

HP Workgroup System and XC Software Installation Guide

Version 1.0



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About This Document

This document describes how to set up the hardware and install the XC software on your HP Workgroup System.



IMPORTANT: This document assumes that you are installing the XC Software Version 3.2.1 from a DVD with a valid license key on a new Cluster Platform Workgroup System which consists of a new HP BladeSystem c3000 enclosure that has no external network connection during initial setup and contains the following:

- Eight or less factory-installed server blades with current firmware and no operating system installed
- A single GbE2c Ethernet switch to which you will connect a Windows laptop to access the Onboard Administrator (OA)
- An internal DVD drive

Intended Audience

This document is intended for customers and system administrators experienced in the use of high-performance clusters. Certain operations described in this document, if performed incorrectly, can cause system crashes and loss of data. If you are not familiar with installing and using high-performance clusters, HP recommends that you contact HP Global Services. This document is also intended for HP service representatives and other persons trained to install High-Performance Computing Cluster Platform products. Such persons are expected to understand the hazards of working in this environment and to take suitable precautions to minimize danger to themselves and others.

Document Organization

This document is organized as follows:

Chapter 1	Provides an overview of the HP Workgroup System configuration described in this document, and what you will have when you complete the procedures described in this document.
Chapter 2	Provides hardware preinstallation procedures.
Chapter 3	Provides hardware setup procedures for unpacking, installing, and starting up.
Chapter 4	Provides software preinstallation procedures.
Chapter 5	Provides software installation procedures for XC System Software.
Chapter 6	Provides troubleshooting information.
Appendix A	Provides additional software setup information.
Appendix B	Provides additional information about the hardware setup, such as system specifications and thermal stabilization.
Appendix C	Provides additional information about how to set up IP addresses on a corporate network..
Appendix D	Provides information about how to configure the LSF sendmail program.

Typographic Conventions

This document uses the following typographical conventions:

<code>%</code> , <code>\$</code> , or <code>#</code>	A percent sign represents the C shell system prompt. A dollar sign represents the system prompt for the Bourne, Korn, and POSIX shells. A number sign represents the superuser prompt.
<code>audit(5)</code>	A manpage. The manpage name is <i>audit</i> , and it is located in Section 5.

Command	A command name or qualified command phrase.
Computer output	Text displayed by the computer.
Ctrl+x	A key sequence. A sequence such as Ctrl+x indicates that you must hold down the key labeled Ctrl while you press another key or mouse button.
ENVIRONMENT VARIABLE	The name of an environment variable; for example, PATH.
[ERROR NAME]	The name of an error, usually returned in the <code>errno</code> variable.
Key	The name of a keyboard key. Enter and Return both refer to the same key.
Term	The defined use of an important word or phrase.
User input	Commands and other text that you type.
<i>Variable</i>	The name of a placeholder in a command, function, or other syntax display that you replace with an actual value.
[]	The contents are optional in syntax. If the contents are a list separated by , you must choose one of the items.
{}	The contents are required in syntax. If the contents are a list separated by , you must choose one of the items.
...	The preceding element can be repeated an arbitrary number of times.
Ⓢ	Indicates the continuation of a code example.
	Separates items in a list of choices.
WARNING	A warning calls attention to important information that if not understood or followed results in personal injury.
CAUTION	A caution calls attention to important information that if not understood or followed results in data loss, data corruption, or damage to hardware or software.
IMPORTANT	This alert provides essential information to explain a concept or to complete a task.
NOTE	A note contains additional information to emphasize or supplement important points of the main text.

Documentation Updates and Release Notes

Documentation updates and release notes (if applicable) are provided on the HP High Performance Computing documentation website at: <http://www.docs.hp.com/en/highperfcomp.html>.

Use the release date of a document to determine that you have the latest version.

HP XC System Software documentation is available at: <http://www.docs.hp.com/en/linuxhpc.html>.

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HP encourages your comments concerning this document. We are committed to providing documentation that meets your needs. Send any errors found, suggestions for improvement, or compliments to:

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Include the document title, manufacturing part number, and any comment, error found, or suggestion for improvement you have concerning this document.

1 HP Workgroup System Overview

The HP Workgroup System is delivered to you factory assembled and ready for deployment. HP Workgroup System solutions offer a choice of HP ProLiant c-Class BladeSystem half-height server blades with either Intel® Xeon™ or AMD Opteron™ processors. One server blade in the configuration is designated as the head node, which you can configure separately from the remaining server blades (compute nodes) in the enclosure. The head node can also be used for preprocessing, postprocessing, and computational workload. Compute nodes are normally used for application computation rather than administrative tasks.



NOTE: A hardware configuration can contain a mixture of Opteron and Xeon nodes, but not Itanium nodes.

The HP Workgroup System is comprised of a single-cabinet cluster containing a variety of components installed to meet the following specifications:

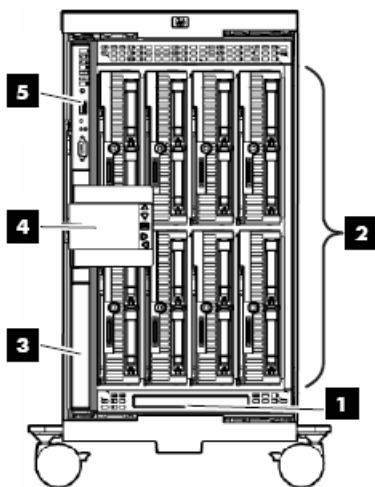
- A single Onboard Administrator (OA) module
- Up to eight half-height server blades
- A shared administration/Gigabit Ethernet network
- SB40 storage blade (optional)

The software option described in this document is HP XC System Software. It is not preinstalled. Installation procedures are included in this document in [Chapter 5 \(page 27\)](#). When you are done, the HP XC System Software will be fully installed, configured, and operational.

1.1 HP Workgroup System Views

The HP Workgroup System ships with the server blades and all of the factory integrated modules installed. Figure 1-1 shows an example front view of the HP Workgroup System.

Figure 1-1 Example Front View



The following list describes the callouts in Figure 1-1:

1. DVD optical drive
2. HP ProLiant BL260c, BL460c, or BL465c half-height server blades (eight)
3. Redundant OA module slot (reserved)
4. HP Insight Display
5. OA module



IMPORTANT: Be sure there is a blade in Bay 1. See Figure 1-2 for enclosure bay numbering.

Figure 1-2 Enclosure Bay Numbering

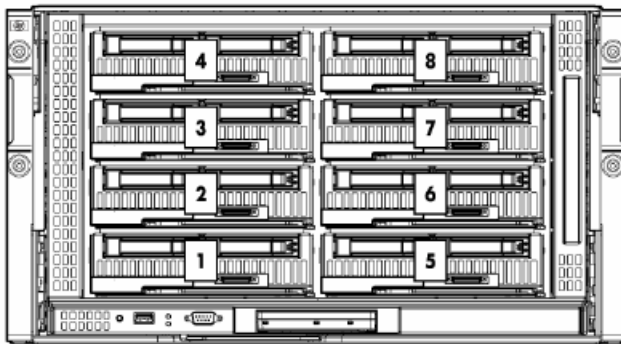
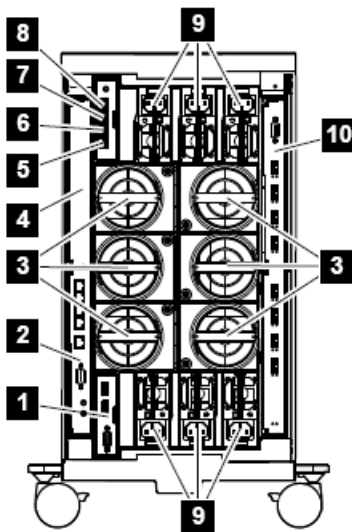


Figure 1-3 shows an example rear view of the HP Workgroup System.

Figure 1-3 Example Rear View



The following list describes the callouts in Figure 1-3:

1. Reserved for future use
2. HP Gigabit Ethernet switch installed in interconnect module bay 1 (IMB1)
3. Active cool fans
4. IMB2 (reserved)
5. Enclosure downlink
6. Enclosure uplink and service port
7. iLO/OA port 1
8. Reserved for future use
9. Power supplies
10. Optional 4X DDR InfiniBand Interconnect installed in IMB3 and IMB4 (not described in this document)

2 Hardware Prerequisites

Gather the following information before starting the installation process. HP recommend that you download all device drivers, firmware, and documentation to your laptop before you begin the software installation process.

2.1 Hardware Preinstallation Checklist

You need the following items to install your hardware:

- 2 RJ45 CAT5 patch cables
- A laptop connected to the switch
- 110 power cord with C13/C14 plug
- A box cutter or pocket knife
- Gloves
- Protective eye wear
- Hardware Documentation
 - *HP XC System Software Hardware Preparation Guide* at:
<http://docs.hp.com/en/A-XCHWP-321/A-XCHWP-321.pdf>
 - [All product manuals for HP BladeSystem c3000 Enclosures](#)
 - [All product manuals for HP BladeSystem c-Class Onboard Administrator](#)
 - *HP Cluster Platform Workgroup System and Cluster Platform Express Overview and Hardware Installation Guide* at:
<http://www.docs.hp.com/en/A-CPCPE-1D/A-CPCPE-1D-121707.pdf>
 - *HP Cluster Platform Workgroup System Tower Hardware Installation Guide* at:
<http://www.docs.hp.com/en/A-CPWST-1B/A-CPWST-1B.pdf>
 - *HP Cluster Platform Site Preparation Guide* at:
<http://www.docs.hp.com/en/A-CPSPG-1D/A-CPSPG-1D.pdf>.
 - *HP BladeSystem c3000 QuickSpecs* at:
http://h18004.www1.hp.com/products/quickspecs/12790_div/12790_div.html
 - *HP BladeSystem c3000 Enclosure Specifications* at:
<http://h18004.www1.hp.com/products/blades/components/enclosures/c-class/c3000/specifications.html>
 - *HP BladeSystem c3000 Enclosure and c3000 Tower Enclosure Maintenance and Service Guide* at:
[All product manuals for HP BladeSystem c3000 Enclosures](#)
 - *HP BladeSystem c3000 Enclosure Setup and Installation Guide* available online from a link at:
[All product manuals for HP BladeSystem c3000 Enclosures](#)
 - *HP XC Systems with HP Server Blades and Enclosures HowTo* at:
http://www.docs.hp.com/en/10077/blade_howto.pdf

2.2 Firmware Requirements

HP installs the current version of firmware on Cluster Platform hardware components before shipping your order. To verify the firmware version for a component, see the following documents:

- For information on displaying the installed version of firmware, see the service guide for the hardware component.
- For the supported firmware versions, see the *HP XC System Software: Master Firmware Tables Version 3.2.1* available online at:
<http://docs.hp.com/en/A-XCFM3-21A/index.html>

To upgrade firmware, follow these steps:

1. Go to the web address specified in Table 2-1 to download the firmware.
2. For information on how to upgrade firmware, see the service guide for the hardware component.



CAUTION: Before installing or upgrading firmware on HP XC System components, see *HP XC System Software: Master Firmware Tables Version 3.2.1*. Important guidelines and firmware versions that are known to be incompatible are detailed in the document. Upgrading firmware to a version other than those specified in *HP XC System Software: Master Firmware Tables Version 3.2.1* can cause problems.

Table 2-1 HP BladeSystem c-Class Firmware and Management Tools Upgrades

Component	Web Address
HP ProLiant Server Blades	
BL260c	c-Class Firmware and Upgrades . Click Server Blade Firmware and Drivers .
BL460c	
BL465c	
HP c-Class BladeSystem Enclosure Components and Switches	
Onboard Administrator (OA)	c-Class Firmware and Upgrades . Click each of the applicable downloads.
HP ProLiant Integrated Lights Out 2 (iLO 2)	
Server Blade mezzanine cards (if applicable)	
HP BladeSystem Integrated Manager	
HP Systems Insight Manager	
HP Insight Control Environment for BladeSystem	
HP Insight Control Linux Edition	
GbE2c Ethernet Switch	GbE2c Ethernet Blade Switch . Click Software & Drivers , and search for your operating system.

3 Hardware Setup

For more information about the HP Workgroup System specifications and thermal stabilization, see Appendix B (page 47).

3.1 Unpack the Enclosure

To unpack and remove the HP Workgroup System from a pallet, follow these steps:

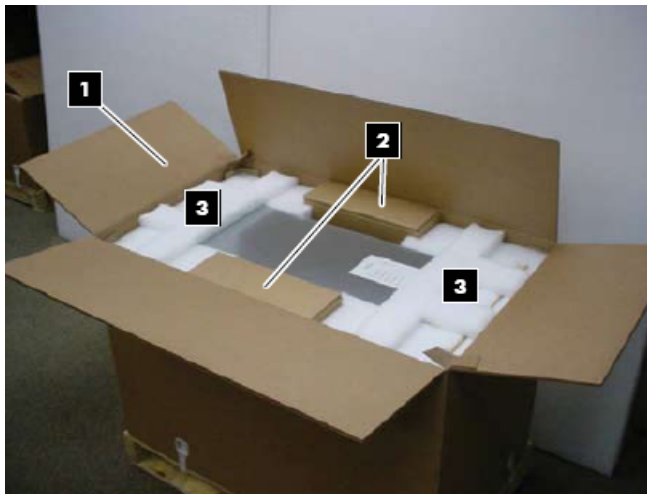
1. Move the pallet to the installation location and leave several feet of space to move around the pallet.



NOTE: Carton graphics provide instructions on how to unpack the HP Workgroup System and to open the top of the box first.

2. Open the top of the cardboard box. (Callout 1, Figure 3-1)

Figure 3-1 Opening the Top of the Cardboard Box



3. Remove the two boxes containing the security bezel, power cords, and other accessories. (Callout 2, Figure 3-1)
4. Remove the cushions from the top of the unit (Callout 3, Figure 3-1) and the cardboard box. (Callout 1, Figure 3-2)

Figure 3-2 Removing the Box



5. Remove the front section of the bottom cushion (Callout 2) and the ramp. (callout 1, Figure 3-3)

Figure 3-3 Removing the Ramp and Front Cushion

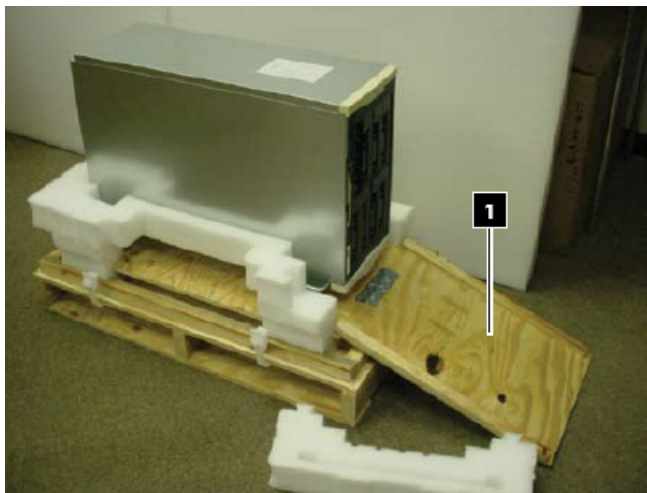


6. Attach the ramp to the plywood deck using the hook-and-loop. (Callout 1, Figure 3-4)



NOTE: Box clamps must be folded out of the way to lay the ramp down.

Figure 3-4 Attaching the Ramp



WARNING! The HP Workgroup System weighs 300+ pounds. To avoid injury, you might require a second person to assist you with this step.

7. Gently roll the unit down the ramp. (Callout 1, Figure 3-5)

Figure 3-5 Rolling the Unit Down the Ramp

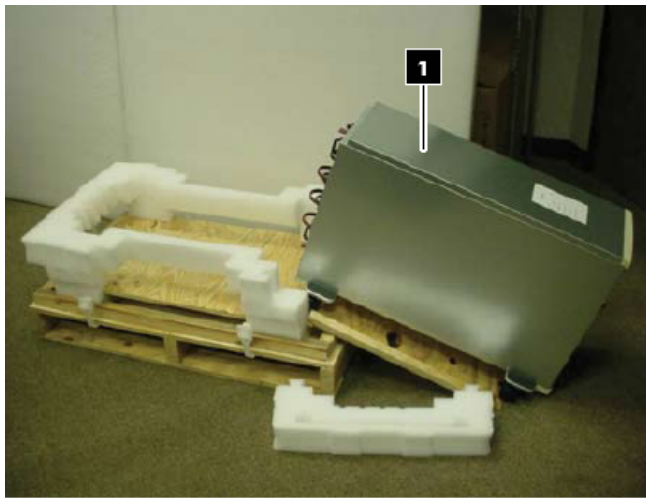


Figure 3-6 Rolling the Unit to the Installation Location



8. Plug the unit into a power source.

3.2 Installing and Starting Up the Hardware

Familiarize yourself with the back of the c3000 enclosure and identify the OA interface port and the HP GbE2c Ethernet switch. See Figure 1-3 (page 12). Verify that there is a blade in bay 1. See Figure 1-2 (page 12) to identify bay numbers. For information about how to move blades in the enclosure, see the *HP BladeSystem c3000 Tower Enclosure Setup and Installation Guide* .

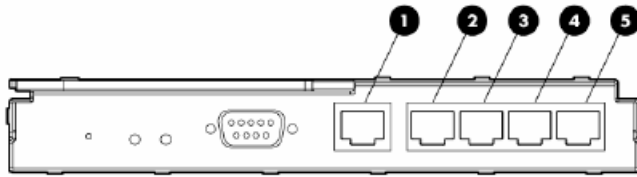
<http://bizsupport.austin.hp.com/bc/docs/support/SupportManual/c01310294/c01310294.pdf>

3.2.1 Setting IP Addresses

Before setting the IP addresses, verify that your c3000 is not connected to the corporate network. Make sure you have downloaded the information recommended in Chapter 2 (page 13).

1. Connect a cable from the OA to the GbE2c switch port 23. See Figure 3-7 callout 4. (For the exact location of the interconnect switch, see Figure 1-3 (page 12) Callout 2.)

Figure 3-7 Interconnect Switch



The following list describes the callouts in Figure C-1:

1. Port 20 RJ-45 connector for 10/100/1000 Mb uplink
 2. Port 21 RJ-45 connector for 10/100/1000 Mb uplink
 3. Port 22 RJ-45 connector for 10/100/1000 Mb uplink
 4. Port 23 RJ-45 connector for 10/100/1000 Mb uplink
 5. Port 24 RJ-45 connector for 10/100/1000 Mb uplink
2. Connect a cable from your laptop to the switch port 21. Callout 2 Figure C-1
 3. Verify that no external network is connected to the switch.
 4. Use the menus on the Insight Display panel to manually set the static IP address and subnet mask for the OA.
 - IP address of the OA: 172.31.32.1
 - IP address of the installation PC: 172.31.32.20
 - Netmask for the PC: 255.255.0.0
 - Starting IP address for enclosure bay IP addressing: 172.31.15.1 (this uses the addresses from 172.31.15.1 to 172.31.15.16)
 5. On your laptop or PC, manually set a static IP address for the NIC in the same subnet as the IP address you set for the OA.
 - a. On your PC, go to **Start** → **Control Panel** → **Network Connections**.
 - b. Right-click **Local Area Connection** and choose **Internet Protocol (TCP/IP)**.
 - c. Click **Properties** and choose **Use the Following IP addresses** and enter the IP addresses listed below. Remember to reset your laptop after installation if you need to access the corporate network.
 6. From your PC or laptop, use the browser to access the OA using the following address:
<https://172.31.32.1>
 7. Log in to the OA. Use the default user name **Administrator** and the default password shown on the tag affixed to the OA.
 8. Create a new user name and password. For example, you can make the User name: **Root**, and the Password: **Test1234** as follows:
 - a. Click the plus sign (+) to open the **User** → **Authentication** menu in the left frame.
 - b. Select the **Local Users** and click **New**.
 - c. Add local user information including a password and confirmation.
 - d. Change privilege level to Administrator and make sure that the **User Enabled** is checked.
 - e. Check **Onboard Administrator Bays** under **User Permissions**. Then click the **Update User** button.
 - f. Test by signing out of the OA and signing in with the new account information.
 9. Assign IP addresses to all iLO2 devices in the enclosure:
 - a. Click the plus sign (+) to open the **Enclosure Settings** menu in the left frame.
 - b. Select the **Enclosure Bay IP Addressing** menu item.
 - c. Select the check box to **Enable Enclosure Bay IP Addressing**.

- d. For Bay 1, specify the IP addresses 172.31.15.1. Click **Autofill** to populate the remaining IP addresses.
- e. Wait 60 seconds for the assignments to take effect, then click **Apply** to save your settings.

3.2.2 Setting Boot Order

To set the boot order for the head node and compute nodes, assuming Bay 1 is the head node, follow these steps:

1. In the left frame of the OA browser window, click the plus sign (+) next to **Device Bays** to display the list of nodes contained in the enclosure.
2. Click the link to the first hardware model in the list. Wait a few seconds until the frame to the right is populated with node-specific information.
3. Click the **Boot Options** tab.

Select a boot device and use the up and down arrows on the screen to position the device so that it matches the boot order listed below.



NOTE: All nodes except the head node must have the same boot order.

Set the following boot order on the head node:

1. USB
2. Floppy
3. CD
4. Hard Disk
5. PXE NIC1

Set the following boot order on all nodes except the head node:

1. USB
2. Floppy
3. CD
4. PXE NIC 1
5. Hard Disk

Click **Apply**.

3.2.3 Setting Up iLO

Perform steps in Section 3.2.3, Section 3.2.4, Section 3.2.5, and Section 4.4 for the head node, then repeat Section 3.2.3, Section 3.2.4, and Section 3.2.5 for each compute node.

To add new identical user names and passwords for OA and iLO:

1. From the OA, click (+) **Device Bays**. Under the hardware model, click **iLO**.
2. In the body of the main window, click **Web Administration** to open the iLO2 utility in a new window.



NOTE: Turn off popup blocking so the window can open.

3. In the new window, click **Administration**.
4. In the left frame, click **User Administration**.
5. Click **New**. Create a new iLO2 user name and password, which must match the user name and password you set on the OA. Do not use any special characters as part of the password.
Use this user name and password whenever you need to access the console port with the `telnet cp-nodename` command, or with the `ssh cp-codename` command.
6. Save user information.



NOTE: The OA automatically creates user accounts for itself (prefixed with the letters OA) to provide single sign-on capabilities. Do not remove these accounts. The OA also creates iLO accounts on each blade for its own use.

3.2.4 Enabling Telnet Access

1. Under the hardware model, click **iLO**.
2. In the body of the main window, click **Web Administration** to open the iLO2 utility in a new window.



NOTE: Turn off popup blocking so the window can open.

3. In the new window, click **Administration**.
4. In the left frame, click **Access**.
5. Click the control to enable **Telnet Access**.
6. Click **Apply** to save the settings.

3.2.5 Setting the Power Regulator

Select an individual blade. Click the **Power Management** tab and make the following settings:

1. For every node except the head node, select **No** to **Automatically Power On Server** because you do not want to automatically turn on power to the node.
2. Click **Submit**.
3. In the left frame, click **Settings**.
4. Select **Enable HP Static High Performance Mode**.
5. Click **Apply** to save the settings.
6. For the head node, continue to Section 4.4. For compute nodes, return to Section 3.2.3 and repeat Section 3.2.3, Section 3.2.4, and Section 3.2.5 for each compute node.

3.2.6 Configuring Smart Array

This section is for configurations containing SB40 storage blades.

Configure disks into the smart array from the remote graphics console. You must add the disk or disks to the smart array before attempting to image the node.

To set up the smart array device, click **Remote Console** on the virtual console page of the iLO2 Web Administrator Utility, then follow these steps:

1. Click **Integrated Remote Console** to open a remote console window which provides access to the graphics console virtual media and power functions.
2. In the remote console window, click **Power**.
3. Click **Momentary Press**.
4. Wait a few seconds for the power on phase to begin. Click the MB1 mouse button in the remote console window to put the pointer focus in this window so that your keyboard strokes are recognized.
5. Watch the screen carefully during the power-on self-test phase, and press the **F8** key when you are prompted to configure the disks into the smart array. Select **View Logical Drives** to determine if a logical drive exists. If a logical drive is not present, create one.

If you create a logical drive, exit the Smart Array utility and power off the node. Do not let it try to boot up.

For more information about specific smart array configurations, see the documentation that came with your HP ProLiant server .

6. Use the virtual power functions to turn off power to the server blade.
7. Close the iLO2 utility web page.
8. Repeat this procedure from every active OA and make the same settings for each server blade in each enclosure.

4 Software Prerequisites

Have the following information ready before starting the installation process. Because it is assumed that you will not have an external network connection during the XC Software installation process, we recommend that you download all passwords, the `XC.lic` file, device drivers, firmware, XC patches, and documentation to your laptop before you begin the software installation process.

4.1 Software Preinstallation Checklist

- Passwords



TIP: For the purposes of this guide, the following values are used:

user: root
password: Test1234

The following lists default factory settings. To change these settings, see [Appendix A](#) (page 45).

- Administrator user name and password are supplied with the HP Workgroup System.
- Root user password
- OA and iLO user name and password *must* be the same. The OA user name and administrator password are on the tag attached to the OA. The iLO defaults are:
user: Admin
password: Admin



NOTE: The database, Nagios, and LSF administrator passwords are defined during the XC Software installation process.

- IP Addresses
 - You need a network cable to connect a laptop directly to the OA to assign IP addresses.
 - You need IP addresses for the head node external network, gateway, and net mask. If you do not have this information, example default values are provided in the XC software installation procedures.
- Software Documentation
 - *HP XC System Software Installation Guide* at:
<http://docs.hp.com/en/A-XCINS-321/A-XCINS-321.pdf>
 - *HP XC System Software Master Firmware List* at:
<http://docs.hp.com/en/A-XCFM3-21A/A-XCFM3-21A.pdf>
 - Information
 - You need the cluster name (also referred to as the node name prefix). The default is `n`. This can be changed during the `cluster_prep` process of the XC Software installation.
 - The time zone for the system.
 - Have an available file containing your license key.

You also need the following items:

- A serial cable required for VLAN setup
- The XC 3.2.1 installation DVD



NOTE: An internal DVD drive is included in the HP Workgroup System enclosure.

4.2 Downloading XC Software Patches

For each supported version of the HP XC System Software, HP releases all Linux security updates and HP XC software patches on the HP IT Resource Center (ITRC) website. To determine if software patches are available, go to the product-specific location on the ITRC. You must download all available patches and updated RPM packages for the XC Software installation now and save to your laptop to be prepared for “Installing Patches from Your Laptop” (page 29) during the XC Software installation.

- HP ITRC website:
<http://www.itrc.hp.com>



NOTE: You must register for an account and password to download patches at
<http://www.itrc.hp.com>.

- *HP XC System Software Release Notes for Version 3.2.1*
Because the HP XC System Software Release Notes are updated periodically, and are only available online:
<http://www.docs.hp.com/en/linuxhpc.html>

To download the XC patches, follow these steps:

1. Create a temporary directory on your laptop.
2. Go to the ITRC website and register as an Americas/Asia Pacific or European customer at:
<http://www.itrc.hp.com/>
When you supply information about yourself and your corporation, an ITRC user ID is assigned to you, and you supply your own password. Remember this user ID and password because you must use it whenever you download a patch.
3. From the **Registration Confirmation** window, select the option to go directly to the ITRC home page.
4. From the ITRC home page, select **patch/firmware database** from the **maintenance and support (hp products)** list.
5. From the Patch/Firmware database page, select **Linux** under **find individual patches**.
6. From the **Search for patches** page in Step 1 of the **Search** utility, select **Vendor and Version**, select **hpxc** as the vendor and select the HP XC version that is appropriate for the cluster platform.
7. In step 2 of the **Search** utility, **How would you like to search?**, select **Browse Patch List**.
8. In step 4 of the **Search** utility, **Results per page?**, select **all**.
9. Click **search>>>** to begin the search.
10. Download all patches that are available for the cluster platform into the temporary directory you created in Step 1. If you are unable to retrieve the files from this website, contact the HP XC Support team at the following email address: xc_support@hp.com.

The downloaded patches are installed during the XC Software installation in “Installing Patches from Your Laptop” (page 29).

4.3 Copying the XC.lic File to Your Laptop

The HP XC license key file was emailed to you. You must copy the XC.lic file to your laptop to use later when installing the XC Software. Use a text editor to remove all **^M** characters (**Ctrl-m**) from the file, if necessary.

If you have not received the license key file, contact your HP representative.

4.4 Associating the Enclosure DVD to the Head Node

To associate the enclosure DVD to the head node (Bay 1), follow these steps:

1. From the OA left navigation frame, go to **Enclosure Settings**. (Figure 4-1)
2. Go to **DVD drive**.
3. Check **1**.
4. Choose **DVD**.
5. Connect to the enclosure DVD.

Figure 4-1 DVD Drive

The screenshot shows the HP Onboard Administrator (OA) interface. The main window is titled "Enclosure Settings - OA-0018FE276741". The left navigation pane shows "Enclosure Settings" selected, with "DVD Drive" highlighted. The main content area displays the "DVD Drive" configuration page. It includes a "Device List" table with columns for Bay, Power State, Remote Console, LO DYC Status, and Device or Image URL. The table shows three bays, all with "On" power state and "Integrated Remote Console (E)" selected for the remote console. Bay 1 is connected to the enclosure DVD, while bays 2 and 3 are disconnected. A "Refresh" button is located at the bottom right of the table.

Bay	Power State	Remote Console	LO DYC Status	Device or Image URL
<input type="checkbox"/> 1	On	Integrated Remote Console (E) Launch	Connected	Enclosure DVD
<input type="checkbox"/> 2	On	Integrated Remote Console (E) Launch	Disconnected	
<input type="checkbox"/> 3	On	Integrated Remote Console (E) Launch	Disconnected	

5 XC Software Installation

For more details on the following steps, see the *HP XC System Software Installation Guide*, Section 2.3.2.



NOTE: The XC Software installation process may take as long as two hours to complete.

5.1 Booting the DVD

1. Start the installation, leaving the browser on the laptop connected to the OA.



NOTE: This document assumes that the internal DVD drive will be used. However, the boot process can be much faster if you use an external drive attached to the head node with a dongle.

2. Open the Integrated Remote Console (IRC) to Bay 1 (head node). (Figure 4-1 (page 25))
3. Turn off the power to the head node.
4. Turn on the power to the head node.
5. The Boot prompt response you enter is server type dependent.

For HP Proliant BL460c:

```
Boot: linux ks=hd:scd0/ks.cfg
```

For HP Proliant BL465c:

```
Boot: linux ks=hd:scd0/ks.cfg pci=nommconf
```

6. Select first disk, a global file system, and no RAID. You must choose your own time zone. For example:

```
Select the disk for the installation: 1
```

```
Do you want to create the XC global file system?: Y
```

```
Would you like XC to use the default partition table?: d
```

```
Enter "C" to continue C
```

```
Time Zone: timezone
```

```
Root Password: Test1234
```

7. After the head node reboots, log in as root.
8. Open a terminal window.

Right-click and choose **Terminal**.

Or

Click **Applications**→**System Tools**→**Terminal** to open a terminal window.

5.2 Running the `cluster_prep` Command



IMPORTANT: Some HP XC patches might need to be run before `cluster_prep`. Check the Readme file of all patches for more details.

IMPORTANT: If you are restarting the `cluster_prep` procedure, you must remove the database on the headnode with the `# reset_db` command.



NOTE: You can access the head node by using the IRC or by using `ssh` with PuTTY to connect to the IP address of the head node.

To run the `cluster_prep` command to prepare the system, follow these steps:

1. Enter the following command:
`# cd /opt/hptc/config/sbin`
2. Enter the following command:
`# ./cluster_prep --enclosurebased`
3. Enter the following responses as indicated. For more information on responses, see Table 3–1 in the *HP XC System Software Installation Guide*.



IMPORTANT: Do not press **Ctrl-c** or **Ctrl-d**, enter the kill command, or use any other abnormal termination method to terminate the `cluster_prep` utility.

If you terminate `cluster_prep` before it completes processing, you must use the Kickstart installation procedure to reinstall the head node.

For example:

```
Enter node naming prefix [n]: Enter or n
```

```
Enter the maximum number of nodes in this cluster [ ]: Enter or 8
```

```
Please enter the Database Admin Password: Test1234
```

```
Please re-enter password: Test1234
```

```
Do you want to configure the external connection on the head node?
```

```
[Y]: Enter
```

```
External Ethernet device on the head node [undef]: eth1
```

```
Enter common user name for all console port management devices: root
```

```
IP address [ ]: ip_address (For example: 16.118.48.57)
```

```
Netmask [ ]: netmask (For example: 255.255.252.0)
```

```
IPv6 address (optional) [ ]: Enter
```

```
Gateway IP address [ ]: network_gateway_ipaddress (For example: 16.118.48.1)
```

```
MTU value (optional) [ ]: Enter
```

```
IP address for DNS name server [ ]: dns_name_server (If unknown, Enter)
```

```
Search path [ ]: dns_searchpath (if unknown, Enter)
```

```
.
```



NOTE: Be sure to use a period after the last domain name.

```
[P]roceed, [R]etry: P
```



NOTE: Enter the letter R to change a response.

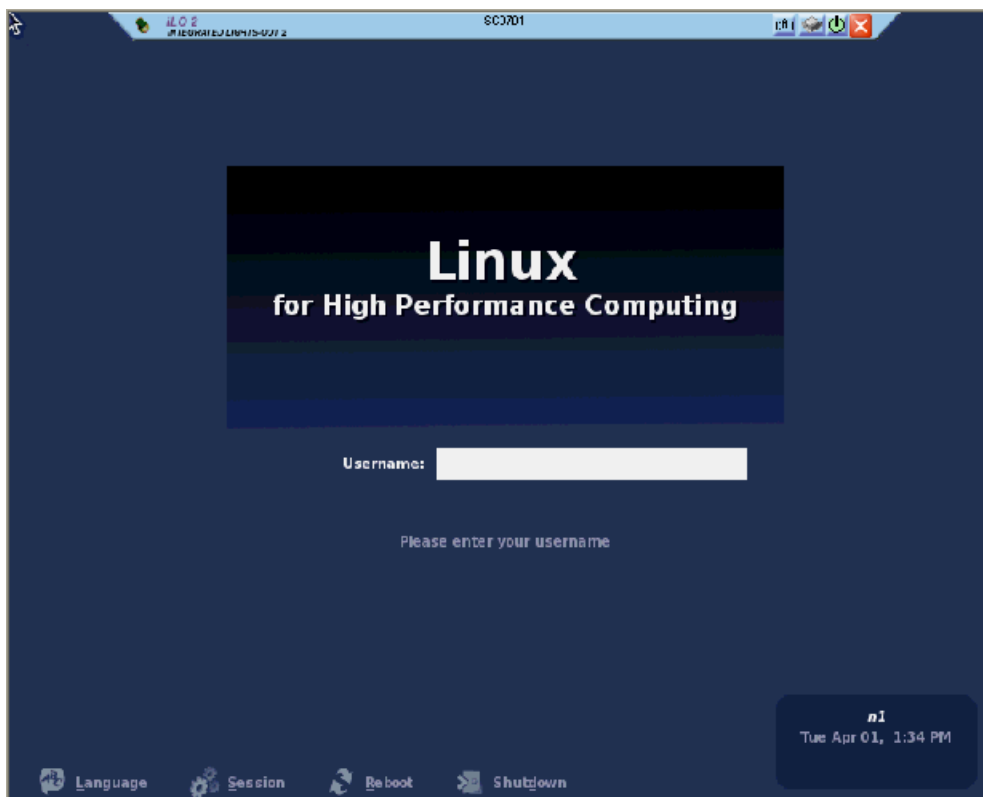
Restarting network ... done

5.3 Installing Patches from Your Laptop

To install the XC Software patches from your laptop, follow these steps:

1. Use the IRC to mount the directory with the XC Software patches that you downloaded on your laptop earlier in “Downloading XC Software Patches” (page 24).
 - Click on the **IRC Virtual Media** icon on the ILO2 tab at the top of the screen (see Figure 5-1) and browse to select the folder with the XC patches. This creates the directory `/media/iLO2_FOLDER` on the head node and mounts the selected laptop folder to that directory.

Figure 5-1 IRC Virtual Media Screen



2. Create a temporary patch download directory on the head node. For example:

```
# mkdir /home/patches
```
3. Copy the contents of the patch file from `/media/iLO2` to `/home/patches` as follows:

```
# cp /media/iLO2_FOLDER/* /home/patches
```
4. Enter the following command:

```
# cd /home/patches
```
5. Enter the following command:

```
# tar -xvzf patch_filename
```

File extensions are typically `.tar.gz`, and `.tgz`. This creates subdirectories in `/home/patches`.

6. To install the patches, change into each directory using `cd`. Follow the instructions in the Readme file.

For more information on how to install the patches, see the README file in each directory.

5.4 Putting the License Key File in the Correct Location

The license key information must already be saved into a file named `XC.lic` on your laptop. See "Copying the `XC.lic` File to Your Laptop" (page 24).



NOTE: The sample `XC.lic` shown in Example 5-1 is included in this document for illustrative purposes only; it is not intended for use and is not valid for the system.

Example 5-1 Sample `XC.lic` File

Hewlett Packard Company -- This message in its entirety may be placed into your license file. Use an ASCII Text Editor to avoid introducing characters which will invalidate the license file. If you have any problems installing this license key, contact the parties listed on the associated license documentation or web site.

```
SERVER this_host ANY
VENDOR Compaq
USE_SERVER
INCREMENT XC Compaq 3.1 28-feb-2007 1 23BBAFCE6662c \
1.6 Task 6: Arrange for IP Address Assignments and Host Names 25
NOTICE="Authorization = BM05WHITMORE19772031 - permanent - HP \
XC System Software - BASE License"
INCREMENT XC-PROCESSORS Compaq 3.0 permanent 68 7BA7E0876F0F \
NOTICE="Date 30-Jan-2007 01:29:36 - License Number = \
LAGA4D1958DL - Qty 68 - 434066-B21 - HP XC System Software 1 \
Proc Flex License"
INCREMENT lsf_xc Compaq 6.1 permanent uncounted 8BC06464E38E \
HOSTID=ANY NOTICE="Date 30-Jan-2007 01:29:36 - License Number \
= LAGA4D1958DL - Qty 1 - p/n 5991-4844 - HP XC System Software \
- LSF License"+
```

To put the license key file in the correct location, follow these steps:

1. Login as the root user on the head node.
2. Mount that folder. Click on **Media** in the IRC. Then choose the **Folder** option.
3. Browse to the location of the license.
4. Copy the contents of the license file from `/media/iLO2_FOLDER/` to `/opt/hptc/etc/license/XC.lic`

```
# cp /media/iLO2-FOLDER/* /opt/hptc/etc/license/XC.lic
```
5. Make sure the file permissions are set to allow only the user `root` to have read and write access:

```
# chmod 600 /opt/hptc/etc/license/XC.lic
# ls -l /opt/hptc/etc/license/XC.lic
-rw----- 1 root root 941 Oct 20 10:34 XC.lic
```
6. To unmount the folder, click **Media** on the IRC, then click **Unmount the folder**.

5.5 Running the `discover` Command

1. Click **(+)** for Active OA and choose **TCP/IP settings** in the left navigation window. Write down the MAC address of the OA (For example: 00.01.02.03.04.05:06).
2. Select **DHCP**, then **Apply**.

3. Enter the following command:

```
# cd /opt/hptc/config/sbin
```
4. Enter the following command:

```
# ./discover --enclosurebased --single --ic=AdminNet
```
5. Enter the following responses as indicated. For more information, see Section 3.6.3 in the *HP XC System Software Installation Guide*. For example:

Enter the MAC address of the OA for the enclosure in the format

```
xx:xx:xx:xx:xx:xx : oa_mac_address
```

Enter the common user name for all console port management devices:

```
root
```

Enter password: **Test1234**

Please re-enter password: **Test1234**

Upon completion, the OA has the address 172.31.32.1. If you need to access the OA, run a browser (e.g. Firefox) on the head node.

5.6 Running the cluster_config Command

To run the `cluster_config` command, follow these steps:

1. Enter the following command:

```
# cd /opt/hptc/config/sbin
```
2. Enter the following command:

```
# ./cluster_config
```

Enter the following responses as indicated. For more information, see Sections 3.8 through 3.11 in the *HP XC System Software Installation Guide*. For example:

HP recommends that you back up the database before proceeding. Do you want to back up the database? (yes/no) [y]: **Enter**

[L]ist Nodes, [M]odify Nodes, [A]nalyze, [H]elp, [P]roceed, [Q]uit:
P



NOTE: You might receive an error as follows:

```
Warning: Unable to get host by address for head node external network xxx.xxx.xxx.xxx
Warning: This could indicate a problem with DNS lookup Warning: Using null name with
name of xxx.xxx.xxx.xxx [L]ist Node [M]odify nodes [A]nalyz [H]elp [P]:
```

You can ignore this error because the system isn't connected to the external network.

```
Do you want to apply your changes to the cluster configuration?
[y/n]: y
```

```
[S]ervices Config, [P]roceed, [Q]uit: P
```

```
Do you want to apply your changes to the cluster configuration?
[y/n]: y
```

```
Do you want to apply your changes to the service configuration?
[y/n]: y
```

Example 5-2 cluster_config Command Output 1

```
root@n1:/opt/hptc/config/sbin
File Edit View Terminal Tabs Help
[root@n1 sbin]# ./cluster_config
Cluster Configuration - XC Cluster version HP XC V3.2.1 RC1 20071127

HP recommends that you back up the database before proceeding.
Do you want to back up the database? (yes/no) [y]:

Database backed up to /var/hptc/database/cndbbackup-20080401151216.sql

[L]ist Nodes, [M]odify Nodes, [A]nalyze, [H]elp, [P]roceed, [Q]uit: p
Do you want to apply your changes to the cluster configuration? [y/n] y

[S]ervices Config, [P]roceed, [Q]uit: p
Do you want to apply your changes to the service configuration? [y/n] y

Configuring system wide functions / policies / behaviors
Executing C02hptc_cluster_sfs sconfigure
Executing C02ssh_config sconfigure
Root ssh keys for the cluster already exist
(Warning: you will not be able to ssh/pdsh to
  other nodes until you reimage them)
Would you like to re-create them? ([n]/y)
```

Given that there are # nodes in this cluster, enter the number of NFS daemons that shall be configured to support them [8]: **Enter**

Enter the IP address or host name of the first external NTP server or leave blank to use the system clock on the NTP server node: **Enter**

Would you like to enable web based monitoring? ([y]/n): **y**

Enter the password for the 'nagiosadmin' web user:

New password: **Test1234**

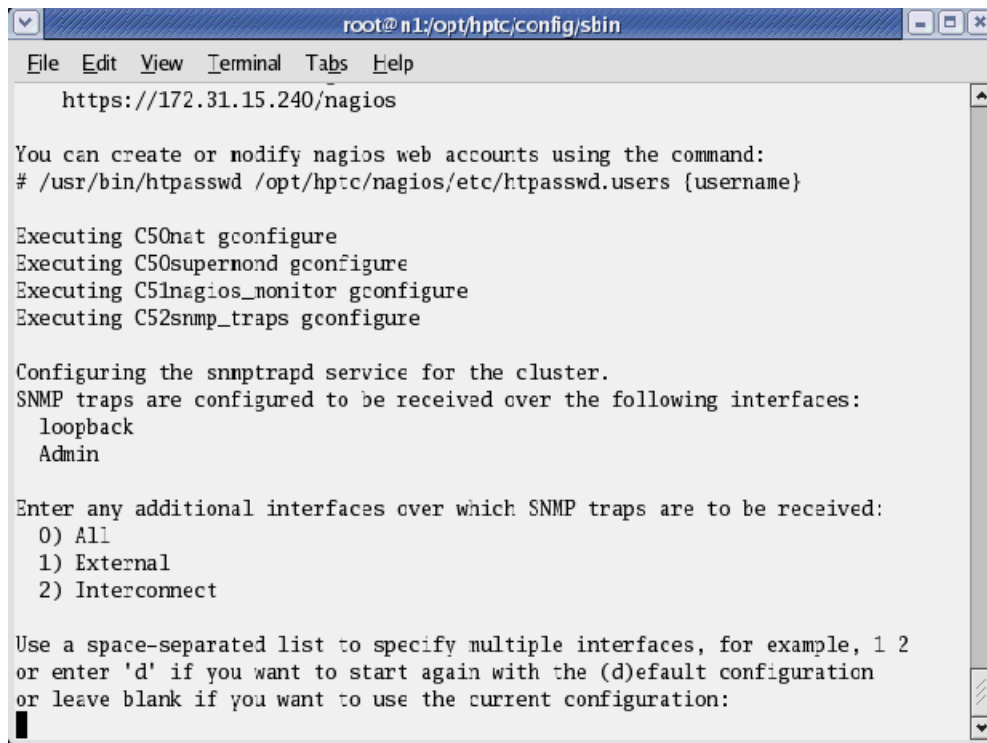
Re-type new password: **Test1234**

Adding password for user nagiosadmin

Interfaces over which traps are to be received:

[0]All, [1]External, [2]Int: **0**

Example 5-3 cluster_config Command Output 2



```
root@n1:/opt/hptc/config/sbin
File Edit View Terminal Tabs Help
https://172.31.15.240/nagios

You can create or modify nagios web accounts using the command:
# /usr/bin/htpasswd /opt/hptc/nagios/etc/htpasswd.users {username}

Executing C50nat gconfigure
Executing C50supernond gconfigure
Executing C51nagios_monitor gconfigure
Executing C52snmp_traps gconfigure

Configuring the snmptrapd service for the cluster.
SNMP traps are configured to be received over the following interfaces:
  loopback
  Admin

Enter any additional interfaces over which SNMP traps are to be received:
0) All
1) External
2) Interconnect

Use a space-separated list to specify multiple interfaces, for example, 1 2
or enter 'd' if you want to start again with the (d)efault configuration
or leave blank if you want to use the current configuration:
█
```

[O]k, [R]especify Interfaces: **O**

Interfaces over which traps will be accepted:

loopback
 Admin

[O]k, [R]especify Interfaces:

Would you like to create a self-signed certificate for the Apache server? ([y]/n): **n**

Do you want to configure SLURM? (y/n) [y]: **n**

SLURM configuration complete. Press 'Enter' to continue: **Enter**

Do you want to install LSF now? (y/n) [y]: **Enter**

There are two types of LSF available to install: 1. Standard LSF: the standard Load Sharing Facility product. 2. LSF-HPC integrated with SLURM: the LSF High Performance Computing solution integrated with SLURM for XC. Which LSF product would you like to install (1/2)?
[2]: **Enter**

LSF System Name [hptclsf]: **Enter**

Enter the name of the Primary LSF Administrator. [lsfadmin]: **Enter**

Do you want to create this user now? (y/n) [y]: **Enter**

New UNIX password: **Test1234**

Retype new UNIX password: **Test1234**

Press 1 or Enter to install this host type: **Enter**

The Golden Image will be created next. [P]roceed, [Q]uit: **P**



CAUTION: Do not interrupt or stop the golden image creation. Do not browse or touch files. Doing so corrupts the golden image.

If you corrupt the golden image, use the following command to remove the base image file (`/var/lib/systemimager/images/base_image`) to recover from a corrupted golden image:

```
# si_rmimage base_image
```

Restart the `cluster_config` process.

5.7 Running the `startsys` Command

Use this procedure to start the system and propagate the golden image to all nodes. Ensure that the power is off on all nodes except the head node. The `startsys` command turns on the power to all nodes, images the nodes, and boots the nodes.



IMPORTANT: You cannot continue if the license file is not present in `/opt/hptc/etc/license`. For information, see “Putting the License Key File in the Correct Location” (page 30)

IMPORTANT: The `startsys` command cannot power nodes on or off if the XC password is incorrect because the iLO always prompts for the password. To verify the XC database password, run the following command:

```
# /opt/hptc/hpls-pwr/mod/getauth
```

1. Enter the following command:

```
# setnode --resync --all
```
2. To image and boot the system in one step, enter the following command:

```
# startsys --image_and_boot
```
3. Make sure all the nodes are up. Enter the following command:

```
# power --status
```

Troubleshooting file system mounting

You might experience a mount failure when the nodes image, boot, and attempt to NFS mount the `/hptc_cluster` file system. Run the following commands on the head node to restart `nfs` and rerun node configuration scripts and restart services on all other nodes:

1.

```
# service nfs restart
```
2.

```
# pdsh -a touch /var/hptc/nconfig.1st
```
3.

```
# stopsys
```
4.

```
# startsys
```

5.8 Configuring the SNMP Trap

To configure the SNMP trap destination for the enclosure, follow these steps:

1. Enter the following command:

```
# manage_enclosure addtrap
```

```
[root@n1 sbin]# manage_enclosure addtrap
```

```
n-enc09CN8734016G: Added SNMP trap receiver destination 172.31.15.240
```

```
You have new mail in /var/spool/mail/root
```

```
[root@n1 sbin]#
```

2. Enter the following command:

```
# manage_enclosure listtrap
[root@n1 sbin] manage_enclosure listtrap
n-enc09CN8734016G:
    172.31.15.240
[root@n1 sbin]#
```

5.9 LSF Post-Configuration Tasks

To finish the configuration, follow these steps:

1. Login as root user on the head node.
2. Set up the LSF environment by sourcing the LSF file as follows:

```
# . /opt/hptc/lsf/top/conf/profile.lsf
```

3. Verify that the LSF profile file has been sourced by finding an LSF command:

```
# which lsid
[root@n1 sbin]# . /opt/hptc/lsf/top/conf/profile.lsf
[root@n1 sbin]# which lsid
/opt/hptc/lsf/top/6.2/linux2.6-glibc2.3-x86-64-slurm/bin/lsid
[root@n1 sbin]#
```

4. (Optional) If you assigned two or more nodes with the `resource_management` role and want to enable LSF failover, enter the following command:

```
# controllsf enable failover
```

5. Determine the node on which the LSF daemons are running:

```
# controllsf show current
[root@n1 sbin]# controllsf show current
LSF is currently running on n1, and assigned to node n1.
[root@n1 sbin]#
```

6. Restart the LIM daemon:

```
# lsadmin limrestart
[root@n1 sbin]# lsadmin limrestart
Checking configuration files ...
No errors found.
Restart LIM on <lsfhost.localdomain> ..... done
[root@n1 sbin]#
```



NOTE: Restarting the LIM daemon is required because the licensing of LSF-HPC with SLURM occurs when the LIM daemon is started. This means that the LIM daemon is licensed only for the processors that are actually available at that time, which might be fewer than the total number of processors available after all of the nodes have been imaged and are up and running.

7. Update the LSF batch system with the latest resource information reported by SLURM:

```
# badmin reconfig
[root@n1 sbin]# badmin reconfig
Checking configuration files ...
No errors found.
Reconfiguration initiated
[root@n1 sbin]#
```

5.10 Verifying LSF-HPC with SLURM

1. Verify that LSF-HPC with SLURM is running as follows:

```
# lsid
Platform LSF HPC 6.2 for SLURM, LSF_build_date
Copyright 1992-2005 Platform Computing Corporation
```

```
My cluster name is hptclsf
My master name is lsfhost.localdomain
```

2. Verify that the `lsf` partition exists and all nodes are in the idle state:

```
# sinfo
PARTITION AVAIL TIMELIMIT NODES STATE NODELIST
lsf          up    infinite    8  idle n[1-8]
```

3. Confirm that the `ncpus` value matches the expected total number of available processors:

```
# lshosts
HOST_NAME      type      model  cpuf  ncpus  maxmem  maxswp  server  RESOURCES
lsfhost.loc  SLINUX6  Opteron8  16.0    60  3649M      -      Yes (slurm)
```

4. Verify the dynamic resource information:

```
# bhosts
HOST_NAME      STATUS  JL/U  MAX  NJOBS  RUN  SSUSP  USUSP  RSV
lsfhost.localdomai ok      -    16    0    0    0    0    0
```

See the troubleshooting information in the *HP XC System Software Administration Guide* if you do not receive a status of `ok` from the `bhosts` command.

5.11 Running the OVP to Verify Software and Hardware Components

The Operation Verification Program (OVP) verifies the major HP XC software and hardware components to provide a level of confidence that the system has been installed and configured correctly.

The OVP performs tests to verify the following:

- The interconnect is functional.
- Network connectivity has been established.
- The administration network is operational.
- A valid license key file is installed and the license manager servers are up.
- All compute nodes are responding and are available to run applications.
- SLURM control daemons are responding and partitioning is valid if LSF-HPC with SLURM is configured.
- CPU usage on all nodes except the head node (by default).
- Memory usage on all compute nodes except the head node (by default).

Start the Operation Verification Program

To start the OVP, follow these steps:

1. Login as the root user on the head node.
2. Start the OVP with no component-specific options to test the entire system:

```
# ovp [--verbose [--verbose]] [--timeout=0]
```

3. Follow along with the OVP command output.
4. Examine the test results to ensure that all tests passed. Test results are stored in a date-stamped log file located in the `/hptc_cluster/adm/logs/ovp` directory. Test failures and warnings are clearly reported in the log file, and it contains some troubleshooting information. In some cases, the errors might be obvious, and the test output is terse.

The format of the OVP log file name includes the following:

- The internal name of the head node.
- The OVP run date in MMDDYYformat.

- The run number, which represents the number of times the OVP has been run. The run number is not included for the first run.

For example, the log file name `ovp_n16_070607.log` indicates that this is the first run of the OVP on July 06, 2007, on head node `n16`.

5. For more information about troubleshooting failed test results, see *HP XC System Software Installation Guide*.

For information about verifying individual cluster components on demand, see `ovp(8)` and the *HP XC System Software Administration Guide*.

If you receive errors or warnings from the OVP, try synchronizing the nodes:

```
# setnode --resync --all
```

5.12 Nagios Web Interface

Nagios is the system and network health monitoring application on an HP XC system. It watches hosts and services and alerts you when problems occur or are resolved.



TIP: HP recommends that you start up the Nagios web interface now to view the network and ensure that all hosts and services are in the green state.

To open the Nagios web page, follow these steps:

1. Open a browser on the head node.
2. Enter the following web address in the Address field:
`https://fully_qualified_HP_XC_hostname/nagios`
3. When prompted, log in as the `nagiosadmin` user and specify the Nagios administrator password.

If the hardware configuration contains less than 100 nodes, the `Service Detail` view provides a good overview of the system. It lists the Nagios hosts and shows their status.

The `Service Problems` view is more useful for hardware configurations with hundreds or thousands of nodes. It provides a practical overview of the system.

For more information about how to use Nagios, see the *HP XC System Software Administration Guide*.

5.13 The `nrg` Command

The `nrg` command uses data collected by the Nagios utility to generate reports. Use the `summary` option to display a summary of defined Nagios services and the state of those services. For example:

```
# nrg --mode summary
Apache HTTPS Server          1-Ok    0-Warn  0-Crit  0-Pend  0-Unk
configuration                10-Ok   0-Warn  0-Crit  0-Pend  0-Unk
Configuration Monitor       1-Ok    0-Warn  0-Crit  0-Pend  0-Unk
Environment                  10-Ok   0-Warn  0-Crit  0-Pend  0-Unk
Host Monitor                  1-Ok    0-Warn  0-Crit  0-Pend  0-Unk
IP Assignment - DHCP         1-Ok    0-Warn  0-Crit  0-Pend  0-Unk
Load Average                  10-Ok   0-Warn  0-Crit  0-Pend  0-Unk
LSF Failover Monitor         1-Ok    0-Warn  0-Crit  0-Pend  0-Unk
Nagios Monitor                1-Ok    0-Warn  0-Crit  0-Pend  0-Unk
NodeInfo                      10-Ok   0-Warn  0-Crit  0-Pend  0-Unk
PING Interconnect            10-Ok   0-Warn  0-Crit  0-Pend  0-Unk
Resource Monitor              1-Ok    0-Warn  0-Crit  0-Pend  0-Unk
Resource Status               10-Ok   0-Warn  0-Crit  0-Pend  0-Unk
Root key synchronization     1-Ok    0-Warn  0-Crit  0-Pend  0-Unk
Sensor Collection Monitor     1-Ok    0-Warn  0-Crit  0-Pend  0-Unk
```

Slurm Monitor	1-Ok	0-Warn	0-Crit	0-Pend	0-Unk
Slurm Status	10-Ok	0-Warn	0-Crit	0-Pend	0-Unk
Supermon Metrics Monitor	1-Ok	0-Warn	0-Crit	0-Pend	0-Unk
Switch	2-Ok	0-Warn	0-Crit	0-Pend	0-Unk
Switch Data Collection	1-Ok	0-Warn	0-Crit	0-Pend	0-Unk
Syslog Alert Monitor	1-Ok	0-Warn	0-Crit	0-Pend	0-Unk
Syslog Alerts	10-Ok	0-Warn	0-Crit	0-Pend	0-Unk
System Event Log	9-Ok	1-Warn	0-Crit	0-Pend	0-Unk
System Event Log Monitor	1-Ok	0-Warn	0-Crit	0-Pend	0-Unk
System Free Space	10-Ok	0-Warn	0-Crit	0-Pend	0-Unk
Totals:	115-Ok	1-Warn	0-Crit	0-Pend	0-Unk

If one or more warnings are reported, use the `analyze` option to obtain an analysis of the problem. When possible, the command output provides potential corrective action or the reasons for a given state. For example:

```
# nrg --mode analyze
```

```
Nodelist      Description
-----
nh            [System Event Log - NOSUCHHOST] The check_sel plug-in failed
to find the console port for this node, a common cause is the
console device cp-xxxxx, is not reachable. If this is the
head node and the head node is externally connected, you may
be able to define cp-xxxxx in /etc/hosts using the external
IP to allow connectivity. Sensor collection may not be
possible when using externally connected console ports for
head nodes on platforms that use IPMI to gather sensor
information. If this is not the head node then it may indicate
a communication problem with the associated console device
'cp-{nodename}'.
```

5.14 Creating a Baseline Copy of the Database

After you run the OVP to verify the successful installation and configuration of the system, HP recommends that you take a snapshot of the configuration and management database to create a baseline version. You can use a baseline copy of the database to restore the database to its original state.

Enter the following command to back up the configuration and management database to a file. If you do not specify a directory, the default location for the backup file is in the `/var/hptc/database` directory. Consider adding a date and time stamp to the file name to determine at a glance when the backup file was created. For example:

```
# managedb backup your_filename
```

Depending on your corporate security policy for managing system and database backups, consider storing the database backup file on a remote system as an additional precaution.

The *HP XC System Software Administration Guide* provides information about basic database management commands. For more information about managing the configuration and management database, see the *MySQL Reference Manual*, which is available at the following website:

<http://dev.mysql.com/>

5.15 Creating a Baseline Report of the System Configuration

The `sys_check` utility is a data collection tool you can use to diagnose system errors and problems. Use the `sys_check` utility now to create a baseline report of the system configuration (software and hardware).

The `sys_check` utility collects configuration data only for the node on which it is run unless you set and export the `SYS_CHECK_SYSWIDE` variable, which collects configuration data for all nodes in the HP XC system.

Use the following commands to run the `sys_check` utility in its simplest form:

```
# export SYS_CHECK_SYSWIDE=1
# sys_check > /tmp/filename.html
```

By default, the `sys_check` utility creates the report in HTML format, but there is an option to create a text version. You can redirect the output of the `sys_check` report to the directory and file name of your choice.

For more information about this utility and its options, see the *HP XC System Software Administration Guide* and `sys_check(8)`.

5.16 Setting Up VLAN



IMPORTANT: Set up the VLAN carefully and in accordance with the following procedures to ensure that access to the switch management functions is available over the required network. Setting up VLAN is particularly important if the system is on an external network because XC uses an autodiscovery process.

VLANs are commonly used to split up groups of network users into manageable broadcast domains, to create logical segmentation of workgroups, and to enforce security policies among logical segments.

If a c3000-based configuration is connected to an external network, both the Administrative/Console network and the external network are connected to the same switch. Although IP addressing and subnetting can be used to separate these networks, the default settings of the HP GbE2c Ethernet switch transmits broadcast traffic between the Administrative/Console network and the external network.

To control the broadcast traffic and to allow separate management policies to be applied to the Administrative/Console network from the external network, you can create a VLAN for the Administrative/Console network. The VLAN must have, as its members, the internal ports of the HP GbE2c switch that are connected to NIC1 of the servers (ports 1-8 on the switch) and the switches management interface. By default, all ports are members of VLAN1.

To start up a hyperterminal, follow these steps:

1. Go to **Programs**→**Accessories**→**Communications**→**HyperTerminal**.
2. Select COM1.
3. Fill in the following information:

Bits per second	9600
Data bits	8
Parity	None
Stop bits	1
Flow control	None

Click **OK**.
4. At the password prompt, type **admin**, which is the default.
5. Enter the following HP GbE2c switch CLI commands to create a second VLAN. Name VLAN#2 **AdminNet** and add the switch ports to it. The CLI prompts as follows:



NOTE: In the following example `/cfg/12/vlan 2`, `12` is the letter `1` as in layer, not the number one. Be sure to put a space between `vlan` and `2`.

```
>> /cfg/12/vlan 2
>> VLAN 2 name AdminNet
>> VLAN 2 add 1
>> VLAN 2 add 2
>> VLAN 2 add 3
>> VLAN 2 add 4
>> VLAN 2 add 5
>> VLAN 2 add 6
```



```
>> VLAN 2 add 7
>> VLAN 2 add 8
>> VLAN 2 add 21
>> VLAN 2 add 23
>> VLAN 2 ena
```

6. Assuming that the switch `ssh` or `telnet` management interface address has been assigned to IP interface `if 1`, add that to the VLAN with the following commands:

```
>> VLAN 2 /cfg/13/if 1
>> IP Interface 1 # vlan 2
```

7. Enter `/` at the CLI prompt, apply, and save the configuration as follows:

```
>> apply
>> save
```

8. Confirm saving to FLASH [y/n]: **y**



TIP: Attach the external ethernet to port 22 of the GbE2c switch to connect to the external network.

For more information on how to configure VLANs for creating separate network segments, including how to use VLAN tagging for devices that use multiple VLANs, see the *HP GbE2c Ethernet Blade Switch for c-Class BladeSystem Application Guide* at:

<http://bizsupport.austin.hp.com/bc/docs/support/SupportManual/c00701973/c00701973.pdf>

For more information on how to configure VLANs for XC Software, see Section 2.6.4 in the *HP XC System Software Hardware Preparation Guide*.

6 Troubleshooting

6.1 Unable to Manually Set IP Addresses for the iLOs

1. Verify that the iLOs are set to DHCP enabled.
2. Power down the node.
3. Then power it on and watch the monitor as the system boots. Early in the boot process, a message appears on the screen that says "F8 to configure". Press F8.
4. Follow the configuration menu to find the DHCP setting and disable it.

6.2 Changing External IP Addresses

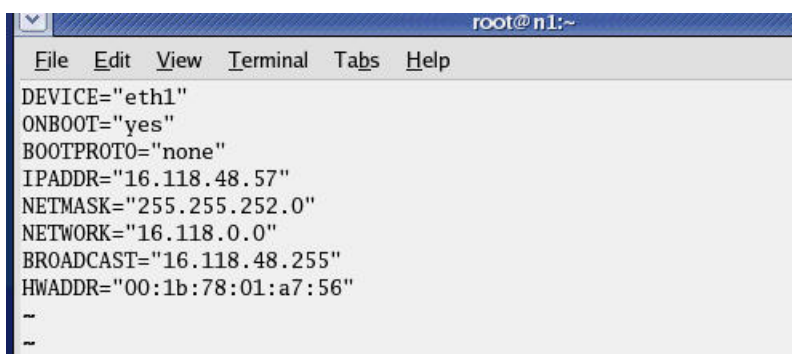
The `netinfo` file is only read the first time `cluster_config` runs. Thus, manually changing `netinfo` and rerunning `cluster_config` does not cause the database to be updated with the new IP address, because there is already an entry in the database. To get this to work, you can update the `/etc/sysconfig/network-scripts/ifcfg-ethX` file; where `X` is your external network adapter (probably `eth1`) with the `16.118.48.57` address. Then perform a `service network restart`. This change remains in the file until the next time you run `cluster_config`, which then reads in the old values from the database. To permanently change this value, either run `reset_db` then rerun `cluster_prep` and `cluster_config`, or manually update the IP address in the database with `mysql` commands.

For example:

1. Copy the file:

```
# cp /etc/sysconfig/network-scripts/ifcfg-eth1 /tmp/ifcfg-eth1.bk
```
2. Using a text editor, edit the `/etc/sysconfig/network-scripts/ifcfg-eth1` file with the correct external entries. The file looks like [Example 6-1](#), with entries that correspond to your external network information and MAC address of the `eth1` device.

Example 6-1 Contents of `network-scripts` File



```
root@n1:~
File Edit View Terminal Tabs Help
DEVICE="eth1"
ONBOOT="yes"
BOOTPROTO="none"
IPADDR="16.118.48.57"
NETMASK="255.255.252.0"
NETWORK="16.118.0.0"
BROADCAST="16.118.48.255"
HWADDR="00:1b:78:01:a7:56"
~
~
```

3. Modify the database:

```
# /opt/hptc/sbin/device_config --host n1 --type External --ipaddr  
<external IP address> --netmask <external netmask> --gateway  
<external gateway> --device eth1 <mac address of eth1>
```

Where the network information and MAC address are the same as in the file in [Example 6-1](#).

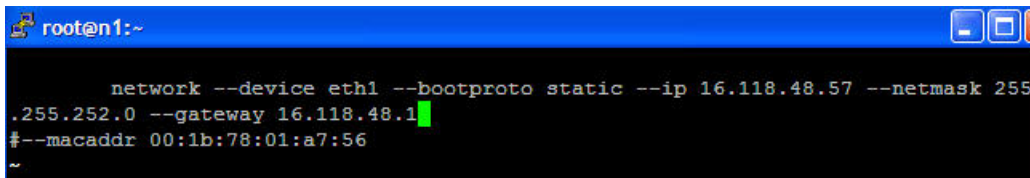
Example 6-2 Modify Database

```
hwaddr:
[root@n1 sysconfig]# pushd /opt/hptc/config
/opt/hptc/config /etc/sysconfig ~
[root@n1 config]# ls
base_addr.ini          modelmap              switches.ini
base_addrV2.ini       nicbond.staticdb.template  switchesV2.ini
collect1.ini          platform_vars.ini    TEMPLATE.txt
discover_data.ini     roles_services.ini   TEMPLATEV2.txt
etc                   sbin
mcs_checkValues.staticdb  SUPPORTED_SYSTEMS
[root@n1 config]# cd sbin
[root@n1 sbin]# ./device_config
External Network Configuration - XC Cluster version HP XC V3.2.1 RC1 20071127

[L]ist Nodes, [M]odify Nodes, [H]elp, [P]roceed, [Q]uit:
[root@n1 sbin]# ./device_config --dryrun --host n1 --type External --ipaddr 16.1
18.48.57 --netmask 255.255.252.0 --gateway 16.118.48.1 --device eth1 00:1b:78:01
:a7:56
Set n1: External to name:
  iftype: Ethernet device: eth1 hwaddr: 00:1b:78:01:a7:56
  ipaddr: 16.118.48.57 netmask: 255.255.252.0 gateway: 16.118.48.1
  ipv6addr: mtu:
Note: Dry run only, no changes made
[root@n1 sbin]#
```

4. (Optional) Edit the file `/etc/sysconfig/netinfo` to reflect the correct external network information and MAC address.

Example 6-3 Sample `netinfo` File



```
root@n1:~
network --device eth1 --bootproto static --ip 16.118.48.57 --netmask 255
.255.252.0 --gateway 16.118.48.1
#--macaddr 00:1b:78:01:a7:56
~
```

5. Run the configuration scripts with the command `service nconfig nconfigure`.
6. Restart the network with the command `service network restart`.

6.3 Lost Connection to the iLO

If iLO2 is not responding to the browser, click **Reset** on the Diagnostic page of the iLO 2 browser interface.

6.4 Removing a Bad Golden Image

To remove the golden image, follow these steps:

1. Login to the head node root user account.
2. Enter the following command:
`# si_image base_image`
3. Go back to `cluster_config` and rerun it.
4. Rerun `cluster_config` and make sure it successfully runs to completion before attempting to touch the keyboard or mouse again.
5. Enter the following command:
`# sys_start image_and_reboot`

6.5 Lost Terminal Window When in the IRC

If a terminal window fails to open in the IRC, press **CTL ALT Backspace**. This will take you back to the login screen. After you login, you can open up a terminal window.

A Additional Software Setup Information

To change the iLO default user name and password

1. Under the hardware model, click **iLO**.
2. In the body of the main window, click the **Web Administration** link to open the Integrated Lights-Out 2 utility in a new window. You might have to turn off popup blocking for this window to open.
3. In the new window, click the **Administration tab**.
4. In the left frame, click the **User Administration** link.
5. Click the **New** button, and create a new iLO2 user name and password, which must match the user name and password you set on the Onboard Administrator. Do not use any special characters as part of the password.

Or, an alternate method is:

1. Access the **MPI Main Menu**.
2. Enter **CM** at the **MP>** prompt.
3. Enter **UC** at the **MP : CM>** prompt and follow the prompts to modify the user account.

To change the OA default user name and password

See Chapter 4 of the *HP XC System Software: Hardware Preparation Guide Version 3.2.1* to change the OA user name and password.

To change the Nagios default user name and password

The Nagios passwords are maintained in the `/opt/hptc/nagios/etc/htpasswd.users` file. Use the `htpasswd` command to add, delete, or edit the user password.

SLURM post-configuration tasks

Perform this procedure as root user on the head node.

- a. Go to Appendix J in the *HP XC System Software Installation Guide* to determine the type of customizations that are available or required. For instance, if you installed and configured SVA, SVA requires certain SLURM customizations.
- b. Use the text editor of your choice to edit the SLURM configuration file: `/hptc_cluster/slurm/etc/slurm.conf`
- c. Use the information in Appendix J to customize the SLURM configuration according to your requirements.
- d. If you make changes to the `slurm.conf` file, save your changes and exit the text editor.
- e. Update the SLURM daemons with this new information:

```
# scontrol reconfig
```

Use the SLURM post-configuration utility to update the `slurm.conf` file with the correct processor count and memory size.

```
# spconfig
```



NOTE: If a compute node did not boot up, the `spconfig` utility configures the node as follows:

```
Configured unknown node n14 with 1 CPU and 1 MB of total memory...
```

After the node has been booted up, rerun the `spconfig` utility to configure the correct settings.

For more information, see section 3.19.1 in the *HP XC System Software Installation Guide*.

B Additional Hardware Setup Information

B.1 HP Workgroup System Specifications

Table B-1 HP Workgroup System Specifications

Size ¹	Height 54.1 cm (21.20 in) Width 34.24 cm (13.48 in) Depth 87.45 cm (34.43 in)
Weight ²	87.09 kg (192 lb) to 155 kg (342 lb) depending on the configuration
Power Requirements ¹	C13/C14 power cords connected directly to low-line wall outlets
Operating Temperature Range ³	10°C to 35°C (50°F to 95°F)
Space and Air Flow ⁴	63.5 cm (25 in) front 76.2 cm (30 in) rear 121.9 cm (48 in) rear from the rear of another enclosure or rack

1 For more details, see [HP BladeSystem c3000 Enclosure – Specifications](#).

2 For more details, see [HP BladeSystem c3000 QuickSpecs](#).

3 For more details, see [All product manuals for HP BladeSystem c3000 Enclosures](#) and click *HP BladeSystem c3000 Enclosure and c3000 Tower Enclosure Maintenance and Service Guide*.

4 For more details, see [All product manuals for HP BladeSystem c3000 Enclosures](#) and click *HP BladeSystem c3000 Enclosure Setup and Installation Guide*.

B.1.1 Thermal Stabilization

Before you remove the enclosure from its packaging, allow it enough time to adjust to the local temperature and humidity of the new operating environment.



CAUTION: Failure to thermally stabilize cluster components can potentially damage drive media or associated electronics when the cluster is activated.

Place the equipment in the room in which it is to be installed. If it arrives in a plastic bag, leave it in the bag. If condensation is visible on any component, stabilize in the operating environment for six hours or until the condensation is no longer visible, whichever is longer. Table B-2 specifies the time required to thermally stabilize the enclosure, based on the ambient shipping temperature.

Table B-2 Thermal Stabilization Specification

Ambient Shipping Temperature Range (°C)	Ambient Shipping Temperature Range (°F)	Minimum Stabilization Time
60 to 66	140 to 151	3 hours
50 to 59	122 to 139	2 hours
40 to 49	104 to 121	1 hour
30 to 39	86 to 103	30 minutes
18 to 29	65 to 85	None
10 to 17	50 to 64	30 minutes
0 to 9	32 to 49	1 hour
-10 to -1	14 to 31	2 hours
-20 to -11	-4 to 13	3 hours

Table B-2 Thermal Stabilization Specification *(continued)*

Ambient Shipping Temperature Range (°C)	Ambient Shipping Temperature Range (°F)	Minimum Stabilization Time
-30 to -21	-22 to -5	4 hours
-40 to -31	-40 to -21	5 hours

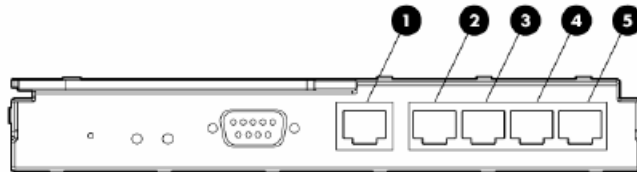
C IP Addresses on a Corporate Network

Use this method if you have access to the corporate network and a DHCP server providing IP addresses. In order to use this process, the iLOs must be set to DHCP enabled.

C.1 Cabling

1. Power off the enclosure.
2. Connect the RJ45 CAT5 patch cable from the OA1 interface port to port 24 of the GigE switch. (Figure C-1) See Figure 1-3 (page 12) for the exact location of the interconnect switch. (Callout 2.)

Figure C-1 Interconnect Switch



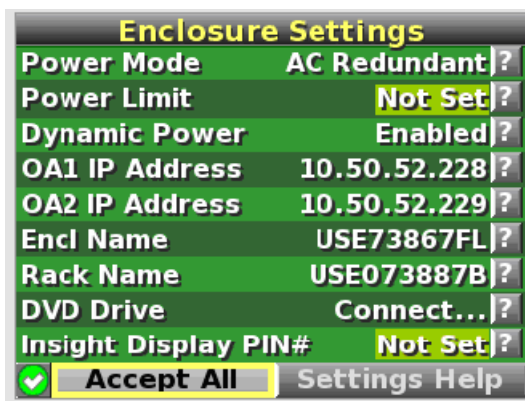
The following list describes the callouts in Figure C-1:

1. Port 20 RJ-45 connector for 10/100/1000 Mb uplink
 2. Port 21 RJ-45 connector for 10/100/1000 Mb uplink
 3. Port 22 RJ-45 connector for 10/100/1000 Mb uplink
 4. Port 23 RJ-45 connector for 10/100/1000 Mb uplink
 5. Port 24 RJ-45 connector for 10/100/1000 Mb uplink
3. Connect port 21 of the GigE switch to the corporate network.

C.2 IP Addresses

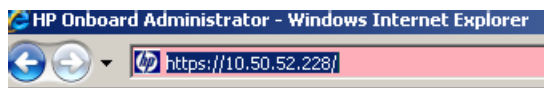
1. Extend the Insight Display Panel.
2. Power on the enclosure and wait for the display to show a network address other than 0.0.0.0. It changes to an address on the corporate network obtained from the DHCP server.

Figure C-2 Enclosure Settings Display



3. Connect your laptop to the corporate network and verify that you can ping the address displayed by the OA.
4. Start a browser on your laptop and use the IP address listed in the **OA1 IP address** field to launch the OA. Figure C-3 shows an example using Internet Explorer:

Figure C-3 OA IP Address



On the warning page, click **Continue to this website**.

5. Enter the Administrator user name and the password supplied with the HP Workgroup System.

D Configure sendmail

LSF requires a mail program to send job output to users who submit jobs and to send administrative messages to the LSF administrator.

By default, LSF uses the `sendmail` mail program. The `sendmail` service is installed by default on the head node in `/usr/lib/sendmail`, but you must configure `sendmail` to meet your site requirements.

sendmail Configuration Requirements on an HP XC System

Although Linux `sendmail` typically functions correctly as shipped, current HP XC host naming conventions cause `sendmail` to improperly identify itself to other mail servers. This improper identification can lead to the mail being rejected by the remote server.

To remedy this issue, perform the following procedure on all nodes with an external connection that will send mail:

1. Be sure you know the fully qualified host name associated with the node's external IP address.
2. On the head node, add an entry for the IP address and fully qualified host name to the top of the `/etc/hosts` file. Make the entry above the comment `#XC-CLUSTER Do Not Edit Below this Line`. An entry is similar to the following:

```
192.0.2.3      penguin.southpole.com
```

In the previous example, `penguin.southpole.com` is the fully qualified host name, and `192.0.2.3` is its external IP address.

3. Save the changes to the file and exit the text editor.
4. Use the text editor of your choice to open and edit the following file:

```
/etc/mail/submit.cf
```

5. Locate the section of the file that is similar to this:

```
# my official domain name
# ... define this only if sendmail cannot automatically determine
# your domain
#Dj$w.Foo.COM
```

6. Uncomment the macro and include the fully qualified host name. The entry is similar to this for `penguin.southpole.com`:

```
# my official domain name
# ... define this only if sendmail cannot automatically determine
# your domain
Djpenguin.southpole.com
```

7. Save the changes to the file and exit the text editor.
8. Use the text editor of your choice to open and edit the following file:

```
/etc/mail/sendmail.cf
```

9. Repeat steps 5 and 6 and make the same changes to the `sendmail.cf` file.
10. Save the changes to the file and exit the text editor.
11. Restart `sendmail`:

```
# service sendmail restart
```

To forward mail to users, the `sendmail` service requires users to create `.forward` files in their home directories to specify where mail is to be sent.

If you intend to make additional, more advanced modifications to `sendmail`, HP recommends that you do not modify the `.cf` files directly. Rather, modify the `.mc` files and run them through an M4 processor to create the `.cf` files. The M4 processing tools are part of the `sendmail-cf` RPM, which is not installed by default. The `sendmail-cf` RPM is available on the HP XC distribution DVD in the extra RPMs directory.

Consult any third-party Linux system administration reference manual if you need more information about configuring `sendmail`.

To use a mail program other than `sendmail`, set the `LSB_MAILPROG` variable in the `/opt/hptc/lsf/top/conf/lsf.conf` file to the appropriate mail program after the system configuration is complete.

Glossary

A

administration network The private network within the HP XC system that is used for administrative operations.

B

base image The collection of files and directories that represents the common files and configuration data that are applied to all nodes in an HP XC system.

branch switch A component of the administration network. A switch that is uplinked to the root switch and receives physical connections from multiple nodes.

C

cluster A set of independent computers combined into a unified system through system software and networking technologies.

compute node A node that is assigned only with the compute role and no other. Jobs are distributed to and run on nodes with the compute role; no other services run on a compute node.

D

DHCP Dynamic Host Control Protocol. A protocol that dynamically allocates IP addresses to computers on a local area network.

Dynamic Host Control Protocol See DHCP.

E

enclosure The hardware and software infrastructure that houses HP BladeSystem servers.

G

golden image A collection of files, created from the golden client file system that are distributed to one or more client systems. Specific files on the golden client may be excluded from the golden image if they are not appropriate for replication.

H

head node The single node that is the basis for software installation, system configuration, and administrative functions in an HP XC system. There may be another node that can provide a failover function for the head node, but HP XC system has only one head node at any one time.

host name The name given to a computer. Lowercase and uppercase letters (a–z and A–Z), numbers (0–9), periods, and dashes are permitted in host names. Valid host names contain from 2 to 63 characters, with the first character being a letter.

I

I/O node A node that has more storage available than the majority of server nodes in an HP XC system. This storage is frequently externally connected storage, for example, SAN attached storage. When configured properly, an I/O server node makes the additional storage available as global storage within the HP XC system.

iLO Integrated Lights Out. A self-contained hardware technology available on CP3000 and CP4000 cluster platform hardware models that enables remote management of any node within a system.

iLO2	The next generation of iLO that provides full remote graphics console access and remote virtual media. <i>See also</i> iLO.
image server	A node specifically designated to hold images that will be distributed to one or more client systems. In a standard HP XC installation, the head node acts as the image server and golden client.
Integrated Lights Out	<i>See</i> iLO.
interconnect	A hardware component that provides high-speed connectivity between the nodes in the HP XC system. It is used for message passing and remote memory access capabilities for parallel applications.
interconnect module	A module in an HP BladeSystem server. The interconnect module provides the Physical I/O ports for the server blades and can be either a switch, with connections to each of the server blades and some number of external ports, it can be or a pass-through module, with individual external ports for each of the server blades. <i>See also</i> server blade.
interconnect network	The private network within the HP XC system that is used primarily for user file access and for communications within applications.
Internet address	A unique 32-bit number that identifies a host's connection to an Internet network. An Internet address is commonly represented as a network number and a host number and takes a form similar to the following: 192 . 0 . 2 . 0.
ITRC	HP IT Resource Center. The HP corporate web page where software patches are made available. The web address is http://www.itrc.hp.com . To download patches from this web page, you must register as an Americas/Asia Pacific or European customer.

L

load file	A file containing the names of multiple executables that are to be launched simultaneously by a single command.
Load Sharing Facility	<i>See</i> LSF-HPC with SLURM.
local storage	Storage that is available or accessible from one node in the HP XC system.
LSF execution host	The node on which LSF runs. A user's job is submitted to the LSF execution host. Jobs are launched from the LSF execution host and are executed on one or more compute nodes.
LSF master host	The overall LSF coordinator for the system. The master load information manager (LIM) and master batch daemon (<code>mbatchd</code>) run on the LSF master host. Each system has one master host to do all job scheduling and dispatch. If the master host goes down, another LSF server in the system becomes the master host.
LSF-HPC with SLURM	<p>Load Sharing Facility for High Performance Computing integrated with SLURM. The batch system resource manager on an HP XC system that is integrated with SLURM. LSF-HPC with SLURM places a job in a queue and allows it to run when the necessary resources become available. LSF-HPC with SLURM manages just one resource: the total number of processors designated for batch processing.</p> <p>LSF-HPC with SLURM can also run interactive batch jobs and interactive jobs. An LSF interactive batch job allows you to interact with the application while still taking advantage of LSF-HPC with SLURM scheduling policies and features. An LSF-HPC with SLURM interactive job is run without using LSF-HPC with SLURM batch processing features but is dispatched immediately by LSF-HPC with SLURM on the LSF execution host.</p> <p><i>See also</i> LSF execution host.</p>

M

MCS	An optional integrated system that uses chilled water technology to triple the standard cooling capacity of a single rack. This system helps take the heat out of high-density deployments of servers and blades, enabling greater densities in data centers.
------------	---

MySQL A relational database system developed by MySQL AB that is used in HP XC systems to store and track system configuration information.

N

NAT Network Address Translation. A mechanism that provides a mapping (or transformation) of addresses from one network to another. This enables external access of a machine on one LAN that has the same IP address as a machine on another LAN, by mapping the LAN address of the two machines to different external IP addresses.

Network Address Translation *See* NAT.

Network Information Services *See* NIS.

NIS Network Information Services. A mechanism that enables centralization of common data that is pertinent across multiple machines in a network. The data is collected in a domain, within which it is accessible and relevant. The most common use of NIS is to maintain user account information across a set of networked hosts.

NIS client Any system that queries NIS servers for NIS database information. Clients do not store and maintain copies of the NIS maps locally for their domain.

NIS master server A system that stores the master copy of the NIS database files, or maps, for the domain in the `/var/yp/`DOMAIN directory and propagates them at regular intervals to the slave servers. Only the master maps can be modified. Each domain can have only one master server.

NIS slave server A system that obtains and stores copies of the master server's NIS maps. These maps are updated periodically over the network. If the master server is unavailable, the slave servers continue to make the NIS maps available to client systems. Each domain can have multiple slave servers distributed throughout the network.

O

OA The enclosure management hardware, software, and firmware that is used to support all of the managed devices contained within the HP BladeSystem c-Class enclosure.

onboard administrator *See* OA.

P

parallel application An application that uses a distributed programming model and can run on multiple processors. An HP XC MPI application is a parallel application. That is, all interprocessor communication within an HP XC parallel application is performed through calls to the MPI message passing library.

PXE Preboot Execution Environment. A standard client/server interface that enables networked computers that are not yet installed with an operating system to be configured and booted remotely. PXE booting is configured at the BIOS level.

R

resource management role Nodes with this role manage the allocation of resources to user applications.

role A set of services that are assigned to a node.

Root Administration Switch A component of the administration network. The top switch in the administration network; it may be a logical network switch comprised of multiple hardware switches. The Root Console Switch is connected to the Root Administration Switch.

root node A node within an HP XC system that is connected directly to the Root Administration Switch.

S

server blade	One of the modules of an HP BladeSystem. The server blade is the compute module consisting of the CPU, memory, I/O modules and other supporting hardware. Server blades do not contain their own physical I/O ports, power supplies, or cooling.
SLURM backup controller	The node on which the optional backup <code>slurmctld</code> daemon runs. On SLURM failover, this node becomes the SLURM master controller.
SLURM master controller	The node on which the <code>slurmctld</code> daemon runs.
SMP	Symmetric multiprocessing. A system with two or more CPUs that share equal (symmetric) access to all of the facilities of a computer system, such as the memory and I/O subsystems. In an HP XC system, the use of SMP technology increases the number of CPUs (amount of computational power) available per unit of space.
ssh	Secure Shell. A shell program for logging in to and executing commands on a remote computer. It can provide secure encrypted communications between two untrusted hosts over an insecure network.
symmetric multiprocessing	<i>See</i> SMP.

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