Oracle® Server X5-4 Installation Guide for Linux Operating Systems

Part No: E56393-03
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Access to Oracle Support

Oracle customers that have purchased support have access to electronic support through My Oracle Support. For information, visit `http://www.oracle.com/pls/topic/lookup?ctx=acc&id=info` or visit `http://www.oracle.com/pls/topic/lookup?ctx=acc&id=trs` if you are hearing impaired.

Référence: E56393-03

Accès aux services de support Oracle

Les clients Oracle qui ont souscrit un contrat de support ont accès au support électronique via My Oracle Support. Pour plus d'informations, visitez le site `http://www.oracle.com/pls/topic/lookup?ctx=acc&id=info` ou le site `http://www.oracle.com/pls/topic/lookup?ctx=acc&id=trs` si vous êtes malentendant.

Contents

Using This Documentation

This section describes how to get the latest firmware and software for the system, documentation and feedback, and a document change history.

Oracle Server X5-4 Model Naming Convention

The Oracle Server X5-4 name identifies the following:

- X identifies an x86 product.
- The first number, 5, identifies the generation of the server.
- The second number, 4, identifies the number of processor sockets in the server.

Getting the Latest Firmware and Software

Firmware, drivers, and other hardware-related software for each Oracle x86 server are updated periodically.

You can obtain the latest version in the following ways:

- Oracle System Assistant: A factory-installed option for Oracle x86 servers. It has all the tools and drivers you need and resides on an internal USB flash stick.
- My Oracle Support: The Oracle support web site located at `https://support.oracle.com`.

Documentation and Feedback

Documentation	Link
All Oracle products	https://docs.oracle.com/
Oracle Server X5-4	http://www.oracle.com/goto/X5-4/docs-videos
Oracle Integrated Lights Out Manager (ILOM). Refer to the documentation for your supported version of Oracle ILOM as listed in the *Product Notes*.	http://www.oracle.com/goto/ILOM/docs
Oracle Hardware Management Pack. Refer to the documentation for your supported version as listed in the *Product Notes*.	http://www.oracle.com/goto/ohmp/docs

Provide feedback on this documentation at: http://www.oracle.com/goto/docfeedback.

About This Documentation

This documentation set is available in both PDF and HTML. The information is presented in topic-based format (similar to online help) and therefore does not include chapters, appendixes, or section numbering.

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Change History

The following lists the release history of this documentation set:

- December 2015. Technical updates.
- August 2015: Minor revisions and updates to docs and library.
- June 2015: Initial publication.

About Linux Operating System Installs

This section contains an overview for installing a new Linux operating system (OS) on your Oracle Server X5-4.

Description	Links
Review which Linux operating systems are supported.	“Supported Linux Operating Systems” on page 9
Review the Oracle Unbreakable Enterprise Kernel for Linux and where it can be used.	“Oracle Unbreakable Enterprise Kernel for Linux” on page 10
Review console display options and how to set them up.	“Selecting the Console Display Option” on page 11
Review boot media options and how to set them up.	“Selecting the Boot Media Option” on page 13
Review installation target options and how to set them up.	“Selecting the Installation Target Option” on page 17
Review OS installation options.	“Linux OS Installation Options” on page 19
Review Oracle System Assistant.	“Oracle System Assistant Overview” on page 21

Note - This document describes how to install a supported Linux OS either manually or by using the Oracle System Assistant. If your system came with a preinstall OS, refer to your server's Installation Guide for information on configuring it.

Related Information

- “Installing a Linux Operating System” on page 31

Supported Linux Operating Systems

The Oracle Server X5-4 supports the following minimum Linux operating systems:

Linux OS Version	Edition
Oracle	Oracle Linux 6.6, and 7.0 OS for x86 (64-bit) with the Oracle Unbreakable Enterprise Kernel for Linux Release 3 update 5 **Note -** Optionally, the Red Hat Compatible Kernel can be used on Oracle Linux 6.6, or 7.0 OS for x86 (64-bit).
Red Hat	Red Hat Enterprise Linux 6.6, and 7.0 OS for x86 (64-bit) **Note -** Optionally, the Oracle Unbreakable Enterprise Kernel for Linux Release 3 u5 can be installed on Red Hat Enterprise Linux 6.6, and 7.0 OS for x86 (64-bit).

The Linux Hardware Compatibility List (HCL) identifies hardware that is compatible with Linux operating systems. To find the latest Linux versions supported for the Oracle Server X5-4, go to the following sites and search using your server model number:

- Oracle Linux – `http://linux.oracle.com/pls/apex/f?p=117:1:3991604960223967`
- Red Hat Enterprise Linux – `http://www.redhat.com/en/services/support`

Note - For all late-breaking requirements for the operating system, refer to the latest version of the *Oracle Server X5-4 Product Notes*. Additionally, you can install any other supported operating system or virtual machine software on your server. Refer to the latest version of the *Oracle Server X5-4 Product Notes* at `http://www.oracle.com/goto/X5-4/docs-videos`.

Note - If the Oracle Linux OS was preinstalled, it was installed with the server set to Legacy BIOS. If you choose to boot the server in UEFI Boot Mode, the preinstalled image is not accessible. Therefore, if you want to use the Oracle Linux OS with the UEFI/ BIOS Boot Mode set to UEFI, you must perform a fresh installation of Oracle Linux OS.

Related Information

- “Installing a Linux Operating System” on page 31

Oracle Unbreakable Enterprise Kernel for Linux

Release 3 of the Oracle Unbreakable Enterprise Kernel for Linux is supported in this release of the server software. Release 3 is installed by default on Oracle Linux 6.6, and 7.0 OS and can be installed on Red Hat Enterprise Linux 6.6, and 7.0 OS. Release 3 is based on the 3.8.x mainline Linux kernel and contains improvements and new features that have been incorporated into mainline Linux since Release 2 of the kernel.

Related Information

- Oracle Unbreakable Enterprise Kernel Release 3 for Linux: For the latest information about operating system compatibility and pointers to installation information, refer to *Oracle Unbreakable Enterprise Kernel Release 3 Release Notes* at:

  `http://docs.oracle.com/cd/E37670_01/index.html`
- “Installing a Linux Operating System” on page 31

Selecting the Console Display Option

This section describes the options for connecting a console to perform the installation.

Console Display Options

You can install the OS and administer the server by attaching a local console directly to the server's service processor (SP). The server supports two types of local consoles:

- A terminal connected to the serial management port (SER MGT)

  You can connect the terminal directly to the port or connect it to a terminal emulator that is connected directly to the port.
- A VGA monitor, USB keyboard, and USB mouse connected directly to the video port (VGA) and any of the four exterior USB connectors

You can also install the OS and administer the server from a remote console by establishing a network connection to the server SP. There are two types of remote consoles:

- Web-based client connection using the Oracle ILOM Remote System Console Plus application
- Secure Shell (SSH) client connection to the network management port (NET MGT)

▼ Set Up the Local Console

1. **To connect a local console, do one of the following:**

- Connect a terminal to the serial management port (SER MGT) either directly or through a terminal emulator.
- Connect a VGA monitor, keyboard, and mouse to the video port (VGA) and the USB ports.

2. **For serial management port (SER MGT) connections only, to establish a connection to the host serial port:**

   a. **Type your Oracle ILOM user name and password.**
   The default Oracle ILOM user name is `root` and the default password is `changeme`.

   b. **At the Oracle ILOM prompt, type:**
   -> **`start /HOST/console`**

The serial management port output is automatically routed to the Linux host serial local console.

Related Information

- Oracle Integrated Lights Out Manager (ILOM) 3.2 Documentation Library at: `http://www.oracle.com/goto/ILOM/docs`

▼ Set Up the Remote Console

1. **View or establish an IP address for the server SP.**
To log in to Oracle ILOM remotely using either the command-line interface (CLI) or the web interface, you must know the IP address of the server's service processor (SP). For instructions, refer to "Modifying Network Settings for Oracle ILOM" in *Oracle Server X5-4 Installation Guide*.

2. **If you are using a web-based client connection, perform these steps; otherwise go to the step 3.**

   a. **In a web browser, type the IP address for the server SP.**

   b. **Log in to the Oracle ILOM web interface.**
   The default Oracle ILOM user name is `root` and the default password is `changeme`.

   c. **Redirect the video output from the server to the web client by launching the Oracle ILOM Remote System Console Plus application.**

3. **If you are using an SSH client connection, perform these steps.**

   a. **From a serial console, establish an SSH connection to the server SP.**

      Type: `ssh root@`*hostname*, where *hostname* can be the DNS name or the IP address for the server SP).

   b. **Log in to Oracle ILOM.**

      The default Oracle ILOM user name is `root` and the default password is `changeme`.

   c. **Redirect the video output from the server to the web client by launching the Oracle ILOM Remote System Console Plus application.**

      -> **`start /HOST/console`**

Related Information

- Oracle Integrated Lights Out Manager (ILOM) 3.2 Documentation Library at: `http://www.oracle.com/goto/ILOM/docs`

Selecting the Boot Media Option

You can start the operating system installation to the server by booting a local or remote installation media source. This section identifies the supported media sources and the setup requirements for each source.

- "Boot Media Options Requirements" on page 13
- "Set Up the Boot Media for a Local Installation" on page 15
- "Set Up the Boot Media for a Remote Installation" on page 15

Boot Media Options Requirements

This section describes the requirements for using local and remote media.

- "Local Boot Media Requirements" on page 14
- "Remote Boot Media Requirements" on page 14

Local Boot Media Requirements

For the local installation, you must either:

- Place a copy of the installation media in an external DVD drive attached to the server USB port.
- Copy the installation media to a USB flash drive and attach it to one of the server's external or internal USB ports.

Note - Installing from a USB flash drive requires extra steps, as described in the *Oracle Linux Documentation libraries*.

Remote Boot Media Requirements

Remote boot media enable you to boot the install over the network. You can start the installation from a redirected boot storage device or another networked system that exports the ISO image over the network using a PreBoot eXecution Environment (PXE).

Supported OS remote boot media sources can include:

- ISO image on a DVD-ROM or a USB flash drive, installed on a remote system
- DVD ISO image available in a location on the network that is setup for virtual redirection
- DVD ISO image mounted on the server service processor (SP)

  For instructions on mounting an installation image onto the server SP, refer to the *Oracle ILOM Administrator's Guide for Configuration and Maintenance* at `http://www.oracle.com/goto/ILOM/docs`. Alternatively, refer to the More Details link in the Oracle ILOM Remote Control → Remote Device web interface page.
- The DVD/ISO image made available as a PXE network boot. The instructions for performing PXE network installations for the supported Linux operating systems are provided in the following sections:
  - “Install Oracle Linux 6.6, or 7.0 Using PXE Network Boot” on page 64
  - “Install RHEL 6.6, or 7.0 Using PXE Network Boot” on page 72

▼ Set Up the Boot Media for a Local Installation

To set up the local boot media, you must insert a storage device that contains the Linux OS installation image into the server using one of the following options.

1. **If the server is equipped with an optional DVD drive, insert the Linux OS installation DVD into the DVD drive located on the front of the server; otherwise, proceed to the next step.**
2. **If your server does not have a DVD drive, insert an external USB DVD drive or a USB flash drive that contains the Linux OS installation media into one of the external USB ports located on the front and rear of the server.**

Note - For information about the location of the server's external USB ports, refer to "Oracle X5-4 Server Feature Overview" in *Oracle Server X5-4 Installation Guide*.

▼ Set Up the Boot Media for a Remote Installation

To redirect the boot media from a remote storage device, perform the following steps:

1. **Insert the boot media into the storage device, for example:**
   - **For DVD-ROM**, insert the media into a DVD-ROM drive on a remote workstation.
   - **For DVD-ROM ISO image**, ensure that ISO image is readily available on a network shared location or is mounted on the server service processor (SP).

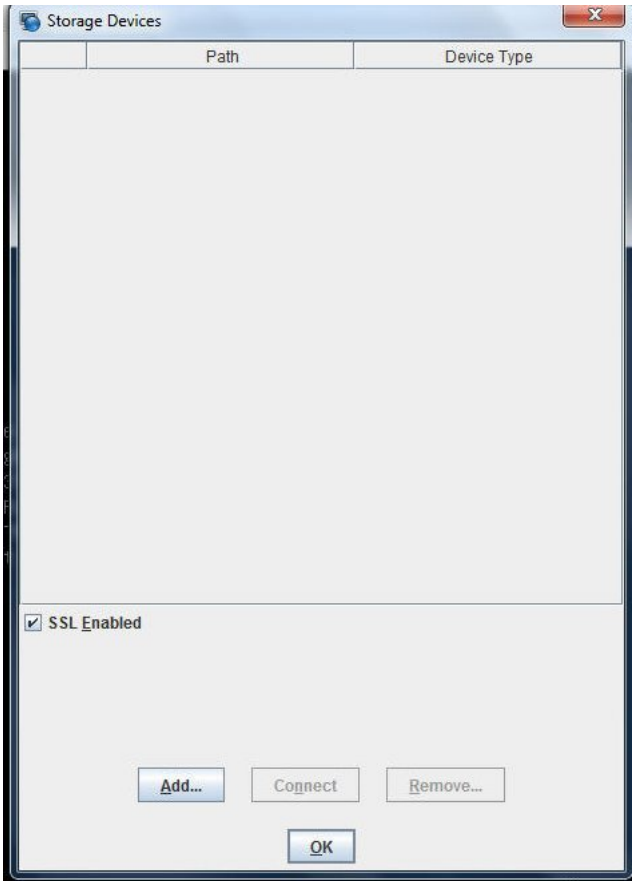
   For instructions on mounting an installation image onto the server SP, refer to the *Oracle ILOM Administrator's Guide for Configuration and Maintenance* at `http://www.oracle.com/goto/ILOM/docs`. Alternatively, refer to the More Details link in the Oracle ILOM Remote Control → Remote Device web interface page.
2. **Establish a web-based client connection to the server Oracle ILOM SP and launch the Oracle ILOM Remote System Console Plus application.**

   For more details, see the setup requirements for web-based client connection in "Selecting the Console Display Option" on page 11.
3. **In the remote console, do the following:**

   a. **Click KVMS to display the KVMS drop-down menu.**

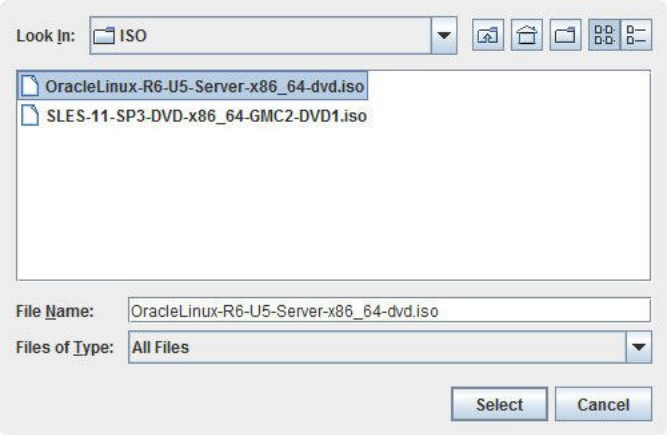
b. Click Storage.

The Storage Devices dialog appears.



c. In the Storage Devices dialog, click `Add`.

The Add Storage Device dialog appears.



d. Browse to the ISO image, select it, and click `Select`.

The Storage Devices screen appears and lists the ISO image.

e. Select the ISO image and click `Connect`.

The ISO image is mounted to the remote console and can be used to perform the OS installation.

Selecting the Installation Target Option

This section describes how to set up the installation target.

- "Installation Target Options" on page 18
- "Set Up a Local Storage Drive (HDD or SSD) as the Installation Target" on page 19
- "Set Up a Fibre Channel Storage Area Network Device as the Installation Target" on page 19

Installation Target Options

With the exception of the embedded Oracle System Assistant USB flash drive (which is reserved for Oracle System Assistant) and the optional NVMe drives (located in the server front panel), you can install the operating system on any of the storage drives installed in the server. These include hard disk drives (HDDs) and solid state drives (SSDs).

For servers equipped with Fibre Channel (FC) PCIe host bus adapters (HBAs), you can choose to install the operating system to an external Fibre Channel storage device.

Note - NVMe drives are not supported on Red Hat Enterprise Linux operating systems. NVMe drives are supported on servers running the Oracle Linux operating system; however, NVMe drives should not be used as installation targets because these drives do not support booting of operating systems.

Important: Internal, USB Embedded Oracle System Assistant Flash Drive Should Not Be Used as a Boot or Storage Drive

The server ships with an embedded Oracle System Assistant USB flash drive. This drive contains the Oracle System Assistant, device drivers, and firmware for Oracle ILOM, BIOS, and supported IO devices. During the installation of all supported operating systems, this USB flash drive is detected as a SCSI disk with a single partition that is read/write capable and is displayed as `Oracle_SSM` in the list of drives. Do not overwrite this device when performing any of the following operations:

- Operating system installations
- Disk or partition formatting operations
- General disk, partition, or filesystem maintenance

If this USB flash drive is overwritten, the original contents can be restored. To restore the contents of the USB flash drive, obtain the Oracle System Assistant recovery and ISO update image and use it to perform a restore operation.

For instructions for downloading the Oracle System Assistant recovery and ISO update image and restoring the server's Oracle System Assistant USB flash drive, refer to the *Oracle X5 Series Servers Administration Guide* at `http://www.oracle.com/goto/x86AdminDiag/docs`.

▼ Set Up a Local Storage Drive (HDD or SSD) as the Installation Target

- **Ensure that the target drive (HDD or SSD) is properly installed and powered on.**
  For information about installing and powering on a HDD or SSD, refer to "Servicing Storage Drives (CRU)" in *Oracle Server X5-4 Service Manual*.

▼ Set Up a Fibre Channel Storage Area Network Device as the Installation Target

1. **Ensure that the Fibre Channel PCIe HBA is properly installed in the server.**
   For information about installing a Fibre Channel PCIe HBA option, refer to "Servicing PCIe Cards" in *Oracle Server X5-4 Service Manual*.
2. **Ensure that the storage area network (SAN) is installed and configured to make the storage device visible to the server's host.**
   For instructions, refer to the documentation supplied with the Fibre Channel HBA.

Linux OS Installation Options

You can choose to install an OS on a single server or on multiple servers. The scope of this document is for single server OS installations. The table below provides some information about these two installation options.

Option	Description
Multiple servers	You can use Oracle Enterprise Manager Ops Center to install an OS on multiple servers, For information, go to `http://www.oracle.com/technetwork/oem/ops-center/index.html`.
Single server	Install an OS to a single server using one of the following methods: ■ Locally: Perform the OS installation locally at the server. This option is recommended if you have just completed the physical installation of the server in the rack. ■ Remotely: Perform the OS installation from a remote location. Uses the Oracle ILOM Remote System Console Plus application to access the Oracle System Assistant or to perform a manual OS installation.

Option	Description
	Note - Oracle recommends the use of Oracle System Assistant for single server OS installations.

For more information about single-server OS installation methods and Oracle System Assistant, see:

- "Single-Server Installation Methods" on page 20
- "Oracle System Assistant Overview" on page 21

Single-Server Installation Methods

Select a method for providing the OS installation media. Use the following information to determine the local or remote OS installation that best serves your needs.

Media Delivery Method	Additional Requirements
Local assisted OS installation – Uses Oracle System Assistant. (Recommended)	A monitor, USB keyboard and mouse, a USB device, and an installation ISO image. For more information, see "Assisted Linux OS Installation" on page 20.
Remote assisted OS installation – Uses Oracle System Assistant. (Recommended)	Oracle ILOM Remote System Console Plus application, an installation ISO image on a DVD or a network location. For more information, see "Assisted Linux OS Installation" on page 20.
Local OS install using a DVD drive – Uses a physical DVD drive connected to the server.	A monitor, USB keyboard and mouse, a USB DVD drive, an installation ISO image on a DVD. For more information, see "Manual Linux OS Installation" on page 21.
Remote OS install using a DVD drive or a DVD ISO image – Uses a redirected physical DVD drive or DVD ISO image on a remote system running the Oracle ILOM Remote System Console Plus application.	An installation ISO image located on a DVD or a network location. If using a DVD, an attached physical DVD drive. Also requires network access to the server's management port. For more information, see "Manual Linux OS Installation" on page 21.

Assisted Linux OS Installation

Assisted Linux OS installation is the recommended method for installing a supported OS on your server. This method involves using Oracle System Assistant. You deliver the OS installation media on either a local or remote DVD drive, USB device, or DVD image. The Oracle System Assistant guides the process and gathers and installs the drivers when necessary. Your server must support Oracle System Assistant, and it must be installed in the server.

Manual Linux OS Installation

With the manual Linux OS installation method, you deliver the Linux OS installation ISO image on either a network location or a DVD. You also need to install any necessary drivers. The drivers for your server are available on the server's internal Oracle System Assistant flash drive (if installed) and from the My Oracle Support web site as either OS-specific and server-specific packages or as an ISO image file. To install the OS, use the installation wizard.

Oracle System Assistant Overview

Oracle System Assistant is a single-server system management tool for Oracle x86 servers. Oracle System Assistant integrates Oracle's single system management products, its own Oracle System Assistant functionality, and a selection of related software to provide a suite of tools that allow for the quick and convenient configuration and management of your server.

You can access Oracle System Assistant locally, using a local console connection, or remotely, using the Oracle ILOM Remote System Console Plus application.

If you just completed the installation of the server, then using Oracle System Assistant locally (while physically present at the server) can be a fast and efficient method of configuring the server. Once the server is operational, you can conveniently access Oracle System Assistant remotely while still retaining full-featured functionally.

The components of Oracle System Assistant include:

- Oracle System Assistant application
- Oracle Hardware Management Pack
- User interface access to configuration and maintenance provisioning tasks (including the Install OS task)
- Oracle System Assistant command-line environment
- Operating system software, drivers, and tools
- Server-specific firmware

Oracle System Assistant resides inside the server as an embedded storage device (USB flash drive). The drive is factory configured with a server-specific version of Oracle System Assistant that is maintained as such by using online updates for all components.

For more information, refer to the following topics:

- “Get Updates and Install OS Tasks” on page 22

- “Obtaining Oracle System Assistant” on page 22

For more information, refer to the *Oracle X5 Series Servers Administration Guide* at `http://www.oracle.com/goto/x86AdminDiag/docs`.

Get Updates and Install OS Tasks

If you want to use Oracle System Assistant to update the OS drivers and other firmware components (such as BIOS, Oracle ILOM, HBAs, and expanders, if applicable), you should perform the Get Updates task before you install the OS. By doing the Get Updates task, you ensure that you are using the latest version of the OS drivers.

Oracle System Assistant's Install OS task provides a guided installation of a supported OS. You supply the OS installation media, and Oracle System Assistant guides you through the installation process. It then retrieves the appropriate drivers based on your server hardware configuration. The Install OS task is not available for all server supported operating systems.

For more information, see the *Oracle X5 Series Servers Administration Guide* at `http://www.oracle.com/goto/x86AdminDiag/docs`.

Obtaining Oracle System Assistant

Since your server supports Oracle System Assistant, the Oracle System Assistant USB flash drive might be already installed in your server. If it is installed, you can update to the latest software release using the Oracle System Assistant Get Updates task. If Oracle System Assistant is installed in your server, but it has been corrupted or overwritten, then download the Oracle System Assistant Updater image from the My Oracle Support web site. For download instructions, refer to “Getting Server Firmware and Software” in *Oracle Server X5-4 Installation Guide*.

For more information about how to determine if your server has Oracle System Assistant or how to perform updates and recovery procedures, refer to the *Oracle X5 Series Servers Administration Guide* at `http://www.oracle.com/goto/x86AdminDiag/docs`.

Related Information

- *Oracle X5 Series Servers Administration Guide* at: `http://www.oracle.com/goto/x86AdminDiag/docs`

Preparing to Install a Linux Operating System

This section describes how to prepare the server for installing the operating system.

Description	Links
Obtain an installation ISO image.	"Obtaining and Preparing a Full Installation Image" on page 23
Verifying and setting the server UEFI optimized defaults.	"Preparing the Boot Environment" on page 24
Configuring boot mode.	"Set the Boot Mode" on page 27
Configuring RAID on the server.	"Configuring RAID" on page 29

Related Information

- "Installing a Linux OS on a Single System Using Oracle System Assistant" on page 31
- "Installing Oracle Linux on a Single System Manually" on page 36
- "Installing Red Hat Enterprise Linux OS on a Single System Manually" on page 67

▼ Obtaining and Preparing a Full Installation Image

To install Linux, you need a full installation image. Oracle provides this image in an ISO file which you must download. Then it can be written to a DVD or located on a network server.

- For Oracle Linux, you can get an image from `http://edelivery.oracle.com/linux`.
- For Red Hat Enterprise Linux, contact Red Hat to obtain an installation image.

Use the following steps to get an Oracle Linux installation image.

1. **Navigate to `http://edelivery.oracle.com/linux`.**
2. **Search for and download the desired full installation ISO image.**

   Select an image that is specifically for x86 servers.

Note - You can also download a smaller boot ISO image, but you cannot use it to complete the Oracle Linux installation.

3. **Write the downloaded ISO image to a DVD or a network location.**

Preparing the Boot Environment

Before you install the operating system, you should ensure that Unified Extensible Firmware Interface (UEFI) settings are configured to support the type of installation you plan to perform.

The following topics provide specific instructions on how to configure UEFI to support the installation:

- "Configure the UEFI Optimal Defaults" on page 24
- "Set the Boot Mode" on page 27

For more information about changing boot properties, refer to the *Oracle X5 Series Servers Administration Guide* at `http://www.oracle.com/goto/x86AdminDiag/docs`.

UEFI is a specification that defines a software interface between an operating system and platform firmware. UEFI is meant to replace the Basic Input/Output System (BIOS) firmware interface. In practice, most UEFI firmware images provide legacy support for BIOS services. For more information about UEFI, refer to the *Oracle X5 Series Servers Administration Guide* at `http://www.oracle.com/goto/x86AdminDiag/docs`.

▼ Configure the UEFI Optimal Defaults

Note - This procedure is optional. If the server is newly installed and this is the first time an operating system is being installed, the UEFI firmware is probably configured to its optimal default settings.

In the BIOS Setup Utility, you can set optimal defaults, as well as view and edit UEFI settings, as needed. By setting optimal defaults, you ensure that the server is operating efficiently with a known good configuration. You can review the optimal defaults in the *Oracle Server X5-4 Service Manual*.

Any changes you make in the BIOS Setup Utility using the F2 key persist until the next time you change them.

In addition to using the F2 key to view or edit the system's BIOS settings, you can use F8 during the BIOS start-up to specify a temporary boot device. If you use F8 to set a temporary boot device, this change is only in effect for the current system boot. The permanent boot device specified using F2 will be in effect after booting from the temporary boot device.

Before You Begin Ensure that the following requirements are met:

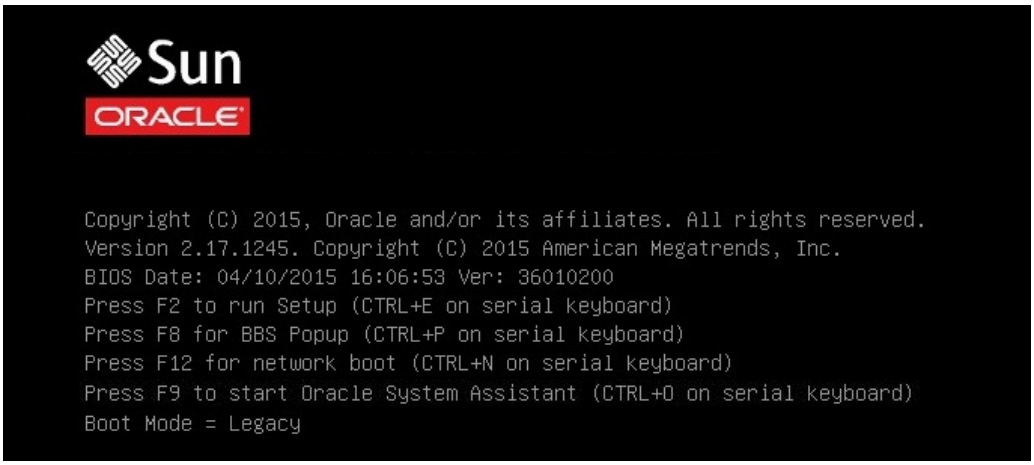
- The server is equipped with a hard disk drive (HDD) or solid state drive (SSD).
- The HDD or SSD is properly installed in the server. For instructions, refer to "Servicing Storage Drives (CRU)" in *Oracle Server X5-4 Service Manual*.
- A console connection is established to the server. For details, see "Selecting the Console Display Option" on page 11.

1. **Reset or power on the server.**

   For example, do one of the following:

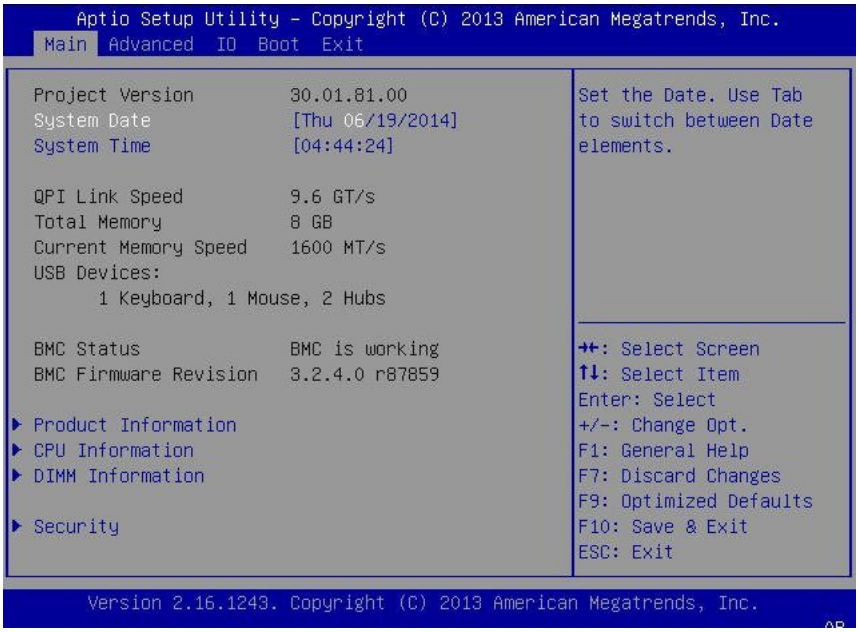
   - **From the local server**, press the Power button (approximately 1 second) on the front panel of the server to turn the server off, then press the Power button again to power on the server.
   - **From the Oracle ILOM web interface**, click Host Management → Power Control, select Reset from the Select Action list box, then click Save.
   - **From the Oracle ILOM CLI**, type: `reset /System`

   The server begins the boot process. After a few moments, the BIOS screen appears.



2. **When prompted in the BIOS screen, press the F2 key to access the BIOS Setup Utility.**

   `[Setup Selected]` and the Boot Mode (Legacy or UEFI) are displayed at the bottom of the BIOS screen, then the BIOS Setup Utility appears. After a few moments, the BIOS Setup Utility appears.



3. **Press the F9 function key to automatically load the optimal default settings.**

   A message appears prompting you to continue this operation by selecting `OK` or to cancel this operation by selecting `CANCEL`.

4. **In the message, highlight `OK`, and then press Enter.**

5. **To save your changes and exit the BIOS Setup Utility, press the F10 key.**

   Alternatively, you can select `Save and Exit` from the Exit menu.

▼ Set the Boot Mode

The server UEFI firmware supports both Legacy BIOS and UEFI boot modes. Legacy BIOS Boot Mode is enabled by default. Because all supported Linux operating systems support both Legacy BIOS and UEFI, you have the option of setting the boot mode to either Legacy BIOS or UEFI before you perform the OS installation.

Note - After you have installed the operating system, if you decide you want to switch from Legacy BIOS to UEFI Boot Mode, or vice versa, you must reinstall the operating system.

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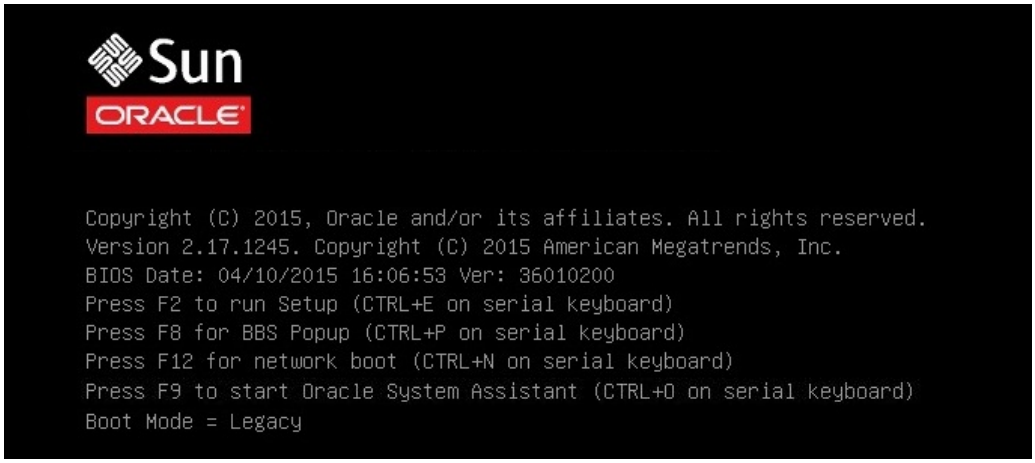
1. **Reset or power on the server.**

   For example, to reset the server, do one of the following:

   - **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.**
   - **From the Oracle ILOM web interface, click Host Management → Power Control, select Reset from the Select Action list box, then click Save.**
   - **From the Oracle ILOM CLI, type:** `reset /System`

   The server begins the boot process and the BIOS screen appears.



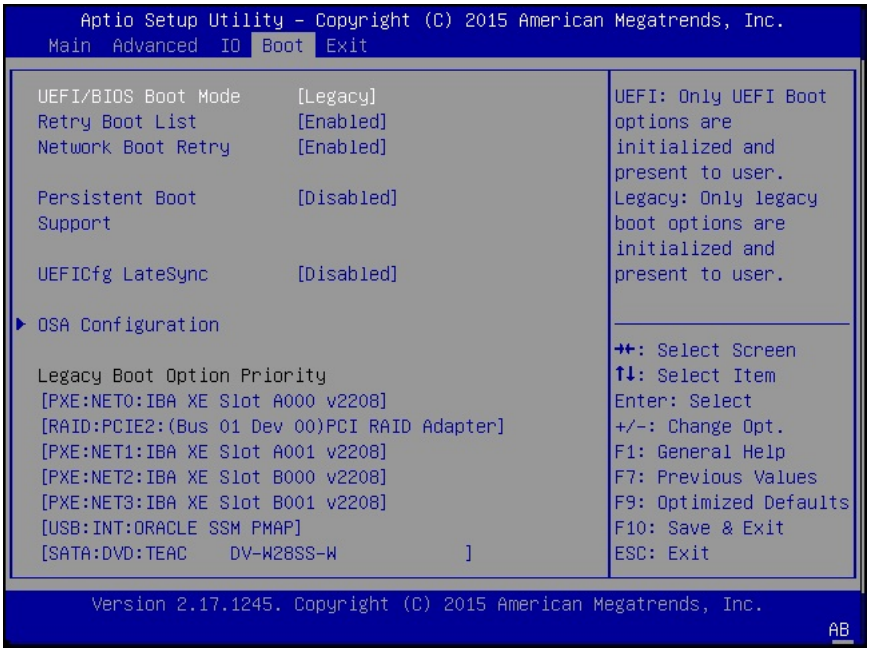
Note - The next steps occur very quickly so be ready to press the F2 function key.

2. **When prompted in the BIOS screen, press the F2 key to access the BIOS Setup Utility.**

   After a few moments, the BIOS Setup Utility appears.

3. **In the BIOS Setup Utility, use the arrow keys to navigate to the Boot menu.**

   The Boot Menu screen appears.



Note - The options in the boot order list differ depending on the storage drive configuration and whether you have enabled the Persistent Boot Support feature. For more information about Persistent Boot Support, refer to the *Oracle X5 Series Servers Administration Guide* at `http://www.oracle.com/goto/x86AdminDiag/docs`.

4. **Use the down arrow key to select the `UEFI/BIOS Boot Mode` field, and then press Enter.**

5. **Select your preferred boot mode, and then press Enter.**

6. **To save changes and exit BIOS, press the F10 key.**

Note - You must select the desired boot mode, Legacy BIOS or UEFI, before starting the operating system installation.

Configuring RAID

If you want to configure the server storage drives in a RAID configuration, configure RAID on your server before you install a Linux OS. For instructions for configuring RAID, refer to "Configuring Server Drives for OS Installation" in *Oracle Server X5-4 Installation Guide*.

Related Information

- *Oracle X5 Series Servers Administration Guide* at: `http://www.oracle.com/goto/x86AdminDiag/docs`

Installing a Linux Operating System

This section provides instructions for installing the Oracle Linux, and Red Hat Enterprise Linux operating systems and system-specific drivers on the server.

Description	Links
Using Oracle System Assistant to install the Linux operating systems.	"Installing a Linux OS on a Single System Using Oracle System Assistant" on page 31
Using media to install the Oracle Linux operating system on a single server.	"Installing Oracle Linux on a Single System Manually" on page 36
Using media to install the Red Hat Enterprise Linux operating system on a single server.	"Installing Red Hat Enterprise Linux OS on a Single System Manually" on page 67

Installing a Linux OS on a Single System Using Oracle System Assistant

The Oracle System Assistant application's Install OS task is the recommended method for installing a supported OS on the Oracle Server X5-4.

- "Install a Linux OS Using Oracle System Assistant" on page 31

▼ Install a Linux OS Using Oracle System Assistant

Before You Begin

Ensure that the following requirements are met:

- Perform the procedures in "Preparing to Install a Linux Operating System" on page 23.
- If you want to configure the boot drive (that is, the storage drive onto which you are installing the OS) for RAID, you must do so before you install the Linux OS. For instructions on how to configure RAID on your server, refer to "Configuring Server Drives for OS Installation" in *Oracle Server X5-4 Installation Guide*.

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

   - **For an ISO image on a DVD**, insert the DVD into the local or remote DVD-ROM drive.
   - **For an ISO image on the network**, ensure that the ISO image is available and that the Oracle ILOM Remote System Console Plus application has mounted the ISO image.

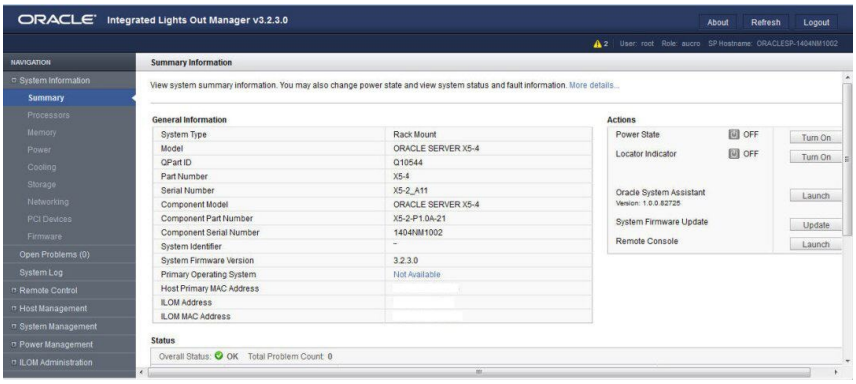
     For additional information about how to set up the installation media, see "Selecting the Boot Media Option" on page 13.

Note - If you are installing Red Hat Enterprise Linux, use the media provided by RedHat.

2. **To launch Oracle System Assistant directly from the Oracle ILOM web interface (recommended), perform the following steps; otherwise proceed to Step 3.**

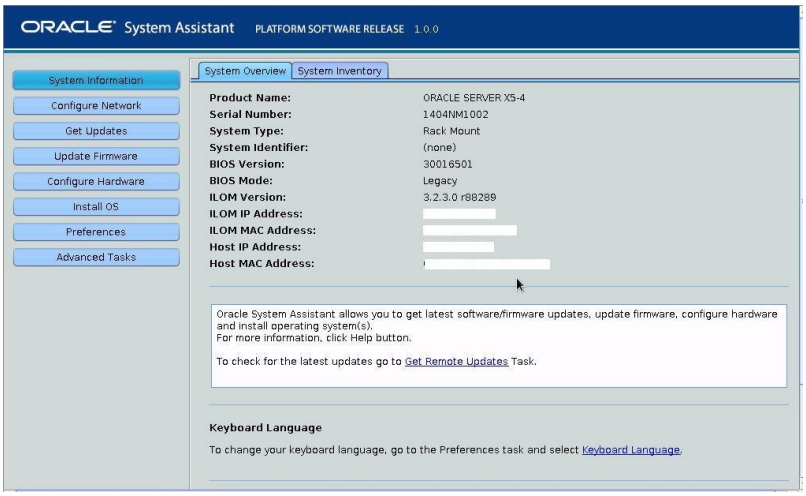
   a. **Log in to the Oracle ILOM web interface.**

      The Oracle ILOM Summary Information page appears.



   b. **In the Actions panel on the Oracle ILOM Summary Information page, click the Oracle System Assistant Launch button.**

The Oracle System Assistant System Overview screen appears.



c. Proceed to Step 4.

3. To launch Oracle System Assistant using the Oracle ILOM Remote System Console Plus application and BIOS, perform the following steps:

a. From the Oracle ILOM Summary Information page, click the Remote Console Launch button.

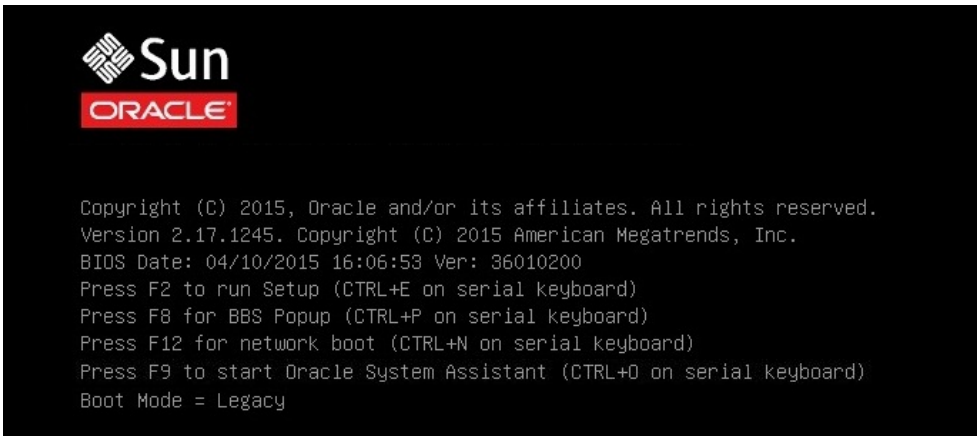
The Oracle ILOM Remote System Console Plus window appears.

b. Reset or power on the server.

For example, do one of the following:

- **From the local server**, press the Power button (approximately 1 second) on the front panel of the server to power off the server, then press the Power button again to power on the server.
- **From the Oracle ILOM web interface**, click Host Management → Power Control, select Reset from the Select Action list box, then click Save.
- **From the Oracle ILOM CLI**, type: `reset /System`

The BIOS screen appears in the Oracle ILOM Remote System Console Plus application.



Note - The next event occurs 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.

c. **Press the F9 key to start Oracle System Assistant.**

The Oracle System Assistant System Overview screen appears.

Note - The Oracle Assistant Overview screen might take a while to appear. Please be patient.

4. **To update Oracle System Assistant to the latest software release version, click the Get Updates button in Oracle System Assistant.**

This action ensures that the server has the latest version of Oracle System Assistant installed before you begin the OS installation.

Note - Server web access is required to update Oracle System Assistant.

5. **To update the server firmware, click the Update Firmware button.**

This action ensures that the server has the latest firmware and BIOS before you begin the OS installation.

6. **To install the Linux OS, click the Install OS button.**

The Operating System Installation screen appears.

7. **From the Supported OS drop-down list, select the Linux OS (Oracle Linux, or Red Hat Enterprise Linux) that your want to install.**

8. **In the Current BIOS mode portion of the screen, select the BIOS boot mode (UEFI or Legacy BIOS) that you want to use for the Linux OS installation.**

   For more information about changing BIOS boot mode, refer to the *Oracle X5 Series Servers Administration Guide* at `http://www.oracle.com/goto/x86AdminDiag/docs`.

9. **In the Select Your Install Media Location portion of the screen, select the location of the installation media.**

   This is the location of the OS installation media. The options are DVD and Network.

   Note - Oracle System Assistant does not support Preboot eXecution Environment (PXE) installs.

10. **In the Boot Disk portion of the screen, select the device to which the Linux OS will be installed.**

11. **Click Installation Details.**

    The Installation Details dialog appears.

12. **In the Installation Details dialog, deselect any items that you do not want to install.**

    Note - In the Installation Details dialog, the OS and Drivers options are mandatory and cannot be deselected.

13. **At the bottom of the Install Operating System screen, click the Install OS button.**

14. **Follow the prompts until the installation is finished.**

    The server boots.

15. **Perform the Linux operating system post installation tasks as required.**

    For post installation tasks, see the following sections:

    - “Post Installation Tasks for Oracle Linux 6.6, or 7.0 OS” on page 67
    - “Post Installation Tasks for RHEL 6.6, or 7.0 OS” on page 75

Installing Oracle Linux on a Single System Manually

This section provides information about installing the Oracle Linux 6.6 for x86 (64-bit) operating system.

Oracle Linux 6.6, or 7.0 OS Installation Task Map

The following table lists and describes the high-level steps for installing the Oracle Linux OS for a new installation.

Step	Description	Links
1.	Install the server hardware and configure the Oracle ILOM service processor.	■ "Installing the Server Into a Rack" in *Oracle Server X5-4 Installation Guide* ■ "Cabling the Server" in *Oracle Server X5-4 Installation Guide* ■ "Connecting to Oracle ILOM" in *Oracle Server X5-4 Installation Guide*
2.	Review the Oracle Linux version supported on the server.	"Supported Linux Operating Systems" on page 9
3.	Obtain the Oracle Linux installation media.	You can download or order the installation media at: `http://www.oracle.com/us/technologies/linux/index.html`
4.	Review the product notes.	*Oracle Server X5-4 Product Notes* at: `http://www.oracle.com/goto/X5-4/docs-videos`
5.	Set up the console, the Oracle Linux media, and the installation target that you will use to perform the installation.	■ "Selecting the Console Display Option" on page 11 ■ "Selecting the Boot Media Option" on page 13 ■ "Selecting the Installation Target Option" on page 17
6.	Set BIOS settings for new OS installations.	"Preparing the Boot Environment" on page 24
7.	Install the Oracle Linux OS.	■ "Install Oracle Linux 6.6 OS Manually Using Local or Remote Media" on page 37 ■ "Install Oracle Linux 7.0 OS Manually Using Local or Remote Media" on page 58

Step	Description	Links
8.	Perform the post installation tasks.	■ "Install Oracle Linux 6.6, or 7.0 Using PXE Network Boot" on page 64 "Post Installation Tasks for Oracle Linux 6.6, or 7.0 OS" on page 67

Related Information

- "Preparing to Install a Linux Operating System" on page 23

Before You Begin

Ensure that the following requirements are met:

- If you want to configure the boot drive (that is, the storage drive onto which you are installing the OS) for RAID, you must do so before you install the Linux OS. For instructions on how to configure RAID on your server, refer to "Configuring Server Drives for OS Installation" in *Oracle Server X5-4 Installation Guide*.
- Set the firmware to the desired boot mode, Legacy BIOS or UEFI. For instructions on how to set the boot mode, see "Set the Boot Mode" on page 27.
- Verify that the UEFI firmware settings are set correctly. For instructions on how to verify and, if necessary, set the UEFI firmware settings, see "Preparing the Boot Environment" on page 24.
- The console display option is selected and set up prior to performing the installation. For more information about this option, see "Selecting the Console Display Option" on page 11.
- The boot media option is selected and set up prior to performing the installation. For more information about this option and setup instructions, see "Selecting the Boot Media Option" on page 13.
- The installation target option is selected and set up prior to performing the installation. For more information about this option and setup instructions, see "Selecting the Installation Target Option" on page 17.

▼ Install Oracle Linux 6.6 OS Manually Using Local or Remote Media

This procedure describes how to install the Oracle Linux operating system from local or remote media. The procedure assumes that you are booting the Oracle Linux installation media from one of the following sources:

- Oracle Linux 6.6 DVD set (internal or external DVD)
- Oracle Linux 6.6 ISO DVD image (network repository)

If you are booting the installation media from a PXE environment, refer to "Install Oracle Linux 6.6, or 7.0 Using PXE Network Boot" on page 64 for instructions.

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

   - **For an ISO image on a DVD**, insert the DVD into the local or remote DVD-ROM drive.
   - **For an ISO image on the network**, ensure that the ISO image is available and that the Oracle ILOM Remote System Console Plus application has mounted the ISO image.

     For additional information about how to set up the installation media, see "Selecting the Boot Media Option" on page 13.

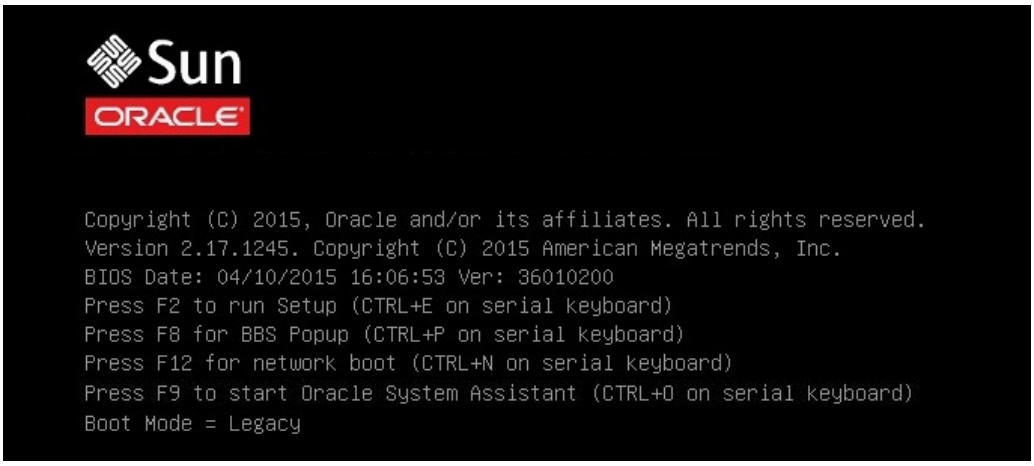
   For additional information about how to set up the installation media, see "Selecting the Boot Media Option" on page 13.

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

   For example, do one of the following:

   - **From the local server**, press the Power button (approximately 1 second) on the front panel of the server to power off the server, then press the Power button again to power on the server.
   - **From the Oracle ILOM web interface**, click Host Management → Power Control , select Reset from the Select Action list box, then click Save.
   - **From the Oracle ILOM CLI**, type: `reset /System`

The server begins the boot process and the BIOS screen appears.

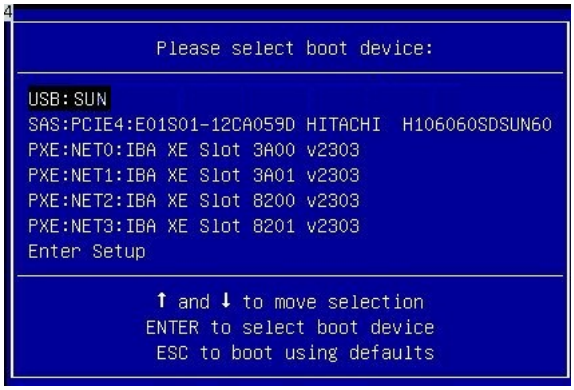


Note - The next event occurs very quickly; therefore, focused attention is needed for the following steps. Watch carefully for these messages as they appear on the screen for a brief time. You might want to enlarge the size of your screen to eliminate scroll bars.

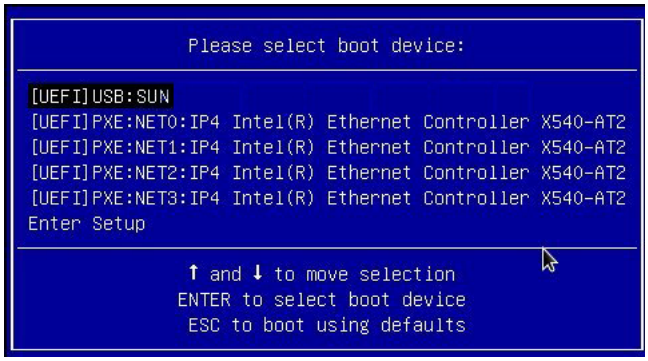
3. **In the BIOS screen, press the F8 key to specify a temporary boot device for the Linux OS installation.**

   `[Boot Pop Up Menu Selected]` appears at the bottom of the BIOS screen, and then the Please Select Boot Device menu appears. The screen that appears will differ depending on whether you have the UEFI/BIOS Boot Mode configured for Legacy BIOS or UEFI.

   - For Legacy BIOS Boot Mode, a screen similar to the following appears:



- For UEFI Boot Mode, a screen similar to the following appears:



Note - The Please Select Boot Device menu that appears in your installation might differ depending on the type of disk controller and other hardware, such as PCIe network cards, installed in your server.

4. **In the Please Select Boot Device menu, select the menu item according to the Linux OS media installation method and the BIOS boot mode you elected to use, then press Enter.**

   For example:

- **If you elected to use the Oracle ILOM Remote System Console Plus application delivery method in Legacy BIOS Boot Mode, select `USB:SUN` from the Legacy BIOS screen.**

- **If you elected to use the Oracle ILOM Remote System Console Plus application delivery method in UEFI Boot Mode, select `[UEFI]USB:SUN` from the UEFI screen.**

5. **The next screen displayed by the installation program depends on whether you selected the Legacy BIOS Boot Mode or the UEFI Boot Mode.**

   - If you selected Legacy BIOS Boot Mode, the Welcome to Oracle Linux Server boot screen appears.
   - If you selected UEFI Boot Mode, the Booting Oracle Linux Server boot screen appears.

6. **For the purposes of this installation, do one of the following:**

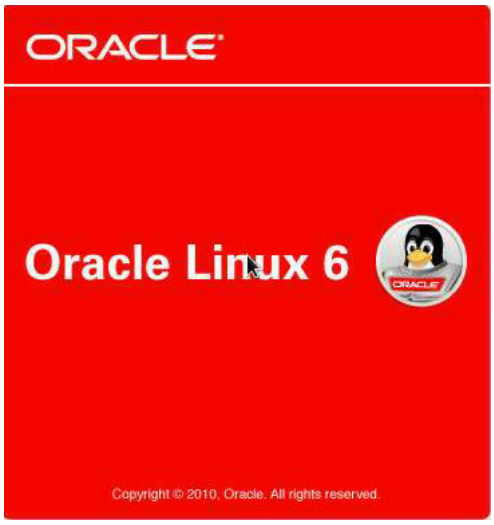
   - If you elected to do the installation in the Legacy BIOS Boot Mode, accept the default and press Enter.
   - If you elected to do the installation in the UEFI Boot Mode, press Enter or allow the screen to timeout.

   The Disc Found screen appears.

7. **If this is the first time that you are doing an install from this media, you should consider selecting `OK` to test the media; otherwise, select `Skip` and press Enter.**

Note - If you have used this disk to do installs before, select Skip; otherwise select OK and test the disk.

The Oracle Linux 6 splash screen appears.



8. **Scroll to the bottom of the Oracle Linux 6 splash screen, and click `Next`.**

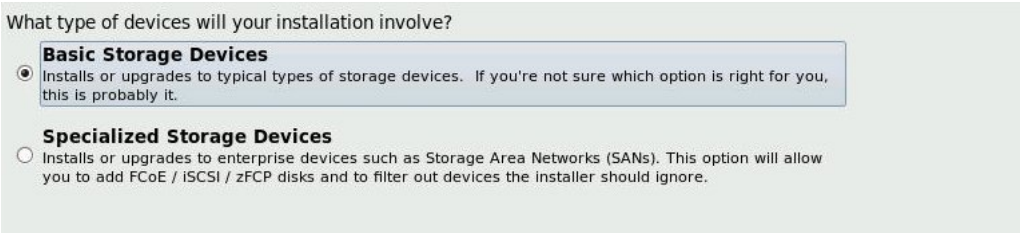
   The "What language would you like to use during the installation process?" screen appears.

9. **Select the appropriate language, and click `Next`.**

   The "Select the appropriate keyboard for the system" screen appears.

10. **Select the appropriate keyboard configuration, and click `Next`.**

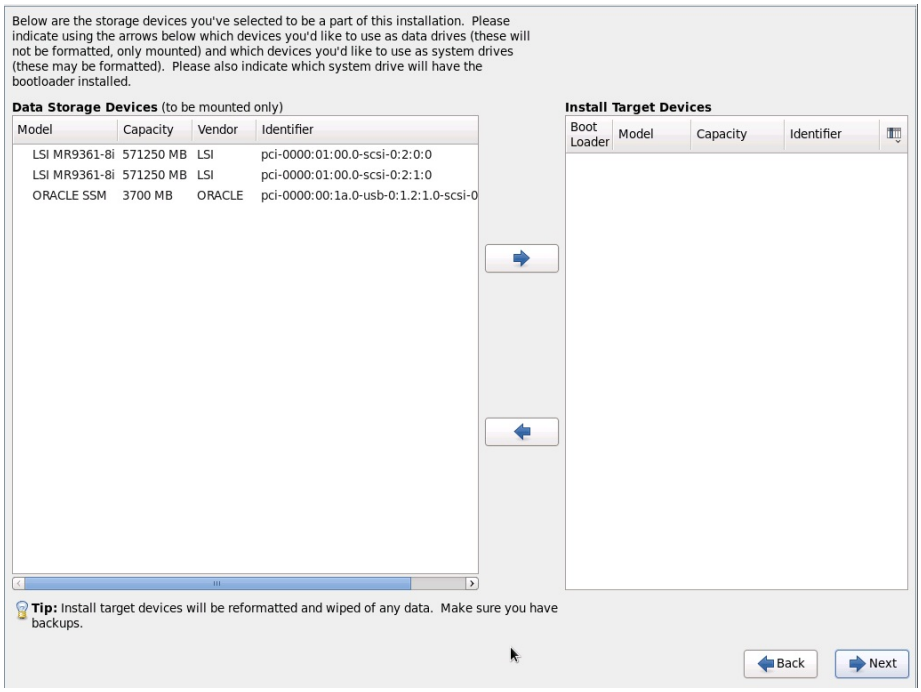
    The "What type of devices will your installation involve?" screen appears.



11. **In the above screen, select Specialized Storage Devices, then scroll to the bottom of the screen, and click `Next`.**

Note - Selecting Specialized Storage Devices allows you to deselect the Oracle SSM in the following screen. This makes the rest of this manual installation easier to perform.

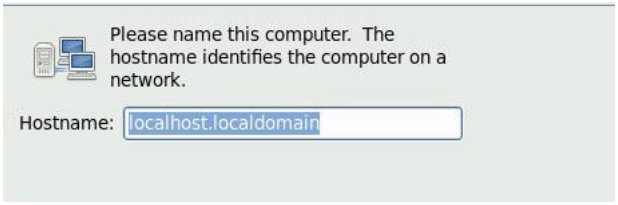
The "Please select the drive you'd like to install the operating system on" screen appears.



12. **Select the storage drive on to which you want to install the operating system, scroll to the bottom of the screen, and click `Next`.**

Caution - Do not select the Oracle SSM drive as the installation target. This drive is reserved for the Oracle System Assistant and should never be used as a boot or storage drive. For more information about the Oracle SSM flash drive, see “Installation Target Options” on page 18.

The "Please name this computer" screen appears.



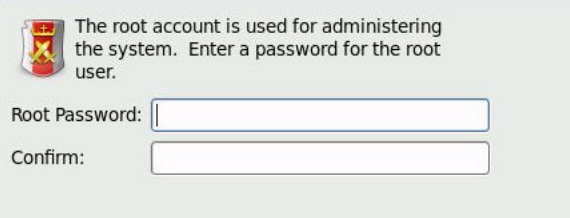
13. **Enter the host name, and click `Next`.**

The Select Time Zone screen appears.

14. **Select the appropriate region and city and, click `Next`.**

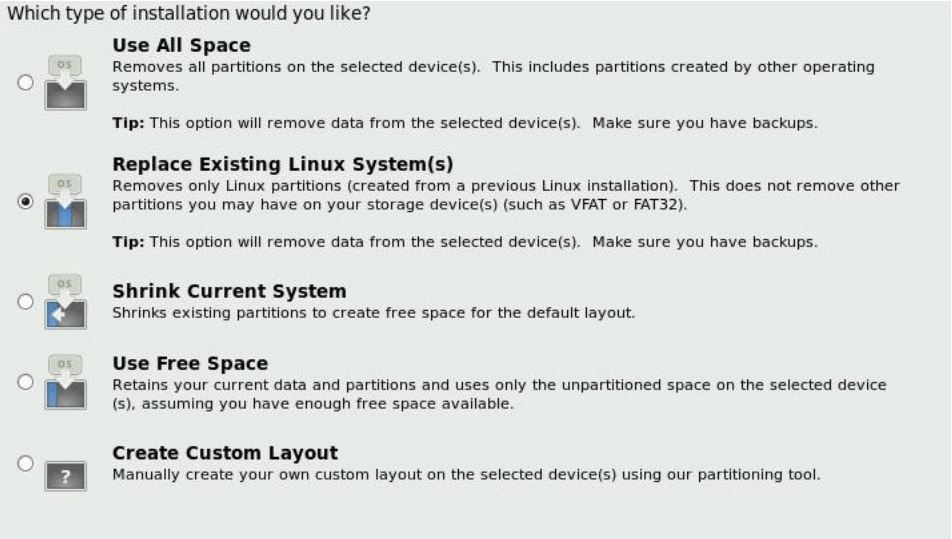
Note - If you want NTP Service, you can set that up after the operating system is installed.

The Root Password screen appears.



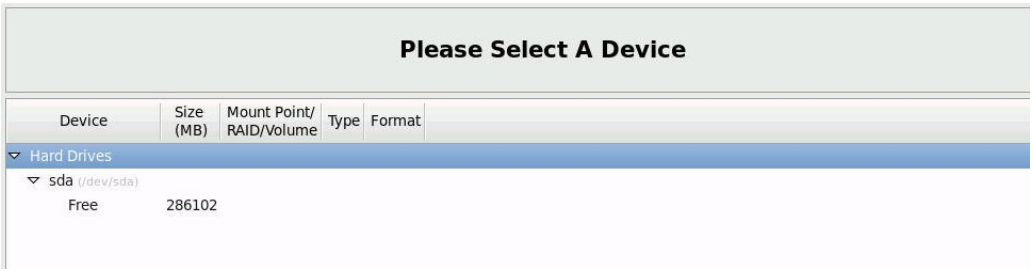
15. Enter root password, and click `Next`.

The "What type of installation would you like?" screen appears.



16. In the above screen, select the appropriate option, and click `Next`.

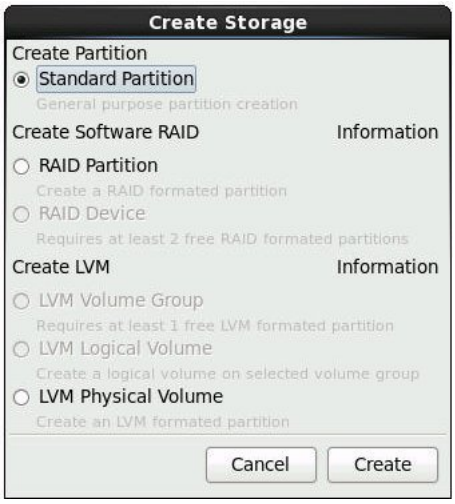
For example, if the storage drive on which you are installing operating system is blank and you select Create Custom Layout, the "Please Select a Device" screen appears.



17. To create partitions, do the following:

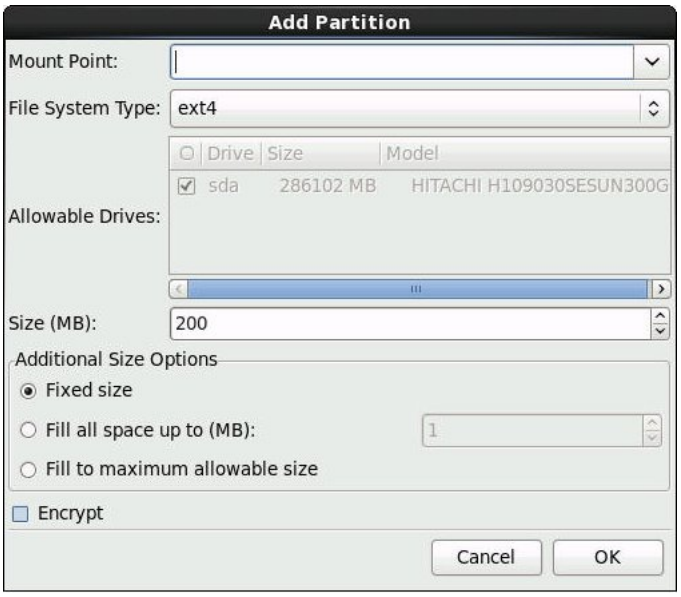
a. Scroll to the bottom of the screen, and click Create.

The Create Storage dialog appears.



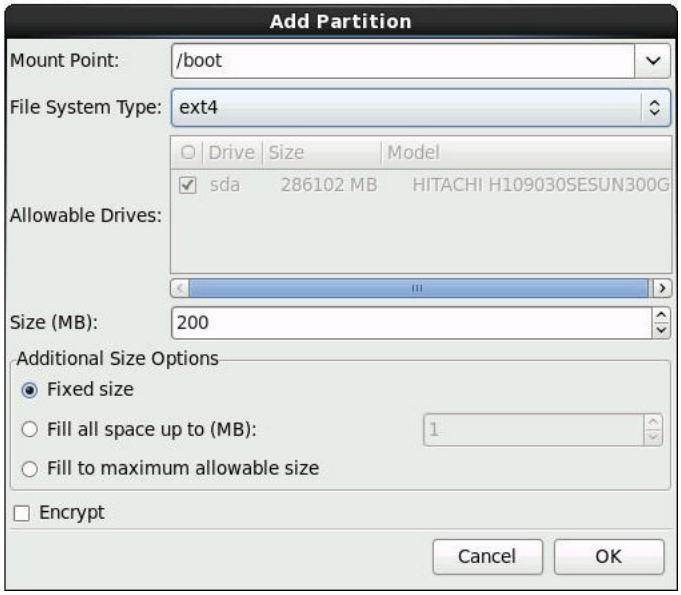
b. Select Standard Partition, and click Create.

The Add Partition dialog appears.



c. In the dialog, set the Mount point to `/boot` and leave the File System Type set to `ext4` and the Size (MB) set to `200`.

Here is the updated Add Partition dialog.



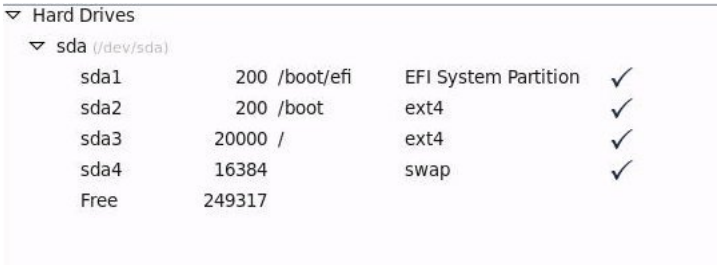
d. Click OK.

The partition is created.

e. Repeat Step a through Step d above to create the following additional partitions:

Mount Point	File System Type	Size (MB)
/boot/efi **Note -** This partition can only be created if you selected the UEFI Boot Mode. It is not supported in Legacy BIOS Boot Mode.	EFI System Partition	200
/	ext4	20000
None	swap	16384

The updated partitions screen appears.



18. Click Next to apply the partitions.

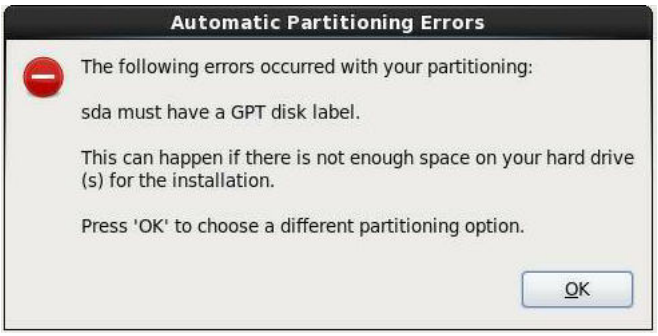
The following dialog appears.

19. Click `Write changes to disk`.

If there are no disk partitioning errors, the install boot loader screen appears and you should proceed to Step 21. If there are disk partitioning errors, proceed to Step 20.

20. **If there is a problem with the data format on the installation target disk, the Automatic Partitioning Errors screen appears.**

Note - The following screen appears if you are installing the operating system in UEFI Boot Mode, in which case GUID Partition Table (GPT) formatted disks are required. If you encounter disk formatting errors when you install the operating system in Legacy BIOS Boot Mode, a similar screen would be displayed indicating the Master Boot Record (MBR) formatted disks are required.



If the above screens appears, the disk to which you are attempting to install Oracle Linux is formatted incorrectly and it needs to be reformatted.

Note - This error occurs if you attempt to do a UEFI Boot Mode OS install to a storage drive that was previously used to store data in Legacy BIOS format or vice versa. UEFI uses the GPT format, while Legacy BIOS formats storage drives in the MBR format. The storage drives that ship with the server are new, so they are unformatted. You will not encounter this error when installing to an unformatted disk.

To recover and reformat the disk without aborting the install, click the keyboard Back button on the install screen several times to return to the initial Oracle Linux splash screen shown in Step 7 and perform these steps:

a. **To start the recovery shell, type `Ctrl+Alt+F2`.**

   The shell appears.

b. **To reformat the disk in GPT format or MBR format as appropriate for this installation, enter the shell commands as shown on the following screen:**

```
anaconda root@localhost /]# parted /dev/sda
GNU Parted 2.1
Using /dev/sda
Welcome to GNU Parted! Type ???help' to view a list of commands.
(parted) p
Model: HITACHI H106030SDSUN300G (scsi)
Disk /dev/sda: 300GB
Sector size (logical/physical): 512B/512B
Partition Table: msdos (or gpt for Legacy BIOS Boot Mode)
Number  Start   End     Size    Type    File system Flags
 1      1049kB  21.5GB  21.5GB  primary ext2
(parted) mklabel
New disk label type? gpt (or msdos for Legacy BIOS Boot Mode)
Warning: The existing disk label on /dev/sda will be destroyed and all data will be
 lost.
Do you want to continue?
Yes/No? yes
(parted) p
Model: HITACHI H106030SDSUN300G (scsi)
Disk /dev/sda: 300GB
Sector size (logical/physical): 512B/512B
Partition Table: gpt
Number  Start  End  Size  File system  Name  Flags
(parted) g
Information: You may need to update /etc/fstab.
anaconda root@localhost /]#
```

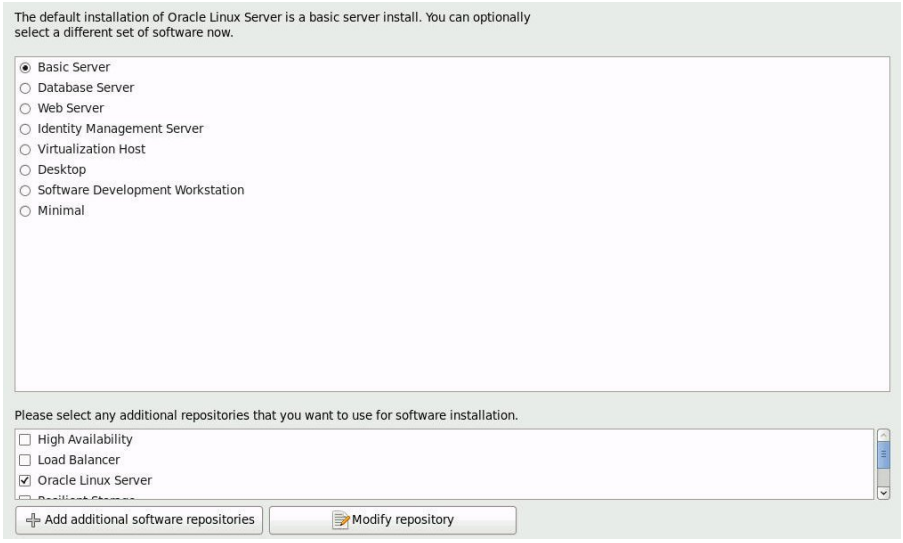
c. **Type `Ctrl+Alt+F6` to return to the graphical installation screen and continue the installation from the point of the Oracle Linux splash screen (go to Step 7).**

Note - In most cases the values that you entered for this installation have been saved, so you will not have to reenter them.

---

21. **In the install boot loader screen, select Install boot loader on /dev/sda1, and click `Next`.**

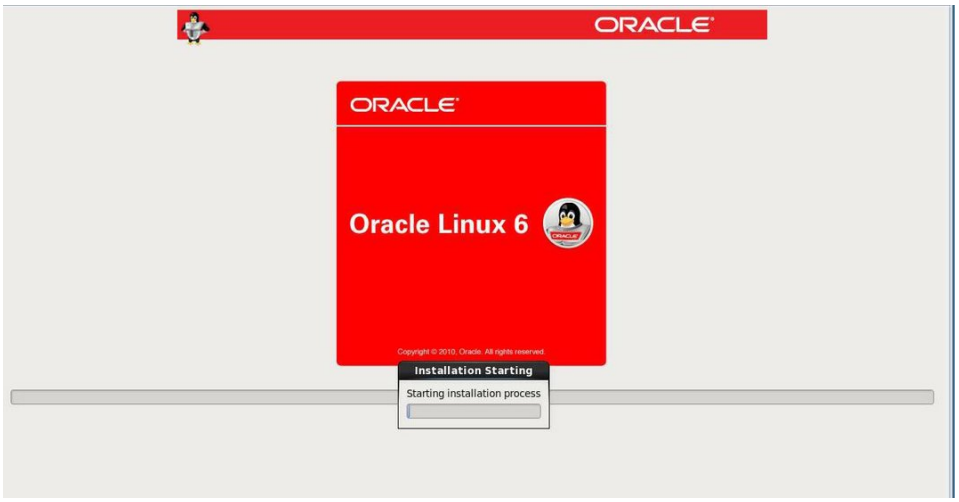
The "Select server software to install" screen appears.



While Basic Server is the default server software install, you can optionally select a different set of software. Additionally, at the bottom of this screen you can select Customize Now to do a custom install of the selected software.

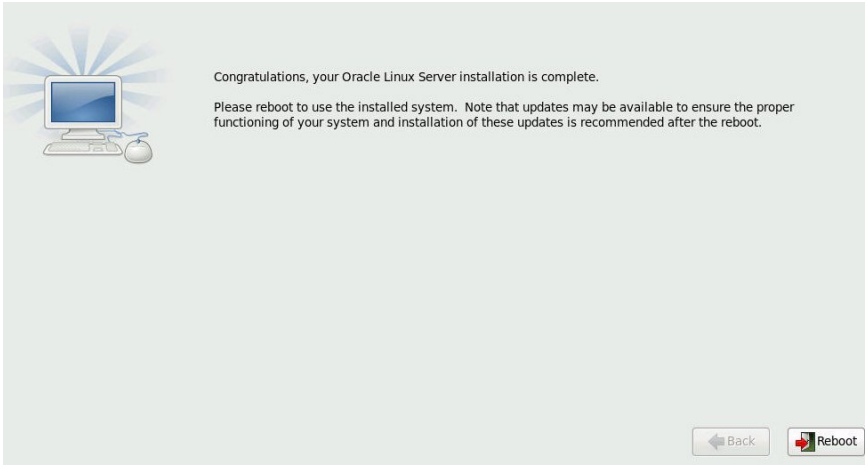
22. For the purposes of this sample installation, accept the Basic Server default and click `Next`.

The Starting Installation Process screen appears.



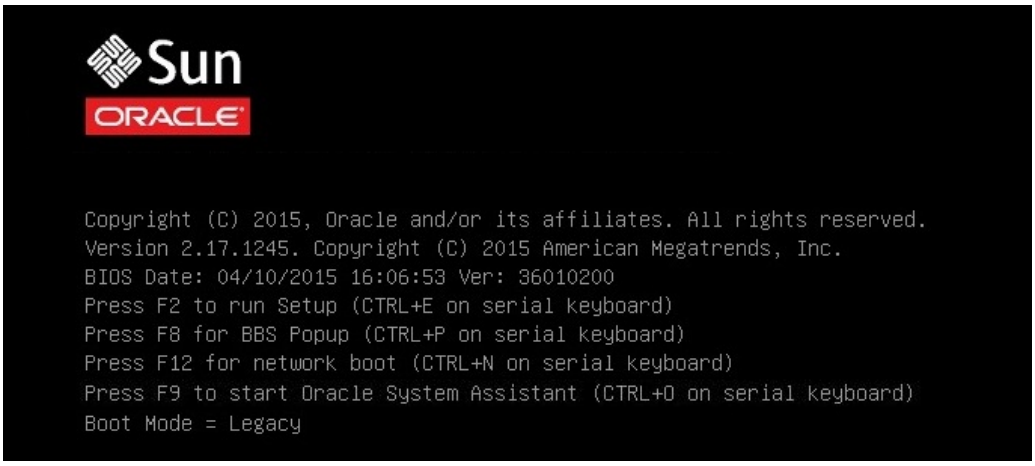
23. Wait until the Oracle Linux OS installation completes.

When the installation completes, the following screen appears.



24. To reboot the Oracle Linux installation, click Reboot.

The server reboots and the BIOS screen appears.



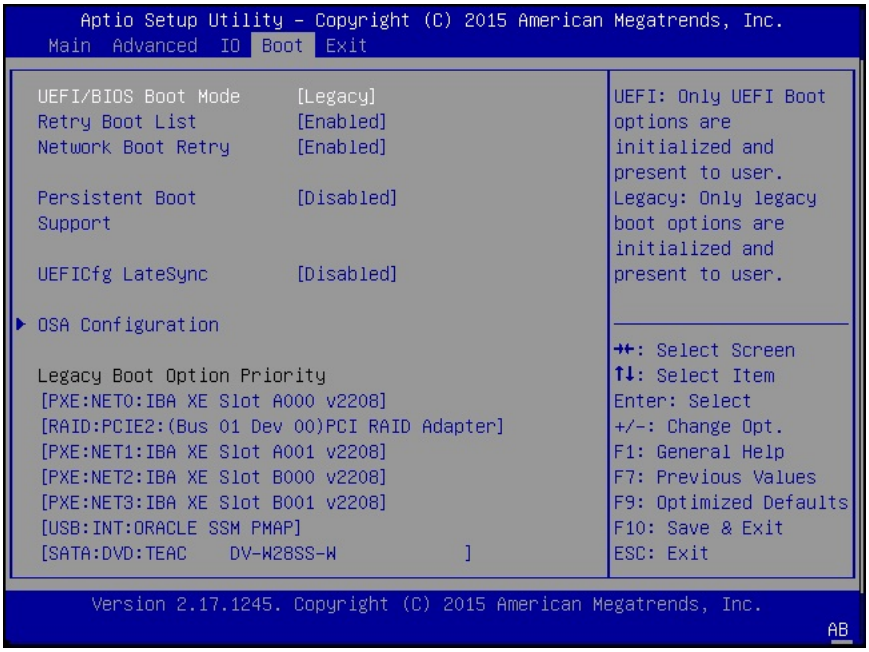
25. **To access the BIOS Setup Utility so that you can set the server to boot from the operating system you just installed, press the F2 key.**

    A BIOS Setup Utility screen appears with the Boot Menu selected. The BIOS screen displayed and the actions required to proceed with installation depend on the UEFI/BIOS Boot Mode you selected for installing the OS.

    - If you installed the OS in Legacy BIOS Boot Mode, proceed to Step 26.
    - If you installed the OS in UEFI Boot Mode, proceed to Step 27.

26. **If you installed the OS in Legacy BIOS Boot Mode, perform these steps and proceed to Step 28.**

a. In the BIOS Setup Utility screen shown below, use the down arrow key to select [USB:SUN] under the Legacy Boot Option Priority field, and press Enter.



Note - The BIOS Boot screen that appears for your installation might differ depending on the type of disk controller and other hardware, such as PCIe network cards, installed in your server.

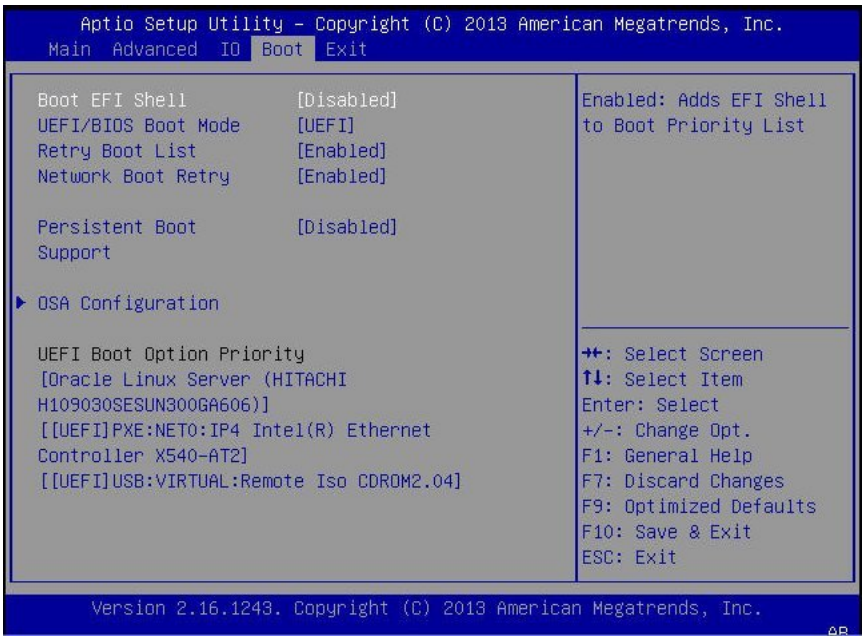
The Boot Option #1 dialog appears.

b. Select [SAS:PCIE4:E01S06-43BB92B5 HITACHI H109030SESUN30], and press Enter.
[SAS:PCIE4:E01S06-43BB92B5 HITACHI H109030SESUN30] moves to the top position.

c. Press the F10 key to save the change and exit the BIOS Setup Utility, then proceed to Step 28.

27. If you installed the OS in UEFI Boot Mode, perform these steps:

a. In the BIOS Setup Utility screen shown below, verify that [Oracle Linux Server (HITACHI H109030SESUN300GA606)] is listed as the first option under UEFI Boot Option Priority field.



Note - The BIOS Boot screen that appears for your installation might differ depending on the type of disk controller and other hardware, such as PCIe network cards, installed in your server.

b. Press the F10 key to exit the BIOS Setup Utility.

28. Wait while the reboot continues.

The following kernel screen appears.

```
Press any key to enter the menu
Booting Oracle Linux Server Unbreakable Enterprise Kernel (3.8.13-16.2.1.el6uek.x86_64)
 in 2 seconds...
```

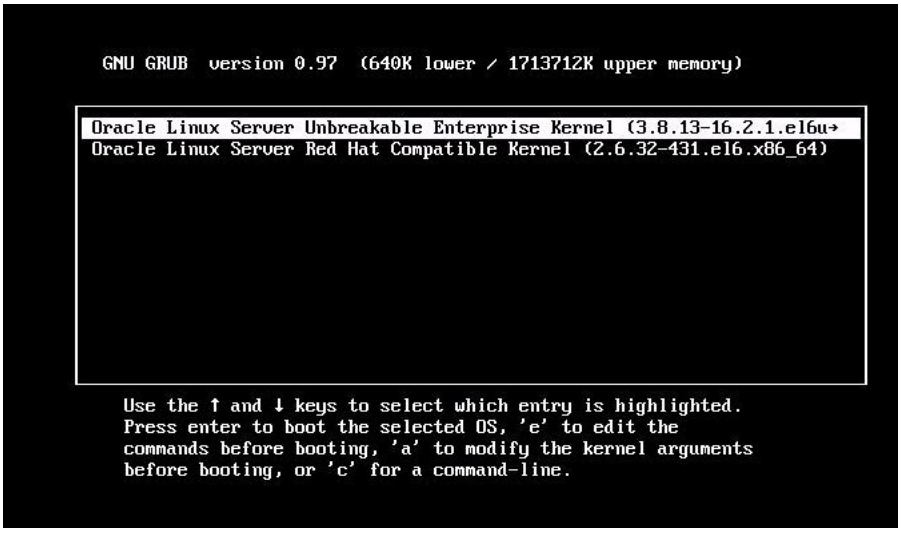
The Oracle Unbreakable Enterprise Kernel Release 3 for Linux is the default kernel.

29. **If you do *not* want to change the default Kernel, proceed to Step 31; otherwise, proceed to Step 30.**

30. **(Optional) If you are installing Oracle Linux 6.6 and you want to switch to the Red Hat compatible kernel, do the following.**

    a. **Press any character key.**

    The GNU GRUB screen appears.



    b. **For the Red Hat compatible kernel, select the second menu option, then press Enter.**

31. **After completing the Oracle Linux installation and rebooting the server with the desired Linux kernel, proceed to "Post Installation Tasks for Oracle Linux 6.6, or 7.0 OS" on page 67.**

▼ Install Oracle Linux 7.0 OS Manually Using Local or Remote Media

This procedure describes how to install the Oracle Linux OS 7.0 from local or remote media. The procedure assumes that you are booting the Oracle Linux installation media from one of the following sources:

- Oracle Linux OS 7.0 DVD set (internal or external DVD)
- Oracle Linux OS 7.0 ISO DVD image (network repository)

If you are booting the installation media from a PXE environment, refer to "Install Oracle Linux 6.6, or 7.0 Using PXE Network Boot" on page 64 for instructions.

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

   - **For an ISO image on a DVD**, insert the DVD into the local or remote DVD-ROM drive.
   - **For an ISO image on the network**, ensure that the ISO image is available and that the Oracle ILOM Remote System Console Plus application has mounted the ISO image.

     For additional information about how to set up the installation media, see "Selecting the Boot Media Option" on page 13.

   For additional information about how to set up the installation media, see "Selecting the Boot Media Option" on page 13.

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

   For example, do one of the following:

   - **From the local server**, press the Power button (approximately 1 second) on the front panel of the server to power off the server, then press the Power button again to power on the server.
   - **From the Oracle ILOM web interface**, click Host Management → Power Control , select Reset from the Select Action list box, then click Save.
   - **From the Oracle ILOM CLI**, type: `reset /System`

   The server begins the boot process and the BIOS screen appears.

   Note - The next event occurs 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 screen, press the F8 key to specify a temporary boot device for the Linux OS installation.**

`[Boot Pop Up Menu Selected]` appears at the bottom of the BIOS screen, and then the Please Select Boot Device menu appears. The screen that appears will differ depending on whether you have the UEFI/BIOS Boot Mode configured for Legacy BIOS or UEFI.

Note - The Please Select Boot Device menu that appears in your installation might differ depending on the type of disk controller and other hardware, such as PCIe network cards, installed in your server.

---

4. **In the Please Select Boot Device menu, select the menu item according to the Linux OS media installation method and the BIOS mode you elected to use, then press Enter.**

   For example:

   - **If you elected to use the Oracle ILOM Remote System Console Plus application delivery method in Legacy BIOS Boot Mode, select `USB:SUN` from the Legacy BIOS screen.**

   - **If you elected to use the Oracle ILOM Remote System Console Plus application delivery method in UEFI Boot Mode, select `[UEFI]USB:SUN` from the UEFI screen.**

5. **The next screen displayed by the installation program depends on whether you selected the Legacy BIOS Boot Mode or the UEFI Boot Mode.**

   - If you selected Legacy BIOS Boot Mode, the Welcome to Oracle Linux Server boot screen appears.
   - If you selected UEFI Boot Mode, the Booting Oracle Linux Server boot screen appears.

6. **For the purposes of this installation, do one of the following:**

   - If you elected to do the installation in the Legacy BIOS Boot Mode, accept the default and press Enter.
   - If you elected to do the installation in the UEFI Boot Mode, press Enter or allow the screen to timeout.

   The Disc Found screen appears. From this screen, you can choose whether to test the media before doing the install.

7. **If this is the first time that you are doing an install from this media, you should consider selecting `OK` to test the media; otherwise, select `Skip` and press Enter.**

Note - If you have used this disk to do installs before, select Skip; otherwise select OK and test the disk.

The Oracle Linux 7.0 splash screen appears.

8. **Proceed with Oracle Linux 7.0 installation instructions, which are located at the Oracle Linux 7.0 Product Documentation Library: `http://docs.oracle.com/cd/E52668_01`.**

Note - Oracle Linux 7.0 contains new features and functionality that will produce behavior and results that vary from Oracle Linux 6.x. Please proceed carefully with your installation.

When the installation is complete, the server reboots and the BIOS screen appears.

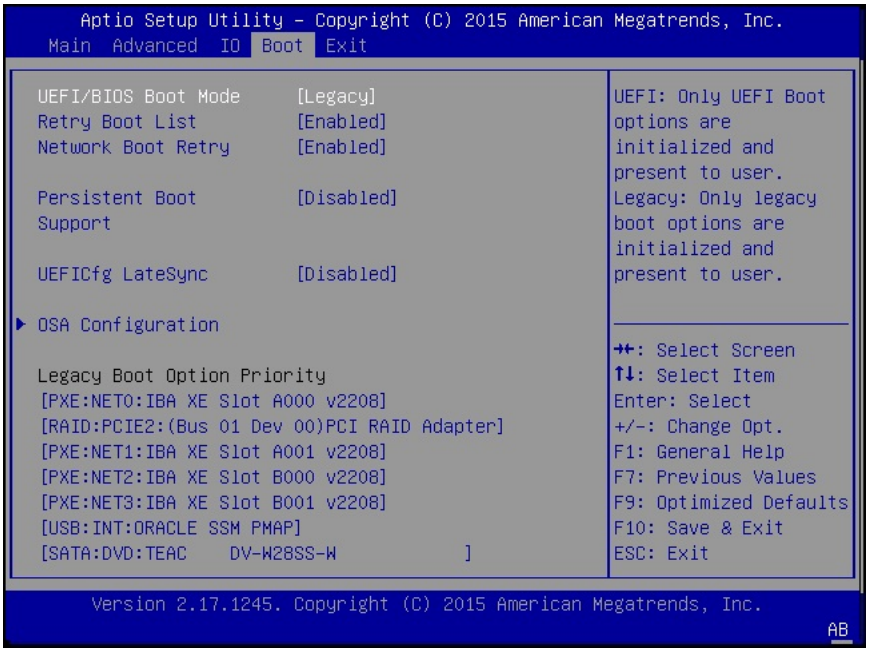
9. **To access the BIOS Setup Utility so that you can set the server to boot from the operating system you just installed, press the F2 key.**

   A BIOS Setup Utility screen appears with the Boot Menu selected. The BIOS screen displayed and the actions required to proceed with installation depend on the UEFI/BIOS Boot Mode you selected for installing the OS.

   - If you installed the OS in Legacy BIOS Boot Mode, proceed to Step 10.
   - If you installed the OS in UEFI Boot Mode, proceed to Step 11.

10. **If you installed the OS in Legacy BIOS Boot Mode, perform these steps and proceed to Step 12.**

a. In the BIOS Setup Utility screen shown below, use the down arrow key to select [USB:SUN] under the Legacy Boot Option Priority field, and press Enter.



Note - The BIOS Boot screen that appears for your installation might differ depending on the type of disk controller and other hardware, such as PCIe network cards, installed in your server.

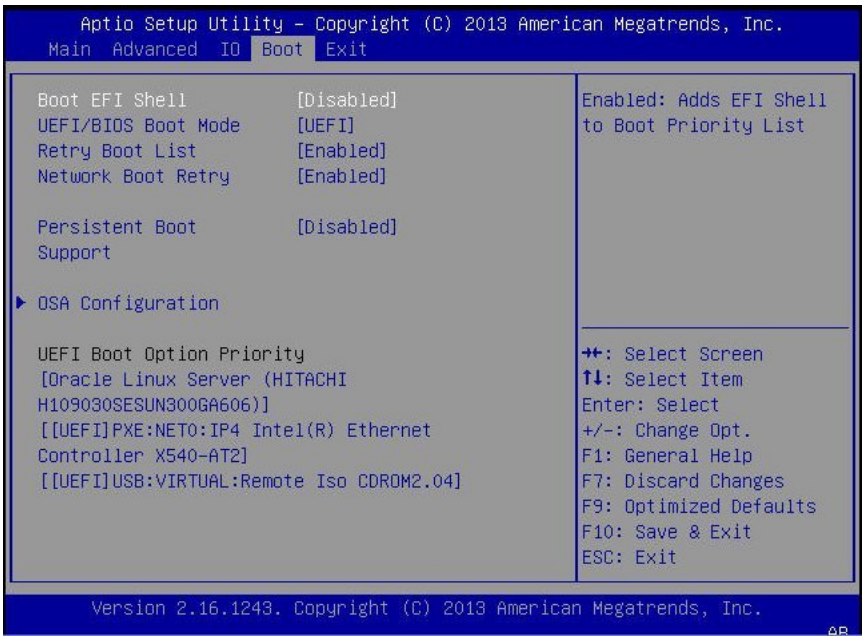
The Boot Option #1 dialog appears.

b. Select [SAS:PCIE4:E01S06-43BB92B5 HITACHI H109030SESUN30], and press Enter.
[SAS:PCIE4:E01S06-43BB92B5 HITACHI H109030SESUN30] moves to the top position.

c. Press the F10 key to save the change and exit the BIOS Setup Utility, then proceed to Step 12.

11. If you installed the OS in UEFI Boot Mode, perform these steps:

a. In the BIOS Setup Utility screen shown below, verify that [Oracle Linux Server (HITACHI H109030SESUN300GA606)] is listed as the first option under UEFI Boot Option Priority field.



Note - The BIOS Boot screen that appears for your installation might differ depending on the type of disk controller and other hardware, such as PCIe network cards, installed in your server.

b. Press the F10 key to exit the BIOS Setup Utility.

12. Wait while the reboot continues.

The following kernel screens appears.

```
Press any key to enter the menu
Booting Oracle Linux Server Unbreakable Enterprise Kernel (3.8.13-16.2.1.el6uek.x86_64)
 in 2 seconds...
```

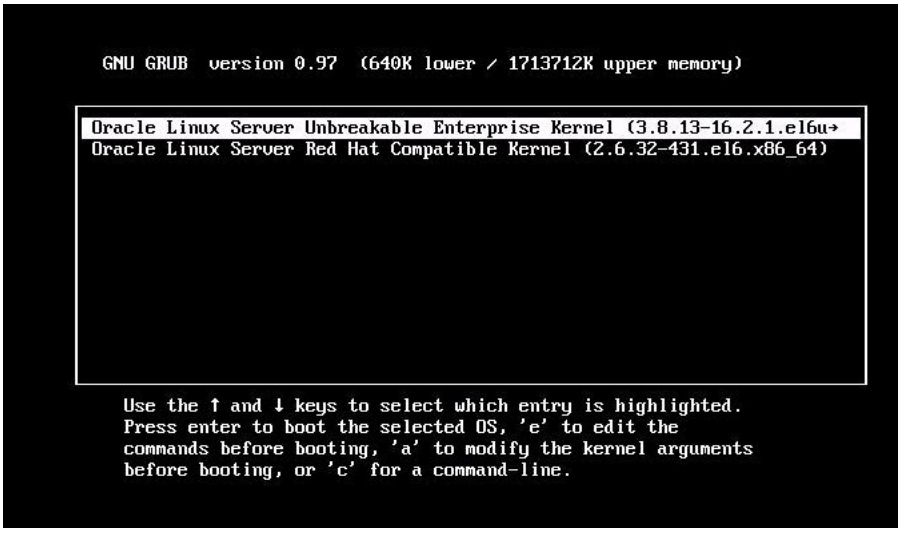
The Oracle Unbreakable Enterprise Kernel Release 3 for Linux is the default kernel.

13. **If you do *not* want to change the default Kernel, proceed to Step 15; otherwise, proceed to Step 14.**

14. **(Optional) If you are installing Oracle Linux 7.0 and you want to switch to the Red Hat compatible kernel, do the following.**

    a. **Press any character key.**

    The GNU GRUB screen appears.



    b. **For the Red Hat compatible kernel, select the second menu option, then press Enter.**

15. **After completing the Oracle Linux installation and rebooting the server with the desired Linux kernel, proceed to "Post Installation Tasks for Oracle Linux 6.6, or 7.0 OS" on page 67.**

Install Oracle Linux 6.6, or 7.0 Using PXE Network Boot

This procedure describes how to install Oracle Linux 6.6, or 7.0 from a PXE network environment. This procedure assumes that you are booting the installation media from one of the following sources:

- Oracle Linux 6.6, or 7.0 ISO DVD image
- Oracle Linux 6.6, or 7.0 KickStart image (network repository)

  KickStart is an automated installation tool. It enables a system administrator to create a single image containing the settings for some or all installation and configuration parameters that are normally provided during a typical Oracle Linux installation. Typically, a KickStart image is placed on a single network server and read by multiple systems for installation.

Before You Begin Ensure that the following requirements are met prior to performing the Oracle Linux PXE installation:

- If you are using a KickStart image to perform the installation, you must:
  - Create a KickStart file.
  - Create the boot media with the KickStart file or make the KickStart file available on the network.
- To use PXE to boot the installation media over the network, you must:
  - Configure the network (NFS, FTP, HTTP) server to export the installation tree.
  - Configure the files on the TFTP server necessary for PXE booting.
  - Configure the server's MAC network port address to boot from the PXE configuration.
  - Configure the Dynamic Host Configuration Protocol (DHCP).

For more information on KickStart and PXE network installation on Oracle Linux 6, refer to the *Oracle Linux Installation Guide* at: `http://docs.oracle.com/cd/E37670_01/index.html`

For more information on KickStart and PXE network installation on Oracle Linux 7.0, refer to the *Oracle Linux 7.0 Installation Guide* at: `http://docs.oracle.com/cd/E52668_01/E54695/html/index.html`

1. **Ensure that the PXE network environment is set up properly and the Oracle Linux installation media is available for PXE boot.**

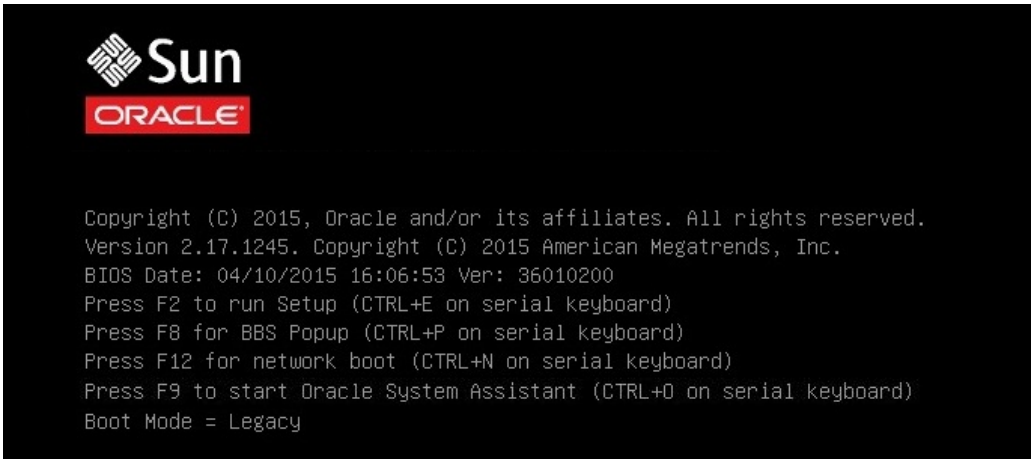
2. **Reset or power on the server.**

   For example, do one of the following:

- **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.
- **From the Oracle ILOM web interface**, click Host Management → Power Control, select Reset from the Select Action list box, then click Save.
- **From the Oracle ILOM CLI**, type: **`reset /System`**

The server begins the boot process and the BIOS screen appears.

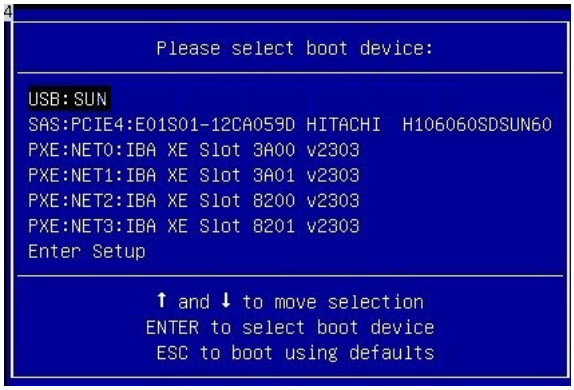
Note - The next event occurs very quickly; therefore, focused attention is needed for the following steps. Watch carefully for these messages as they appear on the screen for a brief time. You might want to enlarge the size of your screen to eliminate scroll bars.



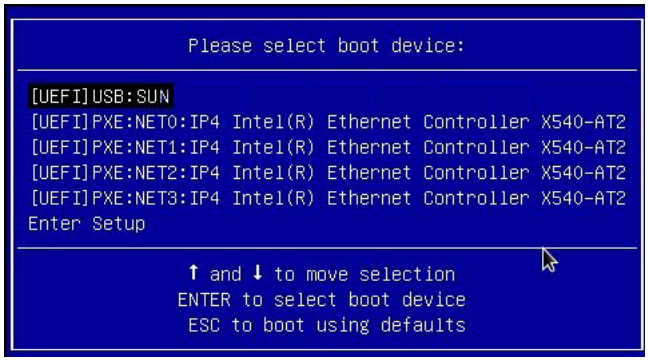
3. **In the BIOS screen, press the F8 key to specify a temporary boot device for the Linux OS installation.**

   `[Boot Pop Up Menu Selected]` appears at the bottom of the BIOS screen, and then the Please Select Boot Device menu appears. The screen that appears will differ depending on whether you have the UEFI/BIOS Boot Mode configured for Legacy BIOS or UEFI.

   - For Legacy BIOS Boot Mode, the following screen appears:



- For UEFI Boot Mode, the following screen appears:



Note - The Please Select Boot Device menu that appears in your installation might differ depending on the type of disk controller and other hardware, such as PCIe network cards, installed in your server.

4. **In the Please Select Boot Device menu, select the network port that is configured to communicate with your PXE network install server, then press Enter.**

   The network bootloader loads and starts to execute.

5. **From this point on, the installation procedure is site specific as determined by the site KickStart file.**

Post Installation Tasks for Oracle Linux 6.6, or 7.0 OS

After installing Oracle Linux 6.6, or 7.0, you should register your system and activate your subscription with Oracle to receive automatic updates to the software. This will ensure that the server is running the latest version of the operating system. Go to:

http://www.oracle.com/technetwork/articles/servers-storage-admin/yum-repo-setup-1659167.html

After you have updated your server with the latest updates, be sure to reboot your server before you use the operating system. In addition to ensuring that your server has the latest improvements to the Oracle Linux operating system, updating your server to the latest updates will ensure that it is running the latest version of the Unbreakable Enterprise Kernel (UEK) for Linux, which is needed for the proper operation of the optional NVMe storage drives, if installed.

Installing Red Hat Enterprise Linux OS on a Single System Manually

This section provides instructions for installing Red Hat Enterprise Linux (RHEL) 6.6, and 7.0 for x86 (64-bit) and the Oracle Unbreakable Enterprise Kernel for Linux.

The following topics are covered:

RHEL 6.6, or 7.0 OS Installation Task Map

The following table lists and describes the high-level steps for installing the Red Hat Enterprise Linux (RHEL) operating system.

Step	Description	Links
1.	Install your server hardware and configure the Oracle ILOM service processor.	■ "Installing the Server Into a Rack" in *Oracle Server X5-4 Installation Guide* ■ "Cabling the Server" in *Oracle Server X5-4 Installation Guide* ■ "Connecting to Oracle ILOM" in *Oracle Server X5-4 Installation Guide*
2.	Review the Linux versions supported by the server.	"Supported Linux Operating Systems" on page 9
3.	Obtain the RHEL installation media.	Go to: `http://www.redhat.com/en/services/support`
4.	Review the product notes.	*Oracle Server X5-4 Product Notes* at: `http://www.oracle.com/goto/X5-4/docs-videos`
5.	Set up the console, the RHEL media, and the installation target that you will use to perform the installation.	■ "Selecting the Console Display Option" on page 11 ■ "Selecting the Boot Media Option" on page 13 ■ "Selecting the Installation Target Option" on page 17
6.	Set BIOS settings for new OS installations.	"Preparing the Boot Environment" on page 24
7.	Install the RHEL OS.	■ "Install RHEL 6.6 or 7.0 OS Manually Using Local or Remote Media" on page 69 ■ "Install RHEL 6.6, or 7.0 Using PXE Network Boot" on page 72
8.	Perform the post installation tasks.	"Post Installation Tasks for RHEL 6.6, or 7.0 OS" on page 75
9.	(Optional) Install the Oracle Unbreakable Enterprise Kernel for Linux.	"(Optional) Install Oracle Unbreakable Enterprise Kernel for Linux on RHEL Using Local or Remote Console" on page 76

Before You Begin

Ensure that the following requirements are met:

- If you want to configure the boot drive (that is, the storage drive onto which you are installing the OS) for RAID, you must do so before you install the Linux OS. For instructions on how to configure RAID on your server, refer to "Configuring Server Drives for OS Installation" in *Oracle Server X5-4 Installation Guide*.
- Set the firmware to the desired boot mode, Legacy BIOS or UEFI. For instructions on how to set the boot mode, see "Set the Boot Mode" on page 27.
- Verify that the UEFI firmware settings are set correctly. For instructions on how to verify and, if necessary, set the UEFI firmware settings, see "Preparing the Boot Environment" on page 24.
- The console display option is selected and set up prior to performing the installation. For more information about this option and setup instructions, see "Selecting the Console Display Option" on page 11.
- The boot media is selected and set up prior to performing the installation. For more information about this option and setup instructions, see "Selecting the Boot Media Option" on page 13.

- The installation target option is selected and set up prior to performing the installation. For more information about this option and setup instructions, see "Selecting the Installation Target Option" on page 17.

▼ Install RHEL 6.6 or 7.0 OS Manually Using Local or Remote Media

This procedure describes how to boot the Red Hat Enterprise Linux (RHEL) 6.6, or 7.0 operating system installation from local or remote media. The procedure assumes that you are booting the RHEL installation media from one of the following sources:

- RHEL 6.6, or 7.0 DVD set
- RHEL 6.6, or 7.0 ISO image

If you are booting the installation media from a PXE environment, refer to "Install RHEL 6.6, or 7.0 Using PXE Network Boot" on page 72 for instructions.

For further details about installing a RHEL OS, see the RHEL documentation collection at `http://www.redhat.com/en/services/support`.

1. Ensure that the install media is available to boot.

- **For a DVD**, insert the DVD into the local or remote DVD-ROM drive.
- **For an ISO image on the network**, ensure that the ISO image is available and that the Oracle ILOM Remote System Console Plus application has mounted the ISO image.

  For additional information about how to set up the installation media, see "Selecting the Boot Media Option" on page 13.

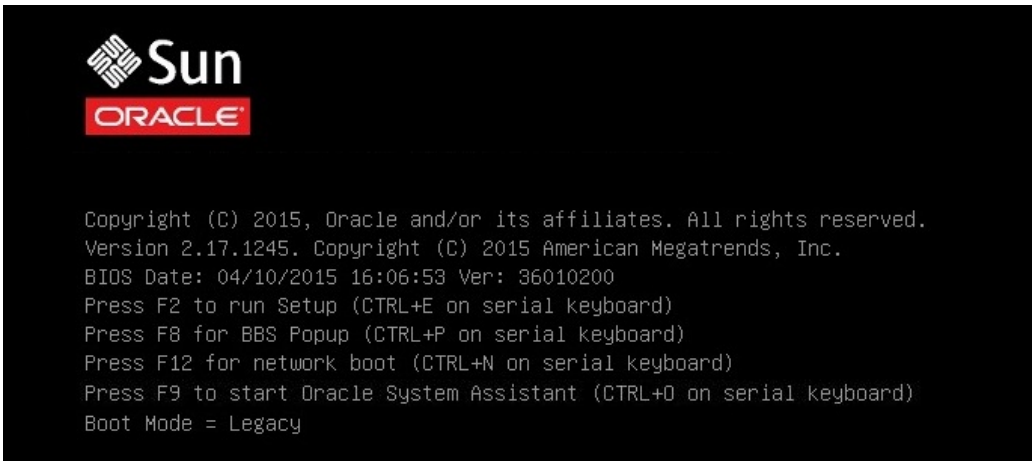
For additional information about how to set up the installation media, see "Selecting the Boot Media Option" on page 13.

2. Reset or power on the server.

For example, do one of the following:

- **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.
- **From the Oracle ILOM web interface**, click Host Management → Power Control, select Reset from the Select Action list box, then click Save.
- **From the Oracle ILOM CLI**, type: **`reset /System`**

The server begins the boot process and the BIOS screen appears.

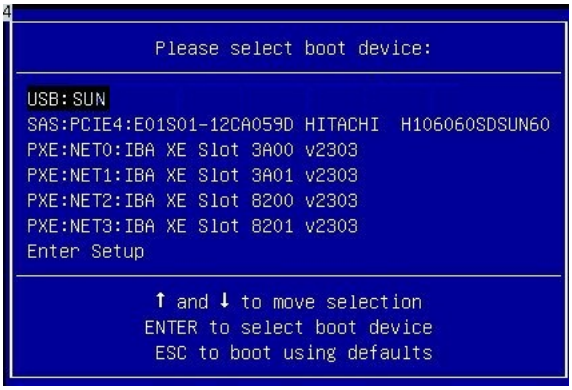


Note - The next event occurs very quickly; therefore, focused attention is needed for the following steps. Watch carefully for these messages as they appear on the screen for a brief time. You might want to enlarge the size of your screen to eliminate scroll bars.

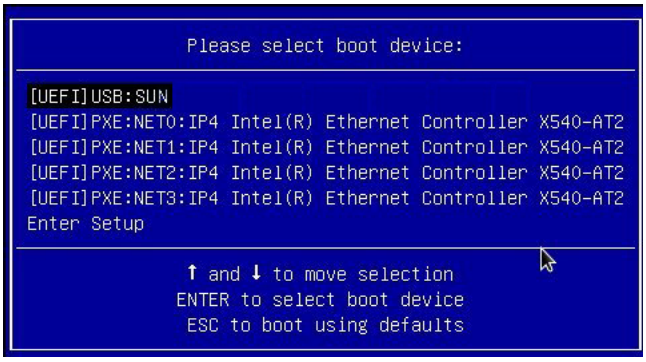
3. **In the BIOS screen, press the F8 key to specify a temporary boot device for the RHEL installation.**

   `[Boot Pop Up Menu Selected]` appears at the bottom of the BIOS screen, and then the Please Select Boot Device menu appears. The screen that appears will differ depending on whether you have the UEFI/BIOS Boot Mode configured for Legacy BIOS or UEFI.

   - For Legacy BIOS Boot Mode, a screen similar to the following appears:



- For UEFI Boot Mode, a screen similar to the following appears:



Note - The Please Select Boot Device menu that appears in your installation might differ depending on the type of disk controller and other hardware, such as PCIe network cards, installed in your server.

---

4. **In the Please Select Boot Device menu, select either the internal, external, or virtual DVD device as the first boot device, then press Enter.**

   After a few seconds, the splash screen for the RHEL installation appears. The bottom half of the splash screen lists instructions, function keys, and the boot prompt.

5. **In the Red Hat Enterprise Linux splash screen, click `Next` to continue the normal user interactive installation.**

Alternately, for text mode, enter the following command:

```
boot: linux text
```

6. **Continue the basic Red Hat installation setup by following the on-screen instructions and the Red Hat documentation.**
   For detailed installation instructions, see the Red Hat Enterprise Linux Installation Guides at:
   `http://www.redhat.com/en/services/support`

Note - If the Oracle Linux 6.6, or 7.0 OS or Oracle VM 3.3 software is preinstalled on the disk, you can choose to partition the disk to remove the preinstalled OS; or, you can choose to keep the preinstalled OS and partition the disk to support dual-boot operating systems.

---

7. **After completing the basic Red Hat installation setup, perform the post installation tasks listed in "Post Installation Tasks for RHEL 6.6, or 7.0 OS" on page 75.**

▼ Install RHEL 6.6, or 7.0 Using PXE Network Boot

This procedure describes how to boot the Red Hat Enterprise Linux (RHEL) 6.6, or 7.0 from a PXE network environment. It assumes that you are booting the install media from RHEL 6.6, or 7.0 KickStart image (network repository).

KickStart is Red Hat's automated installation tool. It enables a system administrator to create a single image containing the settings for some or all installation and configuration parameters that are normally provided during a typical Red Hat Linux installation. Typically, a KickStart image is placed on a single network server and read by multiple systems for installation.

Before You Begin Ensure that the following requirements are met prior to performing the RHEL PXE installation:

- If you are using a KickStart image to perform the installation, you must:
  - Create a KickStart file.
  - Create the boot media with the KickStart file or make the KickStart file available on the network.
- To use PXE to boot the installation media over the network, you must:
  - Configure the network (NFS, FTP, HTTP) server to export the installation tree.
  - Configure the files on the TFTP server necessary for PXE booting.
  - Configure the server's MAC network port address to boot from the PXE configuration.
  - Configure the Dynamic Host Configuration Protocol (DHCP).

Follow the PXE network installation instructions in the Red Hat Enterprise Linux Administration Guides at:

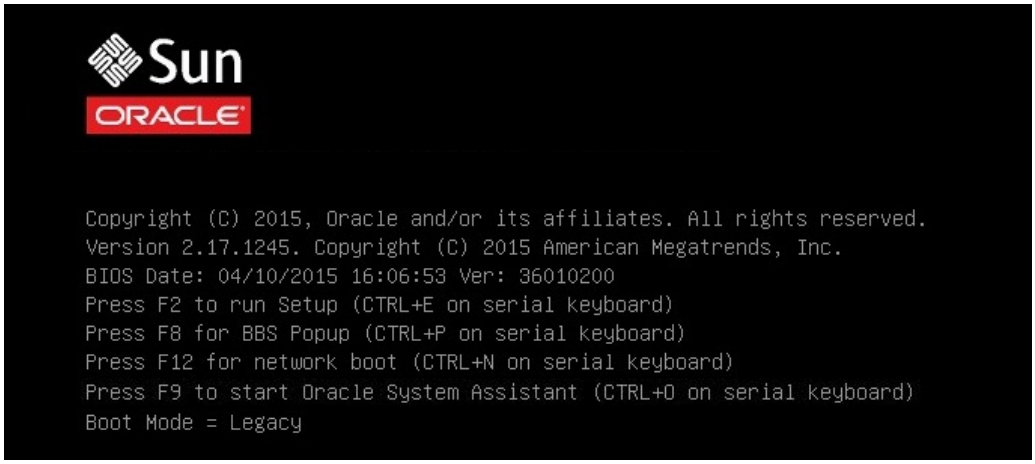
`http://www.redhat.com/en/services/support`

1. **Ensure that the PXE network environment is properly set up and the RHEL installation media is available for PXE boot.**

2. **Reset or power on the server.**
   For example, do one of the following:

   - **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.
   - **From the Oracle ILOM web interface**, click Host Management → Power Control, select Reset from the Select Action list box, then click Save.
   - **From the Oracle ILOM CLI**, type: **`reset /System`**

   The server begins the boot process and the BIOS screen appears.

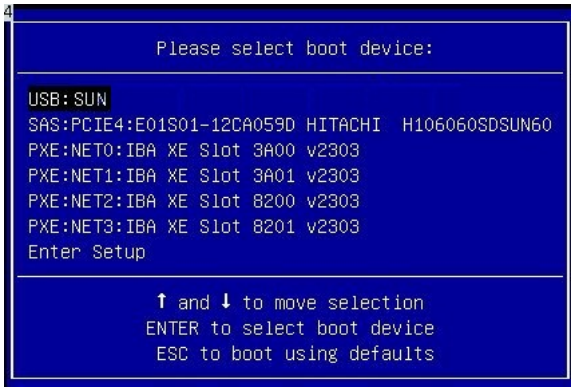


Note - The next event occurs very quickly; therefore, focused attention is needed for the following steps. Watch carefully for these messages as they appear on the screen for a brief time. You might want to enlarge the size of your screen to eliminate scroll bars.

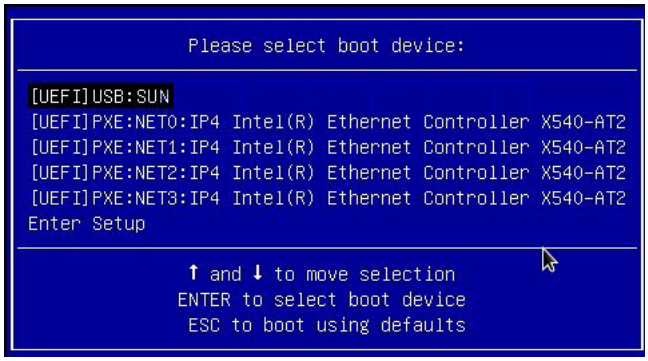
3. **In the BIOS screen, press the F8 key to specify a temporary boot device for the RHEL installation.**

`[Boot Pop Up Menu Selected]` appears at the bottom of the BIOS screen, and then the Please Select Boot Device menu appears. The screen that appears will differ depending on whether you have the UEFI/BIOS Boot Mode configured for Legacy BIOS or UEFI.

- For Legacy BIOS Boot Mode, a screen similar to the following appears:



- For UEFI Boot Mode, a screen similar to the following appears:



Note - The Please Select Boot Device menu that appears in your installation might differ depending on the type of disk controller and other hardware, such as PCIe network cards, installed in your server.

4. **In the Please Select Boot Device menu, select the PXE install boot device (physical network port) that is configured to communicate with your PXE network install server, then press Enter.**

   The network bootloader loads and a boot prompt appears. After a few seconds the installation kernel will begin to load.

5. **From this point on, the installation procedure is site specific as determined by the site KickStart file.**

Post Installation Tasks for RHEL 6.6, or 7.0 OS

After completing the Red Hat Enterprise Linux (RHEL) 6.6, or 7.0 OS installation, you should review the following post installation tasks and perform the tasks that are applicable to your system.

- "Register RHEL and Activate Automatic Updates" on page 75
- "Download and Install OS Updates" on page 75
- "(Optional) Install Oracle Unbreakable Enterprise Kernel for Linux on RHEL Using Local or Remote Console" on page 76

Register RHEL and Activate Automatic Updates

After installing Red Hat Enterprise Linux (RHEL), you should activate your RHEL subscription to receive automatic updates to the software. For more details, see Red Hat Support at:

`http://www.redhat.com/en/services/support`

Download and Install OS Updates

After installing If required, dowload and install the latest errata and bug fixes for the RHEL OS. Refer to the Red Hat documentation for more details: `http://www.redhat.com/en/services/support`

(Optional) Install Oracle Unbreakable Enterprise Kernel for Linux on RHEL Using Local or Remote Console

After you have installed the Red Hat Enterprise Linux 6.6, or 7.0, you have the option of installing and using the Oracle Unbreakable Enterprise Kernel Release 3 for Linux. For instructions for installing Oracle Unbreakable Enterprise Kernel Release 3 for Linux, go to:

- https://oss.oracle.com/ol6/docs/RELEASE-NOTES-UEK3-en.html
- http://docs.oracle.com/en/operating-systems/?tab=2

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