Sun Fire™ X4140, X4240, and X4440 Servers Linux, ESX, and Solaris OS Installation Guide

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Contents

Preface

This *Sun Fire X4140, X4240, and X4440 Servers Operating System Installation Guide* contains detailed procedures for bringing the server to a configurable, usable state. Operating system installation and initial software configuration are covered.

Related Documentation

For a description of the document sets for the Sun Fire? X4140, X4240, and X4440 servers, see the *Where To Find* Documentation sheet that is packed with your system and also posted at the product's documentation site:

http://docs.sun.com/app/docs/prod/server.x64#hic

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.

Select a language from the drop-down list and navigate to the Sun Fire X4140, X4240 or X4440 server document collection using the Product category link. English documentation is revised more frequently and might be more up-to-date than the translated documentation. For all Sun documentation, go to the following URL:

http://docs.sun.com

Product Updates

For product updates that you can download for your server, please visit the download web site:

1. **Browse to** http://www.sun.com/download/

2. **Locate the Hardware Drivers section.**

3. **Click X64 Servers and Workstations.**

4. **Click the link for Sun Fire X4140, X4240, or X4440.**

The site contains updates for firmware and drivers, as well as CD-ROM ISO images.

Using UNIX Commands

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

■ Software documentation that you received with your system

■ Solaris™ Operating System documentation at http://docs.sun.com

Third-Party Web Sites

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Typographic Conventions

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

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

Documentation, Support, and Training

The following table shows where to find documentation, support, and training.

TABLE P-1   Documentation, Support and Training

Sun Function	URL	Description
Sun Documentation	http://docs.sun.com	You can navigate to the Sun Fire X4140, X4240 and X4440 Servers document pages and then download PDF and view HTML documents.
Support	http://www.sun.com/support/	Obtain technical support and download patches.
Training	http://www.sun.com/training/	Learn about Sun courses.
Warranty	http://www.sun.com/service/support/warranty/index.html	Obtain specific details regarding your warranty.
Feedback	http://www.sun.com/hwdocs/feedback/	Submit your comments.

Sun Welcomes Your Comments

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

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

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

Sun Fire X4140, X4240, and X4440 Servers Operating System Installation Guide, 820-2397-12

Overview

About Installing an Operating System on Your Sun Fire Server

There are several supported operating system (OS) distributions and several ways to install each. This document is intended only as a general guide that refers you to detailed procedures. For instructions on installing the Windows Server 2003 and 2008 OS onto a Sun Fire X4140, X4240, or X4440 server, see the *Sun Fire X4140, X4240, and X4440 Windows Operating System Installation Guide* (820-2399).

Note – If you use the Sun StorageTek SAS RAID HBA, your server's BIOS will not see any disks until you configure them with an Adaptec utility. See "How to Make Your Server's BIOS See Your Disks If You Use the Sun StorageTek SAS RAID HBA" on page 83

Supported Operating Systems

Solaris 10 10/08 is pre-installed on your Sun Fire X4140, X4240, or X4440 server. You may also install the following 64-bit Linux or VMware operating systems:

- Red Hat Enterprise Linux (RHEL) 4.7, 5.1, 5.2, or 5.4
- SUSE Linux Enterprise Server (SLES) 10 SP1 or SP2.
- VMware 3.0.3, 3.5 U2

Installation Prerequisites

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

1. Install the server hardware.

2. Configure the service processor.

3. Gather needed information, such as IP address and netmask.

4. (Linux only) Create a Driver CD or use the Sun™ Installation Assistant (recommended procedure). See the documentation for your particular Linux OS, or see Chapter 2 for information about the Sun Installation Assistant (SIA).

Note – If you install a Linux OS by using the SIA (see Chapter 2), which is the recommended procedure, you do not need to create a driver CD.

Installation Instructions

Chapter 4 (RHEL), Chapter 3 (SLES), Chapter 7 (VMware), and Chapter 5 (Solaris) provide all the information you need to manually install these operating systems.

For all supported Linux operating systems, you can use SIA described in Chapter 2. The SIA simplifies installation and handles the acquisition and installation of the appropriate drivers automatically. If you choose to install a Linux OS manually (see Chapters 4 and 3), you must obtain and install the drivers yourself.

If you use SIA to install Linux, you do not need to refer to Chapter 4 (RHEL) or Chapter 3 (SLES).

Related Documentation

TABLE 1-1   Related Documentation

Solaris 10 Installation Guide: Network-Based Installations	`http://docs.sun.com/app/docs/doc/817-5504`
Red Hat Enterprise Linux System Administration Guide	`https://www.redhat.com/docs/manuals/enterprise/`
SUSE Linux Enterprise Server 10 Installation and Administration Guide – on the first installation CD under the `docu` directory as the file `sles-admin.pdf`, or see *SUSE LINUX Enterprise Server 10 Administration Guide*	`http://www.novell.com/documentation/oes/index.html`
Installation and Upgrade Guide for VMware Infrastructure	`http://www.vmware.com/support/pubs/vi_pubs.html`
Sun Integrated Lights Out Manager 2.0 User's Guide	`http://docs.sun.com/app/docs/doc/820-1188`

Installing an OS on the Server

Before installing an OS on the server, review the following sections for an understanding of the decision-making process.

Things You Must Decide

You must decide the following:

1. Which of the supported operating systems will you install?

2. Will the server will be configured for diskless booting?

3. Which installation method will you use?

4. Will you need to update the operating system and drivers?

   In general, you need to perform updates once the operating system has been installed. For information about updates, see the appropriate chapter that corresponds to the OS you will install.

Available installation methods and their compatible operating systems are listed below.

Method	Solaris	Red Hat	SLES	VMware
Preinstalled on disk	Yes	No	No	No
Install using Sun Installation Assistant	No	Yes	Yes	No
Install from distribution media (CD/DVD) on the server using a locally attached CD/DVD drive	Yes	Yes	Yes	Yes
Install from distribution media (CD/DVD) via keyboard, video and mouse switch (KVMS)	Yes	Yes	Yes	Yes
Install from network using Preboot Execution Environment (PXE)	Yes	Yes	Yes	No

Note – KVMS is a method of using keyboard, video, mouse, and storage devices connected to a remote machine as if they were connected to the local machine. The Sun Fire X4140, X4240, and X4440 servers support industry-standard KVMS with devices connected to it through a USB port or the Integrated Lights Out Manager (ILOM) Remote Console application. For information about setting up USB connections to your system, see your server hardware documentation. For more information about setting up a remote KVMS connection to your server with the ILOM Remote Console application, see the *Sun Integrated Lights Out Manager 2.0 User's Guide* (820-1188).

What to Do Next

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

The chapters in this guide provide detailed installation information. For relevant procedures, see the appropriate chapter of this guide for your particular OS:

- Chapter 2, Using the Sun Installation Assistant (SIA) (easy-to-use, assisted method for installing Linux-based operating systems)
- Chapter 3, Installing SUSE Linux Enterprise Server 10
- Chapter 7, Installing VMware
- Chapter 4, Installing Red Hat Enterprise Linux

- Chapter 5, Installing Solaris 10

For Windows installation, refer to the *Sun Fire X4140, X4240, and X444*0 *Windows Operating System Installation Guide* (820-2399).

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 SUSE Linux Enterprise Server 10

Note – If you want to mirror your OS, the recommended procedure is to create a hardware RAID before you install the OS.

- If you are using an Adaptec-based Sun StorageTek SAS RAID Internal HBA (PCIe card), see Appendix A.
- If you are using an LSI-based Sun StorageTek PCI Express SAS 8-Channel HBA (SG-XPCIE8SAS-I-Z) that controls *internal* disks, see Appendix B.
- If you are using an LSI-based Sun StorageTek PCI Express SAS 8-Channel HBA (SG-XPCIE8SAS-E-Z) that controls *external* disks, RAID is not available.

This chapter contains information about *manually* installing SUSE Linux Enterprise Server (SLES) 10 OS on a Sun Fire X4140, X4240, or X4440 server. It contains the following sections:

> **Note –** If you use the Sun Installation Assistant to install SLES 11, the *only* sections of this chapter that you will need to reference are: "Preconfiguring Your Network to Support PXE Installation of SLES 11" on page 14 and "Updating the SLES 11 OS" on page 23.

About the SLES 11 Linux Installation

The Sun Fire X4140, X4240, and X4440 servers support SLES 11.

The most common methods for installing SLES 11 on your server are listed below:

- Installation from your SLES 11 distribution media from a local or remote CD (see "Installing SLES 11 From Distribution Media" on page 11).
- Installation from the network, either from a Preboot Execution Environment (PXE) image stored on a PXE server on your local network or from an image stored elsewhere on your network (see "Preconfiguring Your Network to Support PXE Installation of SLES 11" on page 14)

SLES 11 Installation and Configuration Documentation

You can find help in installing SUSE Linux on your server from the following locations:

- README file—the README file on your SLES 11 CD 1 contains late-breaking information about system requirements and system configuration.
- The Release Notes for SLES 11 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 11. It is available on the first installation CD under the `docu` directory as the file `sles-admin.pdf` under the appropriate language directory.

- SLES 11 Support Sites - SUSE provides considerable technical information about the Enterprise Server OS at its product and support web sites. See the SLES 11 home page at `http://www.novell.com/products/server/` for additional support information.

Task Map for SLES 11 Installation

Consult the following table to determine which procedures documented in this help system are relevant to the installation task(s) that you need to perform.

Installation Task	Relevant Procedure(s) or Source(s)
Install SLES 11 from local or remote CD/DVD drive.	"Installing SLES 11 From Distribution Media" on page 11 or "Installing SLES 11 Using the Remote Console Application" on page 12
Install SLES 11 from local or remote CD/DVD drive or PXE server.	*SUSE Linux Enterprise Server 10 Installation Manual*
Preconfigure your network to install SLES 11 from a PXE server.	"Preconfiguring Your Network to Support PXE Installation of SLES 11" on page 14
Install SLES 11 from a PXE server.	"Installing SLES 11 Using PXE" on page 20
Update SLES 11 software.	"Updating the SLES 11 OS" on page 23

Installing SLES 11 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 SLES 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

- SLES 11 media base CD or DVD set
- SLES 11 installation guide, *SUSE Linux Enterprise Server 10 Installation and Administration Guide* (see "SLES 11 Installation and Configuration Documentation" on page 10)
- Sun Fire X4140, X4240, or X4440 server equipped with equipped the following items:
  - USB keyboard and mouse

- Internal or USB CD/DVD drive
- Monitor

▼ To Install SLES 11 from Distribution Media

1. **Power on the system.**

2. **Press F8 and select CDROM when prompted.**

3. **Insert the SLES 11 CD 1 into your local CD/DVD drive.**

4. **Follow the installation instructions provided with the SLES 11 Installation and Administration Guide to complete the installation of the system software.**

Installing SLES 11 Using the Remote Console Application

This topic explains how to install the SLES 11 OS on your Sun Fire X4140, X4240, or X4440 server using the ILOM Remote Console application.

▼ To Install SLES 11 from the Remote Console

1. **Locate your SLES 11 installation CD/DVD or the equivalent ISO images.**

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

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" chapter of the *Integrated Lights Out Manager (ILOM) Administration Guide* for more information

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

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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 several ways:

   - **CD-ROM**—If you are installing a physical CD into the remote console CD ROM drive, insert the CD into the drive and select CD-ROM.

   - **ISO Image**—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 – Floppy diskette redirection is also available through the JavaRConsole. See the *Integrated Lights Out Manager (ILOM) Administration Guide* for more information. Note that are multiple versions of ILOM, be sure to refer to the guide that matches your server's installed version.

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10. **Turn on the server using the ILOM Web Interface.**

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 11 installation menu appears, use arrow keys to select Installation and press Enter.**

13. **Proceed with SLES 11 installation as usual.**

Preconfiguring Your Network to Support PXE Installation of SLES 11

These procedures describe how to preconfigure your network running SLES 11 software to support PXE installation of SUSE Linux software on your Sun Fire X4140, X4240, or X4440 server. These procedures assume that you already have a bootable server that is running a version of the SLES 11 OS.

Preconfiguring your network for PXE installation involves the following procedures:

- "Copying Files From the Tools and Drivers CD" on page 15
- "Configuring a DHCP Server" on page 15
- "Installing Portmap" on page 17
- "Configuring the TFTP Service" on page 17
- "Configuring the NFS Service" on page 18
- "Disabling the Firewall" on page 19

Required Items

Preconfiguring your network for PXE installation requires the following items:

- SLES 11 server equipped with:
  - CD/DVD drive
  - USB keyboard
  - Monitor (optional)
- SLES 11 media set
- Sun Fire X4140, X4240, or X4440 server Tools and Drivers CD

Caution – On the chassis, Ethernet ports are labeled NICi (i = 0,1,2,3). Linux internally represents Ethernet ports as ethj (j = 0,1,2,3). Labeling implies NICi -> ethj, where i=j. This is generally true, but for the for Sun Fire X4140, X4240, or X4440 servers the mapping is as follows:

NIC0 -> eth2
NIC1 -> eth3
NIC2 -> eth0
NIC3 -> eth1

Copying Files From the Tools and Drivers CD

This section describes how to copy the required PXE configuration support files, from the Sun Fire X4140, X4240, and X4440 server Tools and Drivers CD to the DHCP/PXE server. You can also download the driver RPMs from the Sun Fire X4140, X4240, or X4440 server web site. The downloads links are at http://www.sun.com/servers/blades/x6200/downloads.jsp.

▼ To Copy Files From the Tools and Drivers CD

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

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

   ```
   # mkdir /tmp
   ```

3. **Mount the CD-ROM drive. Enter the command:**

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

4. **Enter the following command to copy the files to the** /tmp/ **directory:**

   ```
   # cp /mnt/cdrom/support/pxeboot/tmp/
   ```

5. **Uncompress and extract the contents of the tar file into the** /tmp/ **directory.**

   ```
   # tar -zxf /tmp/
   ```

   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.**

Configuring a DHCP Server

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

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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
   ```

Installing Portmap

Complete the following steps on your DHCP server.

▼ To Install Portmap

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

Configuring the TFTP Service

Complete the following steps on your DHCP server.

▼ To Configure the TFTP Service

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

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

Configuring Syslinux

Complete the following steps on your DHCP server.

▼ To Configure Syslinux

1. **Determine whether the syslinux package is already installed on the server. Enter the following command:**

   # rpm -qa | grep syslinux

2. **If the syslinux package is not listed, insert the RHEL CD and install syslinux by entering the following commands.**

   # mount /dev/cdrom /mnt/cdrom

   # -Uvh /mnt/cdrom/suse/x86_64/syslinux

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

   # umount /mnt/cdrom

Make sure `pxelinux.0` **and** `pxlinux.cfg`**/ are in the** `/home/pxeboot` **directory. If not, copy these files to the** `/home/pxeboot` **directory.**

Configuring the NFS Service

Complete the following steps on your DHCP server.

▼ To Configure the NFS Service

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

Disabling the Firewall

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

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

▼ To Disable the Firewall

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.

Installing SLES 11 Using PXE

PXE is a powerful and convenient solution for setting up a number of Sun Fire X4140, X4240, or X4440 servers so that their configuration is identical.

Required Items

The PXE installation procedure requires the following items:

- The DHCP server that you set up when you preconfigured your network to support PXE installation equipped with a CD/DVD drive
- SLES 11 media CD set
- Sun Fire server Tools and Drivers CD

Before You Begin

The network interface card (NIC) in your Sun Fire X4140, X4240, or X4440 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.

Before you perform the procedures in this section, you must have configured your Linux network to support a PXE server (see "Preconfiguring Your Network to Support PXE Installation of SLES 11" on page 14).

The two procedures in this section are:

- "Creating a SLES 11 PXE Install Image on the PXE Server" on page 20
- "Installing SLES 11 From a PXE Server" on page 22

Creating a SLES 11 PXE Install Image on the PXE Server

To transfer the SLES 11 PXE files for installation you must:

1. Create a SLES 11 image on your PXE server.

2. **Set up and copy SLES 11 software to a directory.**

3. **Set up the PXE files.**

▼ To Create a SLES 11 Image on Your PXE Server

1. **Insert the Tools and Drivers CD into the DVD-ROM drive.**

2. **Copy the PXE support files from the Tools and Drivers CD into the** `/tmp`
   directory by typing the following commands:

   ```
   # mount /dev/cdrom /mnt/cdrom
   # cp -a /mnt/cdrom/support/pxeboot/tmp
   # cd /tmp
   # tar xfz
   # umount /mnt/cdrom
   ```

▼ Set Up and Copy SLES 11 Software to a Directory

The following steps explain how to create the directory setup containing SLES 11
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 11 files. Enter the**
   following commands:

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

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

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

3. **Remove SLES 11 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/
   ```

▼ Set Up PXE Files

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

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

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

Note – In the text block below, copy from "append" through "autoinst.xml" as one continuous line with no returns.

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

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

3. **Save and exit the file.**

Installing SLES 11 From a PXE Server

This procedure describes the final step of installing the SLES 11 boot image onto your Sun Fire X4140, X4240, or X4440 server. Before proceeding with this procedure you must have done the following:

- Configured your Linux network to support a PXE server. See "Preconfiguring Your Network to Support PXE Installation of SLES 11" on page 14.

- Installed a SLES 11 image on that Linux PXE server. See "Creating a SLES 11 PXE Install Image on the PXE Server" on page 20.

▼ To Install SLES 11 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 installed the SLES 11 image on the PXE server (`sles10` in the example above).**

4. **To configure your SLES 11 Linux server, refer to the Installation and Administration guide on SLES 11 CD 1.**

5. **Perform an Online Software Update to update the OS files (see "Updating the SLES 11 OS" on page 23).**

Updating the SLES 11 OS

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

▼ To Update Your SLES OS

1. **Log in as the superuser.**

2. **Enter the following command to run the YaST Online Update:**

   ```
   # you
   ```

   Note that YaST can operate in both text and graphical modes. These directions apply to both.

3. **If you are behind a network firewall and need to use a proxy server in order to access the internet, you must first configure YaST with the correct proxy information.**

   a. **Select the 'Network Services' tab on the left, then the 'Proxy' screen on the right. Enter the correct proxy URLs in both the HTTP and HTTPS fields.**

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

---

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

   ```
   rug set-prefs proxy-url proxy URL
   ```

   where *proxy URL* is the fully qualified URL of your proxy server (for example: http://proxy.yourdomain:3128/).

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

4. **Register with the Novell Customer Center. 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 product activation code.

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

Updating the SLES SCSI Drivers

To Update the SLES SCSI Drivers:

1. **Insert the Tools and Drivers CD for your server.**

2. **Mount it onto the directory** /mnt

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

3. **Enter the following commands:**

   ```
   # cd /mnt/Linux/drivers
   # rpm -ivh driver-filename
   ```

   For example for SLES 11 SP1 and SP2, 64-bit:

   ```
   # cd /mnt/Linux/drivers
   # rpm -ivh mptlinux-4.00.43.00-1-sles10.x86_64.rpm
   ```

Note – Check the /linux/drivers directory on your Tools and Drivers CD for the specific driver file name for your operating system.

---

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

   ```
   # reboot
   ```

Installing Red Hat Enterprise Linux

This chapter provides information about *manually* installing Red Hat Enterprise Linux on a Sun Fire X4140, X4240, or X4440 server. It contains the following sections:

To Mirror Your OS

Note – If you want to mirror your OS, the recommended procedure is to create a hardware RAID before you install the OS.

- If you are using an Adaptec-based Sun StorageTek SAS RAID Internal HBA (PCIe card), see Appendix A.
- If you are using an LSI-based Sun StorageTek PCI Express SAS 8-Channel HBA (SG-XPCIE8SAS-I-Z) that controls *internal* disks, see Appendix B.
- If you are using an LSI-based Sun StorageTek PCI Express SAS 8-Channel HBA (SG-XPCIE8SAS-E-Z) that controls *external* disks, RAID is not available.

Note – If you use the Sun Installation Assistant to install Red Hat Enterprise Linux, the *only* sections of this chapter that you will need are: "Preconfiguring Your Network to Support PXE Installation of RHEL" on page 32 and "Updating a RHEL OS" on page 41.

About the Red Hat Enterprise Linux Installation

If you have installed Red Hat Enterprise Linux (RHEL) software on other AMD Opteron servers, you are already familiar with how to install it on a Sun Fire X4140, X4240, or X4440 server. The most common methods to install RHEL on your server are to use:

- The RHEL distribution media
- The automatic kickstart installation from RHEL software (installation tree) stored on a Preboot Execution Environment (PXE) network server

---

Note – The Sun Installation Assistant is a convenient, front-end application designed to assist you in installing Red Hat Enterprise Linux on your server. The Sun Installation Assistant supplements the standard installation utilities and procedures that ship with Red Hat Enterprise Linux; it does not replace them. Refer to "Using the Sun Installation Assistant (SIA)" on page 7 for more information.

Red Hat Installation and Administration Documentation

Before you install the RHEL software on a Sun Fire X4140, X4240, or X4440 server, consult the following RHEL documentation.

TABLE 4-1 Sources for RHEL Documentation

Document	Description	Where to Find
README file	Contains late-breaking information about system requirements and system configuration for your version of the RHEL software.	On the RHEL CD 1, and online at: http://www.redhat.com/docs/
Red Hat Enterprise Linux Quick Installation Guide	Brief printed guide containing useful information to assist you during the installation of RHEL.	Included with the RHEL distribution media
Red Hat Enterprise Linux Installation Guide	T full version of the *Installation Guide*.	Included on the Red Hat Documentation CD, and available for download at: http://www.redhat.com/docs/

TABLE 4-1 Sources for RHEL Documentation *(Continued)*

Document	Description	Where to Find
Red Hat Enterprise Linux Introduction to System Administration	Introductory information for RHEL system administrators.	Available for download at: `http://www.redhat.com/docs/manuals/enterprise/`
Red Hat Enterprise Linux System Administration Guide	Information on customizing the RHEL software.	Available for download at: `http://www.redhat.com/docs/manuals/enterprise/`
System Administration for Diskless Booting	Information on configuring your server and Red Hat Linux for diskless booting.	Available for download as the *Red Hat Enterprise Linux Installation Guide for the x86, Itanium™, and AMD64 Architectures* at: `http://www.redhat.com/docs/manuals/enterprise/`
Red Hat Enterprise Linux Security Guide	Guide for securing the RHEL software.	Available for download at: `http://www.redhat.com/docs/manuals/enterprise/`

Task Map for RHEL Installation

Consult TABLE 4-2 to determine which topics documented in this Guide are relevant to the installation tasks that you want to perform.

TABLE 4-2 Task Map for Installing RHEL

Installation Task	Relevant Topic
Collect information about your system and network.	"Preparing to Install RHEL" on page 28.
Install RHEL from distribution media using a local or network-attached CD or DVD drive.	"Installing RHEL From Distribution Media" on page 28.
Update RHEL OS files and drivers.	"Updating a RHEL OS" on page 41.
Run the Sun Installation Assistant (optional).	"Using the Sun Installation Assistant (SIA)" on page 7.

Preparing to Install RHEL

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

Additional Software Updates or Patches

After installing the RHEL software on the server, you might also need to update your system software with patches and packages. See "Updating a RHEL OS" on page 41 for details.

Obtaining Updated Media Kits

To install RHEL updates on a Sun Fire X4140, X4240, or X4440 server, you will need to obtain the RHEL 4 or RHEL 5 Update Media Kit, available at:
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 RHEL media kit.

Installing RHEL From Distribution Media

RHEL provides both a text mode and an easy-to-use graphical interface for installing and configuring the OS. At the boot prompt, you can select the interface that you want to use. Both options are shown later in this section.

Before You Begin

Installing RHEL software from CDs consists of the following procedures:

1. Download the updated media kit from `http://rhn.redhat.com`.

   See "Obtaining Updated Media Kits" on page 28.

2. Install the RHEL software.

3. Update the RHEL software.

   See "Updating a RHEL OS" on page 41.

Required Items

Installation from distribution media requires the following items:

- A Sun Fire X4140, X4240, or X4440 server equipped with:
  - USB keyboard and mouse
  - Internal CD/DVD
  - Monitor
- A RHEL media CD set
- A RHEL Installation Guide

▼ To Install RHEL From Local Media

1. **Power on the system.**

2. **Insert the RHEL Distribution CD 1 into the DVD/CD drive.**

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

3. **At the `boot` prompt, select one of the following:**
   - For text mode, enter the following command:

     `boot: linux text`
   - For graphical mode, press Enter.

4. **Refer to the** *Red Hat Enterprise Linux Installation Guide* **to guide you through the remainder of the installation process.**

5. **Proceed to** "Updating a RHEL OS" on page 41**.**

6. **Update the SCSI drivers.**

   See "To Update the RHEL SCSI Drivers" on page 42.

Installing the RHEL OS Using the Remote Console Application

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

Use the following procedure to install the RHEL 4.5 (or later) OS using the ILOM Remote Console application.

Note – Read the *Integrated Lights Out Manager (ILOM) Administration Guide* before completing the following steps. This guide provides details on using the ILOM service processor web interface to redirect the console.

▼ To Install Using the ILOM Remote Console Application

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

2. **Connect to the ILOM Service Processor Web interface.**

3. **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" chapter of the *Integrated Lights Out Manager (ILOM) Administration Guide* for further instructions.

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 several ways:

   - **CD-ROM**—If you are installing a physical CD into the remote console CD ROM drive, insert the CD into the drive and select CD-ROM.

- **ISO Image**—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 – Floppy diskette redirection is also available through the JavaRConsole. See the *Integrated Lights Out Manager (ILOM) Administration Guide* for more details.

---

10. **Turn on the server using the ILOM Web interface.**

11. **Set up the BIOS as follows:**

    a. **Press Ctrl-E to enter the BIOS Setup utility.**

    b. **Select the Boot menu.**

    c. **Select CD/DVD Drives.**

    d. **Set AMI Virtual CD as the first boot device.**

    e. **Press F10 to save changes and exit.**

    f. **Reboot the server.**

    g. **Press Ctrl-P to select CD/DVD as the boot device.**

12. **When the boot prompt appears, enter `linux text`.**

13. **When prompted to test the CD media before installation, select Skip if you do not want the media test to run.**

14. **Refer to the** *Red Hat Enterprise Linux Installation Guide* **to guide you through the remainder of the installation process.**

Red Hat Enterprise Linux and PXE

The on-board network interface card (NIC) in your Sun Fire X4140, X4240, or X4440 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 the 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 Red Hat Enterprise Linux (RHEL) image on your server.

Tip – PXE is a powerful and convenient solution for setting up a number of your Sun Fire X4140, X4240, or X4440 servers so that their configuration is identical.

⚠️ **Caution –** On the chassis, Ethernet ports are labeled NICi (i = 0,1,2,3). Linux internally represents Ethernet ports as ethj (j = 0,1,2,3). Labeling implies NICi -> ethj, where i=j. This is generally true, but for the for Sun Fire X4140, X4240, or X4440 servers the mapping is as follows:

NIC0 -> eth2
NIC1 -> eth3
NIC2 -> eth0
NIC3 -> eth1

Task Map

If you don't have PXE set up on your network and you would like to take advantage of PXE to install RHEL on your network, you need to perform the following tasks.

Task	Related Sections
Obtain the updated media kit at http://rhn.redhat.com.	"Obtaining Updated Media Kits" on page 28.
Set up your Linux network and PXE server.	"Preconfiguring Your Network to Support PXE Installation of RHEL" on page 32.
Install RHEL images on your PXE server.	"Creating a PXE Install Image on the PXE Server" on page 38.
Configure your server to install from a RHEL image on a PXE server.	"Installing RHEL From a PXE Server" on page 40.

Preconfiguring Your Network to Support PXE Installation of RHEL

Note – In the following sections, if you are installing RHEL 5.x, replace the appropriate RHEL 4 filenames with the names of the RHEL 5 files supplied in the resource CD.

This section describes how to preconfigure a network running RHEL to support PXE installation of RHEL software on a 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 steps:

1. **Configure a DHCP Server.**

   See .

2. **Install Portmap.**

   See .

3. **Configure the TFTP Service.**

   See .

4. **Configure Syslinux**

   See

5. **Configure the NFS Service.**

   See .

6. **Disable the Firewall.**

   See .

Required Items

Preconfiguring your network for PXE installation requires the following items:

- RHEL server equipped with the following:
  - CD/DVD drive internal to the server or connected to the server through a USB port
  - USB keyboard
  - Monitor
- RHEL media set
- Tools and Drivers CD

▼ To Configure a DHCP Server

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

1. **Turn 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-
   ```

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

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

4. **Enter the following command:**

```
# umount /mnt/cdrom
```

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

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

   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;}
```

   n.n.n.n is the PXE server's IP address.

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

   ```
   # umount /mnt/cdrom
   ```

▼ To Configure the TFTP Service 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. **Remove the CD from the server after you enter the following command:**

   ```
   # umount /mnt/cdrom
   ```

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

   Make the following changes:

   - Add `setsebool -P tftpd_disable_trans=1`
   - Change the `-s /tftpboot` entry to `-v -s /home/pxeboot`.
   - Change the disable attribute to `no`.

5. **Restart the inetd server. Enter:**

   ```
   # service xinetd restart
   ```

▼ To Configure Syslinux

1. **Determine whether the syslinux package is already installed on the server. Enter the following command:**

   # rpm -qa | grep syslinux

2. **If the syslinux package is not listed, insert the RHEL CD and install syslinux by entering the following commands.**

   # mount /dev/cdrom /mnt/cdrom

   # rpm -Uvh /mnt/cdrom/RedHat/RPMS/syslinux*

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

   # umount /mnt/cdrom

   Make sure pxelinux.0 **and** pxlinux.cfg/ **are in the** /home/pxeboot **directory. If not, copy these files to the** /home/pxeboot **directory.**

▼ To Configure the NFS Service 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. **Enter the following command:**

   # umount /mnt/cdrom

4. **Remove the CD from the server.**

5. **Edit and save the** /etc/exports **file to add the following line to it:**

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

6. **Start the NFS service. Enter:**

   # service nfs start

7. **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

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

If you enabled firewall security when you installed 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 the command:**

   ```
   # service ipchains stop
   ```

2. **Stop the** `iptables` **service. Enter the command:**

   ```
   # service iptables stop
   ```

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

   ```
   # chkconfig ipchains off
   ```

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

   ```
   # 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.

Installing RHEL From the Network

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

This procedure describes how to create a 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 32.

Required Items

The PXE installation procedure requires the following items:

- A CD/DVD drive on the DHCP Server
- RHEL 4.5 (or later) or RHEL 5 media CD set (see "Obtaining Updated Media Kits" on page 28)
- Tools and Drivers CD

▼ To Create a RHEL Image on Your PXE Install Server

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

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

or

```
# mkdir -p /home/pxeboot/rhel5/
```

Note – You can use a different target directory than the `/home/pxeboot/rhel4/` (or `/home/pxeboot/rhel5/`) directory shown below. The examples in this procedure use this directory.

---

2. **For each RHEL Distribution CD, enter the following commands to copy the contents of the CD to the appropriate PXE target subdirectory:**

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

   ```
   # cp -a /mnt/cdrom/* /home/pxeboot/rhel4/
   ```

   ```
   # umount /mnt/cdrom
   ```

   If you are prompted whether to overwrite any existing files, enter **y** to overwrite the files.

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

   Note – After you have finished, verify that `/home/pxeboot/rhel4/` or `/home/pxeboot/rhel5/` contains the `vmlinuz` and `initrd.img` files. If they are not there, locate them in a subdirectory (probably `rhel4/images` or `rhel5/images`) and copy them to `/home/pxeboot/rhel4/` or `/home/pxeboot/rhel5/`.

   ---

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

   ```
   # cp /tmp/rhel4-pxefile/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.

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

   Edit the nfs line 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.

5. **Create a default directory for the** `pxelinux.cfg` **image:**

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

6. **Append the following entry to the file**
   `/home/pxeboot/pxelinux.cfg/default`**:**

> **Note –** Enter the text block from append to ks=nfs:n.n.n.n:/home/pxeboot/ 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/
```

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.

7. **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 X4140, X4240, or X4440 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 X4140, X4240, or X4440 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 32.
- Installed a RHEL image on your Linux PXE server. See "Creating a PXE Install Image on the PXE Server" on page 38.

▼ To Install RHEL from a PXE Server

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

   The PXE client is the target Sun Fire X4140, X4240, or X4440 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 X4140, X4240, or X4440 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 SCSI drivers.**

   See "To Update the RHEL SCSI Drivers" on page 42.

7. **Update the OS files.**

   See "Updating a RHEL OS" on page 41.

Updating a RHEL OS

Since software is constantly being updated, your distribution media might not contain the most up-to-date versions of the OS.

The following procedures assume that you have already installed the RHEL software on the Sun Fire X4140, X4240, or X4440 server. This procedure explains how to update the RHEL installation with the latest OS.

To use the RHEL 5 update program, your server must be registered with the Red Hat Network (RHN).

▼ To Update the RHEL 4 Software

This procedure assumes 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.

▼ To Update the RHEL 5 Software

Your system must have access to the internet and be registered with the Red Hat Network.

1. **To run the** yum **update program, enter:**

   ```
   # yum
   ```

   The program checks that the machine is registered with Red Hat Network. If so, yum downloads necessary updates from the Red Hat Network repository.

2. **Answer the questions and make your choices before the packages are downloaded and installed.**

   You should periodically update your system using yum.

   For more information, refer to the man page. Enter:

   ```
   # man yum
   ```


▼ To Update the RHEL SCSI Drivers

Insert the Tools and Drivers CD for your Sun Fire X4140, X4240, or X4440 server and mount it onto the directory /mnt:

1. **Insert the Tools and Drivers CD for your server.**

2. **Mount it onto the directory** /mnt:

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

3. **Enter the following commands:**

   ```
   # cd /mnt/Linux/drivers
   ```
   ```
   # rpm -ivh driver-filename
   ```

   For example, for RHEL 5.1 and 5.2, 64 bit for the Sun Fire X4140 server:

   ```
   # cd /mnt/Linux/drivers
   ```
   ```
   # rpm  -ivh mptlinux-4.00.43.00-1-rhel5.x86_64.rpm
   ```

Note – Check the `/linux/drivers` directory on your Tools and Drivers CD for the correct driver file name for your operating system.

---

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

   # **reboot**

Installing Solaris 10

Use this chapter in conjunction with the referenced Solaris 10 documentation to install the Solaris OS on a Sun Fire X4140, X4240, or X4440 server. This chapter contains the following sections:

Note – If you want to mirror your OS, the recommended procedure is to create a hardware RAID before you install the OS.

- If you are using an Adaptec-based Sun StorageTek SAS RAID Internal HBA (PCIe card), see Appendix A.
- If you are using an LSI-based Sun StorageTek PCI Express SAS 8-Channel HBA (SG-XPCIE8SAS-I-Z) that controls *internal* disks, see Appendix B.
- If you are using an LSI-based Sun StorageTek PCI Express SAS 8-Channel HBA (SG-XPCIE8SAS-E-Z) that controls *external* disks, RAID is not available.

Note – If you are configuring the preinstalled Solaris 10 OS that is shipped with the server, refer to the *Sun Fire X4140, X4240, and X4440 Servers Installation Guide (820-2394)*. This chapter contains instructions for installing the Solaris 10 OS from a network or media only.

Before You Begin

Note – 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. For supported systems, see the Solaris Hardware Compatibility List.

Before you begin installing the Solaris 10 OS, review the information in this section.

Note – The installation procedures in this chapter are intended for experienced system administrators who are familiar with using the Solaris OS on an x86 platform.

Minimum System Requirements

TABLE 5-1 lists the minimum system requirements for installation of the Solaris 10 OS.

TABLE 5-1   Minimum System Requirements

Requirement	Description
Hardware requirements	The server hardware and the initial service processor configuration must be installed before you install the Solaris OS.
Minimum Solaris OS version	Solaris 10 8/07 for your Sun Fire X4140, X4240, or X4440 server. Download or order the media for Solaris 10 at: http://www.sun.com/software/solaris/get.jsp
Memory to install	Memory size is between 4 GB and 64 GB.
Disk space	12 Gbytes or greater.
Swap area	512 MB is the default size.
x86/x64 processor requirements	x86/x64 120 MHz or faster processor is recommended. Hardware floating point support is required.
BIOS	Industry standard x86/x64 BIOS (resident in FLASH). The BIOS must be able to boot from CD or DVD media.

Additional Software Information

- The Tools and Drivers CD is available online. It contains updates and additional software. For updates on Solaris 10 versions and hardware compatibility, go to:

  http://www.sunsolve.sun.com

- The Solaris 10 OS box contains the CD and DVD media and documentation that you will need to install the Solaris OS software for both the SPARC and x86 platforms. For a Sun Fire X4140, X4240, or X4440 server, use the media for x86 platforms.

Installation Methods

The server supports several methods for installing the Solaris OS. TABLE 5-2 lists the installation methods and points to the relevant section or document.

Note – The Solaris OS provides additional programs for installation, such as booting over a wide area network (WAN). However, the server supports only those methods listed in TABLE 5-2.

TABLE 5-2   Installation Methods

Method	Description	Section/Document
Install from DVD or CD-ROM media.	Use the Solaris Installation Program on the CD or DVD media to install one server interactively.	"Installing the Solaris OS From Distribution Media" on page 53.
Install from the network by using PXE.	You need a PXE installation to install the Solaris OS over the network from remote DVD or CD images or to automate the installation process and install several systems with a JumpStart installation. To boot over the network by using PXE, you need to set up an install server and a DHCP server, and configure the BIOS on each server to boot from the network.	To set up for a PXE installation, see "x86: Guidelines for Booting with PXE," in the *Solaris 10 Installation Guide: Network-Based Installations.* To boot by using PXE, see "Booting a Server Over the Network by Using PXE" on page 52.

TABLE 5-2 Installation Methods *(Continued)*

Method	Description	Section/Document
Boot from the preinstalled image.	Depending on your configuration, a Solaris OS image may be preinstalled on a hard drive.	*Solaris 10 Installation Guide: Basic Installations.*
Install from a serial console.	Use a serial console to install the Solaris OS in a PXE-based network installation.	"Using a Serial Console to Install the Solaris OS" on page 54.
Perform a diskless boot.	Boot the Solaris OS on a server without a hard drive. Use this method with a PXE-based network installation.	"x86: Booting and Installing Over the Network PXE," in the *Solaris 10 Installation Guide: Network-Based Installations.*

Where to Find Solaris 10 Information

The installation procedures in this chapter reference several Solaris OS documents. Solaris OS documentation is available from the web at

http://docs.sun.com

At the above URL, select Solaris 10 to display the list of documents in the Solaris 10 Documentation Collection.

- See the Solaris 10 installation guides at:

  http://docs.sun.com/app/docs/coll/1236.5

- See the Solaris 10 administration guides at:

  http://docs.sun.com/app/docs/coll/47.16

- See information about upgrading your system at:

  http://docs.sun.com/app/docs/doc/817-5505

- See troubleshooting information in Appendix A at:

  http://docs.sun.com/app/docs/doc/817-5504

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

Task Map for Initial Solaris OS Installation

A task map for initial Solaris OS installation is presented in TABLE 5-3. The table lists the task, a description of each task, and the section or document.

TABLE 5-3   Task Map for Initial Solaris OS Installation

Task	Description	Source
Set up your server.	Install your server hardware and configure the service processor.	*Sun Fire X4140, X4240, and X4440 Servers Installation Guide* (820-2394)
Review the *Sun Fire X4140, X4240, and X4440 Product Notes*.	The Product Notes contain late-breaking news about the Solaris OS software and patches.	*Sun Fire X4140, X4240, and X4440 Servers Product Notes* (820-2396)
Review the system requirements.	Verify that your server meets the minimum system requirements.	TABLE 5-1
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 48
Install the Solaris OS.	Choose an installation method and locate the installation instructions.	TABLE 5-2
Install additional software, if necessary.	The Solaris OS drivers for the server are bundled in the Solaris OS. However, you may need to install additional software from the Tools and Drivers CD.	*Sun Fire X4140, X4240, and X4440 Servers Product Notes* (820-2396)
Install patches, if necessary.	Patches are available from the SunSolve Patch Portal at http://www.sunsolve.sun.com.	*un Fire X4140, X4240, and X4440 Servers Product Notes* (820-2396)

Preparing to Install the Solaris OS

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

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

Media	Title
DVD	Solaris 10 OS *version*[*] DVD
CD-ROM	Solaris 10 OS *version* Software CDs
	Solaris 10 *version* Languages for x86 Platforms CD
	Tools and Drivers CD
Patches	See the *Sun Fire X4140, X4240, and X4440 Servers Product Notes* (820-2396) for information about patches.

* Replace *version* with the version of the Solaris OS you want to install.

Installation Prerequisites

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

1. Verify that your system meets the minimum system requirements (see TABLE 5-1**).**

If you are using the Solaris Installation Program GUI or text installer, you need a local DVD-ROM or CD-ROM drive or network connection, keyboard, and monitor. For more information, see the *Solaris 10 Installation Guide: Basic Installations*, at `http://docs.sun.com/app/docs/prod/solaris.10#hic`. Refer to your platform supplement for hardware questions.

2. Gather the information you need to install the Solaris OS.

See the "Checklist for Installation" in Chapter 1 of the *Solaris 10 8/07 Installation Guide: Basic Installations*.

For a non-networked system, you need to know the host name of the system you are installing and the language and the locales that you intend to use on the system.

For a networked system, use the checklist to gather the following information:

- Host name of the system that you are installing
- Language and locales that you intend to use on the system
- IP address of the name server
- Subnet mask
- Type of name service (for example, DNS, NIS, or NIS+)
- IP address of the gateway
- Domain name
- Host name of the name server

- IP address of the name server
- Root password

3. **If you are installing the Solaris OS over the network, you need to set up a PXE-based network installation before you install the Solaris OS.**

   For information about setting up a PXE-based network installation, see the *Solaris 10 8/07 Installation Guide: Network-Based Installations* at:

   http://docs.sun.com/app/docs/prod/solaris.10#hic.

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

Booting a Server in a GRUB-Based Environment

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

For information about how to boot a server that is running Solaris 10 in a GRUB-based environment, refer to the *Solaris 10 System Administration Guide: Basic Administration* at:

http://docs.sun.com/app/docs/prod/solaris.10#hic

Booting a Server Over the Network by Using PXE

Use this procedure along with the instructions in *Solaris 10 Installation Guide: Networked-Based Installations*.

The Sun Fire X4140, X4240, or X4440 server implements the Intel Preboot Execution Environment (PXE) specification required for a PXE network boot. PXE technology provides your server with the capability to boot the Solaris OS over the network using the Dynamic Host Configuration Protocol (DHCP). Using a PXE-based network installation, you can install the Solaris OS onto a server from the network with remote CD or DVD images. You can also automate the installation process and install the Solaris OS on several servers using a JumpStart scenario.

A PXE network boot is a direct network boot. No boot medium is required on the Sun Fire X4140, X4240, or X4440 server client system.

Before You Begin

To boot over the network using PXE, you first need to do the following:

1. **Set up an install server.**

2. **Add the Sun Fire X4140, X4240, or X4440 server clients to be installed.**

3. **Set up a DHCP server.**

For instructions, see Step 1 in the following section.

▼ To Boot a Server Over the Network Using PXE

1. **Perform the tasks in "Guidelines for Booting with PXE," in the** *Solaris 10 8/07 Installation Guide: Network-Based Installations*, http://docs.sun.com/app/docs/prod/solaris.10#hic.

   If you have already set up the systems you need for a PXE boot, review the Task Map (TABLE 5-3) to verify that you have performed all the steps.

2. **Boot the server over the network by using PXE.**

   Complete the steps in *Solaris 10 8/07 Installation Guide: Network-Based Installations* at `http://docs.sun.com/app/docs/prod/solaris.10#hic`. Follow the on screen instructions.

   When the BIOS screen appears, press F12 to tell the BIOS to perform a network boot from the PXE server.

Installing the Solaris OS From Distribution Media

Use this procedure to install the Solaris OS on a the server from CD or DVD media. This procedure describes an interactive installation using the Solaris Installation Program.

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

Note – The Solaris 10 OS is preinstalled on the server. You do not need to follow this procedure unless you are installing a new OS version.

Before You Begin

Perform the tasks described in "Preparing to Install the Solaris OS" on page 49.

▼ To Install the Solaris OS From Distribution Media

1. **Boot the system by powering the server off and on.**

   The server BIOS supports booting from a DVD or CD.

2. **Insert the Solaris 10 OS CD/DVD into your server's CD/DVD drive.**

3. **Continue the installation procedure by performing the steps in the procedure "x86: To Install or Upgrade with the Solaris Installation Program" in Chapter 2 at** `http://docs.sun.com/app/docs/prod/solaris.10#hic`**.**

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

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

Using a Serial Console to Install the Solaris OS

The Solaris OS text installer enables you to type information in a terminal or a console window to interact with the Solaris OS Installation Program. Use this procedure to use a serial console to install the Solaris 10 OS on your server with a PXE-based network installation.

Before You Begin

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

■ An install server
■ A DHCP server

For information about how to set up these systems, see *Solaris 10 Installation Guide: Network-Based Installations* at `http://docs.sun.com/app/docs/doc/817-5504/`.

▼ To Use a Serial Console to Install the Solaris OS

Note – For Steps 1 through 3, see the *Solaris 10 8/07 Installation Guide: Network-Based Installations* at `http://docs.sun.com/app/docs/prod/solaris.10#hic`.

---

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

A terminal can be a VT100, a PC running terminal emulation, or a terminal server.

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

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

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

4. **Log in to the service processor using an account with Administrator privileges.**

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

   ```
   start /SP/console
   ```

6. **Boot the server.**

   Follow the instructions in *Solaris 10 8/07 Installation Guide: Network-Based Installations* at http://docs.sun.com/app/docs/prod/solaris.10#hic. When prompted, press F12 at the BIOS to boot via PXE.

   After the system is installed, log in to the system and use the eeprom command to change bootenv.rc:

   ```
   # eeprom console=ttya
   ```

Power Management

The Solaris OS provides the ability to perform power management. It can be configured to automatically power off idle system components.

Note – To save power, we recommend that you enable power management for your hard drives.

The file /etc/power.conf contains the configuration settings. It is initialized during boot-up, and can be initialized from the command line by entering the command pmconfig.

The autopm entry in /etc/power.conf is used to enable or disable power management on a system-wide basis. The format of the autopm entry is:

```
autopm behavior
```

where *behavior* can be `default`, `enable`, or `disable`. TABLE 5-4 describes the behavior for each of these three values.

TABLE 5-4   `autopm` Parameters

Parameter	Description
default	Systems that fall under the United States Environmental Protection Agency's Energy Star Memorandum of Understanding #3 have automatic device Power Management enabled. All others do not.
enable	Automatic device Power Management is started when this entry is encountered.
disable	Automatic device Power Management is stopped when this entry is encountered.

For additional information, see the man pages for `pmconfig` and `power.conf`.

OpenSolaris Installation

This chapter provides information about installing the OpenSolaris 2009.06 Operating System (OpenSolaris OS) on the Sun Fire X4140, X4240 and X4440 servers.

This chapter includes the following topics:

- "OpenSolaris Installation Overview" on page 58
- "Installation Methods" on page 59
- "Installing OpenSolaris OS Using Local or Remote Media" on page 61
- "Post OpenSolaris Installation Tasks" on page 69

For information describing how to configure the preinstalled OpenSolaris OS image, see your server installation guide for setup instructions.

Note – Before you begin to install the OS you must have already configured the BIOS for your controller card (see "Configuring LSI RAID for Any Operating System from the BIOS" on page 91).

OpenSolaris Installation Overview

The procedures in this chapter cover the installation of the OpenSolaris OS and supported drivers for a new installation. See TABLE 6-1 for the OpenSolaris installation task map

TABLE 6-1   Task Map for Initial OpenSolaris OS Installation

Task	Description	Instructions
Set up your server.	Install your server hardware and configure the service processor.	See your server's installation guide.
Prepare your server for OS installation.	Set the display environment.If necessary, erase the primary boot disk.	Chapter 1
Set up your system for a RAID or non-RAID configuration based on the SAS controller card.	Your server supports two SAS controller cards. RAID set up is different for each card.	"Configuring LSI RAID for Any Operating System from the BIOS" on page 91
Review the your server's product notes.	The product notes contain late-breaking news about the OpenSolaris OS software and patches.	See your server's product notes.
Install the OpenSolaris OS.	Choose an installation method and locate the installation instructions.	"Installation Methods" on page 59
Install patches, if necessary.	Patches are available from the SunSolve Patch Portal at: http://www.sunsolve.sun.com	See your server's product notes.

Installation Methods

See TABLE 6-1 for installation methods.

TABLE 6-1   The OpenSolaris OS Installation Methods

Method	Description	Section/Procedure
Install from local media.	Use the OpenSolaris Installation Program on the CD or DVD media to install one server interactively.	"Installing Using a Local Drive" on page 59.
Install from a remote console.	Usethe ILOM Remote Console to in the OpenSolaris OS.	"Installing Using the ILOM Remote Console" on page 60
Boot from the preinstalled image.	Depending on your configuration, a OpenSolaris OS image may be preinstalled on a hard drive.	See your server installation guide.

Installing Using a Local Drive

This installation method requires access to the local server on which you want to install OpenSolaris.

Before You Begin

Requirements for remote console installation:

- CD/DVD drive connected to the local server.
- Monitor, keyboard and mouse connected to the local server.
- Media for installing OpenSolaris 2009.06 (or subsequent release).

For installation procedures, see "Installing OpenSolaris OS Using Local or Remote Media" on page 61.

Installing Using the ILOM Remote Console

This installation method includes directing the server output to the local console or to a remote console (RVKM) when the local CD/DVD drive is used.

This method includes using a remote networked server to install the OS onto your server. The CD/DVD drive of the remote system (virtual CDROM) is used to access the OS media, and all output of the server is displayed on the remote system (remote console).

Information about the using keyboard, mouse, video, storage (KVMS) over IP can be found in the ELOM or ILOM documentation.

Before You Begin

Requirements for remote console installation:

- Remote server connected to the network.
- One of the following browsers on the remote system: Internet Explorer, Mozilla, or Firefox.
- CD/DVD drive connected to the remote server.
- Media for installing OpenSolaris 2009.06 (or subsequent release).
- SP of the server set up as instructed in the server's installation guide.
- You must be logged in to the remote server as **root**.

▼ To Install Using the ILOM Remote Console

1. **On a remote system, open a browser, and enter the IP address of the service processor of the server on which you want to install the OS.**

   The login screen appears.

2. **Enter a user name and password that has administrator privileges.**

   The web GUI main screen appears.

3. **Disable the session timeout.**

   a. **To access the Session Time-Out screen, click the System Information tab, and then click the Session Time-Out submenu tab.**

   The Session Time-Out screen appears.

   b. **Click the Disable Timeout radio button, and then click Submit.**

4. **From the main menu, click the Remote Control tab and select Redirection.**

   The Redirection screen appears with a Launch Redirection button.

5. **Click the Launch Redirection button to open a remote console window.**

   A screen appears with a Launch button. It also identifies your current host name, IP address, and user name.

6. **Click Launch.**

7. **Insert the OS CD/DVD to be installed on the server into the local CD/DVD drive.**

8. **In the remote console window, select Storage, and then select Mount devices.**

   The Device Configuration window appears.

Note – If the local server has a CD/DVD drive, be sure that it does not contain bootable medium, or configure the server's BIOS so that the virtual CD/DVD drive is higher on the boot list than the local CD/DVD drive.

---

9. **In the Storage 1 Source field, from the drop-down list, select the CD/DVD drive that you are using to install the OS.**

10. **Click Submit.**

11. **The instructions for installing the OS are the same as the instructions for using a local CD/DVD drive and monitor. See** "Installing OpenSolaris OS Using Local or Remote Media" on page 61**.**

Installing OpenSolaris OS Using Local or Remote Media

The following procedure describes how to boot the OpenSolaris 2009.06 Operating System installation from local or remote media. It assumes that you are booting the installation media from one of the following sources:

- OpenSolaris 2009.06 (or subsequent release) Live CD/DVD (internal or external CD/DVD)

- OpenSolaris 2009.06 (or subsequent release) Live CD ISO image (network repository)

Before You Begin

Prior to performing the installation, the following requirements must be met:

- All applicable installation prerequisites for installing an operating system should have been met. For further information about these prerequisites, see "OpenSolaris Installation Overview" on page 58.

- An installation method (for example: console, boot media, and installation target) should have been chosen and established prior to performing the installation. For information about these setup requirements, see "Installation Methods" on page 59.

Note that the following procedure explains the initial steps for booting the installation media and launching the OpenSolaris installation program.

After completing this procedure, you should review and perform the required post installation tasks described later in this chapter. For more details, see "Post OpenSolaris Installation Tasks" on page 69.

▼ Install OpenSolaris OS Using Local or Remote Media

1. **Ensure that the installation media is available to boot.**

   - **For distribution CD/DVD**. Insert the OpenSolaris 2009.06 Distribution Media (CD labeled 1 or the single DVD) into the local or remote CD/DVD-ROM drive.

   - F**or ISO image**. Ensure that the ISO images are available and that the Sun ILOM Remote Console application is aware of the first ISO image location.

   For additional information about how to set up the installation media, see "Installation Methods" on page 59.

2. **Reset the power on the server.**

   For example:

   - **From the ILOM web interface**, select the `Remote Control --> Remote Power Control` tab, then select the `Power Cycle` option from the Host action drop-down list box.

   - **From the local server**, press the Power button (approximately 1 second) on the front panel of the server to turn the server off, then press the Power button again to power on the server module.

   - **From the ILOM CLI on the server SP**, type: `reset /SYS`

   The BIOS screen appears.

AMIBIOS(C)2006 American Megatrends, Inc.
BIOS Date: 11/19/08 15:40:21 Ver: 08.00.15
Sun BIOS Revision: 07.01.30.00
Sun Fire X4170 Server   CPU Power (TDP Limit) = 95 Watts
Product Serial Number:0000000000
CPU : Genuine Intel(R) CPU   @ 0000 @ 2.67GHz
 Speed : 2.66 GHz   Count : 16

Press F2 to run Setup (CTRL+E on Remote Keyboard)
Press F12 if you want to boot from the network (CTRL+N on Remote Keyboard)
Press F8 for BBS POPUP (CTRL+P on Remote Keyboard)
QPI Operational Speed at : 6.4GT/s
BMC Firmware Revision: 2.0.2.9
Initializing USB Controllers ..

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

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

The Please Select Boot Device menu appears.

Please select boot device:

USB:Port1:TSSTcorp CD/DVDW
USB:Port4:AMI Virtual CDROM
USB:Port0:TUSB6250 USB20
USB:Port2:ST 4GB
USB:Port3:ST 4GB
SCSI:Slot3.F0:#0D00 ID01 LUN0 FUJITSU MBB2147RC
PXE:IBA GE Slot 0701 v1324
PXE:IBA GE Slot 0700 v1324
PXE:IBA GE Slot 0101 v1324
PXE:IBA GE Slot 0100 v1324

↑ and ↓ to move selection
ENTER to select boot device
ESC to boot using defaults
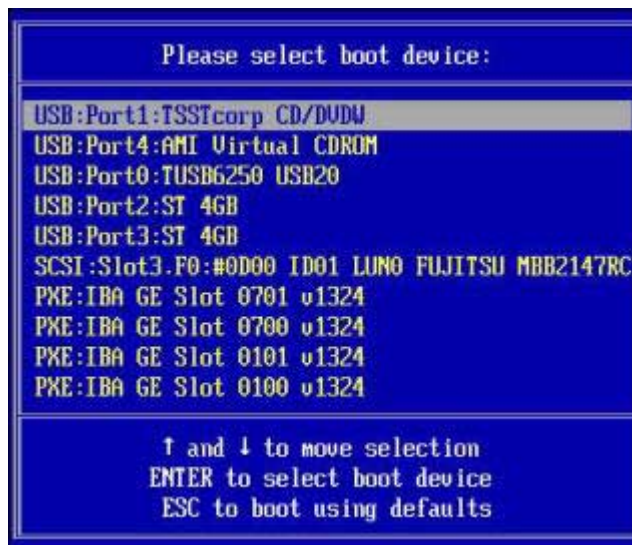
4. In the Boot Device menu, select either the external or virtual CD/DVD device as the first (temporary) boot device, then press Enter.

In the sample Boot Device menu shown in Step 3, the CD/DVDW device is specified as the first boot device.

The device strings listed on the Boot Device menu are in the format of:

device type: slot indicator: *product ID string*

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

The GRUB menu appears.
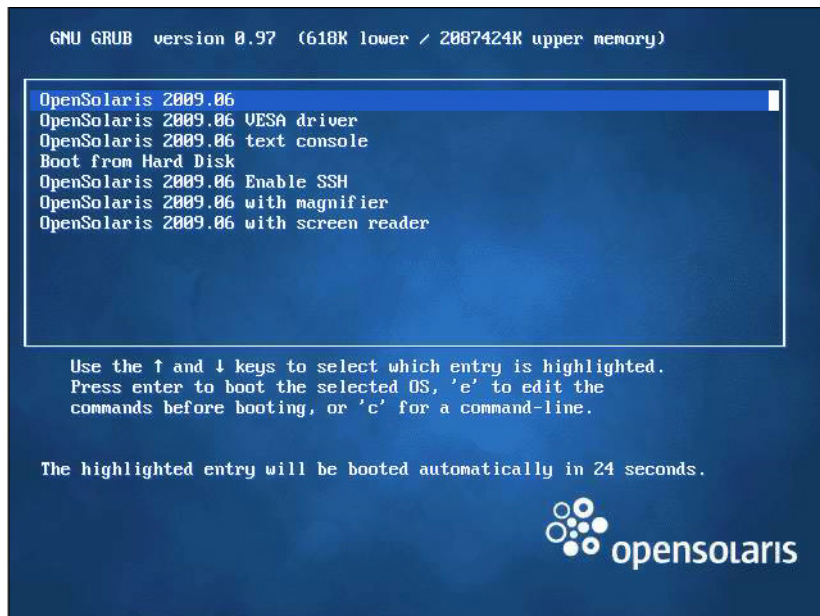
5. In the GRUB menu, select `OpenSolaris 2009.06`, then press Enter.

Note – In the GRUB menu, if you want to redirect the installation output to a serial console, press "e" to edit the GRUB menu to support a serial console (`-B console = ttya`).

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

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

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

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

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

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

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

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

   After a few moments the OpenSolaris 2009.06 desktop appears.
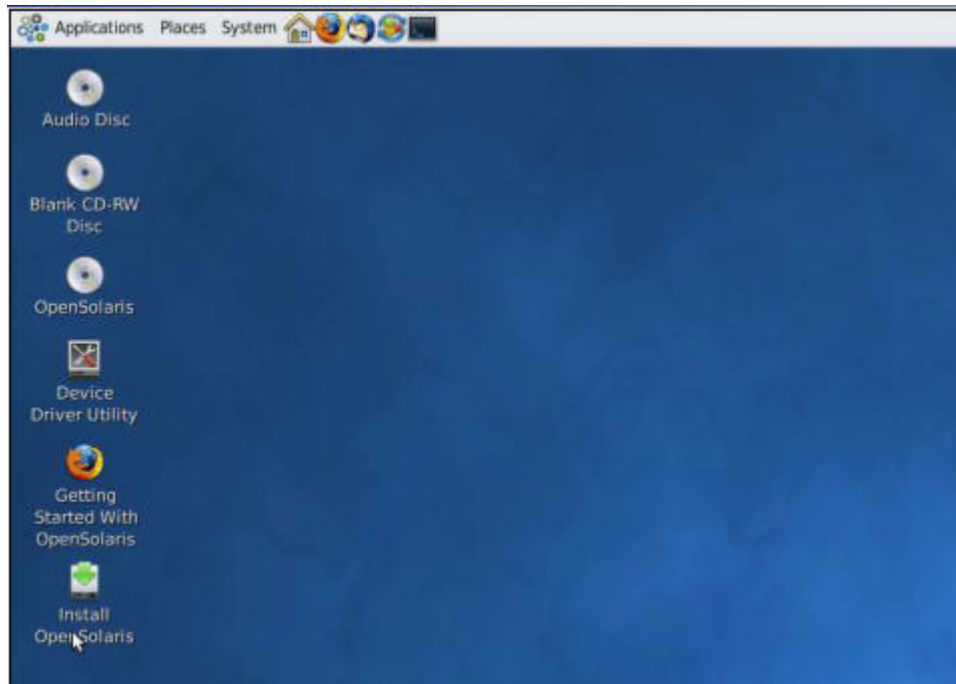
8. In the OpenSolaris desktop, double-click the Install OpenSolaris icon to begin the OS installation.

The OpenSolaris Installer Welcome screen appears.

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

   The OpenSolaris installation program will display several configuration screens.

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

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

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

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

---

11. **Proceed to the section** "Post OpenSolaris Installation Tasks" on page 69 **to perform the post OpenSolaris configuration tasks.**

Post OpenSolaris Installation Tasks

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

- "Install System Device Drivers to Support Additional Hardware" on page 69
- "Install Support Repository Updates" on page 69
- "Enable the Option for Wake On LAN" on page 69 (optional)

Install System Device Drivers to Support Additional Hardware

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

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

Install Support Repository Updates

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

Directions for accessing and installing SRUs can be found at:

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

Enable the Option for Wake On LAN

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

Installing VMware

This chapter contains information about installing a VMware ESX Server 4 OS on a Sun Fire X4140, X4240, or X4440 server.

Note – If you want to mirror your OS, the recommended procedure is to create a hardware RAID before you install the OS.

- If you are using an Adaptec-based Sun StorageTek SAS RAID Internal HBA (PCIe card), see Appendix A.
- If you are using an LSI-based Sun StorageTek PCI Express SAS 8-Channel HBA (`SG-XPCIE8SAS-I-Z`) that controls *internal* disks, see Appendix B.
- If you are using an LSI-based Sun StorageTek PCI Express SAS 8-Channel HBA (`SG-XPCIE8SAS-E-Z`) that controls *external* disks, RAID is not available.

Before You Begin

Review the following sections:

- "Task Map for VMware ESX Server 3 Installation" on page 72
- "VMware Installation and Administration Documentation" on page 72

Task Map for VMware ESX Server 3 Installation

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

Installation Task	Relevant Section
Collect information about your system.	"VMware Installation and Administration Documentation" on page 72.
Plan your network interface.	"Planning Network Interfaces" on page 73
Choose an installation method.	"Select an Installation Method" on page 73
Download ISO image.	"Downloading the VMWare ESX Server ISO Image" on page 74.
Download ISO image and burn to CD.	"Downloading the VMWare ESX Server ISO Image" on page 74.
Identify a specific network interface.	"Planning Network Interfaces" on page 73
Complete the VMware ESX Server 3 software installation.	Refer to: http://www.vmware.com/support/pubs/ vi_pubs.html.
Update the ESX Server 3 software if necessary.	"VMware Updates and Patches" on page 77

VMware Installation and Administration Documentation

Before you begin installing VMware ESX Server 3 software on a Sun Fire X4140, X4240, or X4440 server, collect the necessary information pertinent to your situation by consulting the following required documents at:

http://www.vmware.com/ support/pubs/vi_pubs.html

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

Planning Network Interfaces

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

  Refer to the *Sun Fire X4140, X4240, and X4440 Servers Service Manual* for detailed information concerning network interface cabling and the BIOS considerations of these interfaces.

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

Select an Installation Method

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

- **A remote ISO image** downloaded from the VMware website, redirected through Java remote console.
- **A remote CD/DVD drive** (with a disk burned from the ISO image downloaded from the VMware website) redirected through Java remote console.
- **A local CD/DVD drive** with a disk burned from the ISO image downloaded from the VMware website.
- **Automatic kickstart installation** from VMware software (installation tree) stored on a Preboot Execution Environment (PXE) network server.

This chapter contains the procedures for the first three methods. For information about preparing for PXE install, see the VMware I*nstallation and Upgrade Guide for VESX Server 3 and Virtual Center 2.0,* Chapter 6, "Remote and Scripted Installations" at `http://www.vmware.com/ support/pubs/vi_pubs.html.`

VMware ESX Server 3 Installation Overview

- Read the required documents for VMware ESX Server 3, available at

  `http://www.vmware.com/support/pubs/vi_pubs.html.`

- Decide which of the installation methods you will use:

- From a remote ISO image or from a remote CD/DVD (with a disk burned from an ISO image drive) see "Installing the VMware ESX Server OS Using the Remote Console Application" on page 74):

  -or-

- From the server's CD/DVD drive (with a disk burned from an ISO image) connected to the Sun Fire X4140, X4240, or X4440 server see "To Install VMware ESX Server 3 From a Local CD/DVD Drive" on page 76.

Downloading the VMWare ESX Server ISO Image

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

▼ To Download the VMware ESX Server ISO Image

1. **Download the ISO image using a network-connected system with CD-burning capabilities from:**

   http://www.vmware.com/download/vi/eval.html

2. **Optionally, burn the image to a CD.**

Installing the VMware ESX Server OS Using the Remote Console Application

This section explains how to install the VMWare ESX OS on your server using the Integrated Lights Out Manager (ILOM) Remote Console application.

Note – Read the *Integrated Lights Out Manager (ILOM) Administration Guide* before completing the following steps. This guide provides details on using the ILOM Service Processor Web interface to redirect the console.

▼ To Install Using the ILOM Remote Console Application

1. **Locate your VMWare ESX Server installation CD/DVD or the equivalent ISO image.**

2. **Connect to the ILOM Service Processor Web interface.**

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" chapter of the *Integrated Lights Out Manager (ILOM) Administration Guide* for further instructions.

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

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

---

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

    From your network-connected system go to:

    http://www.vmware.com/support/pubs/vi_pubs.html.

11. **Identify the specific network interface.**

    In the service console window on the Sun Fire X4140, X4240, or X4440 server, identify the available network configuration alternatives (see FIGURE 7-1).

▼ To Install VMware ESX Server 3 From a Local CD/DVD Drive

1. **Connect a USB Keyboard and Mouse to the USB ports on the server.**

2. **Connect a monitor to the server.**

3. **Power on the server.**

4. **Insert the media into the server's CD/DVD drive. The server will boot from the CD/DVD and display a boot prompt:**

   ```
   boot:
   ```

5. **To access the graphical mode, press Enter.**

6. **To work in text mode, enter the following:**

   esx text

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

   From your network-connected system go to:

   http://www.vmware.com/support/pubs/vi_pubs.html.

8. **Identify the specific network interface.**

   In the service console window on the Sun Fire X4140, X4240, or X4440 server, identify the available network configuration alternatives (see FIGURE 7-1). The listing may differ depending on the NICs installed in your server.

FIGURE 7-1   ESX Server 3 Network Configuration Dialog Box

9. **Complete the VMware installation.**

   This is detailed in the *Installation and Upgrade Guide for VMware Infrastructure* at:

   http://www.vmware.com/support/pubs/vi_pubs.html.

VMware Updates and Patches

VMware ESX Server 3 update images are available for download at:

http://www.vmware.com/selfsupport/download

Installing VMware ESXi Installable

This chapter explains the procedure to install VMware ESXi Installable on the Sun Fire X4140, xX4240 and X4440 server.

- "Task Map for VMware ESXi Installable Installation" on page 80
- "VMware Installation and Administration Documentation" on page 80
- "Installing VMware ESXi Installable from CD-ROM" on page 81
- "VMware ESXi Installable Installation Requirements" on page 82

About VMware

Although you can install the VMware ESXi Installable software from a local CD/DVD or a remote CD/DVD, you will need to collect some information about your system before you proceed with any of these installation methods.

You can find detailed information and procedures concerning VMware virtualization software at:

http://www.vmware.com/support/pubs

The most common method to install VMware on your server is:

- Installation from a downloaded image from the VMware website and burned onto CD-ROM media.

VMware Installation and Administration Documentation

Before you begin installing VMware ESXi Installable software on a Sun Fire X4140, X4240 or X4440 server, consult the following required documents for VMware ESXi Installable install, at:

http://www.vmware.com/support/pubs/vi_pubs.html

- *Introduction to VMware Infrastructure (PDF)*
- *Getting Started with ESX Server 3i Installable (PDF)*
- *Configuration Maximums for VMware Infrastructure 3 (PDF)*
- *ESX Server 3i Installable Setup Guide (PDF)*
- *Upgrade Guide (PDF)*
- *Basic System Administration (PDF)*
- *ESX Server 3i Configuration Guide (PDF)*
- *Resource Management Guide (PDF)*
- *Fibre Channel SAN Configuration Guide (PDF)*
- *iSCSI SAN Configuration Guide (PDF)*
- *Virtual Machine Backup Guide (PDF)*

Task Map for VMware ESXi Installable 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.	"VMware Installation and Administration Documentation" on page 80.
Download iso image. If using a physical CD, burn to CD.	"What to Do" on page 81.
Begin installing the VMware ESXi Installable software using a local or network-attached CD or virtual CD drive.	"How To Install From Local Media" on page 82.
Complete the VMware ESXi Installable software installation.	Refer to: http://www.vmware.com/support/pubs/vi_pubs.html
Update the ESXi Installable software if necessary.	"VMware Updates and Patches" on page 82.

Installing VMware ESXi Installable from CD-ROM

The following procedure applies to installing VMware ESXi Installable from a local CD-ROM or a virtual CD-ROM redirected from Java Console.

Before You Begin

- Read the required documents for VMware ESXi Installable.
- If no internal CD-ROM is available, use a network-attached virtual CD (or a USB CD-ROM). For example, you can use ILOM Remote Console to redirect the CD image.

What to Do

The general procedure for installing ESXi Installable follows these steps.

From a network-connected system with CD-burning capabilities:

1. Download the iso image from:

   http://www.vmware.com/download/vi/eval.html

2. (Optional) Burn the image to a CD.

Note – If Java Remote Console is used to redirect a CD drive or image, you can select "Host Device" as the device type.

---

3. Install the ESXi Installable software on the Sun Fire X4140, X4240 or X4440 system.

Note – Make sure you install the operating system to a boot disk.

---

4. Update the ESXi Installable software if necessary. Download available updates from:

   http://www.vmware.com/support/

   The process is detailed in the following sections.

VMware ESXi Installable Installation Requirements

Before you begin installing VMware ESXi Installable on your Sun Fire X4140, X4240 or X4440 server, you will require:

- A USB keyboard and mouse connected to rear USB ports of the server, or access through a Java remote console
- Monitor connected to Sun Fire server (not required if you are using Java KVMS.)
- If there is no built-in CD-ROM, choose either one of the following:
  - External USB DVD/CD-ROM drive connected to the Sun Fire server or
  - Virtual CD drive redirected through Java remote console
- CD-ROM of VMware ESXi Installable media
- The *ESX Server 3i Installable Setup Guide*

How To Install From Local Media

1. **Turn on the Sun Fire system.**

2. **Insert the media into CD-ROM drive. The server will boot from the CD and display a boot prompt.**

   ```
   boot:
   ```

3. **Refer to the *ESX Server 3i Installable Setup Guide* to guide you through the installation process. From your network-connected system go to:**

   http://www.vmware.com/support/pubs/vi_pubs.html.

4. **Complete the VMware installation.**

VMware Updates and Patches

When VMware ESX images are available for updates you can download from:

http://www.vmware.com/support/

How to Make Your Server's BIOS See Your Disks If You Use the Sun StorageTek SAS RAID HBA

If you Use the Sun StorageTek SAS RAID HBA, Your BIOS Does Not See Disks by Default

Your Sun Fire X4140, X4240, or X4440 Server can use a Sun StorageTek SAS RAID Internal HBA (PCIe card).

The Sun StorageTek SAS RAID Internal HBA does not show any new hard disk drives to the server's BIOS by default. If you are using this HBA, your server's BIOS or OS (if installed) will not see *any* disks until you configure the HBA using the Adaptec BIOS Utility.

The Adaptec BIOS utility can also be used to create a hardware RAID where you can install your OS.

Using the Adaptec BIOS Utility

The Adaptec BIOS Utility can create up to 20 volumes. Each volume can contain a single disk or a RAID (RAID levels 0, 1, 1E, 10, 5, 5EE, 50, 6, or 60—with global or dedicated hot spares).

Configuring Adaptec RAID for Any Operating System from the BIOS

This chapter describes how to use the Adaptec RAID Configuration Utility (ARCU) to create a RAID array. You can also use the procedure in this chapter to create single-drive volumes.


Note – On servers equipped with an Adaptec SAS host bus adapter, all drives must be part of a volume before they can be used by the BIOS or the operating system. Adaptec controllers support single-drive volumes that can be used for drives that are not part of a RAID array. This is especially important when you add drives to a system.

▼ To Create a RAID Array

Use the following procedure to create a RAID array.

1. **Power-cycle your server.**

2. **During power up, type Ctrl-A to bring up the ARCU.**

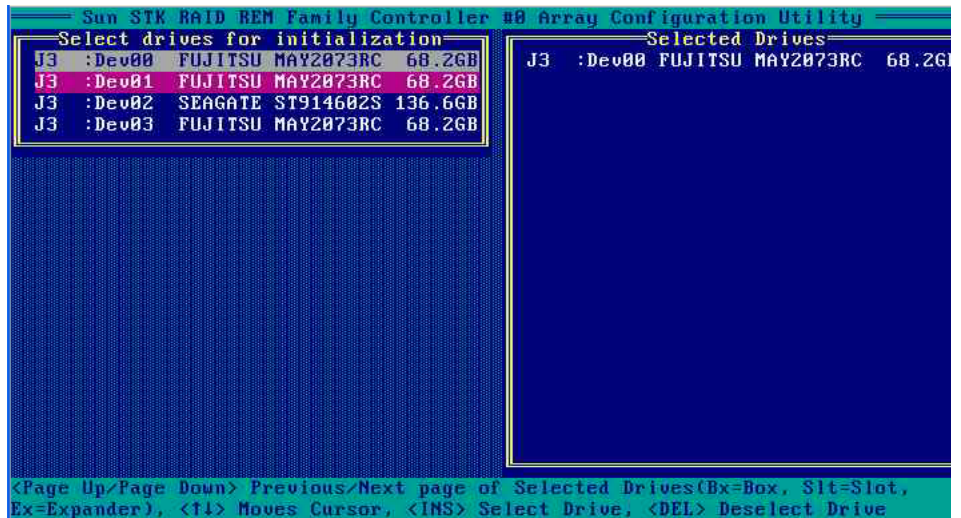   A message appears, and then the ARCU opens.
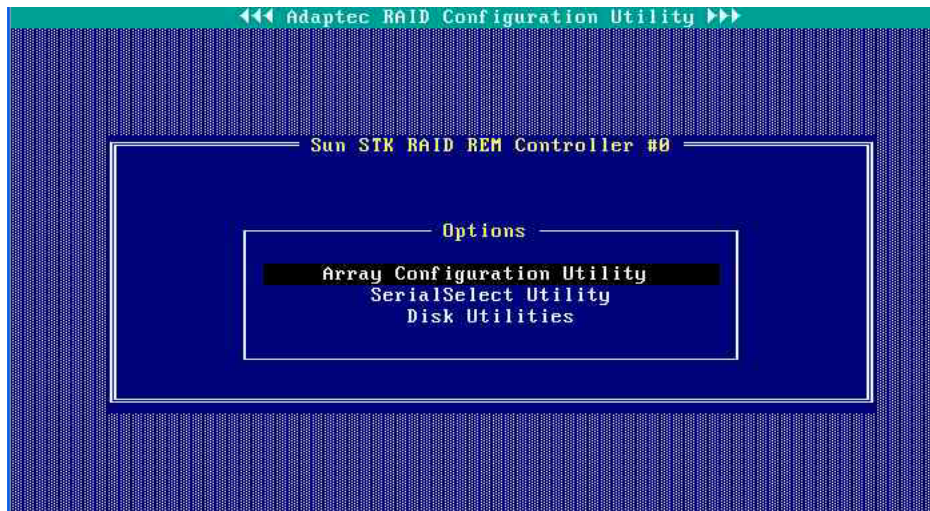
3. **Select Array Configuration Utility.**

   The Array Configuration Utility appears.

4. Select Initialize Drives.

A list of drives appears.

5. Select drives to initialize.

- Use the arrow keys to scroll through the list.
- Use the space bar to select a drive.

Note – You can select many drives, and initialize them all at once, even if they are going to be in different volumes or arrays.
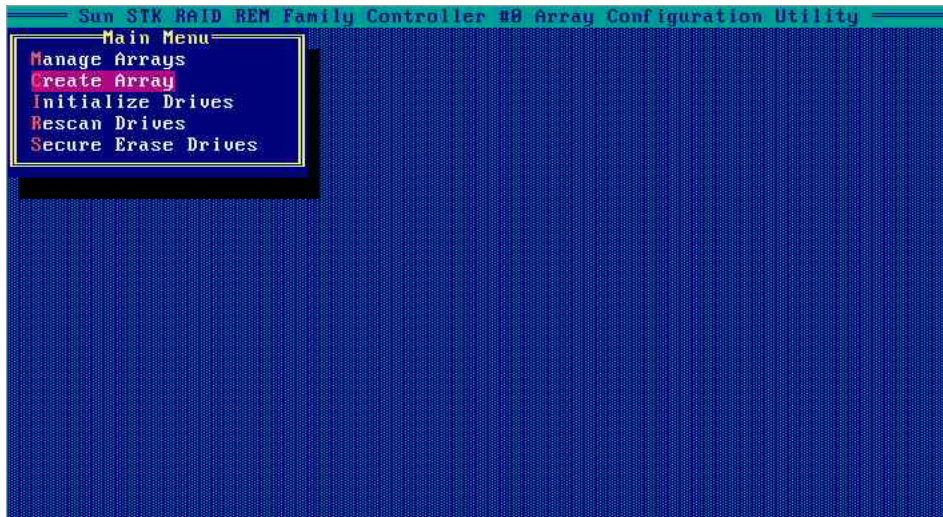
6. **When you have selected all the drives to be initialized, press Enter.**

   A message warns you that initializing a drive erases array information from it.

7. **Type yes.**

   The utility initializes the selected drives, and the main screen appears.

FIGURE A-1 Adaptec RAID controller main screen

8. **Select Create Array from the main menu.**

   A list of drives appears.
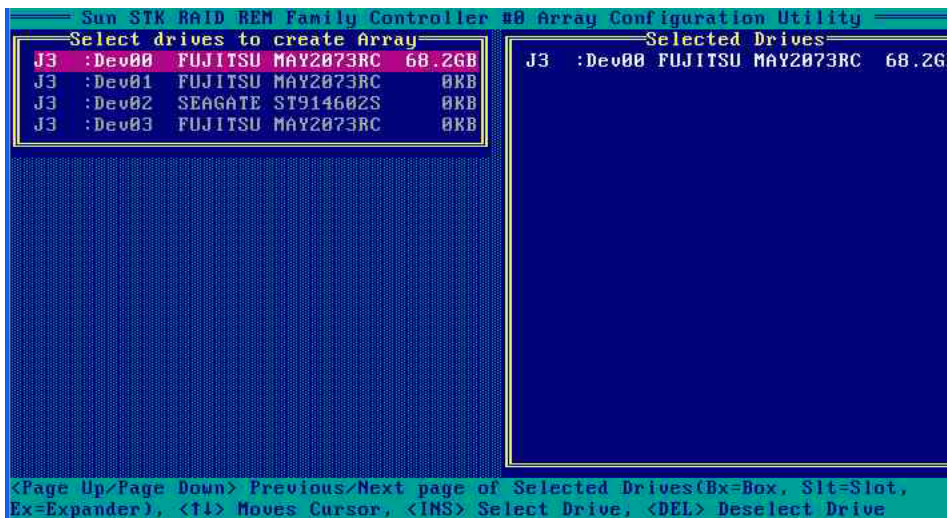
9. **Select the drives to be included in the array or volume.**

   If you are going to create a volume, select the drive to be included in the volume. If you are going to create an array, select all the drives to be included in the array. Repeat Step 9 through Step 13 for each subsequent array or volume.

   - Use the arrow keys to scroll through the list.
   - Use the space bar to select a drive.

10. **After you make your selections, press Enter.**

   The Array Properties view appears.

11. **Make the following selections:**

   - Array Type – Select an array type from the drop-down list. If you selected a single drive, the array type is "volume."
   - Array Label – Type a label.
   - Stripe Size – Type a stripe size.
   - Read Caching – Type **Y** or **N**.
   - Write Caching – Select an option from the list.

12. **Press Enter or click Done to proceed.**

   Depending on the Write Caching selection, a number of warnings might appear:

   - If the Write Caching setting is Enable always, and if you do not have a battery, or if the battery is not charged sufficiently, several warnings might appear. Type **Yes** to proceed, or type **No** to return to the Array Properties screen.
   - If the write cache is enabled, a write cache warning appears.

```
=== Sun STK RAID REM Family Controller #0 Array Configuration Utility ===
```

Leaving a drive's cache on for improving the performance may
allow conditions beyond the control of the RAID controller
whereby inconsistent data is written to the array or volume.
If the drive's stability is in question, use the Controller
Configuration menu to turn off the drive's write cache settings.

13. Click Enter to proceed.

The utility initializes the array.

Configuring LSI RAID for Any Operating System from the BIOS

If you are using an LSI 1068E host bus adapter and you want to install your OS on disks that are part of a RAID, there is an LSI RAID configuration utility that is entered from the server's BIOS and can be used for any operating system.

1. Power off your server module and then power it back on. The BIOS screen appears. Watch for the LSI Logic Corp. screen.
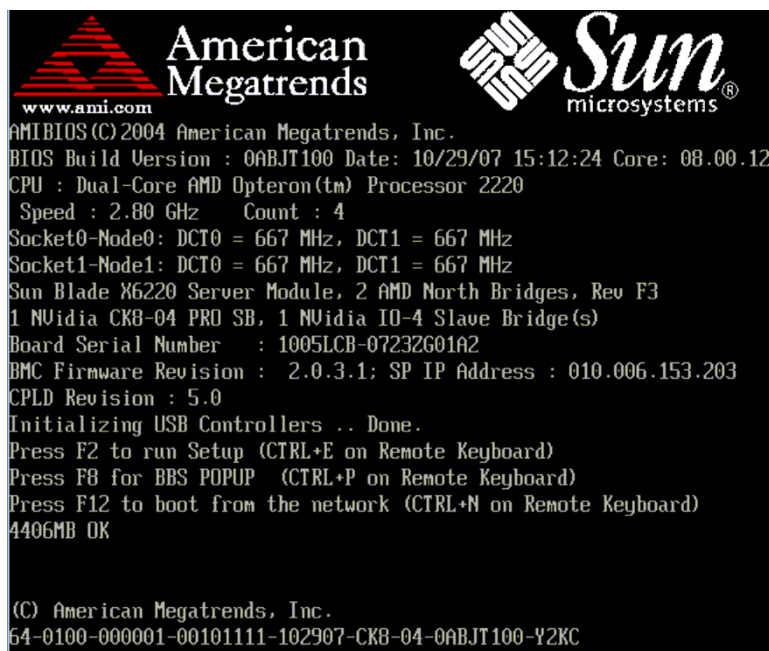
2. **When the BIOS screen shows the LSI Logic Corp. message, press Ctrl-C to start the LSI Logic Configuration Utility.**
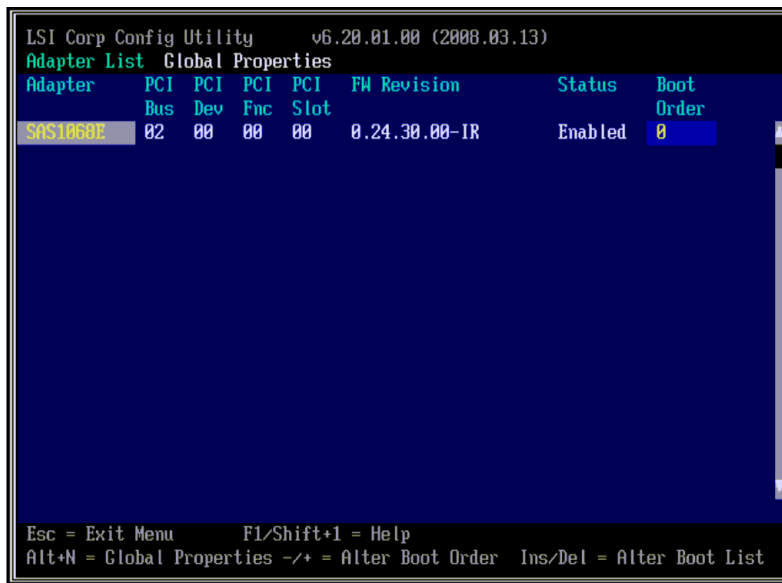

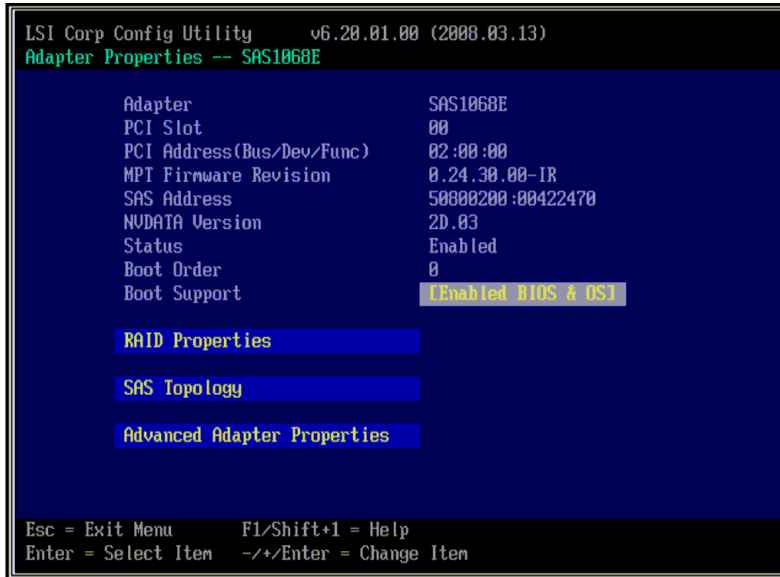The first screen of the utility appears after a short delay.

3. **With the LSI 1068E adapter highlighted in the first screen, press Enter.**

The main screen of the utility opens.

```
LSI Corp Config Utility    v6.20.01.00 (2008.03.13)
Adapter Properties -- SAS1068E

          Adapter                      SAS1068E
          PCI Slot                     00
          PCI Address(Bus/Dev/Func)    02:00:00
          MPT Firmware Revision        0.24.30.00-IR
          SAS Address                  50800200:00422470
          NVDATA Version               2D.03
          Status                       Enabled
          Boot Order                   0
          Boot Support                 [Enabled BIOS & OS]

          RAID Properties

          SAS Topology

          Advanced Adapter Properties


Esc = Exit Menu       F1/Shift+1 = Help
Enter = Select Item   -/+/Enter = Change Item
```

4. **Use the arrow keys to select RAID Properties and press Enter.**

   The next screen allows you to choose the type of RAID. You can choose between
   RAID 1 (two mirrored disks with an optional hot spare) or RAID 1E (three or
   more mirrored disks with one or two hot spares).

```
LSI Corp Config Utility     v6.20.01.00 (2008.03.13)
Select New Array Type -- SAS1068E


      Create IM Volume          Create Integrated Mirror Array of 2
                                disks plus up to 2 optional hot spares.
                                Data on the primary disk may be migrated.


      Create IME Volume         Create Integrated Mirrored Enhanced
                                Array of 3 to 10 disks including up
                                to 2 optional hot spares.
                                ALL DATA on array disks will be DELETED!

      Create IS Volume          Create Integrated Striping array of
                                2 to 10 disks.
                                ALL DATA on array disks will be DELETED!



Esc = Exit Menu        F1/Shift+1 = Help
Enter = Choose array type to create
```
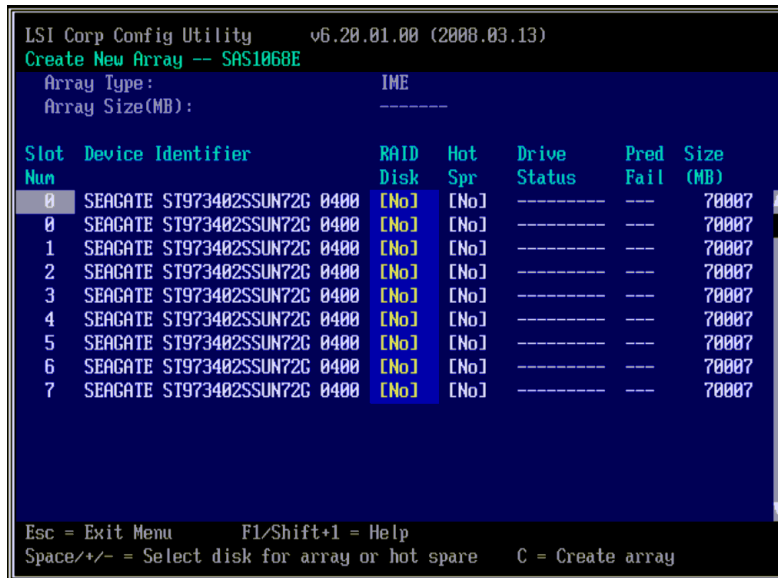
5. Select the type of volume you want to create, in this case an IME volume.
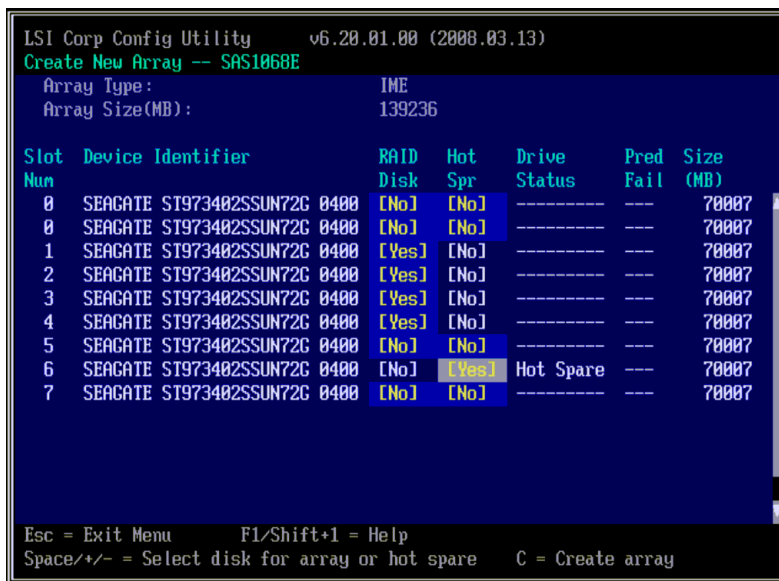
The next screen lists the disks you can choose to include in the volume and also disks you can choose as hot-spares.

Note – Despite the fact that there are dual paths to disks 1 - 7, they are not shown in the BIOS configuration utility. The utility hides them so that you cannot include the same disk twice in a volume. That is, you cannot mirror a disk with itself.
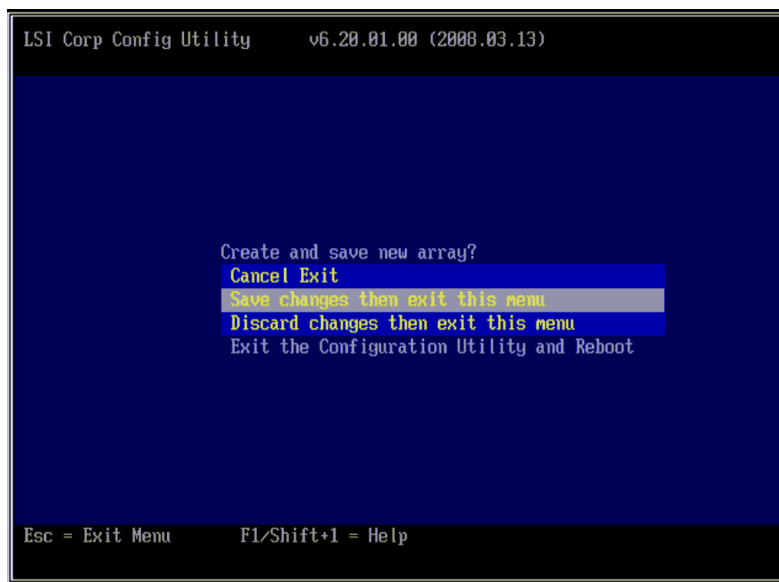

```
LSI Corp Config Utility    v6.20.01.00 (2008.03.13)
Create New Array -- SAS1068E
 Array Type:                    IME
 Array Size(MB):                --------

Slot  Device Identifier        RAID  Hot   Drive       Pred  Size
Num                            Disk  Spr   Status      Fail  (MB)
 0    SEAGATE ST973402SSUN72G 0400  [No]  [No]  ----------  ---   70007
 0    SEAGATE ST973402SSUN72G 0400  [No]  [No]  ----------  ---   70007
 1    SEAGATE ST973402SSUN72G 0400  [No]  [No]  ----------  ---   70007
 2    SEAGATE ST973402SSUN72G 0400  [No]  [No]  ----------  ---   70007
 3    SEAGATE ST973402SSUN72G 0400  [No]  [No]  ----------  ---   70007
 4    SEAGATE ST973402SSUN72G 0400  [No]  [No]  ----------  ---   70007
 5    SEAGATE ST973402SSUN72G 0400  [No]  [No]  ----------  ---   70007
 6    SEAGATE ST973402SSUN72G 0400  [No]  [No]  ----------  ---   70007
 7    SEAGATE ST973402SSUN72G 0400  [No]  [No]  ----------  ---   70007




 Esc = Exit Menu        F1/Shift+1 = Help
 Space/+/- = Select disk for array or hot spare    C = Create array
```

6. **Use the arrow keys to highlight the [No] item in the RAID Disk column for the disks you want to include in the volume. For each such disk, press the spacebar or type the + or - key to change the [No] to [Yes].**

7. **Use the arrow keys to highlight the [No] item in the Hot Spr column for the disks you want to use as hot-spares. For each such disk, press the spacebar or type the + or - key to change the [No] to [Yes].**
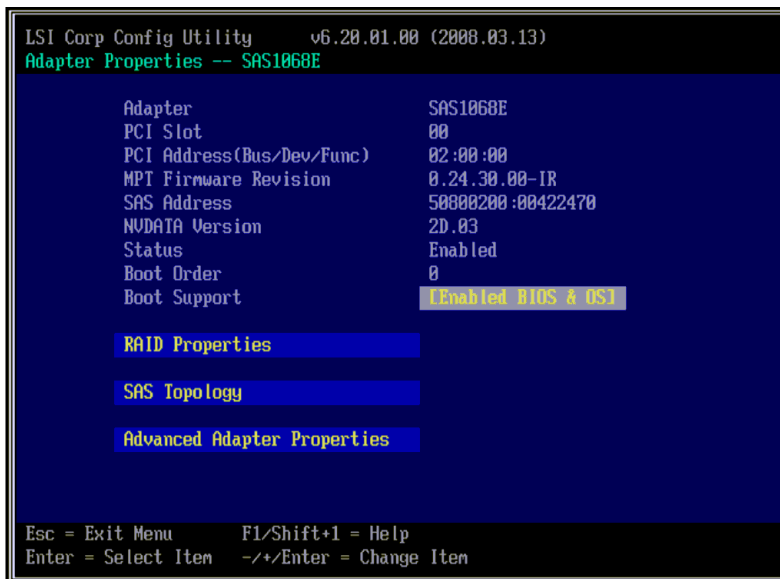
Your selections might look like this:

```
LSI Corp Config Utility      v6.20.01.00 (2008.03.13)
Create New Array -- SAS1068E
   Array Type:                    IME
   Array Size(MB):                139236

Slot  Device Identifier          RAID  Hot   Drive       Pred  Size
Num                              Disk  Spr   Status      Fail  (MB)
   0  SEAGATE ST973402SSUN72G 0400  [No]  [No]  ----------  ---   70007 ▲
   0  SEAGATE ST973402SSUN72G 0400  [No]  [No]  ----------  ---   70007
   1  SEAGATE ST973402SSUN72G 0400  [Yes] [No]  ----------  ---   70007
   2  SEAGATE ST973402SSUN72G 0400  [Yes] [No]  ----------  ---   70007
   3  SEAGATE ST973402SSUN72G 0400  [Yes] [No]  ----------  ---   70007
   4  SEAGATE ST973402SSUN72G 0400  [Yes] [No]  ----------  ---   70007
   5  SEAGATE ST973402SSUN72G 0400  [No]  [No]  ----------  ---   70007
   6  SEAGATE ST973402SSUN72G 0400  [No]  [Yes] Hot Spare   ---   70007
   7  SEAGATE ST973402SSUN72G 0400  [No]  [No]  ----------  ---   70007 ▼


Esc = Exit Menu      F1/Shift+1 = Help
Space/+/- = Select disk for array or hot spare    C = Create array
```

8. **When you are satisfied with your choices, type c to create the array.**

   You are asked for confirmation.

```
LSI Corp Config Utility      v6.20.01.00 (2008.03.13)







               Create and save new array?
               Cancel Exit
               Save changes then exit this menu
               Discard changes then exit this menu
               Exit the Configuration Utility and Reboot







Esc = Exit Menu      F1/Shift+1 = Help
```

9. **Select Save changes then exit this menu, and then press Enter.**

   The volume is created. When the utility finishes creating the volume, the main screen reappears.

```
LSI Corp Config Utility    v6.20.01.00 (2008.03.13)
Adapter Properties -- SAS1068E

        Adapter                    SAS1068E
        PCI Slot                   00
        PCI Address(Bus/Dev/Func)  02:00:00
        MPT Firmware Revision      0.24.30.00-IR
        SAS Address                50800200:00422470
        NVDATA Version             2D.03
        Status                     Enabled
        Boot Order                 0
        Boot Support               [Enabled BIOS & OS]

        RAID Properties

        SAS Topology

        Advanced Adapter Properties



Esc = Exit Menu       F1/Shift+1 = Help
Enter = Select Item   -/+/Enter = Change Item
```

10. **Highlight RAID Properties and press Enter.**

11. **When the next screen appears, select View Existing Array and press Enter.**

    You see the volume you have created

```
LSI Corp Config Utility     v6.20.01.00 (2008.03.13)
View Array -- SAS1068E
      Array                 1 of 1
      Identifier            LSILOGICLogical Volume   3000
      Type                  IME
      Scan Order            7
      Size(MB)              139236
      Status                Optimal

      Manage Array

Slot  Device Identifier           RAID   Hot   Drive    Pred  Size
Num                               Disk   Spr   Status   Fail  (MB)
  1   SEAGATE ST973402SSUN72G 0400 Yes   No    Ok       No    69617
  2   SEAGATE ST973402SSUN72G 0400 Yes   No    Ok       No    69617
  3   SEAGATE ST973402SSUN72G 0400 Yes   No    Ok       No    69617
  4   SEAGATE ST973402SSUN72G 0400 Yes   No    Ok       No    69617
  6   SEAGATE ST973402SSUN72G 0400 No    Yes   Hot Spare No   70007



Esc = Exit Menu       F1/Shift+1 = Help
Enter=Select Item  Alt+N=Next Array  C=Create an array  R=Refresh Display
```

12. **Exit the LSI RAID configuration utility.**

13. **Install your OS on this RAID volume.**

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 99).
- 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 104).

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.

FIGURE C-1 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.**
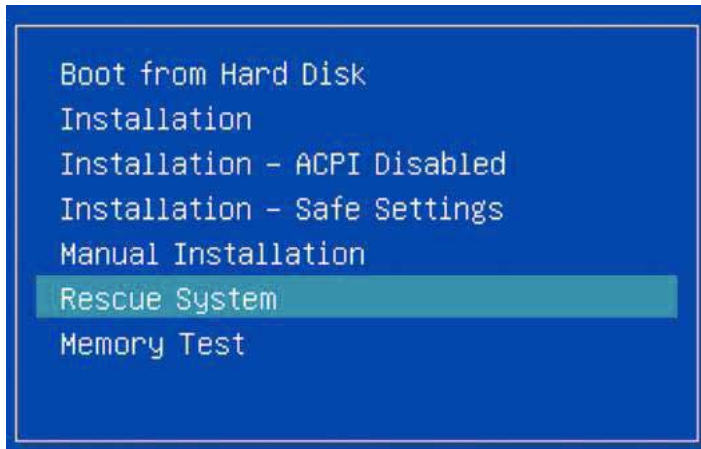
The message `Loading Linux Kernel` appears followed by the SUSE splash screen, then the Choose a Keyboard Map screen appears.

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

```
                    Choose a keyboard map.
            YaST will offer additional keyboard tables later.

                         Ceske
                         Dansk
                         Deutsch
                         English (UK)
                         English (US)
                         Español
                         Français
                         Hellenic
                         Italiano
                         Japanese
                         Magyar
                         Nederlands
                         Norsk
                         Polski
                         Português Brasileiro
                         Português
                         Russian
                         Slovak
                         Suomi/Svensk


              OK                          Back
```
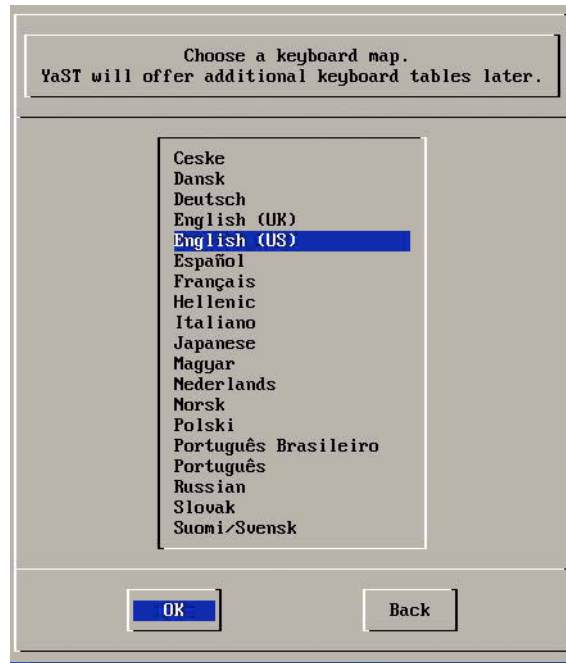
The user shell launches and the Rescue Login prompt appears.

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


```
: Entering runlevel: 3
  logging started on /dev/tty1(/dev/console) at Wed May 17 19:49:24 2006
r Resource Control: previous runlevel: N, switching to runlevel:                3
alizing random number generator                                              done
ing syslog services                                                          done
ing RPC portmap daemon                                                       done
ting Net File System (NFS)                                                  unused
r Resource Control: runlevel 3 has been                                    reached
ed services in runlevel 3:                                          nfsboot nfs

e 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

```
                                                                                    done
 Entering runlevel: 3
 logging started on /dev/tty1(/dev/console) at Wed May 17 19:49:24 2006
r Resource Control: previous runlevel: N, switching to runlevel:                    3
alizing random number generator                                                     done
ing syslog services                                                                 done
ing RPC portmap daemon                                                              done
ting Net File System (NFS)                                                          unused
r Resource Control: runlevel 3 has been                                             reached
ed services in runlevel 3:                                            nfsboot nfs

e login: root
e:~ # ifconfig -a_
```

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

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:

```
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:~ #
```

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.

C

The Keyboard Type screen appears.

3. In the Keyboard Type screen, select the appropriate configuration then click OK.
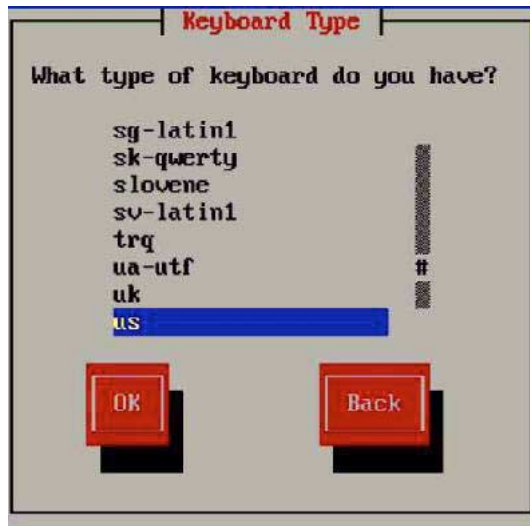
The Setup Network screen appears.

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.

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.

   c. **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.**

8. **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.

9. **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 109).

- *While* configuring a Solaris OS during installation (see "Identifying Logical and Physical Network Interface Names While Installing a Solaris OS" on page 111).

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 plumb` **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 (#):**

   #s 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 a 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-ON-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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