COMPAQ
Integration Note

February 2000
11PE-0100A-WWEN

Prepared by OS Integration

Compaq Computer Corporation

Contents

Implementing Red Hat Linux 6.1 on Compaq ProLiant Servers

Abstract: This document provides information on installing and implementing a Red Hat Linux 6.1 operating system on a Compaq ProLiant server for field service engineers and system administrators. It includes a list of certified Compaq hardware, a description of operating system requirements, a step-by-step installation, and a troubleshooting section.

Appendices A and B include data on standard specifications for Compaq ProLiant products. Appendix C describes the SoftPaqs Compaq released for Red Hat Linux 6.1. Appendix D provides website addresses for additional information on Compaq and Red Hat Linux.

For additional information regarding the configuration of Linux on Compaq X86 servers, see the white paper entitled *Installation and Configuration Guide for Linux and Apache Web Server on Intel*. Check our website at http://www.compaq.com/linux or test drive Linux at http://www.testdrive.compaq.com/linux.

Note: We suggest you read and thoroughly understand this document before installing Red Hat Linux 6.1 on your Compaq server.

Help us improve our technical communication. Let us know what you think about the technical information in this document. Your feedback is valuable and will help us structure future communications. Please send your comments to: linux.feedback@compaq.com

Notice

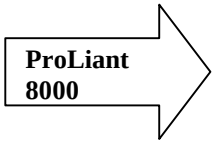
Implementing Red Hat Linux 6.1 on Compaq ProLiant Servers
Integration Note prepared by OS Integration

First Edition (February 2000)
Document Number 11PE-0100A-WWEN

Hardware

Compaq participates in the Red Hat Linux Hardware Certification Program and Compaq engineers constantly review the Compaq hardware and drivers to ensure compatibility with Linux. Check the Compaq website: http://www.compaq.com/linux for the latest information regarding hardware compatibility and device driver updates.

Compaq engineers installed and tested Red Hat Linux 6.1 with several different configurations of Compaq ProLiant servers. Because of its architecture, some exceptions exist for the ProLiant 8000 and for SMART Array Controllers. Special instructions for the ProLiant 8000 and SMART Array Controllers appear next to the symbol shown below.



Servers

The following Compaq servers were certified for use with Red Hat Linux 6.1 as of the date of publication of this document.

- ProLiant 400
- ProLiant 800
- ProLiant 1600R
- ProLiant 1850R
- ProLiant 3000
- ProLiant 5500
- ProLiant 6400R
- ProLiant 6500
- ProLiant 7000
- ProLiant 8000
- ProLiant 8500
- Prosignia Server 720
- Prosignia Server 740

Other servers in the Compaq ProLiant and Prosignia families are being tested for certification with Red Hat Linux at this time.

Controllers

All servers tested, with the exception of the ProLiant 8000 and ProLiant 8500 servers, come equipped with a Symbios Logic SCSI controller. The Compaq SMART Array controller ships standard on the ProLiant 8000 and ProLiant 8500; it is available as an option on other ProLiant servers.

The Compaq SMART Array controller device driver can be obtained through our website on a SoftPaq; use SoftPaq 10775 for DOS or SoftPaq 10776 for UNIX. See Appendix C for more information on the SoftPaqs. The device driver works with the following controllers.

- Compaq Integrated SMART Array Controller
- Compaq SMART Controller (EISA)
- Compaq SMART-2/E Array Controller (EISA}
- Compaq SMART-2/P Array Controller
- Compaq SMART-2DH Array Controller
- Compaq SMART-2SL Array Controller
- Compaq Smart Array 221 Controller
- Compaq Smart Array 3100ES Controller
- Compaq Smart Array 3200 Controller
- Compaq Smart Array 4200 Controller
- Compaq Smart Array 4250ES Controller

Tape Devices

The following Compaq tape drive families work with Red Hat Linux:

- DAT
- SLR
- DLT
- AIT

Network Interface Controllers

Both the ThunderLAN and Intel chipset network interface controllers (NICs) operate in Linux. If you do not know what type of NIC you have on your equipment, refer to Appendix A for hardware specifications. The following controllers are based on the ThunderLAN chipset:

- Compaq NetFlex-3/P Controller
- Compaq Integrated UTP/BNC Controller
- Compaq Integrated 10/100 TX UTP Controller
- Compaq Dual 10/100 TX UTP Controller
- Compaq Netelligent 10/100 TX PCI UTP Controller

The following controllers are Intel based NICs:

- Compaq NC3122 Fast Ethernet NIC
- Netelligent 10/100 TX WOL PCI UTP Intel Controller

Obtain the driver for the Intel 6120 Series NIC, the gigabit module, through the Intel website: http://www.intel.com/support/network/adapter/1000/software.htm. The Compaq NC3151 Controller uses the gigabit module and requires this driver to operate in a Linux environment.

The Compaq NC3131 DualPort Controller requires the device driver found on SoftPaq 10775 (for DOS) or SoftPaq 10776 (for UNIX).

ProLiant 8000

The 2.2 kernel can only detect devices on the Primary PCI Bus, PCI bus 0. By default, the NIC on the ProLiant 8000 and ProLiant 8500 servers is not located on PCI bus 0. Move the NIC to a slot located on PCI bus 0 before beginning installation.

Requirements

To use Red Hat Linux 6.1 as your server operating system, your server should meet the system requirements in Table 1.

Table 1. System requirements

Component	Requirement
Processor	Pentium or higher
RAM	64 MB
Hard drive	1.6 GB

These requirements pertain to the operating system only and do not include consideration for any software applications loaded on your server. Please check your application requirements to make certain your system can run both the operating system and your software.

Installation

Compaq developed a SoftPaq to address issues with Red Hat Linux 6.1 installation and the Smart Array Controllers and the Compaq NC3131 DualPort NIC. The SoftPaq is available in DOS (SP10775), and UNIX (SP10776) versions. Download the SoftPaq from http://www.compaq.com/support/files/server/us/index.html and follow the instructions provided. See Appendix C for more information regarding these SoftPaqs. Check our website for the latest information on device drivers.

In order to properly install the Red Hat Linux 6.1 operating system, use SmartStart to format your hard drive and install Compaq utilities. The Red Hat Linux 6.1 software provides additional formatting parameters for partitioning the hard drive, configuring the server for installation, selecting the packages to install, and configuring your monitor.

Formatting your Compaq Hardware

Both the Compaq SmartStart and Support Software CD and the Red Hat Linux software are necessary to format your Compaq hardware to install the operating system properly.

Compaq SmartStart and Support Software CD

To begin the installation, boot the server with the Compaq SmartStart and Support Software CD.

- Select Manual Configuration → SCO → UnixWare 2.1.3.

SmartStart verifies the configuration, configures the hardware, loads the configuration to the partition, and then restarts the system twice.

If you have SMART controllers on your server, SmartStart automatically goes to the Array Configuration Utility. Use the instructions available on SmartStart and the Help file to configure your array. After you complete the configuration, close the window to restart the server. If you have SMART controllers on your system, please see "SMART Array Controllers" under "Troubleshooting."

For systems without SMART controllers, SmartStart detects and sets the integrated controller as the primary controller and installs the system partition.

SmartStart formats a temporary partition, restarts the server, decompresses SmartStart files, and discovers the hardware. After this process completes, SmartStart notifies you of the removal of SmartStart from memory and the server restarts. The message on the next screen instructs you to remove the SmartStart CD, put in the operating system CD, and click **Continue**. Before you click **Continue**, understand the installation options for Red Hat Linux 6.1.

Red Hat Linux 6.1 Software

There are four options for installing Red Hat Linux 6.1:

- Red Hat Linux CDROM
- Red Hat Linux boot diskette and CDROM
- Red Hat Linux boot diskette and hard drive
- Network

The Red Hat boot diskette allows for installation from the CDROM or the hard drive. The network installation offers HTTP, NFS, and FTP options.

You must run **fdisk** to maintain your Compaq utilities. If you use the Red Hat boot diskette, it offers the option of running **fdisk** through the Regular Mode for installation. If you boot from the Red Hat CDROM or a network boot diskette, use Expert Mode for installation to maintain your system partition.

The procedure listed below includes the additional procedures required in Expert Mode. Some of these instructions occur automatically in Regular Mode. Installation through a network connection contains the same procedures but in a different order. Basic responses do not change regardless of the method except as indicated in the text.

The system comes up to the Red Hat Install screen and contains a message regarding the type of installation you want to perform.

- Enable Expert Mode, unless you use the Red Hat boot diskette, by typing expert and pressing the **Enter** key.

A screen prompting you to insert the driver disk appears.

- Highlight Cancel → **Enter**.
- Highlight Language → **Enter**.
- Highlight Keyboard Type → **Enter**.
- Highlight Install Method → **Enter**.

The next screen prompts you to select how the operating system will be loaded.

- Select the appropriate method.

This screen does not appear when using the CD only installation. The next screen message concerns loading special devices.

- Highlight Add Device → SCSI → **Enter**.

Lists provided throughout the installation process are not necessarily alphabetical.

- Scroll down and select Compaq SMART/2 RAID Controller if you have array controllers.
- Scroll down and select Symbios/NCR 53C8xx if you have an embedded controller.

Note: If you make a mistake on the devices, restart the installation. The incorrect driver might become part of the boot sequence. If it does, the boot sequence might look for the wrong hardware and could give a *Kernel Panic* message on restart.

The controller loads and a message on the screen verifies that it found the driver and provides an option to select another device.

- Highlight Add → Network → **Enter**.
- Highlight your NIC from the list → **Enter**.

The next screen message verifies that it found the driver and lists all drivers loaded.

Red Hat then looks for your mouse driver and defaults to the 3 Button Mouse selection. Red Hat recommends enabling the three-button mouse emulation for your two-button mouse because its GUI makes use of the third button.

- Go to Generic → 2 Button Mouse (PS/2) → Select Emulate 3 Button Mouse → **Next**.

Note: To emulate the third button on a two-button mouse, press both the right and left buttons simultaneously.

The System Installer screen appears prompting you to partition your hard drive.

Partitioning your Hard Drive(s)

While each physical hard drive in your server can contain only four primary partitions, you can create multiple extended partitions. Decide how you want to partition your hard drive before you start this process. The partition set up by SmartStart contains Compaq Utilities and Diagnostics. To operate Red Hat Linux, you need a Linux Native partition and a Linux Swap partition. You might want a separate boot partition. For large logical drives, the boot partition could be necessary to meet the limitation of installing the boot sequence below cylinder 1024.

Some Red Hat Linux file systems can have their own partitions; they include the following:

- */tmp*
- */boot*
- */usr*
- */usr/local*
- */var*
- */home*
- */opt*

Some directories must be a part of /; they include these systems:

- */etc*
- */lib*
- */bin*
- */sbin*
- */dev*

An extended partition can be created for the partitions needed by Linux. The extended partition can then be divided into other extended partitions and logical drives depending on how you want to use the system. If you create an extended partition for the Linux operating system, you still have one primary partition to set up dual booting. For more information on partitioning your hard drive, check http://www.redhat.com/support/docs/howto or review the Red Hat documentation.

Check the options on each installation screen carefully. Selection of an option makes the square or diamond look indented.

Determine how you want to partition your hard drive(s) and calculate your partition sizes before beginning this process. The Compaq Utilities and Diagnostics partition uses at least five cylinders. The swap partition, at a minimum, should equal the RAM in your server and, at a maximum, 2 GB. You can create up to eight swap partitions, but the size cannot exceed 4 GB total. The boot partition, if you want one, should require no more than 20 MB. The Linux Native partition can utilize the remainder of the hard drive space. An option to allow the Linux Native partition to grow is available. If you create an extended partition for the Linux Native and Linux Swap partitions, the extended partition can use the remainder of the drive space.

At the System Installer screen,

- Click **Next** when you are ready to continue.

The following screen provides several options for the installation type.

- Select Custom to preserve your Compaq utility partition.

IMPORTANT: You must run **fdisk** to properly install Red Hat Linux on your Compaq system with the CDROM or network boot installation.

- Select Run **fdisk** in the upper right hand corner → **Next**.

The numbering for disks and partitions using the SMART Array controllers is as follows:

c=controller followed by the number of the controller

d=disk followed by the number of the disk

p=partition followed by the number of the partition

- Select the drive on which to run **fdisk.**

The screen displays all the hard drives on the server. Drive codes are simple–*sda* means the first SCSI disk and *sdb* means the second SCSI disk with the integrated controller. With the SMART Array controller, Linux labels the hard drive *ida/c0d0* with *c* being the controller number and *d* being the disk number; the first controller and disk numbers are *0.*

- Select the first drive listed → **Next**.

If Linux sees more than one disk drive, you should either receive the following warning message at this point of the installation or after you partition the first hard drive:

The partition table on device sdb is corrupted.

To create new partitions it must be initialized,

causing the loss of ALL DATA on this drive.

If you have two disk drives and do not receive this warning message, the second drive might contain data. In our testing, the only time this message did not pop up, the second hard drive had not been properly erased.

- Select Initialize.

The following screen provides a command line so that you can set up your hard drive partitions in Expert Mode. In Regular Mode, a GUI replaces this screen. Navigate in the GUI to set up your partitions. In order to create a boot partition in Regular Mode, create a second Linux Native Partition.

ProLiant 8000

With a SMART Array controller and a large logical drive, you will receive the following message:

The number of cylinders for this disk is set to xxxx, *there is nothing wrong with that, but this is larger than 1024, and could in certain setups cause problems with:*

1. software that runs at boot time (e.g. LILO)

2. booting and partitioning software from other OSs (e.g. DOS fdisk, OS/2 fdisk)

This warning message reminds you that your boot partition must be under cylinder 1023 or your system will not restart properly after installation.

Command Line Help can be accessed by typing **h** or **m** at the command line and pressing **Enter**. The Help file provides a list of commands.

IMPORTANT: The commands on this screen are case sensitive. Check the examples provided in the documentation if you have problems.

- Type **p** (to print the current configuration to the screen).

The Compaq partition, *c0d0p3*, is the third partition in Red Hat Linux. Because the boot partition must be assigned to cylinders below 1023, create the boot partition first.

- Type **n** (to add a new partition) → **p** (for primary) → **1** or **2** or **4**.
- Use the default for the first available cylinder.

You have options for determining the size of each partition. You can type the size in cylinders, the size in megabytes, or the size in kilobytes. Information on the command screen indicates how to make your choice.

- Type the appropriate number for your boot partition (20 MB or less).

Create the Linux Native partition in much the same manner as the boot partition.

- Type **n** → **p** → **1** or **2** or **4**.
- Use the default for the first available cylinder.
- Type the size you want for your Linux Native partition.

Creating a Linux Swap partition requires a few more keystrokes.

- Type **n** → **p** → **1** or **2** or **4**.
- Use the default for the first available cylinder.
- Type the size you want for your Linux Swap partition.
- Type **t** (to change the identification for the partition).
- Type **82** as the hex code.

Hex codes can be found by entering ***l*** *at the command line.*

Either the Linux Native Partition or the boot partition can be configured as the bootable partition by completing the following:

- Type **a** (to make a bootable partition).
- Type the partition number from which you want to boot.
- Type **p** (to check your entry).

You should see the Boot Flag enabled for the appropriate partition.

- Type **w** at the command line to complete the formatting and write the table to the disk.

Configuring your Server

After the partition information writes to the disk, Linux exits from the partition section of the installation and takes you to Disk Druid. Disk Druid assists you in configuring your server by displaying the partitions created and allowing you to edit them.

- Highlight the Linux Native partition → **Edit**.
- Type **/** as the mount point to create the root.

If you created a boot partition, set it up as follows.

- Highlight the boot partition → **Edit**.
- Type **/boot** as the mount point → **Continue**.

The following screen provides an opportunity to select which partition to format.

- Select the primary drive → **Next**.

The next screen configures the Linux Loader (LILO); it starts the operating system when the server boots. You can install LILO to the boot partition, the master partition, or a separate boot disk.

IMPORTANT: If you install LILO to the master boot record, you cannot access the Compaq system partition with the **F10** key. Install LILO to the first sector of the boot partition or to the Linux Native partition.

- Select the first sector of the boot partition → **Next**.

The option for linear mode on this page is not required for Compaq X86 server hard drives.

The installation program then goes to the network configuration including:

- IP Address
- Netmask
- Network
- Broadcast
- Host name
- Gateway
- Primary DNS
- Secondary DNS
- Tertiary DNS

Note: On our CDROM, tertiary was misspelled as ternary but it worked as tertiary.

- Complete the blanks with the correct information → **Next**.

The next screen concerns Time Zone Selection.

- Select your continent → appropriate region → **Next**.

The following screen allows you to configure your user accounts.

- Type the Root Password.
- Confirm the Root Password.

The bottom part of the screen provides an opportunity to add users.

- Type the User Account Name → Password → Full Name → **Add**.

Repeat this step for each user you want to add. The user adds to the lower screen and the upper user screen is blank for the next entry. When completed,

- Select **Next**.

The Authentication Configuration screen enables different types and levels of password protection. Read the documentation and online Help file for more information.

- Select your desired options → **Next**.

Completing the Installation

The last part of the installation process includes selecting the packages you want to install and configuring your monitor.

TIPS: The packages are not alphabetical. There's an Everything *at the bottom of the selection list.*

After the Authentication Configuration screen, the Package Group Selection screen displays. Read your Red Hat Linux documentation to determine what packages you want to install.

- Select the packages you want to install → **Next**.

The next screen, the X Configuration screen, configures the video for your monitor. The selection list includes some Compaq monitors, but not all Compaq monitors. This screen allows you to manually configure your monitor and to test different configurations. The Generic Monitor can be used with Compaq SVGA monitors.

- Select Customize X to manually configure your monitor settings.

Appendix B provides detailed information if you want to manually configure your monitor.

- Select Use Graphical Login if you want to bring up the GUI on reboot.

After completing the X Configuration screen, a warning screen displays to let you know that Red Hat Linux is ready to install. It provides the location for the installation log, */tmp/install.log*.

- Select **Next**.

This part is not interactive, so take a well-deserved break.

The screen displays the message: Installing Packages. If you chose Everything, it takes from 10 to 30 minutes to load the files depending on the speed of your processor.

The following screen prompts you with an option to create a boot disk.

The next screen message is "Congratulations, take out the media, and reboot."

Go for it!

ProLiant 8000

Before rebooting the ProLiant 8000, insert the diskette with the file *CPQ_RH_INSTALL.IMG* from the SoftPaq in the floppy drive. See Appendix C for information about SoftPaq 10775 and SoftPaq 10776.

- Restart the server.
- Type **root** → **Enter** → <root password> → **Enter**.

Mount the floppy and run the kernel installation script as follows:

```
# mount /dev/fd0 / mnt
# cd /mnt
# ./install-kernel
# cd
# umount /mnt
```

To bring up the GUI:

- Type **startx** → **Enter**.

Check your Red Hat Linux documentation for information on configuring the desktop.

Troubleshooting

The hardware information in Appendices A and B provide information to properly install and set up Red Hat Linux. Appendix C supplies data on the SoftPaqs developed by Compaq to address SMART Array Controllers and the Compaq NC3131 DualPort NIC. Check Appendix D for website support for Red Hat Linux 6.1 and Compaq servers.

Red Hat Linux stores the installation log at */tmp/install.log*. Refer to the log when determining what steps were completed when installing the operating system.

Basic Troubleshooting Strategy

This section lists basic methodology to use when troubleshooting. First, gather the information to resolve the issue. In doing so, ask the following questions:

- Is the problem reproducible or random?
- What hardware and/or software are involved?
- Were any errors made in implementing steps?
- Was more than one variable changed at a time?
- Does the problem occur on the server or is it specific to a client?
- Were any steps skipped or completed out of order?
- Were any steps accidentally added?
- Were any steps added intentionally to complete or correct another step? Place checkmarks against the steps as they are/were executed to avoid this. If steps had to be added on the fly in order to proceed, record why and where.

After asking the questions, complete the following steps to resolve the issue:

- Decide on one cause and possible solution at a time. Make appropriate modifications and then test those modifications. Try to minimize the number of things you change between tests.
- Test each modification to see if it fixed the problem.
- Write down all symptoms, causes, and solutions. Having a written record makes an excellent reference for future troubleshooting.
- Install a new copy of the OS into a different directory. Does the problem still occur?

Compaq Partition Access

If you install LILO to the master boot record, you cannot access the Compaq system partition using the **F10** key. In order to be able to access the Compaq partition, parameters must be added to the LILO configuration file. This can be accomplished from the menu in the GUI or through the initial boot screen.

GUI Method

From the Menu,

- Select System → *linuxconf* → LILO Other OS Configuration.
- Select the Other Operating System Setup tab.
- The screen displays two boxes, one for the label and one for the partition name.
- Type the label name in the appropriate box.
- Type the identification of the partition in the correct box.

The partition identification refers to the number given by Linux during the formatting portion of the installation.

- Select **Accept**.

The system restarts.

- Type in your label at the LILO Boot prompt.

Note: Pressing **Tab** at the LILO Boot prompt will provide a list of partition labels that can then be typed at the prompt.

Command Prompt Method

UNIX users might prefer to type the configuration information directly to the *LILO.conf* file in a UNIX text editor. After login,

- Type **cd /etc** and press **Enter**.
- Select a UNIX text editor to alter ***lilo.conf*** and press **Enter**.
- Add this line to the file:

  other = <your partition number as determined from the formatting portion of the installation>

  label = <your label name>

Example:

```
# begin global section
boot=/dev/sda
map=/boot/map
install=/boot/boot.b
prompt
timeout=50
# begin Linux section
image=/boot/vmlinuz-2.2.12.6
        label=linux
        append="mem=128M" # allow access for greater than 64MB RAM
        root=/dev/sda2
        initrd=/boot/initrd-2.2.12-0.6.img
        read-only
```

```
# begin System Partition section
other=/dev/sda3
        label=F10
        table=/dev/sda
```

- Run */sbin/lilo*.
- Restart the system to access the system partition.
- Type in your label at the LILO Boot prompt.

SMART Array Controllers

The Compaq SMART Array controllers require some special handling to operate with Linux. The 2.2.x kernel tree can only detect devices on PCI bus 0. SMART Array Controllers are not on PCI bus 0. Compaq developed a fix for this and it should be included with the next kernel version. Until then, you can download the fix from SoftPaq 10775 (DOS version) or SoftPaq 10776 (UNIX version).

Configuring SMART Array Controllers

To set up the SMART Array controllers using SmartStart, follow this procedure:

- Select UnixWare 2.1.3 as the operating system.

Note: Some issues occur with the interrupt settings if another operating system is selected.

When exiting the System Configuration utility, SmartStart will automatically invoke the Compaq Array Configuration Utility after the initial setup.

- Follow the instructions included in the utility to build a RAID-0, RAID-1, RAID-4, or RAID-5 array set and to create logical drives as desired.
- Save the configuration with the wizard button.

Note: Alternatively, select File → Save in the Array Configuration Utility and exit from the utility.

- Reboot the server to configure the hardware and install the system partition.

When completed, you will be prompted to save the configuration and reboot, or to view or edit details. If you plan to boot from a SMART Array controller, complete the following.

- Select **View** or **Edit Details** and scroll down to where the array controller appears in the hardware list.
- Verify that the array controller's boot order is set as first.

A problem can arise if there are no bootable SCSI devices attached to one of the SCSI controllers on the Compaq server. Even if a bootable partition exists connected to the array controller, bootstrapping dies if the SCSI controllers are set to boot before being connected to a bootable device (such as a disk drive).

Partitioning SMART Array Controllers

Linux only sees one large disk drive with the SMART Array controller and displays the following message when you partition your hard drive:

The number of cylinders of this disk is set to xxxx, there is nothing wrong with that, but this is larger than 1024, and could in certain setups cause problems with:

1) software that runs at boot time (e.g. LILO)

2) booting and partitioning software from other OSs (e.g. DOS fdisk, OS/2 fdisk)

This warning message reminds you to create your boot partition under cylinder 1023. Failure to do so prevents your system from restarting after the installation.

Appendix A–Hardware Specifications

The tables in this section provide information regarding standard specifications for servers shipped by Compaq. The servers are divided into three groups–entry-level, workgroup/departmental, and enterprise.

Entry level servers (Table 2):

- ProLiant 400
- Prosignia Server 720
- Prosignia Server 740
- ProSignia 200

Table 2. Entry-level server specifications

	ProLiant 400	Prosignia Server 720	Prosignia Server 740	ProSignia 200
Processor Speeds	Intel Pentium III 500, 550, and 600MHz Pentium II 350, 400, and 450MHz	Pentium III 500 and 600MHz Pentium II 350, 400, and 450MHz	Pentium III 500, 550, and 600MHz Pentium II 350, 400, and 450MHz	Pentium II 350, 400, and 450MHz
SMP Support	No	No	No	No
L2 Cache	512KB	512KB	512KB	512KB
Maximum Memory	Pentium III 768MB Pentium II 384MB	Pentium III 768MB Pentium II 384MB	1GB	384MB
Disk Controller	Integrated Wide-Ultra2 SCSI	Integrated Wide-Ultra2 SCSI	Integrated Wide-Ultra SCSI-3	Wide Ultra SCSI -3
Disk Controller Chipset	Symbios Logic 53C876	Symbios Logic 53C895	Symbios Logic 53C876	Symbios Logic 53C875J
Tape Drives Supported	DAT, SLR, DDS-3, DLT	DAT, SLR	DAT, SLR	DAT, SLR
NIC	Integrated Compaq Netelligent 10/100 TX PCI Intel UTP Controller (Intel 82558)	Integrated Netelligent 10/100 TX PCI Intel UTP Controller (Intel 82558)	Integrated Netelligent 10/100 TX PCI UTP Controller (ThunderLAN)	Integrated Netelligent 10-T PCI UTP Controller (ThunderLAN)
Video	1024KB, 1024x768 pixel resolution at 256 colors	1024KB, 1024x768 pixel resolution at 256 colors	1024KB, 1024x768 pixel resolution at 256 colors	1024KB, 1024 x 768 pixel resolution at 256 colors
Video Card	ATI Rage IIC	ATI Rage IIC	ATI Rage IIC	CL-5446

Workgroup/Departmental Servers (Table 3):

- ProLiant 800
- ProLiant 1600, 1600R
- ProLiant 1850R
- ProLiant 3000, 3000R

Table 3. Workgroup/Departmental server specifications

	ProLiant 800	ProLiant 1600, 1600R	ProLiant 1850R	ProLiant 3000, 3000R
Processor Speeds	Pentium III 500, 550, and 600MHz Pentium II 350e, 400, and 450MHz	Pentium III 500, 550, and 600MHz Pentium II 350, 400, and 450MHz	Pentium III 500, 550, and 600MHz Pentium II 400 and 450MHz	Pentium III 500, 550, and 600MHz Pentium II 300, 333, 400, and 450MHz
SMP Support	2P	2P	2P	2P
L2 Cache	512KB	512KB	512KB	512KB
Maximum Memory	1GB	1GB	1GB	6/300 512MB 6/333 3GB 6/400 – 6/600 4GB
Disk Controller	Integrated Dual Wide-Ultra SCSI-3	Integrated Dual Channel Wide-Ultra SCSI-3	Integrated Dual Channel Wide-Ultra SCSI-3	Integrated Dual Channel Wide-Ultra SCSI-3 Smart Array 3200 Controller
Disk Controller Chipset	Symbios Logic 53C876	Symbios Logic 53C876	Symbios Logic 53C876	Symbios Logic 53C875J (Integrated Controller)
Tape Drives Supported	DAT, SLR, DDS-3, DLT	DAT, SLR, DDS-3, DLT, AIT	DAT, SLR, DDS-3, DLT, AIT	DAT, SLR, DDS-3, DLT
NIC	Integrated Netelligent 10/100 TX UTP Controller (ThunderLAN)	Integrated Netelligent 10/100 TX UTP Controller (ThunderLAN)	Integrated Netelligent 10/100 TX UTP Controller (ThunderLAN)	10/100 TX PCI UTP Controller (Intel 82558) Netelligent 10/100 TX PCI UTP (450 and below) (ThunderLAN)
Video	1024KB, 1024x768 pixel resolution at 256 colors	1024KB, 1024x768 pixel resolution at 256 colors	1024KB, 1024x768 pixel resolution at 256 colors	1024KB, 1024x768 pixel resolution at 256 colors
Video Card	ATI Rage IIC	Cirrus Logic CL-5446B	ATI Rage IIC	ATI Rage II (400 and above) Cirrus Logic CL-54M30

Enterprise servers (Table 4):

- ProLiant 5500
- ProLiant 6000
- ProLiant 6400R
- ProLiant 6500

Table 4. Enterprise server specifications

	ProLiant 5500	ProLiant 6000	ProLiant 6400R	ProLiant 6500
Processor Speeds	Pentium III Xeon 500 and 550MHz Pentium II Xeon 450MHz	Pentium III Xeon 500MHz Pentium II Xeon 400 and 450MHz	Pentium III Xeon 500MHz	Pentium III Xeon 500MHz Pentium II Xeon 400 and 450MHz
SMP Support	4P	4P	4P	4P
L2 Cache	512KB, 1MB, 2MB	512KB, 1MB	512KB, 1MB, 2MB	512KB, 1MB, 2MB
Maximum Memory	4GB	8GB	4GB	4GB
Disk Controller	Integrated Dual Channel Wide-Ultra SCSI-3 Wide Ultra2 Dual Channel SCSI Controller in a PCI Slot (Pentium III Models w/LVD cages only)	Integrated Dual Channel Wide-Ultra SCSI-3 Compaq Smart Array 3100ES Controller	Integrated Dual Channel Wide-Ultra SCSI-3 Controller	Integrated Dual Channel Wide-Ultra SCSI-3 Controller
Disk Controller Chipset	Symbios Logic 53C867 (Integrated Controller) Symbios 53C879	Symbios Logic 53C875J (Integrated Controller)	Symbios 53C876	Symbios 53C876
Tape Drives Supported	DAT, SLR, DDS-3, DLT, AIT	DAT, SLR, DDS-3, DLT, AIT	DAT, SLR, DDS-3, DLT, AIT	DAT, SLR, DDS-3, DLT, AIT
NIC	Netelligent 10/100 TX PCI UTP (Intel 82558)	Dual-Port Netelligent 10/100 TX PCI UTP Controller (ThunderLAN) NC3131 64 Dual Port 10/100 (Intel 82558)	NC3131 64 Dual Port 10/100 (Intel 82558)	NC3122 64 Dual Port 10/100 (Intel 82558)
Video	1024KB, 1024x768 pixel resolution at 256 colors	2MB, 1024x768 pixel resolution at 256 colors	2MB, 1024x768 pixel resolution at 256 colors	2MB, 1024x768 pixel resolution at 256 colors
Video Card	ATI Rage IIC	ATI Rage IIC Cirrus Logic CL-54C46	ATI Rage IIC	ATI Rage IIC

Additional enterprise servers (Table 4a):

- ProLiant 7000
- ProLiant 8000
- ProLiant 8500

Table 4a. Additional enterprise server specifications

	ProLiant 7000	ProLiant 8000	ProLiant 8500
Processor Speeds	Pentium III Xeon 500MHz Pentium II Xeon 450MHz	Pentium III Xeon 550MHz	Pentium III Xeon 550MHz
SMP Support	8P	8P	8P
L2 Cache	512KB, 1MB, 2MB	512KB, 1MB, 2MB	512KB, 1MB, 2MB
Maximum Memory	8GB	8GB	8GB
Disk Controller	Integrated Dual Channel Wide- Ultra SCSI-3	Smart Array 4250ES	Integrated Wide Ultra2 SCSI Dual Channel SmartArray Controller
Disk Controller Chipset	Symbios Logic 53C875J		
Tape Drives Supported	DAT, SLR, DDS-3, DLT, AIT	DAT, SLR, DDS-3, DLT, AIT	DAT, SLR, DDS-3, DLT, AIT
NIC	NC3131 64 Dual Port 10/100 (Intel 82558)	NC3131 64 Dual Port 10/100 (Intel 82558)	NC3131 64 Dual Port 10/100 (Intel 82558)
Video	2MB, 1024x768 pixel resolution at 256 colors	2MB, 1024x768 pixel resolution at 256 colors	2MB, 1024x768 pixel resolution at 256 colors

Appendix B—Compaq Monitors

Table 5 provides information for manually configuring your Compaq monitor for Linux.

Table 5. Compaq monitor specifications

Monitor	Horizontal Frequency	Vertical Frequency	Monitor	Horizontal Frequency	Vertical Frequency
14" Monitors			**19" Monitors**		
1024	30 - 60 kHz	50 - 100 Hz	P900	30 – 107 kHz	50 – 120 Hz
140	31 – 48 kHz	50 – 100 Hz	S900	30 – 95 kHz	50 – 160 Hz
V40	31 – 48.4 kHz	50 – 100 Hz	V90	30 – 94 kHz	48 – 160 Hz
V45	31 – 50 kHz	50 – 100 Hz	V900	30 – 96 kHz	48 – 160 Hz
SVGA	31.5 – 38 kHz	43 – 60 Hz			
15" Monitors			**21" Monitors**		
150	31 – 48 kHz	50 – 100 Hz	P110	30 - 107 kHz	48 - 160 Hz
151FS	30 - 60 kHz	50 - 100 Hz	P1100	30 - 121 kHz	50 - 160 Hz
P50	30 - 69 kHz	47.5 - 125 Hz	P1610	30 - 96 kHz	48 - 160 Hz
V50	31 - 60 kHz	47.5 - 115 Hz	V1000	30 – 107 kHz	50 – 160 Hz
V55	30 – 60 kHz	47.5 – 125 Hz	QVISION 200	30 - 82 kHz	50 - 160 Hz
V500	30 – 70 kHz	50 – 160 Hz	QVISION 210	31 - 94 kHz	48 - 110 Hz
S500	30 – 54 kHz	50 – 120 Hz			
QVISION 150	31.5 – 58 kHz	50 – 100 Hz			
17" Monitors			**TFT Display**		
171FS COLOR	30 - 60 kHz	50 - 100 Hz	TFT450	31.5 – 60.2 kHz	59 – 85 Hz
QVISION 170	31.5 – 58 kHz	50 - 100 Hz	TFT450R	31.5 – 60 kHz	56.3 – 85 Hz
QVISION 172	31.5 – 82 kHz	50 – 110 Hz	TFT500	31.5 – 60.2 kHz	59 – 85 Hz
S700	30 – 69 kHz	50 – 160 Hz	TFT5000	31.5 – 60.2 kHz	56 – 78.75 Hz
P70	30 - 92 kHz	50 - 150 Hz	TFT5000s	32 – 60 kHz	57 – 85 Hz
P75	30 - 85 kHz	50 - 150 Hz	TFT5000r	31.47 – 60 kHz	57 – 85 Hz
P700	30 – 92 kHz	50 – 120 Hz	TFT8000	31.5 – 80kHz	60 – 85 Hz
V70	30 - 69 kHz	60 - 125 Hz			
V75	30 - 69 kHz	47.5 - 125 Hz			
V700	30 – 85 kHz	50 – 160 Hz			

Appendix C–Compaq SoftPaqs for Red Hat Linux 6.1

The Compaq SoftPaq for Red Hat Linux 6.1 can be downloaded in DOS or UNIX versions. Both SoftPaq 10775 (SP10775), the DOS version, and SoftPaq 10776 (SP10776), the UNIX version, require the creation of diskettes before proceeding with the Red Hat Installation. The SoftPaqs provide device driver workarounds for the SMART Array Controller and the Compaq NC3131 DualPort NIC.

Appendix D–Compaq Information Products

In addition to hardware and software products, Compaq also provides information enabling you to stay current on the latest developments and assisting you in making deployment decisions.

Compaq *ActiveAnswers*™ gives you the benefit of our experience to help manage your system and reduce the time, risks, and complexity associated with deploying solutions.

If you require more timely access to information products, Compaq provides a service called Compaq Info Messenger, which can be accessed through the Compaq website. If you submit a profile to Compaq Info Messenger, telling it what platforms and operating systems you are interested in, the service tracks your areas of interest and advises you when related information products are released.

Customer Advisories inform you of any known problems and workarounds because of a Service Pack release.

Communiqués and press releases announce the availability of new products and versions.

Service Advisories notify Compaq resellers and retailers of any known service-related issues and provide them with the information they need to effectively support their customers.

Solution Stories describe how Compaq customers have addressed their business needs through the combination of Compaq products and third-party software products.

TechNotes and Tech Briefs update customers on the latest developments in Compaq products.

White papers inform you of ways to optimize your environment and obtain the maximum benefit from software enhancements.

These information products range from those with no specific OS focus to those that address specific OS issues and answers. Table 6 lists Compaq resources.

Table 6. Compaq web resources

Item	Web Location
Compaq *ActiveAnswers*	http://www.compaq.com/activeanswers
Compaq Info Messenger	http://www.compaq.com/infomessenger
Compaq Insight Manager	http://www.compaq.com/sysmanage
Compaq Management CD	http://www.compaq.com/support/files/server/us/index.html
Compaq Option ROMPaq	http://www.compaq.com/support/files/server/us/index.html
Compaq SmartStart Subscription Service	http://www.compaq.com/products/servers/smartstart/index.html
Compaq Survey Utility	http://www.compaq.com/support/files/server/us/index.html
Compaq System ROMPaq	http://www.compaq.com/support/files/server/us/index.html
Customer Advisories	http://www.compaq.com/support/techpubs/Customer_advisories/index.html
Press releases	http://www.compaq.com/newsroom/pr
SoftPaqs (complete listing)	http://www.compaq.com/support/files/allsp.html
White Papers and other technical document (complete listing)	http://www.compaq.com/support/techpubs/whitepapers/index.html

Information specific to Linux and Red Hat can be found at the locations listed in Table 7.

Table 7. Linux and Red Hat resources on the web

Item	Location
Red Hat “How To” site	http://www.redhat.com/support/docs/howto
Red Hat certified hardware	http://www.redhat.com/support/hardware
Red Hat manuals	http://www.redhat.com/support/manuals
Red Hat news	http://www.redhat.com/about/press_releases.html
Red Hat errata	http://www.redhat.com/support/errata
Linux kernel information	http://www.kernelnotes.org