COMPAQ
Technical Guide

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Workstation Division

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Contents

Red Hat Linux 5.2 Installation and Configuration on Compaq Professional Workstations AP and SP Models

Abstract: This document provides instructions to help Compaq customers install and configure Red Hat Linux 5.2 on Compaq Professional Workstations AP and SP Models.

Notice

BRIEF SUMMARY OF LINUX STRATEGY FOR COMPAQ PROFESSIONAL WORKSTATIONS

In 1H99, Compaq began compatibility testing and pursuing certification of select Professional Workstation models under the Red Hat Linux distribution (versions 5.2 and 6.0). Compaq is investigating other distributions and certification programs in the future. Currently, Compaq does not provide driver support for Linux on Professional Workstations. Customers who wish to run Linux will need to rely on existing driver sets available through commercial Linux distributions, VARs, or the official Linux Internet web site. The Compaq warranty does not cover technical support and service for Professional Workstations running Linux. Compaq, however, will provide telephone-based technical support for Linux-certified models on a fee basis. Although plans to offer Linux as a preinstalled operating system do not yet exist, this strategy is subject to change.

SOME WEB SITES FOR COMPAQ USERS INTERESTED IN LINUX

For information on Compaq Professional Workstation models that are tested and certified on Red Hat Linux:

HTTP://WWW.COMPAQ.COM/PRODUCTS/WORKSTATIONS/SOFTWARE-PLATFORM/OS.HTML

For official Compaq Linux web site:

HTTP://WWW.UNIX.DIGITAL.COM/LINUX/

For Linux-focused Compaq Active Answers solutions:

HTTP://WWW.COMPAQ.COM/ACTIVEANSWERS/

Overview

This document covers the installation and configuration of Red Hat Linux 5.2 Compaq Professional Workstations AP and SP models.

All Web URLs and FTP sites listed in this guide are embedded links and permit the reader to jump directly to those sites using an installed Web browser.

Prepare the Hardware

The IRQ number of the network interface controller (NIC) must be changed before installation of the operating system or initialization fails. Prior to installation of Linux, run Setup (F10) and change the IRQ number assigned to the NIC (typically 11) to either IRQ 9 or 10.

Install Red Hat Linux

The Red Hat Linux 5.2 install program includes pre-defined installation classes.   Any of the installation classes are appropriate for the AP200, AP400, and AP500. The Workstation class is the most appropriate. The Custom installation class is required for the SP700.

Initial Installation Steps

1. Insert the Red Hat Linux 5.2 Operating System CD into the CD-ROM drive and restart the workstation.

    The Red Hat Linux GUI starts and takes the user through each step of the installation process. Read each screen carefully for instructions and explanations. Use the up/down arrow keys to access the appropriate selection.

2. Choose a language; this varies from site to site.

3. Choose a keyboard type; this varies from site to site.

4. Choose an Installation method (file source).

    Note: This guide assumes a local CD-ROM installation. Alternative installation methods are discussed in the Red Hat 5.x installation manual.

5. Install Path; choose install or upgrade.

6. Installation Class: Choose Workstation or Custom for AP200, AP400, AP500; Choose

Note: The AP400 and AP500 SCSI probe automatically finds the NCR 53C8xx PCI adapter. The SP700 SCSI probe does not identify any SCSI devices so you must answer:

Do you have any SCSI adapters? **Yes**
When prompted to load a SCSI module: **Select NCR 53C8xx PCI**

Class-Based Installation Path

The Workstation and Server Installation Path installs a pre-configured disk partitioning scheme. If the Workstation or Server Installation Path is chosen, the RedHat Linux Installation program prompts the user twice that disk data will be lost, then creates a new file system with three or more partitions. After automatically partitioning the drive, the installation program automatically formats the newly created partitions and proceeds to install packages. Jump ahead to "Finishing the Installation."

Important Note: Workstation or Server Installation Path ignores any Compaq System Partitions! The installation program removes any Linux partitions found on the drive(s) and recreates a filesystem, then installs the Linux Loader (LILO) into the boot sector of the primary drive.

Custom Installation Path

The Custom Installation Path gives the user complete control of creating the Linux filesystem partitions formatting, and software package selection. Users who wish to create custom filesystem configurations or to preserve a previous configuration should choose Custom Installation.

Disk Partitioning

The Red Hat Linux GUI offers the user a choice of either the disk partitioning utility, Disk Druid, or the fdisk utility. Disk Druid displays a table representing the:

- Disk partitions

- Amount of disk used and amount available

- Partition type (Linux Native, Linux Swap, etc.)

- Mount points (i.e. /, /home /usr/local, etc.)

Disk Druid permits the user to add, edit, or delete partitions. In addition, Disk Druid permits the user to designate certain partitions as "growable," in which the partition is initially created as a certain size, but is permitted to "grow" in size as needed.

In general, the swapfile partition size should equal the amount of installed memory. A practical minimum size is 16MB. The maximum swap size is 127MB per swap area. Multiple swapfile partition may be created.

Package Selection

After formatting the partitions, the user must select which RPM packages to install. If the unit will connect to an Ethernet network, you must select the package "Networked Workstation."

Finishing the Installation

Configure Mouse

The RedHat mouseconfig utility probes for a mouse, and typically detects a PS/2-style mouse; however, the user must designate which mouse type to use:

- Systems with a two-button mouse should Emulate 3 buttons.

- Emulate 3 buttons is not necessary on a 3 or 4 button mouse.

Configure X Windows

If you selected X Windows package, RedHat's Xconfigurator tool attempts to detect the installed video board and selects the appropriate X server or presents a list of video boards. If the list appears, select Unlisted Card, then select VGA16 server, you will have to install the X86Free update as explained later in this document.

Note: RedHat Linux 5.2 ships with XFree86 version 3.3.2, which includes support for Matrox Millennium II PCI and AGP. XFree86 3.3.3.1 has recently been released and includes an Xserver for Matrox Productiva G100 and Millennium G200 and 3Dlabs chipsets (ELSA and Oxygen GMX).

The information needed to properly configure the monitor should be obtained directly from the specification sheet in the monitor documentation to ensure the best performance of XFree86 (see monitor specification table in the Appendix). The information required in this module is:

- Monitor type - for Compaq monitors, I recommend choosing Custom or Generic Multisync.

  Note: XFree86 3.3.3.1 update adds several Compaq monitor definitions. Choose the appropriate Compaq Monitor if it is supported by Xconfigurator.

- Vertical (frequency) Range - see your monitor specs

During controller configuration steps:

1. Select Don't Probe

2. Select the correct amount of video RAM,

3. Select No Clockchip option

4. Probe for Clocks screen - select Skip

Network Configuration

If you select Yes when asked to configure the network, Red Hat Linux 5.2 probes and finds the Intel EtherExpress Pro 100 controller on the AP200, AP400, and AP500. The probe does not find the network controller on the SP700, and you should choose the Intel EtherExpress Pro 100 controller.

Timezone Configuration

Linux needs to know the timezone in which the system will be located. The user may select the appropriate timezone and optionally designate if the system clock is set to Greenwich Mean Time – Universal Coordinated Time (GMT/UTC).

Printer Configuration

Next, Red Hat Linux prompts to configure a Printer - local or networked. The queue specifics may be configured and modified as necessary.

Root Password

Next, Red Hat Linux prompts for the creation of a root user password. Type in the desired password twice, pressing Enter after each entry. Select OK to continue.

Boot Disk Creation

Just as Windows NT prompts to create an Emergency Recovery Diskette, RedHat Linux prompts the user to create an Emergency Boot Diskette. The Boot Diskette should be created, especially if the system will dual boot between Linux and Windows NT.

Configure LILO

The last steps in the Red Hat Linux installation process involve configuring LILO, the Linux boot loader. RedHat's Class Installation automates placement of LILO in the boot sector of the primary disk.

Note: LILO can boot many non-Linux operating systems if installed in the boot sector of a drive, HOWEVER LILO CANNOT BOOT WINDOWS NT! Windows NT's boot loader "owns" the boot sector of the host drive. Therefore, in this step of Red Hat Linux configuration, LILO must be installed in the Linux root partition if you plan to dual-boot Linux with Windows NT!

See the section entitled "Dual Booting Windows NT and Red Hat Linux" for discussion on how to get Linux to boot from the Windows NT Boot Menu; for example,

```
NT Workstation Version 4.0
NT Workstation Version 4.0 [VGA Mode]
Linux
```

After selecting the location where LILO will be installed, Red Hat Linux prompts for the following information:

- Other partitions to add to the LILO menu. DOS, Windows 95, and F10 Diags partition can be added in this step.

- Optional boot parameters that must be passed to the Linux kernel at bootup. The screen also shows an option to Use Linear Mode (needed for some SCSI drives). Check this box if the system has SCSI hard drives.

Installation is Complete

After installing LILO, the Red Hat Linux 5.x installation process is complete, and the script will end by rebooting the unit. Remove all diskettes and CD-ROMs, allow the system to restart, and observe the bootup messages to verify that the SCSI driver loads properly and that all daemons start normally.

Final Configuration and Customization Steps

Installing the XFree86 Updates

The installation of the XFree86 3.3.3.1 update is required for proper operation of X on many models because of no support for graphic boards in the XFree86 version shipped with the Red

Dual-Booting Windows NT and Red Hat Linux

Several Linux HOWTO's have been published to document dual-booting Linux with other operating systems. The following steps outlined in one specific HOWTO have been used successfully. The steps may be found at:

http://metalab.unc.edu/mdw/HOWTO/mini/Linux+NT-Loader.html

Installation sequence matters.

1. Install the Diagnostics and Setup utilities first, using SmartStart for Workstations,

2. Install Windows NT 4.0 Workstation and the Workstation SSD,

3. Install Linux last.

In section 5 of the HOWTO document, the author indicates that the LILO boot sector must be copied from the Linux system partition onto diskettes or otherwise moved to the NT partition, since Windows NT's NTLDR owns the Master Boot Record.

Unless you created a Linux Boot Diskette, you must boot the system from the Red Hat Linux Installation diskettes. At the boot prompt, enter rescue and press enter. Continue through the process of identifying keyboard, PCMCIA support, and SCSI support (pick NCR 53C810/53C820 (Alternate) as before).

The rescue diskettes will leave the user at the command prompt. Enter the commands below to mount the Linux partition and the floppy assuming /dev/sda4 is your Linux Partition:

```
[WS]# mount sda4 /mnt
```

Extract the Linux boot sector as follows (type this command on a single line):

```
[WS]# dd if=/mnt/dev/sda4 of=/mnt/bootsect.lnx bs=512 count=1
```

There is something wrong if your `bootsect.lnx` has more than 512 bytes.

Now, eject the Supplemental Diskette and insert a DOS-formatted diskette. The next step copies the file `bootsect.lnx` to the DOS-formatted diskette as this is your method to transfer files to the Windows NT-NTFS partition. Insert the DOS diskette in place of the Linux boot diskettes, then you can copy it with:

```
[WS]# mkdir /floppy
[WS]# mount -t msdos fd0 /floppy
[WS]# cp /mnt/bootsect.lnx /floppy
[WS]# umount /floppy
```

Linux SMP Support

See the links referenced in the "Additional Resources" for more specifics. The Linux SMP
FAQ cites the following prerequisites to successfully enable SMP support on Linux:

"How do I make a Linux SMP kernel?"

The SMP FAQ is quoted below:

- `Uncomment the SMP=1 line in the main Makefile`
  `(/usr/src/Linux/Makefile).`

- `Enable "RTC support". Note that inserting RTC support`
  `actually doesn't prevent drift, but … it can prevent lockup`
  `when the clock is read at boot time. A note … says also`
  `that activating the Enhanced RTC is necessary to get the`
  `second CPU working (identified) on some original Intel`
  `Mainboards.`

- `Do NOT enable APM! APM and SMP are not compatible, and your`
  `system will almost certainly … crash under boot if APM is`
  `enabled.`

You must rebuild all your kernel and kernel modules when changing to and from SMP mode.
Remember to `make modules` and `make modules_install`.

Appendix

Additional Resources

The following Web URLs provide additional resources.

Red Hat Support Pages:
http://www.redhat.com/support/docs/rhl

Red Hat Linux 5.2 Errata Page:
http://www2.portal.redhat.com/support/docs/rhl/rh52-errata-general.html

Upgrading to the 2.2.x Linux Kernel on Red Hat Linux 5.2 systems
http://www.redhat.com/support/docs/rhl/kernel-2.2/kernel2.2-upgrade.html

Linux Documentation Project (HOWTO Library):
http://www.LINUXresources.com/LDP/HOWTO/HOWTO-INDEX-3.html#ss3.1

Red Hat Linux Installation Guide:
http://www.LINUXgazette.com/issue18/redhat.html

Linux SMP HOWTO:
http://sunsite.unc.edu/mdw/HOWTO/Parallel-Processing-HOWTO.html

Linux SMP FAQ:
http://www.irisa.fr/prive/dmentre/smp-faq/smp-faq-2.html

Compaq Monitor Specifications

Monitor	Horizontal Frequency	Vertical Frequency
1024 COLOR	30 - 60 kHz	50 - 100 Hz
151FS COLOR	30 - 60 kHz	50 - 100 Hz
171FS COLOR	30 - 60 kHz	50 - 100 Hz
QVISION 172	31.5 - 82 kHz	50 - 110 Hz
QVISION 200	30 - 82 kHz	50 - 160 Hz
QVISION 210	31 - 94 kHz	48 - 110 Hz
P50	30 - 69 kHz	47.5 - 125 Hz
P75	30 - 85 kHz	50 - 150 Hz
P110	30 - 107 kHz	48 - 160 Hz
P1610	30 - 96 kHz	48 - 160 Hz
V50	31 - 60 kHz	47.5 - 115 Hz
V55	30 - 60 kHz	47.5 - 125
V75	30 - 69 kHz	47.5 - 125 Hz
V90	30 - 94 kHz	48 - 160 Hz
V500	30 – 70 kHz	50 – 160 Hz
V900	30 – 96 kHz	48 - 160 Hz
V1000	30 - 107 kHz	48 - 160 Hz
TFT450	31.5 - 60.2 kHz	59 - 85 Hz
TFT500	31.5 - 60.2 kHz	59 - 85 Hz
TFT5000	31.5 - 60.2 kHz	56 – 78.75 Hz
TFT8000	31.5 - 80.0 kHz	60 - 85 Hz
S700	30 - 69 kHz	50 - 160 Hz
S900	30 - 95 kHz	50 - 160 Hz