

A. Installing Linux: RHEL ES Version 4

Overview

This installation manual provides instructions on how to properly install and configure Red Hat Linux for the SIGMET (IRIS & RDA) application software (Red Hat Enterprise Linux ES Version 4). We recommend that you read through this manual completely if you are about to install the Linux OS and the SIGMET application software for the first time. If you wish to install on RHEL3, please use the manual version as of May 2005 (release 8.09 – 8.09.7).

For more information and a more in-depth discussion of the installation process, please refer to the Red Hat Enterprise Linux Installation Guide which can be found on the Documentation CD of your RHEL ES CDs.



During this process it is critical to take notes so that you can properly reuse this information during the post installation modifications.

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A.1 Installation Overview

SIGMET supports two types of installation methods:

- **Automatic**
- **Manual**

The **automatic** installation method uses bootable scripts located on every IRIS/RDA release CD (version 8.06 or later). These scripts contain instructions for the operating system installation, SIGMET software installation (IRIS/RDA), and post installation configuration. While some manual steps are still required after this automatic procedure, the time necessary to complete an IRIS/RDA installation on a new computer system is drastically reduced.



The **automatic installation** is the only installation method for RVP8/RCP8/RCW systems.

The **manual** installation method is documented here as an alternative in the event that there is a problem with the automatic installation.

A.1.1 Using this Manual

The instructional sections of this manual use the following format:

Screen “Title”

Action: What to do

The Screen Title indicates what you will see on the installation wizard screen. In some cases we include a screen capture. The action explains what you should do.

Note: Use the **Tab** key to move between different fields/options on the screen and the **space bar** to select check boxes.

A.1.2 Types of installation media

Installing Linux requires a Linux installation tree (Linux files) and a boot device. The Linux installation tree can come either from the local CD-ROM (set of 4) or the single DVD-ROM labeled “32 bit Installation”, a file copied onto your MS windows disk partition (if available), or a file accessible over the network (via NFS or FTP). SIGMET recommends a CD-ROM or DVD-ROM based installation and this is the only type of installation that will be covered in this manual. For more information refer to the Red Hat Enterprise Linux Installation Guide. SIGMET’s IRIS/RDA release CD-ROM contains all of the necessary files for an NFS installation, which easily scales when the number of systems increases above two or three.

A.1.3 Installation Preparation

You have a choice of using the RHEL CDROM set (4 disks) or single DVD depending on whether you have a CD drive or a DVD drive available on your system. Verify that you can boot from a CDROM or DVD by powering off your computer system, inserting the RHEL CDROM labeled CD 1 or the RHEL DVD (32-bit side facing up, not the 64-bit side) into the appropriate drive and then powering on your computer. **If a Linux screen is displayed on your screen continue to Section A.2 for the automatic installation procedure or Section A.3 for the manual procedure.**

If a Linux screen was not displayed on your computer then continue with this section. When the computer is booting, a message will be displayed to “Press DEL to enter SETUP” (or some other key to enter setup).

Here is what to check: In the BIOS Features Setup, set the boot sequence to be “CD, A, C”. For older systems: Try “A, CD, hard disk”. In the Standard CMOS Setups, set the Drive A: to “1.44M, 3.5 in.” This should be done even if you do not have a drive A, since the operating system will attempt to switch a SCSI CD ROM to drive A. Finally, save your changes by pressing the F10 key. The system will reboot.

Some new computer systems can be configured without floppy drives (drive A). In this situation, you should choose to have your CD boot first.

A.2 Automatic Installation

Figure A–1: RedHat Greeting



Action: Select from the options displayed on the splash screen.

After this command has been entered, the installation process will continue automatically. The CDs should be inserted by an operator (when prompted) in the following order: 1, 2, 3, 4, 1. Once the installation is complete the last CD (CD1) will eject from the system. The system will reboot. If the automatic installation does not work for some reason, use the manual installation in section A.4.

A.2.1 SIGCONFIG

Once the operating system installation is complete, SIGMET provides a script that performs all of the necessary post OS installation steps and installs the SIGMET software called sigconfig.

Login as root with a password of “xxxxxxx” (8 x’s). Insert the IRIS/RDA release CD into the CD-ROM. Run the following commands, depending on your system configuration:

```
# ln -s /media/cdrecorder /mnt/cdrom
# mount /media/cdrecorder
# cd /mnt/cdrom/sigmet
```

For IRIS only:

```
# ./sigconfig -iris
```

For RVP8:

```
# ./sigconfig -rvp8
```

For RCP8:

```
# ./sigconfig -rcp8
```

For RCW (RCP8 & IRIS):

```
# ./sigconfig -rcw
```

SIGCONFIG automatically install IRIS and take care of a large majority of the post installation steps including creating **users, creating IRIS directories, installing IRIS, and turning on/off services**. Sigconfig's other command line options enable it to be used on an **rvp8, rcp8, or rcw** (IRIS & RCP8 on one system).

Run the following commands:

```
# cd /  
# eject cdrom (remove the disk from the drive)  
# reboot
```

When this reboot step is complete you should proceed to Section A.3. Your system is capable of running IRIS without further effort on your part.

A.3 Automatic Installation Post-Install Steps

A.3.1 Configuring X Windows

X–windows is the unix/linux software that provides the underlying software to support graphical user interfaces (GUI). To test if the X–windows configuration completed at the end of the installation process was successful, login as root and type the following:

```
# xinit
```

The screen should go blank for a second and then the screen should have a white box in the upper left hand corner with a command prompt and cursor. If this does not happen and an error message is displayed, try running:

```
# system-config-display
```

or if you want to ignore the existing configuration files the type:

```
# system-config-display --reconfig
```

You can use this utility to modify your X–Windows settings so that the “xinit” command will execute error free and optimize it for your display. Select at least 16 bit color depth (thousands of colors) and a resolution of 1280x1024 (1024x768 is also acceptable). If modifying your settings does not fix the problem, SIGMET recommends that you proceed to the optional X–Windows Troubleshooting section A.7.

A.3.2 Configuring your time zone

If you used the automatic installation procedure or need to your time/date settings for another reason, as root, run:

```
# system-config-date
```

Unfortunately, this GUI does not support setting the timezone to UTC. Do this with the following command:

```
# ln -s /usr/share/zoneinfo/GMT /etc/localtime
```

A.4 Manual Installation

Manual installation is typically used to install Linux and IRIS onto workstations that are not provided by SIGMET, i.e., not RVP8 or RCP8 hardware. Note that the automatic procedure should always be used for RVP8 and RCP8 systems. The manual procedure described here can still take advantage of our automated post OS installation scripts (specifically **sigconfig** and **sigbuildmini**) to perform system configuration functions.

A.4.1 Disk Partitioning

The procedure described here assumes that you will be doing the partitioning as part of the procedure. SIGMET recommends the following structure for an operational system (the example is a **20GB** disk):

Device	Size	Type	Mount Point
/dev/hda1	5GB	Ext3	/
/dev/hda2	5GB	Ext3	/usr
/dev/hda3	2X Memory	Swap	
/dev/hda4	Remaining	Ext3	/usr/iris_data

For a development system, the recommended configuration is similar except that the /usr partition should get the remaining disk space rather than the /usr/iris_data partition. Note that as a minimum, / and /usr should be at least 5 GB.

For dual boot systems (Windows & Linux), please see section A.9 before continuing. If you plan on using RVP8 Time Series Archive (Appendix G, *RVP 8 User's Manual*), it is highly recommended that you use a separate large capacity disk.

A.4.2 Install Redhat Linux RHEL ES Version 4

If you have not already done so, place the RHEL CD-ROM #1 or the DVD (labeled in small letters “32 bit Installation” side up) into the appropriate drive and reboot your computer. At the first prompt screen, Select the “graphical mode” installation by hitting the “enter” key. Then follow the instructions below.

Screen Title: Welcome to Red Hat Enterprise Linux ES

Purpose: Describes the various navigation commands and keystrokes.

Action: After reading click “Next”.

Screen Title: Keyboard Configuration

Purpose: Choose the keyboard layout. This depends on the keyboard type that you have purchased.

Action: For most systems choose “U.S. English” then click “Next”.

Screen Title: Upgrade Examine

Purpose: If an installation is detected, then you can choose whether to upgrade or do a “fresh installation”. Here we assume that you will be doing a “fresh installation”. This is often the safest thing to do.

Important: Before you proceed, be sure that you have backed up any critical files. The sigbrn utility, if installed, can be used for this. See Appendix D of this manual.

Action: Select “Install Red Hat Enterprise Linux ES” and click “Next”.

Screen Title: Disk Partitioning Setup

Action: Select “Manually partition with Disk Druid” and click “Next”

Screen Title: Disk Setup

Purpose: To partition the disk. The approach documented here is to wipe clean all existing partitions and redefine the partitions needed for IRIS. This assumes that you do not care about any existing partitions and have backed-up anything that you want to save. This would not be the case for a dual-boot system that can boot Windows or Linux.

Actions:

- 1.) Highlight an existing partition and then click “Delete”. Keep doing this until all partitions have been deleted.
- 2.) Click “New” to get the “Add Partition” screen. Configure the new partition and then click OK. In all cases, you should select the option “Force to be a primary partition”. You will need to repeat this for the following partitions.

Device	Mount Point	Type	Format	Size (MB)	Size Options

/dev/hda1	/	ext3		5000	Fixed Size
/dev/hda2	/usr	ext3		5000	Fixed Size
/dev/hda3		swap		1000	Fixed Size
/dev/hda4	/usr/iris_data	ext3		8100	Fill to max size

Note that the sizes in the final table will generally not exactly match the sizes that you type-in because of quantization of the disk storage.

3. Finally, click “Next”

Screen Title: Boot Loader Configuration

Action: Click “Next” to accept the default to boot RHEL ES with no password or advanced options.

Screen Title: Network Configuration

Purpose: Set basic network configuration. You can do this later, but if you know the information you might as well do it now. You will need to consult with your network manager to get the information. An example is shown here:

Actions:

1.) Select “Edit” Network Devices. In the “Edit Interface eth0” menu

Deselect “Configure using DHCP”

Select “Activate on boot”

IP Address: e.g. 192.168.76.51

Net Mask: e.g., 255.255.255.0

2.) Hostname: Select “manually” and enter a host name provided by your network manager (e.g., iris-test.sigmet.com).

3.) Miscellaneous Settings: per requirements of network manager.

Screen Title: Firewall Configuration

Purpose: Use the system to limit outside access. SIGMET installation assumes that some other systems are providing firewall security and that the SIGMET systems are safely within the firewall. Therefore no firewall protection is installed.

Actions:

1.) Select “No firewall”.

2.) For “Enable SELinux?” select “Disabled”

3.) Click “Next and then “Proceed” in the advisory screen message.

Screen Title: Additional Language Support

Purpose: Select any additional languages and set the default language.

Action:

- 1.) Select English (USA) and any other language support that is needed.
- 2.) Select the English (USA) as the default language.
- 3.) Select “Next”

Screen Title: Time Zone

Actions:

- 1.) Select the nearest city in your time zone.
- 2.) Select “System clock uses UTC”
- 3.) Select : “Next”

Screen Title: Set Root Password

Action: Enter the password for root (twice) and then click “Next”. The default SIGMET root password is “xxxxxxx” (8 x’s).

Screen Title: Package Installation Defaults

Action: Select “Customize software packages to be installed” and click “Next”.

Screen Title: Package Group Selection

Purpose: Select the packages to install (✓) or not to install (☐). In some cases you will need to look at the “Details” to select or de-select specific packages.

Desktops

- ✓ X Window System
- ✓ GNOME Desktop Environment
- ✓ KDE (K Desktop Environment)

Details: Select all packages in details submenu

Applications

- ✓ Editors
 - Details: also select:
 - Emacs
 - XEmacs
- ☐ Engineering and Scientific
- ✓ Graphical Internet
 - Details: Also select thunderbird
- ☐ Text-Based Internet

✓ Office/Productivity

✓ Sound and Video

Details: Select All

☐ Authoring and Publishing

✓ Graphics

Details: Select All

☐ Games and Entrainment

Servers

✓ Server Configuration Tools

Details: Select All

✓ Web Server (for IRIS/WEB installations)

☐ Mail Server

✓ Window File Server

☐ DNS Server

✓ FTP Server

☐ PostgreSQL Database

☐ MySQL Database

☐ News Server

☐ Network Server

✓ Legacy Network Server

Details: Only Select

rsh-server

telnet-server

Development

✓ Development Tools

Details: Accept the defaults and also select

ddd

dmalloc

XEmacs

✓ X Software Development

☐ GNOME Software Development

☐ KDE Software Development

- ✓ Legacy Software Development

System

- ✓ Administration Tools
- ✓ System Tools
 - Details: Accept the defaults and also select festival
- ✓ Printing Support

Miscellaneous

- ☐ Everything
- ☐ Minimal

Screen Title: About to Install

Action: Select “Next”

The install process will take about 20 to 40 minutes depending on the speed of your computer.

Screen Title: Congratulations

Action: Select “Reboot”

Screen Title: Welcome

Purpose: After the first reboot you will need to enter some customization information. You only need to do this once.

Action: Select “Next”

Screen Title: License Agreement

Action: Select “Yes I agree ...” and then click “Next”

Screen Title: Date and Time

Action: Set the date and time. Use your local time. NTP, if used will be setup later.

Screen Title: Display

Action: As a minimum select 1280x1024 and “Thousands of Colors”, then “Next”

Screen Title: Red Hat Login

Purpose: To register with Red Hat. This will be bypassed and you can do it later.

Action: Select “Tell me why ...” then “Next”

Screen Title: Why Register?

Action: Select “I can not complete ...” then “Next”

Screen Title: System User

Purpose: This will be done in a later step.

Action: Simply select “Next” and then “Continue” in the pop-up.

Screen Title: Sound Card

Purpose: Check sound function

Action: “Play test sound” then select “Next”

Screen Title: Additional CD's

Purpose: There are none to install.

Action: Select “Next”

Screen Title: Finish Setup

Purpose: To congratulate you. Nice job!

Action: Select “Next”

At this point you will need to do some post-install configuration to prepare the operating system for the IRIS and /or RDA installation. Proceed to the next section.

A.5 Manual Installation Post-Install Steps

After logging in as root there are some steps to customize the Linux installation for IRIS and RDA use. Many of the steps here are performed automatically by running the **sigconfig** utility as described in section A.2.1. You should go to this section and run this utility. The steps here describe the manual steps performed by the utility and some additional steps as well.

The specific steps performed by **sigconfig** are indicated by the ✓ symbol. If the sigconfig utility is successfully run, there is no need to repeat the steps.

✓A.5.1 Install additional rpms

Install this rpm which is included on your RHEL4 cdrom #4:

```
# rpm -Uvh ImageMagick-c++-6.0.7.1-5.i386.rpm
```

If you are doing an RDA install, then install this canbus library rpm which in on your IRIS/RDA release cdrom:

```
# cd /mnt/cdrom/sigmet/drivers/kvasercan-4.2.1-3
# rpm -Uvh lib.i686.rpm
```

✓A.5.2 Disable Graphical Login

Once the system starts up you will notice a graphical login. IRIS will not work with a graphical login, so we must change this to a terminal. Do the following:

- Edit the file /etc/inittab
- Change the line: id:5:initdefault: to id:3:initdefault:
- reboot

Here you can use the editor “vi” or “emacs”. vi is a favorite of old time UNIX developers. It has no GUI. The emacs editor is more user-friendly and has a GUI similar to other editors.

A.5.3 Set the Root Prompt Symbol

To match our documentation the root prompt symbol should be set to “# “. Do this as root by adding the following line to the very end of the file /root/.bashrc:

```
PS1='# '
```

✓A.5.4 Make a cd Mount Point

Make the mount point by typing the following command as root:

```
# mkdir -p /mnt/cdrom
```

✓A.5.5 User Account Configuration

Type in the following commands to create accounts for the operator & observer users that are needed for IRIS, the RVP8 or RCP8.

```
# /usr/sbin/userdel operator
# /usr/sbin/useradd -g users -m -n operator -u 1000 -s /bin/ksh
# /usr/sbin/useradd -g users -m -n observer -u 1001 -s /bin/ksh
# echo 'xxxxxx' | passwd --stdin operator
# echo 'xxxxxx' | passwd --stdin observer
```

By default, the Linux OS forces the use of “strong passwords”. If you wish to be able to use simpler passwords, you should now edit the file “**/etc/pam.d/passwd**”. The file should then be made to consist of only a single line reading:

```
password required /lib/security/pam_unix.so
```

Save the file and exit. Now each user can change their password to be anything.

✓A.5.6 Configuration for Automatic Startup

The RVP8/RCP8/IRIS application software can be configured to startup automatically following a boot of the system. In the Automatic Software Installation, this happens by default. However, in the Manual Software Installation, this is an optional configuration that may be performed. The procedure to configure this is documented here.

The procedure to configure the automatic software startup contains two stages. First is to copy the appropriate startup program to the startup directory, and second is to enable that startup program to run following a boot.

A.5.5.1 Copying of Automatic Startup Programs

Below are the commands required to copy the startup programs. Note that if a single system is supporting multiple applications (ie, RCP8 and IRIS), then you must perform the copies described for both:

RVP8:

```
# cp ${IRIS_ROOT}/bin/rda/rdasys /etc/rc.d/init.d
# cp ${IRIS_ROOT}/config_template/rc.d/rvp8 /etc/rc.d/init.d
# cp ${IRIS_ROOT}/config_template/rc.d/dspexport /etc/rc.d/init.d
# chmod 755 /etc/rc.d/init.d/rdasys
# chmod 775 /etc/rc.d/init.d/rvp8
# chmod 775 /etc/rc.d/init.d/dspexport
```

RCP8:

```
# cp ${IRIS_ROOT}/bin/rda/rdasys /etc/rc.d/init.d
# cp ${IRIS_ROOT}/config_template/rc.d/rcp8 /etc/rc.d/init.d
# chmod 755 /etc/rc.d/init.d/rdasys
# chmod 775 /etc/rc.d/init.d/rcp8
```

```
IRIS:
# cp ${IRIS_ROOT}/config_template/rc.d/iris_init_linux
    /etc/rc.d/init.d/iris
# chmod 775 /etc/rc.d/init.d/iris
```

A.5.5.2 Enabling Startup Programs

Below are the commands required to enable the startup programs:

```
RVP8:
# chkconfig --add rdasys
# chkconfig --add rvp8
# chkconfig --add dspexport
```

```
RCP8:
# chkconfig --add rdasys
# chkconfig --add rcp8
```

```
IRIS:
# chkconfig --add iris
```

A.5.7 Basic Network Configuration

If you did not use the automatic installation procedure or need to change your network settings for another reason, as root, run:

```
# system-config-network
```

After you have made your desired changes:

```
# reboot
```

You can manually inspect and edit the various network configuration files. The ones required for IRIS are as follows:

File name	Function	Test
/etc/sysconfig/network	Set official local host name and basic networking.	# hostname Should show hostame exactly as as in the file.
/etc/sysconfig/network-scripts/ifcfg-eth0	Define the local IP address and the other basic network information	# ifconfig eth0 Displays network configuration and status summary for device eth0.
/etc/hosts	Defines IP addresses, hostnames and aliases for all of the various IRIS or other network nodes.	# ping <hostname or alias> Shows that the hostname or alias corresponds to the proper IP address.

<code>/etc/hosts.equiv</code>	A list of other hosts and the corresponding users who are allowed remote access without password.	<code># rsh hostname date</code> Also required for rcp and rlogin.
<code>/etc/X0.hosts</code>	A list of other hosts who are allowed to display an X-Window on your local screen	<code>\$ sigterm <hostname></code> A terminal should appear. Note that IRIS will first need to be installed for this to work.
<code>/etc/resolv.conf</code>	Specifies a network domain name server (DNS) as an alternative to a fixed <code>/etc/hosts</code> table. Many IRIS systems do not use this feature.	If after login, X-windows takes a long time to start, then there may be a problem with the DNS. In this case move <code>resolv.conf</code> to <code>/etc/resolv.conf.back</code> .

The various files should look something like the examples below. Note that your specific node names and IP addresses, etc., will be different so check with your network manager to get these assigned.

```
/etc/sysconfig/network (should look something like:)
NETWORKING=yes
HOSTNAME=typhoon.sigmet.com
GATEWAY=192.168.76.10

/etc/sysconfig/network-scripts/ifcfg-eth0 (should look something like):
DEVICE=eth0
BOOTPROTO=static
BROADCAST=192.168.76.255
IPADDR=192.168.76.27
NETMASK=255.255.255.0
NETWORK=192.168.76.0
ONBOOT=yes
TYPE=Ethernet

/etc/hosts (should look something like)
127.0.0.1          localhost.localdomain localhost
192.168.76.27      typhoon.sigmet.com  typhoon
192.168.76.28      otherhost.sigmet.com otherhost

/etc/hosts.equiv (should look something like)
cloud.sigmet.com  operator
typhoon.sigmet.com operator
others.sigmet.com operator

/etc/X0.hosts (should look something like)
cloud.sigmet.com  operator
typhoon.sigmet.com operator
others.sigmet.com operator
```

SIGMET recommends the use of a static `/etc/hosts` file. In this case, to avoid possible confusion with the DNS server, you should move the `resolv.conf` file as follows:

```
mv /etc/resolv.conf /etc/resolv.conf.org
```

If you plan to use DNS, then the `resolv.conf` should look something like (depending on your network):

```
/etc/resolv.conf (should look something like the following)
search sigmet.com
nameserver 192.168.76.10
```

After you have completed the networking, it is recommended that you reboot the system to test the changes. If you change the host name for example, you will need to reboot for this to take effect. For most other changes however you can test by simply stopping and starting the network service as follows:

```
Restart the network by typing;
service network stop
service network start
```

✓A.5.8 Service Configuration

For operation of IRIS various services must be enabled including those in /etc/xinetd.d

- **rlogin**
- **rsh**
- **telnet**

These services are required by IRIS. To enable these services type the commands:

```
✓ # chkconfig rlogin on
✓ # chkconfig rsh on
✓ # chkconfig telnet on
```

Other optional services are in /etc/init.d. These are:

- **sshd** (optional secure shell)
- **vsftpd** (sometime called wu-ftp)
- **ntpd** (see also section A.5.12)
- **tomcat** (required for web server)
- **httpd** (required for web server)

To enable the optional services in /etc/init.d type similar commands, for example:

```
# chkconfig vsftpd on
# service vsftpd start
```

SIGMET recommends removing the sendmail service.

```
# chkconfig --del sendmail
```

To see which services are currently on, type:

```
# chkconfig --list
```

If you are logged into a window environment, there is also a GUI that can be accessed as root by typing:

```
# system-config-services
```

This GUI can be used to enable and disable services, but it appears that each run level must be set independently. The commands on the other hand default to turn on services for run levels 2, 3, 4 and 5 so these are what SIGMET recommends to use.

When you are done, “# **reboot**” and then check with “# **chkconfig --list**” to verify that the required services have been started automatically.

A.5.9 FTP for Red Hat Enterprise Linux (vsftpd)

By default, ftp access to your computer may be blocked. If you wish to allow ftp access, check the following:

The `/etc/vsftpd.ftpusers` file contains a list of user names which are not allowed to ftp. Check this to make sure your desired ftp user name is not listed (i.e. operator).

There is an additional file in `/etc/` called `vsftpd.user_list` which can be used for advanced security configuration. Check this to make sure your desired ftp user name is not listed (i.e. operator).

The `/etc/vsftpd/vsftpd.conf` should be reviewed depending on the security requirements of your network. SIGMET recommends at least the following change which will disable anonymous FTP:

```
anonymous_enable=NO
```

A.5.10 rcp

Authorization to use **rcp** is controlled both by the file `/etc/hosts.equiv` discussed in section 1.4.1, and by the `pam.d` software. Take a look in the `/etc/pam.d` directory. There is a separate file controlling many different services. The “`rsh`” file controls `rsh` and `rcp`. Login as operator and then conduct a simple test to see if you are authorized to use “`rsh`” commands. Type “`rsh host date`”, where “`host`” is your hostname. The `host date` should be displayed to the terminal of the “`rsh`” commands are authorized.

```
$ rsh iris-test date
Wed Jan  4 12:12:34 EST 2006
```

If the test does not work properly the `rsh` file should be modified. The `rsh` file should contain the following:

```
##PAM-1.0
# For root login to succeed here with pam_securetty, "rsh" must be
# listed in /etc/securetty.
auth      required      /lib/security/pam_nologin.so
auth      required      /lib/security/pam_securetty.so
auth      required      /lib/security/pam_env.so
auth      required      /lib/security/pam_rhosts_auth.so
account   required      /lib/security/pam_stack.so service=system-auth
session   required      /lib/security/pam_stack.so service=system-auth
```

The documentation for this package is available online on your system. Point your browser to the file: `/usr/share/doc/pam-0.74/html/pam.html`.

Here is a summary: The word “required” means that the operation must pass all 6 of these security tests before it is permitted. The “`pam_nologin.so`” command means that if the file `/etc/nologin` exists you are stopped. The “`pam_securetty.so`” means that if you are root, and the terminal is not listed in the `/etc/securetty` file then you are blocked. The “`pam_rhosts_auth.so`” means that `ruserok` function must pass, which basically means that the `/etc/hosts.equiv` file is checked, or the `$HOME/.rhosts` file is checked. I have not figured out what the other lines mean. When it fails, a single line is added to the `/var/log/messages` file mentioning the failure, but not the reason.

If you cannot get it to work, then try changing one of the lines from “required” to “sufficient”. This should make it go without checking the rest. Changing this file takes effect right away, you do not need to reboot.

In addition to the `/etc/pam.d/rsh` file, there is also a `/etc/xinetd.d/rsh` file. This file frequently gets damaged on installation. If this happens to you, remove and reinstall the `rsh-server` rpm file. The `/etc/pam.d/rsh` file should contain:

```
# default: on
# description: The rshd server is the server for the rcmd(3) routine and, \
#               consequently, for the rsh(1) program. The server provides \
#               remote execution facilities with authentication based on \
#               privileged port numbers from trusted hosts.
service shell
{
    disable = no
```

```
    socket_type      = stream
    wait             = no
    user             = root
    log_on_success   += USERID
    log_on_failure   += USERID
    server           = /usr/sbin/in.rshd
}
```

The RHEL Linux has a problem with kerberos **rsh** and **rcp** as follows:

- 1) **rsh** does not work at all to hp 10.20 systems
- 2) **rcp** gets a warning message to all platforms

As it turns out, there are 2 sets of r* commands installed on those systems. The commands in /usr/bin work fine the old way. We recommend for SIGMET systems that you remove the kerberos path from your PATH as follows:

```
# mv /etc/profile.d/krb5.sh /etc/profile.d/krb5.sh.org
```

Then log out and in.

A.5.11 Routing

By default, a Linux system will not route network data. To enable routing, type the following command:

```
# echo 1 > /proc/sys/net/ipv4/ip_forward
```

Once you get this working, put the same line in your `/etc/rc.d/rc.local` file so it takes effect each time you boot.

A.5.12 Configuring NTP

To configure your machine to time sync with another machine, edit the `/etc/ntp.conf` file to contain a single line similar to the following:

```
server 198.102.75.10
```

Substitute in the correct IP address of the machine to sync to. To make a computer the time server, use the special address as follows:

```
server 127.127.1.1
```

Ntp will set the time after approximately 15 minutes after building a time syncing model. This means that after booting, the time may change in about 15 minutes. This can cause problems with automatic startup of IRIS. To fix this problem, create a file `/etc/ntp/step-tickers` and put in just the server IP address, without the word “server”. Ntp will then set the date at boot time, if possible. Do not put in the `step-tickers` file on the time server.

If `ntpd` was not added under section A.5.5 (Configurion for automatic startup), type the following:

```
# chkconfig --add ntpd
# chkconfig ntpd on
```

This will take effect after the next reboot. To start without rebooting, type:

```
# service ntpd start
```

It will take 15 minutes before it will sync the times. If the times are more than 10 minutes apart, `ntp` will assume there is an error and never change the time. To check on the status of `ntp`, type:

```
# ntpq -p
```

The first character before the server host will be “*” when it thinks it is time synced.

Another convenient check to compare the time of your workstation with that of another (such as the `ntp` server is):

```
# date ; rdate -p nodename
```

Note the semicolon between the two commands allows both the local “date” command to be run simultaneously with the remote date (`rdate`) command on the other workstation. This allows the times to be easily compared.

You can also manually set the time from another computer with the following command. This will not work if ntpd is running on your machine.

```
# ntpdate host
```

A.5.13 Configuring xinetd

The default configuration for **xinetd** in Linux allows receipt of only a limited number of remote shell commands per minute. This limit can easily be exceeded with a burst of network transfers between SIGMET systems. This will cause a network send request to become “aborted”, and the network link to fail thereafter. SIGMET recommends raising this number to at least 100 on all systems. This is easily done by editing the **/etc/xinetd.d/rsh** file and adding a line similar to the others in the “service shell” section, i.e., before the final “}”, that reads as follows:

```
per_source = 100
```

Changes take effect when you reboot, or send the hup signal to inetd with:

```
kill -s hup /var/run/xinetd.pid
```

These instructions apply to RedHat Linux 7.0 and later.

A.6 Region Specific Settings

The NORDRAD 2 (N2) python code uses the tk library. You need to make a link for this to work:

```
# cd /usr/lib  
# ln -s libtk8.3.so libtk.so
```


A.7 X-Windows Troubleshooting: Framebuffer Method

Sometimes the standard X server for your video card just does not seem to work, or works very poorly. In cases like this, you can often achieve success by configuring the card as a frame buffer device, rather than using one of the specific X servers. We have used this method several times for video cards that were not fully supported by Linux, and it works quite well. Frame buffer support is directly built into the 2.2.x kernels, so the procedure is pretty easy.

Here are instructions that should get tough-dog video cards up and running:

- Don't worry too much about setting up X during the install. You're going to change the `/etc/X11/xorg.conf` file later anyway. Just fiddle through the X setup, choose VGA16 or some other generic server like SVGA, pick a monitor, etc. It will probably fail, which is no problem — just quit the X setup stuff when you get the chance, and complete the RedHat install.
- When you first boot, login as root and edit your `/etc/lilo.conf` file, adding the line `VGA=794` under the read-only line in the Linux section. This is the decimal code for 16bpp and 1024x768 resolution. To get a different resolution and color depth, see the valid decimal code table below (from the Vesafb Mini-HOWTO).

Colors	640x480	800x600	1024x768	1280x1024	1600x1200
256	769	771	773	775	796
32,768	784	787	790	793	797
65,536	785	788	791	794	798
16.8M	786	789	792	795	799

- Exit the editor saving your changes, and type:

```
lilo -v
```

Then reboot. When you reboot, you should now have a cute penguin in the top left hand corner of your screen and your resolution should be 1280x1024.

- Now, login as root and do the following (assuming you still have your RedHat install CD in the drive):

```
# mount /dev/cdrom /mnt/cdrom
# cd /mnt/cdrom/RedHat/RPMS
# rpm -Uvh XFree86-FBDev-3.3.6-35.i386.rpm
# cd /etc/X11
# rm X
# ln -s /usr/X11R6/bin/XF86_FBDev /etc/X11/X
```

- Now you need to edit your `/etc/X11/xorg.conf` (for older systems you should modify the `XF86Config-4` file as well) file so it will work with the FBDev server. First, delete all the mode lines. You don't need them. Next, add this to the area that has all the different screen and server information:

```
Section "Screen"
    Driver      "FBDev"
    Device      "My Video Card"
```

```
Monitor      "My Monitor"
DefaultDepth 16
  SubSection "Display"
    Depth    16
    Modes     "1280x1024"
  EndSubSection
EndSection
```

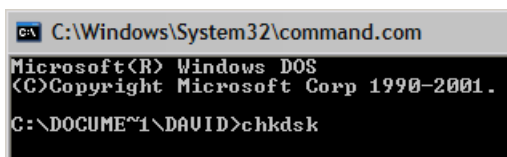
- Run “**xinit**”. That’s it! Naturally, you will have to change the Depth and Modes lines to reflect the decimal code you chose for your depth and resolution in your lilo.conf file.

A.8 Installing Linux on Windows System (Dual Booting)

Installing Linux on a windows system provides the end user with a little more flexibility, but requires a modified installation process. The following instructions are focused on computer systems that have a single hard drive with Microsoft Windows and Partition Magic 8 already installed. Here is a quick overview of the process:

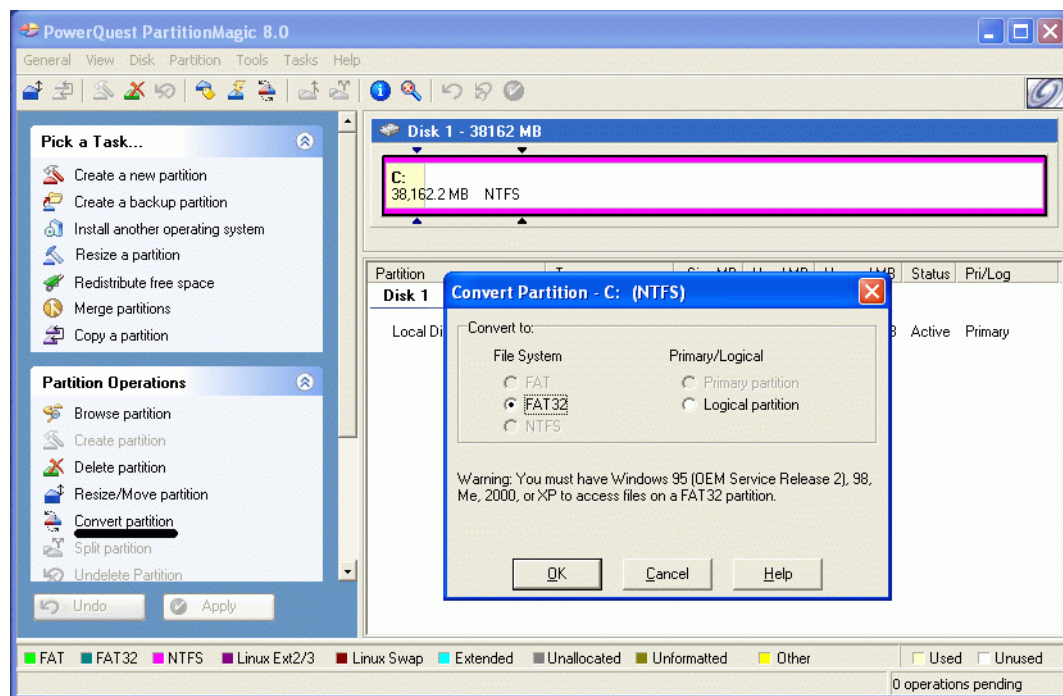
- Run chkdsk to verify the windows partition is not damaged.
- Convert NTFS partition to FAT32 (enabling linux to access windows' data), using Partition Magic.
- Create free space for linux by shrinking the windows partition, using Partition Magic.
- Manually install RHEL4 from cdroms, but do not erase the windows partition.

Figure A–2: chkdsk



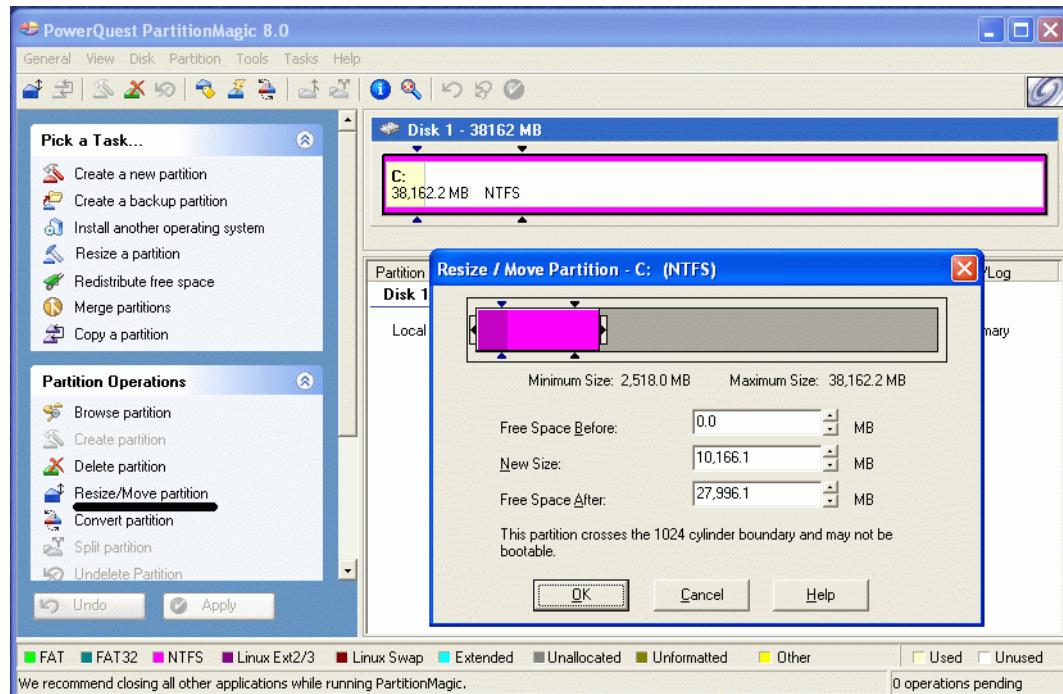
Action: Run chkdsk from a command prompt

Figure A–3: Convert NTFS partition (c:) to FAT32



Action: Convert partition to FAT 32

Figure A–4: Resize Partition



Note: For older computer systems (prior to 2002) and those not using Red Hat Enterprise Linux, you must also create 150 MBs before the Windows partition to create /boot partitions.

Action: Resize the partition by entering the number of desired MBs for your complete (all linux partitions) linux installation in the “Free Space After” field. After clicking OK, click the Apply button in the left hand corner. You **MUST** reboot your computer for these changes to occur. Make sure that your CD and disk drives are empty.

A.8.1 Dual Boot Partition Example

Partitioning – The addition of a Windows partition increases the partition numbers by one, here is an example of a 40 GB disk.

Device	Mount Point	Type	Size (MB)	Purpose
/dev/hda1		FAT32	10000	windows
/dev/hda2	/	ext3	5000	Linux
/dev/hda3	/usr	ext3	5000	Linux
/dev/hda4				Extended*
/dev/hda5		swap	1000	Linux Swap
/dev/hda6	/usr/iris_data	ext3	19000	Linux

*Automatically created when needed during partitioning process.

A.9 Special notes for notebook installations

Most notebook computers have only a single bay for the cdrom or floppy, and some have unusual interfaces to these devices. Often there is a magic code required to allow booting from the cdrom, or to enable the graphics. Fortunately each model laptop is well documented on the web page:

<http://Linux-on-laptops.com/>