

application note

Setting Up an HP NetServer LC 3, LPr, LH 3, LH 4 and E 60 as a Red Hat Linux 6.0 Web Server

July 1999

The information contained in this document is subject to change without notice. For more information see Notice section at end of document.

Contents

Executive Summary	2
About Linux	2
General Public License	2
Linux Support	2
Red Hat Linux 6.0 Supported on the LC 3, LH 3, LH 4, LPr and E 60	2
Benefits Claimed for Linux	2
How to Get Linux	3
Linux 6.0 Installation on an HP NetServer LC 3, LH 3, LH 4, LPr and E 60	4
Assumptions	4
Conventions Used in This Document	4
Pre-Installation Steps	4
Beginning the Installation	5
Removing All Partitions	5
Linux Installation Procedure	5
Continuing the Linux Installation	6
Completing the Installation	7
Restart the System	9
Setting up the Apache Web Server	9
Test Point	9
More Information	9
Appendix A	10
Configuration of System Tested	10
Appendix B	12
Example Hard Disk Setup using fdisk	12
Using fdisk	12
Notice	14

Executive Summary

The Hewlett Packard NetServer LC 3, LH 3, LH 4, LPr and E 60 can be integrated as an Internet Server in a variety of ways. One of these makes use of the Linux Operating System (OS) for personal computers and the Apache Group Apache Web Server. This application note provides details about how to install Red Hat Linux version 6.0 on the HP NetServer LC 3, LH 3, LH 4, LPr and E 60.

About Linux

The Linux OS for personal computers is a UNIX-like OS and meets POSIX standards. It uses a kernel developed and made freely available by Linus Torvalds (for whom it is named). Originally developed over the global Internet, Linux has become a widely-used OS that involves its users in developing new features.

General Public License

Linux is supplied as a set of executable files which are accompanied by the corresponding source code. The files and code can be copied under the terms of a GPL or "General Public License." This means users can install and use it for free. In exchange, under the GPL, users who make changes in the source code (to extend the usefulness of the OS on their own installations) are required to make their changes available to the rest of the user community under the same terms (with source code and free of charge).

Linux Support

Linux installations can be time-consuming and each requires someone skillful in OS programming. Distributors of Linux (like Red Hat Software of Research Triangle Park, NC) have created documentation, service, and support facilities for users who want to install Linux. The kernel and source code are still freely licensed, but the client pays for the convenience of installing the software as a package from a CD-ROM. Other services are also available for a fee.

Red Hat Linux 6.0 Supported on the LC 3, LH 3, LH 4, LPr and E 60

HP and Red Hat support Red Hat Linux 6.0 on the tested, approved HP NetServer LC 3, LH 3, LH 4, LPr and E 60 configuration (See Appendix A.) HP recommends Red Hat Linux version 6.0, the Commercial Server Edition, be purchased directly from Red Hat software or a Red Hat distributor. The Commercial Server Edition comes bundled with 90 days of support. If another version is chosen, Red Hat has support options available for purchase. Hewlett Packard does not provide support for the Linux Operating System, nor for Red Hat software running on its servers. HP does provide support for hardware problems related to installation of Linux, and will assist customers to classify and solve such problems. Please ensure you enlist Red Hat's support directly before you install the software.

Benefits Claimed for Linux

Some of the benefits claimed for the use of Linux include the following:

- Can be run from a disk partition, even if another OS is installed
- Multi-user, multi-tasking, multi-threading operating system adapted originally for Intel PC microcomputers
- Now runs on a wide range of server and computer equipment, including the HP NetServer LC 3, LH 3, LH 4, LPr and E 60, Digital Alpha, Sun SPARC, and Apple Power Mac.
- No restrictive control is in place on the OS and improvements; although Linux may be packaged for sale, it is also available for free download
- Packages are freely available for running the Netscape Communicator web browser and for maintaining World Wide Web sites

How to Get Linux

You can learn how to order Linux by contacting the following:

Red Hat Software
2600 Meridian Parkway
Durham , NC 27713

Email redhat@redhat.com

World Wide Web <http://www.redhat.com>

Support is available in the United States by dialing (877) 4REDHAT.

Linux may also be available for purchase at local electronic supply and software stores.

More information is available about Linux from www.li.org.

Linux 6.0 Installation on an HP NetServer LC 3, LH 3, LH 4, LPr and E 60

Assumptions

The installation user script in this document assumes you are installing Red Hat Linux 6.0 on an HP NetServer LC 3, LH 3, LH 4, LPr or E 60. In addition, you need at least one new SCSI hard drive connected to the ultra-wide connector on the embedded Symbios SYM53C895 SCSI or Adaptec 2740,2840,2940 controller (in a Linux device scan, this controller shows up as Symbios driver NCR 538xx or Adaptec driver). You can boot Red Hat Linux 6.0 from any disk that is connected to Embedded NetRaid and a NetRAID card, however, HP has certified and will support booting from the embedded NetRaid on the LH4 only. All other configurations booting from a NetRaid are not supported.

The networking protocol is assumed to be TCP/IP and the network adapter to be the factory bundled HP D5013A LAN adapter (which shows up in a Linux device scan as the Intel 82558 network interface controller). Refer to Red Hat documentation for details on network protocols and other information, if necessary.

No tape drive is assumed in the server system. However, HP strongly recommends integrating a backup device and running routine backups on any server that is put into production use. In addition, no UPS (uninterruptable power supply) is assumed. As with tape drives, HP also strongly recommends that a UPS be used with any server that contains critical data.

NOTE	This installation user script assumes you are installing Red Hat Linux 6.0 on a clean (or newly formatted) hard disk. If you are installing on a disk which contains user data or programs, do not use this script. Instead, use documentation that accompanies Red Hat Linux 6.0 or contact the place where you got your software.
-------------	---

Conventions Used in This Document

In the steps which follow, these style conventions are used:

- **Screen Title** are shown bold. The same text appears about midway down each screen at the top bar of the box.
- Text that you see on the screen looks like this.

```
---> Highlighted choices are indented and have an arrow pointing to them.
```
- User Inputs (what you should type) look like this:

```
command1 command2
```
- The keys on your keyboard are represented like this: <Enter>, <Space>, <F3>, and so forth.

Pre-Installation Steps

To prepare for installation you need the following:

- IP address for the server
- Subnet Mask
- Default Gateway
- Machine Name

- Domain Name

NOTE It is not recommended to use DHCP to assign the IP information of a server.

NOTE HP recommends that you create a boot disk by using the DOS *rawrite* utility on the CD-ROM. For example, assuming your CD-ROM is drive D, you would type:

```
d:\dosutils\rawrite -f d:\images\boot.img
```

You may need this floppy later if you encounter problems booting from the CD-ROM.

Beginning the Installation

Removing All Partitions

The following procedure is used with new hard disks. If you have a hard disk which has been previously used, all partitions must be deleted.

Linux Installation Procedure

1. Check Appendix A to ensure your configuration matches the Configuration of the System Tested. Turn on the HP NetServer LH 3, LH 4, LPr, LC 3 or E 60. Insert the Red Hat Linux CD-ROM into the CD-ROM drive. Press the system "reset" button. If the CD-ROM does not boot, use the boot disk made during pre-installation. (See above.)
2. You should see "Welcome to Red Hat Linux" on a black screen displayed with four options. The default is to install or upgrade. Use the default by pressing <Enter>. (After one minute, the default is automatically selected.)

<p>CAUTION Expert mode can be accessed from this screen. This mode is only for experienced programmers, who use it for debugging new code or changing source code. <i>It is possible to damage your system in expert mode.</i></p>

3. A gray-on-blue screen with introductory information entitled "Red Hat Linux" appears.
Select OK and press <Enter>
4. At the **Choose a Language** screen, select
--->English (or your choice)
and press <Enter>
5. At **Type of Keyboard**, select
--->us (or your choice)
and press <Enter>
6. At **Installation Method**, select
---> Local CD-ROM
and press <Enter>
7. You will see a note to insert CD—it should already be in the drive.
Press <Enter>.

8. You will see a CD-ROM initialization message. Then a brief pause
9. At **Installation Path**, select
---> Install
and press <Enter>.
10. At **Installation Class**, select
---> Custom
Tab to "OK" and press <Enter>.

NOTE "Server" and "Workstation" classes may be more limited in flexibility than "Custom".

11. At **SCSI**, you will see a message such as "Scanning NCR 538xx" for LPr, LH 3 and LH 4, or "Scanning Adaptec 2740, 2840, 2940" for LC 3 and E 60 and a brief pause
12. At **SCSI Configuration**, you will see "NCR 538xx" for LPr, LH 3 and showing "Adaptec 2740, 2840, 2940" for LC 3 and E 60 (the Linux device scan automatically detects this) and asking whether you want to check for others. Do one of the following:
 - ◇ Tab to "yes" and press <Enter> to find the AMI MegaRAID driver for the embedded NetRAID and HP NetRAID card in your system.
 - or
 - ◇ Tab to "no" and press <Enter> if you do not have an embedded NetRAID and HP NetRAID card in your system.
13. At **Module Options "Autoprobe"** <Enter>.
When asked whether you want to check for more SCSI adapters, select "NO" and press <Enter>.
14. At **Disk Setup**, use Disk Druid or fdisk to set up your partitions.

NOTE Druid is somewhat easier, but may involve some trial and error repetition. Before using fdisk, you must erase the master boot record. An example of using fdisk is illustrated in Appendix B.

Continuing the Linux Installation

NOTE The following discussion assumes you have sda1 as the Linux Native partition and sda2 as the Linux Swap partition.

15. At the **Partition Disks** screen, tab to "Done" and press <Enter>.
16. A screen appears showing information about your choices on disk partitioning. From this screen, you need to indicate where the root filesystem will be located. To begin the edit, press <F3>.
17. On the edit screen in front of the text string indicating the root file system, type
/
(in Linux, this / indicates the root directory)
Tab to "OK" and press <Enter>
Notice the "/" in front of the main Linux Native partition.
18. At **Current disk Partitions**, tab to "OK" and press <Enter>

19. At the **Active Swap Space** screen, be sure `/dev/sda2` is highlighted. If not, use either the down arrow or tab key to highlight it. Toggle the selection by pressing the space bar, and check to see that the asterisk appears indicating that `/dev/sda2` has been selected.

NOTE Also select "check bad blocks during formatting." Doing so will take more time now but may make your system more reliable.

Tab to "OK" and press <Enter>.

20. At **Scanning Packages**, there will be a pause while the scan is completed. This may take a few moments.
21. At **Partitions to Format**, be sure `/dev/sda1` is highlighted. If not, use either the arrow or tab key to highlight it. Toggle the selection by pressing the space bar, and check to see that the asterisk appears indicating that `/dev/sda1` has been selected.

NOTE Also select "check bad blocks during formatting." Doing so will take more time now but may make your system more reliable.

Tab to "OK" and press <Enter>.

22. At **Components to Install**, use the arrow keys and space bar to select the packages you want installed on your system. If you want all 561 packages and have plenty of space, scroll all the way to the bottom of the list and select "**Everything**".

NOTE If you do not select everything, be sure to select Apache Web Server manually so it will start up at boot time.

When you are satisfied with your selections, tab to "OK" and press <Enter>.

23. At **Install Log**, make a note of the location of your log file, in case you need to refer to or use it. Select "OK" and press <Enter>.
24. During file system construction, you will see a "Running" message.
25. The **Install Status** screen shows the installation status of the Linux system, including any packages you selected for installation.

Completing the Installation

26. At **Probing Result (Configure Mouse)**, select "OK" and press <Enter>.
27. At **Configure Mouse**, tab to "OK" and press <Enter>.
28. At **Network Configuration**, select "OK" and press <Enter>.
29. At **Probe**, you will see the message:
An Intel Express Pro100 card had been found on you system.
Select "OK" and press <Enter>.
30. At **Boot Protocol**, provide your addresses or protocols and press <Enter>.
31. At **Configure Timezones**, select your time zone, tab to "OK" and press <Enter>.
32. At **Services**, use the arrow keys and the space bar to deselect "PCMCIA" and "Sound". Tab to "OK" and press <Enter>.
33. At **Configure a Printer?**, make choices as needed. Use the <Enter> key to confirm.
34. At **Root Password**, type in your chosen password and press <Enter>.

35. At **Authentication configuration**, choose the default <OK>.
36. At **Boot Disk**, select Yes <Enter>. Put a diskette to be used as the Boot Disk in the floppy drive.
37. You will see "Creating Bootdisk".
38. Then you will go to **Lilo Installation**. Unless you have a reason to make another choice, use the default. Tab to "OK" and press <Enter>.

The only entry required on this screen is to be sure you have an **asterisk** selected at "Use linear mode."

Note:

HP recommends the installation of a utility partition in all NetServers to make maintaining the NetServer easier. The utility partition uses the multi-boot capability of the PC. The Linux loader (LILO) also uses the multi-boot capability of the PC. A potential for conflict exists. This describes how to install the utility partition and Linux so they will co-exist without conflict.

Solution:

There are two ways to install the utility partition and Linux so the two work together. In both cases, install the utility partition as recommend by HP during the configuration of the hardware.

A. During the creation of the Linux partition, use fdisk to mark the partition with /boot as Active. Install Red Hat Linux 6.0 as recommended by Red Hat. During the LILO installation, install it to the Linux /boot partition instead of the Master Boot Record (MBR). With this method, the system will first boot to the utility partition multi-boot program and then to the LILO multi-boot program in that order.

B. Install Red Hat Linux 6.0 as recommended by Red Hat. Install the LILO in the Master Boot Record. During the configuration of the LILO you will be shown a list of bootable partitions. The utility partition will show up as an unlabelled partition. Use the LILO edit feature to give a name to the utility partition. Otherwise you cannot boot to the utility partition. With this method you will always boot to LILO first and must use LILO to boot to the utility partition.

HP recommends method A as it is consistent with the operation of the utility partition with other supported operating systems.

39. Choose a video card:
 - Select ATI Mach64 3D Rage IIC card for E 60 and LC 3
 - Select Cirrus Logic GD54XX for LH 3, LH 4 and LPr

NOTE Please select your monitor from the menu. If your monitor is not on the menu, select "Custom" here. Also note later in the process "Video Mode" may require different entries for a different monitor.

Then tab to "OK" and press <Enter>.

40. At **Screen Configuration**, select "Don't Probe" and press <Enter>.
41. At **Video Memory**,
 - Select 1 Meg for the LC 3, LH 3, LH 4, or LPr.
 - Select 4 Meg for the E 60.

Tab to "OK" and press <Enter>.
42. At **Clockchip Configuration**, select "No Clockchip Setting". Tab to "OK" and press <Enter>.
43. For **Video Mode**, use the arrow keys and the space bar to select one from each column, then tab to move to the next choice. Make sure each of the following is selected:

Three configurations for LC 3, LH 3, LH 4, and LPr:

```
---> 8-bit 1024 X 768
---> 16-bit 800 X 600
---> 24-bit 640 X 400
```

Three configurations for E 60:

```
---> 8-bit 1280 X 1024
---> 16-bit 1024 X 768
---> 24-bit 800 X 600
```

NOTE You can use lower resolutions for the E 60, if needed.

Tab to "OK" and press <Enter>.

44. When you see the message "Starting X", select <OK>. Then select <Yes> to "start when you reboot".
45. At **LILO**, the system will pause.
46. You will then see "Done". Once you press <Enter> to select "OK" the original boot screen appears. Take out the CD and boot diskette. The system automatically reboots. If you delay taking out the CD, the system may fail to reboot. If this happens, make sure the CD and floppy disks are taken out, then press the reset button on the front panel of the computer.

NOTE There is no reset button on the E 60.

Restart the System

The screens associated with the HP NetServer BIOS scroll by. Once the reset is completed, you should see the local host login.

Setting up the Apache Web Server

The Apache web server service (httpd) should have started at boot time. You should be able to view the Apache default web page on a remote machine by simply typing in the fully qualified domain name (for example www.mydomain.com). The web documents are stored in the directory /home/httpd by default but all aspects of the web server can be changed through either the graphical tool in the control panel or from editing the configuration files in /etc/httpd/conf/ using an editor like vi or emacs. For additional help visit the Apache web site at www.apache.org.

Test Point

Your Web server is now running. You should be able to access it through a browser from a remote machine over the network or Internet. Type in the domain name of the server (for example www.mydomain.com) or the IP address of the server (for example 10.0.0.1) into your browser. The homepage should appear.

More Information

Tips and pointers for installing Red Hat Linux 6.0 are included in Appendix C.

Appendix A

Configuration of System Tested

NOTE	Maximum RAM size for this release is 1 GB.
-------------	--

Hardware	Configuration Details
Baseboard	Hewlett Packard NetServer LH3,LH4,LPr,LC 3 and E60 System Board
Processor	Intel Pentium III microprocessor operating at 550MHz.
Memory	Four 128MB PC compliant DIMM. Always check approved memory list before buying DIMMs for your HPLH3, LH4, LPr ,LC 3 or E60 Net Server.
SCSI Controller	Symbios Logic 53C895 SCSI controller ,Adaptec AIC78xx and HP MegaRaid controller. (shows up in the Linux device scan as an NCR 538xx , AIC78xx and Megaraid controller)
NIC	HP D5013A Adapter, which shows up in the Linux device scan as an Intel 82558 controller
Video	Integrated Cirrus Logic GD 5446 PCI w/1MB of Video RAM and ATI Rage IIC w/4MB of video RAM
IDE Controller	Integrated dual channel IDE controller
Floppy Controller	Integrated floppy controller
Floppy drive	1.44MB Floppy Drive
CD-ROM	IDE ATAPI Torison CDR U240Z 24XCD-ROM drive on LPr IDE 32X CDROM on all except LPr.
Hard Drives	Two 4.2GB or 9.1GB capacity Hewlett-Packard Ultra II wide SCSI
Monitor	HP 17-inch monitor
Mouse	PS/2 compatible
Keyboard	PS/2 compatible

Software	Configuration Details
OS	Red Hat Linux 6.0 on CD-ROM
Apps	Apache Web Server

HP supported and Redhat Certified configurations:

LH 3:

Booting Embedded SCSI A Sysbios controller with 9GB HD

Slot 2 HP NetRAID 3Si card with RAID5

Slot 3 HP D5013A NIC

2 X 128 RAM

2 X 550/512 PIII CPUs

LH 4:

Booting Embedded SCSI A NetRAID with RAID 0

Slot 2 Adaptec 2940uw controller

Slot 3 HP D5013A NIC

2 X 128 RAM

4 X 500/512 PIII CPUs

LC 3:

Booting Embedded SCSI A Adaptec controller

Slot 1 HP D5013A NIC

2X 550/512 PIII CPUs

2 X 128 RAM

LPr:

Booting Embedded SCSI A Symbios controller

Slot 1 HP NetRaid 3Si with Raid5

Embedded HP D5013A NIC card

2 X 550/512 PIII CPUs

2 X 128 RAM

E 60:

Booting Embedded adaptec SCSI A

Embedded NIC

Slot 1 HP D5013A NIC

Slot 2 NetRaid 1Si with RAID 0

2 X 500 PIII CPUs

64 MB RAM

Appendix B

Example Hard Disk Setup using fdisk

The following is an example for how to use fdisk to configure a drive. This procedure assumes you used the DOS utility fdisk/mbr to erase the master boot record at the beginning of installation. If not, you must do so before proceeding. See "Preinstallation." The procedure can be used with an HP 4.26 GB disk. It begins after the "SCSI Configuration" screen.

1. At **Disk Setup**, tab to "fdisk" and press <Enter>.
2. **Partition Disks**—displays a screen message showing the number and types of disk detected.

Tab to "Edit" and press <Enter>.

NOTE The fdisk program screens are black and white, text-based instructions. You respond to questions by typing in a number or letter, or by accepting the default with <Enter>.

Using fdisk

3. When you see:

```
"This is the fdisk program . . . . Command (m for help) . . ."
```

Type: **m** and press <Enter>.

You will see **Command action**—list of commands shown.

4. At the command prompt:

```
Command (m for help) . . .
```

Partition your Linux Native Partition on a 4.26 GB hard disk, make the following choices:

NOTE This step assumes there is no utility partition on your NetServer. The cylinders on your hard disk may be different from this example.

```
n <Enter>
```

```
p <Enter>
```

```
1 <Enter>
```

```
First cylinder: 1 <Enter>
```

```
Last cylinder: 980 <Enter>
```

5. To partition your Linux Swap Partition on a 4.26 GB hard disk, make the following choices at the command prompt:

```
Command (m for help) . . .
```

NOTE This step assumes there is no utility partition on your NetServer. The cylinders on your hard disk may be different from this example.

```
n <Enter>
```

```
p <Enter>
```

```
2 <Enter>
```

```
First cylinder: 981 <Enter>
```

Last cylinder: **1008** <Enter>

NOTE Administrators with a basic knowledge of disk data storage may want to decide their own usage.

6. To check partitions, at the "Command (m for help) . . ." prompt:

p <Enter>

NOTE Both partitions will be "Linux Native" type at this point. No asterisk will be evident in the "Boot" column yet.

7. To designate one of the partitions as swap space, at the "Command (m for help) . . ." prompt:

t <Enter>

2 <Enter>

82 <Enter>

8. To toggle a bootable flag, at the "Command (m for help) . . ." prompt:

a <Enter>

1 <Enter>

9. To check partitions, at the "Command (m for help) . . ." prompt:

p <Enter>

<p>CAUTION If you do not place a bootable flag on the main Linux Native partition (where the OS is installed) at this point, it may later be impossible for Linux to boot up from the hard disk. In that case, you may have to start the installation over.</p>
--

10. If you determine everything to be correct, at the "Command (m for help) . . ." prompt:

w <Enter>

You might see messages about the disk partition table.

Once you have written the configuration to disk, return to the section on "Continuing the Linux Installation".

Notice

The information contained in this document is subject to change without notice.

Hewlett-Packard makes no warranty of any kind with regard to this material, including, but not limited to, the implied warranties of merchantability and fitness for a particular purpose. Hewlett-Packard shall not be liable for errors contained herein or for incidental or consequential damages in connection with the furnishing, performance, or use of this material.

Hewlett-Packard assumes no responsibility for the use or reliability of its software on equipment that is not furnished by Hewlett-Packard.

This document contains proprietary information that is protected by copyright. All rights are reserved. No part of this document may be photocopied, reproduced, or translated to another language without the prior written consent of Hewlett-Packard Company.

Pentium II[®] and EtherExpress[®] are registered trademarks of Intel Corporation. Symbios[®] is a registered trademark of Symbios, Inc. Linux[®] is a registered trademark of Linus Torvalds. Alpha[®] is a registered trademark of Digital Equipment Corporation. SPARC[®] is a registered trademark of SPARC International. Power Mac[®] is a registered trademark of Apple Computer Corporation. Netscape[®] is a registered trademark of Netscape Communications Organization. UNIX[®] is a registered trademark in the United States and other countries, licensed exclusively through X/Open Company, Ltd. UNIX[®] and XWindow[®] System are registered trademarks of X/Open Company Ltd. Red Hat is a registered trademark of Red Hat Software, Inc. Cirrus Logic[®] is a registered trademark of Cirrus Logic, Inc. NEC[®] is a registered trademark of NEC Corporation in the United States and other countries. Phoenix[®] a registered trademark of Phoenix Technologies Ltd. NCR[®] is a registered trademark of NCR Corporation.

Hewlett-Packard Company
Network Server Division
Technical Marketing / MS 45SLE
19055 Tantau Ave
Cupertino, CA 95014 USA

© Copyright 1999, Hewlett-Packard Company.