Administrator's Guide for Linux on HP ProLiant WS460c G6 Workstation Blades



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Intended audience

This document is for the person who installs, administers, and troubleshoots servers and storage systems. HP assumes you are qualified in the servicing of computer equipment and trained in recognizing hazards in products with hazardous energy levels.

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Introduction

Overview

For an overview of the HP Workstation Blade Solution, including its architecture, HP recommends that you read the following documents available on the HP website (www.hp.com/support/WS460c_manuals (http://www.hp.com/support/ws460c_manuals)).

- *HP Workstation Blade Solution Planning Guide*

  HP recommends reviewing this planning guide first.
- *HP ProLiant Workstation Blades*
- *HP Remote Graphics Software User Guide*
- *HP Workstation Blade Client Series—Embedded OS Version 9.xx Manual*
- Administrator guides

Workstation blade solution documents

The three building blocks of the workstation blade solution are:

- HP ProLiant Workstation blades
- HP RGS
- Client computers

The following documents describe the building blocks:

- *Administrator's Guide for Linux on HP ProLiant Workstation Blades* (this document)
- *Administrator's Guide for Microsoft® Windows® on HP ProLiant Workstation Blades*
- *Hardware and Software Supported by HP ProLiant Workstation Blades*. This document lists hardware that works with the workstation blade, such as network switches and graphics cards. The document also lists software, such as manageability software, that is supported by the workstation blade.
- *HP Remote Graphics Software User Guide*. The client computers are described in the *HP Workstation Blade Client Series—Embedded OS Version 9.xx Manual*.

Contacting HP technical support or an authorized reseller

Before contacting HP, always attempt to resolve problems by completing the procedures in this guide.

IMPORTANT: Collect the appropriate server information and operating system information before contacting HP for support.

For the name of the nearest HP authorized reseller:

- See the Contact HP worldwide (in English) webpage (http://welcome.hp.com/country/us/en/wwcontact.html).

For HP technical support:

- In the United States, for contact options see the Contact HP United States webpage (http://welcome.hp.com/country/us/en/contact_us.html). To contact HP by phone:
  - Call 1-800-HP-INVENT (1-800-474-6836). This service is available 24 hours a day, 7 days a week. For continuous quality improvement, calls may be recorded or monitored.
  - If you have purchased a Care Pack (service upgrade), call 1-800-633-3600. For more information about Care Packs, refer to the HP website (http://www.hp.com/hps).
- In other locations, see the Contact HP worldwide (in English) webpage (http://welcome.hp.com/country/us/en/wwcontact.html).

Purchasing and downloading RHEL 4 and RHEL 5

Purchasing and downloading RHEL 4 and RHEL 5 online

1. Log in to the Red Hat website at http://www.redhat.com (http://www.redhat.com). Click **Log In**, and then either log in to your existing Red Hat account, or click **Sign Up** if you need to establish a login account.
2. Return to the main web page, and then click **Buy Online**. On the next screen, click **Desktop Operating Systems**. On the subsequent screen, click **add to cart** for either Workstation with Basic Subscription or Workstation with Standard Subscription, and then complete your purchase.
3. Click **Downloads** at the top of the main web page, and then click **Download your software here** in the Red Hat Enterprise Linux section.
4. On the Download Software page, the RHEL 4 image you just purchased is listed as:

   `Red Hat Enterprise Linux WS (v. 4 for 64-bit AMD64/Intel EM64T)`

   Click the link, which displays the RHEL 4 ISO Images Download web page. Immediately above the circled ISO images, `Red Hat Enterprise Linux WS 4.5` appears, which refers to version 4, update 5 of Red Hat Enterprise Linux.
5. Download the five ISO images, and burn each of them to a CD.

Downloading the HP Installer Kit for Linux

In addition to acquiring Linux, you must have the HP Installer Kit for Linux (HPIKL) CD. This CD contains Linux drivers and RGS and is included with the HP ProLiant xw460c Workstation Blade. However, if the online CD is more recent than the CD included with your workstation blade, HP recommends that you download and use the latest HPIKL CD from http://www.hp.com (http://www.hp.com).

1. Go to http://www.hp.com/support/xw460c (http://www.hp.com/support/xw460c), and then select **Download drivers and software**.
2. Select **Red Hat Enterprise Linux 4 (AMD64/EM64T)**.
3. Scroll down to Software, and then find HP Installer Kit for Linux-HP Driver CD for Red Hat Enterprise Linux 4 Update 5. Verify that this software is more recent than the HPIKL CD that is included with your workstation blade. If the online CD is more recent, click **Obtain software**, and then download the software to your computer.
4. Create the HPIKL CD from the downloaded software.

Installing and powering on the workstation blade

Installation overview

This chapter describes how to install and power on the workstation blade. A building block approach is followed, starting with a single workstation blade and client computer, and validating their operation before integrating other workstation blades and client computers into the solution. This process consists of the following steps:

1. Set up the client computer.
2. Install and power on the first workstation blade by performing these steps:
   a. Prepare the workstation blade enclosure and its networking infrastructure.
   b. Configure the workstation blade hardware.
   c. Install the workstation blade in the enclosure and provide power to the workstation blade.
3. Install RHEL 4 on the workstation blade. The installation process described in "Installing Red Hat Enterprise Linux 4 update 5 (on page 12)," also installs and validates RGS on the workstation blade.
4. After validating the workstation blade with the client computer, integrate other workstation blades and client computers into the solution.

   In previous generations of workstation blades (such as the HP ProLiant xw25p Workstation Blade), it was possible to power up a workstation blade without installing it in an enclosure by using the HP Diagnostic Station. However, the HP ProLiant xw460c Workstation Blade does not have such a diagnostic station. The only way to power this workstation blade and connect it to the network is to install the workstation blade and network interconnect devices in the c3000 or c7000 Enclosure.

Before you perform the installation, powering on, and validation procedures, you must have the following:

- A PC is available to verify network connectivity to the workstation blade and client computer.
- The documentation listed in the Overview (on page 5) section.
- The necessary power calculations to ensure that there is sufficient power in the enclosure for the workstation blades and other equipment. For more information, see the HP website at http://www.hp.com/go/bladesystem/powercalculator (http://www.hp.com/go/bladesystem/powercalculator).
- Sufficient cooling for the enclosures
- Characterized and designed network infrastructure to accommodate the network requirements of your workstation blades and client computers. The *HP Workstation Blade Solution Planning Guide* provides extensive information on optimizing your network.

Setting up your client computer

RGS is preinstalled on the following client computers:

- HP Workstation Blade Client
- HP dc72 Workstation Blade Client
- HP dc73 Workstation Blade Client

If a different client computer is used, ensure that RGS (specifically, the RGS Receiver) is installed on the computer, and RGS is properly configured to communicate with the workstation blade.

Configure the monitors for your client computers. The following lists the maximum number of monitors supported by each of the workstation blade clients:

- HP Compaq t5720 Thin Client (two monitors)
- HP Workstation Blade Client (four monitors)
- HP dc72 Workstation Blade Client (four monitors)
- HP dc73 Workstation Blade Client (four monitors)

Installing and powering on the workstation blade

Because the workstation blade shares many components with the server blade, review the following server blade documents for details on the installation and turn on process:

- *HP BladeSystem c7000 Enclosure Setup and Installation Guide*
- *Power Supply Installation Instructions for HP BladeSystem c7000 Enclosures*
- *HP ProLiant BL460c Server Blade User Guide*
- *HP BladeSystem Onboard Administrator User Guide*
- *Integrated Lights-Out 2 User Guide*

Preparing the workstation blade infrastructure

1. Set up the enclosure, including wiring the PDUs by following the instructions in the *HP BladeSystem c7000 Enclosure Setup and Installation Guide*.
2. Install power supplies in the enclosure, according to the HP BladeSystem power guidelines on the HP website at http://www.hp.com/go/bladesystem/powercalculator (http://www.hp.com/go/bladesystem/powercalculator).
3. Install Onboard Administrator modules. If you are using multiple c7000 Enclosures, connect the Onboard Administrator module in each enclosure to the uplink/downlink Ethernet connectors in each module.
4. Install your network devices in the enclosure, and then connect them to your site network infrastructure. The NIC1 and NIC2 signals are connected to network device 1 and network device 2, respectively. The iLO 2 signals are connected to both Onboard Administrator modules.
5. Connect power to the enclosure, and turn it on. When the enclosure is powered up for the first time, Insight Display launches an installation wizard to guide you in the configuration process. Complete the configuration process and verify there are no installation or configuration errors that appear on the Insight Display.

6. Verify the Onboard Administrator module and network devices can be accessed over the network from the PC.

After completing the preceding steps, you should now have a suitable environment for installing and powering on the workstation blade.

Configuring the workstation blade hardware

The workstation blade hardware is configured before installing the workstation blade in the enclosure. The following workstation blade hardware is configurable:

- Memory—Up to eight 4-Gb DIMMs can be installed in the workstation blade, for a total of 32 Gb of memory.
- SAS disks—A second SAS disk, or SAS disks with different storage capacities, can be installed.
- Intel® Xeon® processors—A second processor, or processors with different speeds, can be installed.

No mezzanine 1 cards are supported by Linux, so the mezzanine 1 slot must remain empty. The factory-installed NVIDIA graphics adapter is a mezzanine 2 card, and is the only card supported in the mezzanine 2 slot.

Methods to connect media to the workstation blade

- Connect media to one of the USB connectors on the Local I/O Cable
- NFS mount a network drive to the workstation blade using Linux
- Using iLO 2 virtual media to mount PC media (such as a CD/DVD drive) to the workstation blade. Virtual media enables the workstation blade to access the PC media directly, as if the media is physically attached to the workstation blade. For more information about iLO 2 virtual media, see "iLO 2 virtual media".

  Of the three methods to connect media to the workstation blade, iLO 2 virtual media is used in this guide to perform the installation of the Linux OS, as described in "Installing Red Hat Enterprise Linux 4 update 5 (on page 12)."

Powering on the workstation blade

You can power on the workstation blade by using either the Local I/O Cable or the iLO 2 Remote Console. To use the Local I/O Cable, a keyboard, mouse, and monitor are connected to the Local I/O Cable. This enables the user to view and interact directly with the workstation blade without depending on the correct operation of iLO 2. The disadvantage of using the Local I/O Cable is that it requires being proximate to the workstation blade, which might be installed in a difficult-to-access location, such as a congested, noisy data center.

The iLO 2 Remote Console enables you to install RHEL 4 from any computer that has a JavaScript-enabled browser and local media, such as a CD drive. Because of the convenience of performing a remote installation, the iLO 2 Remote Console is used as an example in installing RHEL 4 in this guide.

To power on the workstation blade:

1. Insert the workstation blade in the c3000 or c7000 Enclosure. Because the workstation blade is hot-pluggable, it can be inserted and removed while the enclosure is powered on.
2. To view the boot process, establish a connection to the iLO 2 Remote Console.

3. Power on the workstation blade by pressing the front panel Power On button. The boot sequence appears on the iLO 2 Remote Console. Set Remote Console Mode to Setup Mode. Save the BIOS setting, and then continue with the boot process.

   An error message might appear, because no operating system is detected.

Installing Red Hat Enterprise Linux 4 update 5

Installing Red Hat Enterprise Linux 4 update 5 overview

This chapter describes how to install the Red Hat Enterprise Linux 4 (RHEL 4) update 5. An example installation is presented, which can be used as the basis for creating a custom installation process, if required. The installation process consists of the following steps:

1. Pre-installation preparation—In this step, the required software and documentation is acquired.
2. Pre-installation setup—Access to iLO 2 is established, remote media is mounted, the workstation blade is rebooted, and Setup Mode is selected.
3. Installing RHEL 4—This section describes how to install RHEL 4 update 5.
4. (Optional) Installing the HP iLO 2 High-Performance Mouse—This is an optional step, and resolves an iLO 2 cursor tracking problem.
5. Installing the HPIKL CD—Next, hpsetup, the NVIDIA driver, and the RGS Sender are installed from the HPIKL CD.
6. Post-installation verification and modifications—In this step, the results of the installation are verified.
7. Rebooting the workstation blade—The workstation blade is rebooted, which switches the Linux desktop from the ATI video controller to the NVIDIA graphics adapter.
8. RGS connection establishment—To verify that Linux installation is complete, the final step is to establish an RGS connection to the workstation blade from the client computer.

Pre-installation setup

This section describes several setup steps that are required prior to installing Linux.

1. Because this installation is performed using iLO 2, the first step is to establish a connection to the iLO 2 subsystem. This is accomplished by opening a browser window on the Local Computer, and entering the iLO 2 IP address using https. For example:

   ```
   https://10.10.42.78
   ```

   This displays the iLO 2 login page. Log in to iLO 2 by providing the Login name and Password.
2. After logging in to iLO 2, the Status Summary page is displayed.
3. iLO 2 Virtual Media is used to mount the Local Computer CD drive to the workstation blade. On the Status Summary page, click the **Virtual Media** tab, and then click **Virtual Media Applet**. The process of downloading a JavaScript applet begins, during which a number of dialogs appear. Click **Yes** or **Run**, as appropriate.
4. The Virtual Media window appears. Select Local Media Drive under Virtual CD/DVD-ROM, select the CD drive letter on your Local Computer (D:), and then click Connect. The Local Computer CD drive mounts to the workstation blade.

5. On the iLO 2 web page, select the **Remote Console** tab, select **Settings** on the left, select the **Settings** tab, and then ensure that the **High Performance Mouse** is disabled (the default setting). Then click **Apply**. If you do not make this selection, iLO 2 does not display a cursor in the Remote Console window.
6. Select **Information** on the left, and then select **Integrated Remote Console**. This displays a console window on your Local Computer to perform the Linux installation.
7. Click the power button to display the **Virtual Power Button** menu. The **Momentary Press** button changes the workstation blade power state each time it is clicked-from off to on or from on to off. If the workstation blade is powered down (as indicated at the bottom of the Integrated Remote Console window), click **Momentary Press** once to turn power on. If the workstation blade is already powered, click **Momentary Press** to turn power off and, after the workstation blade is powered down, click **Momentary Press** again to turn power on.

   As the workstation blade boots up, the boot screen appears.
8. As the workstation blade boots, press the **F9** key on your Local Computer to enter the ROM-based setup utility. Then set Remote Console Mode to Setup Mode. Remote Console Mode has been changed from User Mode (the prior mode, in this example) to Setup Mode. Your workstation blade might already be in Setup Mode. Before exiting the ROM-Based Setup Utility, insert CD1 of RHEL 4.

Pre-installation preparation

1. Acquire RHEL 4 update 5.
2. Download the latest HPIKL CD. Even though the HPIKL CD is included with the workstation blade, the downloadable version may be more recent. Furthermore, the same website that contains the downloadable HPIKL CD might also contain drivers that are more recent than the driver versions on the HPIKL CD-if so, download the more recent drivers.
3. Ensure that you have access to the workstation blade documentation.
4. Because Linux installation will be performed using iLO 2, you must have access to a computer running a browser that supports JavaScript, such as Internet Explorer. This computer will be referred to as the Local Computer.
5. After Linux installation is complete, RGS is used to connect from the Local Computer to the workstation blade. Therefore, the RGS Receiver needs to be installed on the Local Computer. If your Local Computer is the HP dc72 Workstation Blade Client or the HP dc73 Workstation Blade Client, RGS is already installed. If your Local Computer is not one of these client computers, you must install the RGS Receiver. To download and install the free RGS Receiver, start at http://www.hp.com/go/rgs (http://www.hp.com/go/rgs).
6. For post-installation verification and troubleshooting, ensure that you have the capability to remotely log into the workstation blade from your Local Computer-for example, by using SSH. If you cannot establish a connection to the workstation blade using RGS, you can use SSH to remotely access and troubleshoot the workstation blade.

A free Telnet/SSH client, called PuTTY, can be downloaded from the web.

Installing RHEL 4

The workstation blade must be in Setup Mode, and CD1 of the RHEL 4 installation disks must be inserted prior to rebooting the workstation blade. To install RHEL 4:

1. After the workstation blade boots, you can see the initial Red Hat screen. For this example installation, to perform the installation in graphical mode, press **ENTER**.
2. After intermediate dialogs (such as a dialog indicating that the USB-storage driver is being loaded), you can see the dialog to select testing of the CD media. For this example installation, use the **Tab** key to select **Skip**, and then press the **Space** bar.

   Performing a media test with remotely mounted media can add a significant amount of time to the installation.
3. A message appears, such as:

   ```
   Running anaconda, the Red Hat Enterprise Linux system installer --
   please wait….
   ```

   Because the RHEL 4 installation media is remotely mounted, the installation process proceeds more slowly than when the installation media is mounted directly to the workstation blade.

   In the following steps, the iLO 2 Remote Console creates a cursor (iLO 2 cursor) that is separate from the cursor on your Local Computer (the local cursor). The iLO 2 cursor, which is the active cursor in the Remote Console window, does not closely track the local cursor. Back and forth movement of the local cursor might cause the two cursors to become better aligned. You must move the local cursor in order to position the iLO 2 cursor over the interface item to be selected in the Remote Console window.

   When RHEL 4 installation is complete, and after you log in as root, you have the option of installing a mouse driver that fixes the local cursor/iLO 2 cursor tracking issue for the subsequent installation steps
4. After several minutes, the Welcome to Red Hat Enterprise Linux WS screen appears. Use your local cursor to position the iLO 2 cursor over Next, and then click the left mouse button.
5. For the next screens of the example installation, select the following:
   - Language Selection: English (English)
   - Keyboard Configuration: U.S. English
   - Disk Partitioning Setup: Automatically partition
   - Automatic Partitioning: Remove all partitions on this system.
   - Warning (for the previous dialog): Yes
   - Disk Setup: Next (to accept the current partition settings)
   - Boot Loader Configuration: Next (to use the default GRUB boot loader)
6. The next screen enables you to configure the network devices. If static IP addresses are required, use the **Edit** button to provide the IP address for each Ethernet device (eth0 and eth1). Because DHCP is used in this installation, click **Next**.
7. The Firewall Configuration screen appears. For this installation, the firewall is disabled, which simplifies the connection later by RGS. Click **Next**. You are warned about the lack of a firewall. Click **Proceed**.
8. For the next screens of this installation, select the following:
   - Additional Language Support: English (USA)
   - Time Zone Selection: America/Denver - Mountain Time
   - Set Root Password: Set and confirm the root password.
9. The Package Installation Defaults screen appears. For this installation, select **Customize software packages to be installed**, and then click **Next**. In the Package Group Selection window, select

Everything at the bottom of the window, then click **Next**. This ensures that all available packages are installed.

10. The **About to Install** screen appears. Click **Next** to begin the installation. A message appears, indicating which of the installation CDs that are required. Click **Continue** to proceed.
11. The Installing Packages screen appears with the following dialogs:
    - `Formatting / file system…`
    - `Formatting /boot file system…`
    - `Transferring install image to hard drive…`
    - `Preparing RPM transaction…`
    - `Starting install process, this may take several minutes…`
    - `Preparing to install…`
12. In this step, you are prompted to insert the RHEL 4 installation CDs. This step can take several hours when using the iLO 2 remotely-mounted CD drive.
    a. When prompted, insert RHEL WS CD 2, and press **OK**.
    b. When prompted, insert RHEL WS CD 3, and press **OK**.
    c. When prompted, insert RHEL WS CD 4, and press **OK**.
    d. When prompted, insert RHEL WS CD 5, and press **OK**.
    e. When prompted, re-insert RHEL WS CD 1, and then press **OK**. Dialogs appear, indicating `Perform post install configuration` and `Installing bootloader…` Following this, the installation complete screen appears.
13. Remove RHEL WS CD 1, and then click **Reboot** in the installation complete screen, which initiates a reboot of the workstation blade.
14. After booting of Linux is complete, the Welcome screen appears. Click **Next**.
15. Perform the following steps over the next screens:
    a. If the license terms are agreeable, select **Yes, I agree to the License Agreement**, and then click **Next**.
    b. Set the Date and Time for the workstation blade, and then click **Next**.
    c. Select the display resolution and color depth that you wish to use, and then click **Next**. For this example installation, the default resolution of 800x600 is retained.
16. You are prompted to log in to Red Hat to register your product. Because registration will be done at a later time for this installation, select the **Tell me why…** radio button.
17. To complete the deferral of registration, check the **I can not complete registration…** radio button, and then click **Next**.
18. The System User screen appears, enabling you to create a username and password for non-administrative use. For this installation, an account with username jsmith is created.
19. You are prompted for additional CDs. You have the option of installing the software on the HPIKL CD. Choose one of the following:
    - To install software from this CD, insert the CD, and then click **Install**.
    - Install software from the HPIKL CD at a later step.
20. The Finish Setup screen appears. Click **Next**. A login screen appears. With the username jsmith, log in. The Red Hat Linux desktop appears.

(Optional) Installing the HP iLO 2 High-Performance Mouse for Linux

The HP iLO 2 High-Performance Mouse for Linux driver (mouse driver) addresses the cursor tracking problem between the local cursor and the iLO 2 cursor. Installing the mouse driver is optional, and its use is temporary.

Upon completing the software installation, you must reboot the workstation blade. After rebooting, the Linux desktop will be generated by the NVIDIA graphics adapter using RGS (not by the ATI video controller using iLO 2). The combination of NVIDIA/RGS does not exhibit the cursor tracking issue, so the mouse driver is not needed after the reboot. The mouse driver is only beneficial for those installation steps that are based on the continued use of iLO 2 to access the ATI video controller.

To install the mouse driver, perform the following steps:

1. Go to the HP website http://www.hp.com/servers/ilo (http://www.hp.com/servers/ilo), and then click **iLO 2 Standard** > **Software & Drivers**.
2. Select **Red Hat Enterprise Linux 4 (AMD64/EM64T)**.
3. Click **Driver - Lights-Out Management** at the top of the next page to view the Lights-Out management drivers.
4. Click the **HP iLO2 High-Performance Mouse for Linux** link. On the next page, click **download** to download the mouse driver. Store the driver on a CD, and then insert it into the iLO 2 Virtual Media CD drive mounted on the workstation blade.
5. Copy the mouse driver from the iLO 2 Virtual Media CD drive (/media/cdrom) to a temporary folder on the workstation blade.
6. Follow the mouse installation instructions that are provided on the driver download page.
7. Enable the High Performance Mouse, and then click **Apply**.

The iLO 2 cursor closely tracks the local cursor.

Installing the HPIKL CD

In this section, hpsetup, the NVIDIA driver, and RGS are installed from the HPIKL CD. Use of the iLO 2 Remote Console is continued, and it is assumed that you have logged into the workstation blade as root. To install the HPIKL CD on the workstation blade, perform the following steps:

1. Insert the HPIKL CD into your iLO 2 Virtual Media CD drive. If installation from the HPIKL CD does not begin automatically, create a terminal window, and execute `autorun.sh`.
2. The install.sh window is created, and, after several minutes, a message appears, indicating that the NVIDIA driver is being installed.
3. The RGS Sender is installed, as follows:
   a. You are asked if you accept the RGS HP license agreement. Enter `yes`, and then press **Enter**.
   b. You are asked `Continue with this customization?` Enter `yes`, and then press **Enter**.
   c. You are notified that RGS installation is complete, and prompted to `Hit <Enter> or any key to continue…`. Press **Enter**.

d. You are presented with a prompt to decide whether to enable or disable the iLO 2 Remote Console. Setup Mode is the recommended operating mode for Linux workstation blades. In Setup Mode, the iLO 2 Remote Console is enabled. Enter `yes`, and then press **Enter**.

e. Based on enabling the iLO 2 Remote Console, you are notified that a line has been added to the rgsenderconfig file. Remote Console Mode has been set to Setup Mode (which is the same as the current mode that has been used throughout this installation process). Press **Enter**, which terminates the install.sh window.

4. Remove the HPIKL CD from the CD drive.

   If you are unable to remove the CD by pressing the eject button on your local CD drive, you must press the **Disconnect** button in the iLO 2 Virtual Media window. This enables the eject button. If the remote CD drive is still needed, press the Connect button to re-connect the Virtual CD/DVD-ROM drive.

Post-installation verification and modifications

Until now, the X workstation has been running on the ATI video controller. When the workstation blade is rebooted in the next section, the X workstation will switch operation to the NVIDIA graphics adapter. When this occurs, the only way to view the X window system will be by connecting to the workstation blade using RGS. To ensure that an RGS connection can be established following rebooting, HP recommends that, prior to rebooting, you perform the following steps to verify that the workstation blade is in the correct state to receive an RGS connection request from the Local Computer (client computer).

1. The workstation blade has two built-in NICs, Ethernet 0 (eth0) and Ethernet 1 (eth1). During this installation, only one of them should have been enabled. Which one that is (eth0 or eth1) can vary. In this step, use the `ifconfig -a` command to verify that one (and only one) NIC is enabled.
2. The workstation blade is required to have a hostname. Execute the following command to see if a hostname has been assigned by your DHCP/DNS services:

   ```
   hostname -i
   ```

   If the response is `Unknown host` or `127.0.0.1`, manually assign a hostname by editing the /etc/hosts file

   Execute the following commands (customized for your workstation blade):

   ```
   hostname blc77.fct.hp.com
   hostname -i
   ```

   The latter command displays the IP address-in this case, 10.10.54.77.
3. Verify that both the ATI video controller and the NVIDIA graphics adapter are enabled by executing:

   ```
   lspci | grep -i vga
   ```

   Both adapters are visible to Linux.
4. If the RGS Sender is correctly installed, the /opt/hpremote/rgsender directory displays contents.

If establishing an RGS connection proves difficult, HP recommends that you ensure that you can establish an SSH connection to the workstation blade, so that you can troubleshoot any RGS issues. In this example installation, PuTTY is used to establish an SSH connection to the workstation blade.

Rebooting the workstation blade

Reboot the workstation blade to complete the process of switching the Linux desktop from the ATI video controller to the NVIDIA graphics adapter.

1. Establish a connection to the iLO 2 subsystem, and log in to iLO 2 by providing the Login name and Password.
2. The Virtual Media window appears. Select **Local Media Drive** under Virtual CD/DVD-ROM, select the CD drive letter on your Local Computer (D:), and then click **Connect.** The Local Computer CD drive mounts to the workstation blade.
3. Click the power button to display the **Virtual Power Button** menu. If the workstation blade is powered down (as indicated at the bottom of the Integrated Remote Console window), click **Momentary Press** once to turn power on. If the workstation blade is already powered, click **Momentary Press** to turn power off and, after the workstation blade is powered down, click **Momentary Press** again to turn power on.

Establishing an RGS connection

All requirements are met to establish an RGS connection to the workstation blade from the Local Computer. The final step in the installation process is to verify that an RGS connection can be established.

To establish an RGS connection, perform the following steps:

1. Start the RGS Receiver on the Local Computer.
2. In the RGS Receiver Control Panel, enter the hostname or IP address of the workstation blade in the **Hostname** box. For this example installation, the IP address is that of NIC eth1.
3. After entering the hostname or IP address, click **Connect**. You are presented with the RGS Login and Password authentication prompts. Enter the name and password of an authorized user on the workstation blade.
4. If an RGS connection is successfully established, the RHEL 4 login dialog appears. Log in.

If you are unable to establish an RGS connection, or for much more detailed information on RGS, see the *HP RGS User Guide*.

Managing the workstation blade

Workstation blade management overview

This chapter describes how to manage workstation blades, and includes information on the following topics:

- Onboard Administrator
- Integrated Lights-Out 2 (iLO 2)
- Remote Desktop Connection
- System Management Homepage
- HP SIM
- HP Rapid Deployment Pack
- HP Insight Diagnostics
- ROM-based Setup Utility
- BIOS programming
- POST

The workstation blade design is based on the design of the corresponding server blade, and most of the manageability features are common between workstation blades and server blades. The following documents contain information about the manageability of the systems:

- *HP ProLiant BL460c Server Blade User Guide*
- *HP BladeSystem c7000 Enclosure Setup and Installation Guide*
- *HP BladeSystem c3000 Enclosure Setup and Installation Guide*
- *HP BladeSystem c3000 Tower Enclosure Setup and Installation Guide*
- *HP BladeSystem Onboard Administrator User Guide*
- *HP Integrated Lights-Out 2 User Guide*

Onboard Administrator

OA enables you to use a web browser to remotely log in to OA and obtain detailed information about the contents of each c7000 Enclosure.

Using Onboard Administrator, you can determine the following:

- A workstation blade is installed in each device bay.
- All workstation blades are powered on as indicated by the green lights.
- Four power supplies are installed in the enclosure.
- Two network interconnect devices are installed in the rear of the enclosure.

- One Onboard Administrator module is installed in the rear of the enclosure.

Onboard Administrator also provides detailed information about each workstation blade in the enclosure.

The iLO 2 management processor also supports workstation blade power management. However, using iLO 2 power management requires a separate login to iLO 2 on each workstation blade. With Onboard Administrator, you can manage power for all workstation blades from a single Onboard Administrator login session.

All Onboard Administrator modules in the rack are linked together with Ethernet cables, allowing administrators to view and control the workstation blades in every enclosure by logging into the Onboard Administrator module in any enclosure. As described in the HP Workstation Blade Solution Planning Guide, Onboard Administrator also includes the Insight Display, which enables administrators to locally view and control the workstation blades.

Integrated Lights-Out 2 (iLO 2)

The iLO 2 feature enables administrators to remotely perform most workstation blade management functions that otherwise would require a visit to the workstation blades. For example, iLO 2 enables administrators to remotely:

- Change BIOS settings
- View the boot process
- Install software

Many iLO 2 capabilities require that Remote Console Mode is set to Admin Mode.

Accessing iLO 2

The most common way to access iLO 2 is from a web browser pointed to the iLO 2 IP address (using HTTPS). After logging into iLO 2, the status summary screen is displayed.

iLO 2 virtual media

The iLO 2 Virtual Media screen allows you to connect a floppy drive, USB key, or CD/DVD drive to the workstation blade from your local PC. To create this connection, perform the following steps:

1. Click the **iLO 2 Virtual Devices** tab.
2. Click the **Virtual Media** link.
3. Select the media on your PC to connect to the workstation blade, and then click the **Connect** button.

To verify that the virtual media is connected to the workstation blade, you can use RGS to run Windows® Explorer on the workstation blade.

Local image files on the PC can also be connected to the workstation blade by selecting Local Image File under Virtual Floppy/USB Key or Virtual CD/DVD-ROM, and providing the file name.

The Integrated Remote Console can also be used to mount local drives, folders or images from the PC to the workstation blade.

System Management Homepage

This section describes how to view the workstation blade SMH. SMH enables you to view information generated by the four blade management agents: NIC, workstation, storage, and foundation. To access SMH, point your browser to either of the workstation blade IP addresses (NIC1 or NIC 2) using HTTPS and port number 2381.

If your credentials are correct, but you cannot log in to SMH, make the following change to the workstation blade security options:

1. Go to **Control panel > Administrative Tools > Local Security Policy > Security Options**.
2. Ensure that Network Access: Sharing and security model for local accounts is set to Classic - local users authenticate as themselves. This setting is also required for RGS operation, and might have already been set.

After logging in, the Overall System Status page appears.

Local access to SMH

If you have a monitor, keyboard, and mouse connected to the Local I/O Cable, you can view SMH using:

- Either of these URLs: https://127.0.0.1:2381 (https://127.0.0.1:2381) or https://localhost:2381 (https://localhost:2381).
- The Start menu by clicking **Start > All Programs > HP Management Agents > HP System Management Homepage**, which opens a browser window pointed to https://127.0.0.1:2381 (https://127.0.0.1:2381).

HP SIM

The workstation blade is designed to work with HP SIM. If you created a custom Windows® image, ensure that SNMP and the HP Insight Management Agents for Windows are installed.

HP Rapid Deployment Pack

The HP ProLiant Essentials Rapid Deployment Pack is a software deployment solution that facilitates the installation, configuration, and deployment of high volumes of workstation blades through either a GUI-based or web-based console. HP Rapid Deployment Pack is designed to automate repetitive tasks such as configuring and deploying operating system images, configuring network switches, and configuring BIOS settings. System configuration time is reduced, making it possible to rapidly scale workstation blade deployments to high volumes.

This section focuses primarily on image capture and image deployment techniques using HP RDP for the workstation blade.

HP RDP content

HP RDP is based on Altiris Deployment Solution (DS) technology. Functionality specific to HP ProLiant Systems is added by the ProLiant Integration Module (PIM)-a collection of scripts that have been predefined for ProLiant systems to perform routine tasks. Interaction with Altiris DS occurs in a GUI or web-based environment called the Deployment Server Console. The DS Console provides a drag-and-drop

interface for assigning jobs to computers (drag computer to job or job to computer). Toolbar buttons provide shortcuts to common Altiris DS tasks.

Infrastructure requirements

HP RDP requires the following:

- DHCP server
- PXE server
- Altiris Deployment Solution
- A database-either Microsoft® SQL Server or Microsoft® Data Engine (MSDE)

HP RDP-specific differences between server blades and workstation blades

There are several differences between server blades and workstation blades that affect HP RDP:

- The operating systems are different.
- The workstation blade operating system is preinstalled on the hard drive.
- The workstation blade boots differently from the server blade.
- The server blade supports several software tools not supported by the workstation blade.

These differences combine to limit some HP RDP functionality for the workstation blade, as described in the following sections.

Booting

The workstation blade boot process differs from the server blade boot process in two ways:

- The workstation blade boots from the hard drive. Booting from the hard drive occurs because there is an OS installed on the hard drive. With the server blade, PXE booting occurs because there is no OS installed. If PXE booting is required on the workstation blade, the administrator will need must use the iLO 2 remote console to force PXE booting to occur.
- The workstation blade is shipped with Remote Console Mode set to User Mode. This is desirable for most systems because RGS, using the NVIDIA graphics adapter, offers better performance than the ATI video controller. However, because the RGS is not preinstalled on the operating system image, the administrator might need to set Remote Console Mode to Admin Mode to create the reference image.

Software tools

- ProLiant Support Packs are not currently supported on the workstation blade.
- The SmartStart Scripting Toolkit is not supported on the workstation blade. In particular, the Conrep.exe tool and server deployment jobs that capture firmware settings (for example, the default Hardware Configuration or Server Deployment jobs) do not capture settings for features that are unique to the workstation blade, such as Remote Console Mode. These settings must be configured using iLO 2 or the local I/O cable.

Using Rip-n-Replace and Virtual Bay features to replace failed systems

Both the Rip-n-Replace and the Virtual Bay functionality of the blade systems architectures should also function on workstation blades. However, a new system placed into the Virtual Bay is not detected until it is either PXE booted or booted with an image that has the A-client installed and configured. Automatic deployment jobs are then enabled. The default for the workstation blade is to boot to the Windows® XP Professional image preinstalled on the hard drive, which does not have the A-client installed or configured.

HP Insight Diagnostics

The HP Insight Diagnostics utility enables you to perform and view critical computer hardware and software configuration information from various sources. This utility enables you to run diagnostics and view the hardware configuration of the system.

As noted below, the HP Insight Diagnostics are available on the Documentation and Diagnostics CD that is included with your workstation blade. The server version of these diagnostics, available on the SmartStart CD, is not supported on the workstation blade.

Key features and benefits

HP Insight Diagnostics simplifies the process of identifying, diagnosing, and isolating hardware issues. In addition to robust management tools, service tools can be invaluable for quickly resolving system problems. To streamline the service process and resolve problems quickly, you must have the right information available at the time a service call is placed. The primary information requirement, which is also the one that provides the greatest insight into potential system issues, is the system configuration.

Uses of Insight Diagnostics include:

- Testing and diagnosing apparent hardware failures
- Documenting system configurations for upgrade planning, standardization, inventory tracking, disaster recovery, and maintenance
- Sending configuration information to another location for in-depth analysis

Theory of operation

HP Insight Diagnostics Offline Edition operates in offline mode only-the operating system is not running, and information from the operating system is not available to the diagnostics. Offline Survey is available to display the current system configuration.

The Insight Diagnostics Test feature enables you to test functionality of all the major hardware components in the system. This feature is flexible to enable you to customize test selections by providing different modes and types of testing. It includes Quick, Complete, and Custom testing levels to give you control over testing depth and required user interaction.

Accessing HP Insight Diagnostics

HP Insight Diagnostics is available on the Documentation and Diagnostic CD included with your workstation blade. To start the diagnostic utility on the CD:

1. Power on your workstation, and then press the **F10** key during the initial boot process to enter the Computer Setup utility.
2. Select your language from the list, and then press the **Enter** key. In the Computer Setup Utilities menu, four headings appear: **File, Storage, Security** and **Advanced**. Other headings might appear depending on the workstation.
3. Use the right arrow key to select **Storage**.
4. Use the down arrow key to select **Boot Order**, and then press **Enter**.
5. Select CD/DVD drive, and then enable it as a bootable device by pressing the **F5** key. If not already enabled, pressing the **F5** key again disables the device. The default setting is enabled.
6. Set the CD/DVD drive to the top of the boot order. Select **CD/DVD**, press the **Enter** key, and then use the up arrow to move it to the top of the boot order.
7. To apply and save changes, press the **F10** key, and then select **File>Save Changes and Exit**.
8. Insert the Documentation and Diagnostic CD into the workstation.
9. Restart the blade. HP Insight Diagnostics launches.

Survey tab

The Survey tab displays system configuration information. In the **View** section on the left side of the screen, you can select the **Summary** view to see limited configuration data or select the **Advanced** view to see the data in the selected category. The following categories of information are available on the **Survey** tab:

- **All**—Provides a listing of all categories of information about the computer.
- **Overview**—Provides a listing of general information about the computer.
- **Architecture**—Displays the type of bus the computer uses and BIOS information. In addition, if the bus is a PCI, information about the PCI configuration appears.
- **Asset Control**—Displays asset tag, system serial number, and processor information.
- **Communication**—Displays information about the computer parallel port (LPT) and serial port (COM) settings, and USB and network controller information.
- **Graphics**—Displays information about the graphics controller of the computer.
- **Input Devices**—Displays information about the keyboard, mouse, and other input devices connected to the computer.
- **Memory**—Displays information about all memory in the computer. This includes memory slots on the system board and any memory modules installed.
- **Miscellaneous**—Displays information obtained from the computer configuration memory (CMOS), system management BIOS data, system board data, and diagnostics component information.
- **Storage**—Displays information about storage media connected to the computer. This list includes all fixed disks, diskette drives, and optical drives.
- **System**—Displays information about the system board, processor, chassis, and BIOS, plus internal speaker and PCI bus information.

Test tab

The Test tab enables you to choose various parts of the system to test. You can also choose the type of test and testing mode. There are three types of tests to choose from:

- **Quick Test**—Provides a predetermined script for which a sample of each hardware component is tested. Quick Test requires no user intervention in either Unattended or Interactive mode.
- **Complete Test**—Provides a predetermined script in which each hardware component is fully tested. You can select Interactive or Unattended tests, which will change the devices tested during the Complete Test. Most tests are available in Interactive mode but require user intervention.
- **Custom Test**—Provides the most flexibility in controlling testing. Custom Test mode enables you to specifically select which devices, tests, and test parameters are run. You can select tests that do not require any user interaction using the Interactive or Unattended test modes. More tests are available in Interactive mode but require user intervention.

To begin testing:

1. Click the **Test** tab.
2. Select **Type of Test** to perform, and then select **Interactive** or **Unattended** as the test mode.
3. Determine how you want the test to be executed.
   a. Select **Number of Loops**, and then enter the number of loops to perform.
   b. Select **Total Test Times**, and then enter the amount of time in minutes that you want the diagnostic test to run.

      When choosing to run the test over a specified number of loops, enter the number of loops to perform. If you want to run the diagnostic test for a specified time period, enter the amount of time in minutes.
4. Click **Begin Testing** in the lower right corner of the display to start the test.

While tests are being performed, you can monitor the progress by clicking the **Status** tab. Any errors that are detected are summarized in the Error Log. Click **Save** to save the report to a diskette or a USB key drive (if attached).

If the diagnostics utility detects an error during a test, you can mouse-over the failed text in the Status tab to display additional information about the type of error and the error code.

To view all test failure information, select **Error Log**. To view the status of all testing that has been performed, click the **Log** tab.

Status tab

The Status tab displays the status of selected tests. The type of test executed (**Quick, Complete**, or **Custom**) also appears. The main progress bar displays the percent complete of the current set of tests. While testing is in progress, a **Cancel Testing** button is available if you want to cancel the test.

After testing is complete, the Cancel Testing button is replaced with two buttons, Select New Tests and Retest. To return to the previous test selection page to select a new set of tests, click the **Select New Tests** button. To run the last set of tests executed without having to return to the test selection page, click the **Retest** button.

The Status tab also displays:

- Devices being tested

- Tests that are running
- Overall elapsed time
- Individual elapsed test times
- Condition status of each test

Log tab

The Log tab displays two types of logs:

- **Test Log**—Displays all tests that have been executed, number of times the tests were executed, number of times the tests failed, and the time it took to complete the tests. To clear the contents of the Test Log, click the **Clear Test Log** button.
- **Error Log**—Displays the tests that have failed during diagnostic testing. In addition to displaying the devices and tests, this section can also include error details. The description section describes the errors found by the diagnostic tests. To view a recommended action to resolve an error, click the **Recommended Repair** button. The error count is the number of times the test has failed. To clear contents of the Error Log, click the **Clear Error Log** button.

Help tab

The Help tab has three views:

- **HP Insight Diagnostics**—Provides introductory and detailed information about Insight Filed Diagnostics.
- **Error Codes**—Provides error code listings, including device tested, messages, and recommended repair information.
- **Test Components**—Reloads and refreshes all components and displays component details after the refresh.

The Help tab provides the following options:

- **Reload**—Located in the upper-right corner of the display, this selection reloads all hardware components.
- **About**—Provides Insight Diagnostics revision details.
- **Exit**—Located in the lower-left corner of the screen, this selection provides the option to exit diagnostics.

Saving and printing information in HP Insight Diagnostics

You can save information displayed in the HP Insight Diagnostics Status and Log tabs to a diskette or USB 2.0 drive key (64MB or higher). You cannot save this information to the hard drive. The system automatically creates an html file that looks the same as the information displayed on the screen.

1. Insert a diskette or USB 2.0 drive key (capacity must be 64MB or higher). USB 1.0 drive keys are not supported.
2. Click **Save** in the upper right corner of the tab.
3. Select **Save to the floppy** or **Save to USB key**.

4. Enter a file name in the File Name box, and then click the **Save** button. An html file is saved on the diskette or USB drive key.
5. Print the information from the diskette or USB drive key.

To exit HP Insight Diagnostics, click **Exit** in the upper-right corner of the screen, and then remove the Documentation and Diagnostics CD from the optical drive.

Downloading the latest version of HP Insight Diagnostics

1. Go to http://www.hp.com (http://www.hp.com).
2. Click the **Support & Drivers** link.
3. Select the **Download driver and software** radio button.
4. Enter your product number (for example, `WS460c`) in the text box, and then press the **Enter** key.
5. Select your operating system.
6. Click the **Diagnostic** link.
7. Locate HP Insight **Diagnostics**, and then click **Download**.

The download includes instructions for creating a bootable CD.

ROM-Based Setup Utility

The RBSU enables BIOS parameters to be changed during the boot process. For example, Remote Console Mode is set using RBSU. For details on RBSU options, see the *HP ROM-Based Setup Utility User Guide* on the HP website http://www.hp.com/support/xw460c (http://www.hp.com/support/xw460c).

Power-on Self Test

At power-on, the workstation blade performs POST.

BIOS Serial Console

BIOS Serial Console allows you to configure the serial port on the local I/O cable to view POST error messages and run RBSU. A keyboard and mouse are not required.

BIOS programming

HP provides a downloadable SoftPaq to update the BIOS. Each BIOS SoftPaq includes a version number and date. If there is a more recent BIOS version available than the BIOS on your workstation blade, HP recommends that you update to the latest BIOS.

The BIOS version is not dependent on the operating system that you are using.

Acronyms and abbreviations

BACS

Broadcom Advanced Control Suite

BBWC

battery-backed write cache

BIOS

Basic Input/Output System

DHCP

Dynamic Host Configuration Protocol

DIMM

dual inline memory module

DNS

domain name system

DVI

digital visual interface

FEC

Fast EtherChannel

GEC

Gigabit EtherChannel

HPIKL

HP Installer Kit for Linux

HTTPS

hypertext transfer protocol secure sockets

I/O

input/output

iLO 2

Integrated Lights-Out 2

ISO

International Organization for Standardization

LACP

Link Aggregation Control Protocol

LAN

local-area network

MSDE

Microsoft® Data Engine

NIC

network interface controller

OA

Onboard Administrator

OOBE

out of box experience

OS

operating system

PDU

power distribution unit

POST

Power-On Self Test

PXE

Preboot Execution Environment

QFE

quick fix engineering

RBSU

ROM-Based Setup Utility

RDP

Rapid Deployment Pack

RGS

remote graphics software

RHEL

Red Hat Enterprise Linux

RIS

reserve information sector

SAM

Session Allocation Manager

SAS

serial attached SCSI

SATA

serial ATA

SIM

Systems Insight Manager

SMASH

System Management Architecture for Server Hardware

SMH

System Management Homepage

SNMP

Simple Network Management Protocol

SQL

structured query language

SSH

Secure Shell

UID

unit identification

USB

universal serial bus

VLAN

virtual local-area network

WOL

Wake-on LAN

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