Smart Setup Guide

HP Integrity Servers for Microsoft Windows Server 2003

Manufacturing Part Number: 5990-8264
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Legal Notices

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1 Planning the installation

Installing a Microsoft® Windows® Server 2003 64-bit version operating system on an HP Integrity server involves preparing the hardware for the OS installation, loading the OS, and updating the system with the latest OS patches. This chapter helps you plan the installation based on the server model, the OS edition, and the source of the OS media, and your network environment. Subsequent chapters guide you through the installation process.

Overview

The HP Integrity server family, based on the Intel® Itanium® 2 processor, supports 64-bit Windows Server 2003 on a full range of server models, from entry-level servers such as the 2-processor rx1620, through mid-range servers such as the rx7620 and rx8620, up to the high-end 128-processor Superdome. Some HP Integrity servers, such as rx7620, rx8620, and Superdome, are based on the HP Super-Scalable Processor chipset (sx1000). They are composed of basic building blocks known as **cells**. These **cell-based servers** can be set up either as a single system or divided into multiple partitions, where each partition is assigned memory, processors, and I/O resources for its exclusive use. Each partition can execute its own OS image.

NOTE This document describes the installation of Microsoft® Windows Server 2003 with SP1. Do not use previous versions of this document to install Windows Server 2003 with SP1. Do not use this version to install Windows Server 2003 without SP1.

The Windows Server 2003 operating system family consists of several product editions which share core functionality but offer varying levels of features and scalability. HP Integrity servers support the following editions:

- **Datacenter Edition** is designed for servers running mission-critical applications such as databases, enterprise resource planning, high-volume real-time transaction processing, and server consolidation. This version supports up to 64 processors in a single partition, 1TB memory, and the ability to cluster up to 8 nodes.
- **Enterprise Edition** is recommended for servers running applications such as networking, messaging, inventory and customer service systems, databases, and e-commerce Web sites in medium and large enterprises. This version supports up to 8-processors, 1TB memory, and the ability to cluster up to 8 nodes.

Table 1-1 shows the certification matrix for HP Integrity server models and Windows Server 2003 OS editions:

Table 1-1 Certification Matrix

Model	Enterprise Edition	Datacenter Edition
rx1620	✔	
rx2600	✔	
rx2620	✔	
rx4640	✔	
rx5670	✔	
Cell-based servers		
rx7620	✔	✔
rx8620	✔	✔
Superdome		✔

Choosing an installation scenario

When you purchase an HP Integrity server, you can order additional hardware, support options, and an OS enablement kit (such as the HP Integrity Essentials Foundation Pack for Windows). You can also order factory-installation of the OS. Depending on your order (or subsequent use), your system may be in one of the following states:

- **Factory-installed Windows Server 2003**

  The Windows Server 2003, Datacenter edition is always factory-installed. To get the system up and running, verify the OS was installed correctly, set up the system, and update the system with the latest firmware, drivers, and Microsoft QFEs (patches and fixes) available from the latest Integrity Essentials Foundation Pack or from the HP Integrity servers support web site: http://www.hp.com/support/itaniumservers/

- **Factory-installed OS other than Windows Server 2003**

  If you choose to run Windows Server 2003 instead of an alternate factory-installed OS, you can perform the migration yourself on an entry-level server or engage an HP Customer Engineer (CE) to perform the migration on a mid-range or high-end server. Contact HP support or sales to engage the CE.

  When migrating to Windows Server 2003 from another OS, pay close attention to the differences in supported hardware between the two operating systems. You must replace incompatible components with those supported on Windows Server 2003. If you want to keep the data residing on the server hard disk, you must back up the data and verify that you can restore it elsewhere.

  You can now prepare the server hardware for installation. Use the *HP Smart Setup* media and the *Microsoft Windows Server 2003* media to load the OS files on the server. After installation, set up the system, and update it with the latest firmware, drivers, and Microsoft QFEs (patches and fixes) available from the latest Integrity Essentials Foundation Pack or from the HP Integrity servers support web site: http://www.hp.com/support/itaniumservers/ .

- **No operating system installed**

  Prepare the server hardware for installation. Use the *HP Smart Setup* media and the *Microsoft Windows Server 2003* media to load the OS files on the server. After installation, verify that the OS was installed correctly, configure the system, and update it with the latest firmware, drivers, and Microsoft QFEs (patches and fixes) available at the HP Integrity servers support web site or from the latest Integrity Essentials Foundation Pack.

- **Installed Windows Server 2003 incorrect or inoperable**

  Prepare the server hardware for installation. Use the *HP Reinstallation* media to restore the OS files, firmware, drivers, and QFEs onto the server. After re-installation, verify that the OS was installed correctly, configure the system, and update it with the latest firmware, drivers, and Microsoft QFEs (patches and fixes) available at the HP Integrity servers support web site or from the latest Integrity Essentials Foundation Pack.

Choosing an installation environment

The installation environment consists of the server model, the OS edition, a local console or a remote console, and the media you need to perform the installation. In addition to installing from Smart Setup and Microsoft RTM media or reinstallation media, you can automate the installation of Windows Server 2003 using a Remote Installation Service (RIS) server on the network and a Pre-Boot eXecution Environment (PXE) client on the HP Integrity server.

Table 1-2 lists the HP Integrity server models, the OS edition supported on those models, the console options, and relevant media choices.

Table 1-2 Installation matrix

Server	OS Edition	Console	Media
rx1620 rx2600 rx2620 rx4640 rx5670	Enterprise	Local	HP Smart Setup and Microsoft RTM
			HP Reinstallation
		Remote (headless server)	HP Smart Setup and Microsoft RTM
			HP Reinstallation
		PXE/RIS	
Cell-based servers			
rx7620 rx8620	Enterprise	Local	HP Smart Setup and Microsoft RTM
			HP Reinstallation
		Remote (headless server)	HP Smart Setup and Microsoft RTM
			HP Reinstallation
		PXE/RIS	
	Datacenter (factory-installed)	Local	HP Reinstallation
		Remote (headless server)	HP Reinstallation
Superdome	Datacenter (factory-installed)	Local	HP Reinstallation
		Remote (headless server)	HP Reinstallation

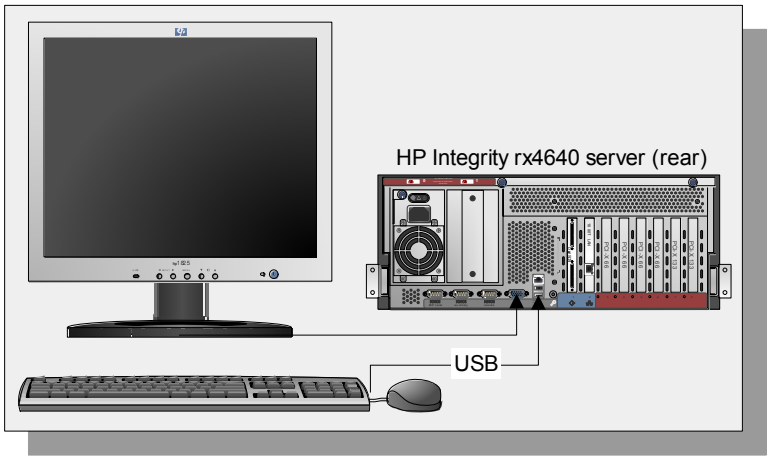
Using a local console

A **local console** is a VGA monitor, a USB HP keyboard, and a USB mouse connected to the server. (You may use a USB-to-PS2 dongle to connect to a console switch).

NOTE If a VGA card is not already installed, you must install the HP Graphics and USB Combo Adapter (A6869A) to use a local console. No other graphics card is supported by HP Integrity servers. Also, only HP keyboards are supported with this card.

Figure 1-1 shows a local console connected to an HP Integrity rx4640 server:

Figure 1-1 Local console configuration



A local console provides complete access to all the installation and administration tasks that can be performed on the server. You can use the local console to prepare the server for installation, install the OS, and check server status after installation.

Using a local console to perform an installation:

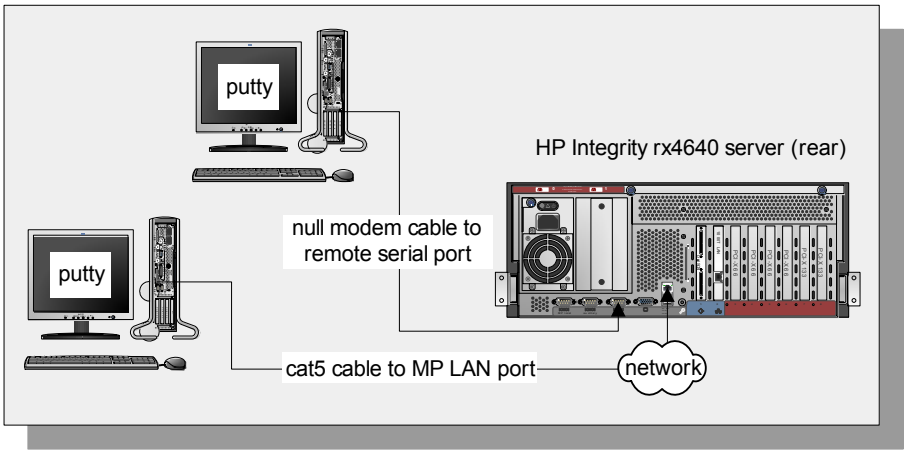
- You can specify server settings at the time of installation.
- You can log on immediately to Windows after installation completes.
- You can perform any administrative task directly.

Using a remote console

A **remote console** is a PC running terminal emulation software, such as **PuTTY** (can be installed from the Smart Setup media or from the Web) or **HyperTerminal**, connected to the server via the Management Processor (MP) serial port or LAN port.

Figure 1-2 shows remote consoles connected to an HP Integrity rx4640 server:

Figure 1-2 Remote console configurations



While using a remote console to install Windows:

- You cannot specify operating system settings at the time of installation.
- You must assign an IP address to the MP LAN interface if you use the MP LAN port. To assign the IP address, you must connect the workstation to the MP serial port, access the MP command menu, enable LAN access, and specify the LAN password.

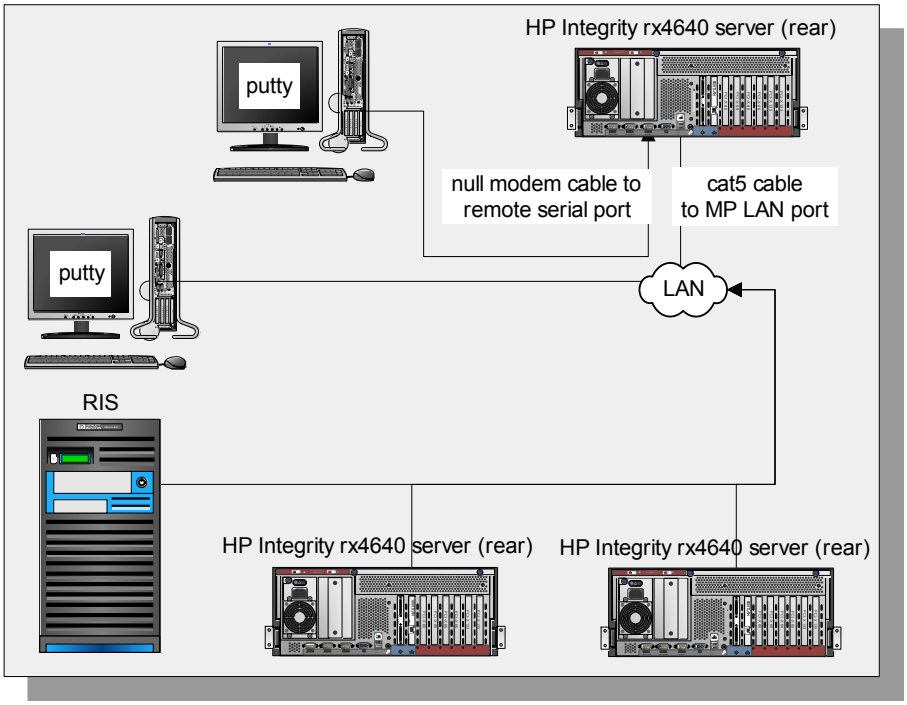
Using PXE/RIS

A Remote Install Server (RIS) is a specialized Windows server used to perform multiple software installations across a network. The RIS server, working in conjunction with an agent (the PXE client) residing on target systems, performs automated installations. Using this method of remote installation gives the user:

- Installations are automated; no user intervention is needed
- Multiple servers can be installed in one batch job
- Each server receives a standardized image
- Installations can be done from anywhere on the intranet

Figure 1-3 shows a sample PXE/RIS setup:

Figure 1-3 PXE/RIS configuration



NOTE

When performing a PXE/RIS remote installation please note the following:

- Remote installation using PXE/RIS is not supported with Windows Server 2003, Datacenter edition.
- The RIS server should not be connected to your Integrity server using your intranet during initial Windows OS installation. Set up a small “private” network, populated with your RIS server, a hub, and the system LAN NIC of the HP Integrity server. This protects your intranet from errors that might occur during the Windows install process. When the Windows OS installation has completed, connect the RIS to the target Integrity servers using your intranet.

Using the HP Smart Setup media

The HP Integrity Essentials Foundation Pack for Windows includes the HP Smart Setup media. You can use the HP Smart Setup media both before and after the OS is installed:

- **Before installing the OS**, boot the server with the Smart Setup media in the CD/DVD drive. The server boots to the **EFI-Based Setup Utility** (**EBSU**). EBSU provides an easy-to-use interface for offline setup and configuration tasks such as creating hard disk partitions and updating the firmware. Moreover, EBSU provides a utility called **Express Setup**, which guides you through the process of installing the OS. EBSU works in conjunction with the Microsoft RTM media, which holds the OS image. We strongly recommend that you use EBSU to install the OS.
- **After installing the OS**, use the Smart Setup media to install drivers, utilities, and important fixes that will ensure the stability and performance of the system.

Using the Microsoft RTM media

You can purchase the Microsoft RTM media either with the HP Integrity Essentials Foundation Pack for Windows from HP or separately from a Windows reseller. Or, your organization may have a volume license for Windows Server 2003, 64-bit version. You will need this media and the license key to install Windows Server 2003 (if Windows is not factory-installed) on HP Integrity servers.

Regardless of the source, the OS can be easily installed using the EFI-Based Setup Utility (EBSU) available on the HP Smart Setup media. To access the EBSU, simply boot your server from the HP Smart Setup media, automatically loading the EBSU.

Using the HP Reinstallation media

HP Integrity servers factory-installed with Windows Server 2003 provide the HP Reinstallation media, which allows you to restore the server to its factory condition if necessary. You need the corresponding license key to re-install Windows Server 2003.

Using EFI

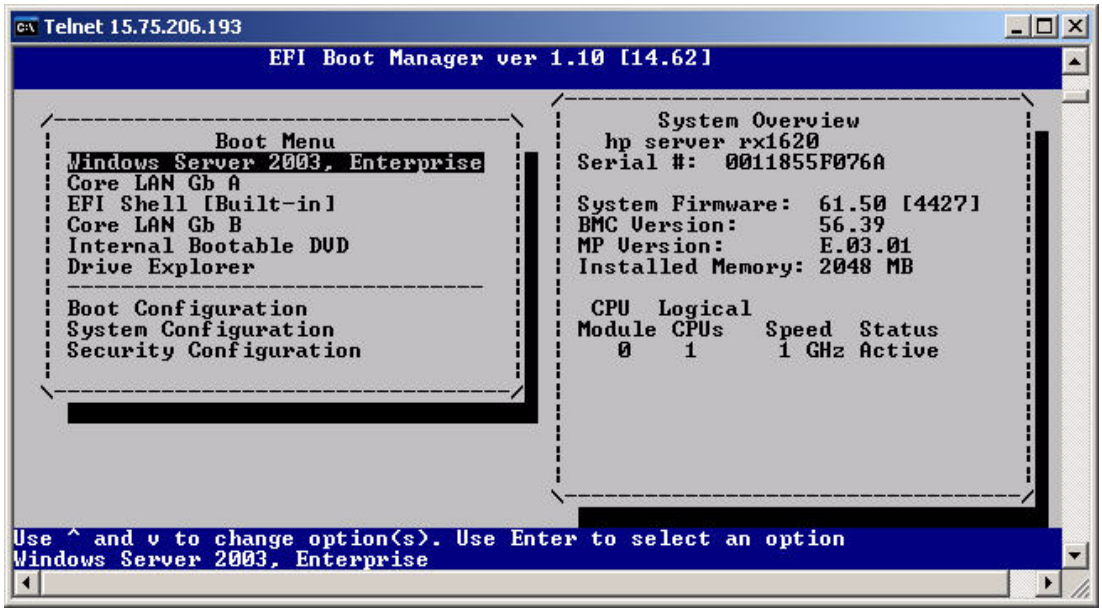
The Intel® **Extensible Firmware Interface** (**EFI**) specification defines a new model for the interface between the operating system, the firmware, and the hardware. EFI serves the same purpose on Itanium-based computers as BIOS on x86-based computers. EFI provides a standard environment for running pre-boot applications and for booting the OS.

HP Integrity servers use EFI to initialize the platform firmware and load the operating system. After the system is initialized, EFI provides two interfaces with which you can interact:

EFI Boot Manager

First displayed when you power on the server, the EFI Boot Manager provides a menu-based interface (use arrow keys to traverse menus) with options for booting the OS, loading EFI applications, configuring the server, and other pre-boot operations.

Figure 1-4 EFI Boot Manager



EFI Shell

Available as a selection from the EFI Boot Manager, the EFI Shell provides a command-line interface from which you can get information about the system, install an OS, boot the OS, execute batch scripts, launch EFI applications, load EFI drivers, and manage files and system variables.

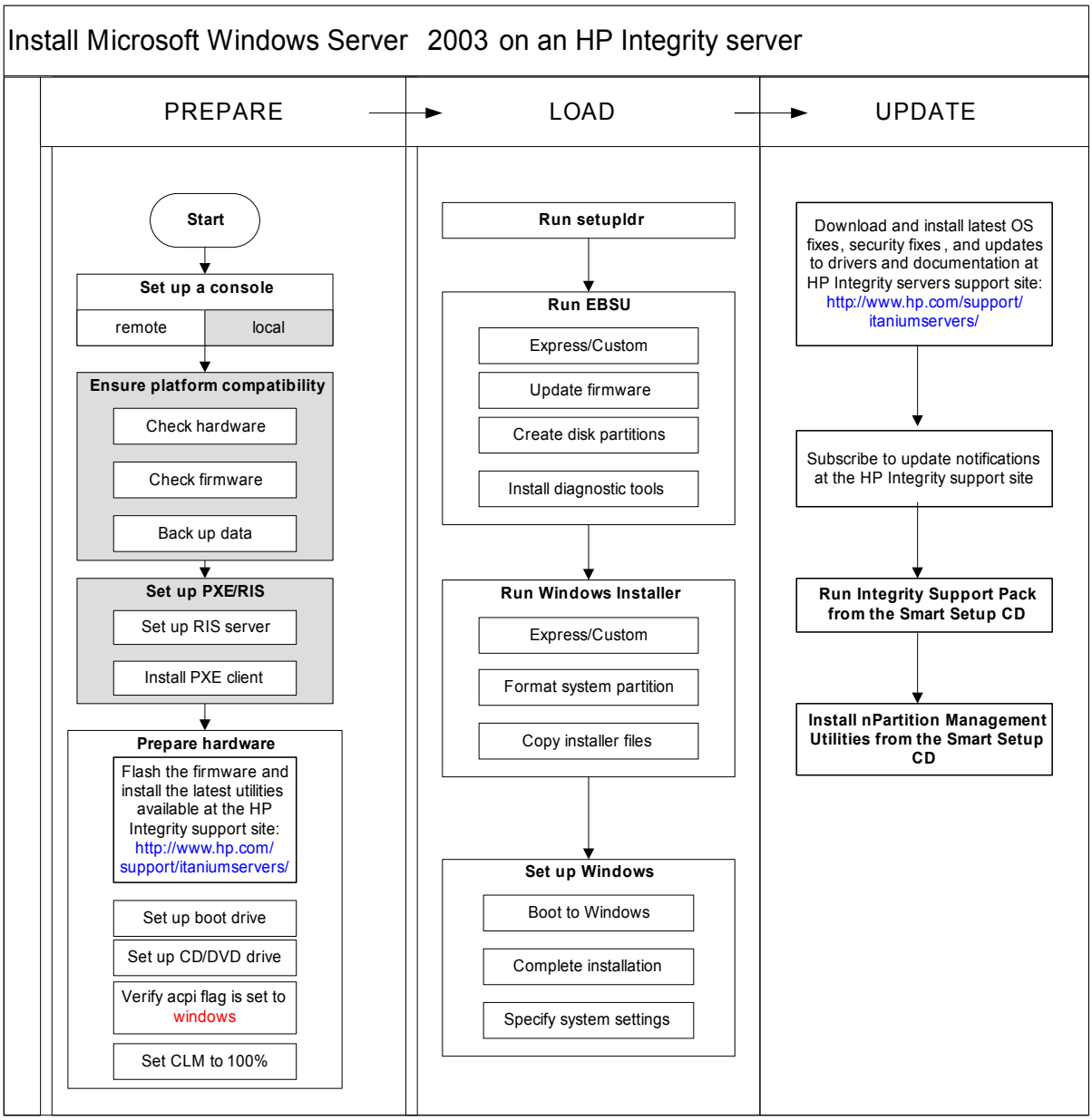
See Also

- *EFI Documentation*: http://developer.intel.com/technology/efi/help/efidocs.htm
- *EFI Shell commands*: From the EFI Shell, type help or ? at the EFI prompt for a list of EFI shell commands.

Installation Process

The installation process involves preparing the server for the OS, loading the OS on the server, and updating the system with the latest firmware, drivers, utilities, security fixes, and OS fixes. Figure 1-5 shows the main tasks involved in each stage.

Figure 1-5 Installation Overview



In practice, there are minor differences—based on the choice of console and installation media—in the sequence of tasks or the interface you would use to perform them. Before performing these tasks, refer to the detailed task instructions in the following chapters, noting any warnings or cautions that applying to a given task.

2 Preparing for installation

Preparing your server for an operating system installation involves setting up a console (either local or remote, or both), optionally setting up a PXE/RIS environment, if applicable, and preparing the hardware for installation. If you are migrating from another OS, you must also ensure that the server platform and its peripheral cards are compatible with Windows Server 2003 before proceeding. This chapter provides detailed instructions for each task.

Locating the Microsoft Certificate of Authenticity

The certificate contains the CD-key for Microsoft Windows Server 2003. You must enter this key as part of the installation procedure. The physical location of the Certificate of Authenticity (COA) depends on the server model.

Table 2-1 Locating the Microsoft COA

Integrity server	Location
rx1600 and rx1620	The COA is on the underside of the pullout strip located near the power switch, as shown in the illustration below. 
rx2620	The COA is on a pullout strip located on the front of the system adjacent to the hard drives as shown in the illustration below. 

Table 2-1 Locating the Microsoft COA (Continued)

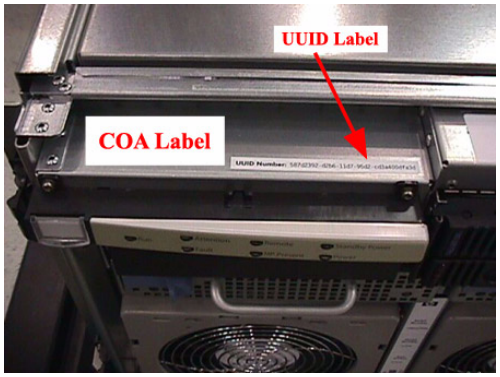
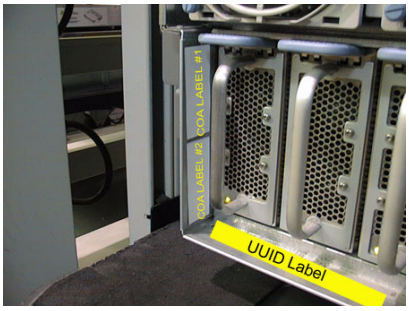
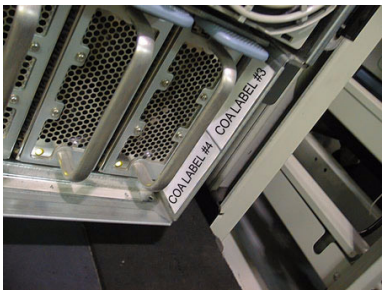
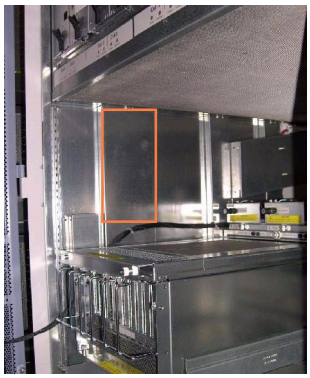
Integrity server	Location
rx4640	The COA is located on the left side panel as shown in the illustration below.  
rx5670	The COA is located on the front of the system just below the hard drive as shown in the illustration below. 
rx7620	The COA is located on the front of the system, above the light panel, next to the UUID label, as shown in the illustration below. If additional COAs are installed, the location is shown in the second illustration below.  

Table 2-1 Locating the Microsoft COA (Continued)

Integrity server	Location
rx8620	The COA is located in the front of the system, at the bottom, near the power supply as shown in the first illustration below. If additional COAs are required, they are located as shown in the second illustration below.  
Superdome	The COA is located in the inside the unit, on the left , in the open space between the cells and the IOX as shown in the illustration below. 

Ensuring platform compatibility

If you are migrating from another operating system to Windows Server 2003, ensure that the firmware is up to date, that the hardware is compatible, and any data on the server disk is backed up.

Check system firmware version

To check the system firmware version boot the server to EFI:

Step 1. Use the Down arrow key to select EFI. Press **Enter**.

Step 2. At the EFI Shell prompt, type `info fw`.

The EFI shell lists the firmware version as follows:

```
FIRMWARE INFORMATION
Firmware Revision:
All CELLS - 1.12 Thu Oct 16 08:10:32 2003
```

Step 3. Check the installed version against the version present on the HP Smart Setup media or on the HP Integrity support site at http://www.hp.com/support/itaniumservers/.

NOTE For rx7620, rx8620, and Superdome servers, contact HP support or an HP CE to obtain the latest firmware.

Check hardware compatibility

To verify that your existing hardware is compatible with Windows Server 2003:

Step 1. Refer to the *Supplies and Accessories* page for each server to check supported hardware configurations. For example, the Supplies and Accessories page for the rx8620 server at http://www.hp.com/products1/servers/integrity/mid_range/rx8620/supplies.html lists the processors, memory, adapters, cards, and controllers that are available for that server.

Step 2. Verify existing device compatibility at the *HP Integrity server connectivity* site at http://www.hp.com/products1/serverconnectivity/index.html.

Step 3. Verify storage compatibility by reviewing the *HP Integrity Server-Storage support matrices* at http://www.hp.com/products1/serverconnectivity/support_matrices.html. This list is not exhaustive because storage vendors may support more configurations than those indicated at the site. As a general rule, check with your storage vendor and an HP sales representative for a definitive statement on server-storage compatibility.

Back up existing data

If you want to restore the data on the hard disk of the server after migrating to Windows, you must back up the data and verify that you are able to restore it:

Step 1. Perform a server-wide backup using your existing backup utilities.

Step 2. Verify the integrity of the backup by restoring samples of data to another server.

Step 3. Store the backup in a safe place.

Setting up a console

You can install the operating system and administer the server from either a local console, a remote console, or both:

- A *remote console* is a terminal or a PC running terminal emulation software, such as **PuTTY** or **HyperTerminal**, connected to the server via the Management Processor (MP) serial port or LAN port. A remote console provides access to the EFI shell, MP commands, and, after Windows boots, to the Special Administration Console (SAC).
- A *local console* is a VGA monitor, a USB keyboard, and a USB mouse connected to the server. If a VGA card is not already installed, you must install the HP Graphics and USB Combo Adapter (A6869A) to use a local console. The local console provides a graphical user interface, allowing you to use the EFI, the MP commands, and—after Windows boots—the Windows user interface.

Set up a remote console

From the remote console, you can access the EFI shell, the Management Processor (MP), and the Microsoft Special Administration Console (SAC). You can use these utilities while installing and administering Windows Server 2003 on HP Integrity servers.

You can configure a remote console in two ways:

- Connect a PC to the Management Processor (MP) port via a null modem cable.
- Connect a PC to the LAN port via a cat5 LAN cable.

On the remote PC, execute a terminal emulation application such as HyperTerminal or PuTTY. PuTTY is a free implementation of Telnet and SSH for 32-bit Windows and UNIX, and provides an xterm terminal emulator. We recommend that you run PuTTY version 0.57 or higher, available on the Smart Setup media or from the PuTTY web site at: http://www.chiark.greenend.org.uk/~sgtatham/putty/download.html.

To set up a remote console:

Step 1. Connect a PC via null modem cable to the MP serial port or a cat5 cable to the LAN port.

Step 2. Install PuTTY on the PC and specify these port settings:

- Bits per second: 9600
- Data bits: 8
- Parity: none
- Stop bits: 1
- Flow Control: Xon/Xoff

Step 3. Use the Keyboard Configuration Panel to map the Backspace character to Control-H.

Step 4. Boot the server.

Step 5. Run PuTTY and press **Enter**.

The MP prompt is displayed.

Set up a local console

On servers configured with internal graphics card, you can connect a monitor, keyboard and mouse directly to the appropriate ports. On servers without internal graphics card, you must first install an HP Graphics and USB Combo card (A6869A) and connect the console to the appropriate ports. Then, from an existing remote console, modify system configuration to redirect the output to the local console.

Table 2-2 Graphics Support on Server Models

Server Model	Graphics Card
rx1600, rx2600, rx4640	internal graphics card
rx5670, rx7620, rx8620, Superdome	optional HP Graphics and USB Combo card (A6869A)

To install the HP Graphics and USB Combo card:

Step 1. Install the HP Graphics and USB Combo card card in an open PCI slot of the server.

Step 2. Connect a VGA monitor, USB HP keyboard, and USB mouse to the appropriate ports.

Step 3. Boot the server to EFI.

Step 4. At the remote console, from the EFI Boot Manager, select **System Configuration**.

Step 5. Select **Select Active Console Output Devices**.

Step 6. Highlight the line with the graphics card PCI device.

If there is no asterisk at the start of the line, the device is disabled. Use the space bar to toggle the state of the card from disabled to enabled (as indicated by the asterisk).

Step 7. Select **Save Settings to NVRAM** and then **Exit**.
The video display is now directed to the local console.

Setting up PXE/RIS

Remote Installation Services (RIS) enables you to create, maintain, and quickly install identical OS and software configurations on multiple remote systems with a predefined level of user interaction. RIS uses the Pre-boot eXecution Environment (PXE) to enable client computers without an operating system to boot remotely to a RIS server. The RIS server then installs the operating system over a TCP/IP network connection. You can create different sets of RIS images for different groups of client computers. You can also use Group Policy settings to limit the installation options that RIS presents to clients. In addition, you can configure RIS for either interactive or fully-automated installations.

Set up RIS server

Setting up one or more RIS servers in your network requires careful planning, design, and implementation. The following checklist provides an overview of the tasks involved in setting up a RIS server.

- Ensure that both your RIS server and client (Integrity server) hardware meet the Remote Installation Services (RIS) hardware requirements.
- Ensure that your network is based on TCP/IP, and that a Domain Name System (DNS) server exists on the network. You do not need to use the Microsoft version of DNS.
- Ensure that a Dynamic Host Configuration Protocol (DHCP) server exists on the network. You do not need to use the Microsoft version of DHCP.
- Ensure that Active Directory exists on the network.
- Install the Remote Installation Services component on the RIS server.
- Run the Remote Installation Services Setup Wizard.

See Also

Refer to the Microsoft Windows Server 2003 Technical Reference web site for detailed descriptions of the concepts, tasks, best practices, and troubleshooting tips for setting up a RIS server: http://www.microsoft.com/windowsserver2003/proddoc/default.mspx.

Set up PXE on the HP Integrity server

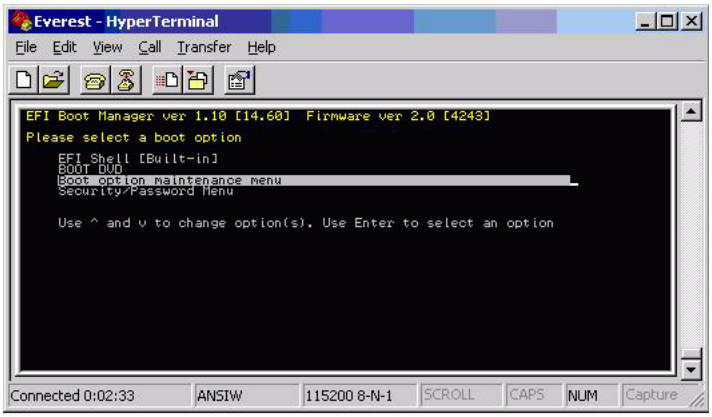
PXE is built on common Internet protocols and services, including TCP/IP, DHCP, and TFTP. PXE extensions to the DHCP protocol allow RIS servers to communicate with the network-bootable HP Integrity servers.

To enable PXE on the HP Integrity server, you must specify the network interface card (NIC) that it should use to communicate with the RIS server. When the HP Integrity server boots from this NIC, it effectively boots from the remote RIS server. Working in conjunction with the RIS server, PXE installs a new image of the Windows Server 2003 on the HP Integrity server.

To enable PXE on the HP Integrity server:

Step 1. From the EFI Boot Manager, select **Boot Option Maintenance menu**.

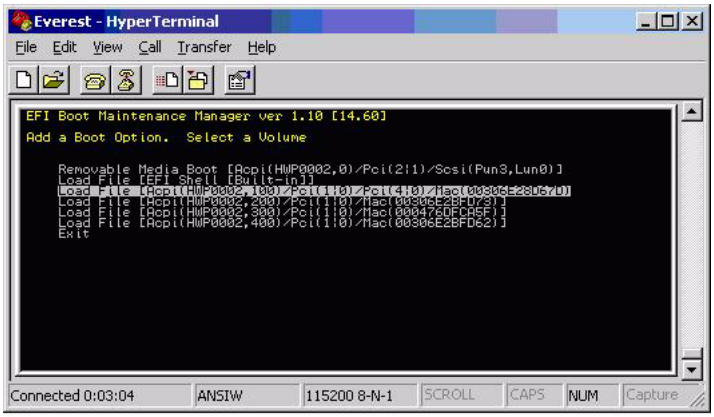
Figure 2-1 EFI Boot Option Menu



Step 2. Select **Add a Boot Option**.

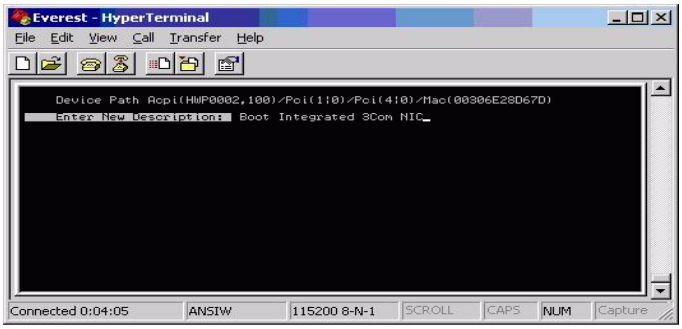
Step 3. Select a NIC from the list of supported boot controllers.

Figure 2-2 Select the PXE Boot NIC



Step 4. Enter a description for the NIC.

Figure 2-3 Describe the NIC



Step 5. Press **Enter** to select the default options.

Step 6. Enter Yes to save the settings.

Preparing the server hardware

To set up the server hardware for OS installation, set up the boot drive, set up the CD/DVD drive, and—if the server is cell-based—verify that the ACPI boot option is set to windows.

Set up the boot drive

The operating system installs through the boot controller detected as adapter zero to the drive detected as drive zero.

CAUTION HP recommends that only the target OS drive be connected during installation. This ensures that the OS is installed on the correct drive. Make sure that the Z: drive letter is free. Windows Server 2003 with SP1 creates the EFI partition here.

To set up the boot drive:

Step 1. Power down the server.

Step 2. Make a note listing all device connections so you can reconnect them after installation completes.

Step 3. Disconnect all mass storage devices from all controllers except the boot controller.

Step 4. Configure the boot controller and boot drive.

NOTE If you are using a RAID controller, prepare the controller and select the RAID type according to instructions in the RAID controller documentation.

If you are using a Storage Area Network (SAN), see the Boot from SAN Application Note on the HP Smart Setup media.

Locate the DVD/CD drive

When hardware (for example, HDD, USB device, DVD-ROM drive) is added to a system after it has booted to EFI, the EFI shell environment does not automatically detect the new device. You must reconnect the device driver for the EFI shell to recognize the device.

Also, the EFI shell environment creates default mappings for all the device handles that support a recognized file system. After you change the system configuration or add a new device, you must regenerate these mappings.

To enable the EFI shell to detect and and access the DVD/CD drive:

Step 1. From the EFI shell, type `reconnect -r`.

The `reconnect` command reconnects one or more drivers from a device, disconnecting all the drivers from all the devices and then reconnecting them. If a device handle is not specified, the reconnect operation is performed on all the handles in the system. If a device handle is specified, only device handle and the devices below it are reconnected.

Step 2. From the EFI shell, type `map -r`.

The -r option regenerates all the mappings in a system. EFI shell displays the device mapping table, as follows.

```
fs0 : Acpi(PNP0A03,0)/Pci(2|0)/Ata(Primary,Master)/CDROM(Entry1)

blk0 : Acpi(PNP0A03,1)/Pci(1|0)/Scsi(Pun0,Lun0)

blk1 : Acpi(PNP0A03,0)/Pci(2|0)/Ata(Primary,Master)

blk2 : Acpi(PNP0A03,0)/Pci(2|0)/Ata(Primary,Master)/CDROM(Entry1
```

Step 3. Note the device name of the CD-ROM device (fs0). You will use this to explore the contents of the CD or DVD.

See also

The `map` command displays or defines a mapping between a user-defined name and a device handle. The most common use of this command is to assign drive letters to device handles that support a file system protocol. Once these mappings are created, the drive letters can be used with all the file manipulation commands.

The `map` command can be used to create new mappings or delete an existing mapping with the -d option. If the map command is used without any parameters, all the current mappings are listed. If the -v option is used, the mappings are shown with additional information on each mapped handle.

Set ACPI flag to windows (cell-based servers only)

On cell-based servers, such as rx7620, rx8620, and the Superdome, the Advanced Configuration and Power Interface (ACPI) flag must be set to the flag appropriate for the operating system it boots. For the server to boot to Windows Server 2003, the ACPI flag must be set to **windows**.

If you purchased your server with a Windows operating system option (such as the Microsoft retail media or the HP Smart Setup media), this flag is set to **windows** in the factory. If you purchased the server with a different or no operating system, you must set this flag to **windows**.

CAUTION

If the server is booted to Windows Server 2003 without setting the ACPI flag to **windows**, the OS displays a blue screen error.

To set the ACPI flag:

Step 1. From EFI shell, type `acpiconfig`.

EFI displays the current ACPI settings. If the flag is set to **windows**, EFI displays `acpiconfig: windows`

Step 2. If the flag is not set to **windows**, type `acpiconfig windows`.

Step 3. Type `acpiconfig` to display the settings again and verify that the flag is set correctly.

Windows Server 2003 implements the ACPI 1.0b specification with some extensions from version 2.0, whereas HP-UX and Linux implement ACPI 2.0. As a result, the firmware has to be prompted by this flag to recognize that the operating system to be booted is Windows Server 2003.

NOTE If you update the system firmware, this flag may be reset to default. Verify that the flag is set to windows after you flash the system firmware.

Set Cell Local Memory to 100% (cell-based servers only)

HP recommends that you set the Cell Local Memory (CLM) parameter to 100% to maximum server performance. This setting allocates all available local cell RAM for the use of that cell only, preventing unnecessary RAM reads and writes to physical RAM accessed over the server backplane.

Modify CLM settings for each nPartitition using the nPartition command mangement tool (parmodify). You must first install nPartition on the server to be modified, or on a remote management station. See the nPartition Guide for detailed information on how to install these tools.

To set the CLM parameter:

Step 1. From the server console, run the “parmodify” command with -p# and -m# options to modify each cell’s attributes in each nPar you modify.

For example:

```
parmodify -p0 m0::::100%
```

where: -p is the partition number and -m is the cell number in that partition

sets cell local memory to 100% in cell 0, partition 0.

Step 2. Restart the server to make the changes active.

3 Installing the OS

This chapter provides instructions for installing the OS using a local console, a remote console, or a PXE-enabled NIC. This chapter also shows you how to re-install Windows Server 2003. Each method comprises a series of tasks, concluding with two tasks that verify that the OS was installed correctly. You must install the HP Support Pack after installing the OS.

Installing from a local console

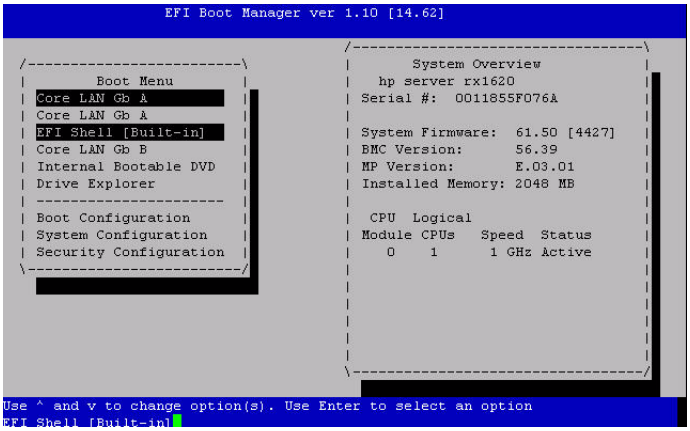
This task involves using EBSU to prepare the server, using Windows Setup to prepare the OS, loading the OS on the server, and specifying system settings.

Run EBSU

EBSU provides an easy-to-use interface to flash the firmware, partition the hard disk, install diagnostic tools, configure storage controllers, and run other EFI utilities.

Step 1. Power on the server. The server boots to EFI.

Figure 3-1 Boot to EFI



Step 2. Load the HP Smart Setup media into the server DVD drive.

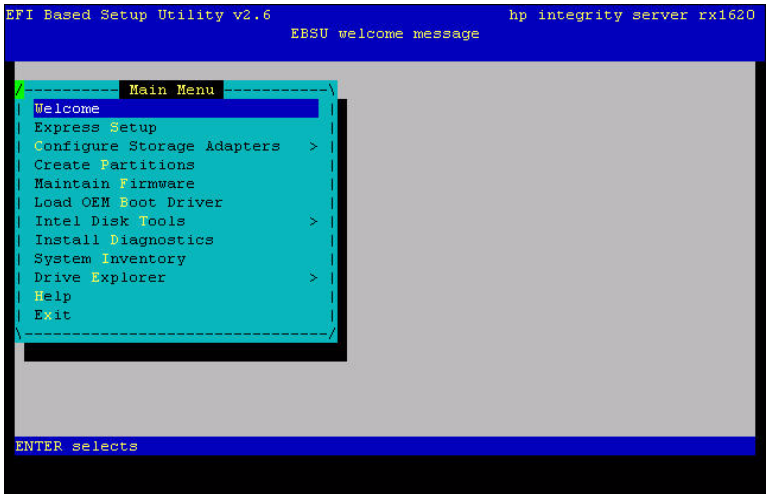
Step 3. From the EFI Boot Menu, select **Internal Bootable DVD** and press **Enter**.

Step 4. EBSU starts and displays the Welcome screen. Select **OK** and press **Enter** to continue.

Figure 3-2 Enter EBSU

Step 5. From the main menu, select **Express Setup** and press **Enter**.

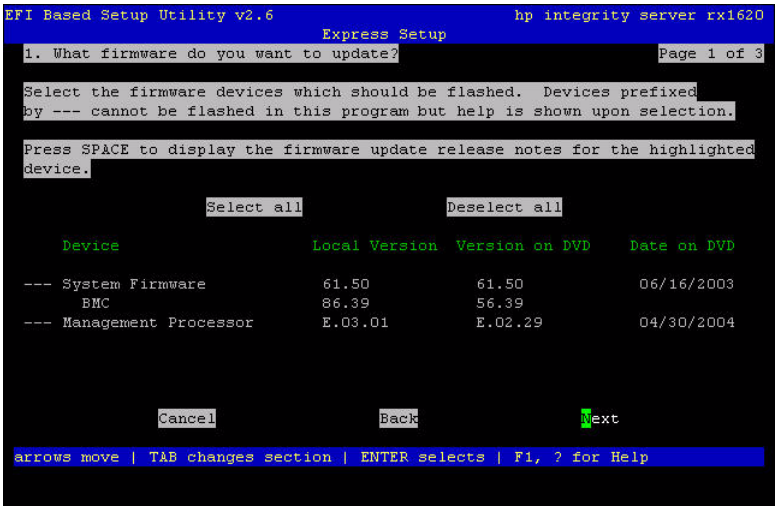
Figure 3-3 Select Express Setup



Step 6. EBSU displays the Express Setup introduction. Press **Enter** to continue.

Step 7. EBSU displays the firmware update screen, listing each device, its installed firmware version, and the firmware version on the Smart Setup media. Select the device(s) whose firmware you want to update. To continue, select **Next** and press **Enter**.

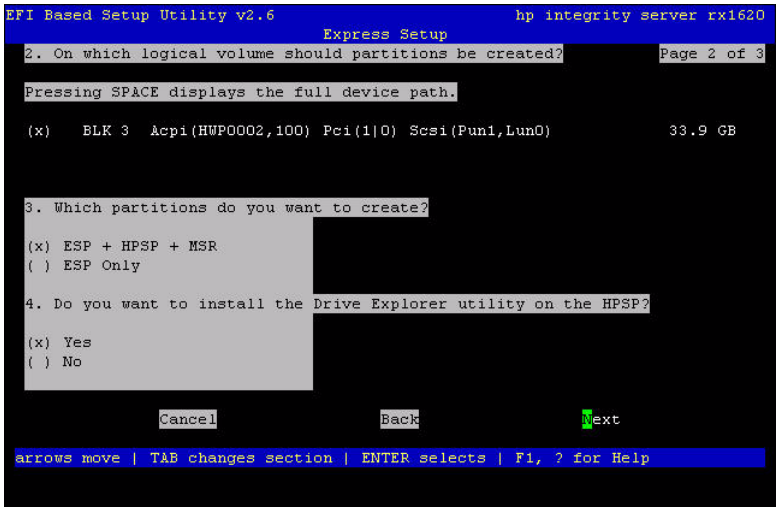
Figure 3-4 Update firmware



NOTE You may not be able to use EBSU to flash the firmware of some devices. You cannot flash the firmware if the installed version is the same or higher than the version on the Smart Setup media. Also, you cannot use EBSU to flash the Management Processor (MP) firmware. You must download the latest MP firmware from the HP Integrity support site: http://www.hp.com/support/itaniumservers/ and flash it separately.

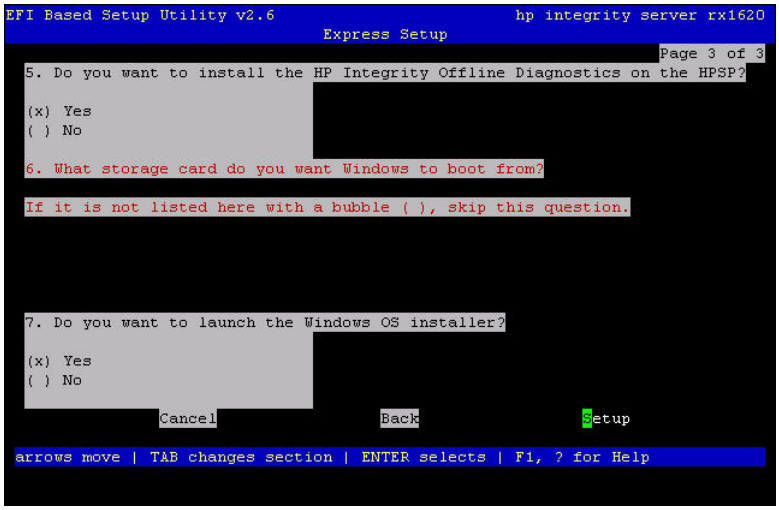
Step 8. Specify the disk partitions you want to create (**ESP Only** or **ESP + HPSP + MSR**). We recommend the default—ESP + HPSP + MSR—as a means to simplify the maintenance of your server. Also, specify the option to install the Drive Explorer utility, which enables you to browse a drive in EFI. Select **Next** and press **Enter**.

Figure 3-5 Partition disk



Step 9. Specify the option to install offline diagnostic tools (from the *HP Itanium Processor Family offline diagnostics and utilities CD*). Also, specify the option to launch the Windows OS installer. Select **Setup** and press **Enter**.

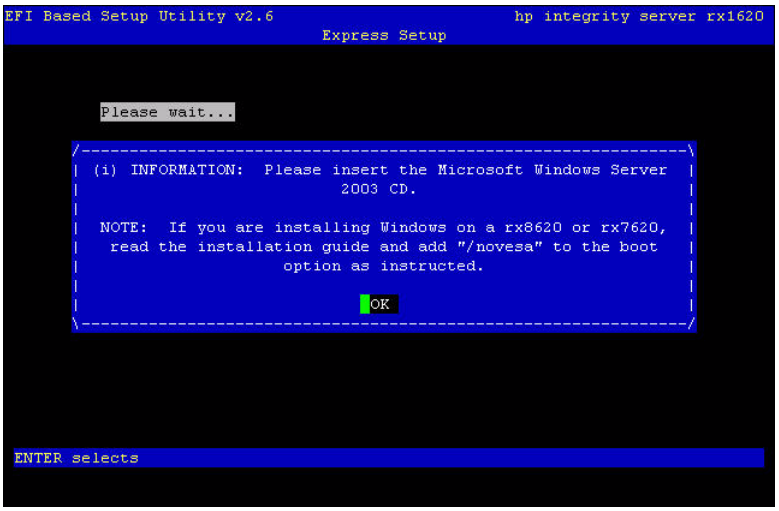
Figure 3-6 Install diagnostic tools



Step 10. EBSU displays the partition confirmation window. Select **Continue** and press **Enter**.

Step 11. EBSU prompts you to insert the Microsoft Windows Server 2003 CD in the DVD drive. Insert the *Microsoft Windows Server 2003 CD* and press **Enter**.

Figure 3-7 Insert the Microsoft Windows Server 2003 CD

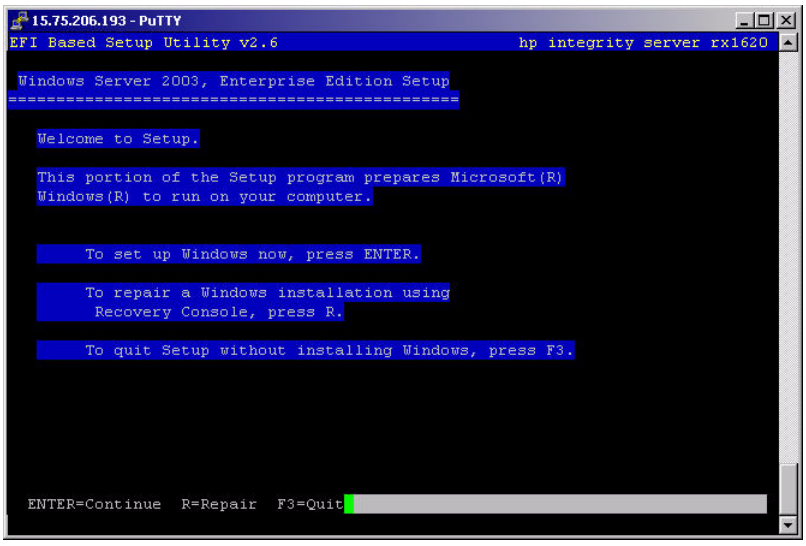


Run Windows Setup

Windows Setup prompts you to create a system partition on the boot disk if needed, copies the operating system files on to that partition, and attempts to reboot from the boot disk.

Step 1. When you insert the Microsoft Windows Server 2003 CD in the DVD drive, it launches Windows Setup. Press **Enter** to start the installation.

Figure 3-8 Launch Windows Setup



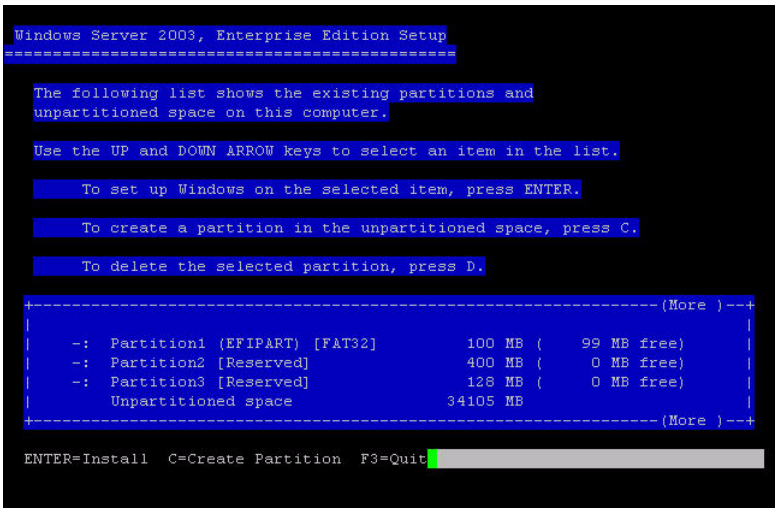
Step 2. Windows Setup prompts you to select **Express Install** or **Custom Install**. Express Install minimizes user interaction, selecting various installation options on your behalf. Select **Express Install** by pressing **Enter**.

Figure 3-9 Choose install type

Step 3. If Windows Setup cannot find a system partition, it prompts you to create one. Press **Enter** to continue. Windows creates a partition and then prompts you to format it.

Step 4. Select the partition in which you want to install the OS and press **Enter**. Windows formats the partition if necessary, checks the partition for errors, and begins to copy the OS files.

Figure 3-10 Choose install partition



Step 5. Monitor the copy process until it completes.

Figure 3-11 Copy installer files to disk

Upon completion, Windows Setup counts down to a reboot. Allow the system to reboot.

Specify server settings

To set up Windows Server 2003 after initial boot from the local console:

Step 1. When the system boots, Windows displays a screen indicating that an EMS channel (MP remote port) is present. It may take 2 to 15 minutes for the mouse and keyboard to start operating in this mode.

Step 2. When prompted to enter server settings, click **OK**.

Step 3. From the *Windows Setup Wizard*, enter the following setup information:

1. In the *License Agreement* window, click **Accept** and then **Next**.
2. In the *Regional and Language Options* window, click **Next**.
3. In the *Your Product Key* window, enter the product key.
   The product key is located on the label attached to the server.
4. In the *Licensing Modes* window, select the license you purchased.
5. In the *Administrator Password* window, enter the server name and a password.
6. In the *Date and Time* window, select the appropriate timezone, and click **Next**.

The server reboots to the EFI Boot Manager.

Step 4. From the EFI Boot Menu, select Windows Server 2003. The server boots to Windows.

Step 5. Log in to the system with the administrator password you specified earlier.

Step 6. Install the HP Update CD and the HP Support Pack after installing the OS.

Installing from a remote console

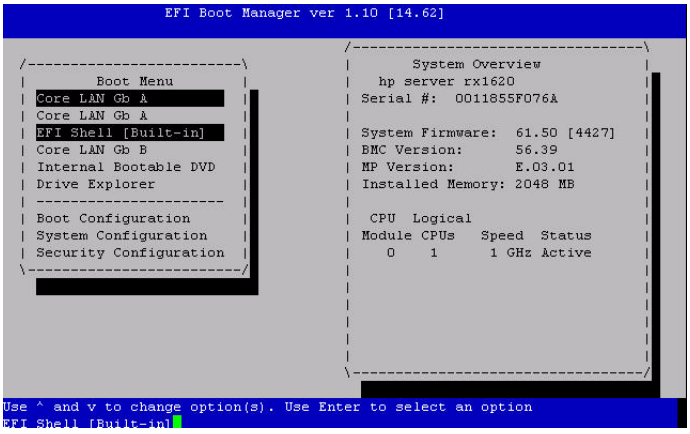
Installing from a remote console involves booting from the HP Smart Setup media, running EBSU, launching Windows Setup, loading OS files to the boot disk, and then booting the server from the boot disk. You should be connected to the Management Processor of the target server using a terminal emulation application such as **HyperTerminal**. To install the OS using the remote console:

Run EBSU

EBSU provides an easy-to-use interface to flash the firmware, partition the hard disk, install diagnostic tools, configure storage controllers, and run other EFI utilities.

Step 1. Power on the server. The server boots to EFI.

Figure 3-12 Boot to EFI



Step 2. Load the HP Smart Setup media into the server DVD drive.

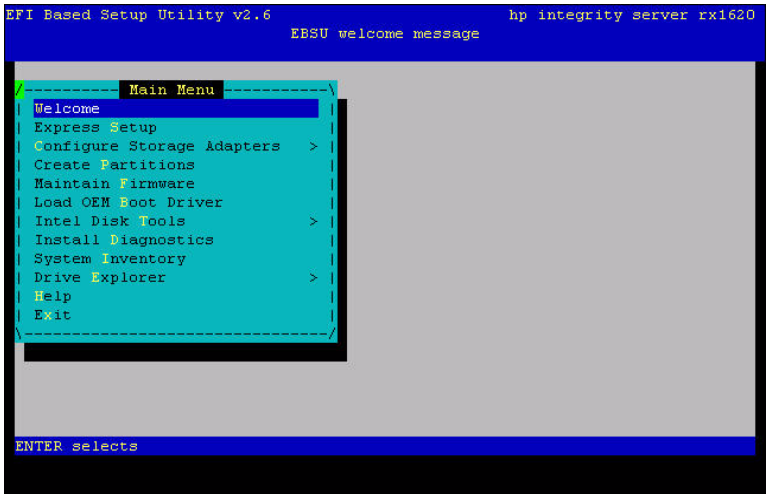
Step 3. From the EFI Boot Menu, select **Internal Bootable DVD** and press **Enter**.

Step 4. EBSU starts and displays the Welcome screen. Select **OK** and press **Enter** to continue.

Figure 3-13 Enter EBSU

Step 5. From the main menu, select **Express Setup** and press **Enter**.

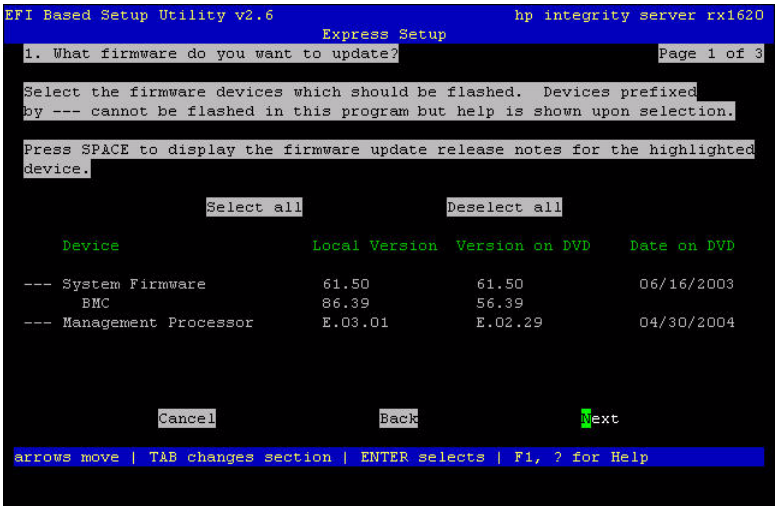
Figure 3-14 Select Express Setup



Step 6. EBSU displays the Express Setup introduction. Press **Enter** to continue.

Step 7. EBSU displays the firmware update screen, listing each device, its installed firmware version, and the firmware version on the Smart Setup media. Select the device(s) whose firmware you want to update. To continue, select **Next** and press **Enter**.

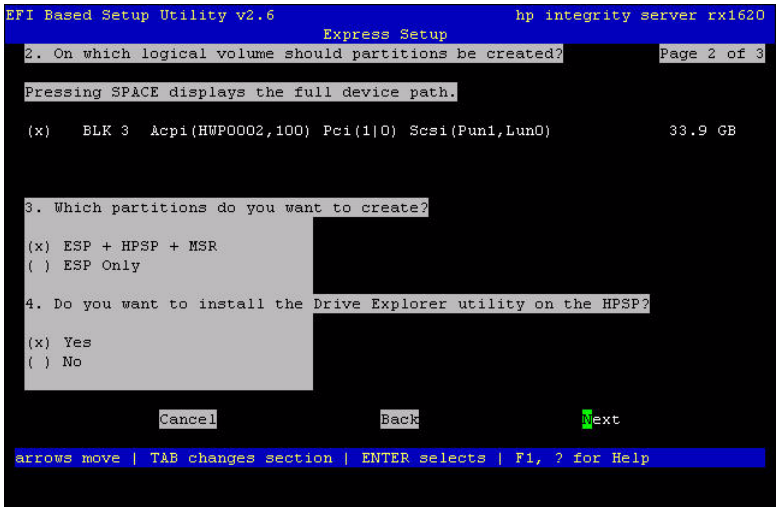
Figure 3-15 Update firmware



NOTE You may not be able to use EBSU to flash the firmware of some devices. You cannot flash the firmware if the installed version is the same or higher than the version on the Smart Setup media. Also, you cannot use EBSU to flash the Management Processor (MP) firmware. You must download the latest MP firmware from the HP Integrity support site: http://www.hp.com/support/itaniumservers/ and flash it separately.

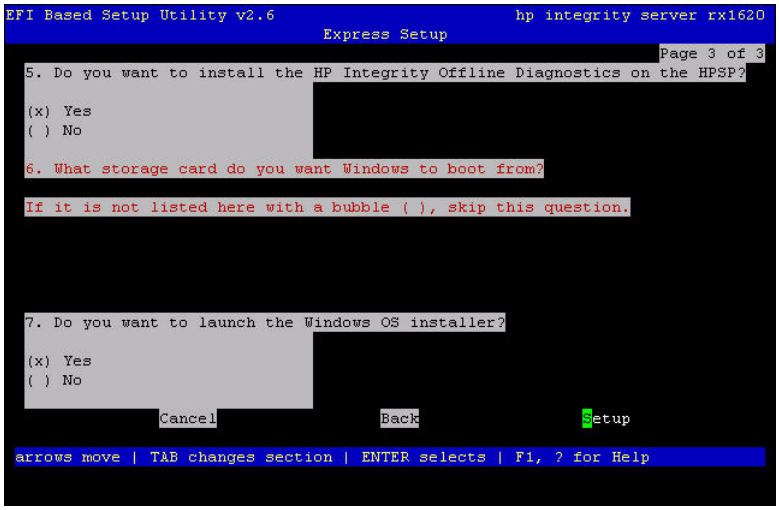
Step 8. Specify the disk partitions you want to create (**ESP Only** or **ESP + HPSP + MSR**). We recommend the default—ESP + HPSP + MSR—as a means to simplify the maintenance of your server. Also, specify the option to install the Drive Explorer utility, which enables you to browse a drive in EFI. Select **Next** and press **Enter**.

Figure 3-16 Partition disk



Step 9. Specify the option to install offline diagnostic tools (from the *HP Itanium Processor Family offline diagnostics and utilities CD*). Also, specify the option to launch the Windows OS installer. Select **Setup** and press **Enter**.

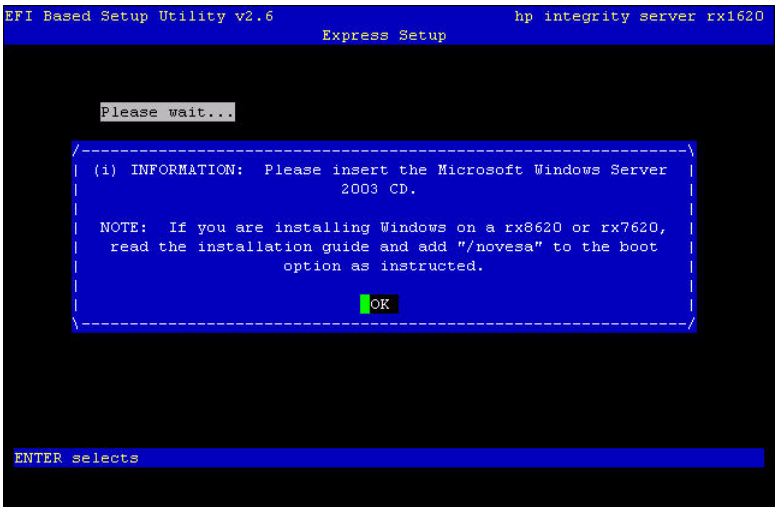
Figure 3-17 Install diagnostic tools



Step 10. EBSU displays the partition confirmation window. Select **Continue** and press **Enter**.

Step 11. EBSU prompts you to insert the Microsoft Windows Server 2003 CD in the DVD drive. Insert the *Microsoft Windows Server 2003 CD* and press **Enter**.

Figure 3-18 Insert the Microsoft Windows Server 2003 CD

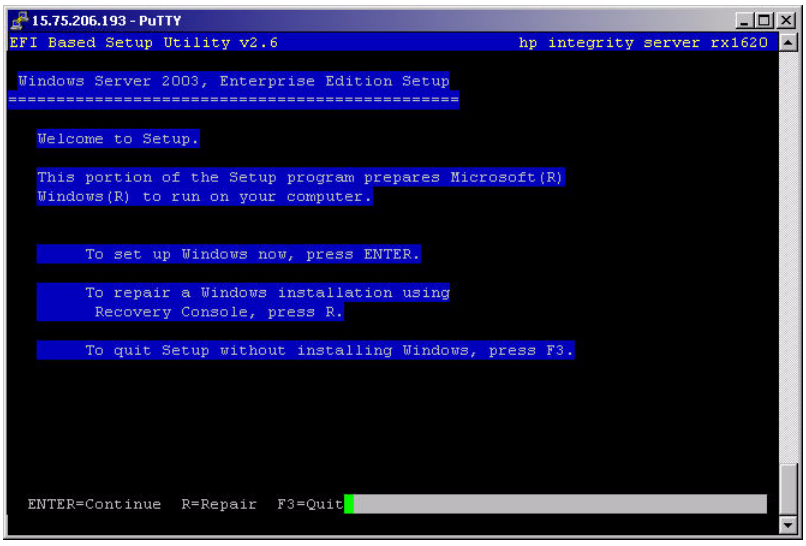


Run Windows Setup

Windows Setup prompts you to create a system partition on the boot disk if needed, copies the operating system files on to that partition, and attempts to reboot from the boot disk.

Step 1. When you insert the Microsoft Windows Server 2003 CD in the DVD drive, it launches Windows Setup. Press **Enter** to start the installation.

Figure 3-19 Launch Windows Setup



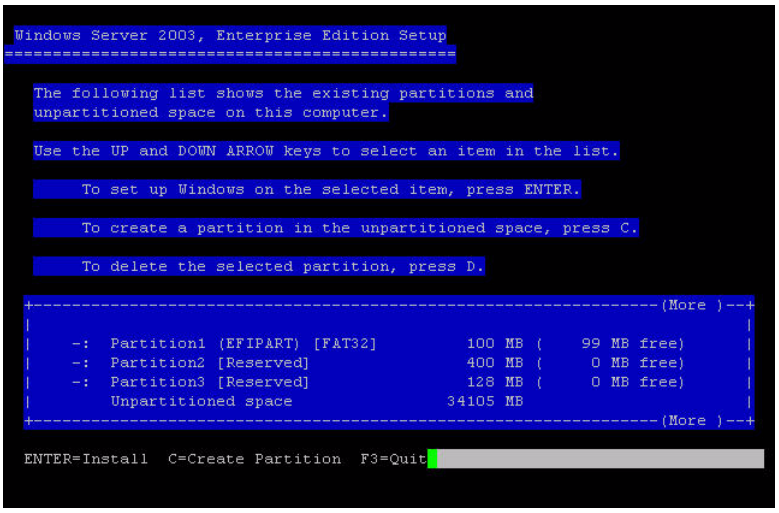
Step 2. Windows Setup prompts you to select **Express Install** or **Custom Install**. Express Install minimizes user interaction, selecting various installation options on your behalf. Select **Express Install** by pressing **Enter**.

Figure 3-20 Choose install type

Step 3. If Windows Setup cannot find a system partition, it prompts you to create one. Press **Enter** to continue. Windows creates a partition and then prompts you to format it.

Step 4. Select the partition in which you want to install the OS and press **Enter**. Windows formats the partition if necessary, checks the partition for errors, and begins to copy the OS files.

Figure 3-21 Choose install partition



Step 5. Monitor the copy process until it completes.

Figure 3-22 Copy installer files to disk

Upon completion, Windows Setup counts down to a reboot. Allow the system to reboot.

Enter the product key

Step 1. At the SAC prompt, press **Esc+Tab** to switch to a new command channel.

Step 2. When prompted, type the product key and press **Enter**.

Installing from PXE

Support for PXE/RIS installations is limited to the following HP Integrity servers:.

Table 3-1 Integrity servers supporting PXE/RIS installations

Server	PXE/RIS support
rx1620, rx2600, rx2620, rx4640, rx5670	Yes
rx7620, rx8620	Yes — Enterprise edition only
Superdome	No

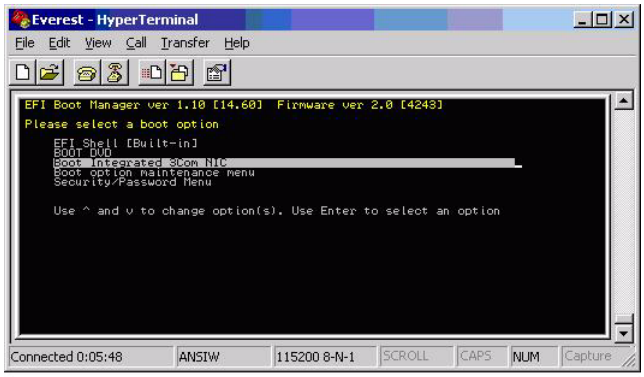
To install Windows Server 2003 from PXE:

Step 1. From EFI, select the **Boot Manager**.

Step 2. At the **Boot Manager**, select the **Boot Options** menu.

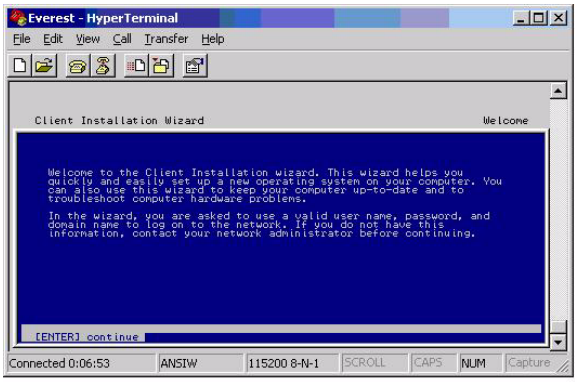
Step 3. From the list of available boot sources, select the NIC to boot from and press **Enter**.

Figure 3-23 Select NIC



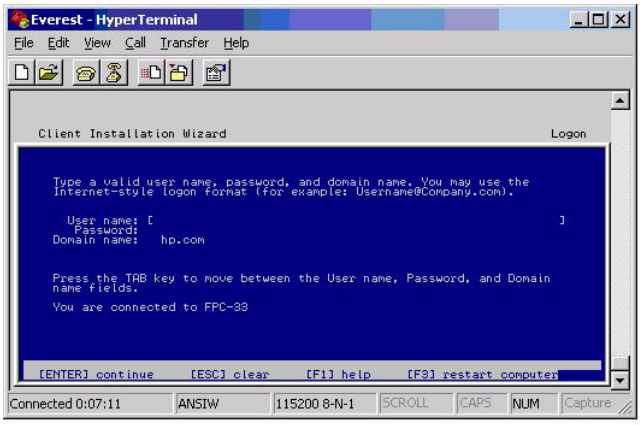
Step 4. At the PXE boot status window, press **Enter** to continue.

Figure 3-24 Review PXE boot status



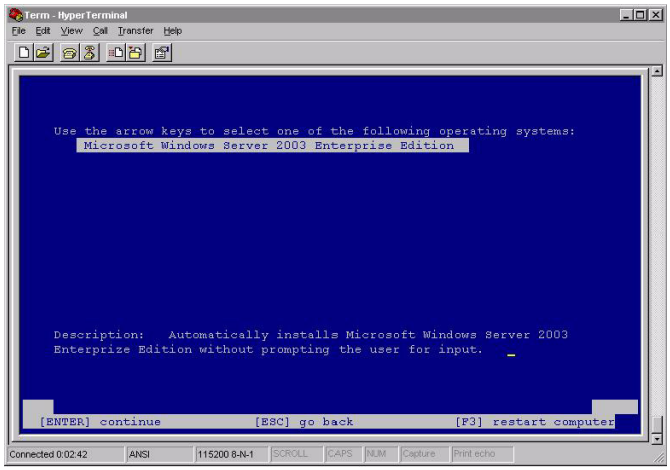
Step 5. At the login screen, type a valid user name and password, and press **Enter**.

Figure 3-25 Log in to RIS server



Step 6. At the OS selection screen, select the OS (Windows Server 2003, Enterprise Edition) to be installed and press **Enter** to start the installation.

Figure 3-26 Select the OS to install



Step 7. Complete the installation by following the instructions on screen.

Reinstalling from a local console

HP Integrity servers that are factory-installed with Windows Server 2003 are shipped with the HP Reinstallation media, which allows you to restore the system to its factory settings if needed. Reinstalling the operating system involves loading the image from the Reinstallation media on to the boot disk and, after Windows Server 2003 is loaded, specifying the server settings.

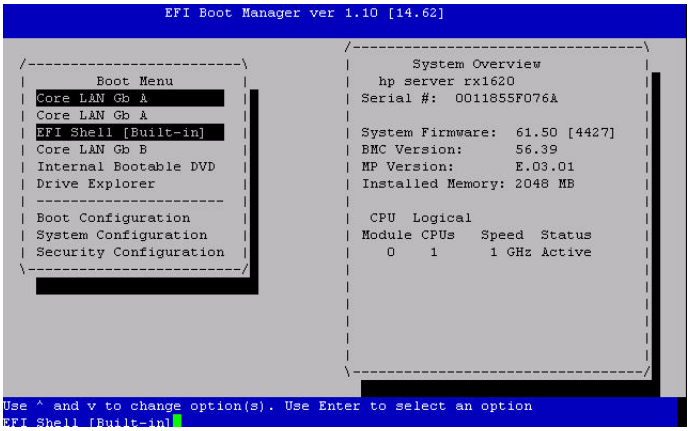
WARNING **Reinstallation overwrites all files on the Boot Disk. Please note the Boot Disk is determined by bus search order and may not be the disk you expect it to be. HP recommends disconnecting or unplugging ALL drives from the server except the Boot Disk. This includes all SAN storage too.**

Load the system image

To install the Windows Server 2003 with SP1 operating system on the server from the local console:

Step 1. Boot the Server to EFI.

Figure 3-27 Boot to EFI



Step 2. Because Windows Server 2003 with SP1 cannot create a boot entry if one already exists you must delete the existing boot entry. To delete the boot entry:

1. Select **EFI Boot Manager Menu >Boot Option Maintenance Menu > Delete Boot Option(s)**
2. Select a Windows Server 2003 boot entry to delete and press **Enter**.

Step 3. Insert the *HP Reinstallation media* in the DVD drive.

Step 4. From the EFI boot manager, select **Internal Bootable DVD**, if present.

If this entry is absent:

1. Select **EFI Shell**.

2. In the EFI Shell, select the DVD file system.
   For example, if the DVD file system is fs1, type **fs1**:
3. Start the boot loader by typing **setupldr**.

Step 5. Click **Re-Install** on the HP Recovery Console.

Step 6. Enter **Y** to continue with the reinstallation.

Step 7. Select the desired partition size (33 GB recommended). The maximum partition size is limited to the size of the drive. Click **OK** to continue.

NOTE The installation process copies files to the hard disk. It may display `99% complete` for a long time. Do not power off the server.

Step 8. When the installation process displays a dialog box, click **OK** to continue.

Step 9. Click **Exit**. The server reboots to the Windows Server 2003 operating system. Set up the system according the instructions in the following section.

Specify server settings

To set up Windows Server 2003 after initial boot from the local console:

Step 1. Start the server.
Windows displays a pop-up screen indicating that an EMS channel (headless server MP port) is present. It may take 2 to 15 minutes for the mouse and keyboard to start operating in this mode.

Step 2. When prompted to enter setup information at the local console, click **OK**.

Step 3. From the *Windows Setup Wizard*, enter the following setup information:

1. In the *License Agreement* window, click **Accept** and then **Next**.
2. In the *Regional and Language Options* window, click **Next**.
3. In the *Your Product Key* window, enter the product key.
   The product key is located on the label attached to the server.
4. In the *Licensing Modes* window, select the license you purchased.
5. In the *Administrator Password* window, enter the server name and a password.
6. In the *Date and Time* window, select the appropriate timezone, and click **Next**.

The server reboots to the EFI Boot Manager and then boots up Windows Server 2003. You can now log in to the server using the administrator password you selected.

Reinstalling from a remote console

HP Integrity servers that are factory-installed with Windows Server 2003 are shipped with the HP Reinstallation media, which allows you to restore the system to its factory settings if needed. Reinstalling the operating system involves loading the image from the Reinstallation media on to the boot disk and, after Windows Server 2003 is loaded, specifying the server settings.

WARNING **Reinstallation overwrites all files on the Boot Disk. Please note the Boot Disk is determined by bus search order and may not be the disk you expect it to be. HP recommends disconnecting or unplugging ALL drives from the server except the Boot Disk. This includes all SAN storage too.**

Load the system image

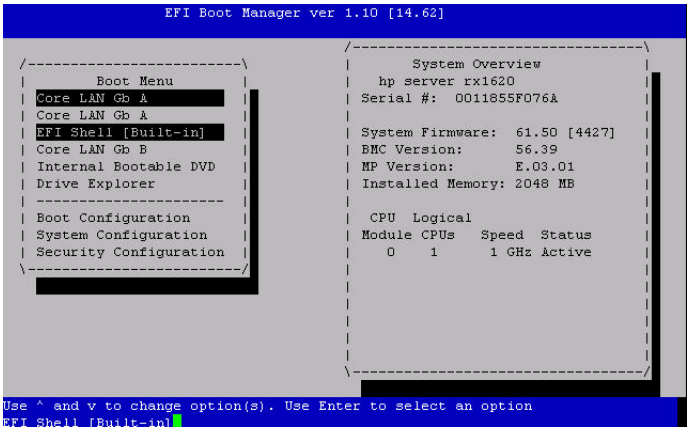
To reinstall Windows Server 2003 from a remote console:

Step 1. Boot the Server.

1. Select **EFI Boot Manager Menu** > **Boot Option Maintenance Menu** > **Delete Boot Option(s)**
2. Arrow down to select a Boot entry to delete. Press **Enter**.

Step 2. From the remote console, log in to the Management Processor using a terminal emulator such as **HyperTerminal or PuTTY**.

Figure 3-28 Boot to EFI



Step 3. Insert the *HP Reinstallation media* in the DVD drive of the target system.

Step 4. Reboot the server.

Step 5. At the **MP>** prompt, on the remote console, enter the CO command to launch the live console.

Step 6. Select **EFI Boot Manager menu > Internal Bootable DVD** and press **Enter**. The server boots from the *HP Reinstallation media*.

Step 7. At the **SAC>** prompt, enter the **cmd**.

Step 8. Switch to a new command channel by pressing **Esc+Tab**.

Step 9. At the **x:\ia64\system32>** prompt invoke the installation menu by entering **txtrestore**. A Warning message appears stating that all data including the partition table data will be lost upon reinstallation.

Step 10. Enter Y to continue.

Step 11. Select the desired partition size (33 GB recommended). The maximum partition size is limited to the size of the drive. Click **OK** to continue.

NOTE The installation process copies files to the hard disk. It may display `99% complete` for a long time. Do not power off the server.

Step 12. When the installation process completes, the local console displays a screen indicating that the EMS was detected. When prompted to use the local console, do *NOT* click OK.

Step 13. Return to the remote console and perform system setup as indicated in the following section.

Specify server settings

To set up Windows Server 2003 after initial boot from a remote console:

Step 1. At the **SAC>** prompt, switch to channel one by pressing **Esc+Tab**.

The system displays the following screen:

```
************************************************************

Name:                   Unattended Setup Channel

Description:            Provide parameters to automate Setup

Type:                   VT-UTF8

Channel GUID:           0cfc0ee2-3a27-11d7-8484-806e6f6e6963

Application Type GUID: 00000000-0000-0000-0000-000000000000


Press <esc><tab> for next channel.

Press <esc><tab>0 to return to the SAC channel.

Use any other key to view this channel.

************************************************************
```

Step 2. Press any key and then press **Page Down**.

Step 3. Accept the license agreement by pressing **F8**.
On the Windows default terminal emulator, **F8** is **<Esc>8**. Press **8** within two seconds after pressing **Esc**. Otherwise, the system will register only **Esc** and reboot.

Step 4. Enter the product key.
The product key is located on the Microsoft Certificate of Authenticity attached to the server.

Step 5. Enter the administrator password and re-enter to confirm.

The mini-setup process continues automatically and after completion, reboots the system. Wait for the **SAC>** prompt to reappear.

Step 6. Open a terminal server client and connect to your server's IP address. Change the computer name and IP address, if needed.

Step 7. On the desktop, open the OnlineReference page, scroll to the bottom, and click on the link to **c:\hputils\usercompanyname.com**.

Step 8. When prompted, enter company and user name, and click OK to complete setup.

Creating a new boot file using the EFI Shell

To create a new boot file:

Step 1. Remove all media from the DVD drive.

Step 2. Select **EFI Shell** from the EFI Boot Manager Menu.

Step 3. Enter **fs0:** at the EFI Shell prompt.

Step 4. Enter **cd MSUTIL** at the **fs0:>** prompt.

Step 5. Execute **NVRBOOT.EFI** boot utility at the **fs0:\MSUTIL>** prompt.

Step 6. Enter **X** to export the current EFI boot content to the boot file.

Step 7. Select the first entry with the text Windows Server 2003.

Step 8. Enter the path: **EFI\Microsoft\Winnt50\boot0001** at the prompt. This creates the Windows boot file **boot0001**.

Verify successful boot file creation

To verify that the boot file was created successfully:

Step 1. Select **EFI Shell** from the EFI Boot Manager Menu.

Step 2. Enter **fs0:** at the EFI Shell prompt.

Step 3. Enter **cd MSUTIL** at the **fs0:>** prompt.

Step 4. Execute **NVRBOOT.EFI** boot utility at the **fs0:\MSUTIL>** prompt.

Step 5. Enter **I** to Import.

Step 6. Enter the path **EFI\Microsoft\Winnt50\boot0001**.

Step 7. Click **Exit** to return to the EFI Boot Manager menu utility.

Step 8. Boot the server using the new Windows entry.

Verifying the installation

This section describes tasks that verify that the OS is up and running.

Check hardware status

The Windows Device Manager is a comprehensive tool for detecting and evaluating problems with installed hardware devices and resource conflicts.

To check server hardware status:

Step 1. From Windows, right-click on the **My Computer** icon.

Step 2. Click the **Properties** button, displaying the **System Properties** window.

Step 3. Click the **Hardware** tab.

Step 4. Click **Device Manager**, displaying the **Device Manager** window.

Step 5. Scan the listed devices, verifying that no device displays a yellow bang (!) or a question mark (?).

- A **yellow bang** (exclamation mark) indicates either a hardware problem, device driver, missing .ini file or resource conflict with the flagged device.
- A **question mark** indicates that Windows has been arbitrarily "told" that the flagged device is installed but cannot find it or recognize it.

Step 6. If a device is flagged with either fault indicator (bang or question mark), double-click that device, displaying the **Device Properties** dialog box. If a printer is available, open the **View** menu and select **Print** to obtain a hardcopy report of all device statuses.

NOTE A yellow bang might appear under `Non-Plug and Play Drivers` in the Device Manager when hidden devices are enabled. The yellow bang appears only if the *Show hidden devices* is enabled under the Non-Plug and Play Drivers in the Device Manager.

If no serial legacy device is found in the system, the OS generates a yellow bang for the Serial option. HP Integrity rx8620 and rx7620 servers do not have legacy serial devices so this error always occurs. The bang does not indicate faulty hardware in this case.

Install New Device Drivers

If you installed the OS from Microsoft RTM media, you must also install device drivers for the HP Integrity server for all devices displaying a yellow "bang" icon in the system device manager. These drivers are available on the HP Smart Setup CD.

To install a device driver from the Smart Setup CD:

Step 1. Insert the HP Smart Setup CD in the server CD/DVD drive. Accept the End User Licensing Agreement.

Step 2. Run the Windows Device Manager and use a menu path of **View > Devices by Type** to list the system devices

Step 3. Expand the entry named Other devices.

This shows a list of all devices whose drivers were not found during installation of the operating system. Some of these devices may have a specific name, while others are shown simply as “Unknown Device”. Each item is indicated by a yellow “bang” icon (a small yellow exclamation mark) next to its name.

Step 4. Right-click on the first item and select Update Driver from the context menu.

Step 5. In the Hardware Update Wizard screen, select **Install the software automatically** and click **Next**.

Step 6. If you see a warning dialog stating the driver is not digitally signed, ignore it. This is not an issue, so click **Next** to continue.

Step 7. When successful installation is indicated, click **Finish**.

Set up a Remote Desktop Connection

By establishing a Remote Desktop Connection (RDC), you can verify that the operating system on the remote computer is up and running.

NOTE The remote administration mode is enabled by default on Windows Server 2003 if you are using the OS supplied as part of the HP Reinstall media. If you are installing or reinstalling using Microsoft RTM media, the Remote Desktop functionality is not enabled. You must enable this from the My Computer properties tab. Users must have unique user names. Windows does not permit two users with the same name to log on simultaneously.

To set up an RDC:

Step 1. Click **Start > Programs > Accessories > Communications** > **Remote Desktop Connection**.

Step 2. Click the **Computer** dropdown list.

Step 3. Select **Browse for more**.

Step 4. Select the HP Integrity server with which you want to establish a connection.

Step 5. Click **OK**.

Step 6. Click **Connect**.

Step 7. Log on to the remote server.

Windows displays the desktop of the server.

4 Updating the server

This chapter provides instructions for performing administration tasks on Windows Server 2003 remotely. This chapter also provides links to web sites that enable you to keep your server up to date with the latest patches, fixes, and updates to utilities and documentation. You can also sign up for automated notifications to stay informed of available updates.

Updating your system

Updating your system after installing the OS involves these tasks:

- Installing the Integrity Support Pack from the HP Smart Setup CD
- Installing the latest updates from the HP website

NOTE Firmware updates for Superdome, rx8620, and rx7620 servers must be performed by HP CEs in compliance with the support agreement.

You must install the Integrity Support Pack if you did not use the HP Reinstallation media to install the OS.

Install the Integrity Support Pack

To install the Integrity Support Pack:

Step 1. Log into the server as administrator using an RDC connection from another PC.

Step 2. Make the CD drive on your local machine available to the server (part of the RDC configuration).

Step 3. Insert the HP Smart Setup CD in the remote PC CD/DVD drive.

The Smart Update CD starts automatically and displays the license agreement screen.

Step 4. Click **Accept** to continue.

Step 5. Click **Install Support Pack**.

Step 6. Click **Install ISP**, starting the HP Remote Deployment Utility.

Step 7. Type in the machine name or IP address of the server you are updating in the **Target Machine** field.

Step 8. Select the appropriate support pack from the Support Pack pulldown list.

Step 9. Click **Install**.

Install updates from the web

The latest software updates are available on the HP website. Go to:

`http://www.hp.com/products1/servers/integrity/index.html`

and select **Support and Drivers**.

Register for HP support notifications

HP recommends that you register for alerts and notifications to stay informed of updates to the drivers, patches, and other components specific to your server.

Go to http://www.hp.com/united-states/subscribe/gateway/

Register for Microsoft security notifications

HP recommends that you register for Microsoft security notifications to stay informed of patches that may be applicable to your operating system.

Go to http://www.microsoft.com/technet/security/bulletin/notify.mspx

Register for Microsoft Windows Update

HP recommends that you use the Microsoft Windows Update feature to download the latest patches and hot fixes to the operating system.

Go to http://support.microsoft.com/

Administering the system remotely

When a server is running normally, you can connect to the server over the network and administer it using tools such as Windows Management Instrumentation (WMI), Terminal Services Remote Desktop for Administration, Microsoft Management Console (MMC), Telnet, Microsoft Script Host, and other third-party tools:

- **WMI**: A management infrastructure in Windows that supports monitoring and controlling system resources through a common set of interfaces and provides a logically organized, consistent model of Windows operation, configuration, and status.
- **Terminal Services**: The underlying technology that enables Remote Desktop, Remote Assistance, and Terminal Server.
- **MMC**: A framework for hosting administrative tools called snap-ins. A console might contain tools, folders or other containers, World Wide Web pages, and other administrative items.
- **Telnet**: A protocol that enables an Internet user to log on to and enter commands on a remote computer linked to the Internet, as if the user were using a text-based terminal directly attached to that computer. Telnet is part of the TCP/IP suite of protocols. The term telnet also refers to the software (client or server component) that implements this protocol.

When a server is not functioning normally, you must access the server without relying on the network. you must establish a secure connection through a phone line or serial port, or through an additional network connection (possibly on a secondary network).

For servers equipped with the proper firmware, Emergency Management Services provides functionality that you can use to administer a server remotely. Except for hardware maintenance and replacement, all administrative functions that you can accomplish locally are also available remotely. This includes starting your system and performing system-recovery tasks.

Emergency Management Services consists of components that are standard features of Windows Server 2003, and to which console redirection functionality has been added. Emergency Management Services also includes a remote-management console that is unique to it: Special Administration Console (SAC). You access this console from a remote system using terminal emulation software such as telnet, PuTTY, and HyperTerminal.

Special Administration Console (SAC)

Special Administration Console (SAC) is the primary Emergency Management Services command-line environment hosted by Windows Server 2003. It is separate from the command-line environment and provides different functionality.

Because SAC is available early in the boot process, you can use it to manage the server during normal system operation and initiation. You can also use it when the system is in Safe Mode and during GUI-mode Setup. When Emergency Management Services is enabled, SAC remains active as long as the kernel is running.

When SAC is active, it displays the SAC prompt: `SAC>`. SAC provides a set of commands you can use to perform a number of management tasks that help return your system to a normally functioning state:

- **restart**: Restart the server.
- **shutdown**: Shut down the computer. Do not use this command unless you can be physically present at the computer when you are ready to restart it.
- **T**: List the processes and threads that are currently running.
- **K<*PID*>**: End the given process. PID is the process identification number you specify.
- **I**: Set or view the Internet Protocol (IP) address of the server. If no parameters are passed, this command lists IP information. You can display or set the IP address, subnet mask, and gateway of a given network interface device by providing the network number, IP address, and subnet information. To do so, use the following format: `I <network#><IPaddress><subnet>`
- **crashdump**: Manually generates a Stop error message and forces a memory dump file to be created. A stop error is a serious error that affects the operating system and that could place data at risk. The operating system generates an obvious message, a screen with the Stop error, rather than continuing on and possibly corrupting data. Also called a fatal system error.
- **cmd**: Creates Windows command-prompt channels. To use a command-prompt channel, you must provide valid logon credentials. You must log on to each command-prompt instance. Press ESC+TAB to switch back and forth between the command prompt channels and SAC. If a command prompt channel becomes unresponsive, use the K (end) command to close it; you can then open another command prompt channel.
- **ch**: Lists all channels.

TIP

To list all available SAC commands, type **?** or **help** at the SAC prompt as follows:
`SAC>help`

To list the subset of SAC commands available for managing command channels, type:
`SAC>ch -?`

SAC also provides access to the setup logs during GUI-mode Setup. You can press ESC+TAB to switch between the setup logs and SAC. When accessing the setup logs from Emergency Management Services, you can see which portions of Setup have completed and whether any errors have occurred. This is a very useful way to check the progress of your setup and to diagnose setup failures.

The three setup log channels are as follows:

- *setuplog.txt*: Monitors setup progress.
- *setupact.log*: Displays any warnings during setup.
- *setuperr.log*: Displays any errors that might occur during setup.

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