



Sun Fire™ X4540 Server Linux and Solaris OS Installation Guide

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Preface

This Installation Guide contains instructions for installing supported versions of Linux and Solaris™ operating systems on the Sun™ Fire X4540 server.

Product Updates

For firmware and driver updates, as well as CD/DVD ISO images that you can download for the Sun Fire X4540 server, go to:

<http://www.sun.com/servers/x64/x4540/downloads.jsp>

Related Documentation

For a description of the document set for the Sun Fire X4540 server, see the *Where To Find Documentation* sheet that is packed with your system and also posted at the product's documentation site. To navigate to your product go to:

<http://docs.sun.com>

Translated versions of some of these documents are available on 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.

For Solaris and other software documentation, go to:

<http://docs.sun.com>

Operating System Installation Overview

This chapter gives an overview of the operating system (OS) installation process. For additional information about disk management and monitoring utilities, see the *Integrated Lights Out Manager (ILOM)* documentation. (Note that there are multiple versions of ILOM. Be sure to refer to the guide that matches your server's installed version of ILOM.)

Preparing to Install an OS on a Sun Fire X4540 Server

There are several supported OS distributions and several ways to install each. This section is intended only as a general guide that refers you to detailed procedures.

Prerequisites

You must complete the following before you can begin the installation:

- Install the server hardware.
- (Optional) Configure the service processor (you can do this after installation if you prefer).
- (Solaris OS only) Install and set up the software on the preinstall image and the Bootable Diagnostics CD.
- Gather needed information, such as the IP address and netmask. If you need to identify the server's physical network interface names for a Linux installation, see [Appendix A](#). If you need to identify the server's physical network interface names for a Solaris installation, see [Appendix B](#).

Things You Must Decide

Before you begin installing the OS, answer the following questions.

- Which OS are you installing on your Sun Fire X4540 server?

A list of supported operating systems for the Sun Fire X4540 series servers is available at <http://www.sun.com/servers/x64/x4540/os.jsp>

- Are you configuring the server for diskless booting?

Operating System	Relevant Documentation on Diskless Configurations
Solaris 10	See “ About Solaris OS Installation ” on page 7 or <i>Solaris 10 Installation Guide: Network-Based Installations</i> at http://docs.sun.com/app/docs/coll/1236.6
Red Hat Linux	See “ About RHEL Installation ” on page 14 or <i>Red Hat Enterprise Linux System Administration Guide</i> at https://www.redhat.com/docs/manuals/enterprise/ .
SUSE Linux Enterprise Server 10	See “ About SUSE Linux Enterprise Server 10 Installation ” on page 38, or go to http://www.novell.com/documentation/sles10/index.html

- Which installation method can you use?

Method	Solaris	Red Hat	SUSE
Preinstalled on disk	YES	NO	NO
Install from distribution media (CD/DVD) on the server	YES	YES	YES
Install from distribution media (CD/DVD) via KVMs	YES	YES	YES
Install from network using PXE (Preboot Execution Environment)	YES	YES	YES
Install using Sun Installation Assistant (SIA)—a graphical operating system installation tool that assists you in the installation of supported versions of Linux	NO	YES	YES
Install on to Compact Flash	YES	YES	YES

Note – The Sun Fire X4540 server supports industry-standard remote KVMs (keyboard, video, mouse, and storage) operation with the Integrated Lights Out Manager (ILOM) Remote Console application. For more information on setting up a remote KVMs connection to your server, see the *Integrated Lights Out Manager (ILOM)* documentation. (Note that there are multiple versions of ILOM. Be sure to refer to the guide that matches your server’s installed version of ILOM.)

- Will you need to update the OS?

In general, you might need to perform updates once the OS has been installed. For details, see the appropriate chapter for your particular OS.

Optional Software

Additional software is available for Linux and Solaris operating systems to aid in the operation and management of your server.

- Hardware Error Report and Decode (HERD) Utility

HERD is a utility that runs on Linux for monitoring, decoding, and reporting correctable hardware errors. For more information, refer to the *x64 Servers Utilities Reference Manual* (820-1120) available with your server's documentation at:

<http://docs.sun.com>

- `hd` Hard Disk Mapping Utility

The `hd` utility runs on Solaris, Linux and Windows and provides a logical-to-physical mapping of the server's 48 hard disk drives. For more information, refer to the *x64 Servers Utilities Reference Manual* (820-1120) available with your server's documentation at <http://docs.sun.com>.

Note – The examples shown for the `hd` utility in the *x64 Servers Utilities Reference Manual* are for the Sun Fire X4500. Disk mapping for the X4540 will be different.

- Disk Control and Monitoring Utility (DCMU)

The Disk Control and Monitoring Utility (DCMU) is a program for the Sun Fire X4540 server running the Red Hat Linux, or SUSE Linux operating systems. DCMU assists with drive insertion and removal, reports changes in disk configuration and synchronizes the disk FRU (Field Replaceable Unit) information with information stored in the Sun Fire X4540's Service Processor.

For details, refer to [Chapter 6](#) (for Red Hat), or [Chapter 7](#) (for SLES).

- IPMItool

The IPMItool is a command line utility that reads the sensor data repository (SDR) and displays sensor values, System Event Log (SEL), Field Replaceable Unit (FRU) inventory information, gets and sets LAN configuration parameters, and performs chassis power control operations via the server's Service Processor. For information about using the IPMItool, refer to your *Sun Integrated Lights Out Manager 2.0 User's Guide* (820-1188).

Drivers for Option Cards

Option cards supported by operating systems are listed on the platform-specific product web page under Companion Products. To check if the driver of your option card is available for download, check the Option Cards link on the Product Page.

For example, Sun Fire X4100 M2 platform page and related option card are:

<http://www.sun.com/servers/entry/x4100/>

<http://www.sun.com/servers/entry/x4100/optioncards.jsp>

For complete platform listings please visit:

<http://www.sun.com/servers/index.jsp?tab=2>

Next Steps

- See the appropriate chapter for your OS:
 - [Installing Solaris 10 Operating System](#)
 - [Installing Red Hat Enterprise Linux \(RHEL\)](#)
 - [Installing SUSE Linux Enterprise Server \(SLES\) 10](#)
- Or, for assisted OS installation of Linux using Sun Installation Assistant, proceed to [Using the Sun Installation Assistant \(SIA\)](#).
- Or, for installing Solaris or Linux on Compact Flash, proceed to [Installing and Booting an OS on Compact Flash](#).
- Gather the installation, administration, and configuration documentation. See the chapters in this guide for pointers to relevant documentation.

Using the Sun Installation Assistant (SIA)

This chapter describes operating system installation options using the Sun Installation Assistant (SIA). You can choose to install a Linux or Windows operating system on your Sun x64 architecture server using SIA.

About the Sun Installation Assistant (SIA)

The Sun Installation Assistant (SIA) is a tool that assists in the installation of supported Linux and Microsoft Windows operating systems (OS). With SIA, you can install the OS, the appropriate drivers, and if necessary, additional system software by simply booting the SIA media and following the prompts.

SIA does not automate the OS installation process. You still need to follow the vendor installation procedures for your OS, but you do not have to inventory your system hardware, search for and download the most recent supported Sun device drivers, nor do you need to create a separate driver CD. SIA does that work for you.

Features and Benefits

SIA provides the following features and benefits:

- Bootable media from either a local drive attached to the server (CD/DVD or USB flash drive), a remote redirected network drive (virtual CDROM or ISO image), or a PXE network boot.

- Identification of your platform hardware and installed option cards.
- Identification of the operating system media and the supported device drivers that are required for your system.

Note that SIA does not provide the operating system software. The operating system software must be provided by the customer during the SIA installation.

- Assisted operating system installation on platform-supported bootable media (hard disk, compact flash)
- Installation (if required) of the most recent OS-level device driver(s) supported by Sun, and system software required for your system.
- Option to upgrade server BIOS and Service Processor (SP) firmware on supported servers.
- Script-based unattended SIA installation of a supported Linux OS from a Linux-based PXE server.
- Intuitive error messages if an error or unexpected condition occurs during the installation.
- Event log file readily available, if required, at the `/root` for Linux, or `C:\` for Windows of the newly installed server.

How to Get Started Using SIA

The following information will help you get started using SIA.

- For a complete list of supported Sun server platforms, refer to the SIA information page at:

<http://www.sun.com/systemmanagement/sia.jsp>

- The Sun Installation Assistant CD ships with most Sun servers that support the x64 processor architecture. You may also download the latest ISO CD image of the Sun Installation Assistant from the Sun Download page at:

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

Updates to the SIA program can be obtained easily during the SIA installation by using the Remote Update option in the SIA.

- The *Sun Installation Assistant for Windows and Linux User's Guide* (820-3357) describes using SIA with your server and may be downloaded from the Sun documentation web site at:

<http://docs.sun.com>

Installing Solaris 10 Operating System

This chapter describes the installation process for the Solaris 10 operating system.

Note – Your server can be equipped with an internal compact flash (CF) card, on which you can install supported Linux or Solaris operating systems. Due to the limited size of the CF card, a full installation might not be possible, and some installation modes and functions, such as LVM and swap, are not recommended. A discussion of the advantages and disadvantages of booting from CF and CF card optimization procedures are available in [“Installing and Booting an OS on Compact Flash” on page 77](#).

About Solaris OS Installation

This chapter describes some of what you need to know to install the Solaris Operating System (Solaris OS) on a Sun Fire X4540 server and points you to the Solaris OS documentation for more detailed information you will need to complete the installation.

This chapter contains instructions for installing the Solaris 10 OS from network or media. If you are configuring the preinstalled Solaris 10 OS that is shipped with the server, refer to the *Sun Fire X4540 Installation Guide*.

Note – This chapter is intended for experienced system administrators who are familiar with using the Solaris OS on an x86/x64 platform.

Overview

In this document the term “x86” refers to the Intel 32-bit family of microprocessors and compatible 64-bit and 32-bit microprocessors made by AMD. The supported x86 based systems appear in the Solaris Hardware Compatibility List at <http://www.sun.com/bigadmin/hcl>.

The minimum Solaris OS for a Sun Fire X4540 server is Solaris 10 5/08. The Solaris 10 OS box contains the DVD media and documentation that you will need to install the Solaris OS software for both SPARC and x86 platforms. For a Sun Fire X4540 server, use the media for x86 platforms.

The Sun Fire X4540 server supports the following Solaris OS installation methods:

- Install one server from CD/DVD media interactively with the Solaris installation program.
- 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 CD/DVD images
 - JumpStart™ installation
 - Diskless boot
 - Install using a serial console
- Boot from the preinstalled Solaris 10 OS image on the hard drive.

Note – On the Sun X4540 Server, there are four possible boot locations: c0t0 (physical drive slot 0), c0t1 (physical drive slot 1), c1t0 (physical drive slot 8) and c1t1 (physical drive slot 9). These device identifiers are the default with the server configured to boot off of the factory installed SATA storage. If you add additional storage devices (such as a USB storage device), the device identifiers may change depending on which device the operating system looks at first during boot.

Use [TABLE 3-1](#) to identify the steps you need to perform to install the Solaris OS.

TABLE 3-1 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 Fire X4500/X4540 Server Installation Guide</i>
Review requirements specific to the Sun Fire X4540 server.	Verify that your server meets the minimum system requirements.	See TABLE 3-2 and the <i>Sun Fire X4500/X4540 Server Installation Guide</i>
Review the Sun Fire X4540 Server Product Notes.	The product notes contain late-breaking news about the Solaris OS software and patches.	<i>Sun Fire X4540 Server Product Notes</i>
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 Solaris OS Installation” on page 7
Locate the Solaris OS documentation.	The Solaris OS documentation included with your software contains most of what you need to know about installation.	“Where to Find Solaris 10 Information” on page 10
Install the Solaris OS.	Choose an installation method and locate the installation instructions.	See TABLE 3-3 .
Install patches, if necessary.	Patches are available from the SunSolve Patch Portal at http://www.sunsolve.sun.com .	<i>Sun Fire X4540 Server Product Notes</i>

TABLE 3-2 Minimum System Requirements for a Solaris OS Installation

Requirement	Description
Hardware requirements	The server hardware and the initial service processor configuration (if used) must be installed before you install the Solaris OS.
Minimum Solaris OS	Solaris 10 5/08 for x86 and x64 platforms or later compatible versions.
Memory to install	256 MB is the recommended size. 64 MB is the minimum size.
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/DVD media.

TABLE 3-3 Installation Methods

Method	Description	Instructions
Install from CD/DVD media.	Use the Solaris Installation Program on the CD/DVD media to install one server interactively.	Follow the instructions for x86 installation in <i>Solaris 10 Installation Guide: Basic Installations</i> at http://docs.sun.com/app/docs/doc/817-0544 .
Install from the network by using PXE.	<p>You need to use PXE to install the Solaris OS over the network from remote CD/DVD images or to automate the installation process and install several systems with a JumpStart installation.</p> <p>To boot over the network by using PXE, you need to set up an install server, a DHCP server, and configure the BIOS on each server to boot from the network.</p>	Follow the instructions for an x86 PXE installation, in <i>Solaris 10 Installation Guide: Network-Based Installations</i> at http://docs.sun.com/app/docs/doc/817-5504 .
Boot from the preinstalled image.	Depending on your configuration, a Solaris OS image might be preinstalled on a hard drive.	<i>Sun Fire X4500/X4540 Server Installation Guide</i> .
Install from a serial console.	Use a serial console to install the Solaris OS in a PXE-based network installation.	Follow the instructions for an x86 PXE installation in <i>Solaris 10 Installation Guide: Network-Based Installations</i> at http://docs.sun.com/app/docs/doc/817-5504 .
Perform a diskless boot.	Boot the Solaris OS on a Sun Fire X4540 server without a hard drive. Use this method with a PXE-based network installation.	Follow the instructions for an x86 PXE installation in <i>Solaris 10 Installation Guide: Network-Based Installations</i> at http://docs.sun.com/app/docs/doc/817-5504 .

Note – The Solaris OS provides additional programs for installation, such as booting over a wide area network (WAN), but the Sun Fire X4540 server supports only those methods listed in this document.

Where to Find Solaris 10 Information

Solaris 10 OS documentation is available at:

<http://docs.sun.com/app/docs/prod/solaris.10>

Select the version-specific documents that describes your installation in the documentation collection. Make sure to follow instructions specific to x86 systems, where specified.

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

Installing Red Hat Enterprise Linux (RHEL)

This chapter includes information on installing the Red Hat Enterprise Linux (RHEL) operating systems and system specific drivers onto your Sun Fire X4540 server.

This chapter includes the following sections:

- [“About RHEL Installation” on page 14](#)
- [“Preparing to Install RHEL” on page 15](#)
- [“Installing RHEL Using SIA” on page 18](#)
- [“Installing RHEL From Distribution Media” on page 19](#)
- [“Installing RHEL Using the Remote Console Application” on page 20](#)
- [“Installing RHEL Using PXE” on page 23](#)
- [“Updating the RHEL OS” on page 34](#)

About RHEL Installation

This section describes the various requirements and methods for installing RHEL 4.7 and 5.1 64-bit on your Sun Fire X4540 server.

Task Map for RHEL Installation

Consult the following table to determine which sections in this document are relevant to the installation tasks that you want to perform.

Installation Task)	Relevant Section
Collect information about your system and network.	“Red Hat Installation and Administration Documentation” on page 15
Download the required media.	“Preparing to Install RHEL” on page 15
If you are installing the OS on a Compact Flash card, set the boot priority to make your CF card the primary boot device.	“Installing and Booting an OS on Compact Flash” on page 17
Install RHEL from the Sun Installation CD, --or--	“Installing RHEL Using SIA” on page 18
Install RHEL from distribution media using a local DVD drive, --or--	“Installing RHEL From Distribution Media” on page 19
Install RHEL from distribution media using a remote DVD drive, --or--	“Installing RHEL Using the Remote Console Application” on page 20
Install RHEL from a PXE image.	“Installing RHEL Using PXE” on page 23
Update RHEL operating system files and drivers.	“Updating the RHEL OS” on page 34

Red Hat Installation and Administration Documentation

Before you install the RHEL software on a Sun Fire X4540 server, consult the following 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 software.	On the RHEL CD 1, and online at http://www.redhat.com/docs/
<i>Red Hat Enterprise Linux Quick Installation Guide</i>	A printed guide containing useful information to assist you during the installation of RHEL.	Included with the RHEL distribution media
<i>Red Hat Enterprise Linux Installation Guide</i>	The expanded version of the printed <i>Quick Installation Guide</i> .	Included on the Red Hat Documentation CD, and available for download at http://www.redhat.com/docs/
<i>Red Hat Enterprise Linux Introduction to System Administration</i>	Introductory information for RHEL system administrators.	Available for download at http://www.redhat.com/docs/manuals/enterprise/
<i>Red Hat Enterprise Linux System Administration Guide</i>	Information on customizing the RHEL software.	Available for download at http://www.redhat.com/docs/manuals/enterprise/
<i>System Administration for Diskless Booting</i>	Information on configuring your server and Red Hat Linux for diskless booting.	Available for download as the <i>Red Hat Enterprise Linux Installation Guide for the x86, Itanium™, and AMD64 Architectures</i> at http://www.redhat.com/docs/manuals/enterprise/
<i>Red Hat Enterprise Linux Security Guide</i>	Guide for securing the RHEL software.	Available for download at http://www.redhat.com/docs/manuals/enterprise/

Preparing to Install RHEL

Although you can install the Red Hat Enterprise Linux software you will need to collect some information about your system and your network before you proceed with the installation.

You might need to verify the following information before installing the RHEL software on the server.

Item to Verify	Value
DHCP server name	servername
MAC address of server	MAC_address

Obtaining Updated Media Kits

To install Red Hat Enterprise Linux on the Sun Fire X4540 server, you will need to obtain the Red Hat Enterprise Linux 4 Update Media Kit.

To obtain this kit, log in to:

<http://rhn.redhat.com>

You will need your enterprise account information to download the updated ISO images. An enterprise account is an account that the customer creates to access Red Hat's support network after purchasing the Red Hat Enterprise Linux media kit.

After you obtain the updated .iso images, write them to CDs and use them in place of the media you obtained with your Red Hat Enterprise Linux 4 box.

Obtaining the Latest Tools and Drivers DVD Image

The Tools and Drivers DVD for your Sun server contains important drivers that are required for your Linux installation (for example, video, chipset and the server's LSI MPT disk controller). The latest ISO image of the Tools and Drivers DVD for your Sun Fire server can be downloaded at:

<http://www.sun.com/servers/x64/x4540/support.xml>

Additional Software Updates or Patches

After installing the Red Hat Enterprise Linux software on the server, you might also need to update your system software with patches and packages. See [“Updating the RHEL OS” on page 34](#) for details.

Installing and Booting an OS on Compact Flash

Your Sun server can be equipped with an internal Compact Flash (CF) card, on which you can install supported Linux or Solaris operating systems. Due to the limited size of the CF card, a full installation might not be possible and some installation modes and functions, such as LVM and swap, are not recommended. A discussion of the advantages and disadvantages of booting from CF and CF card optimization procedures are available in [“Installing and Booting an OS on Compact Flash” on page 77](#).

Before installing the OS on a Compact Flash card, you must identify and configure it as your system’s primary boot device. The primary boot device is the device upon which you install and boot the OS. You can install the OS on, and boot from, an internal HDD, an external HDD (for example, a hard disk in a storage enclosure), or the internal CF card.

The server’s boot device priority is set through the server’s BIOS setup program. During the boot process, press the F2 key when prompted and navigate to the Boot Device Priority screen to set the internal CF card as the primary boot device.

Boot Disk ID On Linux Changes If Virtual Floppy Or CD-ROM Is Mounted At Installation

For the Sun Fire X4500 server, typically, the boot device nodes are `/dev/sdy` which is located at Slot 0, and `/dev/sdac` located at Slot 1.

Note – The device ID of the boot disk on Linux changes if a virtual floppy or a CD-ROM is mounted at installation. If this is the case with your system, issue the `hd` command to determine the boot disk. Use this disk as the target disk for the OS installation.

Installing Integrated Lights Out Manager (ILOM) 2.0.2.5 changes the controller IDs and the names of the system drives. For more information see “Upgrading to ILOM 2.0.2.5 Changes Controller IDs” in the *Sun Fire™ X4500/X4540 Server Installation Guide*.

The OS must be installed on one of these device nodes. You must also ensure that the GRand Unified Bootloader (GRUB) is installed on the boot device.

TABLE 4-1 Boot Drives With Virtual Devices

Firmware	Virtual Floppy	Virtual CD-ROM	Boot Device Name(s)
Before 2.0.2.5	Not Mounted	Not Mounted	/dev/sdy, /dev/sdac
Before 2.0.2.5	Not Mounted	Mounted	/dev/sdy, /dev/sdac
Before 2.0.2.5	Mounted	Not Mounted	/dev/sdy, /dev/sdac
Before 2.0.2.5	Mounted	Mounted	/dev/sdy, /dev/sdac
2.0.2.5 or later	Not Mounted	Not Mounted	/dev/sdx, /dev/sdab
2.0.2.5 or later	Not Mounted	Mounted	/dev/sdx, /dev/sdab
2.0.2.5 or later	Mounted	Not Mounted	/dev/sdy, /dev/sdac
2.0.2.5 or later	Mounted	Mounted	/dev/sdy, /dev/sdac

To ensure that GRUB gets installed on the boot device, you should perform the following step(s):

1. **During RHEL installation (using the graphical user interface), in the Advanced GRUB menu, select the device `/dev/disk_name`.**
2. **Click the up-arrow until `/dev/disk_name` is at the top of the list. This process could require approximately 90 clicks.**

Once the installation is complete, GRUB resides on `/dev/disk_name`.

Installing RHEL Using SIA

To perform a basic installation from local media, Sun recommends using the Sun Installation Assistant (SIA) CD. By using the SIA CD, you can install the OS, the appropriate drivers, and additional software on your system by simply booting from the SIA CD. SIA eliminates the need to inventory your system hardware, search out and download Sun-supported drivers, and create a driver CD. For more information on the SIA CD, refer to [Chapter 2](#).

Installing RHEL From Distribution Media

Red Hat Enterprise Linux provides both a text mode and an easy-to-use graphical interface for installing and configuring the operating system. At the boot prompt, you can select the interface that you want to use.

Required Items

Installation from distribution media requires the following items:

- Sun Fire X4540 server equipped with:
 - An internal or external DVD-ROM drive (an internal DVD-ROM drive comes standard with the system)
 - USB keyboard and mouse
 - Monitor
- RHEL media CD set
- Latest Tools and Drivers DVD or ISO image

▼ To Install From Local Media

3. Make a note of the following issues specific to your server:

- The X4540 server requires the LSI MPT disk controller driver update file located on the Tools and Drivers DVD. You may opt to install this driver after the initial installation of RHEL. Check the directory `/linux/drivers/` on your server Tools and Drivers CD for `.rpm` files that relate to the version of Linux you are installing.
- On the Sun X4540 Server, there are four possible boot locations: `/dev/sda` (physical drive slot 0), `/dev/sdb` (physical drive slot 1), `/dev/sdi` (physical drive slot 8) and `/dev/sdj` (physical drive slot 9). These device identifiers are the default with the server configured to boot off of the factory installed SATA storage. If you add additional storage devices (such as a USB storage device), the device identifiers might change depending on which device the operating system looks at first during boot.

4. Turn on the system.

5. Insert the Red Hat Enterprise Linux Distribution CD 1 into the local DVD/CD drive on the Sun Fire X4540 server.

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

6. Do one of the following at the boot prompt, depending on which type of interface you want to use:

- For text mode, type the following command:

```
boot: linux text
```

- For graphical mode, press Enter at the boot prompt.

7. Follow the installation instructions provided with the *Red Hat Enterprise Linux Installation Guide* to complete the installation of the operating system.

Installing RHEL Using the Remote Console Application

This section explains how to install the RHEL operating system on your server using the Integrated Lights Out Manager (ILOM) Remote Console application. For more information see the *Integrated Lights-Out Manager (ILOM) Administration Guide*. Note that there are multiple versions of ILOM, be sure to refer to the guide that matches your server's installed version of ILOM.

▼ To Install RHEL Using the ILOM Remote Console Application

1. Locate your RHEL installation CD/DVD or the equivalent ISO images.

Note – The ILOM Remote Console application can redirect ISO images.

2. Locate the appropriate LSI MPT driver update ISO file from the Tools and Drivers CD.

The X4540 server requires the LSI MPT disk controller driver update file located on the Tools and Drivers DVD. You may opt to install this driver after the initial installation of RHEL. Check the directory `/linux/drivers/` on your server Tools and Drivers CD for `.rpm` files that relate to the version of Linux you are installing.

Note – This driver disk image can be written to a diskette or left as an image file because the Remote Console application can redirect a diskette image. If your hard drive is not displayed during the Red Hat installation process, verify that this driver disk was recognized during Red Hat boot.

3. Connect to the ILOM Service Processor web GUI.

If necessary, refer to the *Integrated Lights-Out Manager (ILOM) Administration Guide* (note that there are multiple versions of ILOM, be sure to refer to the guide that matches your server's installed version of ILOM).

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

5. Click 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 into the remote console CD ROM drive, insert the CD into the drive and select CD-ROM.

-or-

- If you are using an ISO image installed on the remote console, select CD-ROM image and provide the location of the ISO file.

Note – Diskette redirection is also available through the JavaRConsole. See the *Integrated Lights Out Manager (ILOM) Administration Guide* for more details (note that there are multiple versions of ILOM, be sure to refer to the guide that matches your server's installed version of ILOM).

10. Turn on the server using the ILOM web GUI.

11. Set up the BIOS as follows:

- a. Press Ctrl-E to enter 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. Reboot and press Ctrl-P to select CD/DVD as the boot device. When the boot prompt appears, enter:
- ```
linux dd
```
13. When prompted for the driver disk, select Yes.
14. When prompted for the driver disk source, select sda.
15. After the driver is done loading, select No when asked for additional driver.
16. When prompted for testing the CD media before installation, select Skip if you do not want the media test to run.
17. Proceed with Red Hat OS installation, but first take note of the following issues specific to your server:
- The X4540 server requires the LSI MPT disk controller driver update file located on the Tools and Drivers DVD. You may opt to install this driver after the initial installation of RHEL. Check the directory `/linux/drivers/` on your server Tools and Drivers CD for `.rpm` files that relate to the version of Linux you are installing.
  - On the Sun X4540 Server, there are four possible boot locations: `/dev/sda` (physical drive slot 0), `/dev/sdb` (physical drive slot 1), `/dev/sdi` (physical drive slot 8) and `/dev/sdj` (physical drive slot 9). These device identifiers are the default with the server configured to boot off of the factory installed SATA storage. If you add additional storage devices (such as a USB storage device), the device identifiers might change depending on which device the operating system looks at first during boot.

---

# Installing RHEL Using PXE

The onboard network interface card (NIC) in your Sun Fire X4540 server supports the Preboot Execution Environment (PXE) network booting protocol. The system BIOS and network interface BIOS on your server automatically query the network for a DHCP server. If that 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 your system can be used to install a bootable RHEL image on your server.

---

**Note** – PXE is a powerful and convenient solution for setting up a number of Sun Fire X4540 servers so their configuration is identical.

---

## Task Map

To take advantage of RHEL and PXE on your network, you need to perform the following tasks.

| Task                                                                                        | Related Sections                                                                             |
|---------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------|
| Obtain the updated media kit at <a href="http://rhn.redhat.com">http://rhn.redhat.com</a> . | <a href="#">“Obtaining Updated Media Kits” on page 16</a>                                    |
| Set up your Linux network and PXE server.                                                   | <a href="#">“Preconfiguring Your Network to Support PXE Installation of RHEL” on page 24</a> |
| Install RHEL images on that PXE server.                                                     | <a href="#">“Creating a PXE Install Image on the PXE Server” on page 31</a>                  |
| Configure your server to install from a RHEL image on a PXE server.                         | <a href="#">“Installing RHEL From a PXE Server” on page 33</a>                               |
| Update the OS.                                                                              | <a href="#">“Updating the RHEL OS” on page 34</a>                                            |

# Preconfiguring Your Network to Support PXE Installation of RHEL

This section describes how to preconfigure your network running RHEL to support PXE installation of RHEL software on your server. 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.

Preconfiguring your network for PXE installation involves the following procedures:

1. [“To Copy Files From the Tools and Drivers CD” on page 24](#)
2. [“To Configure a DHCP Server” on page 25](#)
3. [“To Install Portmap” on page 26](#)
4. [“To Configure the TFTP Service” on page 27](#)
5. [“To Install and Configure the neopxe Boot Server Daemon” on page 27](#)
6. [“To Configure the NFS Service” on page 29](#)
7. [“To Disable the Firewall” on page 30](#)
8. [“To Complete the PXE Preconfiguration” on page 30](#)

## Required Items

Preconfiguring your network for PXE installation requires the following items:

- RHEL server equipped with:
  - DVD drive
  - USB keyboard
  - Monitor
- RHEL media set
- Tools and Drivers CD for your Sun Fire server. If you do not have access to the Tools and Drivers CD, you can download the latest ISO image at:

<http://www.sun.com/servers/x64/x4540/support.xml>

## ▼ To Copy Files From the Tools and Drivers CD

This section describes how to copy the PXE support files, which are required for PXE configurations, from the Tools and Drivers CD.

---

**Note** – This example uses RHEL 4. If you are installing another version/update of RHEL, replace `rhel4` with the file name that corresponds to your version of RHEL.

---

1. Insert the Tools and Drivers CD into the DHCP/PXE server.
2. Create a temporary directory to copy the PXE support files if `/tmp` does not exist. Enter:

```
mkdir /tmp
```

3. Enter the following commands to copy the files to the `/tmp/` directory:

```
mount /dev/cdrom /mnt/cdrom
```

```
cp /mnt/cdrom/linux/pxe/rhel4-pxefiles.tar.gz /tmp/
```

4. Uncompress and extract the contents of the tar file into the `/tmp/` directory. Enter:

```
cd /tmp
```

```
tar -zxvf rhel4-pxefiles.tar.gz
```

When you extract the file, a directory with all required files is created at `/tmp/rhel4-pxefiles/`.

## ▼ To Configure a DHCP Server

Complete the following steps on the server that will be your 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. Enter:

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

3. If the DHCP server package is not listed, insert the RHEL CD 5 and install the DHCP server. Enter:

```
mount /dev/cdrom /mnt/cdrom
```

```
rpm -Uvh /mnt/cdrom/RedHat/RPMS/dhcp-*.rpm
```

4. Unmount the CD, by entering the following command:

```
umount /mnt/cdrom
```

5. Remove the CD from the server.

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

---

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

---

Enter the following in the DHCP configuration file:

```
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 PXE server's IP address.

---

**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` directory.

---

**7. 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.

**8. Also 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;
}
```

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

**9. Start the DHCP service. Enter:**

```
service dhcpd start
```

**10. Configure the server to always start DHCP. Enter:**

```
chkconfig dhcpd on
```

## ▼ To Install Portmap

Complete the following steps on your DHCP server.

**1. Determine whether the portmap server package is already installed on the server. Enter:**

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

2. If portmap is not listed, insert the RHEL CD 2 and install the portmap service by entering the following commands:

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

3. Unmount the CD, by entering the following command:

```
umount /mnt/cdrom
```

4. Remove the CD from the server.

## ▼ To Configure the TFTP Service

Complete the following steps on your DHCP server.

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

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

2. If the TFTP server package is not listed, insert the RHEL CD 4 and install the TFTP service by entering the following commands:

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

3. Unmount the CD, by entering the following command:

```
umount /mnt/cdrom
```

4. Remove the CD from the server.

5. 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`.

6. Restart the inetd server. Enter:

```
service xinetd restart
```

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

Complete the following steps on your DHCP 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 your DHCP server. Enter:

```
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 entering 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. Enter:

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

4. Configure the PXE Linux image. Enter:

```
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, you can 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. Enter:

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

## ▼ To Configure the NFS Service

Complete the following steps on your DHCP server.

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

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

2. If the NFS service package is not listed, insert the RHEL CD 2 and install the NFS service with the following commands:

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

3. Remove the CD from the server after you enter the following command:

```
umount /mnt/cdrom
```

4. Edit and save the `/etc/exports` file to add the following line to it:  
`/home/pxeboot * (no_root_squash,no_subtree_check,insecure)`

5. Start the NFS service. Enter:

```
service nfs start
```

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

```
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

If you enabled firewall security when you installed RHEL software 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. Enter:

```
service ipchains stop
```

2. Stop the `iptables` service. Enter:

```
service iptables stop
```

3. Stop the `ipchains` service from starting when you restart the server. Enter:

```
chkconfig ipchains off
```

4. Stop the `iptables` service from starting when you restart the server. Enter:

```
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.

---

---

**Note** – 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 enable the firewall after downloading software to PXE clients.

---

## ▼ To Complete the PXE Preconfiguration

When you have completed all the previous configuration steps, do the following.

1. Reboot the PXE/DHCP server.
2. Refer to the next section, [Creating a PXE Install Image on the PXE Server](#).

# Creating a PXE Install Image on the PXE Server

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

## Before You Begin

Before you install a RHEL image on your PXE server, you must configure your Linux network to support PXE images. See [“Preconfiguring Your Network to Support PXE Installation of RHEL” on page 24](#).

## Required Items

The PXE installation procedure requires the following items:

- A CD/DVD drive on the DHCP Server
- RHEL 4.7 or 5.2 media CD set (see [“Obtaining Updated Media Kits” on page 16](#))
- Tools and Drivers CD for your Sun Fire server

## ▼ To Create a RHEL Image on Your PXE Install Server

1. Insert the Tools and Drivers CD into the CD/DVD drive of the DHCP/PXE server.

---

**Note** – The following examples refer to RHEL 4. Replace `rhel4` with the file name that corresponds to your update.

---

2. Enter the following commands to copy the Sun support files from the Tools and Drivers CD to the `/tmp` directory on your DHCP/PXE server:

```
mount /dev/cdrom /mnt/cdrom
cp -a /mnt/cdrom/linux/pxe/rhel4-pxefiles.tar.gz /tmp
cd /tmp
tar -zxvf rhel4-pxefiles.tar.gz
umount /mnt/cdrom
```

3. Set up the directory structure that will hold the RHEL software. Enter:

```
mkdir -p /home/pxeboot/rhel4/
```

4. For each RHEL distribution CD, enter the following commands to copy the contents of the distribution CD to the PXE target subdirectory:

---

**Note** – Eject and insert RHEL CDs only when the CD/DVD drive is unmounted.

---

```
mount /dev/cdrom /mnt/cdrom
cp -r /mnt/cdrom/* /home/pxeboot/rhel4/
umount /mnt/cdrom
```

5. Copy the `vmlinuz` and `initrd.img` files to the appropriate PXE target subdirectory (`/home/pxeboot/rhel4/`).

```
cp /home/pxeboot/rhel4/images/pxeboot/vmlinuz /home/pxeboot/rhel4/
cp /home/pxeboot/rhel4/images/pxeboot/initrd.img /home/pxeboot/rhel4/
```

6. Copy the kickstart file `ks.cfg` to your PXE server. Enter:

```
cp /tmp/rhel4-pxefiles/ks.cfg /home/pxeboot/rhel4/
```

The kickstart configuration file contains a configuration that might not be optimal for your operating environment. Modify the file as necessary to suit your environment.

7. On your PXE server, edit and save the kickstart file, `/home/pxeboot/rhel4/ks.cfg`.

Edit the `nfs` line is as follows:

```
nfs --server n.n.n.n --dir /home/pxeboot/rhel4/
```

Where `n.n.n.n` is the IP address of your PXE server. Ensure that the location indicated after `--dir` is pointing to the top level of your image.

8. Add the following entry to the file `/home/pxeboot/pxelinux.cfg/default`:

---

**Note** – Enter the text block from `append` through `ks.cfg` as one continuous string with no returns.

---

```
default rhel4
label rhel4
kernel rhel4/vmlinuz
append ksdevice=eth0 console=tty0 load_ramdisk=1
initrd=rhel4/initrd.img network
ks=nfs:n.n.n.n:/home/pxeboot/rhel4/ks.cfg
```

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

---

**Note** – For console-based installations, add `console=ttyS0,9600` to the append line.

---

9. **Save the modified version of the** `/home/pxeboot/pxelinux.cfg/default` **file.**

## Installing RHEL From a PXE Server

This procedure describes how to configure your Sun Fire X4540 server to initiate the request to download the boot image file from the PXE/DHCP server and how to install the RHEL boot image onto your Sun Fire X4540 server.

### Before You Begin

Before you configure your server to install RHEL from a PXE server, you need to have done the following:

- Configured your Linux network to support a PXE server. See [“Preconfiguring Your Network to Support PXE Installation of RHEL”](#) on page 24.
- Installed a RHEL image on that Linux PXE server. See [“Creating a PXE Install Image on the PXE Server”](#) on page 31.

### ▼ To Install a RHEL from a PXE Server

To configure your server to install a RHEL image from a PXE server, do the following.

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 Fire X4540 server to which you are installing RHEL software.

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 image when you installed a RHEL image on the PXE server.**

The RHEL install image downloads onto the target Sun Fire X4540 server.

5. To configure the Linux OS for your server, refer to the manual that is shipped with your RHEL media kit.

6. Update the OS files.

See [“Updating the RHEL OS”](#) on page 34.

---

## Updating the RHEL OS

This procedure describes how to update the RHEL OS.

### Before You Begin

Since software is constantly being updated, it is possible that your distribution media might not contain the most up-to-date versions of the OS. This procedure explains how to update a RHEL installation to the latest OS. The following procedure assumes that you have already installed the RHEL software on the Sun Fire X4540 server.

### ▼ To Update the RHEL Software

Follow these steps to update the OS software. These procedures assume that your system has access to the Internet.

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

Refer to the documentation included with your RHEL media kit for details.

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

Select the kernel packages in the `available package updates` section.

---

## Updating the RHEL SCSI Drivers

If you install your RHEL OS with SIA, these drivers are automatically updated. If you install the OS manually, you must update the drivers yourself.

## ▼ To Update the RHEL SCSI Drivers

1. **Insert the Tools and Drivers CD for your Sun Fire™ X4540 server and mount it onto the directory /mnt.**

2. **Enter the following commands:**

For RHEL 4:

```
cd /mnt/linux/drivers
rpm -ivh mptlinux-redhat4.0-3.13.04.00-2.i686.rpm
```

For RHEL 5.1:

```
cd /mnt/linux/drivers
rpm -ivh mptlinux-4.00.22.00-1-rhel5.x86_64.rpm
```

For RHEL 5.2:

```
cd /mnt/linux/drivers
rpm -ivh mptlinux-4.00.41.00-1-rhel5.x86_64.rpm
```

3. **Installation of the new drivers is now complete. Reboot the server for the changes to take effect.**





# Installing SUSE Linux Enterprise Server (SLES) 10

---

This chapter contains information about installing SUSE Linux Enterprise Server 10 (SLES 10 SP2 64-bit). It contains the following sections:

- [“About SUSE Linux Enterprise Server 10 Installation” on page 38](#)
- [“Installing SLES Using SIA” on page 40](#)
- [“Preparing to Install SLES” on page 39](#)
- [“Installing SLES 10 From Distribution Media” on page 40](#)
- [“Installing the SLES 10 OS Using the Remote Console Application” on page 41](#)
- [“Installing SLES Using PXE” on page 44](#)
- [“Updating the SLES 10 OS” on page 53](#)

---

# About SUSE Linux Enterprise Server 10 Installation

This section describes the various requirements and methods for installing SLES 10 SP2 64-bit on your Sun Fire X4540 server.

## Task Map for SLES 10 Installation

Consult the following table to determine which procedures are relevant to the installation tasks that you need to perform.

| Installation Task (Goal)                                                                                                  | Relevant Procedures or Sources                                                              |
|---------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------|
| Collect information about your system and network.                                                                        | <a href="#">“SUSE Linux Installation and Configuration Documentation” on page 38</a>        |
| Download the latest software.                                                                                             | <a href="#">“Preparing to Install SLES” on page 39</a>                                      |
| If you are installing the OS on a Compact Flash card, set the boot priority to make your CF card the primary boot device. | <a href="#">“Installing and Booting an OS on Compact Flash” on page 39</a>                  |
| Install SLES 10 using the Sun Installation Assistant.<br>--or--                                                           | <a href="#">“Installing SLES Using SIA” on page 40.</a>                                     |
| Install SLES 10 from a local CD/DVD drive,<br>--or--                                                                      | <a href="#">“Installing SLES 10 From Distribution Media” on page 40.</a>                    |
| Install SLES 10 from a remote CD/DVD drive,<br>--or--                                                                     | <a href="#">“Installing the SLES 10 OS Using the Remote Console Application” on page 41</a> |
| Install SLES 10 from an image stored on a networked PXE server.                                                           | <a href="#">“Installing SLES Using PXE” on page 44</a>                                      |
| Update SLE10 software.                                                                                                    | <a href="#">“Updating the SLES 10 OS” on page 53</a>                                        |

## SUSE Linux Installation and Configuration Documentation

You can find information about installing SUSE Linux on your server from the following locations:

- README file—the README file on your SLES 10 CD 1 contains late-breaking information about system requirements and system configuration.
- The Release Notes for SLES 10 are available on the first installation CD, under the `docu` directory.
- *SUSE Linux Enterprise Server 10 Start-Up Guide*—This short manual provides a quick introduction to the installation. It is available on the first installation CD under the `docu` directory, as the file `startup.pdf` under the appropriate language directory.
- *SUSE Linux Enterprise Server 10 Installation and Administration Guide*—This manual provides detailed information about planning, deployment, configuration and administration of SLES 10. It is available on the first installation CD under the `docu` directory as the file `sles-admin.pdf` under the appropriate language directory.
- SLES 10 Support Sites—Novell provides considerable technical information about the SUSE Linux Enterprise Server OS at its product and support web sites. For support information, see the SLES 10 Home Page at:  
<http://www.novell.com/products/server/>

---

## Preparing to Install SLES

Before installing SLES, ensure that you have all you need to perform the installation.

### Obtaining the Latest Tools and Drivers DVD Image

The Tools and Drivers DVD for your Sun server contains important drivers that are required for your Linux installation (for example, video, chipset and the server's LSI MPT disk controller). The latest ISO image of the Tools and Drivers DVD for your Sun Fire server can be downloaded at:

<http://www.sun.com/servers/x64/x4540/support.xml>

### Installing and Booting an OS on Compact Flash

Your Sun server can be equipped with an internal Compact Flash (CF) card, on which you can install supported Linux or Solaris operating systems. Due to the limited size of the CF card, a full installation might not be possible, and some

installation modes and functions, such as LVM and swap, are not recommended. A discussion of the advantages and disadvantages of booting from CF and CF card optimization procedures are available in [“Installing and Booting an OS on Compact Flash” on page 77](#).

Before installing the OS on a Compact Flash card you must identify and configure it as your system’s primary boot device. The primary boot device is the device upon which you install and boot the OS. You can install the OS on, and boot from, an internal HDD, an external HDD (for example, a hard disk in a storage enclosure), or the internal CF card.

The server’s boot device priority is set through the server’s BIOS setup program. During the boot process, press the F2 key when prompted and navigate to the Boot Device Priority screen to set the internal CF card as the primary boot device.

---

## Installing SLES Using SIA

To perform a basic installation from local media, Sun recommends using the Sun Installation Assistant (SIA) CD. By using the SIA CD, you can install the OS, the appropriate drivers, and additional software on your system by simply booting from the SIA CD. SIA eliminates the need to inventory your system hardware, search out and download Sun-supported drivers, and create a driver CD. For more information on the SIA CD, refer to [Chapter 2](#).

---

## Installing SLES 10 From Distribution Media

SLES 10 provides an easy-to-use graphical interface for installing and configuring the OS. Whether you are using distribution CDs to install SUSE Linux 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 Fire X4540 server equipped with internal DVD-ROM drive. An external CD/DVD drive can also be used.
  - USB keyboard and mouse
  - Monitor

- SLES 10 media base CD/DVD set.
- Latest Tools and Drivers DVD or ISO image for your Sun Fire server

## ▼ To Install SLES 10 From Distribution Media

### 1. Make a note of the following issues specific to your server:

- The X4540 server requires the LSI MPT disk controller driver update file located on the Tools and Drivers DVD. You may opt to install this driver after the initial installation of SLES. Check the directory `/linux/drivers/` on your server Tools and Drivers CD for rpm files that relate to the version of Linux you are installing.
- On the Sun X4540 Server, there are four possible boot locations: `/dev/sda` (physical drive slot 0), `/dev/sdb` (physical drive slot 1), `/dev/sdi` (physical drive slot 8) and `/dev/sdj` (physical drive slot 9). These device identifiers are the default with the server configured to boot off of the factory installed SATA storage. If you add additional storage devices (such as a USB storage device), the device identifiers might change depending on which device the operating system looks at first during boot.

### 2. Power on the system.

### 3. Press F8 and select CD-ROM when prompted.

### 4. Insert the SLES 10 CD 1 (or DVD) into your local CD/DVD drive.

### 5. Follow the installation instructions provided with the SLES 10 Installation Guide to complete the installation of the operating system.

---

## Installing the SLES 10 OS Using the Remote Console Application

This section explains how to install the SLES 10 OS on your server using the Integrated Lights Out Manager (ILOM) Remote Console application. For more information see the *Integrated Lights-Out Manager (ILOM) Administration Guide*. Note that there are multiple versions of ILOM, be sure to refer to the guide that matches your server's installed version of ILOM.

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

1. Locate your SLES 10 installation CD/DVD or the equivalent ISO images.
2. Connect to the ILOM Service Processor web GUI.
3. Click the Remote Control tab, then the Mouse Mode Settings tab.
4. If necessary, change the mouse mode to Relative Mouse Mode.

See the “Remote Console Application” section of the *Integrated Lights Out Manager (ILOM)* documentation for further instructions. (Note that there are multiple versions of ILOM, be sure to refer to the guide that matches your server’s installed version of ILOM.)

5. Click 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 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.

---

**Note** – Diskette redirection is also available through the JavaRConsole. See the *Integrated Lights Out Manager (ILOM)* documentation for more details. (Note that there are multiple versions of ILOM, be sure to refer to the guide that matches your server’s installed version of ILOM.)

---

10. Turn on the server using the ILOM web GUI.
11. Set up the BIOS as follows:
  - a. Press Ctrl-E to enter 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 installation menu appears, use arrow keys to select Installation and press ENTER.
  13. Proceed with SLES 10 installation as usual, first taking note of the following issues specific to your server:
    - The Sun Fire X4540 server requires the LSI MPT disk controller driver update file located on the Tools and Drivers DVD. You may opt to install this driver after the initial installation of SLES. Check the directory `/linux/drivers/` on your server Tools and Drivers CD for rpm files that relate to the version of Linux you are installing.
    - On the Sun Fire X4540 Server, there are four possible boot locations: `/dev/sda` (physical drive slot 0), `/dev/sdb` (physical drive slot 1), `/dev/sdi` (physical drive slot 8) and `/dev/sdj` (physical drive slot 9). These device identifiers are the default with the server configured to boot off of the factory installed SATA storage. If you add additional storage devices (such as a USB storage device), the device identifiers might change depending on which device the operating system looks at first during boot. For an example of default disk mapping for your server, see Chapter 7, [“Examples Using the `cfgdisk` Command” on page 71.](#)

---

# Installing SLES Using PXE

The onboard network interface card (NIC) in your Sun Fire X4540 server supports the Preboot Execution Environment (PXE) network booting protocol. The system BIOS and network interface BIOS on your server automatically query the network for a DHCP server. If that 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 your system can be used to install a bootable SLES image on your server.

---

**Note** – PXE is a powerful and convenient solution for setting up a number of Sun Fire X4540 servers so their configuration is identical.

---

## Preconfiguring Your Network to Support PXE Installation of SLES

These procedures describe how to preconfigure your network running SLES 10 software to support PXE installation of SUSE Linux software on your Sun Fire X4540 server. These procedures assume that you already have a bootable server that is running a version of the SLES 10 operating system.

Preconfiguring your network for PXE installation involves the following procedures:

1. [“To Copy Files From the Tools and Drivers CD” on page 45](#)
2. [“To Configure a DHCP Server” on page 45](#)
3. [“To Install Portmap” on page 47](#)
4. [“To Configure the TFTP Service” on page 47](#)
5. [“To Install and Configure the neopxe Boot Server Daemon” on page 47](#)
6. [“To Configure the NFS Service” on page 49](#)
7. [“To Disable the Firewall” on page 50](#)
8. [“To Complete the PXE Preconfiguration” on page 50](#)



## 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 set
- Latest Tools and Drivers DVD for your Sun Fire server

## ▼ To Copy Files From the Tools and Drivers CD

1. Log in as the superuser.

2. Insert the Tools and Drivers CD into the DHCP/PXE server.

You can also download the driver RPMs from the Sun Fire X4540 web site. The downloads links are at

<http://www.sun.com/servers/x64/x4540/support.xml>

3. Create a temporary directory to copy the PXE support files to. Enter the following command:

```
mkdir /tmp
```

4. Enter the following commands to copy the files to the `/tmp/` directory:

```
mount /dev/cdrom /mnt/cdrom
cp -a /mnt/cdrom/linux/pxe/sles10-pxefiles.tar.gz /tmp/
```

5. Uncompress and extract the contents of the tar file into the `/tmp/` directory. Enter the following command:

```
tar -zxvf /tmp/sles10-pxefiles.tar.gz
```

When you extract the file, a directory with all required files is created at `/tmp/sles10-pxefiles/`.

6. Unmount the CD/DVD by entering the following command:

```
umount /mnt/cdrom
```

7. Remove the Tools and Drivers CD from the server.

## ▼ To Configure a 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. Enter the following command:

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

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

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

4. Set up your 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. Edit the `/etc/dhcpd.conf` file

---

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. Also 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;
}
```

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

7. Edit the `/etc/sysconfig/dhcpd` file and verify that the `DHCPD_INTERFACE` is set to the interface that is connected to the network you are planning to run the PXE server.

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

```
DHCPD_INTERFACE="eth0"
```

8. Start the DHCP service. Enter the following command:

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

9. Configure the server to always start DHCP. Enter the following command:

```
chkconfig dhcpd on
```

## ▼ To Install Portmap

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

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

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

```
yast -i portmap
```

## ▼ To Configure the TFTP Service

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

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

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

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

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

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

1. If a compiler is not installed on the DHCP 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. Enter the following commands:

```
cd /tmp/sles10-pxefiles/neopxe-0.2.0
./configure
make
make install
```

3. 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
```

4. Copy the PXE Linux image from the /tmp/ directory. Enter the following commands:

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

5. Configure the PXE Linux image. Enter the following commands:

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

6. 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.

---

7. Start the `neopxe` daemon. Enter the following command:

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

## ▼ To Configure the NFS Service

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

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

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

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

5. Configure the server to always start the NFS service. Enter 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.

---

## ▼ To Disable 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 software to PXE clients.

---

1. Execute the YaST command. Enter 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 those only.

## ▼ To Complete the PXE Preconfiguration

When you have completed all the previous configuration steps, do the following.

- **Reboot the PXE/DHCP server.**

Proceed to the next section, [Creating a SLES 10 PXE Install Image on the PXE Server](#).

# Creating a SLES 10 PXE Install Image on the PXE Server

To transfer the SLES 10 PXE files for installation you must:

- Create a SLES 10 image on your PXE server
- Set up and copy SLES 10 software to a directory
- Set up the PXE files

You are then ready to install SLES 10 from your PXE server.

## ▼ To Create a SLES 10 Image on Your PXE Server

1. Insert the Tools and Drivers CD into the CD/DVD drive.
2. Copy the PXE support files from the Tools and Drivers CD into the `/tmp` directory by entering the following commands:

```
mount /dev/cdrom /mnt/cdrom
cp -a /mnt/cdrom/linux/pxe/sles10-pxefiles.tar.gz /tmp
cd /tmp
tar xzf sles10-pxefiles.tar.gz
umount /mnt/cdrom
```

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

The following steps explain how to create the directory setup containing SLES 10 files for PXE installation.

---

**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. Enter:  

```
mkdir -p /home/pxeboot/sles10/CD{1,2,3,4}
```
2. Insert SLES 10 CD 1 into your server and copy its content to your PXE server. Enter:  

```
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/
```

## ▼ To Set Up PXE Files

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

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

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

---

**Note** – Enter 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 the PXE server.

## Installing SLES 10 From a PXE Server

This procedure describes the final step of installing the SLES 10 boot image onto your Sun Fire X4540 server.

### Before You Begin

Before you configure your server to install SUSE Linux from a PXE server, you need to have:



- Configured your Linux network to support a PXE server. See [“Preconfiguring Your Network to Support PXE Installation of SLES”](#) on page 44.
- Installed a SLES 10 image on that Linux PXE server. See [“Creating a SLES 10 PXE Install Image on the PXE Server”](#) on page 51.

## ▼ To Install SLES 10 From a PXE Server

1. Connect the PXE client to the same network as the PXE server.
2. Power on the PXE client and press F12 to select network boot.
3. When you are prompted at the boot: prompt, enter in the label you gave the image when you install 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 operating system files.

---

## Updating the SLES 10 OS

The OS installation media shipped with your distribution of SLES 10 software might not contain the most up-to-date versions of the SUSE software. It is possible that there have been updates to the SLES 10 software. This procedure describes how to update the SUSE OS software on your Sun Fire server after you have installed it from a PXE server or from distribution CDs.

## ▼ To Update Your SLES 10 OS

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

```
you
```

---

**Note** – 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 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. Select the **Software** tab on the left, then select **Novell Customer Center Configuration** and follow the directions.

You will need your Novell Customer Center username and password, as well as a SLES 10 product activation code.

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

## ▼ To Update the SLES SCSI Drivers:

1. Insert the Tools and Drivers CD your Sun Fire™ X4100/X4100M2 or X4200/X4200M2 server

2. Mount it onto the directory `/mnt`

```
mount /dev/cdrom /mnt
```

3. Enter the following commands:

For SLES 10 SP1, 64-bit

```
cd /mnt/linux/drivers
rpm -ivh mptlinux-4.00.22.00-1-sles10.x86_64.rpm:
```

For SLES 10 SP2, 64-bit

```
cd /mnt/linux/drivers
rpm -ivh mptlinux-4.00.41.00-1-sles10.x86_64.rpm:
```

4. Installation of the new drivers is now complete. Reboot the server for the changes to take effect.

# Disk Control and Monitor Utility (DCMU) for RHEL

---

This chapter describes how to use the Disk Control and Monitor Utility (DCMU) on a Red Hat Enterprise Linux (RHEL4.7 or 5.2) 64-bit operating system. It includes the following sections:

- [“Overview of the DCMU for RHEL” on page 55](#)
- [“DCMU Installation Procedure” on page 56](#)
- [“cfgdisk Command” on page 58](#)
- [“Examples Using the cfgdisk Command” on page 58](#)
- [“faultmond” on page 62](#)
- [“Examples Using the faultmond Command” on page 62](#)
- [“hotplugmon” on page 64](#)
- [“Viewing System and Service Processor Logs Using IPMItool” on page 64](#)

---

## Overview of the DCMU for RHEL

The Disk Control and Monitor Utility (DCMU) controls and monitors all 48-disk drives on the Sun Fire X4540 server and provides the following features:

- Monitors disk drive status and hot plug events.
- Reports disk drive failures, Field Replaceable Units (FRU) information, and hotplug events to the host’s service processor (SP).

- Controls connect/disconnect events and logs these events in syslog and, more importantly, in the service processor logs (SDR, FRU, SEL).

You may access these logs individually for specific information to aid in the administration or troubleshooting of the disk array. DCMU for RHEL consist of three components. Each component updates the FRU, SDR (Sensor Data Record), SEL (System Event Log) and service processor logs:

- `cfgdisk`
- `hotplugmon`
- `faultmond`

IPMItool is an additional command line component that may be used as a supplement to DCMU to access service processor sensor data, read the SEL and FRU information, and perform chassis power control operations via the server's Service Processor.

---

## DCMU Installation Procedure

To use Disk Control and Monitor Utility (DCMU), you must install the application. To install the application, you should perform the following steps:

### Installing DCMU

The installation of DCMU consists of one step because the package is in rpm format.

- For RHEL 4.7: `dcmu_rhel4-1.2-0.x86_64.rpm`
- For RHEL 5.2: `dcmu_rhel5-1.2-0.x86_64.rpm`

### ▼ To Install DCMU

- Enter the following command:

```
rpm -i dcmu-rhel4-1.2-0.x86_64.rpm
--or--
rpm -i dcmu-rhel5-1.2-0.x86_64.rpm
```

The following files are installed as components of the DCMU installation:

- `faultmond`, `cfgdisk`, and `hotplugmon` binary files to `/usr/bin` directory.
- `faultmond` startup script file to `/etc/rc.d/init.d`

- `cfgdisk.1.gz`, `faultmond.1.gz`, and `hotplugmon.1.gz` man page files to `/usr/share/man/man1`.

## IPMI Service Must Be Running to Use DCMU Utilities

The initial installation of the DCMU components prepares the system for running the DCMU utilities described in this chapter. However, since the DCMU utilities also require that the IPMI service is running, you have two options before you can start using the DCMU utilities: manually start the IPMI service, or reboot the server, which will automatically start `faultmond` and IPMI.

If rebooting the server after the initial DCMU installation is not possible, and you wish to run DCMU utilities, you must first start the IPMI service by entering the following command:

```
service ipmi start
```

---

**Note** – After the initial installation of DCMU, rebooting the server will start both IPMI and `faultmond`.

---

## Uninstalling DCMU

If you need to uninstall DCMU, perform the following procedure.

### ▼ To Uninstall DCMU

- Enter the following command:

```
rpm -e dcmu_rhel4-1.2-0
--or--
rpm -e dcmu-rhel5-1.2-0
```

---

# cfgdisk Command

The `cfgdisk` command is a command-line utility and that queries and provides status of all 48-disk drives located in the Sun Fire X4540 server. The `cfgdisk` command also allows you to connect and disconnect disk drives from the OS while also allowing you to monitor disks connected to the server.

## cfgdisk Command Options

Use the `cfgdisk` command to connect and disconnect disk drives and determine disk drive status by using the parameters shown in [TABLE 6-1](#). The following options are supported:

**TABLE 6-1** `cfgdisk` Command Options

| Option | Description                            |
|--------|----------------------------------------|
| -h     | Displays help information              |
| -v     | Displays utility version information   |
| -o     | Connects and disconnects disk drive(s) |
| -d     | Displays disk drive information        |

---

## Examples Using the cfgdisk Command

This section contains examples of common `cfgdisk` commands. For more information and options, refer to the `cfgdisk` man page.

### Displaying Disks, Device Nodes, Slots, and Status

The following command displays a map of all disk drives:

```
cfgdisk
```

Here is an example of `cfgdisk` command output listing physical slot number, logical name, and status information.

| Device  | Slot Number | Device Node | Status    |
|---------|-------------|-------------|-----------|
| sata0/0 | 0           | /dev/sda    | Connected |
| sata0/1 | 1           | /dev/sdb    | Connected |
| sata0/2 | 2           | /dev/sdc    | Connected |
| sata0/3 | 3           | /dev/sdd    | Connected |
| sata0/4 | 4           | /dev/sde    | Connected |
| sata0/5 | 5           | /dev/sdf    | Connected |
| sata0/6 | 6           | /dev/sdg    | Connected |
| sata0/7 | 7           | /dev/sdh    | Connected |
| sata1/0 | 8           | /dev/sdi    | Connected |
| sata1/1 | 9           | /dev/sdj    | Connected |
| sata1/2 | 10          | /dev/sdk    | Connected |
| sata1/3 | 11          | /dev/sdl    | Connected |
| sata1/4 | 12          | /dev/sdm    | Connected |
| sata1/5 | 13          | /dev/sdn    | Connected |
| sata1/6 | 14          | /dev/sdo    | Connected |
| sata1/7 | 15          | /dev/sdp    | Connected |
| sata2/0 | 16          | /dev/sdq    | Connected |
| sata2/1 | 17          | /dev/sdr    | Connected |
| sata2/2 | 18          | /dev/sds    | Connected |
| sata2/3 | 19          | /dev/sdt    | Connected |
| sata2/4 | 20          | /dev/sdu    | Connected |
| sata2/5 | 21          | /dev/sdv    | Connected |
| sata2/6 | 22          | /dev/sdw    | Connected |
| sata2/7 | 23          | /dev/sdx    | Connected |
| sata3/0 | 24          | /dev/sdy    | Connected |
| sata3/1 | 25          | /dev/sdz    | Connected |
| sata3/2 | 26          | /dev/sdaa   | Connected |
| sata3/3 | 27          | /dev/sdab   | Connected |

---

---

|         |    |           |                             |
|---------|----|-----------|-----------------------------|
| sata3/4 | 28 |           | Disconnected or not present |
| sata3/5 | 29 |           | Disconnected or not present |
| sata3/6 | 30 |           | Disconnected or not present |
| sata3/7 | 31 | /dev/sdaf | Connected                   |
| sata4/0 | 32 |           | Disconnected or not present |
| sata4/1 | 33 | /dev/sdah | Connected                   |
| sata4/2 | 34 |           | Disconnected or not present |
| sata4/3 | 35 | /dev/sdaj | Connected                   |
| sata4/4 | 36 | /dev/sdak | Connected                   |
| sata4/5 | 37 | /dev/sdal | Connected                   |
| sata4/6 | 38 | /dev/sdam | Connected                   |
| sata4/7 | 39 |           | Disconnected or not present |
| sata5/0 | 40 |           | Disconnected or not present |
| sata5/1 | 41 |           | Disconnected or not present |
| sata5/2 | 42 | /dev/sdaq | Connected                   |
| sata5/3 | 43 |           | Disconnected or not present |
| sata5/4 | 44 |           | Disconnected or not present |
| sata5/5 | 45 |           | Disconnected or not present |
| sata5/6 | 46 |           | Disconnected or not present |
| sata5/7 | 47 |           | Disconnected or not present |

---

## Disconnecting a Disk Using `cfgdisk`

Use the `cfgdisk` command to disconnect a disk before performing the hot plug event of physically removing it. The following command shows an example of how to use `cfgdisk` to **disconnect** a disk drive.

```
cfgdisk -o disconnect -d sata5/1
```

The command returns the following prompts. Enter Y at both to disconnect the disk:

```
Are you sure (y/n)? y
Are you sure sata5/1 device is not in use(y/n)? y
Device sata5/1 has been successfully disconnected.
```



## Connecting a Disk Using `cfgdisk`

After performing the hot plug event of physically adding a disk into the system, use the `cfgdisk` command to connect it. The following command shows an example of how to use `cfgdisk` to **connect** a disk drive.

```
cfgdisk -o connect -d sata5/1
```

The command returns the following:

```
Command has been issued to connect sata5/1 device, it may take a few
seconds to connect sata5/1, check status by re-running cfgdisk
command.
```

## Displaying `cfgdisk` Help Information

The following command shows how to use the `cfgdisk` command to display help information:

```
cfgdisk - h
```

---

## `faultmond`

A component of DCMU, `faultmond` is a daemon which is started at boot time. It scans all disk at polling intervals, and then reports FRU, SDR, and SEL information to the service processor.

## `faultmond` Command Options

The command line parameters shown in [TABLE 6-2](#) are available for `faultmond`:

**TABLE 6-2** `faultmond` Command Options

| Option | Description                                        |
|--------|----------------------------------------------------|
| -h     | Displays help information                          |
| -t     | Displays polling interval information (in minutes) |
| -V     | Displays version information                       |
| -D     | Runs as a non-daemon process                       |

---

## Examples Using the `faultmond` Command

This section contains examples of common `faultmond` commands. For more information, refer to the `faultmond` man page.

The following command shows the use of `faultmond`.

```
faultmond -h
```

The command, for example, returns the following:

```
faultmond version 1.0:
```

## Starting faultmond From the Command Line

To start faultmond, enter the following command:

```
service faultmond start
```

## Stopping faultmond From the Command Line

To stop faultmond, enter the following command:

```
service faultmond stop
```

## Setting the Polling Interval From the Command Line

To set the polling interval with faultmond, do the following:

1. **Stop faultmond from the command line.**

```
service faultmond stop
```

2. **Set the polling interval. For example, to set the polling interval to be 1 minute, you would enter:**

```
faultmond -t 1
```

3. **Check the polling interval.**

```
ps -ef | grep faultmond
```

The output would look like the following:

```
ps -ef |grep faultmond
root 15357 1 5 15:49 ? 00:00:00 faultmond -t 1
root 15364 15307 0 15:50 pts/4 00:00:00 grep faultmond
```

---

## hotplugmon

A component of DCMU, hotplugmon is not a command line utility. It monitors hotplug events and then reports them to service processor.

---

**Note** – Activation of hotplugmon can only be done using faultmond from the command line or during boot time. To stop or start faultmond and hotplugmon manually, you should use the `faultmond service` commands.

---

---

## Viewing System and Service Processor Logs Using IPMItool

This section describes how to view individual log file information from the command line.

### Obtaining and Installing the IPMItool

The IPMItool is a command line utility that reads the sensor data repository (SDR) and displays sensor values, System Event Log (SEL), Field Replaceable Unit (FRU) inventory information, gets and sets LAN configuration parameters, and performs chassis power control operations via the server's Service Processor.

For your convenience, this tool is available as an installable rpm (x86 64-bit or i386 32-bit versions) on your server's Tools and Drivers CD, or as a downloadable package from the Sun software download site:

<http://www.sun.com/servers/x64/x4540/downloads.jsp>

For information about using the IPMItool, refer to your *Sun Integrated Lights Out Manager 2.0 User's Guide* (820-1188)

## Viewing the SDR log

The following commands show how view the SDR log file, either at the server:

```
ipmitool -I open sdr elist
```

or over the network:

```
ipmitool -I lan -H SP-IP -U root -P SP-password sdr elist
```

Where *SP-IP* represents the IP address of the service processor and *SP-password* represents the password for the service processor.

## Viewing the FRU log

The following commands show how view the FRU log file, either at the server:

```
ipmitool -I open fru
```

or over the network:

```
ipmitool -I lan -H SP-IP -U root -P SP-password fru
```

Where *SP-IP* represents the IP address of the service processor and *SP-password* represents the password for the service processor.

---

**Note** – When viewing the FRU log of a server running Linux, hard disk drive FRU information stored in the Service Processor FRU log may display a `Product Name` attribute. This attribute is meaningless, and should be ignored. Here's an example of what you might see when viewing logged FRU data (via the `ipmitool` command or the server's management tool) if this erroneous attribute were present:

```
FRU Device Description : hdd40.fru (ID 58)
Product Manufacturer : HITACHI
Product Name : 232VDDF12872G-40 <--ignore this line
Product Part Number : HDS7225SBSUN250G
Product Version : V440A81A
Product Serial : VDK41BT4CAD0GE
```

---

## Viewing the SEL log

The following commands show how view the SEL log file, either at the server:

```
ipmitool -I open sel elist
```

or over the network:

```
ipmitool -I lan -H SP-IP -U root -P SP-password sel elist
```

Where *SP-IP* represents the IP address of the service processor and *SP-password* represents the password for the service processor.

## Viewing the System log

All events and error information from DCMU are logged in syslog (*default: /var/log/messages*). These include hard drive hotplug events, drive disconnect and connect events, and drive fault polling events.

## Disk Control and Monitor Utility (DCMU) for SLES 10

---

This chapter describes how to use the Disk Control and Monitor Utility (DCMU) on a SUSE Linux Enterprise Server 10 (SLES 10 SP2) 64-bit operating system. It includes the following sections:

- [“Overview of the DCMU for SLES 10” on page 67](#)
- [“DCMU Installation Procedure” on page 68](#)
- [“diskmond Command” on page 69](#)
- [“cfgdisk Command” on page 71](#)
- [“Examples Using the cfgdisk Command” on page 71](#)
- [“Viewing System and Service Processor Logs Using IPMItool” on page 74](#)

---

## Overview of the DCMU for SLES 10

The Disk Control and Monitor Utility (DCMU) controls and monitors all 48-disk drives on the Sun Fire X4540 server and provides the following features:

- Monitors disk drive status, hotplug events, and disk drive faults.
- Reports disk drive failures, Field Replaceable Units (FRU) information, and hotplug events to the service processor (SP).

You may access these logs individually for specific information to aid in the administration or troubleshooting of the disk array. DCMU for SLES consist of two components. Each component updates the FRU, SDR (Sensor Data Record), SEL (System Event Log) and service processor logs:

- `cfgdisk`
- `diskmond`

IPMItool is an additional command line component that may be used as a supplement to DCMU to access service processor sensor data, read the SEL and FRU information, and perform chassis power control operations via the server's Service Processor.

---

## DCMU Installation Procedure

To use Disk Control and Monitor Utility (DCMU), you must install the application. To install the application, you should perform the following steps:

### Installing DCMU

The installation of DCMU consists of one step because the package is in rpm format.

- `dcmu_sles10-1.2-0.x86_64.rpm`

### ▼ To Install DCMU

- Enter the following command:

```
rpm -i dcmu_sles10-1.2-0.x86_64.rpm
```

The following files are installed as components of the DCMU installation:

- `diskmond` and `cfgdisk` binary files to `/usr/bin` directory.
- `diskmond` startup script file to `/etc/rc.d/init.d` directory.
- `cfgdisk.1.gz` and `diskmond.1.gz` man page files to `/usr/share/man/man1` directory.

## IPMI Service Must Be Running to Use DCMU

The initial installation of the DCMU components prepares the system for running the DCMU utilities described in this chapter. However, since DCMU also requires that the IPMI service is running, you have two options before you can start using DCMU: manually start the IPMI service, or reboot the server, which will automatically start `diskmond` and IPMI.

If rebooting the server after the initial DCMU installation is not possible, and you wish to run DCMU, you must first start the IPMI service by entering the following command:



```
service ipmi start
```

---

**Note** – After the initial installation of DCMU, rebooting the server will start both IPMI and diskmond.

---

## Uninstalling DCMU

To uninstall DCMU, perform the following procedure.

### ▼ To uninstall DCMU

- Enter the following command:

```
rpm -e dcmu_sles10-1.2-0
```

---

## diskmond Command

The Disk Control and Monitor Utility (DCMU) for SLES 10 has one primary utility called `diskmond`. The `diskmond` command is started at boot time with default polling interval of 60 minutes. It updates the FRU (Field Replacable Units), SDR (Sensor Data Record), SEL (System Event Log) and service processor logs.

The `diskmond` command spawns one thread to monitor hot plug event, another thread to monitor pending drive failure and reports both of these events to the service processor (SP). Diskmond performs the following functions:

- Scans all disk at polling intervals, and then reports FRU, SDR, and SEL information to the service processor.
- Monitors hotplug events and then reports them to service processor.

## diskmond Command Options

Use the `diskmond` command to connect, disconnect, and determine disk drive status by using the parameters shown in [TABLE 7-1](#). The following options are supported for the functions shown:

**TABLE 7-1** `diskmond` Command Options

| Option            | Description                                                       |
|-------------------|-------------------------------------------------------------------|
| -h                | Displays help information                                         |
| -V                | Displays utility version information                              |
| -D                | Displays disk drive information                                   |
| -t <i>minutes</i> | Displays polling interval information (in minutes) in the syslog. |

---

## Examples Using the `diskmond` Command

This section contains examples of common `diskmond` commands issued from the command line. For more information and options, refer to the `diskmond` man page.

### Starting `diskmond` From the Command Line

To start `diskmon`, enter the following command:

```
service diskmond start
```

### Stopping `diskmond` From the Command Line

To stop `diskmon`, enter the following command:

```
service diskmond stop
```

# Finding the status of diskmond From the Command-line

To obtain status from diskmon, enter the following command:

```
service diskmond status
```

## cfgdisk Command

The `cfgdisk` command queries and provides status of all 48-disk drives located in the Sun Fire X4540 server. The `cfgdisk` command also allows you to connect and disconnect disk drives from the OS while also allowing you to monitor disks connected to the server.

Use the `cfgdisk` command to connect, disconnect, and determine disk drive status. The command line options shown in [TABLE 7-2](#) are supported:

**TABLE 7-2**    `cfgdisk` Command Options

| Option | Description                            |
|--------|----------------------------------------|
| -h     | Displays help information              |
| -V     | Displays utility version information   |
| -o     | Connects and disconnects disk drive(s) |
| -d     | Displays disk drive information        |

## Examples Using the cfgdisk Command

This section contains examples of common `cfgdisk` commands issued from the command line. For more information and options, refer to the `cfgdisk` man page.

### Displaying Disk, Device Nodes, Slots and Status

The following command displays a map of all disk drives:

```
cfgdisk
```

Here is an example of `cfgdisk` command output listing physical slot number, logical name, and status information:

| Device  | Slot Number | Device Node | Status    |
|---------|-------------|-------------|-----------|
| sata0/0 | 0           | /dev/sda    | Connected |
| sata0/1 | 1           | /dev/sdb    | Connected |
| sata0/2 | 2           | /dev/sdc    | Connected |
| sata0/3 | 3           | /dev/sdd    | Connected |
| sata0/4 | 4           | /dev/sde    | Connected |
| sata0/5 | 5           | /dev/sdf    | Connected |
| sata0/6 | 6           | /dev/sdg    | Connected |
| sata0/7 | 7           | /dev/sdh    | Connected |
| sata1/0 | 8           | /dev/sdi    | Connected |
| sata1/1 | 9           | /dev/sdj    | Connected |
| sata1/2 | 10          | /dev/sdk    | Connected |
| sata1/3 | 11          | /dev/sdl    | Connected |
| sata1/4 | 12          | /dev/sdm    | Connected |
| sata1/5 | 13          | /dev/sdn    | Connected |
| sata1/6 | 14          | /dev/sdo    | Connected |
| sata1/7 | 15          | /dev/sdp    | Connected |
| sata2/0 | 16          | /dev/sdq    | Connected |
| sata2/1 | 17          | /dev/sdr    | Connected |
| sata2/2 | 18          | /dev/sds    | Connected |
| sata2/3 | 19          | /dev/sdt    | Connected |
| sata2/4 | 20          | /dev/sdu    | Connected |
| sata2/5 | 21          | /dev/sdv    | Connected |
| sata2/6 | 22          | /dev/sdw    | Connected |
| sata2/7 | 23          | /dev/sdx    | Connected |
| sata3/0 | 24          | /dev/sdy    | Connected |
| sata3/1 | 25          | /dev/sdz    | Connected |
| sata3/2 | 26          | /dev/sdaa   | Connected |
| sata3/3 | 27          | /dev/sdab   | Connected |

|         |    |           |                             |
|---------|----|-----------|-----------------------------|
| sata3/4 | 28 |           | Disconnected or not present |
| sata3/5 | 29 |           | Disconnected or not present |
| sata3/6 | 30 |           | Disconnected or not present |
| sata3/7 | 31 | /dev/sdaf | Connected                   |
| sata4/0 | 32 |           | Disconnected or not present |
| sata4/1 | 33 | /dev/sdah | Connected                   |
| sata4/2 | 34 |           | Disconnected or not present |
| sata4/3 | 35 | /dev/sdaj | Connected                   |
| sata4/4 | 36 | /dev/sdak | Connected                   |
| sata4/5 | 37 | /dev/sdal | Connected                   |
| sata4/6 | 38 | /dev/sdam | Connected                   |
| sata4/7 | 39 |           | Disconnected or not present |
| sata5/0 | 40 |           | Disconnected or not present |
| sata5/1 | 41 |           | Disconnected or not present |
| sata5/2 | 42 | /dev/sdaq | Connected                   |
| sata5/3 | 43 |           | Disconnected or not present |
| sata5/4 | 44 |           | Disconnected or not present |
| sata5/5 | 45 |           | Disconnected or not present |
| sata5/6 | 46 |           | Disconnected or not present |
| sata5/7 | 47 |           | Disconnected or not present |

## Disconnecting a Disk Using `cfgdisk`

Use the `cfgdisk` command to disconnect a disk before performing the hot plug event of physically removing it. The following command shows an example of how to use `cfgdisk` to **disconnect** a disk drive.

```
cfgdisk -o disconnect -d sata5/1
```

The command returns the following prompts. Enter **Y** at both to disconnect the disk:

```
Are you sure (y/n)? Y
Are you sure sata5/1 device is not in use(y/n)? Y
Device sata5/1 has been successfully disconnected
```

## Connecting a Disk Using `cfgdisk`

After performing the hot plug event of physically adding a disk into the system, use the `cfgdisk` command to connect it. The following command shows an example of how to use `cfgdisk` to **connect** a disk drive.

```
cfgdisk -o connect -d sata5/1
```

The command returns the following:

```
Command has been issued to connect sata5/1 device, it may take few
seconds to connect sata5/1, check status by re-running 'cfgdisk'
command.
```

## Displaying `cfgdisk` Help Information

The following command shows how to use the `cfgdisk` command to display help information:

```
cfgdisk -h
```

For additional information about `cfgdisk` or `diskmond`, refer to the man pages.

---

## Viewing System and Service Processor Logs Using IPMItool

This section describes how to view individual log file information from the command line using the IPMItool.

## Obtaining and Installing the IPMItool

The IPMItool is a command line utility that reads the sensor data repository (SDR) and displays sensor values, System Event Log (SEL), Field Replaceable Unit (FRU) inventory information, gets and sets LAN configuration parameters, and performs chassis power control operations via the server's Service Processor.

For your convenience, this tool is available as an installable rpm (x86 64-bit version) on your server's Tools and Drivers CD, or as a downloadable package from the Sun software download site:

<http://www.sun.com/servers/x64/x4540/downloads.jsp>

For information about using the IPMITool, refer to your *Sun Integrated Lights Out Manager 2.0 User's Guide* (820-1188)

## Viewing the SDR log

The following commands show how view the SDR log file, either at the server:

```
ipmitool -I open sdr elist
```

or over the network:

```
ipmitool -I lan -H SP-IP -U root -P SP-password sdr elist
```

Where *SP-IP* represents the IP address of the service processor and *SP-password* represents the password for the service processor.

## Viewing the FRU log

The following commands show how view the FRU log file, either at the server:

```
ipmitool -I open fru
```

or over the network:

```
ipmitool -I lan -H SP-IP -U root -P SP-password fru
```

Where *SP-IP* represents the IP address of the service processor and *SP-password* represents the password for the service processor.

---

**Note** – When viewing the FRU log of a server running Linux, hard disk drive FRU information stored in the Service Processor FRU log might display a Product Name attribute. This attribute is meaningless, and should be ignored. Here's an example of what you might see when viewing logged FRU data (via the `ipmitool` command or the server's management tool) if this erroneous attribute were present:

```
FRU Device Description : hdd40.fru (ID 58)
Product Manufacturer : HITACHI
Product Name : 232VDDF12872G-40 <--ignore this line
Product Part Number : HDS7225SBSUN250G
Product Version : V440A81A
Product Serial : VDK41BT4CAD0GE
```

---

## Viewing the SEL log

The following commands show how view the SEL log file, either at the server:

```
ipmitool -I open sel elist
```

or over the network:

```
ipmitool -I lan -H SP-IP -U root -P SP-password sel elist
```

Where *SP-IP* represents the IP address of the service processor and *SP-password* represents the password for the service processor.

## Viewing the System log

All events and error information from DCMU are logged in syslog (*default: /var/log/messages*). These include hard drive hotplug events, drive disconnect and connect events, and drive fault polling events.



## Installing and Booting an OS 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 CF for booting an operating system (OS). It also contains procedures for prolonging the life span of your CF card through optimization. Both the Solaris and Linux operating systems support booting from CF. The procedures for optimizing each are slightly different. The sections included in this chapter are:

- [“CF OS Installation Overview” on page 78](#)
- [“Reducing OS Write/Erase Cycles for Linux OS Installation on CF” on page 79](#)
- [“Reducing OS Write/Erase Cycles for Solaris OS Installation on CF” on page 85](#)

---

# CF OS Installation Overview

Your Sun server can be equipped with an internal compact flash (CF) card, on which you can install and boot supported versions of the Solaris or Linux operating system (OS).

## Advantages and Disadvantages

As a boot device, the main advantages of CF over a hard drive (HD) are its very low power consumption, its fast access 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, so compared to a HD, both the time required to read and write and the total package size of a CF card is significantly reduced. The advantages CF provide improved power and cooling, performance, and space efficiencies.

A 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 numerous write-intensive tasks such as logging and swapping.

## Prolonging CF Life Span by Reducing Write/Erase Cycles

Reading from CF does not cause degradation, so, to optimize CF for booting an OS, it is important to reduce the number write and erase cycles. You can prolong the usability of the CF card by configuring the OS to redirect and relocate the more write-intensive tasks off CF and on to other devices, such as an external HD or RAM. Some of the things you can do to reduce write/erase cycles and prolong the usability of CF as a boot device include:

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

- Defer or eliminate file metadata updates

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

- [“Reducing OS Write/Erase Cycles for Linux OS Installation on CF” on page 79](#)
- [“Reducing OS Write/Erase Cycles for Solaris OS Installation on CF” on page 85](#)

---

## Reducing OS Write/Erase Cycles for Linux OS Installation on CF

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 server’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 79](#)
- [“Moving /tmp to tmpfs for an OS Installation on CF” on page 82](#)
- [“Managing Swap Space for an OS Installation on CF” on page 83](#)
- [“Tuning the File System for an OS Installation on CF” on page 85](#)

## Redirecting Log Output for CF OS Installation

This section contains two procedures that you can use to redirect log output from 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 79](#)
- [“Redirecting Log Output Over the Network Using syslog” on page 80](#)

## 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*

*server* The NFS server.

*/path/to/dir* 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)*

*/path/to/logs/* The path to the log directory.

*client host name* The host name of the client (recommended for multiple server logging).

*client\_IP* 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, enter 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 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 echoes 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 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 RAMdisk. Performing this procedure reduces the OS write/erase cycles and prolongs the life span of the CF card.



---

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

---

### ▼ To Move /tmp to tmpfs

#### 1. Determine the size of the tmpfs ramdisk 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
-or-
```

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 CF

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.

## Swap Options

The options for managing are:

- Eliminating Swap
- Swapping to external storage

### *Eliminating Swap*

Running your system without swap is not an optimal solution. However, swapping to 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 don't need swap.

For more information about how to determine if your system can run without swap, see *Prolonging Flash Life by Reducing Disk Writes*.

### *Swapping to External Storage*

If you have external storage, you can use a partition on that hard drive (HD) for swap space. If the HD you want to swap to 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 to External Storage Post-Installation” on page 84](#).

# Configuring Swap to 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 `/etc/fstab` file.

---

**Note** – Swapping to 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 to 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
```

*device\_name* The name of the HD.

*X* 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
```



# Tuning the File System for an OS Installation on CF

For more information about tuning your OS to reduce write/erase cycles and increase CF card life span, see the Sun document, *Prolonging Flash Life by Reducing Disk Writes*.

---

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

This section contains the following information:

- [“Disabling Swap” on page 85](#)
- [“Using a Dedicated Dump Device” on page 87](#)
- [“Moving Temporary Files to RAMdisk” on page 87](#)
- [“Disabling File System Access Time Updates” on page 88](#)
- [“Configuring Remote Logging” on page 89](#)

### Disabling Swap

The Solaris OS 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 HD 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
```

*device\_name* 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 -
```

---

**Note** – Do not comment out the two lines in `/etc/vfstab` that start with the `SWAP` keyword, as those are for `/tmp` and `/var/tmp`, and not related to the actual swap device specification.

---

4. Save and exit the file.
5. For the changes to take effect, reboot, or, if you don't 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 swapname
```

*swapname* The name of the swap file.

## Using a Dedicated Dump Device

By default, the Solaris 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 our purposes, because we 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/cXtYd0sZ -s savecore-dir
```

The above command example uses `dumpadm` to configure hard disk `cXtYd0sZ` as the dedicated dump device.

## Moving Temporary Files to RAMdisk

By moving temporary files to RAM, you can further reduce I/O to the CF card. By default the Solaris OS `/tmp` file system is mounted using `tmpfs`, essentially a RAM disk. By moving `/var/tmp` to `tmpfs`, you can eliminate the majority of temp 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 RAMdisk

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

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

See [CODE EXAMPLE 8-1](#) for an example of this.

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 don't want to reboot, use the following `mount` command:

```
% mount -a
```

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

## Disabling File System Access Time Updates

Unix file systems 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 file systems allow you to disable updates to the file `atimes`. 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 (`dfratime`) 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(1M)` man page.



---

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

---

### ▼ To Disable File System Access Time Updates for ZFS

- Enter the following command:

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

*filesystem\_name* The name of the filesystem to disable `atime`. The man page for `zfs(1M)` contains details about setting ZFS properties. The `atime` property is inherited by child data sets.

### ▼ To Disable File System 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 (see [CODE EXAMPLE 8-1](#)).

#### CODE EXAMPLE 8-1

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

---

**Note** – In the example above, the swap line in `/etc/vfstab` has been commented out intentionally to disable swap.

---

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

3. For the changes to take effect, reboot, or, if you don't 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`:**

The code example below 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
```

```
*.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 `loghost`:

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

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

# Identifying Logical and Physical Network Interface Names for Linux OS Configuration

---

While configuring an operating system for a networked server, it is necessary to provide the logical names (assigned by the OS) and the physical name (MAC address) of each network interface.

You should begin by finding and recording the MAC addresses of all your physical ports from their labels.

This appendix explains how to obtain the needed logical information in these situations:

- While configuring a SUSE Linux Enterprise Server OS during installation (see [“Identifying Logical and Physical Network Interface Names While Installing a SUSE Linux OS”](#) on page 91).
- While configuring a Red Hat Enterprise Linux OS during installation (see [“Identifying Logical and Physical Network Interface Names While Installing a RHEL Linux OS”](#) on page 97).

---

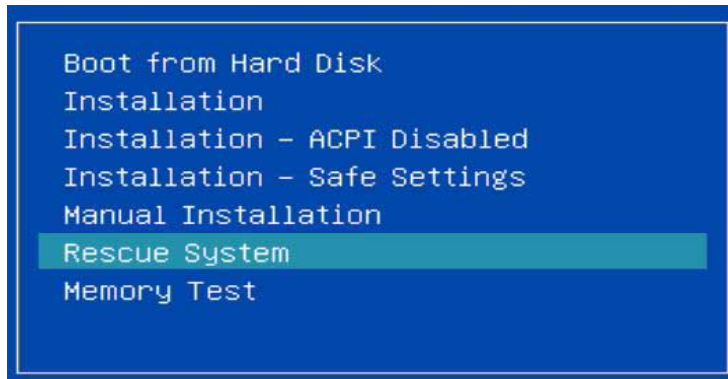
## Identifying Logical and Physical Network Interface Names While Installing a SUSE Linux OS

When you are configuring the SUSE Linux OS while installing it, you reach a point where you must enter the logical and physical names (MAC addresses) of the network interfaces.

This section explains how to launch a user shell during the SUSE Linux OS configuration to obtain the logical and physical network interface names that you need to continue with the configuration.

## ▼ Launch User Shell and Identify Network Interfaces

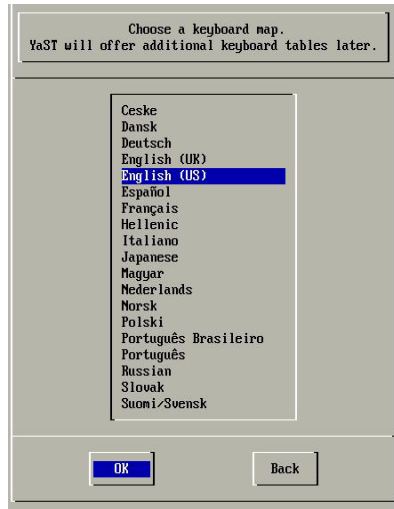
1. If you have not already done so, select `Rescue System` and press `Enter`.



The message `Loading Linux Kernel` appears followed by the SUSE splash screen, then the `Choose a Keyboard Map` screen appears.



2. In the Choose a Keyboard Map screen, select the appropriate keyboard configuration and click OK.



The user shell launches and the Rescue Login prompt appears.

3. At the Rescue Login prompt, type `root` to log in, then press Enter.

```
INIT: Entering runlevel: 3
Boot logging started on /dev/tty1(/dev/console) at Wed May 17 19:49:24 2006
Master Resource Control: previous runlevel: N, switching to runlevel: 3
Initializing random number generator done
Starting syslog services done
Starting RPC portmap daemon done
Importing Net File System (NFS) unused
Master Resource Control: runlevel 3 has been reached
Skipped services in runlevel 3: nfsboot nfs
Rescue login: root
```

The Rescue prompt appears.

4. At the Rescue prompt (#), type the following command then press Enter to display all network interfaces.

```
ifconfig -a
```

```
INIT: Entering runlevel: 3
Boot logging started on /dev/tty1(/dev/console) at Wed May 17 19:49:24 2006
Master Resource Control: previous runlevel: N, switching to runlevel: 3
Initializing random number generator
Starting syslog services
Starting RPC portmap daemon
Importing Net File System (NFS)
Master Resource Control: runlevel 3 has been
Skipped services in runlevel 3:
Rescue login: root
Rescue:~ # ifconfig -a_
```

The output of the Linux SUSE named and physical named network interfaces appear. See the following sample output as an example.

```
eth4 Link encap:Ethernet HWaddr 00:14:4F:0C:A1:52
 BROADCAST MULTICAST MTU:1500 Metric:1
 RX packets:0 errors:0 dropped:0 overruns:0 frame:0
 TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
 collisions:0 txqueuelen:1000
 RX bytes:0 (0.0 b) TX bytes:0 (0.0 b)
 Base address:0xc800 Memory:b5d80000-b5da0000

eth5 Link encap:Ethernet HWaddr 00:14:4F:0C:A1:53
 BROADCAST MULTICAST MTU:1500 Metric:1
 RX packets:0 errors:0 dropped:0 overruns:0 frame:0
 TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
 collisions:0 txqueuelen:1000
 RX bytes:0 (0.0 b) TX bytes:0 (0.0 b)
 Base address:0xcc00 Memory:b5de0000-b5e00000

eth6 Link encap:Ethernet HWaddr 00:14:4F:0C:A4:72
 BROADCAST MULTICAST MTU:1500 Metric:1
 RX packets:0 errors:0 dropped:0 overruns:0 frame:0
 TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
 collisions:0 txqueuelen:1000
 RX bytes:0 (0.0 b) TX bytes:0 (0.0 b)
 Base address:0xf800 Memory:bbd80000-bbda0000

eth7 Link encap:Ethernet HWaddr 00:14:4F:0C:A4:73
 BROADCAST MULTICAST MTU:1500 Metric:1
 RX packets:0 errors:0 dropped:0 overruns:0 frame:0
 TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
 collisions:0 txqueuelen:1000
 RX bytes:0 (0.0 b) TX bytes:0 (0.0 b)
 Base address:0xfc00 Memory:bbde0000-bbe00000

lo Link encap:Local Loopback
 inet addr:127.0.0.1 Mask:255.0.0.0
 UP LOOPBACK RUNNING MTU:16436 Metric:1
 RX packets:8 errors:0 dropped:0 overruns:0 frame:0
 TX packets:8 errors:0 dropped:0 overruns:0 carrier:0
 collisions:0 txqueuelen:0
 RX bytes:528 (528.0 b) TX bytes:528 (528.0 b)

Rescue:~ #
```

If you have multiple network interfaces and the output of interfaces scrolls off the top of the screen, you can display the output per interface.

5. To view the output per network interface, type the following command at the prompt, then press Enter:

```
ifconfig eth#
```

where # = the interface number. For example, if you type:

```
ifconfig eth0
```

The output for **eth0** appears:

```
eth0 Link encap:Ethernet HWaddr 00:14:4F:0C:A1:53
 BROADCAST MULTICAST MTU:1500 Metric:1
 RX packets:0 errors:0 dropped:0 overruns:0 frame:0
 TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
 collisions:0 txqueuelen:1000
 RX bytes:0 (0.0 b) TX bytes:0 (0.0 b)
 Base address:0xcc00 Memory:b5de0000-b5e00000
```

In the sample output above:

- **eth0** entry in the first column refers to the Linux SUSE logical named interface. This first column in the output identifies the logical names SUSE assigned to the network interface.
- **HWaddr 00.14.4F.0C:A1:53** entry in second column (first row) refers to the physical MAC address of the network port.

- a. Record the SUSE logical network interface name with the physical port MAC address for future reference.

You will need to refer to this record when configuring the network interfaces during the Linux SUSE OS installation.

6. When you are done, do one of the following to exit the Rescue shell.

- a. From the ILOM web interface, select Remote Control ->Remote Power Control->Reset.

- b. From other consoles, type **reboot** at the Rescue prompt (#), then press Enter.

7. Restart the Linux SUSE installation program.

---

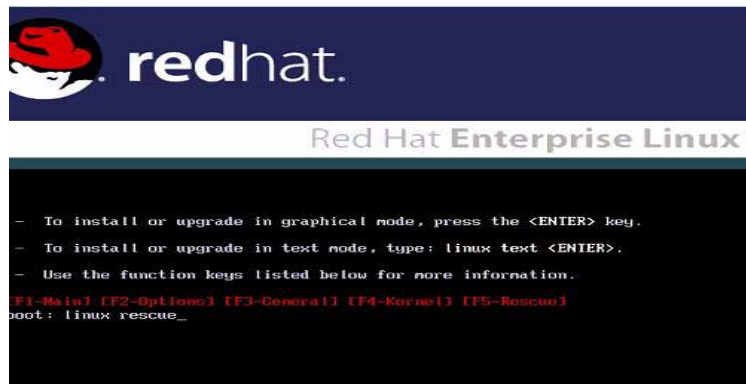
# Identifying Logical and Physical Network Interface Names While Installing a RHEL Linux OS

When you are configuring the RHEL Linux OS while installing it, you reach a point where you must enter the logical and physical names (MAC addresses) of the network interfaces.

This section explains how to launch a user shell during the Red Hat Linux configuration to obtain the logical and physical network interface names that you need to continue with the configuration.

## ▼ Launch User Shell and Identify Network Interfaces

1. If you have not already done so, type: **linux rescue** at the boot prompt, then press Enter.



The Choose a Language screen appears.

2. In the Choose a Language screen, select the appropriate language and click OK.



The Keyboard Type screen appears.

3. In the Keyboard Type screen, select the appropriate configuration then click OK.



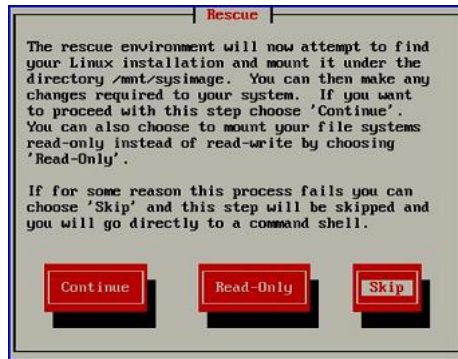
The Setup Network screen appears.

4. In the Setup Network screen, click No.



The Rescue screen appears.

5. In the Rescue screen, click Skip.



The user shell appears.

6. At the command prompt (#) in the user shell, type the following command to display all network interfaces, then press Enter.

```
ifconfig -a
```

The output of the Linux Red Hat named network interfaces appear. See the following sample output as an example.

```
TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
collisions:0 txqueuelen:1000
RX bytes:0 (0.0 B) TX bytes:0 (0.0 B)
Base address:0xcc00 Memory:b5de0000-b5e00000

eth6 Link encap:Ethernet HWaddr 00:14:4F:0C:A4:72
 BROADCAST MULTICAST MTU:1500 Metric:1
 RX packets:0 errors:0 dropped:0 overruns:0 frame:0
 TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
 collisions:0 txqueuelen:1000
 RX bytes:0 (0.0 B) TX bytes:0 (0.0 B)
 Base address:0xf000 Memory:bbd00000-bbda0000

eth7 Link encap:Ethernet HWaddr 00:14:4F:0C:A4:73
 BROADCAST MULTICAST MTU:1500 Metric:1
 RX packets:0 errors:0 dropped:0 overruns:0 frame:0
 TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
 collisions:0 txqueuelen:1000
 RX bytes:0 (0.0 B) TX bytes:0 (0.0 B)
 Base address:0xfc00 Memory:bbde0000-bbe00000

lo Link encap:Local Loopback
 LOOPBACK MTU:16436 Metric:1
 RX packets:0 errors:0 dropped:0 overruns:0 frame:0
 TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
 collisions:0 txqueuelen:0
 RX bytes:0 (0.0 B) TX bytes:0 (0.0 B)

-/bin/sh-3.00#
```

If you have multiple network interfaces and the output of interfaces scrolls off the top of the screen, you can display the output per interface.



7. To view the output per network interface, type the following at the command prompt, then press Enter:

```
ifconfig eth#
```

where # = the interface number. For example, if you type:

```
ifconfig eth0
```

The output for **eth0** appears,:

```
-/bin/sh-3.00# ifconfig eth0
eth0 Link encap:Ethernet HWaddr 00:14:4F:0C:A1:F2
 BROADCAST MULTICAST MTU:1500 Metric:1
 RX packets:0 errors:0 dropped:0 overruns:0 frame:0
 TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
 collisions:0 txqueuelen:1000
 RX bytes:0 (0.0 B) TX bytes:0 (0.0 B)
 Base address:0x8800 Memory:89b80000-89ba0000

-/bin/sh-3.00#
```

In the sample output above:

- eth0 entry in the first column refers to the Linux Red Hat logical named interface. This first column in the output identifies the logical names Red Hat assigned to the network interface.
- HWaddr 00:14:4F:0C:A1:F2 entry in second column (first row) refers to the physical MAC address of the network port.

8. Record the Red Hat logical network interface name with the physical port MAC address for future reference. You will need to refer to this record when configuring the network interfaces during the Red Hat OS installation.

9. When you are done, do one of the following to exit the user shell.

- From the ILOM, select Remote Control ->Remote Power Control->Reset.
- From the ILOM Remote Console, select Ctrl Alt Delete in the Keyboard menu.
- From other consoles, press Ctrl->Alt->Delete.

10. Restart the Linux Red Hat installation program.



## Identifying Logical and Physical Network Interface Names for Solaris OS Installation

---

While configuring an operating system for a networked server, it is necessary to provide the logical names (assigned by the OS) and the physical name (MAC address) of each network interface.

You should begin by finding and recording the MAC addresses of all your physical ports from their labels.

This appendix explains how to obtain the needed logical information in these situations:

- *Before* configuring a pre-installed Solaris OS (see [“Identifying Logical and Physical Network Interface Names for a Pre-installed Solaris OS”](#) on page 103).
- *While* configuring a Solaris OS during installation (see [“Identifying Logical and Physical Network Interface Names While Installing Solaris OS”](#) on page 105).

---

## Identifying Logical and Physical Network Interface Names for a Pre-installed Solaris OS

Pre-installed Solaris OS are unconfigured.

Prior to configuring the OS, you use the procedure below to identify the network interfaces by their logical and physical names (MAC addresses). You record this information, which you need during configuration, and then return the OS to its unconfigured state before proceeding with the configuration.

**1. Log in to the system as root and run `ifconfig -a` in a command shell.**

The command discovers all installed network interfaces. The shell prompt (#) appears when the discovery completes.

**2. To output a list of all Solaris named interfaces along with their physical MAC addresses, type this command at the prompt (#):**

```
ifconfig -a
```

A sample `ifconfig-a` output is as follows:

```
ifconfig -a
```

```
lo0: flags=2001000849<UP,LOOPBACK,RUNNING,MULTICAST,IPv4,VIRTUAL>
mtu 8232 index 1
```

```
inet 127.0.0.1 netmask ff000000
```

```
e1000g0: flags=1000802<BROADCAST,MULTICAST,IPv4> mtu 1500 index 2
```

```
inet 0.0.0.0 netmask 0
```

```
ether 0:14:4f:c:a1:ee
```

```
e1000g1: flags=1000802<BROADCAST,MULTICAST,IPv4> mtu 1500 index 3
```

```
inet 0.0.0.0 netmask 0
```

```
ether 0:14:4f:c:a1:ef
```

```
e1000g2: flags=1000802<BROADCAST,MULTICAST,IPv4> mtu 1500 index 4
```

```
inet 0.0.0.0 netmask 0
```

```
ether 0:14:4f:c:a5:d6
```

```
e1000g3: flags=1000802<BROADCAST,MULTICAST,IPv4> mtu 1500 index 5
```

```
inet 0.0.0.0 netmask 0
```

```
ether 0:14:4f:c:a5:d7
```

```
e1000g4: flags=1000802<BROADCAST,MULTICAST,IPv4> mtu 1500 index 6
```

```
inet 0.0.0.0 netmask 0
```

```
ether 0:14:4f:c:a1:4e
```

In the sample above, the Solaris named network interfaces appear as `e1000g0`, `e1000g1`, and so on. The MAC address for each network interface appears after the word `ether`. For example, the MAC address associated to the Solaris-named network interface `e1000g0` is `0:14:4f:c:a1:ee`.

**3. Record the Solaris network interface name for each MAC address previously recorded in the Configuration Worksheet list.**

**4. When you are done, type `sys-unconfig(1M)` at the command line.**

This command restores the system configuration to the "as-manufactured" state.

---

**Caution** – The `sys-unconfig(1M)` command will halt the system

---

For example,

```
sys-unconfig
WARNING
```

```
This program will unconfigure your system. It will cause
it
```

```
to revert to a "blank" system - it will not have a name or
know about other systems or networks.
```

```
This program will also halt the system.
```

```
Do you want to continue (y/n) ?
```

**5. Reboot the system.**

You will be prompted with a series of configuration questions.

**6. In the Network Connection screen, select Yes.**

The Configure Multiple Network Interfaces screen appears.

**7. In the Configure Multiple Network Interfaces screen, consult the list of network interface names recorded in Step 3, then select the appropriate network interfaces.**

**8. Continue the normal Solaris configuration.**

---

## Identifying Logical and Physical Network Interface Names While Installing Solaris OS

When you are configuring the Solaris OS while installing it, you reach a point where you must enter the logical and physical names (MAC addresses) of the network interfaces.

This section explains how to launch a user shell during the Solaris OS configuration to obtain the logical and physical network interface names that you need to continue with the configuration.

## ▼ Launch User Shell and Identify Network Interfaces

1. In the Install Type menu, select Option (6) Single User Shell and press Enter.

If a message appears about mounting an OS instance, select **q**. You should not mount any OS instance.

The message "Starting Shell" appears, see the following figure.

```
1. Solaris Interactive (default)
2. Custom JumpStart
3. Solaris Interactive Text (Desktop session)
4. Solaris Interactive Text (Console session)
5. Apply driver updates
6. Single user shell

Enter the number of your choice.
Selected: 6

Single user shell

Searching for installed OS instances...

Multiple OS instances were found. To check and mount one of them
read-write under /a, select it from the following list. To not mount
any, select 'q'.

 1 /dev/dsk/c2t0d0s0 Solaris 10 6/06 s10x_u2wos_08 X86
 2 /dev/dsk/c2t1d0s0 Solaris 10 6/06 s10u2_08-DN-WOS X86

Please select a device to be mounted (q for none) [?,??,q]: q

Starting shell.
#
```

2. At the command prompt (#), type the following command to plumb all network interfaces.

```
ifconfig -a plumb
```

---

**Note** – The plumb process may take some time.

---

3. At the command prompt, type the following command to output a list of all network interfaces by their Solaris logical name and physical MAC address name.

```
ifconfig -a
```

The output of Solaris named interfaces and MAC addresses appears. For an example, see the following sample output.

```
ifconfig -a | more
e1000g0: flags=1000802<BROADCAST,MULTICAST,IPv4> mtu 1500 index 2
 inet 0.0.0.0 netmask 0
 ether 0:14:4f:c:a1:ee
e1000g1: flags=1000802<BROADCAST,MULTICAST,IPv4> mtu 1500 index 3
 inet 0.0.0.0 netmask 0
 ether 0:14:4f:c:a1:ef
e1000g2: flags=1000802<BROADCAST,MULTICAST,IPv4> mtu 1500 index 4
 inet 0.0.0.0 netmask 0
 ether 0:14:4f:c:a5:d6
e1000g3: flags=1000802<BROADCAST,MULTICAST,IPv4> mtu 1500 index 5
 inet 0.0.0.0 netmask 0
 ether 0:14:4f:c:a5:d7
e1000g4: flags=1000802<BROADCAST,MULTICAST,IPv4> mtu 1500 index 6
 inet 0.0.0.0 netmask 0
 ether 0:14:4f:c:a1:4e
e1000g5: flags=1000842<BROADCAST,RUNNING,MULTICAST,IPv4> mtu 1500 index 1
 inet 0.0.0.0 netmask 0
 ether 0:14:4f:c:a1:4f
e1000g6: flags=1000802<BROADCAST,MULTICAST,IPv4> mtu 1500 index 7
 inet 0.0.0.0 netmask 0
 ether 8:0:20:b6:ce:94
e1000g7: flags=1000802<BROADCAST,MULTICAST,IPv4> mtu 1500 index 8
 inet 0.0.0.0 netmask 0
#
```

In the sample output above, the:

- e1000g# entry in the first column refers to the Solaris logical named interface. This first column in the output identifies the logical names assigned by Solaris to the network interfaces.
- ether #:#:#:#:#: entry in second column (third row) refers to the physical MAC address name of the network port.

For example:

The physical MAC address for the Solaris named network interface e1000g0 is 0:14:4f:c:a1:ee.

4. Record the Solaris network interface name next to the physical port MAC address previously recorded (per the Configuration Worksheet).
5. When you are done, type **exit** at the command prompt.

The Solaris Installation program will resume where you last left off.



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---

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