

Linux® for VnmrJ

Installation Guide
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VARIAN

Linux® for VnmrJ Installation Guide

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Chapter 1 Introduction

Varian, Inc. NMR spectrometers use VnmrJ as the data acquisition and processing software.

1.1 About This Guide

This guide describes how to prepare a Linux workstation to run VnmrJ. This chapter prepares you for installing Linux for VnmrJ, and the second chapter gives general information about safety.



The remaining chapters describe different types of installations based on your system.

1.2 Warning and Caution Symbols

These procedures help you establish operating conditions that permit safe and efficient use of your equipment. Special considerations and precautions are shown in the form of **NOTES**, **CAUTIONS**, and **WARNINGS** as described below. You must operate your equipment in accordance with these procedures and any additional information provided by Varian. Contact Varian, Inc. if you have any questions regarding the safe and proper use of your equipment.

The following warning and caution notices illustrate the styles used in these procedures for safety precaution notices and explain when each type is used.

NOTE: Notes give additional and important information.

Warning Symbol	Warning Description
 CAUTION	Alerts you to situations when failure to observe instructions could result in serious damage to equipment or loss of data.
 WARNING	Alerts you to potentially hazardous situations that could result in serious injury or death to humans or animals, or significant property damage.

1.3 Getting Started

These instructions apply to the following Red Hat® Linux® version and Dell workstation:

- Red Hat® Enterprise Linux® (RHEL) Desktop version 5.3 on a Dell Precision T3500 workstation.
- Red Hat® Linux® version 5.1 on a Dell OptiPlex 755n workstation and Precision T3400 workstation.
- Older version of Red Hat and earlier Dell workstations. See Installing Older Versions of Red Hat® Linux® from CD or DVD, page 32.

Table 1 General Installation Steps

Task	Reference
Collect network information	Table 3 Network Information Worksheet, page 4
Set up Dell Pre-installed RHEL 5.3	Setting Up Dell Pre-installed RHEL 5.3 Desktop, page 6
Install Red Hat® Linux® version 5.3 from DVD	Installing Red Hat® Linux® from a DVD, page 9
Restoring Dell Pre-installed RHEL 5.3	Restoring Dell Pre-installed RHEL 5.3 to Factory Defaults, page 7
Configure the Network	Configuring Network Settings, page 16
Install Nvidia Video Display Drivers	Installing Nvidia Video Display Drivers, page 24
Install older versions of Red Hat® Linux®	Installing Older Versions of Red Hat® Linux® from CD or DVD, page 32.
Install VnmrJ	<i>VnmrJ Installation and Administration User Guide</i>

1.4 Requirements

A host computer system (with two network interface ports) purchased from Varian, Inc. or in full compliance with current Varian Inc. specifications is required. Specification is available upon request. No other computer systems are supported.

Become familiar with the Linux operating system, computer hardware, and Ethernet™ networks before beginning any of the procedures in this guide.

1.5 Collecting Network Information

Use Table 3 Network Information Worksheet to collect network information and use this information when installing Linux. The network administrator for the site must provide all required network information.

Table 2 Reserved System Names

inova, inovaauto, gemcon, or wormhole, master1, rf1, rf2, rf3, rf4, rf5, rf6, rf7, rf8, lock1, lock2, grad1, grad2, pfg1, pfg2, ddr1, ddr2, ddr3, ddr4, ddr5, ddr6, ddr7, ddr8
--

Table 3 Network Information Worksheet

Network	Comments	Your Configuration
Host Name	The host name of the host computer. Do not use names listed in Table 2 Reserved System Names, page 4	
Network Device	The network interface (Ethernet board) installed in the computer. Linux system shows eth1 for the primary computer (on board) interface and eth0 as the secondary (card slot) interface. NOTE: Dell Factory - installed Red Hat RHEL reverses the sense of eth0 and eth1.	

Network	Comments	Your Configuration
IP Address (eth1)	The network IP number for the Ethernet board connected to the NMR console. IP addresses, select one: 172.16.0.1 or 10.0.0.1.	
IP Address (eth0)	The network IP number for the Ethernet board connected to the network—supplied by the local network administrator.	
Netmask	The associated netmask or subnet mask number. Typically, this number is 255.255.255.0.	
Gateway	For the secondary network card—supplied by the local network administrator.	
Name Service	Depends on the local network setup. NIS+, NIS, DNS, DCE, or similar.	
Domain Name	Network domain name, for example: <code>our.domain</code> —supplied by the local network administrator.	
Name Server	Network name server and IP address—supplied by the local network administrator.	
Proxy Server (Optional)	Proxy server name, for example, <code>proxy.domain.com</code> —supplied by the local network administrator.	

Chapter 2 Setting Up Dell Pre-installed RHEL 5.3 Desktop

2.1 Applicability of Setting Up Dell Pre-installed RHEL 5.3 Desktop

The following procedure is for setting up the 64-bit version of Dell pre-installed RHEL 5.3 Desktop for the first time on the following computer:

Dell Precision T3500

2.2 Preparation


1. Turn on the workstation.
2. Continue with, Initial Linux Setup After Reboot, page 15.
3. Use Table 3 Network Information Worksheet, page 4, to complete the initial set up options for Configuring Network Settings, page 16.
4. Complete Setting Up the Xorg File, page 26.

Chapter 3 Restoring Dell Pre-installed RHEL 5.3 to Factory Defaults

3.1 Applicability of Restoring Dell Pre-installed RHEL 5.3


This procedure is applicable to the restoring of the 64-bit version of Red Hat Linux 5.3 pre-installed from Dell:

Dell Precision T3500

 WARNING	This procedure completely erases the hard drive and all data on it. Back up all data that needs to be retained before continuing further.
--	---

3.2 Preparation


1. Turn on the workstation.
2. Login as root.

 WARNING	If this is not the first time re-installing the Pre-installed Red Hat, the following steps will be required to allow another re-install.
--	--

3. Mount /dev/sda2 onto /mnt, for example, `mount /dev/sda2 /mnt`
4. Changed to the mnt directory, `cd /mnt`
5. Copy the autoexec.bat.org to autoexec.bat, for example, `cp autoexec.bat.org autoexec.bat`
6. Change out of this directory, for example, `cd /`
7. Unmount the partition, `umount /mnt`

You may now proceed with the restoring instructions below.

3.3 Restoring Dell's Red Hat

 WARNING	This procedure completely erases the hard drive and all data on it. Back up all data that needs to be retained before continuing. The installation script does not prompt for permission once the script is started.
--	--

1. Change the directory to /usr/src/dell
`cd /usr/src/dell`
2. Enter the following at the prompt (command is case sensitive):
`sh ./reinstall.sh`
The script asks you to enter **RESTORE TO FACTORY DEFAULT** for confirmation. The system will reboot shortly afterwards.
After reboot you are presented a display asking: **Are You SURE You Want To Restore Your System to original factory Defaults?**
3. Select **Yes**.
4. Another screen is presented stating: **ALL DATA WILL BE DESTROYED, Are You Sure?**
5. Select **Yes**.
6. Wait as system reinstalls the Red Hat OS.
System will reboot on completion.
7. Continue with, Initial Linux Setup After Reboot, page 15.
8. Use Table 3 Network Information Worksheet, page 4, to complete the initial set up options for Configuring Network Settings, page 16.
9. Complete Setting Up the Xorg File, page 26.

Chapter 4 Installing Red Hat® Linux® from a DVD

4.1 Applicability of the Varian Custom DVD Installation of Red Hat® Linux®

This procedure is applicable to the installation of the 64-bit version of Red Hat Linux 5.1 from a DVD on the following computer system:

Dell OptiPlex 755n, Dell Precision T3400

NOTE: Varian Custom DVD is found in a Dell DVD sleeve. The DVD is called *OS Recovery DVD*.



WARNING

This procedure completely erases the hard drive and all data on it. Back up all data that needs to be retained before continuing further.

4.2 Preparation

1. Turn on the workstation.
2. Insert the DVD into the DVD drive.
3. Reboot.
4. Wait for the F12 message to appear in the upper right corner.
5. Press the F12 key to make a one time change in the boot sequence so the workstation boots from the DVD drive.
6. Change the boot sequence to use the DVD drive:
 - a. Use the down arrow key to highlight Onboard or USB DVD/CD drive.
 - b. Press Enter (the computer boots using the DVD/CD drive).
7. Continue with Installing Red Hat.

4.3 Installing Red Hat



WARNING

This procedure completely erases the hard drive and all data on it. Back up all data that needs to be retained before continuing. The installation script does not prompt for permission once the script is started.

1. Enter the following at the prompt (command is case sensitive):

```
linux ks=cdrom:/Varian755_RH51.cfg
```

The installation takes approximately 35 minutes. The DVD ejects and re-inserts itself once during this process. Do not remove the DVD, or the post installation script will be skipped.


2. Wait for the message: **installation complete**.
3. Restart the workstation.
4. Log in as root.
5. Enter varian1 (the default root password).
6. Refer to the Linux documentation for instructions on changing the password for the root login and change the password.
7. Remove the DVD from the drive.
8. Double-click the computer icon.
9. Double-click the filesystem folder.
10. Double-click the Dell_drivers folder.
11. Verify that the folder contains several files with the extension **.rpm**.
This verifies successful installation of both the Red Hat 5.1 and the post installation successful.
12. Repeat the installation process if the dell_drivers folder is missing or if the dell_drivers folder does not contain files with the extension **.rpm**.
13. Continue with Configuring Network Settings, page 16.

Chapter 5 Installing Red Hat® Linux® from RHEL 5.3 DVD



5.1 Applicability of the Red Hat DVD Installation of Red Hat® Linux®

This procedure is applicable to the installation of the 64-bit version of Red Hat Linux 5.3 from a DVD on the following computer system:

Dell OptiPlex 755n, Dell Precision T3400, and T3500

 WARNING	This procedure completely erases the hard drive and all data on it. Back up all data that needs to be retained before continuing. Do not use this procedure if this is a Dell Factory-Installed RHEL system, unless the original disk is no longer in service.
--	---

5.2 Installing Red Hat

 WARNING	This procedure completely erases the hard drive and all data on it. Back up all data that needs to be retained before continuing further. The installation script does not prompt for permission once the script is started.
 WARNING	Do not use this procedure unless the disk replacement was necessary. Otherwise, use the restoring of Dell's pre-installed Red Hat Instructions; see Restoring Dell Pre-installed RHEL 5.3 to Factory Defaults.

5.3 Preparation

1. Turn on the workstation.
2. Insert the DVD into the DVD/CD-ROM drive.
3. Reboot.
4. Wait for the F12 message to appear in the upper right corner.
5. Press the F12 key to make a one time change in the boot sequence so the workstation boots from the CD-ROM.
6. Change the boot sequence to use the DVD drive:
 - a. Use down arrow key to highlight Onboard or USB DVD/CD drive.
 - b. Press Enter (the computer boots using the DVD drive).
7. If you get the message: "Selected boot device not available, press F1 to retry boot or F2 for setup utility. Press F5 to run onboard diagnostics," then press F1 to retry.
8. Continue with Installing the 64-bit Version of Linux.

5.4 Installing the 64-bit Version of Linux

Install the operating system in the following order:

- Responding to Options Presented During Installation
- Setting Up the Linux Installation Process
- Installing Linux
- Setting up Linux

5.4.1 Responding to Options Presented During Installation

The following table summarizes the suggested responses to various prompts presented during the installation process and is provided as a guide and reference. Follow the installation procedure beginning with Installing Linux, page 13.

Table 4 Suggested Responses to Installation Prompts

Screen	Selection
Test CD Media	Skip
Language Selection	English
Keyboard Configuration	U.S. English
Install Number	Type the 1 year subscription number (without dashes) found on the product key card (red card).
Installation Type (full)	Install Red Hat Enterprise Linux workstation (do not upgrade)
Disk Partitioning Setup	Automatically Partition See Installing Linux, page 13
Boot Loader Configuration	GRUB (default)
Network Configuration	Use the network information worksheet to configure the network
Firewall Configuration	Select No firewall
Additional Language Support	Select English (USA) as the default; select other languages to install, such as Japanese
Time Zone Configuration	Select the local time zone
Set Root Password	Enter a root password
Package Installation Defaults	Select Customize the set of packages to be installed
Package Group Selection	Follow the suggestion in Package Groups and Option Selections, page 14

5.4.2 Setting Up the Linux Installation Process

1. At the initial Red Hat installation screen, press ENTER for the graphical installation.
2. Wait for the Red Hat Linux installation **Welcome** screen to display.
3. Click **Next** to begin setting up the installation.
4. Click **Next** after a series of screens appear that require making a selection.

NOTE: Refer to Table 4 for responses.

5. Continue with installing Linux.

5.4.3 Installing Linux

Refer to Responding to Options Presented During Installation, page 12 and the Red Hat manuals as needed.

1. Click **Next** to begin.
At the completion of each screen, click **Next** to proceed to the next step. The **Back** button shows the previous screen.
2. When you see the **Disk Partitioning Setup** screen, do the following:
 - a. Select **Remove all partitions on selected drives and create default layout**.
 - b. For **Drives to use for installation**, use the default, unless something else is appropriate for your system installation.
 - c. Verify that the option: **Review (and modify if needed) the partition created** is selected.
3. Click **Next**.
4. Select **Yes** in popup window.
5. Except for special partitioning needs, leave the partitioning as is.
6. Click **Next** to continue.
The boot loader in the Boot Loader Configuration screen is displayed.
7. Keep the GRUB boot loader as the default, click **Next**.
8. Select devices; configure the network device.

To configure device:

NOTE: Device configuration is part of Configuring Network Settings, page 16.

1. Select **eth0**.
2. Click **Edit**.
3. Configure eth0.

NOTE: Refer to information in Table 3 Network Information Worksheet, page 4.

4. Enter hostname using manual method if needed.
5. Enter Gateway (also referred to as the default router) IP using Table 3 Network Information Worksheet, page 4.

NOTE: This field is not available if eth0 is set to DHCP.

6. Enter DNS IP(s) using network information worksheet.
7. Click **Next**.

To continue installing Linux after configuring device:

1. Enter Time Zone Info, click **Next**.
2. Enter Root password, click **Next**.
3. Select **Multimedia, Office and Software Development**.
4. Select **Customize now**.
5. Click **Next**.

5.4.4 Package Groups and Option Selections

Based on the Dell RHEL Installation, the following selections are suggested. The left box shows Package Groups; the right box shows the optional packages for the Package Group selected. In addition there is an Optional package button below the right box. This opens a selections box displaying all the packages, with the default list of packages selected as indicated by the check mark. The user can select additional packages if they wish, but for the purposes of VnmrJ, no additional packages need be selected.

1. Select each package group and then select the package options as follows.

Package Group	Package Options
Desktop Environments	GNOME and KDE
Applications	All the options
Development	Development Libraries Development Tools GNOME Software Development Legacy Software Development Ruby X Software Development
Servers	Legacy Network Server Printing Support
Base System	All the options, except OpenFabrics Enterprise Distribution
Languages	Chinese Support French Support German Support Japanese Support Korean Support Spanish Support

2. Click **Next**.
3. Click **Next** to start software installations.
4. After installation is complete, remove the ejected DVD and then click **Reboot**.

5.4.5 Initial Linux Setup After Reboot

After reboot you are greeted by Red Hat's post installation setup.

1. Click **Forward** in the **Welcome** screen.
2. Read the License Agreement, and click **Yes, I agree to the License Agreement**; click **Forward**.
3. **Disable Firewall**, click **Forward**, and then click **Yes** to popup windows.
4. **Disable SELinux**, click **Forward**, and then click **Yes** to popup window.
5. Click **Forward** in **Kdump** screen.
6. Set the appropriate Date and Time, click **Forward**.
7. Select **No** for **Setup Software Updates**, click **Forward**, and then click **No thanks, I'll connect later**.
8. Click **Forward**.
9. **Create User**.
 - User name: admin01 (or something else appropriate for your site)
 - Full name: Administrator
 - Password: Enter an appropriate password for your site
 - Confirm Password: Re-enter the password
10. Click **Forward**.
11. For sound card, test if appropriate to your site, and then click **Forward**.
12. For additional CDs, click **Finish**, if no additional CDs are needed.
13. Click **OK** on popup windows to reboot the system.



CAUTION

Do not install VnmrJ before the network settings are configured.

Follow the procedures in Configuring Network Settings, page 16.

Chapter 6 Configuring Network Settings

Configure the network in the Network Configuration screen. Each workstation Ethernet port must be configured. Systems not connected to a network require only one Ethernet port (on board port) and systems connected to a network require two Ethernet ports (one on board and one card).

6.1 Connecting the Workstation to the Console and Network

6.1.1 For Non-Dell Pre-installed Red Hat OS

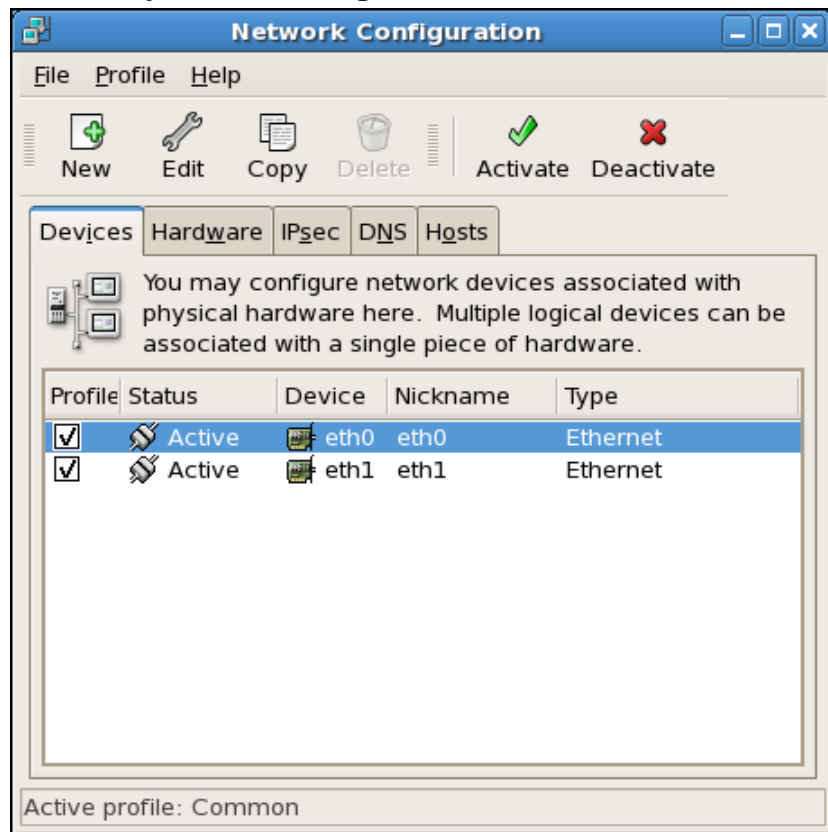
1. Connect the on board network interface card, eth1, to the NMR console.
2. Connect the card slot network interface card, eth0, to the local network.
3. Turn on the computer.
4. Turn on the console.
5. Log in as root (password required).

6.1.2 For Dell Pre-installed Red Hat OS

1. Connect the on board network interface card, eth0, to the local network.
2. Connect the card slot network interface card, eth1, to the NMR console.
3. Turn on the computer.
4. Turn on the console.
5. Log in as root (password required).

6.2 Configuring the Workstation to NMR Console Ethernet Port

6.2.1 Start the Systems Setting Window



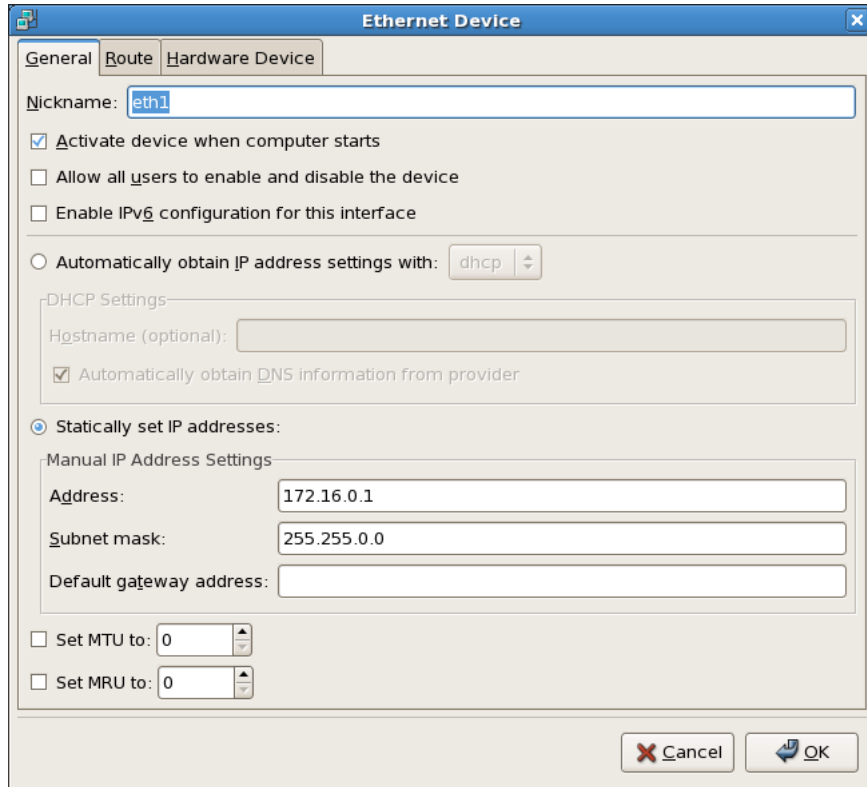
1. Click **System** on the main menu.
2. Select **Administration**.
3. Select **Network** to start the Network Configuration Tool.
4. Click the **Devices** tab.

6.2.2 Configure eth1 (NMR Console Port)

The network port, eth1, is the port connected to the NMR console.

1. Double-click **eth1**.
2. Select the following options or enter the following to configure eth1 (port connected to the NMR console):
 - a. Select **Activate device when computer starts** in the **Ethernet Device** screen.

NOTE: If not selected, port will not be active after reboot.



- b. Select **Statically set IP addresses**, required for Varian MR Systems.
- c. Type **IP Address**.

Select a system IP address, from Table 5, for the system that does not conflict with the network at the site and corresponds to the NMR console, to which the host computer is connected. See Table 3 Network Information Worksheet, page 4.

Table 5 IP Addresses

Main network address	Set IP to
Does not start with 172.16	172.16.0.1
Starts with 172.16	10.0.0.1

Refer to Table 3 Network Information Worksheet on page 4 for DNS IP numbers and any network information specific to the network at the site. The local network administrator must provide all the required information.

- d. For **Netmask**, type: 255.255.255.0
 - e. For **Default Gateway Address**, leave empty.
3. Click **OK**.

4. Do one of the following:
 - Local network connection required and available; see Configuring the Workstation's Local Ethernet Port, page 19.
 - No local network connection required or available; see Configuring the Second Ethernet Port with No Local Network Connection, page 21.

6.3 Configuring the Workstation's Local Ethernet Port

6.3.1 Required Information Specific to the Local Network

Refer to Table 3 Network Information Worksheet on page 4 for DNS IP numbers and any network information specific to the network at the site. The local network administrator must set up the connection between the workstation and the local network and provide all the required information.

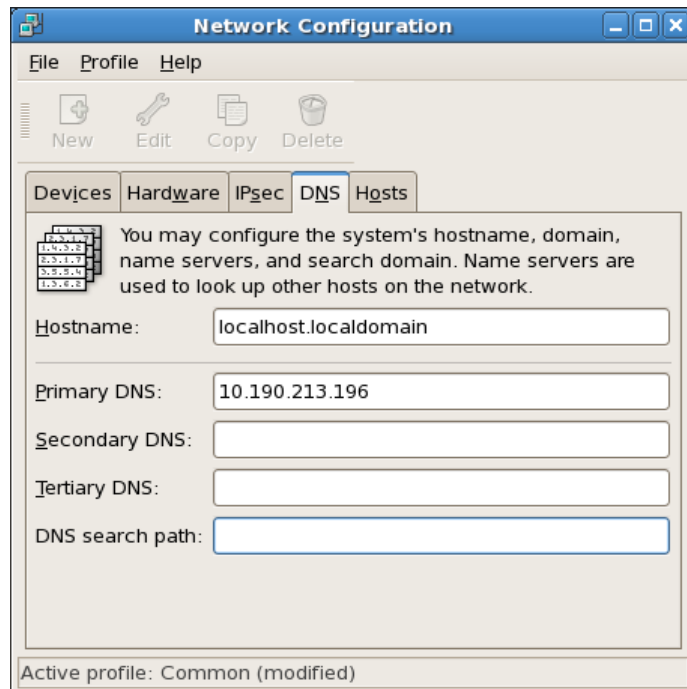
6.3.2 Configure eth0 (Local Network Port)

The network port, eth0, is the port connected to the local network. To configure eth0:

1. Start the **Network Configuration Tool**, if it is not open.
2. Click the **Devices** tab.
3. Double-click **eth0**.
The **Ethernet Device** screen opens with the **General** tab selected.
4. Select Activate **device when computer starts** (must be selected or port will not be active after reboot).
5. Set up the IP address (information supplied by the local network administrator) by selecting either of the following:
 - Automatically obtain IP address settings**
 - a. Select **dhcp**.
 - b. Fill in the Hostname (optional) if needed.
 - c. Select **Automatically obtain DNS information from provider** to have the system obtain the required information from the local network.
 - Statically set IP addresses**
Fill in the following fields (information provided by the local network administrator):
 - Address
 - Subnet mask
 - Default gateway address
6. Click **OK**.

To set up the DNS:

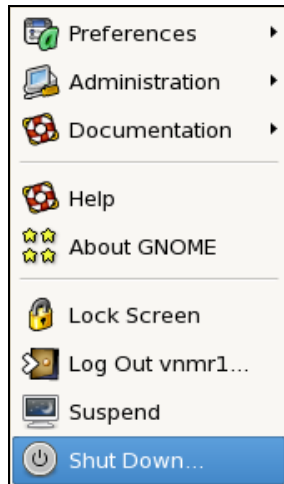
1. Click the **DNS** tab.



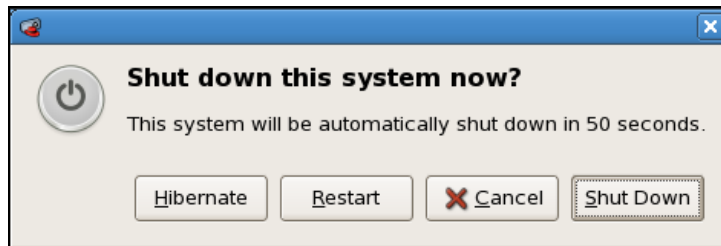
2. Delete any entries already present.
3. Enter the following:
 - Hostname: The default name is Varian-NMR.
 - DNS addresses: Enter all DNS addresses supplied by the site network administrator.
 - DNS search path. Enter DNS search path supplied by the site network administrator.
4. Click the **Hosts** tab.
5. Click the **New** button.
6. Enter the following:
 - Address: The IP address of the machine (if IP statically assigned)
 - Hostname: The hostname used (for example, Varian-NMR)
 - Aliases: Any other names you wish this machine to be known as. (optional)
7. Click **File**.
8. Click **Save**.
9. Click **Quit** to exit the Network Configuration Tool.

To complete configuration:

1. Click **System** on the main toolbar.
2. Click **Shut Down**.



3. Click **Restart**.



The workstation is now attached to the customer network.

4. Continue with installing VnmrJ. Refer to the *VnmrJ Installation and Administration User Guide* for instructions.

6.4 Configuring the Second Ethernet Port with No Local Network Connection

Use this procedure if network information is not available or no local network connections are required:

6.4.1 Start the Systems Setting Window

1. Click **System** on the main menu.
2. Select **Administration**.
3. Select **Network** to start the Network Configuration Tool.
4. Click the **Devices** tab.

6.4.2 Configure eth0

1. Double-click **eth0**.
2. Select **Activate device when computer starts** in the **Ethernet Device** screen

NOTE: If not selected, port will not be active after reboot.

3. Select **Statically set IP addresses**.
 - Set IP=123.123.123.123 (or any phony IP except 172.xx.xx.xx)
 - Subnet mask=255.255.255.0
 - Gateway IP=blank
4. Click **OK**.
5. Highlight **eth0**.
6. Click **Activate**.
7. Click the **DNS** tab.
The default hostname, localhost.localdomain, should show in the DNS tab. Do not call the host computer wormhole or use any of the names listed in Table 2 Reserved System Names, page 4.
8. If the computer boot-up hangs up (for 5 minutes) at enabling swap space, do one of the following:
 - Activate and configure eth0.
 - Disable send mail service if not connected to a LAN (applications=>system settings=>server settings=>services).
9. Continue with installing VnmrJ. Refer to the *VnmrJ Installation and Administration User Guide* for instructions.

6.5 Configuring eth0/hostname After Loading VnmrJ

1. Log in as root.
2. Open a terminal window.
3. Type: `/vnmr/bin/sudoins`
This sets vnmr1 privileges with user accounts. A message **sudoins done** is shown.
 - The following messages or events may occur if the eth0/hostname is configured after loading VnmrJ:
 - Cannot make a new user.
 - Cannot set up printers.
 - Console is inactive/cannot communicate.
 - Hostname changes to wormhole (that is, the terminal prompt shows vnmr1@wormhole).
 - The hostnames in the DNS GUI field, `/etc/sysconfig/network`, and typing hostname in a terminal should have the same hostname (localhost or some other name, but not wormhole).
 - Ensure that both `ifcfg-eth0` and `ifcfg-eth1` (under `/etc/csysconfig/network-scripts`) do not have a line similar to `hostname=wormhole`. If they do, simply delete the line.
 - Controllers take a long time to boot (more than 3 minutes instead of the normal 10-15 seconds).

Reset as follows:

1. Reset the master1 controller. Wait for all the controllers to boot (may take 4-5 minutes).
2. Open a terminal window and change user to root
3. Type: `/vnmr/bin/setacq`
It will fail.
4. Reboot the master1 again.
All controllers should boot in 10-15 seconds.
5. Re-run `setacq`.
6. Start VnmrJ.
7. Enter `load=y su` on the VnmrJ command line (setup complete message should appear).

Chapter 7 Installing Nvidia Video Display Drivers

The following chapter describes how to install a Dynamic Kernel Module Support (DKMS) Nvidia drivers using the VnmrJ 3.0 installation or using the Nvidia driver obtained from Nvidia's Web site.

NOTE: If you have a System that has the Dell Pre-Installed RHEL 5.3 (Dell Precision T3500), go to Setting Up the Xorg File, page 26.

7.1 Installing DKMS Nvidia Drivers

The DKMS Nvidia Driver is the preferred driver with RHEL 5.3.

To install the DKMS Nvidia drivers, use the following packages within the VnmrJ 3.0 installation under the directory, /vnmr/adm/linux. Use these if you have installed the RHEL from the RHEL DVD.

NOTE: The exact names may vary as newer drivers are obtained, for example:


```
dell-nvidia-180.29-1dkms_rhel5.3.x86_64.rpm
```

Install the DKMS driver by issuing the following commands as root within the directory containing the rpms.

```
rpm -Uvh dkms-2.0.19-1.noarch.rpm
rpm -Uvh dell-nvidia-180.29-1dkms_rhel5.3.x86_64.rpm
```

Then type "reboot" to reboot the system.

7.2 Installing the Nvidia Driver from Nvidia's Web Site

 CAUTION	These are not DKMS drivers. Do not install non-DKMS Nvidia drivers, unless you need the latest driver or you are instructed by Varian, Inc.
--	---

Video drivers can be installed using incompatible methods, notably Dell and Nvidia. Attempting to use the Nvidia's .run file installation on a system that has a DKMS installed driver will result in both drivers being used simultaneously, resulting in an inoperable display.

Nvidia's driver packages use a .run file (for example, NVIDIA-Linux-x86_64-180.51-pkg2.run), which is a self-extracting archive. When executed, it extracts the contents of the archive and runs the contained nvidia-installer utility, which provides an interactive interface to walk you through the installation. You must shut down the X Server before you install this driver.

Nvidia-installer will also install itself to /usr/bin/nvidia-installer, which may be used later to uninstall drivers, auto-download updated drivers, and so on.

NOTE: Prior to using Nvidia's .run file installation, the DKMS driver must be removed.

To determine if or what DKMS drivers are installed (as root):

```
dkms status
```

```
nvidia, 180.29, 2.6.18-128.el5, x86_64: installed
```

There may be other drivers shown, but note the Nvidia display driver only.

The DKMS status gives the information needed to remove it properly: The module name 'nvidia' and version '180.29'.

To remove the driver module (as root):

```
dkms remove -m nvidia -v 180.29 --all
```

After you remove the driver module, install the Nvidia driver:

1. As Root, type the command: `/sbin/init 3`

This should prompt you to log on. If the system is unresponsive to the keyboard, press ALT+F2 combination to obtain a new shell window.

NOTE: Using the ALT-F[2-n] provide multiple shell to log on when the X server is not running, for example, ALT+F2, additional logon shells ALT+F3, ALT+F4, and so on.

2. Log on as root at the shell logon prompt.
3. Install the Nvidia video driver according to Nvidia's installation instructions, for example:

```
sh ./NVIDIA-Linux-x86_64-180.51-pkg2.run
```

Use the defaults when asked for input from the installation.

4. Return Linux to full operation by typing:

```
/sbin/init 5
```

NOTE: For the Nvidia driver installation, occasionally, you must give the kernel path with the option `--kernel-source-path /usr/src/kernels/your_kernel_here`

- a. Use: 'uname -r' to obtain the running kernel revision, for example:

```
uname -r
```

2.6.18-128.1.10.el5 is the /usr/src/kernels directory to get the precise name base on the kernel revision

- b. Invoke the installation with the kernel path option:

```
sh ./NVIDIA-Linux-x86_64-180.51-pkg2.run --kernel-source-path  
/usr/src/kernels/2.6.18-128.1.10.el5-x86_64
```

7.3 Setting Up the Xorg File

After installing an Nvidia driver for the first time, you must run the `nvidia-xconfig` and `nvidia-settings` applications (as root) to properly set up the display to use the new driver.

Within a shell terminal, run the following (as root):

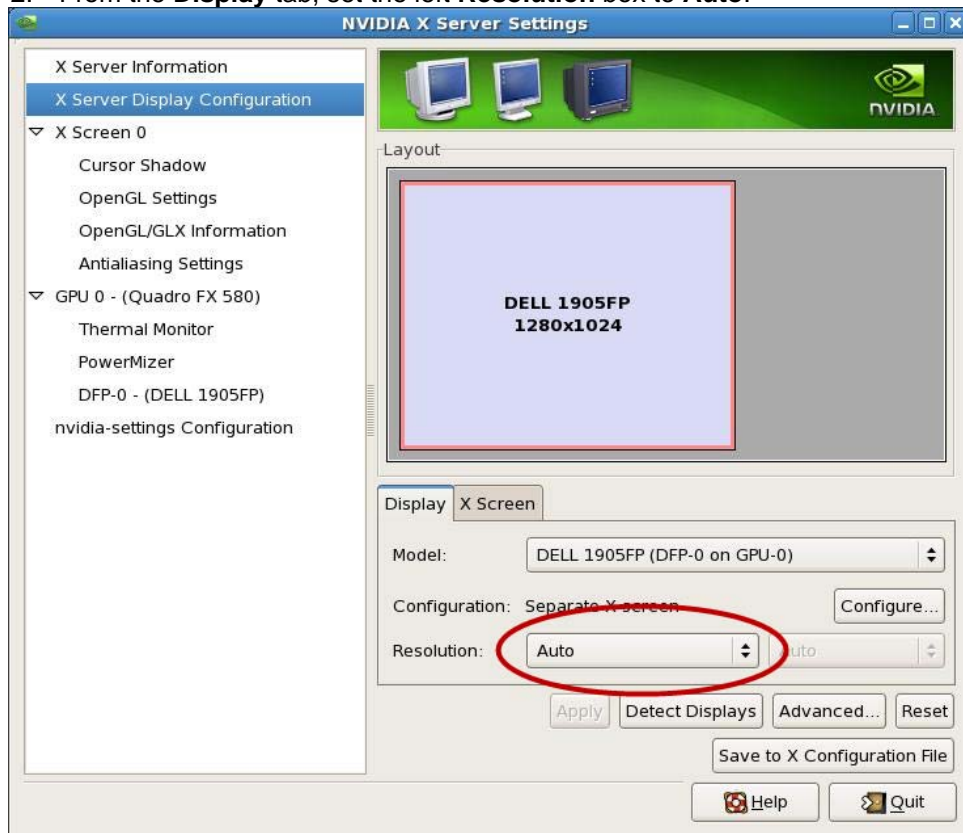
```
nvidia-xconfig
```

Some text output should appear, indicating the `xorg.conf` was changed.

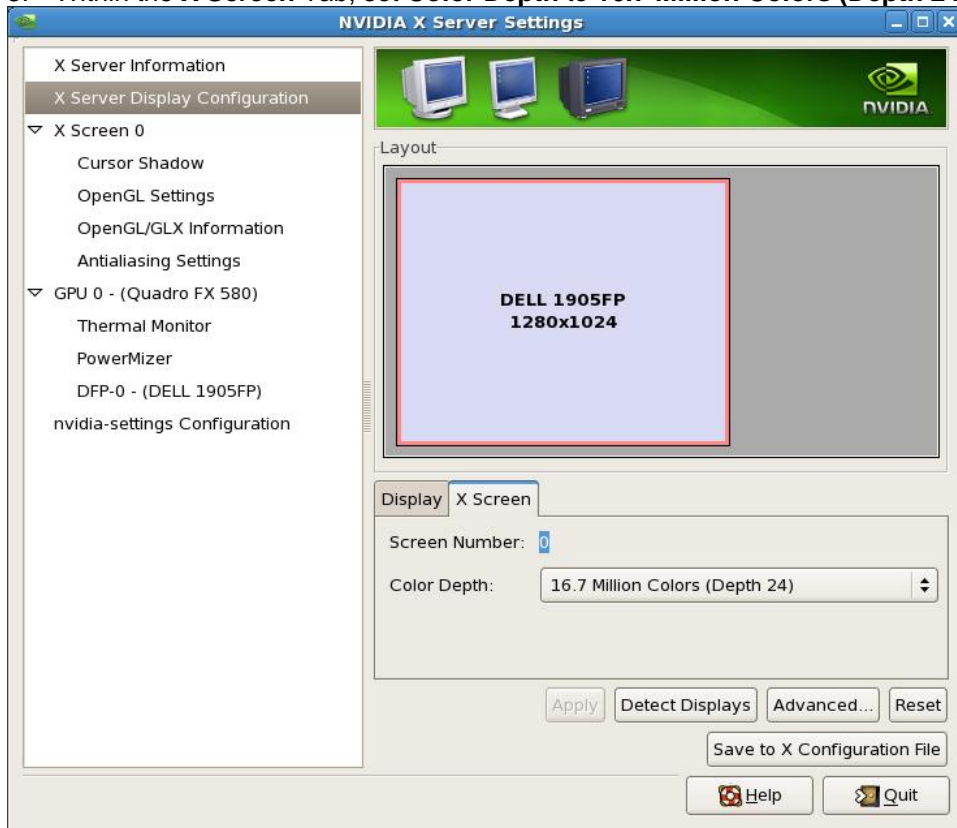
```
nvidia-settings
```

A UI will appear.

1. Click **X Server Display Configuration**.
2. From the **Display** tab, set the left **Resolution** box to **Auto**.



3. Within the **X Screen** Tab, set **Color Depth** to **16.7 Million Colors (Depth 24)**.



4. Click **Save to X Configuration File**.

5. Uncheck the **Merge with existing file** checkbox on the Save X Configuration window and click **Save**.



6. Click the **Quit** button.

7. Log off and then log on to enable the new video driver.

Chapter 8 Linux Administration Notes

This chapter provides additional information about Linux administration as it relates to VnmrJ.

8.1 Understanding User Accounts

One method of creating user accounts for VnmrJ is to let the VnmrJ installation software use the “VnmrJ master user” (vnmr1), and to then use vnmrj adm (the VnmrJ Administrative interface) to create any additional users (vnmrj adm calls makeuser internally; calling makeuser in a UNIX shell should also be OK).

The one drawback with this method is that makeuser automatically selects a user-ID (UID) for new users, and if you define multiple users, their user-ID will depend on the sequence in which they are defined. On a single / stand-alone Linux / VnmrJ installation this is perfectly OK – the user actually never needs to know what his/her user-ID is. However, in networked installations with multiple Linux / VnmrJ installations you may experience problems if the user-ID for a given user name is not the same across all workstations, in that (for example) on NFS-mounted partitions you may not be able to read what you think are your files on the remote system, because these files may have an unexpected UID.

The proper solution for networked systems (apart from using NIS or similar means of sharing user definitions, password information etc.) would be to define all users before starting the VnmrJ installation. This way you (or the system administrator) can decide what the user-ID for a given user name should be on all systems, and the user definitions can be made consistent across the network.

Note that makeuser allocates UIDs starting and incrementing from the value 500. Many UNIX system administration handbooks actually recommend the following:

- Not using UIDs below 100 at all (these should be reserved for internal use).
- Using UIDs between 100 and 1000 for administrative accounts only.
- Allocating UIDs from 1001 (or 1000) up for ordinary users.

Note that under Solaris, makeuser allocates UIDs starting at value 72 – we strongly recommend not propagating this to the Linux systems.

The real pitfall with a manual user account definition under Linux is in the choice of user shell: by default, under Red Hat Linux, user accounts are set up with “bash” as the default user shell. You will not be able to start VnmrJ with this setting. You must make sure you specify **tcsh** (/bin/tcsh) as the user's default shell on Linux platforms.

8.2 Transferring Data from a Sun to a Linux PC

This section describes transferring data from a Sun workstation to a Linux workstation. You may want to transfer files if you are considering upgrading a NMR spectrometer host from a Sun workstation to a PC running Red Hat Linux and VnmrJ 2.1A or newer.

8.2.1 Single-User Data Transfer

The most generic solution certainly is to use NFS mounting for temporary access to the Sun disk from the PC. This involves the following steps:

1. Make sure both systems are on the same network branch and can access each other.
It is convenient if the systems know each other through entries in `etc/hosts` (then you can use host names), but that's not a requirement; the minimal condition is that the two systems can reach each other by IP address - you can test this by using `ping ip_address`, for example:

```
# ping 123.45.67.89
```

which should report:

```
host 123.45.67.89 is alive
```

Make sure you try this from both sides.

2. On the Sun, edit the file `/etc/dfs/dfstab` as root, adding a line such as
`share -F nfs /export/home`
then (still as root) enter:

```
/etc/init.d/nfs.server start
```

which initiates the sharing and starts the necessary NFS daemon copies. The command `share` without argument should now report the shared file system.

3. On the Linux PC, as root, make sure you have a mount point that you can use, for example:

```
mkdir /mnt/sundisk
```

Mount the Sun file system with

```
mount host_name:/export/home /mnt/sundisk
```

or, if the Sun workstation is not listed in `/etc/hosts`:

```
mount ip_address:/export/home /mnt/sundisk
```

4. As a VnmrJ user, you should be able to transfer your files, for example, with

```
cp -r /mnt/sundisk/vnmr1/vnmrsys/data/* ~/vnmrsys/data
```

– Or –

```
cp -r /mnt/sundisk/vnmr1/data/* ~/data
```

(This command will not work if you are logged in as root)

This works as expected, based on two conditions:

- There are no symbolic links involved (`cp -r` would replace such links by the files they are pointing to). If you want symbolic links to be copied as such, then rather use a command such as:

```
cd /mnt/sundisk/vnmr1/data
```

```
tar cf - . | (cd ~/data; tar xfbp -)
```

- All files to be copied are “world-readable”; that is, have read permission for everybody (and directories must have “execute” permission for everybody). The problem with the last point is that in all likelihood (at least, if you simply used makeuser to define the VNMR / VnmrJ users on the two systems), users may have identical names on both systems, but they will have different UIDs (see also Varian NMR News 2005-02-05). If the copying fails, you can alter the permissions first: log into the Sun, then (as VNMR / VnmrJ user) use the following command:

```
chmod -R +r ~
```

and in the case of problems with directory access use

```
find ~ -type d -exec chmod +x {} \;
```

It may be necessary for every VnmrJ user to perform these steps. While basic FTP is OK for simple, plain files, it is tedious to use for transferring nested directories - but alternatively, you may use GUI-based, easy-to-use FTP utilities such as gFTP under Linux to do the data transfer.

This should avoid permission issues, as on the remote system you act as a local user.

NOTE: Beware of transferred binary executables! Compiled programs **ONLY** work on the architecture for which they have been compiled. Files (other than shell scripts) in ~/bin or /vnmr/bin are suspicious under that aspect.

8.2.2 Multiple-User Data Transfer

With many users a managed data transfer as root might be more efficient than the single-user procedure described above. To do this, you must export the Sun file system(s) with root permission. This is achieved by changing the file sharing command in /etc/dfs/dfstab, for example:

```
share -F nfs -o root=host1:host2 /export/home
```

where host1 and host2 would be potential NFS clients with root access. Now, after mounting, root retains root access even on the NFS-mounted file system, and a global data transfer can be done with the following commands, for example:

```
mkdir /home/import
```

```
cd /export/home
```

```
tar cf - vnmr1 vnmr2 user3 user4 ... | (cd /home/import; tar xvfBp -)
```

where /home/import is a directory on the Linux system that receives all Sun files. In this case, the transferred files will retain the UID and the GID that they had in the Sun and Solaris environment. Due to the potential discrepancy in the UID and GID assignment, you will need to correct the ownership of the transferred files. You can do this by file or directory name, for example:

```
cd /home/import
```

```
chown -Rh vnmr1:nmr vnmr1
```

```
chown -Rh vnmr2:nmr vnmr2
```

```
...
```


Alternatively, if you have directory trees with mixed ownership, you can change the ownership by UID, for example, if vnmr1 in Solaris had UID 72, you can catch all files with that UID by entering:

```
find /home/import -user 72 -exec chown -h vnmr1:nmr {} \;
```

In this case, the recursion is achieved with the find command. The -h option causes chown to change the ownership of a symbolic link rather than trying to change it on the file the link points at.

8.3 Logging in Remotely to a Linux Workstation

Security features in Linux require the use of **ssh** (Secure Shell) instead of rlogin to remotely login to a Linux workstation.

The typical syntax for the ssh command is:

```
ssh [-l login_name] host_name
```

Other login options are:

```
ssh login -name@host_name
```


```
ssh host_name [-l login_name]
```

Chapter 9 Installing Older Versions of Red Hat® Linux® from CD or DVD

9.1 Applicability of the CD Installation of Red Hat® Linux®

This procedure assures compatibility with VnmrJ and applies to the installation of 64-bit Red Hat Linux version 4.0 from a CD on the following computer system:

Dell Precision 380N

 WARNING	<p>Do not use this procedure to install Linux on either of the following systems:</p> <p>Dell Precision 390N: Refer to Applicability of the Varian Provided DVD Installation of Red Hat, page 38.</p> <p>Dell OptiPlex 755n: Refer to Installing Red Hat® Linux® from a DVD, page 9.</p>
--	--

9.2 Booting from the Installation CD

Use the arrow keys (up, down, left, or right) or the mouse to select options during the installation process. The instruction to restart the computer requires powering down the computer and powering it back up. Rebooting the computer is either automatic or the user is prompted to select or accept a restart.

Use the 64-bit version of Linux for this installation. Read the labels on the CDs.

1. Start the computer.
2. Press F2 during the start-up process and access the BIOS settings.

NOTE: Restart the computer and try again if the screen passes before F2 is pressed.

3. Insert the first of the Linux installation CDs into the CD/DVD drive.

4. Change Boot Sequence in the BIOS settings:
 - a. Go to the **Boot Sequence** section after entering the **BIOS setup** window and press ENTER.
Boot options:
onboard or USB floppy drive
onboard SATA hard drive
onboard IDE hard drive
onboard or USB CD-ROM
 - b. Change this sequence and place the CD-ROM first in boot order.
The computer first looks at the CD-ROM drive for bootable media; if it does not find bootable media on the CD-ROM drive, it looks for the hard drive or diskette drive.
 - c. Follow the on screen instructions and press ENTER to save the changes.

To set SATA Operation to **RAID Autodetect / AHCI**:

1. Select **Drives**.
2. Press Enter.
3. Select **SATA Operation**.
4. Press Enter.
5. Select **RAID Autodetect / AHCI**.
6. Press Enter.
7. Select **Save / Exit** in the next window.
The system saves changes to the BIOS settings and automatically reboots the computer. Refer to the documentation that came with the host system or the *Red Hat Linux Installation* manual for more information.
8. Press Esc to exit.
9. Select **Save / Exit**.
10. Press Enter.
11. Select the **CD-ROM** option from the boot loader screen, if asked, and click **OK**.
12. Select the Graphical Mode (software will automatically default to graphic mode if no action is taken) for the Red Hat installation.
13. Press Enter.

9.3 Installing the 64-bit Version of Linux

9.3.1 Responding to Options Presented During Installation

The following table summarizes the suggested responses to various prompts presented during the installation process and is provided as a guide and reference. Follow the installation procedure beginning with Setting Up the Linux Installation Process, page 34.

Screen	Selection
Test CD Media	Skip
Language Selection	English
Keyboard Configuration	U.S. English
Installation Type (full)	Install Red Hat Enterprise Linux workstation (do not upgrade)
Disk Partitioning Setup	Automatically Partition. See Step 2 in Installing Linux
Boot Loader Configuration	GRUB (default)
Network Configuration	Configuring Network Settings on page 16
Firewall Configuration	Select No firewall
Additional Language Support	Select English (USA) as the default; select other languages to install, such as Japanese
Time Zone Configuration	Select the local time zone
Set Root Password	Enter a root password
Package Installation Defaults	Select Customize the set of packages to be installed
Package Group Selection	Select Everything

9.3.2 Setting Up the Linux Installation Process

1. Wait for the Red Hat Linux installation **Welcome** screen to display.
2. Click **Next** to begin setting up the installation.
A series of screens appear that require making a selection and clicking the **Next** button.
3. Continue with Installing Linux, page 34.

9.3.3 Installing Linux

Refer to Responding to Options Presented During Installation on page 33 and the Red Hat manuals as needed.

To begin installing Linux:

1. Click the **Next** button to begin.
The **Next** button must be clicked on at the completion of each screen to proceed to the next step. The **Back** button steps the process backward.

2. When the **Disk Partitioning Setup** screen is shown, do the following:
 - a. Select **Automatically Partition**.
 - b. Select **Remove all Partitions**.
 - c. Verify that the option: **Review (and modify if needed) the partition created** is checked.
 - d. Select **Yes** in popup window.

To add the /home partition:

1. Select **Remove all Partitions on this System**.
2. Select **Next**.
3. Select **Yes** in Warning dialog box.
4. Select **VolGroup00**.
5. Select **Delete**.
6. Select **/dev/ida2**.
7. Select **Delete**.
8. Select **New**.
9. Select **swap** as File System Type with the following:
 - a. Select **swap**.
 - b. Set the size (MB) to **2000**.
 - c. Select **Fixed Size**.
 - d. Select **OK**.
10. Select **New**.
11. Select **/** as the Mount Point and **ext3** as the File System Type with the following:
 - a. Set the size (MB) to **20000**.
 - b. Select **Fixed Size**.
 - c. Select **OK**.
12. Select **New**.
13. Select **/home** as the Mount Point and **ext3** as the File System Type with the following:
 - a. Set the size (MB) to the remaining disk space.
 - b. Select **Fixed Size**.
 - c. Select **OK**.
14. Click **Next** to accept the changes and continue.

The boot loader in the Boot Loader Configuration screen is shown.
15. Keep the GRUB boot loader as the default.

To configure the network:

1. Do not configure any network device.
2. Refer to Configuring Network Settings, page 16.
3. Click **OK**.

To configure the Firewall:

1. Select **No firewall** and **Disable SELinux active**.
2. Click **Proceed** in the **Warning No Firewall** window.

To install Additional Language Support:

1. Select **English (USA)** as the default.
2. Optional: select other languages.

To set up time zone and password:

1. Enter the time zone information.
2. Set the root password as appropriate.

To set up Package Installation Defaults, make the following selections:

1. Select **Customize the set of packages to be installed**.
2. Click **Next**.
3. Scroll to the bottom and select **Everything**, which is at the end of the list.
4. Click **Next** to start the software installation.
5. Click **Continue**.

The information window shows a message that CDs 1 to 5 are required.

The Installing Packages screen is shown, displays a progress bar, and starts the installation process. Switch CDs as instructed. An hour or more is required to install the software.

9.3.4 Rebooting the System

1. Click **Reboot** when the last CD has loaded.
Installation of the patch for 64-bit operation fixes any graphics issues after the computer reboots.
2. **Restart** the computer.
3. Press Enter when the **Booting Red Hat Graphics Linux** screen is shown (screen disappears quickly).

NOTE: Restart the computer after the startup has completed if the Booting Red Hat Graphics Linux screen disappears before the ENTER key is pressed.

4. **Highlight** the first entry: Red Hat Enterprise Linux WS (2.6.9-XX.ELsmp)
5. Do not press Enter.
6. Press the A key to modify the kernel.
7. Wait for the Linux kernel to load.

8. Wait for the operating system to a prompt and text.
9. Append a `-s` (a space proceeds the `-s`) to the end of the line that is shown and press Enter.
10. Wait for the system to boot and show the `sh-3.00#` prompt.
11. Insert the *Supplement for DELL 380N* CD, supplied by Varian, into the CD-ROM drive.
12. Wait for the system to mount the CD.
13. Only if **auto mount fails**, do the following:
 - a. Enter the following at the `sh-3.00#` prompt:

```
mount /dev/cdrom /media
```
 - b. Enter the following at the `sh-3.00#` prompt:

```
cd /media
ls
./pkgsetup
```
 - c. Wait for the patches to install.
 - d. Enter the following at the `sh-3.00#` prompt:

```
cd
umount media
eject
reboot
```

9.3.5 Setting Up Linux

Complete the setup information requested in the following screens. VnmrJ requires a generic (**user01**) user account.

1. Click **Next** in the **Welcome** screen.
2. Read the **License Agreement** and then click **Yes, I agree to the License Agreement**.
3. Click **Next**.
4. Set the appropriate Date and Time and then disable **Network Time Protocol**.
5. Select **configure Graphics and Monitor**.
Select the monitor supplied with the computer by clicking on the **triangle symbol** next to DELL in the **Monitor Configuration** screen.
6. Set the following in the **Customize Graphics Configuration** screen:
 - Color Depth: Millions of Colors
 - Screen Resolution: 1280x1024
7. Click **Next**.
8. Click the message **Tell me why ... and provide Red Hat login**.
9. Click **Next**.
10. Choose not to register now.
11. Click **Next**.

12. Enter user01 for the user account.
 - a. Click **Use Network Login** to configure the name server and authentication.
 - b. Click the **User Information** tab and configure the name server as appropriate for the site.


Refer to the Table 3 Network Information Worksheet, page 4 and the network administrator.
 - c. Click the Authentication tab and *disable* Use MD5 Passwords.
13. Install any of the *Additional CDs* listed.
VnmrJ does not required the content of these CDs but they might be useful the user.
14. Click **Next** to finish setup.
15. Login as root.
Linux is now installed as required for VnmrJ.
16. Continue with Entering the Network Configuring Settings, page 41.
Do not install VnmrJ before the network settings are configured.


9.4 Applicability of the Varian Provided DVD Installation of Red Hat® Linux®

This procedure is applicable to the installation of the 64-bit version of Red Hat Linux 4.0 update 3 from a DVD on the following computer systems:

NOTE: The Varian DVD is called *Red Hat 4.0u3 Installation DVD*.

- Dell Precision 370N
- Dell Precision 380N
- Dell Precision 390N

 WARNING	<p>Do not use this procedure to install Linux on either of the following systems: Dell OptiPlex 755n: Refer to Installing Red Hat® Linux® from a DVD, page 9.</p>
--	---

 WARNING	<p>This procedure will completely erase the hard drive; all data will be lost. Backup all data that needs to be retained before continuing further.</p>
--	---

9.5 Disk Partitioning, Packages Installed, and Features

9.5.1 Disk Partitioning

This procedure installs the corrected disk image of Red Hat Linux 4 update 3 and format the hard disk as SATA with the partitions and sizes given in the following table.

Table 6 Disk Partitions and Sizes - DVD Installation

Partition	Size
/boot	100 MB
/	20 GB
swap	2 GB
/home	(rest of disk space)

9.5.2 Packages Installed

- FTP
- RARP daemon

9.5.3 Features

- Improves I/O response time — new format no longer uses the VolumeGroup0.
- Loads the correct network driver.
- Creates root password as varian1.
- Loads all video drivers — no need to install the Supplement CD.


9.6 Preparation and First Time Installation

This section is required for the first time when the operating system is being installed. Skip to Continue with Installing Red Hat, page 40, if the operating system is being reloaded.

NOTE: Make sure that the DVD drive is set to master and the CD-RW to slave via jumpers on the back of each drive (this check may be needed on 390N with a DVD-RW below the CD-RW). Dell ships the 390 with both the drives set to cable select. If the DVD drive is set as cable select (default), then automatic installation from DVD will NOT occur—instead you will get the graphical install and will have to enter items manually. The jumpers from left to right are cable select (CS), slave (S), and master.

1. Insert the DVD into the DVD/CD-ROM drive and reboot.
2. Hit the F2 key to get into the BIOS (wait for the F2 message to display) as soon as the F2 message appears in the upper right corner.
3. Change the boot sequence in the BIOS to boot from the CD-ROM:
 - a. Under System use down arrow key to select **Boot sequence** and press Enter.
 - b. Use arrow keys to highlight the **CD-ROM drive**.

- c. Press the U key to move the CD - ROM drive to the first boot position.
- d. Press Enter.
- 4. Set the hard drive to Raid Autodetect:
 - a. Scroll down to the line **Drives** and press Enter.
 - b. Scroll down to **SATA Operation** and press Enter.
 - c. Select **RAID Autodetect / AHCI** and press Enter (click Save if prompted).

 WARNING	Do not select Combination. Linux will not function with this selection.
--	---

- 5. Press **Esc**.
- 6. Select **Save /Exit**.
- 7. Press Enter (the computer reboots).

9.7 Continue with Installing Red Hat

- 1. To reinstall Linux, do the following:

NOTE: For first time installation, skip to Step 2.

- a. Insert the DVD into the DVD/CD-ROM drive.
- b. Reboot.
- c. Wait for the Red Hat installation prompt.
- d. Continue with step 2.
- 2. At the **Boot prompt**, enter the following based on the computer model.

Computer type	Enter the following
Dell 370N	linux ks=cdrom:/ks370.cfg
Dell 380N	linux ks=cdrom:/ks380.cfg
Dell 390N	linux ks=cdrom:/ks390.cfg

Installation of Linux OS requires about 35 minutes. The installation routine sets the root password to varian1, ejects the DVD, and reboots the system after the OS is installed. Remove the DVD before it is automatically re-inserted and the system starts to load the software from the DVD (if this happens eject the DVD and reboot the system).

- 3. Press any key during the first reboot when **Welcome to Kudzu** screen is shown.
- 4. For Dell 390N, do the following:
 - a. Click the **Hardware Added** window.
 - b. Use the arrow keys in the **Hardware Added** window and highlight **configure** for the **Broadcom network card**.

- c. Press Enter.
 - d. Click the **Configure TCP/IP** window.
 - e. Select **Do not check "Use dynamic IP..."**
 - f. Set the IP address as follows:

Main network address	Set IP to
Does not start with 172.16	172.16.0.1
Starts with 172.16	10.0.0.1
 - g. Set netmask to **255.255.255.0**
 - h. Leave the field for gateway **blank**.
 - i. Use down arrow to click **OK**.
5. For Dell 370N, Dell 380N, and Dell 390N, do the following:
 - a. Click the **Hardware Added** window.
 - b. Use the right arrow key in the **Hardware Added** window to highlight **Ignore** for the **Nvidia video adapter**.
 - c. Press Enter.
 6. Wait for the computer to finish the reboot process.
 7. Do not load the *Supplement for Dell 390N* CD-ROM.

9.8 Entering the Network Configuring Settings

Configure the network in the Network Configuration screen. Each workstation Ethernet port must be configured. Systems not connected to a network require only one Ethernet port (on board port) and systems connected to a network require two Ethernet ports (one on board and one card).

Follow the procedures in Configuring Network Settings, page 16 with the following exception for starting the Network Configuration Tool:

1. Log in as root.
2. Click **Applications** on the main menu.
3. Select **System Settings**.
4. Select **Network** to start the Network Configuration Tool.
5. Click the **Devices** tab.
6. Continue with Configuring Network Settings, page 16.

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