsole).
- A remote CD/DVD drive (with a CD-ROM burned from the ISO image downloaded from the VMware web site) redirected through the ILOM Remote Console application.
- A local CD/DVD drive (with a CD-ROM burned from the ISO image downloaded from the VMware web site).
- Automatic KickStart installation from VMware software (installation tree) stored on a Preboot Execution Environment (PXE) network server.

This chapter contains the procedures for the first three methods. For information about preparing for PXE installation, see the VMware *Installation and Upgrade Guide for VESX Server 3 and Virtual Center 2.0*, Chapter 6, “Remote and Scripted Installations.” This document can be accessed at

[http://www.vmware.com/pdf/vi3\\_301\\_201\\_installation\\_guide.pdf](http://www.vmware.com/pdf/vi3_301_201_installation_guide.pdf)

Alternately, go to the following web site and search for the document:

[http://www.vmware.com/support/pubs/vi\\_pubs.html](http://www.vmware.com/support/pubs/vi_pubs.html)

---

## VMware ESX Server 3.5 Update 1 Installation Overview

Perform the following steps to install the VMware server software:

- 1. Review the VMware ESX Server 3.5 documentation, available at**  
[http://www.vmware.com/support/pubs/vi\\_pubs.html](http://www.vmware.com/support/pubs/vi_pubs.html).  
For a list of the documents, see “VMware Installation and Administration Documentation” on page 70.
- 2. Download the VMware server ISO image.**  
For instructions, see “Downloading the VMware ESX Server 3.5 ISO Image” on page 72.
- 3. Depending on the installation method that you selected, use the appropriate procedure below to install the VMware server software:**
  - **Remote installation.** From a remote ISO image or from a remote CD/DVD drive (with a CD-ROM burned from an ISO image) (see “Installing VMware ESX Server 3.5 From a Remote CD or Remote ISO Image” on page 73).
  - **Local installation.** From a local USB CD/DVD drive (with a CD-ROM burned from an ISO image) connected to the Sun Blade X6440 server module (see “Installing VMware ESX Server 3.5 From a Local CD” on page 75).
- 4. Update the VMware ESX Server 3.5 software with the latest updates and patches, if necessary.**  
See “Updating the VMware Server 3.5 Software With Updates and Patches” on page 77.

---

## Downloading the VMware ESX Server 3.5 ISO Image

No matter what method you choose to install VMware ESX Server, you must first download an ISO image of the software installation CD.

### ▼ To Download the VMware ESX Server 3.5 ISO Image

- 1. Download the ISO image using a network-connected system with CD-burning capabilities from:**  
<http://www.vmware.com/download/vi/eval.html>
- 2. Optionally, burn the image to a CD.**



---

# Installing VMware ESX Server 3.5 From a Remote CD or Remote ISO Image

The following procedure describes how to use the Integrated Lights Out Manager (ILOM) Remote Console to install VMware ESX Server 3.5 from a remote CD/DVD drive or a remote ISO image.

---

**Note** – Read the *Sun Integrated Lights Out Manager 2.0 User's Guide* (820-1188) before completing the following steps. This guide provides details on using the ILOM service processor web interface to redirect the console.

---

## ▼ To Install VMware ESX Server 3.5 From a Remote CD or Remote ISO Image

1. **Locate your VMware ESX Server installation CD/DVD or the equivalent ISO image.**
2. **Connect to the ILOM service processor web interface.**
3. **Select the Remote Control tab, then select the Mouse Mode Settings tab.**
4. **If necessary, change the mouse mode to Relative Mouse Mode.**  
See the “Remote Console Application” chapter of the *Sun Integrated Lights Out Manager 2.0 User's Guide* for further instructions.
5. **Select the Redirection tab.**
6. **Click the Launch Redirection button to start the JavaRConsole application.**
7. **Log in to the JavaRConsole.**
8. **Start keyboard and mouse redirection.**  
Select Keyboard and Mouse in the Devices menu.
9. **Start CD/DVD redirection.**  
From the JavaRConsole Devices menu, you can redirect the CD in two ways:
  - If you are installing a physical CD-ROM into the remote console CD drive, insert the CD-ROM into the drive and select CD-ROM.
  - If you are using an ISO image installed on the remote console, select CD-ROM Image and provide the location.

---

**Note** – Depending on the number of USB devices in use, you *may* be prompted for the install location or device. This deviates from the normal installation. To continue the installation under these circumstances, select CD-ROM Image. Then, when prompted to select a device driver, select Linux USB Driver.

---

**10. Refer to the *Installation and Upgrade Guide for VMware Infrastructure* to guide you through the installation process.**

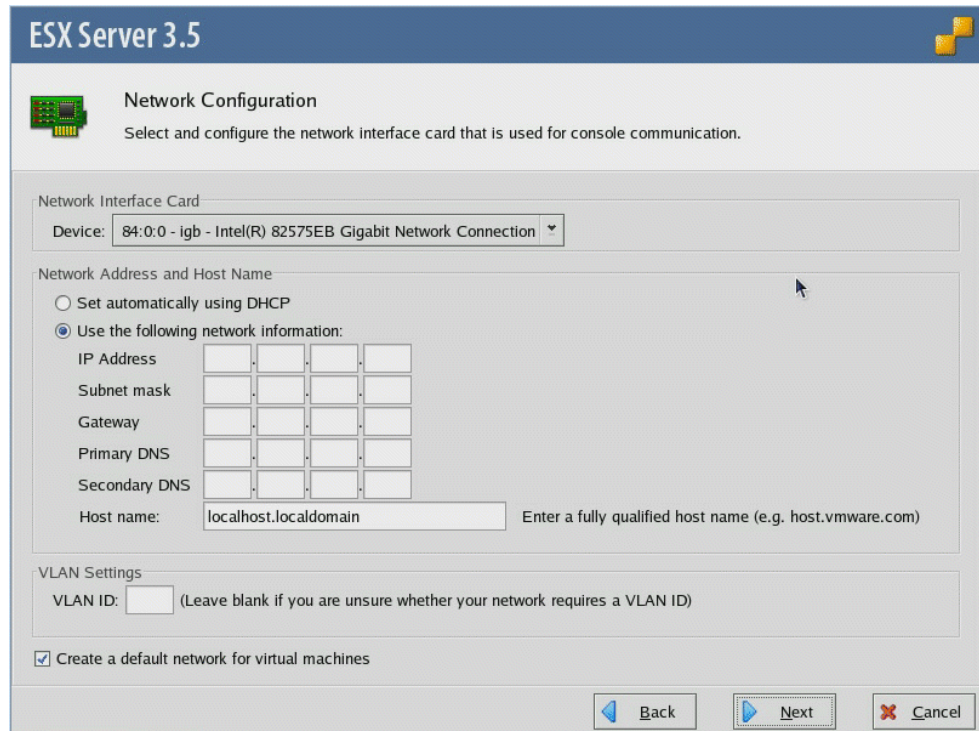
From your network-connected system go to

[http://www.vmware.com/support/pubs/vi\\_pubs.html](http://www.vmware.com/support/pubs/vi_pubs.html).

**11. Identify the specific network interface for the Sun Blade X6440 server module.**

In the service console window on the Sun Blade X6440 server module, identify the available network configuration alternatives (see [FIGURE 6-1](#)).

**FIGURE 6-1** ESX Server 3.5 Update 1 Network Configuration Dialog Box



12. **Update the VMware ESX Server 3.5 software with the latest updates and patches, if necessary.**

See [“Updating the VMware Server 3.5 Software With Updates and Patches”](#) on page 77.

---

**Note** – Installing all critical and security patches is recommended for best performance.

---

## Installing VMware ESX Server 3.5 From a Local CD

The following procedure describes how to install VMware ESX Server 3.5 from a CD-ROM installed in a locally connected USB CD/DVD drive.

### Required Items

Installation from local distribution media requires the following items:

- Sun Blade X6440 server module equipped with the following four items:
  - USB keyboard and mouse.
  - USB CD/DVD drive.
  - Monitor.
  - Multi-port dongle cable to connect to the front of the Sun Blade X6440 server module.
- VMware ESX Server 3.5 media CD-ROM.

### ▼ To Install VMware ESX Server 3.5 From a Local CD

1. **Connect the multi-port dongle cable to the front of the Sun Blade X6440 server module.**
2. **Connect the following to the USB ports on the dongle:**
  - A CD/DVD drive
  - A USB Keyboard and Mouse

---

**Note** – You can also configure keyboard, video and mouse (KVM) access through a JavaRConsole.

---

3. **Connect a monitor to the server module (this is not required if you are using Java KVM).**

4. **Power on the server module.**

5. **Insert the CD-ROM with the ISO image into the CD/DVD drive.**

The server boots from the CD-ROM and displays a boot prompt.

boot:

6. **To access graphical mode, press Enter.**

7. **To work in text mode, type the following:**

**esx text**

8. **Refer to the *Installation and Upgrade Guide for VMware Infrastructure* to guide you through the installation process.**

From your network-connected system go to [http://www.vmware.com/support/pubs/vi\\_pubs.html](http://www.vmware.com/support/pubs/vi_pubs.html).

9. **Identify the specific network interface for the Sun Blade X6440 server module.**

In the service console window on the Sun Blade X6440 server module, identify the available network configuration alternatives (see [FIGURE 6-1](#) for ESX Server 3.0.1 and [12](#) for ESX Server 3.0.2).

10. **Complete the VMware installation.**

This is detailed in the *Installation and Upgrade Guide for VMware Infrastructure* at [http://www.vmware.com/support/pubs/vi\\_pubs.html](http://www.vmware.com/support/pubs/vi_pubs.html).

11. **Update the VMware ESX Server 3.5 software with the latest updates and patches, if necessary.**

See “[Updating the VMware Server 3.5 Software With Updates and Patches](#)” on [page 77](#).

---

**Note** – We strongly recommend installing all critical and security patches.

---

---

# Updating the VMware Server 3.5 Software With Updates and Patches

Because software is constantly being updated, your distribution media might not contain the latest updates and patches.

VMware ESX Server 3.5 update images are available for download at [http://www.vmware.com/download/vi/vi3\\_patches.html](http://www.vmware.com/download/vi/vi3_patches.html).



# Installing and Booting an Operating System on Compact Flash

---

This chapter contains an overview on using a compact flash (CF) card as a bootable device, and covers the advantages and disadvantages of using a CF for booting an operating system (OS). It also contains procedures for prolonging the life span of your CF card through optimization. The Solaris, OpenSolaris, and Linux operating systems support booting from CF. The procedures for optimizing each are slightly different.

This chapter contains the following sections:

- [“Compact Flash Operating System Installation Overview” on page 79](#)
- [“Reducing OS Write/Erase Cycles for Linux OS Installation on Compact Flash” on page 81](#)
- [“Reducing OS Write/Erase Cycles for Solaris OS or OpenSolaris OS Installation on CF” on page 87](#)

---

## Compact Flash Operating System Installation Overview

Your Sun Blade X6440 server module can be equipped with an internal 8-GB (or 16-GB) compact flash (CF) card, which you can use to install and boot supported versions of the Solaris, OpenSolaris, or Linux operating system.

# Advantages and Disadvantages of Using Compact Flash

As a boot device, the main advantages of CF card over a hard drive are its very low power consumption, its fast read speeds, and its size. A CF card requires no power to maintain its data, because it is solid-state non-volatile memory. It has no moving parts, no seek time, no latency period, and no spin-up. Compared to a hard drive, both the time required to read and write and the total package size of a CF card are significantly reduced. Therefore, CF offers improved power and cooling, performance, and space efficiencies.

The disadvantage of CF is its limited life span. The card's life span is dependent upon the number of write/erase cycles it receives. A block of memory on a CF card can only sustain a limited number of write/erase cycles before it degrades and the card becomes unusable (reading does not degrade CF). In this respect, an OS can place a high demand on a CF card, because it performs many write-intensive tasks such as logging and swapping.

## Prolonging Compact Flash Life Span by Reducing Write/Erased Cycles

You can significantly prolong the useful life of a CF card by configuring the OS to redirect and relocate the more write-intensive tasks off the CF card on to other devices, such as an external hard drive or RAM. Specifically, some of the things you can do to reduce write/erase cycles include:

- Always use a high-grade CF card
- Redirect log output by:
  - Mounting to an network file system (NFS) share
  - Logging over the network using `syslog`
- Relocate the `/tmp` directory to `tmpfs` or to an external storage
- Eliminate swap or swap to external storage

The above options are discussed in the following Linux, Solaris, and OpenSolaris OS-specific sections:

- [“Reducing OS Write/Erased Cycles for Linux OS Installation on Compact Flash” on page 81](#)
- [“Reducing OS Write/Erased Cycles for Solaris OS or OpenSolaris OS Installation on CF” on page 87](#)



---

# Reducing OS Write/Erase Cycles for Linux OS Installation on Compact Flash

The procedures in this section detail how to prolong CF life span by reducing OS write/erase cycles. After you have installed an OS to the Sun Blade X6440 server module's CF card, it is recommended that you implement as many of the following procedures as possible:

- [“Redirecting Log Output for CF OS Installation” on page 81](#)
- [“Moving /tmp to tmpfs for an OS Installation on CF” on page 84](#)
- [“Managing Swap Space for an OS Installation on Compact Flash” on page 85](#)
- [“Reducing OS Write/Erase Cycles for Solaris OS or OpenSolaris OS Installation on CF” on page 87](#)

## Redirecting Log Output for CF OS Installation

This section contains two procedures that you can use to redirect log output off the CF card. These procedures will help to reduce OS write/erase cycles and prolong the life span of the CF card:

- [“Redirecting Log Output to an NFS Share” on page 81](#)
- [“Redirecting Log Output Over the Network Using syslog” on page 82](#)

## Redirecting Log Output to an NFS Share

This procedure details how to mount /var over NFS at boot time to redirect system log output off the CF card and onto an NFS share drive. Performing this procedure reduces the OS write/erase cycles and prolongs the life span of the CF card.

---

**Note** – If you have multiple servers logging to the NFS server, each server should have a separate directory. This will reduce file-locking related problems and simplify log analysis.

---

## ▼ To Redirect Log Output to an NFS Share

1. To mount `/var` over NFS at boot time, add the following entry to the `/etc/fstab` file:

```
server:/path/to/dir /var nfs sync 0 0
```

Where:

- `server` is the NFS server.
- `/path/to/dir` is the path to the directory to mount as `/var`.

2. Save and close the `/etc/fstab` file.

You will now need to make an entry in the `/etc/exports` file on the log server to authorize the client to mount and write to the share.

3. To authorize the client to mount and write to the share drive, add the following entry to the `/etc/exports` file on the log server:

```
/path/to/logs/client host_name client_IP(rw,no_root_squash,no_subtree_check)
```

Where:

- `/path/to/logs/` is the path to the log directory.
- `client host_name` is the host name of the client (recommended for multiple server logging).
- `client_IP` is the IP address of the client.

4. Save and close the `/etc/exports` file.

Since you made changes to the `/etc/exports` file, you should now refresh the NFS server.

5. To refresh the NFS server, type the following command:

```
% exportfs -r
```

## Redirecting Log Output Over the Network Using syslog

This procedure details how to redirect system log output from the CF card and over the network using `syslog`. Performing this procedure reduces the OS write/erase cycles and prolongs the life span of the CF card.

---

**Note** – There are some security implications when logging over a network with `syslog`, especially over an untrusted network, because `syslog` uses UDP to send log messages. If this is an issue in your implementation, consider replacing `syslog` with `syslog-ng`. `syslog-ng` can do remote logging via TCP and you can use it over an SSH tunnel or VPN.

---

---

**Tip** – You might also want to implement firewall rules to restrict which hosts are allowed to log output to your log server.

---

## ▼ To Redirect Log Output Over the Network Using `syslogd`

---

**Note** – The remote log server must have `syslogd` running with the `-r` flag.

---

- **To configure `syslogd` to log to a remote server edit the `/etc/syslog.conf` file by performing the following modification:**

**Change:**

```
kern.*; /var/log/messages
```

**To:**

```
*.*; @host.domain.com
```

The above modification redirects all kernel related messages from the `/var/log/messages` directory to `host.domain.com`. The following is an example of a sample `/etc/syslog.conf` file that sends messages to a remote system:

```
# Sample syslog.conf file that logs emergencies to the local file
system
# and echos all log messages to host.domain.com
# log all error and emergency messages to the local machine
*.err;*.emerg /var/log/messages
# send everything to host.domain.com
*.*; @host.domain.com
```

The above sample sends all log messages to `host.domain.com`. Additionally, the following line saves a copy of error and emergency level messages:

```
*.err;*.emerg /var/log/messages
```

To tune your system even further comment out this line. Comment lines are preceded by the `#` character:

```
# *.err;*.emerg /var/log/messages
```

---

**Tip** – Since many daemons can be configured to redirect their logging output to `syslog`, you can tune your system further by redirecting many of the other log files that are generated on your system.

---

---

**Note** – If you receive errors when trying to log output to a remote server, ensure that your Linux distribution has started `syslog` after the network was brought up.

---

## Moving `/tmp` to `tmpfs` for an OS Installation on CF

This procedure details how to mount `/tmp` as a `tmpfs` RAM disk. Performing this procedure reduces the OS write/erase cycles and prolongs the life span of the CF card.



---

**Caution** – A RAM disk uses volatile memory. Information stored in a RAM disk will not survive a reboot or power outage. Additionally, RAM disks decrease the total available memory.

---

### ▼ To Move `/tmp` to `tmpfs`

#### 1. Determine the size of the `tmpfs` RAM disk partition.

You should make this determination based upon the memory needs of your system.

100 MB is used in the example in this procedure. This value is set with the `size` parameter. Acceptable suffixes are K, M, or G (kilo, mega, and giga, respectively). See the `tmpfs` man page for information about other configuration options.

#### 2. To mount `/tmp` as a 100 MB `tmpfs` partition, run the following command:

```
% mount -t tmpfs -o size=100M,nr_inodes=1k,mode=777 tmpfs /tmp
```

To automate the above mount, add the following entry to the `/etc/fstab` file:

```
none /tmp tmpfs auto,size=100M,nr_inodes=1k,mode=777 0 0
```

#### 3. Save and close the file.

# Managing Swap Space for an OS Installation on Compact Flash

The procedures detailed in this section show how to manage system swap so that it does not occur on the CF card. Performing this procedure reduces the OS write/erase cycles to and prolongs the life span of the CF card.

The options for managing swap are:

- Eliminating swap
- Swapping on external storage

## Eliminating Swap

Running your system without swap is not an optimal solution. However, swapping on CF is not advisable either. Swap space, while not a requirement, does provide a buffer zone to guard against transient problems with inadequate resources.

The key to running without swap is to understand the memory requirements of your applications and plan your system based on these requirements. If you have enough RAM to satisfy your server's projected need for temporary storage then you do not need swap.

## Swapping on External Storage

If you have external storage, you can use a partition on that hard drive for swap space. If the hard drive you want to swap on is attached to the system, you can configure swap space during installation process. If you did not configure swap during the installation process, see ["Configuring Swap on External Storage Post-Installation"](#) on page 86.

# Configuring Swap on External Storage Post-Installation

If you would like to configure swap post-installation, you will need to do the following:

1. Create a swap partition.
2. Initialize the swap space.
3. Add an entry in the `/etc/fstab` file.

---

**Note** – Swapping from a disk that you also use for data storage can increase the number of seeks that disk performs and therefore increase latency for that disk.

---

## ▼ To Configure Swap on External Storage Post-Installation

---

**Note** – This procedure assumes that you are starting from a blank disk.

---

1. Create a partition with the following command:

```
% parted /dev/device_name mkpart primary Linux-swap 0 X
```

Where:

- `device_name` is the name of the hard drive.
- `X` is the size of the swap space in megabytes.

---

**Note** – The general rule of thumb is that swap space should be 2 times your RAM size.

---

2. Edit the `/etc/fstab` file to add the new swap device:

```
/dev/device_name swap swap defaults 0 0
```

3. Reboot the system, or to start swapping without waiting for a reboot, enter the following command:

```
% swapon /dev/device_name
```

---

# Reducing OS Write/Erase Cycles for Solaris OS or OpenSolaris OS Installation on CF

- [“Disabling Swap” on page 87](#)
- [“Using a Dedicated Dump Device” on page 88](#)
- [“Moving Temporary Files to a RAM Disk” on page 89](#)
- [“Disabling Filesystem Access Time Updates” on page 90](#)
- [“Configuring Remote Logging” on page 91](#)

## Disabling Swap

The Solaris OS or OpenSolaris allows the administrator to configure a swap device during installation. If the root disk of the OS is on CF, then swap should be disabled, or moved to a hard drive or RAM.

If this is a new machine, then relocate or disable swap. If the machine is already installed, you can disable swap by removing the swap device entry from the `vfstab` file or by using the `swap` command.

### ▼ To Disable Swap by Editing the `vfstab` File

1. (If necessary) To identify swap devices, enter the following command:

```
% swap -l
```

The command returns the current swap device. For example:

```
/dev/dsk/device_name
```

Where: *device\_name* is the name of the device used for swap.

2. Open the `vfstab` file in an editor, and locate the swap entry line.

The file is divided into seven fields. The swap entry line will have your swap device listed in the first field and `swap` listed in the fourth field. For example:

```
/dev/dsk/device_name - - swap - no -
```

**3. Edit the `vfstab` file by changing the swap entry to a comment.**

To change an entry to a comment, type the `#` character at the beginning of the entry line. For example, the following swap entry line has been changed to a comment:

```
# /dev/dsk/device_name - - swap - no -
```

**4. Save and exit the file.**

**5. For the changes to take effect, reboot, or, if you do not want to reboot, use the following `mount` command:**

```
% mount -a
```

Refer to the `mount` man page for a description of options.

## ▼ To Disable Swap Using the `swap` Command

● **Enter the following command:**

Refer to the `swap` man page before entering this command.

```
% swap -d swap_name
```

Where: *swap\_name* is the name of the swap file.

## Using a Dedicated Dump Device

By default, the Solaris OS or OpenSolaris OS uses the swap device as a source for kernel crash dumps. When the swap device is disabled, the swap partition is configured as a dedicated dump device. This is unsuitable for most purposes, because you want to minimize writes to the CF card. If you would like to capture crash dumps, use the following procedure to configure a different dedicated dump device.

## ▼ To Configure a Dedicated Dump Device

● **To configure a device as a dump device, enter the following command:**

```
# dumpadm -c kernel -d /dev/dsk/device_name
```

Where: *device\_name* is the name of the device to configure as a dump device.



# Moving Temporary Files to a RAM Disk

By moving temporary files to RAM, you can further reduce I/O to the CF card. By default the Solaris OS or OpenSolaris OS `/tmp` filesystem is mounted using `tmpfs`, essentially a RAM disk. By moving `/var/tmp` to `tmpfs`, you can eliminate the majority of temporary files from being written to the root disk. You can do this manually, or you can move `/var/tmp` to `tmpfs` by editing the `vfstab` file.

## ▼ To Move Temporary Files to a RAM Disk

### 1. Add the following entry to the `/etc/vfstab` file:

```
swap - /tmp tmpfs - yes -  
swap - /var/tmp tmpfs - yes -
```

TABLE 7-1 shows an example of this entry.

TABLE 7-1 `/etc/vfstab` File with `noatime` Setting

#device #to mount	device to fsck	mount point	FS type	fsck pass	mount at boot	mount options
fd	-	/dev/fd	fd	-	no	-
/proc	-	/proc	proc	-	no	-
#/dev/dsk/c1d0s1	-	-	swap	-	no	-
/dev/dsk/c1d0s0	/dev/rdisk/c1d0s0	/	ufs	1	no	noatime
/dev/dsk/c1d0s7	/dev/rdisk/c1d0s7	/export0	ufs	2	yes	-
/devices	/devices	/devices	devfs	-	no	-
sharefs	-	/etc/dfs/sharetab	sharefs	-	no	-
ctfs	-	/system/contract	ctfs	-	no	-
objfs	-	/system/object	objfs	-	no	-
swap	-	/tmp	tmpfs	-	yes	-
swap	-	/var/tmp	tmpfs	-	yes	-

### 2. Save and exit the file.

**Note** – To manually move `/var/tmp` to `tmpfs`, use the `mount` command:

```
% mount -F tmpfs swap/var/tmp
```

3. For the changes to take effect, reboot, or, if you do not want to reboot, use the following `mount` command:

```
% mount -a
```

Refer to the `mount` man page for a description of options.

## Disabling Filesystem Access Time Updates

UNIX filesystems are required to update file metadata each time a file is accessed. Even if the file has been read, but not written, the OS will still update the access time (or `atime`). UFS and ZFS filesystems allow you to disable updates to the file access times. For ZFS, you use the `set` command. For UFS, you configure the `noatime` option in the `vfstab` file. Additionally, UFS offers the option to defer `atime` writes (`dfertime`) until the disk is accessed for a reason other than updating access times. This option is set by default. For more information, see the `mount_ufs` man page.

---

**Note** – Disabling file `atime` may result in unpredictable behavior with some applications that depend on `atime` updates to function properly.

---

### ▼ To Disable Filesystem Access Time Updates for ZFS

- To disable `atime` updates under ZFS, enter the following command:

```
zfs set atime=off filesystem_name
```

Where: *filesystem\_name* is the name of the filesystem to disable `atime`.

### ▼ To Disable Filesystem Access Time Updates for UFS

1. To disable `atime` updates under UFS, edit the `/etc/vfstab` file by adding the `noatime` mount option to the appropriate entry.

TABLE 7-2 shows an example of this entry.

**TABLE 7-2** `/etc/vfstab` File with `noatime` Setting

#device #to mount	device to fsck	mount point	FS type	fsck pass	mount at boot	mount options
fd	-	/dev/fd	fd	-	no	-
/proc	-	/proc	proc	-	no	-
#/dev/dsk/c1d0s1	-	-	swap	-	no	-

**TABLE 7-2** /etc/vfstab File with noatime Setting (Continued)

#device #to mount	device to fsck	mount point	FS type	fsck pass	mount at boot	mount options
/dev/dsk/c1d0s0	/dev/rdsk/c1d0s0	/	ufs	1	no	noatime
/dev/dsk/c1d0s7	/dev/rdsk/c1d0s7	/export0	ufs	2	yes	-
/devices	/devices	/devices	devfs	-	no	-
sharefs	-	/etc/dfs/sharetab	sharefs	-	no	-
ctfs	-	/system/contract	ctfs	-	no	-
objfs	-	/system/object	objfs	-	no	-
swap	-	/tmp	tmpfs	-	yes	-
swap	-	/var/tmp	tmpfs	-	yes	-

2. Save and exit the /etc/vfstab file.

3. For the changes to take effect, reboot, or, if you do not want to reboot, use the following `mount` command:

```
% mount -a
```

Refer to the `mount` man page for a description of options.

## Configuring Remote Logging

You can configure the `syslog` daemon to send its log messages to a remote host. To do this, you must edit the `syslogd.conf` file to change the destination for log messages to `@loghost` or `@hostname`. If `loghost` is used, it maps to `localhost` in the hosts database by default. Be sure to change the `loghost` entry in `/etc/hosts` to point to the correct machine. The `syslog.conf` man page contains additional details about remote logging.

---

**Tip** – If you have a machine configured to receive log messages for other hosts, consider allowing the machine with the root CF device log to this remote host.

---

## ▼ To Configure Remote Logging

1. **Edit the `syslog.conf` file and redirect `/var/adm/messages` to `@loghost` or `@hostname`.**

[CODE EXAMPLE 7-1](#) shows a sample `syslog.conf` file. In this sample, the original entry is changed to a comment, by affixing the `#` character to the beginning of the entry, and the new entry has been added beneath it:

```
*.err;kern.debug;daemon.notice;mail.crit /var/adm/messages
*.err;kern.debug;daemon.notice;mail.crit @loghost
```

### CODE EXAMPLE 7-1 Sample `syslog.conf` File

```
*.err;kern.notice;auth.notice /dev/sysmsg
#*.err;kern.debug;daemon.notice;mail.crit /var/adm/messages
*.err;kern.debug;daemon.notice;mail.crit @loghost

*.alert;kern.err;daemon.err operator
*.alert root
*.emerg *
#if a non-loghost machine chooses to have authentication messages
# sent to the loghost machine, un-comment out the following line:
#auth.notice ifdef( LOGHOST , /var/log/authlog, @loghost)
#mail.debug ifdef( LOGHOST , /var/log/syslog, @loghost)

mail.debug @loghost
```

2. **Save and exit the `syslog.conf` file.**
3. **If necessary, define `loghost` by editing the `/etc/hosts` file.**

Since the example above uses `loghost`, it needs to be defined in the `/etc/hosts` file. You define `loghost` using the IP address of the log machine, indicating where the OS should send the messages. The following example is an excerpt from the `/etc/hosts` file that has modified `localhost` so that it is no longer `localhost`:

```
127.0.0.1 localhost ::1 localhost
192.168.15.33 loghost
```

4. **Save and exit the `/etc/hosts` file.**

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