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

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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 Microsoft Windows Operating Systems Installs

This section contains an overview for installing a new Microsoft Windows Server 2012 or 2012 R2 operating system (OS) on your server.

Description	Links
Review Windows operating system installation steps.	“Windows OS Installation Task Map” on page 9
Review the supported Windows operating systems.	“Supported Windows Server Operating Systems” on page 10
Review storage driver requirements for SAS HBAs.	“SAS PCIe HBA Requiring Mass Storage Driver for Windows Server 2012 or 2012 R2” on page 11
Review console display options and how to set them up.	“Selecting the Console Display Option” on page 12
Review boot media options and how to set them up.	“Selecting the Boot Media Option” on page 14
Review installation target options and how to set them up.	“Selecting the Installation Target Option” on page 19
Review operating system installation options.	“Windows Server OS Installation Options” on page 20
Review Oracle System Assistant.	“Oracle System Assistant Overview” on page 22

Related Information

- “Installing a Windows Server Operating System” on page 31

Windows OS Installation Task Map

The following table lists and describes the steps for installing the Windows Server operating system.

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 Windows Server versions supported on the server.	"Supported Windows Server Operating Systems" on page 10
3.	Obtain the Windows Server installation media.	`http://technet.microsoft.com/en-us/windowsserver/default.aspx`
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 boot media, and the installation target that you will use to perform the installation.	■ "Selecting the Console Display Option" on page 12 ■ "Selecting the Boot Media Option" on page 14 ■ "Selecting the Installation Target Option" on page 19
6.	Verify and, if necessary, configure BIOS.	"Preparing the Boot Environment" on page 25
7.	Install the Windows Server operating system.	■ "Install Windows Server 2012 or 2012 R2 on a Single System Using Oracle System Assistant" on page 32 ■ "Install Windows Server 2012 or 2012 R2 Manually Using Local or Remote Media" on page 37 ■ "Install Windows Server 2012 or 2012 R2 Using PXE Network Boot" on page 57
8.	Perform the post installation tasks, if applicable.	"Post Installation Tasks for Windows Server" on page 63

Related Information

- "Preparing to Install the Windows Server Operating System" on page 25

Supported Windows Server Operating Systems

The Oracle Server X5-4 supports the following Microsoft Windows operating systems.

Windows OS	Edition
■ Windows Server 2012	■ Standard Edition ■ Datacenter Edition

Windows OS	Edition
■ Windows Server 2012 R2	■ Standard Edition ■ Datacenter Edition

Note - For all late-breaking requirements for the Windows Server operating system, refer to the latest version of the *Oracle Server X5-4 Product Notes* at `http://www.oracle.com/goto/X5-4/docs-videos`.

Additionally, you can install any other supported operating system or virtual machine software on your server. The Windows Hardware Compatibility List (HCL) identifies the latest operating system version supported on Oracle hardware. To find the latest Windows version supported for the Oracle Server X5-4, go to the following site and search using your server model number:

`http://www.windowsservercatalog.com/`

Related Information

- "Installing a Windows Server Operating System" on page 31

SAS PCIe HBA Requiring Mass Storage Driver for Windows Server 2012 or 2012 R2

The following table identifies the SAS external PCIe host bus adapter (HBA) option that is supported on the Oracle Server X5-4 at the time of this publication. If you have this SAS external PCIe HBA configured on your server and you are installing Microsoft Windows Server 2012 or 2012 R2, you need to load the mass storage driver for the HBA when you install the Windows Server 2012 or 2012 R2 operating system. This mass storage driver is available on the internal Oracle System Assistant USB flash drive.

TABLE 1 Supported SAS PCIe HBAs Requiring Mass Storage Driver

Supported SAS PCIe HBA	Model Number	Driver Required During Installation
Oracle Storage 12 Gb/s SAS PCIe HBA, External	7110118/7110119	LSI Adapter, SAS3 3008 Fury -StorPort (LSI_SAS3.INF)

Instructions for loading the mass storage driver during the Windows Server 2012 or 2012 R2 installation are provided in "Installing Windows Server 2012 or 2012 R2 on a Single System Manually" on page 36.

If your server does not have an internal Oracle System Assistant USB flash drive, you can download the ISO image that includes the drivers. For download instructions, refer to "Getting Server Firmware and Software" in *Oracle Server X5-4 Installation Guide*.

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.

   Note - The default speed of the serial management port is 9600 baud.

- 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 password is `changeme`.

   b. **At the Oracle ILOM login prompt, type:**

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

   The serial management port output is automatically routed to the server's 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 next step.**

   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 password is `changeme`.

      The Oracle ILOM Summary Information page appears.

   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 a 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 is **`root`** and the password is **`changeme`**.

   c. **Redirect the serial output from the server to the SSH client. Type:**
   `-> 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 14
- "Set Up the Boot Media for a Local Installation" on page 15
- "Set Up the Boot Media for a Remote Installation" on page 16

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 15

Local Boot Media Requirements

Local boot media requires a built-in storage device on the server or an external storage device attached to the server.

Supported OS local boot media sources can include:

- DVD-ROM installation media
- USB removable flash drive media

Remote Boot Media Requirements

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

Supported OS remote boot media sources can include:

- DVD-ROM installation media, and a remote USB removable flash drive installation media
- DVD ISO image available in a location on the network that is setup for virtual redirection
- DVD-ROM installation media 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.
- Automated installation image (requires PXE boot). For instructions for performing PXE network installations for the supported Windows Server operating systems, see "Install Windows Server 2012 or 2012 R2 Using PXE Network Boot" on page 57.

▼ 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 Windows Server OS installation media into the server using one of the following options.

1. **If the server is equipped with an optional DVD drive, insert the Windows Server 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 Windows Server 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 install the OS from media sourced from a remote location using the Oracle ILOM Remote System Console Plus application, perform these steps.

1. **To redirect the boot media from a remote storage device, perform these steps; otherwise, go to the next step.**

   a. **Mount or present the OS boot media so that it is accessible, for example:**

   - **For DVD-ROM**, insert media into the built-in or external DVD-ROM drive on a remote system.
   - **For DVD-ROM ISO image**, ensure that the ISO image(s) are readily available on a network shared location or are 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.**

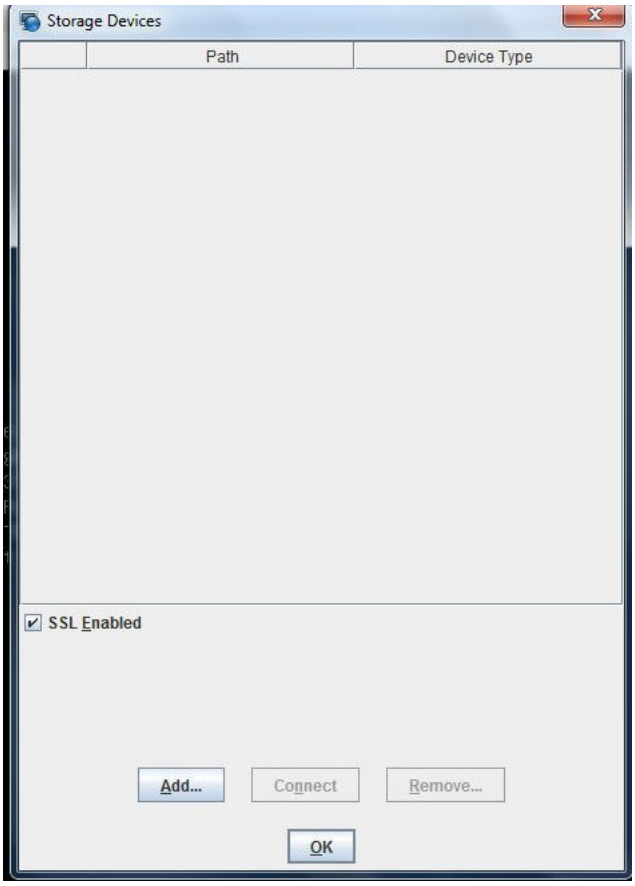
   For more details, see the setup requirements for web-based client connection in "Selecting the Console Display Option" on page 12.

3. **In the remote console, do the following:**

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

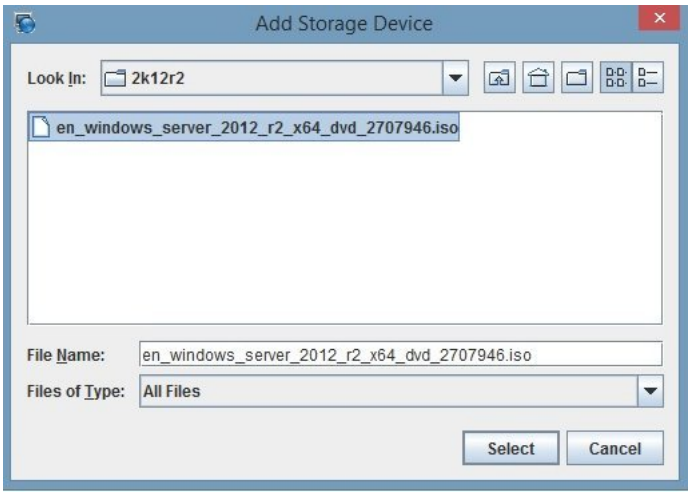
   b. **Click Storage.**

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.

4. To perform the installation using PXE, perform these steps.

a. Configure Windows Deployment Services to PXE install the Windows operating system.

Configure the PXE server to export the Windows operating system.

b. Make the OS install media available for PXE boot.

If you are using an automated OS installation image, you will need to create and provide the automated OS install image.

For detailed instructions for automating the installation setup process, consult the Windows operating system documentation.

c. **To boot the installation media, in the server's BIOS Setup Utility Please Select Boot Device menu, select the network adapter card as the temporary boot device.**

Make sure the network adapter card is the default boot device in the BIOS.

On BIOS post, select F2 to enter the BIOS. Move to the **`Select Boot Device`** menu and select the network adapter card as the default boot device.

For details for performing a Windows Server installation using a PXE network boot, see "Install Windows Server 2012 or 2012 R2 Using PXE Network Boot" on page 57.

Selecting the Installation Target Option

This section describes how to set up the installation target.

Installation Target Options

You can install the operating system on any of the hard disk drives (HDDs) installed in the server.

Note - NVMe drives cannot be used as installation targets. These drives do not support the installation and booting of operating systems.

NVMe drives are not supported for servers running the Windows Server operating system. If your server is equipped with NVMe drives, you have to install either the Oracle Solaris or Oracle Linux operating system to use them.

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

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

- **Ensure that the target drive (HDD) is properly installed and powered on.**

  For information about installing and powering on a HDD or SSD, refer to "Servicing PCIe Cards" in *Oracle Server X5-4 Service Manual*.

Note - NVMe drives cannot be used as installation targets. These drives do not support the installation and booting of operating systems.

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

1. **Ensure that the PCIe host bus adapter (HBA) is properly installed in the server.**

   For information about installing a 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 host on the server.**

   For instructions, refer to the documentation supplied with the Fibre Channel PCIe host bus adapters (HBAs).

Windows Server OS Installation Options

For single-server OS installations, Oracle System Assistant is recommended. For multiple-server OS installations, Oracle Enterprise Manager Ops Center is recommended. 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.

Option	Description
	■ Remotely: Perform the OS installation from a remote location. This option uses the Oracle ILOM Remote System Console Plus application to access Oracle System Assistant or to perform a manual OS installation. **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 21
- “Oracle System Assistant Overview” on page 22

Single-Server Installation Methods

Select a method for providing the Windows 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 Windows distribution media. For more information, see “Assisted Windows Server OS Installation” on page 22.
Remote assisted OS installation – Uses Oracle System Assistant. (Recommended)	Oracle ILOM Remote System Console Plus application, a redirected DVD drive or ISO image file, and Windows distribution media. For more information, see “Assisted Windows Server OS Installation” on page 22.
Local using a DVD drive – Uses a physical DVD drive connected to the server.	A monitor, USB keyboard and mouse, a USB DVD drive, and Windows distribution media. For local installations, you deliver the installation media using a local DVD drive or USB flash drive attached directly to the server. For more information, see “Manual Windows Server OS Installation” on page 22.
Remote using a DVD drive or a DVD ISO image – Uses a redirected physical DVD drive on a remote system running the Oracle ILOM Remote System Console Plus application.	A remote system with a browser, an attached physical DVD drive, Windows distribution media, and network access to the server's management port. For remote installations, you deliver the installation media using the remote DVD, USB flash drive, or DVD ISO image. For more information, see “Windows Deployment Services OS Installation” on page 22.
WDS WIM image – Uses a customized Windows Imaging Format (WIM) image on a Windows Deployment Services (WDS) server.	A server running WDS and a WIM image customized for your server. For more information, see “Windows Deployment Services OS Installation” on page 22.

Assisted Windows Server OS Installation

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

Manual Windows Server OS Installation

With this method, you deliver the Windows distribution media on either a local or remote DVD drive, USB device, or DVD image. 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 distribution media's installation wizard.

Windows Deployment Services OS Installation

You can install the Windows OS from Windows Deployment Services. For the advanced user, you can create a customized Windows Imaging Format (WIM) image for your server on a system running Windows Deployment Services (WDS). After this WIM image has been created, you can network boot your server from its network adapter card and select the WIM image from the WDS system for deployment. For more information about WDS, go to: http://technet.microsoft.com/library/hh831620.

Oracle System Assistant Overview

Oracle System Assistant is a single-server system management tool for Oracle x86 servers. Oracle System Assistant integrates Oracle system management products, and a selection of related software to provide a suite of tools that allow for the quick and convenient configuration and maintenance 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 drivers and tools
- Server-specific firmware

Oracle System Assistant resides inside the server as an embedded storage device (USB flash drive) and is factory configured with a server-specific version of tools and drivers maintained through online updates.

For more information about Oracle System Assistant, see the following topics:

- “Get Updates and Install OS Tasks” on page 23
- “Obtaining Oracle System Assistant” on page 24

For more information about Oracle System Assistant, 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 (during boot select Oracle System Assistant (F9) and choose **`Get Updates`**) before you install the OS. By doing the Get Updates task, you ensure that you are using the latest version of the platform firmware and drivers.

The Oracle System Assistant application'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.

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 ISO 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 the Windows Server Operating System

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

Description	Links
Setting up UEFI.	"Preparing the Boot Environment" on page 25
Setting the boot mode.	"Set the Boot Mode" on page 26
Configuring RAID on the server.	"Configuring RAID" on page 29

Related Information

- "Installing Windows Server 2012 or 2012 R2 on a Single System Using Oracle System Assistant" on page 32
- "Installing Windows Server 2012 or 2012 R2 on a Single System Manually" on page 36

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 server is equipped with Unified Extensible Firmware Interface (UEFI), which supports both Legacy BIOS and UEFI boot modes. UEFI is a specification that defines a software interface between an operating system and platform firmware. UEFI firmware is meant to replace the Basic Input/Output System (BIOS) firmware interface. The server can be configured to boot in either Legacy BIOS Boot Mode (default) or UEFI Boot Mode.

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*. Setting optimal defaults resets the BIOS to the default Legacy BIOS

Boot Mode if the server was in UEFI Boot Mode. Selecting optimal defaults resets the UEFI firmware to the factory default of Legacy BIOS Boot Mode.

Note - The set optimal defaults procedure is optional. If the server is newly installed and this is the first time that an operating system is being installed, then UEFI is probably configured to its optimal default settings and you do not have to perform this procedure.

Any changes you make in the BIOS Setup Utility (using the F2 key) are permanent until the next time you change them.

In addition to using the F2 key to view or edit the system's UEFI/BIOS settings, you can use F8 during the UEFI/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 in the UEFI/BIOS using F2 will be in effect after booting from the temporary boot device.

The following topic provides specific instructions on how to configure UEFI to support the installation:

- "Set the Boot Mode" on page 26

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

▼ Set the Boot Mode

The server can be configured to boot in either Legacy BIOS Boot Mode (default) or UEFI Boot Mode. Legacy BIOS Boot Mode is enabled by default. Because Windows Server 2012 and 2012 R2 operating systems support both Legacy BIOS and UEFI, you have the option of setting the boot mode to either Legacy BIOS Boot Mode or UEFI Boot Mode before you perform the OS installation.

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

Before You Begin Ensure that the following requirements are met:

- A console connection is established to the server. For details, see "Selecting the Console Display Option" on page 12.

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, and 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, and then click Save.
   - From the Oracle ILOM CLI, type: **`reset /System`**

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

   Note - The BIOS screen might take a while to appear. Please be patient.

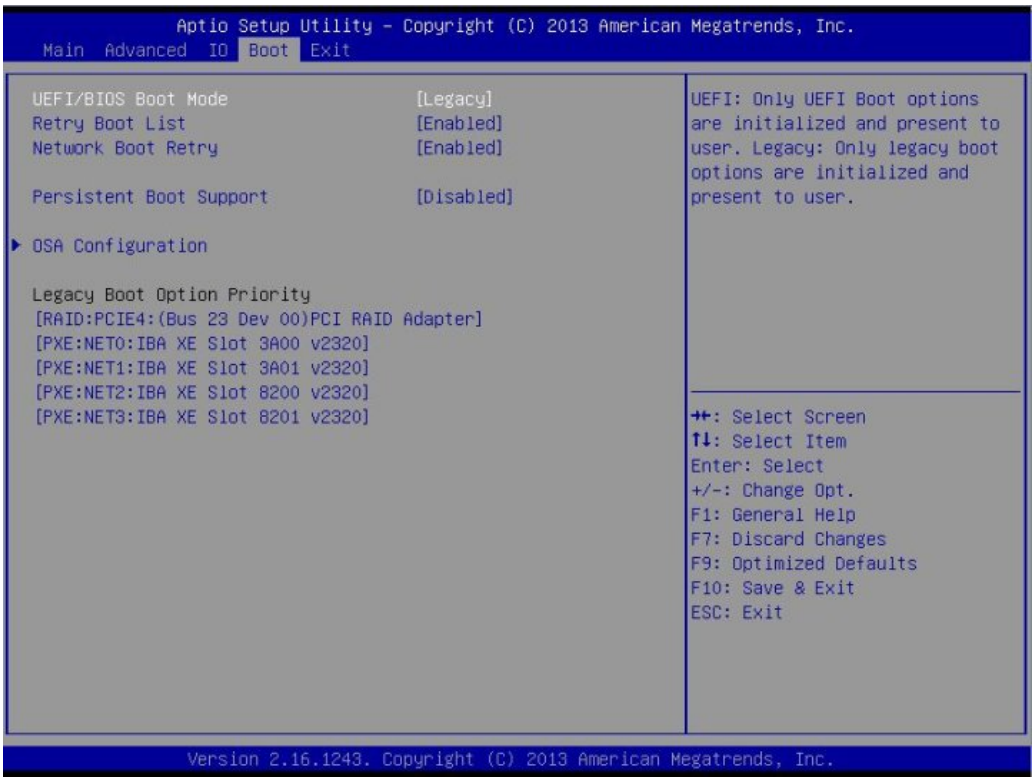
   Note - The next events occur very quickly; therefore, focused attention is needed for the following steps. Watch carefully for these messages as they appear on the screen for a brief time. You might want to enlarge the size of your screen to eliminate scroll bars.

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 Boot Mode or UEFI Boot Mode, 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 the Windows 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 Windows Server Operating System

This section describes how to install the Microsoft Windows Server operating systems on the server.

Description	Links
Preinstallation requirements.	"Before You Begin" on page 31
Using Oracle System Assistant to install the Windows operating system.	"Installing Windows Server 2012 or 2012 R2 on a Single System Using Oracle System Assistant" on page 32
Using media to install the Windows operating system.	"Installing Windows Server 2012 or 2012 R2 on a Single System Manually" on page 36

Related Information

- "Preparing the Boot Environment" on page 25
- "Configuring RAID" on page 29

Before You Begin

Ensure that the following requirements are met:

- If you want to configure RAID (redundant array of independent disks) on the server's storage drives, you must do so before you install the operating system. For instructions for configuring RAID, refer to "Configuring Server Drives for OS Installation" in *Oracle Server X5-4 Installation Guide*.

Note - If you are using the Oracle Storage 12 Gb/s SAS PCIe RAID HBA Internal to manage your storage drives, you must create a RAID volume and make it bootable before installing the operating system; otherwise, the HBA will not be able to identify the server's storage drives.

- Verify that the UEFI firmware settings are set to the optimal defaults. For instructions on how to verify and, if necessary, set the UEFI firmware settings. For more information about UEFI optimal defaults, refer to the *Oracle X5 Series Servers Administration Guide* at: http://www.oracle.com/goto/x86AdminDiag/docs.
- Set the UEFI firmware to the desired boot mode, Legacy BIOS or UEFI. For instructions on how to set the UEFI boot mode, see "Set the Boot Mode" on page 26.
- 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 12.
- 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 14.
- The storage drive to be used as 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 19.
- Gather the Microsoft Windows Server 2012 or Windows Server 2012 R2 operating system documentation so that you can use it with the Windows Server operating system instructions provided in this section. You can obtain a copy of Microsoft Windows Server 2012 and 2012 R2 installation documentation at: http://technet.microsoft.com/en-us/windowsserver/default.aspx.

Installing Windows Server 2012 or 2012 R2 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 Microsoft Windows Server OS on the Oracle Server X5-4, because it automatically injects platform drivers into the Windows OS during installation.

- "Install Windows Server 2012 or 2012 R2 on a Single System Using Oracle System Assistant" on page 32

▼ Install Windows Server 2012 or 2012 R2 on a Single System Using Oracle System Assistant

Before You Begin

- Perform the steps in "Preparing to Install the Windows Server Operating System" on page 25.
- If you want to configure the boot drive (that is, the storage drive onto which you are installing the Windows Server OS) for RAID, you must do so before you install the 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.**

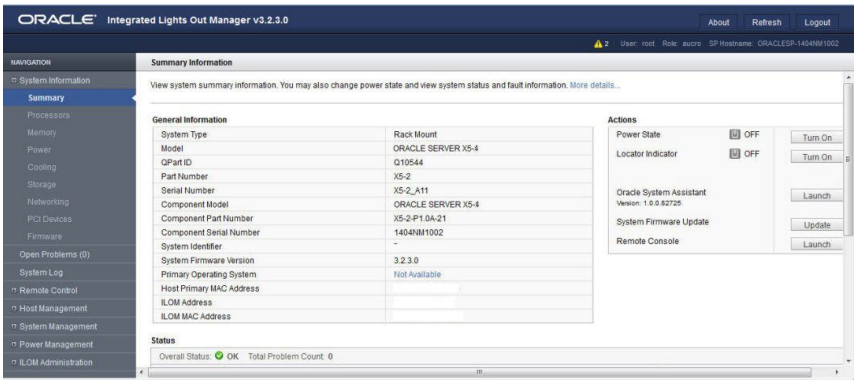
   - **For Distribution DVD**, insert the Windows Server Distribution media (single DVD) into the local or external USB DVD-ROM drive.
   - **For ISO image**, ensure that the ISO image is available and that the Oracle ILOM Remote System Console Plus application has mounted the ISO image.

   For additional information about how to set up the installation media, see "Selecting the Boot Media Option" on page 14.

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

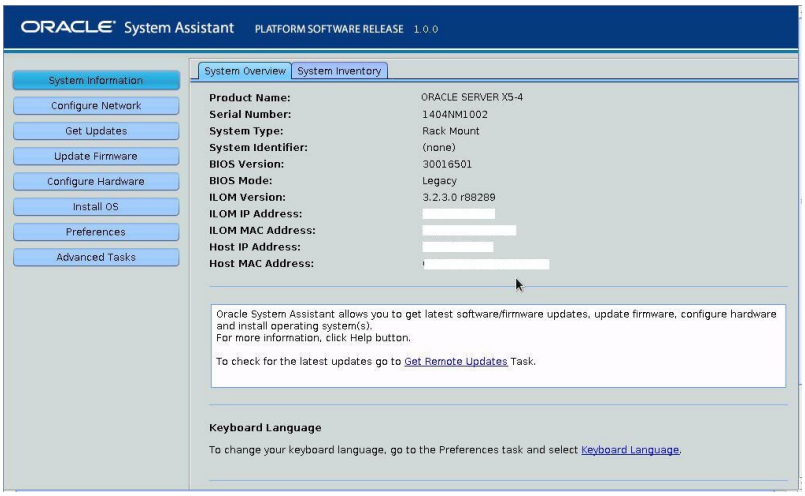
   a. **Log in to the Oracle ILOM web interface.**

   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 remote console and BIOS, perform the following steps:

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

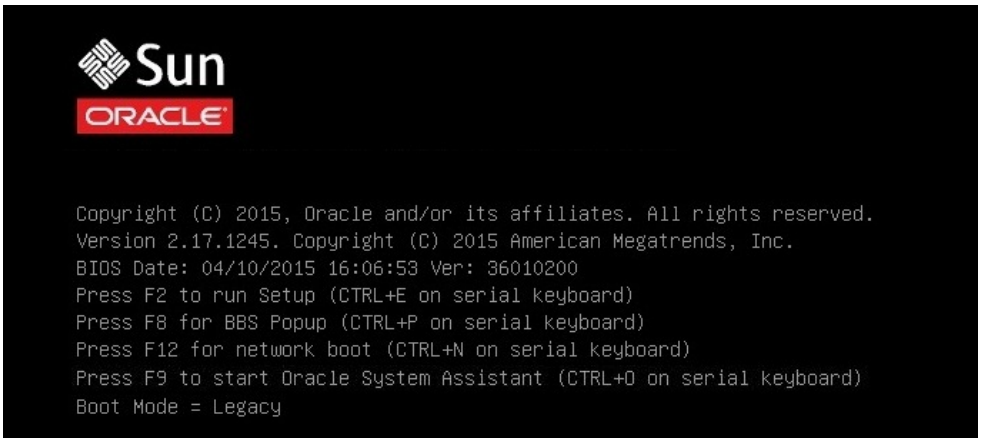
The Oracle ILOM Remote System Console Plus window appears.

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, and 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, and then click Save.
- **From the Oracle ILOM CLI**, type: `reset /System`

The server begins the boot process and 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.**

The Oracle System Assistant System Overview screen appears.

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 software release package 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 Windows Server OS, click the Install OS button.**

The Install Operating System screen appears.

7. **From the Supported OS drop-down list, select the Windows Server OS.**

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

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 distribution media. The options are DVD and Network.

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

10. **Click Installation Details.**

    The Installation Details dialog appears.

11. **In the Installation Details dialog, deselect any items that you do not want to install and click OK.**

    Note - In the Installation Details dialog, the Install Microsoft Windows Server and Use Oracle recommended Drivers options are mandatory and cannot be deselected.

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

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

13. **To start the installation, after the BIOS post screen appears, press F8.**

    Select the location of the Windows installation media.

Installing Windows Server 2012 or 2012 R2 on a Single System Manually

This section provides instructions for installing the Windows Server 2012 and 2012 R2 operating systems.

- "Install Windows Server 2012 or 2012 R2 Manually Using Local or Remote Media" on page 37
- "Install Windows Server 2012 or 2012 R2 Using PXE Network Boot" on page 57

▼ Install Windows Server 2012 or 2012 R2 Manually Using Local or Remote Media

This procedure describes how to boot the Microsoft Windows Server 2012 or 2012 R2 operating system from local or remote media. It assumes that you are booting the Windows installation media from one of the following sources:

- Windows Server 2012 or 2012 R2 DVD
- Windows Server 2012 or 2012 R2 ISO image

Note - The Windows Server 2012 or 2012 R2 ISO image can be used for remote installation or for creating an installation DVD.

Note - If you are booting the installation media from a PXE environment, see "Install Windows Server 2012 or 2012 R2 Using PXE Network Boot" on page 57 for instructions.

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

   - **For Distribution DVD**, insert the Windows 2012 or 2012 R2 Distribution media (single DVD) into the local or remote DVD-ROM drive.
   - **For ISO image**, ensure that the Windows 2012 or 2012 R2 ISO image is available and the ISO image has been mounted in the Oracle ILOM Remote System Console Plus application using the KVMS menu.

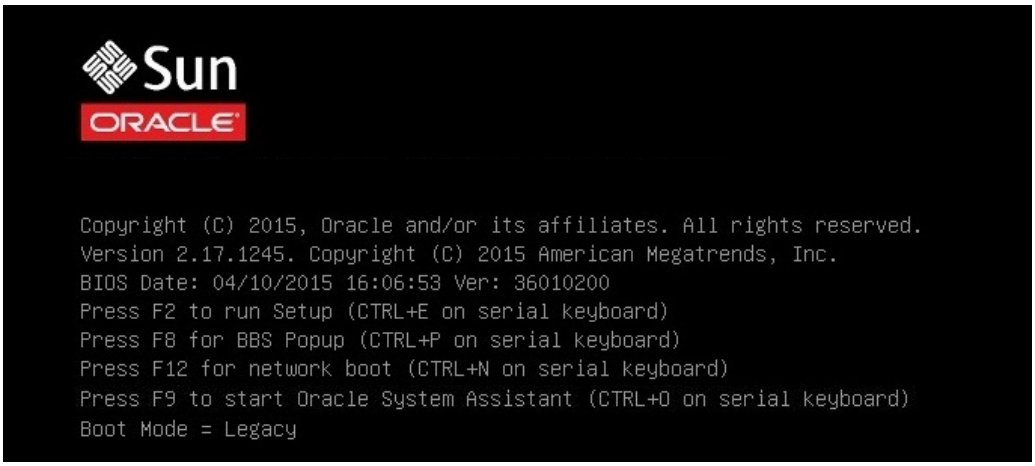
   For additional information about how to set up the installation media, see "Selecting the Boot Media Option" on page 14.

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, and 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, and then click Save.
   - **From the Oracle ILOM CLI**, type: `reset /System`

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

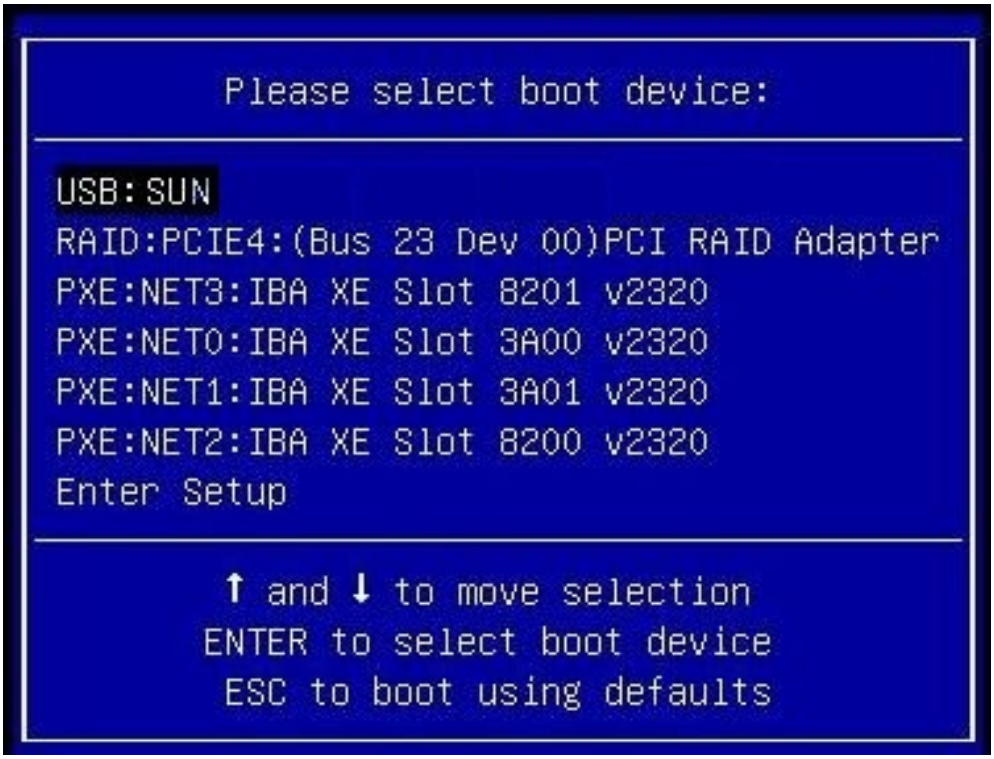


Note - The next event occurs very quickly; therefore, focused attention is needed for the following steps. Watch carefully for these messages as they appear on the screen for a brief time. You might want to enlarge the size of your screen to eliminate scroll bars.

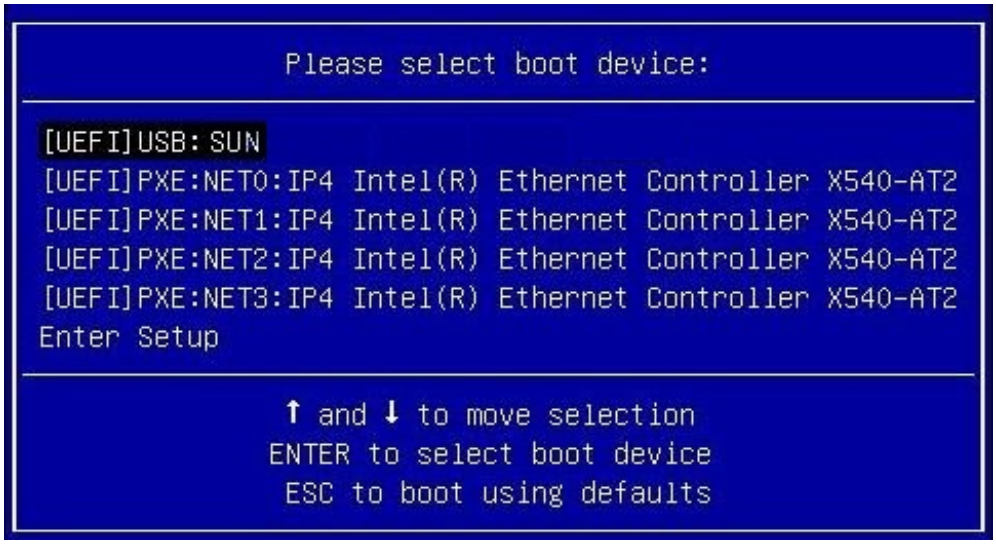
3. **In the BIOS screen, press the F8 key to specify a temporary boot device for the Windows OS installation.**

   `[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 be different depending on whether you have the UEFI/BIOS Boot Mode configured for Legacy BIOS Boot Mode or UEFI Boot Mode.

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



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



For UEFI mode, both IPv4 and IPv6 protocols are selectable for each network adapter interface, in addition to local and remote boot devices.

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.

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

   For example, if you elected to use the Oracle ILOM Remote System Console Plus application delivery method, select `USB:VIRTUAL: Remote Iso CDROM2.04` from the Legacy BIOS Boot Mode screen or `[UEFI]USB:VIRTUAL: Remote Iso CDROM2.04` from the UEFI Boot Mode screen.

5. **If prompted with `Press any key to boot from CD`, press any key.**

The Windows installation wizard starts and the Loading Files screen appears.

The Windows installation wizard continues until the Language Localization dialog appears.

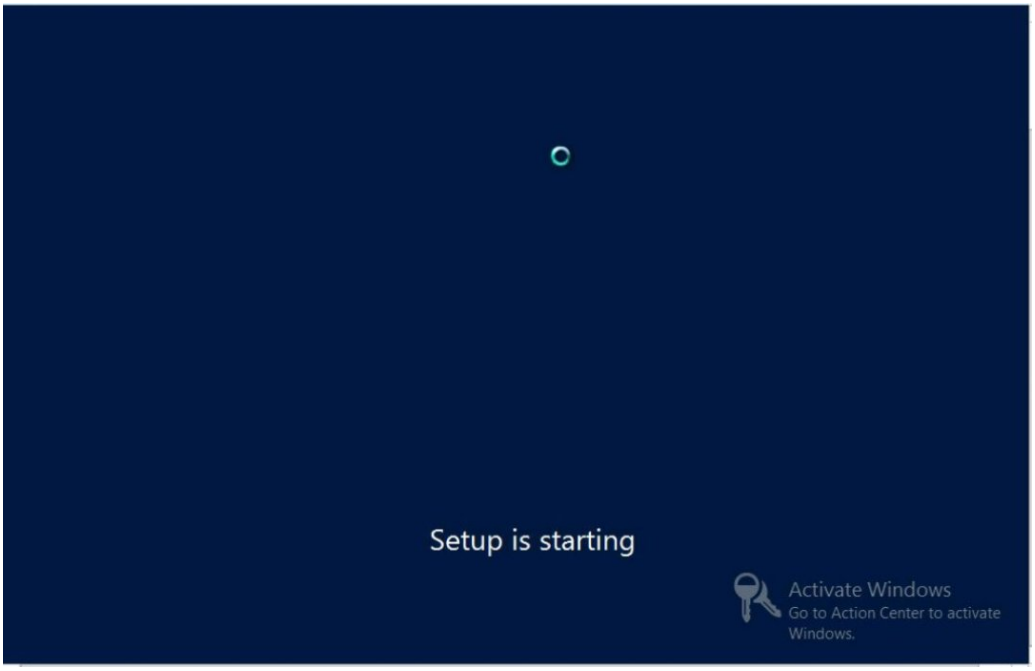
6. **Select your language and other preferences, and then click `Next` to continue.**

   The Install Now screen appears.

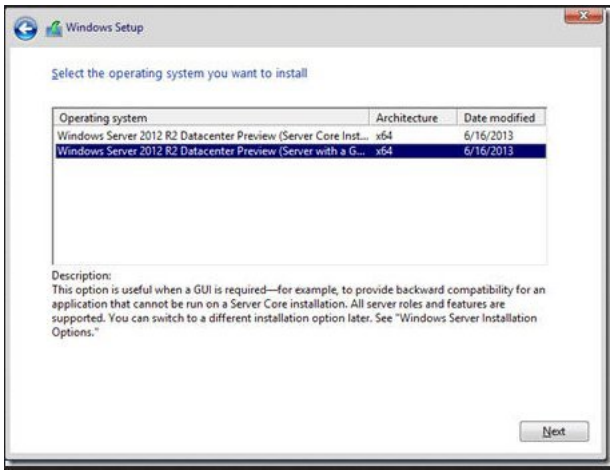
Note - The Install Now screen allows you to continue the installation or access an optional Repair menu (see lower left of the screen) for troubleshooting.

7. **Click Install now.**

The Setup Is Starting screen appears.



Then the Select the Operating System dialog appears.

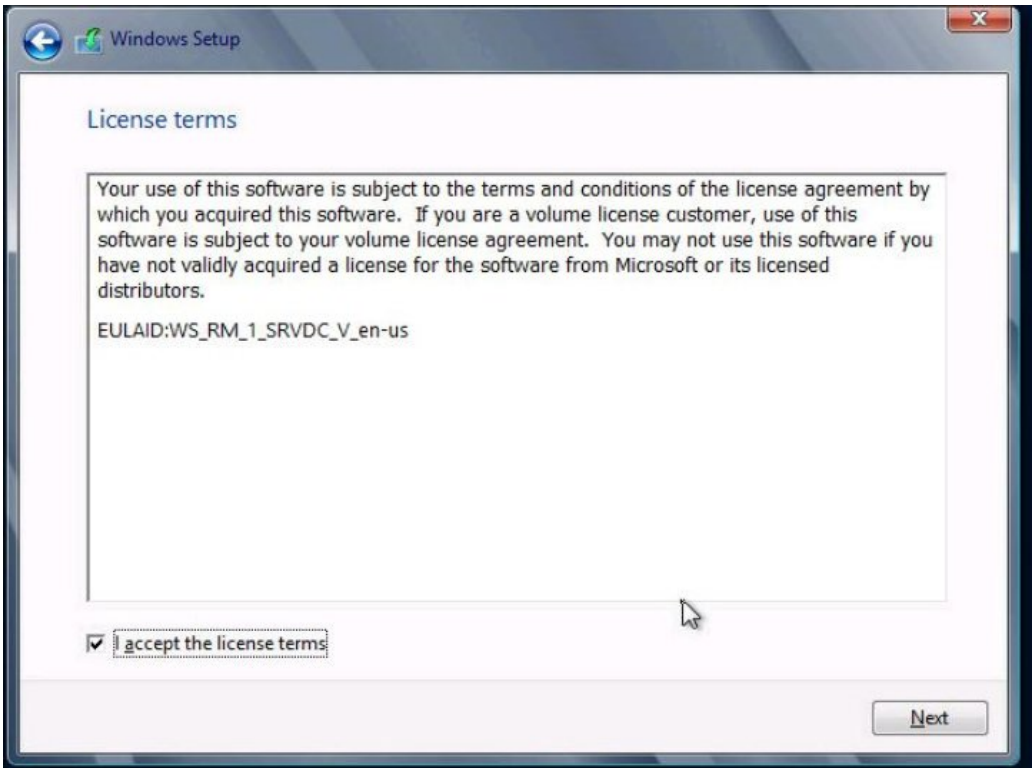


8. **In the Select Operating System dialog, select the desired operating system, and then click `Next` to continue.**

   For most installs, select Windows Server 2012 (or 2012 R2) Datacenter (Server with GUI) at the bottom of the list.

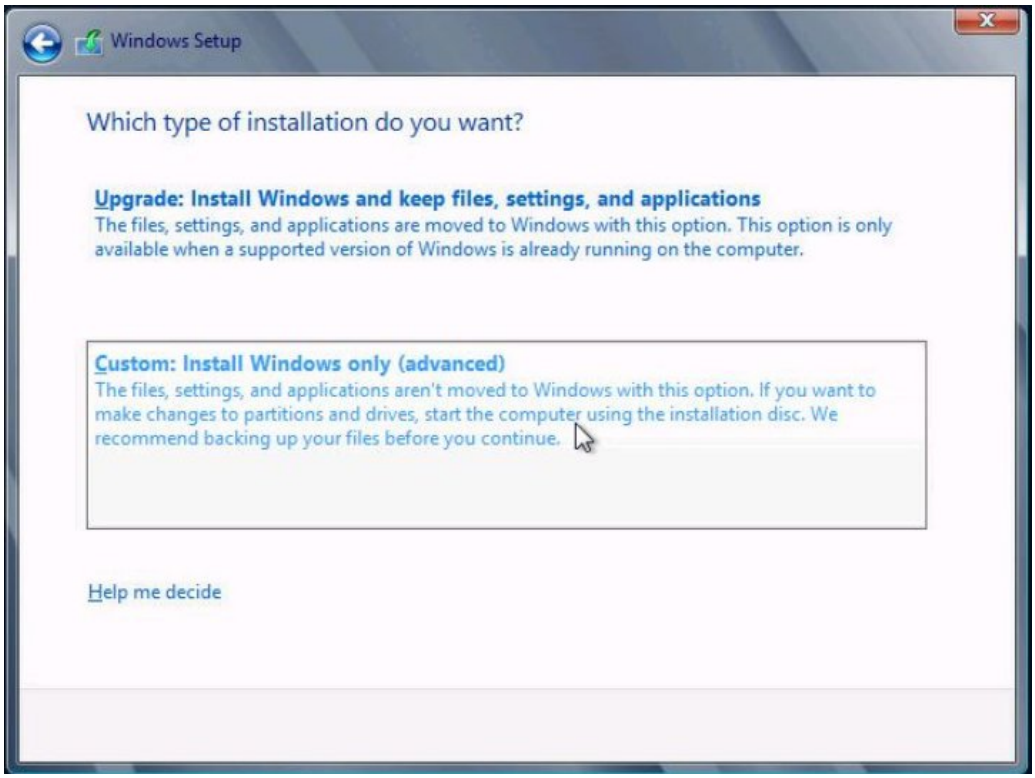
   For more information on the different types of Windows operating systems, see the Windows Server 2012 or 2012 R2 documentation at `http://technet.microsoft.com/en-us/windowsserver/default.aspx`.

The License Terms screen appears.



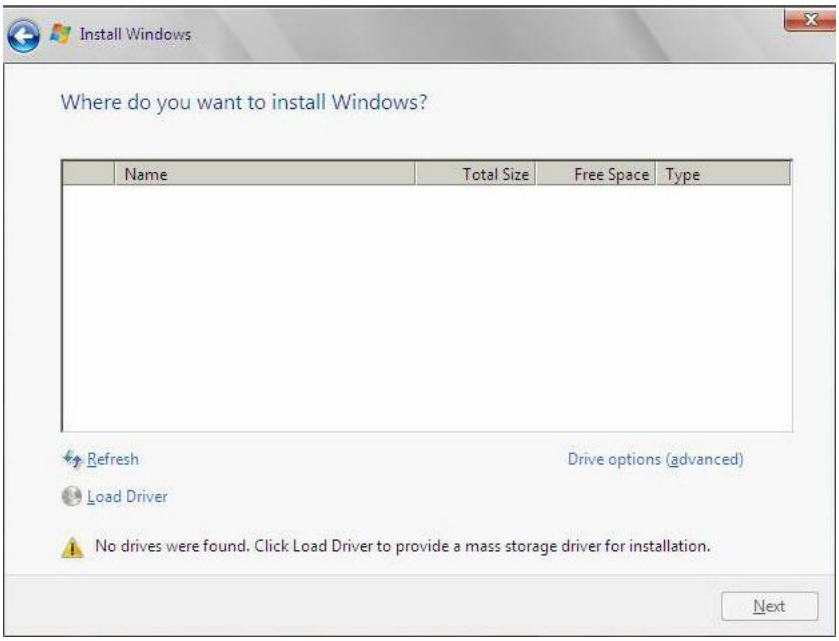
9. **In the License Terms screen, check the `I accept the license terms` box, and then click `Next` to continue.**

The Which Type of Installation Do You Want dialog appears.



10. **For all new installations, in the Which Type of Installation Do You Want dialog, click `Custom: Install Windows only (advanced)`**

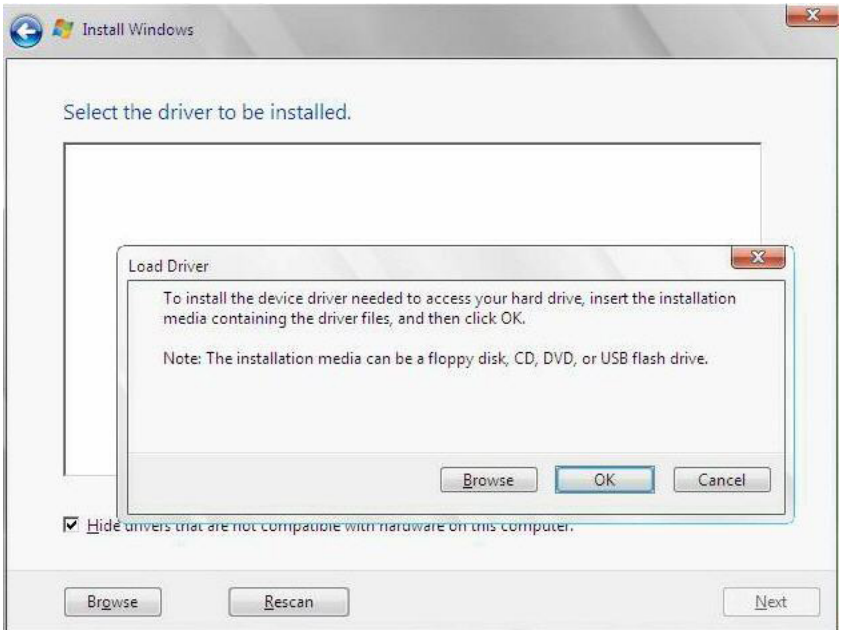
The Where Do You Want to Install Windows dialog appears.



11. In the Where Do You Want to Install Windows dialog, perform one of the following tasks:

- If you do not see any storage targets listed and have a Oracle Storage 12 Gb/s SAS PCIe HBA External card configured on your server, click Load Driver to display the Load Driver dialog, and then proceed to Step 12.
- If you see the storage target where you want to install the operating system but want to change the default partition settings associated with that target, select the target, click Drive Options (Advanced), and then proceed to Step 13.
- If you see the storage target where you want to install the operating system and do not want to change the default partition settings for that target, select the target and click Next, and then proceed to Step 14.

12. In the Load Driver dialog, do the following:



a. Ensure that the drivers are accessible according to the installation method chosen (described in "Selecting the Boot Media Option" on page 14).

For example:

- Storage drivers are on a disk mounted as a device from the remote console.
- Storage drivers are on a local physical storage media, such as the Oracle System Assistant USB flash drive (if installed), which is mounted internally in the server's chassis; a DVD; or virtual media mounted from the remote console.

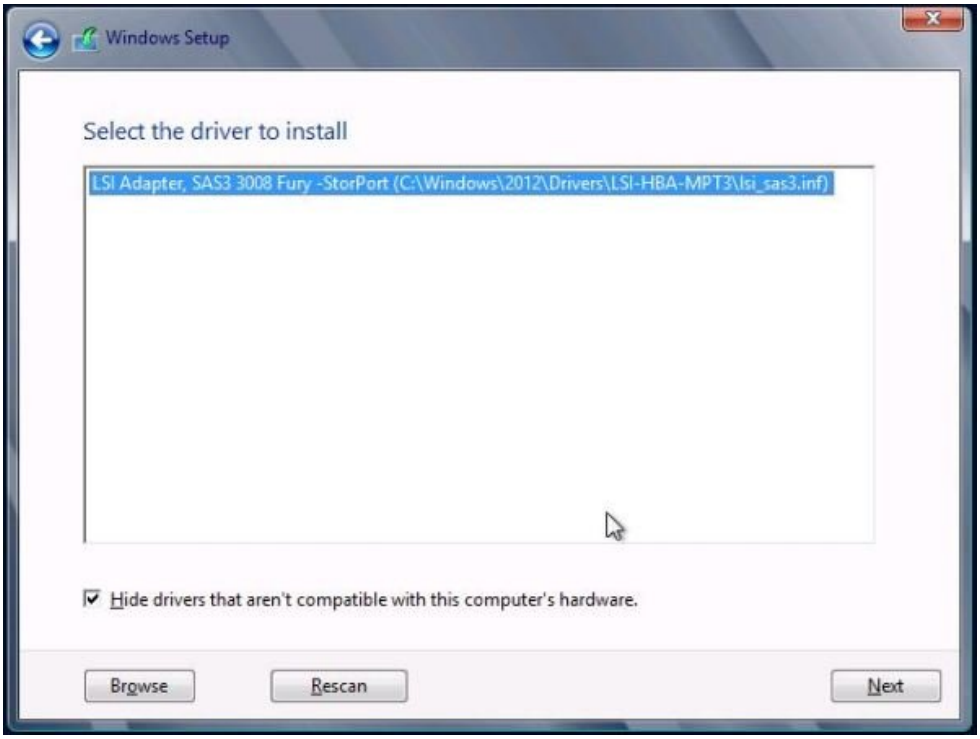
b. In the Load Driver dialog, click Browse to navigate to the appropriate driver media folder as described below.

- For a system configured with the Oracle Storage 12 Gb/s SAS PCIe HBA External option, navigate to the following directory on the internal Oracle System Assistant USB flash drive to load the appropriate driver: `Windows/2012/Drivers/LSI-HBA-MPT3`.

c. In the Browse for Folder dialog, select the appropriate driver, and then click `OK` to load the driver.

The selected driver appears in the Select the Driver to Install dialog.

For example:



d. In the Select the Driver to Install dialog, click Next to install the driver.

The Where Do You Want to Install Windows dialog appears.

Note - If you previously removed or unmounted the Windows Server install media to load the drivers from the internal Oracle System Assistant USB flash drive, you might see the following message: `Windows Cannot be installed to this disk.` If this message appears, insert or re-mount the Windows install media, and then click Refresh.

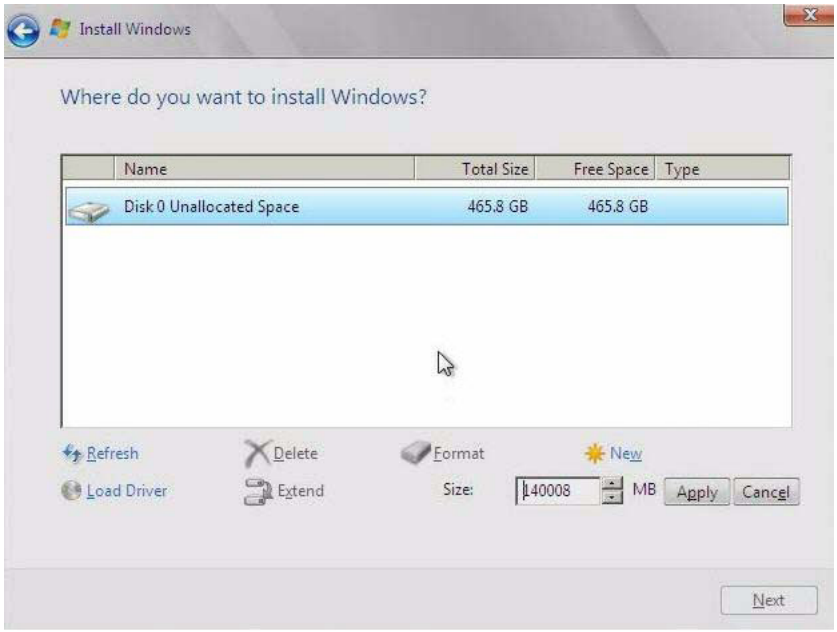
---

e. In the Where Do You Want to Install Windows dialog, do one of following:

- Select the storage target listed and click Next to install the operating system, and then proceed to Step 14.

- If any partitions exist on your target disk, it is recommended that you allow the setup process to create the appropriate partitions. To delete preexisting partitions, proceed to Step 13.

13. (Partition Drive, advanced) In the lower portion of the Where Do You Want to Install Windows dialog, do the following:



a. Click Delete to delete the selected storage target existing partition configuration.

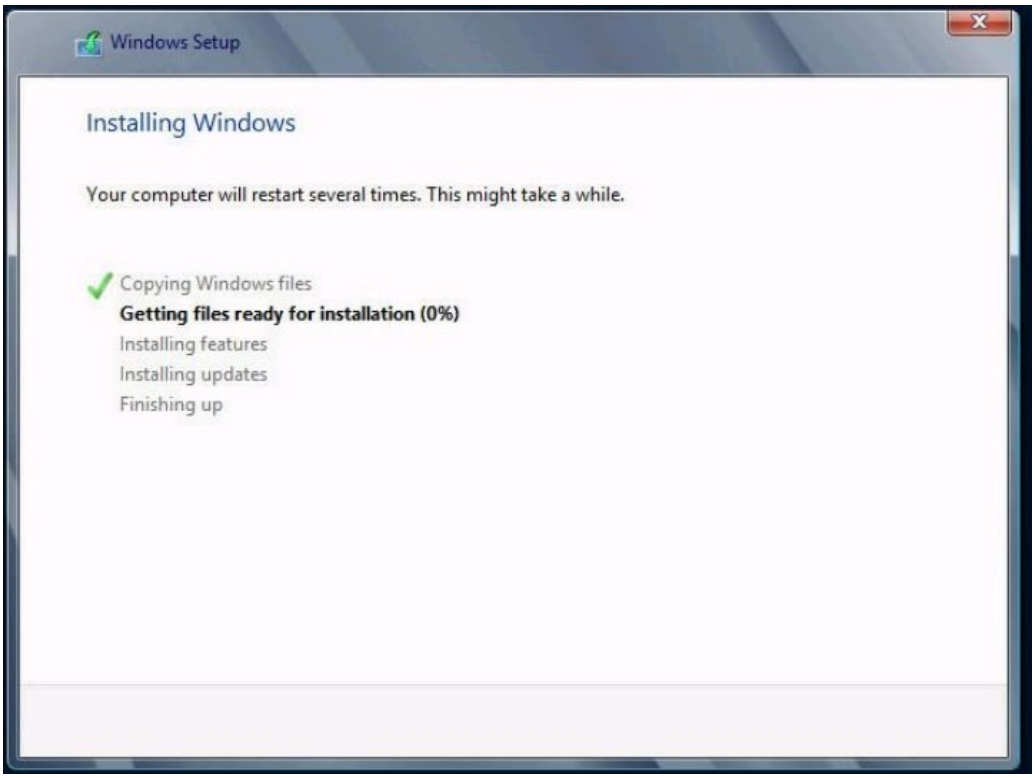
A confirmation window appears

b. Click OK to confirm the partition deletion.

c. If any additional partitions exist on the target disk, repeat Step a and Step b.

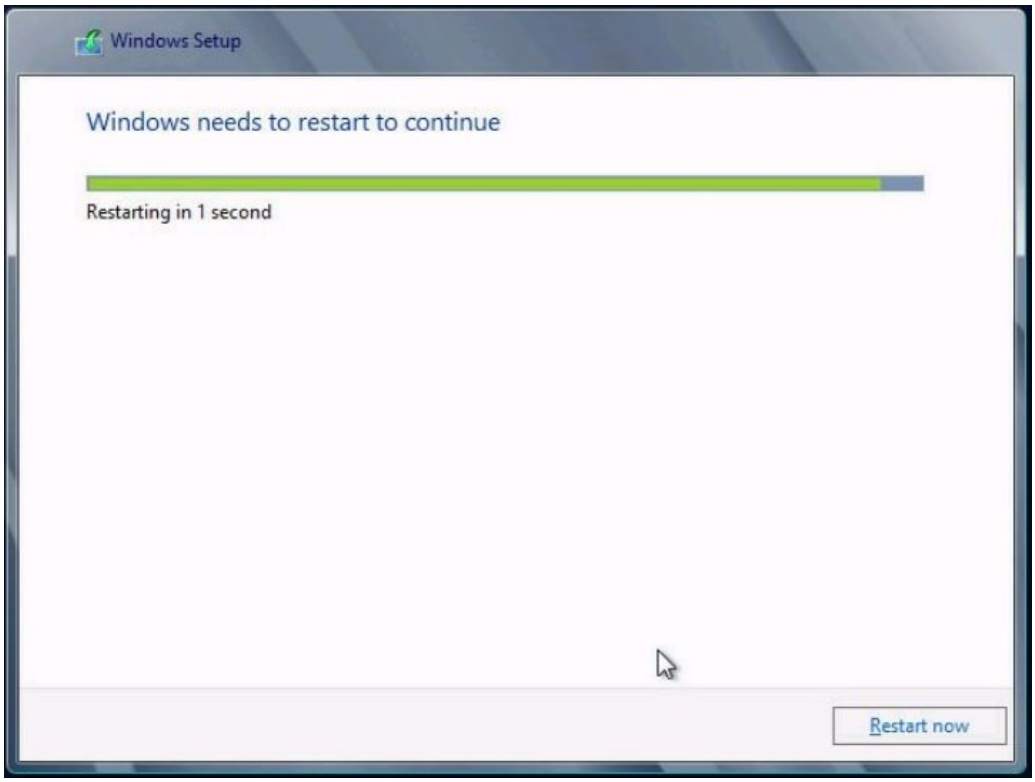
14. Select (highlight) the disk to which you want to install Windows, and then click `Next`.

The Installing Windows screen appears.



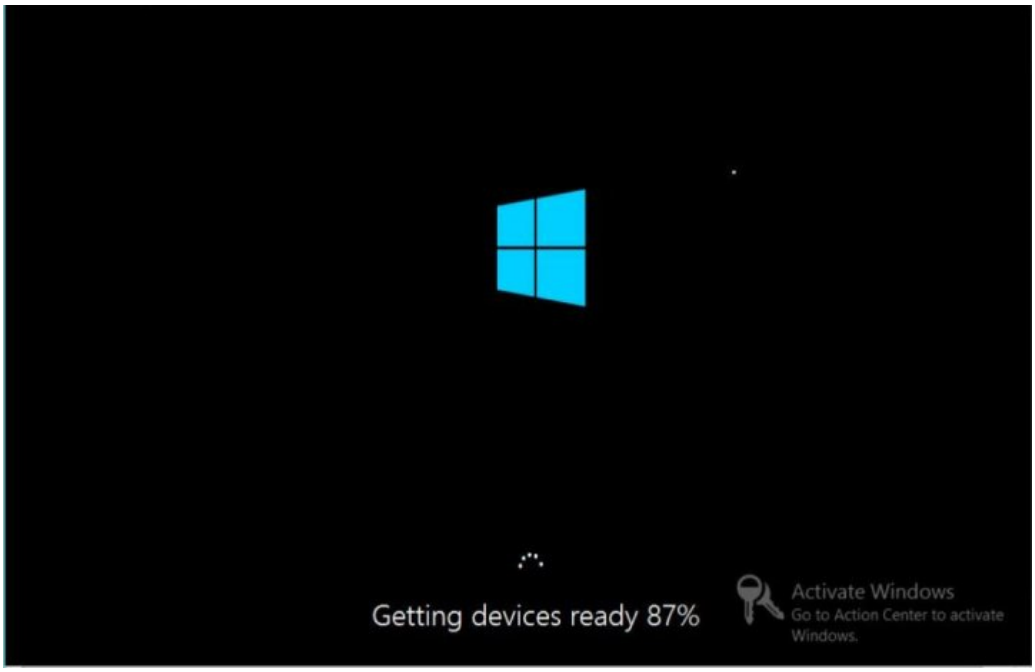
The setup and installation process begins and files are copied to the target.

The Windows Needs to Restart to Continue screen appears.

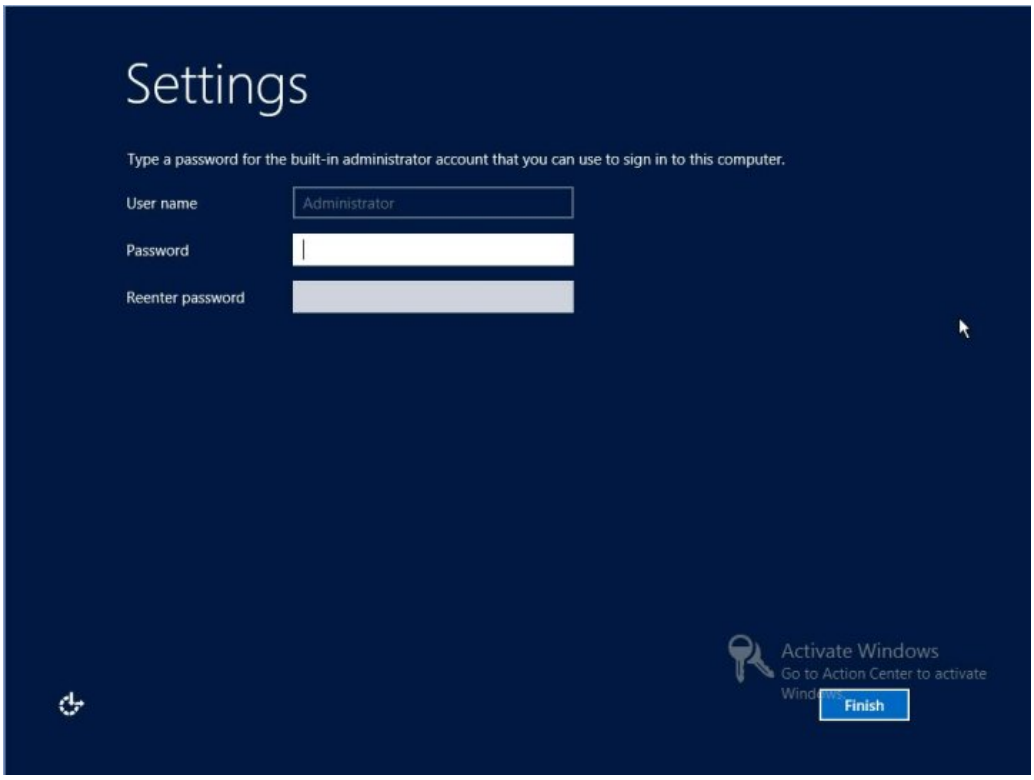


The system reboots.

15. **After the system reboots, wait while the Getting Devices Ready screen appears and the Windows Installation Wizard configures the device settings.**



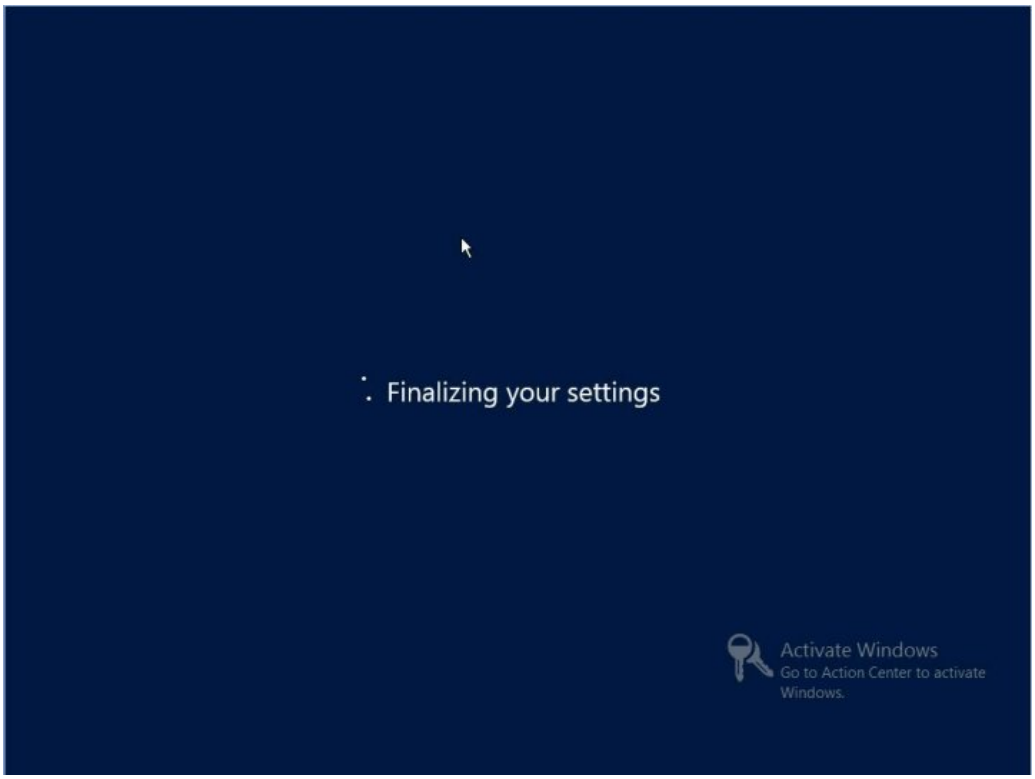
After the devices are configured, the system reboots again and the Settings screen appears.



16. **Enter the Administrator user name and password, and then click `Finish`.**

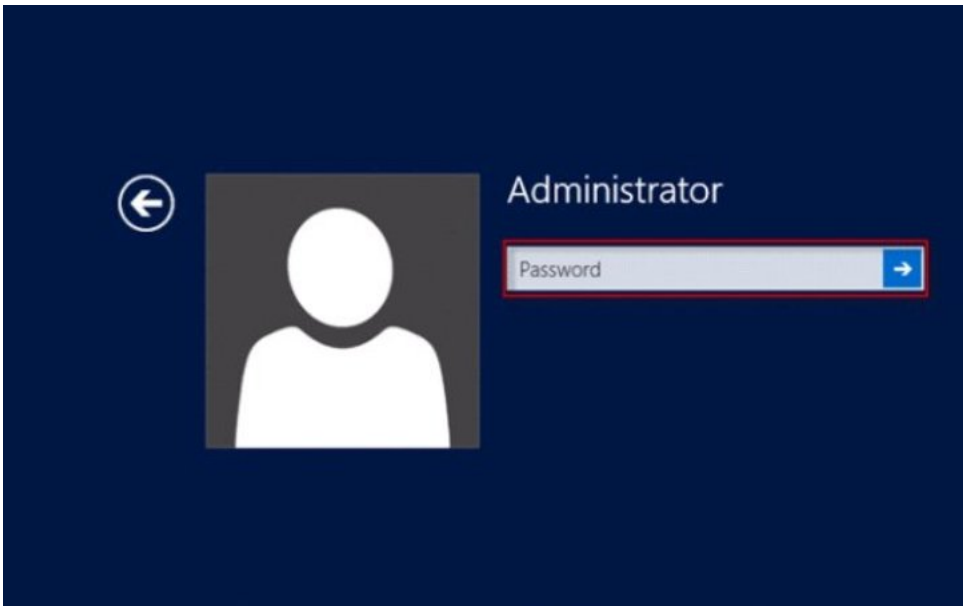
The Finalizing Your Settings screen appears.

This screen indicates that the Windows OS has been installed.



17. **After the installation completes, type Ctrl+Alt+Delete to log in.**

The Administrator login screen appears.



18. **Enter the Administrator password, and then click the arrow to log in.**

    The Windows Server desktop appears.

    This completes the installation.

19. **Proceed to “Post Installation Tasks for Windows Server” on page 63 and perform the post installation tasks.**

    These post installation tasks add Oracle OEM software and upgrade operating system drivers (if needed).

▼ Install Windows Server 2012 or 2012 R2 Using PXE Network Boot

This section provides instructions to install the Windows Server 2012 or 2012 R2 operating system over an established PXE-based network using a customer-provided Windows Imaging Format (WIM) image.

Note - This task documents the initial steps to install Windows Server over the network using Windows Deployment Services (WDS). Specifically, it explains the steps for selecting the server PXE network adapter card that will communicate with your WDS installation server. For further information about using WDS to install Windows Server 2012 or 2012 R2, refer to Microsoft's Windows Deployment Services documentation.

Before You Begin To use WDS to perform the installation, you must:

- Add the required system device drivers to the `install.wim` image and, if necessary, the `boot.wim` image.

  For instructions for adding drivers to the WIM installation image(s), see the Microsoft Windows Deployment Services documentation.
- Obtain a WDS user account and password to authenticate to the PXE service.

1. Ensure Windows WDS is properly configured and the Windows Server 2012 and 2012 R2 WIM images are ready for PXE installations.

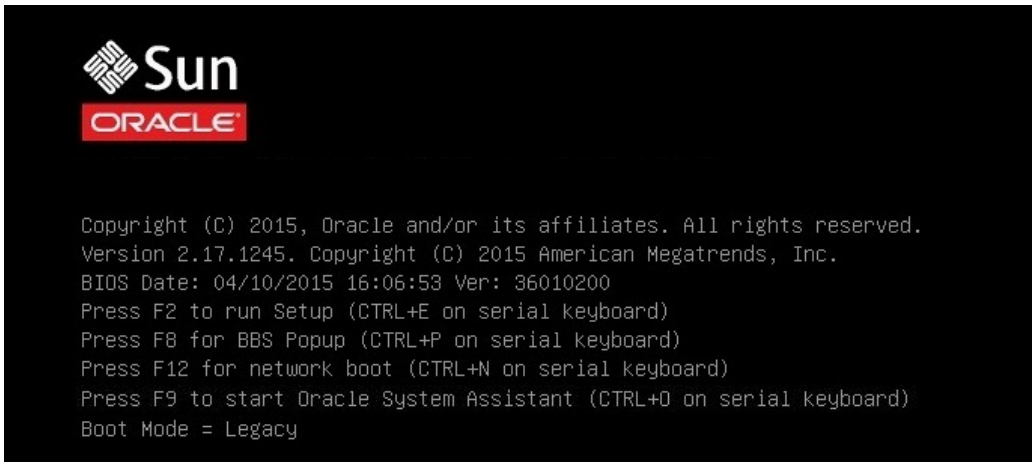
Ensure that the PXE network environment is properly set up and the Windows installation media is available for PXE boot.

2. Reset the server.

For example, to reset the server:

- **From the local server**, press the Power button (approximately 1 second) on the front panel of the server to power off the server, and 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, and then click Save.
- **From the Oracle ILOM CLI**, type: **`reset /System`**

The server begins the boot process and 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.

3. **To verify PXE boot support is enabled, perform the following steps:**

Note - PXE boot support is enabled by default; however, this step directs you to verify that PXE boot is enabled in the event that it was disabled. Once you have verified that PXE boot support is enabled, you can omit this step on subsequent PXE boots.

a. **Press the F2 key to access the BIOS Setup Utility.**

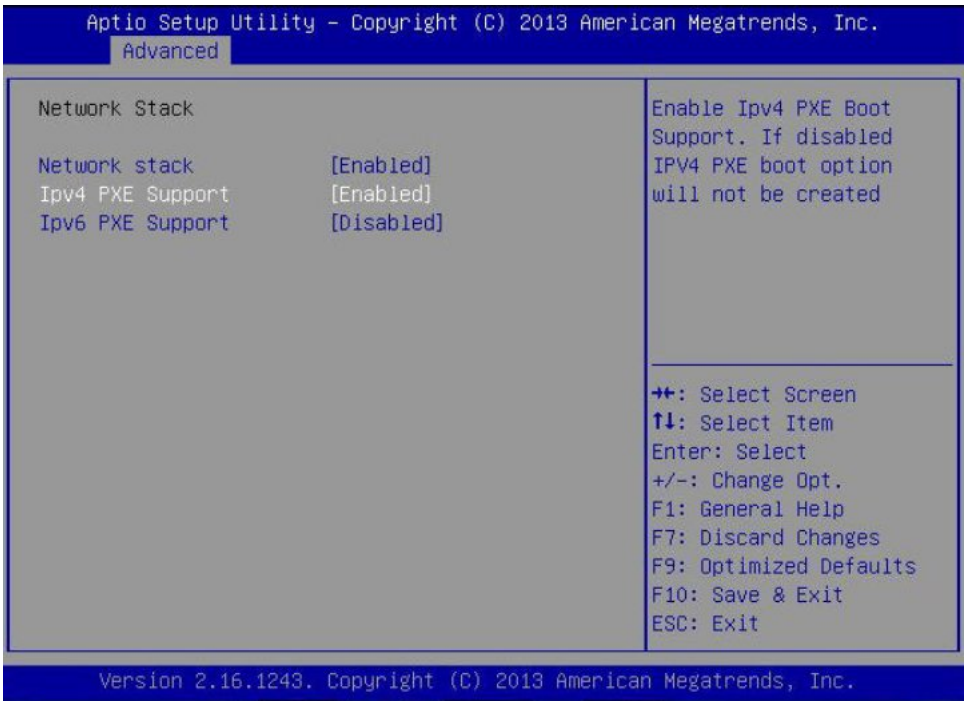
   The BIOS Setup Utility appears.

b. **Select Advanced in the top menu bar.**

   The BIOS Setup Utility Advanced screen appears.

c. **Select Network Stack from the list of available options.**

The BIOS Setup Utility Network Stack screen appears.



d. If necessary, set the appropriate PXE Support setting (either IPv4 or IPv6) to Enabled.

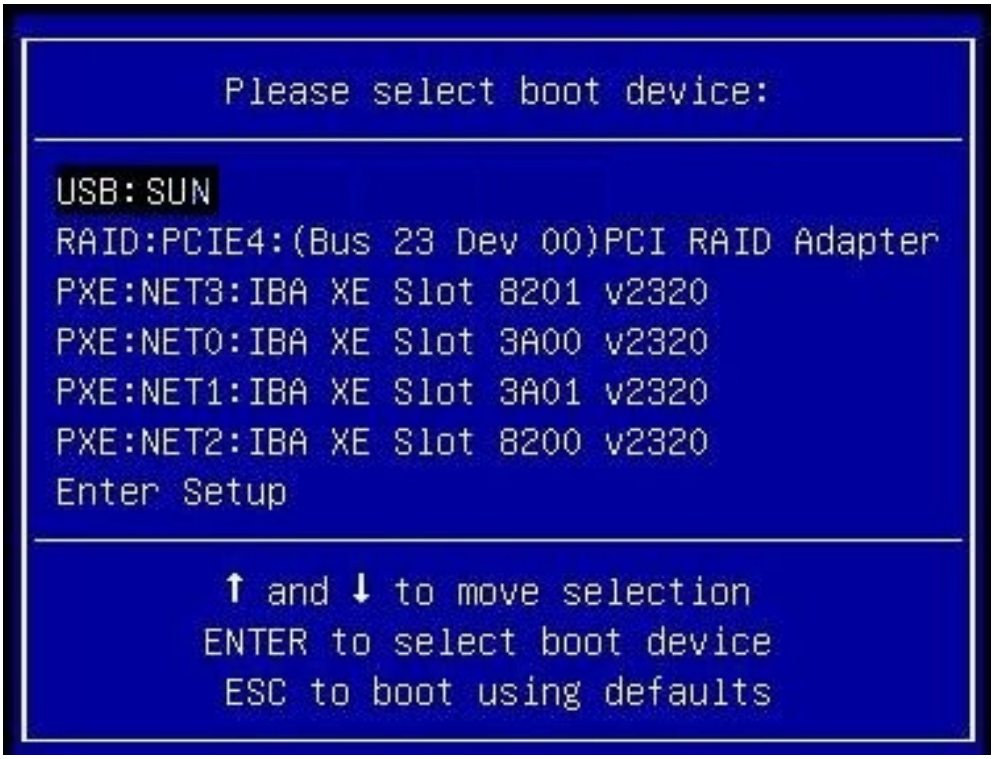
e. To save the changes and exit the BIOS Setup Utility, press the F10 key.

This causes the server to reset. After resetting, the BIOS screen appears again.

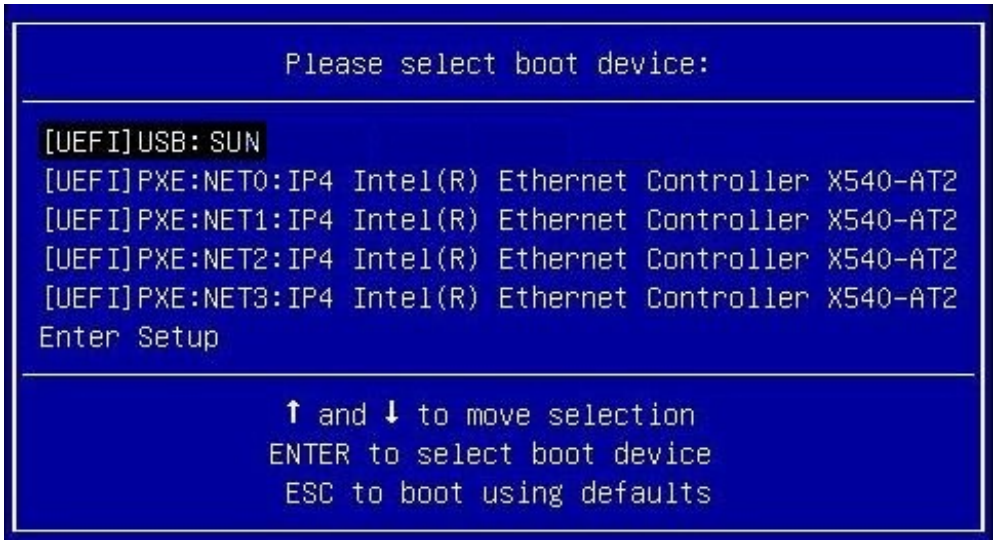
4. In the BIOS screen, press the F8 key to specify a temporary boot device or press F12 to network boot (PXE).

The Please Select Boot Device menu appears listing the available boot devices. The screen that appears will differ depending on whether you have BIOS configured for Legacy BIOS Boot Mode or UEFI Boot Mode.

- 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 boot device menu that appears in your installation might differ depending on the type of disk controller installed in your server.

For UEFI mode, both IPv4 and IPv6 protocols are selectable for each network adapter interface, in addition to local and remote boot devices.

5. **In the Please Select Boot Device menu, select the server network adapter that is configured to communicate with your PXE network install server.**

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

6. **To complete the installation, refer to Step 5 of "Install Windows Server 2012 or 2012 R2 Manually Using Local or Remote Media" on page 37.**

Post Installation Tasks for Windows Server

Note - The procedures in this section assume that you have installed the Microsoft Windows Server operating system using the manual procedure, that is, you did not use Oracle System Assistant. If you used Oracle System Assistant to install your operating system, you can skip this section because Oracle System Assistant automatically performs these post installation tasks for you.

After completing a manual installation of the Windows Server 2012 or 2012 R2 and rebooting the server, you should review the following post installation tasks and, if necessary, perform the tasks that are applicable to your server.

Description	Link
About Supplemental Software.	"Supplemental Software Component Options" on page 63
Install device drivers and supplemental software.	"Manually Installing Device Drivers and Supplemental Software" on page 64
Configure NIC teaming.	"Configuring Intel NIC Teaming" on page 66

Supplemental Software Component Options

Oracle System Assistant provides an application, called `InstallPack` to install platform Supplemental Software components. `InstallPack` has two options to install Supplemental software: Oracle System Assistant makes several Supplemental Software components available for the server.

You have two options for installation:

- **Typical** – Installs all Supplemental Software applicable for your server.
- **Custom** – Installs only the Supplement Software selected for installation.

The following table identifies the optional Supplemental Software components that Oracle System Assistant makes available for your server.

TABLE 2 Optional Supplemental Software

Available Supplemental Software Components	Integrated RAID Controller
Qlogic Drivers Installs Qlogic drivers (FC, FCoE, NIC, iSCSI) using a wizard.	Typical
Oracle Hardware Management Pack Oracle Hardware Management Pack provides tools to help you manage and configure your server. It enables you to: ■ Use a management agent at the operating system level to enable in-band monitoring of your server hardware over Simple Network Management Protocol (SNMP). You can use this information to integrate your server into your data center management infrastructure. ■ Use a management agent to enable in-band monitoring of your server's storage devices, including RAID arrays. You can view this information from the Oracle Integrated Lights Out Manager (ILOM) web interface or command-line interface (CLI). ■ Use a BIOS configuration tool, which runs on the host operating system and configures the host BIOS CMOS settings, host boot order, and some service processor (SP) settings. ■ Use IPMItool to access the server's service processor via the IPMI protocol and perform management tasks.	Custom
Intel Network Connections PROSet for Windows Enables additional network features, including NIC Teaming.	Typical
LSI MegaRAID StorCLI Enables you to configure, monitor, and maintain RAID on the SAS 3 internal RAID host bus adapter (HBA).	Typical
LSI MegaRAID Storage Manager for Windows Enables you to configure, monitor, and maintain RAID on the SAS 3 internal RAID host bus adapter (HBA).	Typical
Intel Chipset Software Installation Utility Automatically tells you if you need to update your chipset INF files and prompts you to install the files.	Typical

Manually Installing Device Drivers and Supplemental Software

The InstallPack application provides an installation wizard for manually installing platform-specific device drivers and supplemental software. This application is included in Oracle System Assistant and is also available for download from My Oracle Support. For download instructions, refer to "Getting Server Firmware and Software" in *Oracle Server X5-4 Installation Guide*.

If your server is equipped with Oracle System Assistant and you used it to install the operating system, then the required platform-specific device drivers and supplemental software are

installed for you. However, if your server is not equipped with Oracle System Assistant, then you can use InstallPack, which is included in the OS (operating system) Pack, to install the platform-specific device drivers and supplemental software. For instructions on obtaining the OS Pack, refer to "Getting Server Firmware and Software" in *Oracle Server X5-4 Installation Guide*.

If you installed Windows without Oracle System Assistant, browse to the Oracle System Assistant USB stick and select the Windows operating system/installer directory. Double-click the InstallPack installation wizard to manually install the platform supplemental software and drivers. See "Install Server-Specific Device Drivers and Supplemental Software" on page 65.

The following procedure describes how to use InstallPack to install the device drivers and supplemental software.

- "Install Server-Specific Device Drivers and Supplemental Software" on page 65

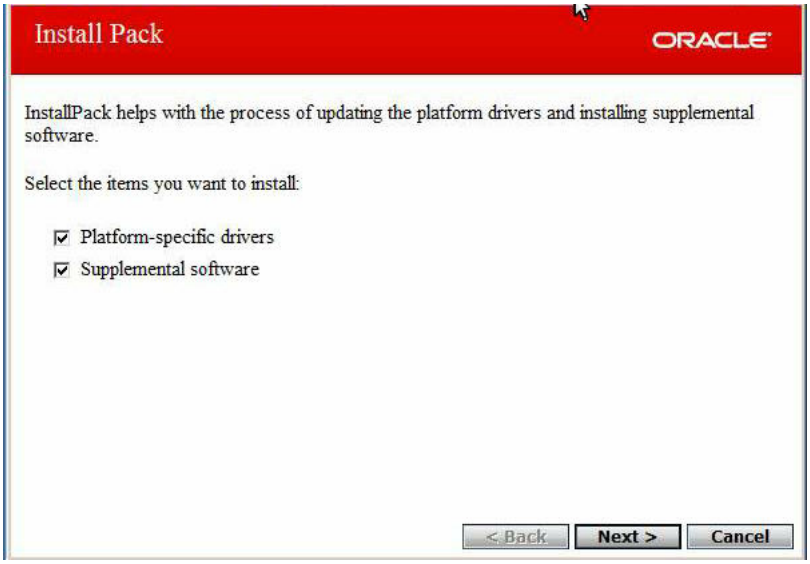
Related Information

- "Supplemental Software Component Options" on page 63

▼ Install Server-Specific Device Drivers and Supplemental Software

1. **Click on the Install Pack wizard executable: `InstallPack.hta`.**

The Install Pack dialog appears.



2. **In the Install Pack dialog, click `Next` to accept the default installable items.**

Note - You should always accept the “default installable items” to ensure that the most recent versions of the drivers are installed.

The Install Pack notice dialog appears.

3. **Follow the on-screen prompts to complete the installation of the device drivers and supplemental software.**

Configuring Intel NIC Teaming

For more information on setting up Intel NIC teaming for your environment, refer to the Intel Connectivity web page on Advanced Networking Services Teaming at:

`http://www.intel.com/support/network/sb/CS-009747.htm`

Additionally, you can download the complete set of Intel Network Connections User Guides for your server's network adapters at:

http://www.intel.com/support/network/sb/cs-009715.htm

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