

This book has been prepared
exclusively for

VEIS COMPUTER EDUCATION

RETHAT LINUX



CHAPTER I

INTRODUCTION AND INSTALLATION TO RET HAT LINUX

Linux: Linux is a free operating system that was created by Linus Torvalds in 1991. Linux developed by free exchange of ideas and software. The common Linux features are as follows:

- **Multiuser:** You can multiple users logged in and working on the system at the same time.
Multitasking: Many programs can run at the same time. It is possible for several users to run their respective jobs at the same time.
- **Graphical User Interface:** Provides graphical interface called X Windows System or simply X.
- **Hardware Support:** Provides support for all the type of peripherals.
- **Networking Connectivity:** Supports Local Area Network devices, protocols.
- **Application Support:** Because of compatibility with POSIX and several different application programming interfaces(APIs), a wide range of freeware and shareware software is available for Linux.
- **Multithreading:** Multi threading is a technique by which a task is divided into multiple sub tasks called as threads. Each sub task is given to CPU, hence all these sub tasks are executed simultaneously. At the end of execution of these sub tasks, they are linked together to give the final output.

Red Hat Linux: Red Hat Linux is a commercial product produced by Red Hat software, inc. The software is available free of cost.

Features of Ret Hat:

- **Software Packaging:** - Red Hat software, Inc. created the Red Hat Package Management (RPM) method of packing Linux. Available freely at www.rehat.com or available in CDs with Ret Hat 8.0 Linux Bible.
- **Easy Installation:** -The Red Hat Linux installation process provides easy steps for installing Linux.

- UNIX System V-style-level scripts:- Red Hat Linux uses the UNIX system V services.
- Desktop Environments(GNOME and KDE): - Red Hat Linux comes with GNOME and KDE desktop . GNOME is installed by default and offers some nice features that include drag and drop that operate like windows shades . KDE is another popular desk top manager that includes a wide range of configuration.
- GUI Administration Tools: - There are helpful configuration tools.
- Testing:- The exact configuring that you get on a Red Hat Linux distribution Has been thoroughly tested by experts around the world.
- Automatic Updates:- The software packages that make up Red Hat Linux are constantly being enhanced.
- Built-in Mozilla web browser.

INSTALLING RED HAT LINUX

Minimum Hardware Requirement to Install Red Hat 8.0

- Intel-compatible processor with minimum 333 MHz processor.
- Memory - 64 MB
- Hard Disk - 2GB for workstation install and 4.6GB to install everything.
- CDROM Drive or FDD
- Keyboard and Monitor

Installation procedure

Make the system to boot through CD Drive. While installation the steps will be as follows:

1. **Insert the LINUX CD-ROM in the CD-ROM drive:** If installing from a local hard disk or network, insert an installation boot disk.
2. **Start Your Computer:** The system will boot automatically because the Linux CD comes bootable.
3. **Start the Boot Procedure:** At the boot prompt press the “Enter key” to start the boot procedure in graphical mode.

4. **Continue:** When the Welcome screen appears, click Next.
5. **Choose a Language:** Indicate the language you would like to use for example “English”
6. **Choose a Keyboard:** Indicate the kind of keyboard e.g. “U.S. English, with Generic 101-Key
7. **Add a Mouse:** Indicate the kind of mouse e.g. serial 3 button.
8. **Choose Install Type:** Select either “Install on System” for new install or “upgrade existing system” to upgrade an existing version of Red Hat. For new install Choose one of following:
 - Personal Desktop: Sufficient for a home or office or network support. This type of installation can use part of hard disk that is free space.
 - Workstation: Similar to personal desktop but adds tools for system administration and software development.
 - Server: A server install the software packages used for Linux server. This type of installation use entire hard disk.
 - Custom: Provide choice to choose own software packages.
9. **Choose your partitioning policy:** You have following choices: -
 - Automatically Partition: With this selection, all Linux partition on all hard disk are erased and used for installation. If you choose this option, then it will prompt you to “Remove all Linux partitions in this system” or “Remove all partitions on this system” or “Keep all partitions and use existing free space”. Choose one of these.
 - Manually partition with Disk Druid: With this selection, you can partition the hard disk using disk druid utility.
Note: Choose this option.
 - Manually partition with fdisk (experts only): With this selection, you can partition the hard disk using fdisk utility.

While partitioning if you have multiple hard disk, you can select which of those disk should be used. Select at least one root (/) partition that can hold the

entire installation and one swap partition. Size of swap partition should be twice the size of the RAM for better performance.

10. **Configure Boot Loader:** Select the GRUB or LILO boot loader. The default boot loader is GRUB. (Boot Loader control the boot process).
11. **Configuring Networking:** This allows you to configure local area network (LAN). If only dial-up networking skip this.
12. **Choose a Firewall Configuration:** This maintains the security of your system from outsiders. It has three choices, these are high, medium and no firewall.
13. **Choose Language Support:** This option used to support additional language.
14. **Choose a Time Zone:** To choose time zone select “India” from the map.
15. **Configure User Account:** At this time choose a password for *root* user and add one or more regular user accounts.
16. **Enable Authentication:** Select any one of the network-wide authentication.
17. **Select Package:** Select the type of packages you would like to install.
18. **Begin Installing:** The installation will begin. Just go through the instructions, it takes approximately 20 to 60 minutes to complete.
19. **Create Boot Disk:** If you want create a boot disk, insert a blank floppy and click next.
20. **Configure Video Hardware:** Choose the correct video card, if not detected automatically.
21. **Select Monitor Configuration:** Select the monitor you have.
22. **Choose custom X configuration (Colour & Resolution):** Based on your hardware select combination of the number of colours and screen resolution.
23. **Finish Installing:** When you see the “Congratulation” screen, eject the CD and click Exit.

Logging into Red Hat Linux: After the computer has been turned on and the operating system has started, you see either a graphical login screen (default) or a text based login prompt. In the graphical several menu buttons on the login screen. You can ignore them or simply type your username and password. The options are as follows:

- **Option:** Click option to select a language other than the last language you selected when Red Hat Linux was installed.
- **Session:** Click session to choose a different desktop Gnome or KDE or Failsafe.
- **System:** Instead of logging in, if you want to shut down or restart your computer.

The Login Session: As you log in, Red Hat Linux starts up a user environment that is unique to your user account. Various attributes are set that remain active during your login session until they are changed.

Features that make up of user environment are:

- **A Home Directory:** It identifies a location on the hard disk where you can save and protect the files that you need. The *root* user's home directory is */root*. Other users home directories in the */home* directory. For example, if user name is *suren*, the home directory would be */home/suren*.
- **A Shell Configuration:** There are several shells available for use with Linux, with each having slightly different features. The bash shell, which stands for **B**ourne **A**gain **S**hell.
- **A Graphical Configuration:** The graphical interface provides many ways to configure the system.

The Shell Interface: If Red Hat has no GUI, you must enter commands from the shell. The default prompt for a user is a dollar sign: \$. The default prompt for a root user is a pound sign (also called hash sign): #. The \$ and # sign are preceded by user name, system name, and current directory name.

For example, a login prompt for the user named *suren* on a computer named *pr* with *VEIS* as the current directory would appear as follows:

[suren@pr VEIS]\$

Note: Click Terminal window to work in the shell from the GUI environment.

SHELL Commands:

- **pwd** - To find out the current working directory.

Syntax: **pwd**

Result: **/usr/bin**

- **cd** – To get back to your home directory and to change to other directory.

Syntax 1: **cd** (To get back to home directory from other directory)

Syntax 2: **cd directory name** (To change to named directory)

Example:

\$cd /usr/VEIS/trg

Result

/usr/VEIS/trg

- **ls** - List the content of the current directory.

Syntax: **ls**

options: -l = displays a long list

-a = displays hidden files

Syntax: **ls -la /home/suren**

Result:

```
drwxrwxrwx    2  suren   pr   1024 May 08 08:15  .
drwxr-xr-x    3   root   trg   24    May 10 10:30  ..
-rw- - - - -    1  suren   trg  2204 May 18 10:15  .bash_hist
crw-rw-r--    1  suren   trg  5666 May 11 23:15  letter
```

c	rw-rw-r--	1	suren	trg	5666	May 11	23:15	Letter
Indicates type of file	File permissions for owner, group & others	Number of links	Owner of the file	Group	File size in bytes	Creation date	Creation time	File name

Indication file types:

- ordinary file

c special character file

d directory file

File permission

r = read w = write x = executed

- **cat:** Concatenates files

Syntax: Cat [options] [files]

Description: The cat command is used to display the contents of one or more files on to the screen.

Example:

```
$ cat emp2.dat.
```

Example:

```
$ cat emp1.dat emp2.dat > file2
```

This example combines two files and redirects output to another file.

- **mv:** Moves and renames files

Syntax: mv file1 file2 (To rename a file)

mv files directory (To move a file to another directory)

Description: The MV command is used to rename directory. The MV and CP commands differ in the fact that the cp command creates a new copy of the file whereas the mv command moves the file to the new name.

- **cp:** Copies files

Syntax: cp file 1 and file2 cp files directory

Description: the Cp command is used to create duplicate copies of files.

- **copy:** Copies the directory.

Syntax: copy [options] source destination

Description: Copy copies the contents of one directory into another directory. If files, directories, or special files do not exist at the exit at the destination, then they are created with the same modes as the source.

- **mkdir**: Creates new directories.

Syntax: mkdir [options] dir names

Description: The mkdir command creates a new directory.

- **rm** : Remove file

Syntax: rm [options] files

- **rmdir**: Removes directories.

Syntax: rmdir [options] directories

- **wc**: Count line, words and characters.

Syntax: wc [options] [files]

The 'wc' command counts lines, words, and characters in the named files. By default all information is displayed.

- **id**

Result: *uid=598 (suren) gid=98(training) groups=98(training), 8(adm), 7(acc)*

This command is used to displays the user's identity. In above example

User name = suren

User ID = 598

Primary group of user = training

Training group ID = 98

Suren is also belong to other groups = adm(uid 8) and acc (uid 7)

- **who -umH**

Result: *pr1.VISHALVEIS.com!suren tty1 Jan 07 10:30 .*

This command is used to see current login session. In above example

User name = suren
Computer name = pr1
Domain name = VISHALVEIS.com
Terminal = tty1
Session begin at = 10:30 on Jan 07

- **echo \$home** – To find out the home directory.

Syntax: **echo \$ pwd**

Result: **/home/suren**

- **ps** – To list the running processes.

Syntax: **ps [options]**

Options:-

- a Show all processes of all users that are associated with your current terminal
- u Show username, process starting time, and CPU & memory usages.

Example:

ps -au

USER	PID	%CPU	%MEM	VSZ	RSS	TTY	STAT	START TIME	COMMAND
root	2146	0.0	0.8	1808	2100	ttyp0	S	14:50 0:00	LOGIN – suren
suren	2147	0.0	0.7	1889	1030	ttyp0	S	14:50 0:00	-bash

In above example

- USER column shows the name of the user who started the process.
- PID column shows ID number of process.
- %CPU column shows percentage of CPU uses.
- %MEM column shows percentage of memory (RAM) uses
- VSZ (Virtual Set Size) shows the size of image process (in kilobytes).
- RSS (Resident Set Size) shows size of the program in the memory.
- TTY column shows terminal device used for current session.

- STAT column shows the state of process, with R indicating a currently running process and S indicating a sleeping process.
 - START shows the time the process began running.
 - TIME shows the cumulative system time used.
- **exit** – Type exit to exit the shell or press Ctrl+D. If you are exiting from your login shell, type logout to exit the shell.

COMMAND – LINE EDITING

Keystrokes for Navigating Command Line:

<u>Keystroke</u>	<u>Full Name</u>	<u>Meaning</u>
Ctrl+f	Character forward	Go forward one character.
Ctrl+b	Character backward	Go backward one character.
Alt+f	Word forward	Go forward one word.
Alt+b	Word backward	Go backward one word.
Ctrl+a	Beginning of line.	Go to the beginning of the current line
Ctrl+e	End of line	Go to the end of the line.
Ctrl+l	Clear screen	Clear screen and leave line at the top of the screen.

Keystrokes for Editing Command Line:

<u>Keystroke</u>	<u>Full Name</u>	<u>Meaning</u>
Ctrl+d	Delete current	Delete the current character.
Back space or Rubout	Delete previous	Delete the previous character.
Ctrl+t	Transpose character	Switch positions of current and previous character.

Alt+u	Uppercase word.	Change the current word to upper case.
Alt+l	Lowercase word	Change the current word to lowercase.
Alt+c	Capitalize word.	Change the current word to an initial capital.
Ctrl+v	Insert special character	Add a special character , e.g., to add a Tab character , press ctrl+v+Tab

Keystrokes for Cutting & Pasting Text in Command Line:

<u>Keystroke</u>	<u>Full Name</u>	<u>Meaning</u>
Ctrl+k	Cut end of line	Cut text to the end of the line.
Ctrl+u	Cut beginning of line	Cut text to the beginning of the line
Ctrl+w	Cut previous word.	Cut the word located behind the cursor.
Alt+d	Cut next word	Cut the word following the cursor.
Ctrl+y	Paste recent text.	Paste most recently cut text.
Alt+y	Past earlier text.	Rotate back to previously cut text and paste it.
Ctrl+c	Delete whole line.	Delete entire line.

Command Line Recall

After you type a command, that entire command is saved in shell's history list. The list is stored in a history file, from which any command can be recalled to run again. After it is recalled, you can modify the command, as follows:

History –To view the command history.

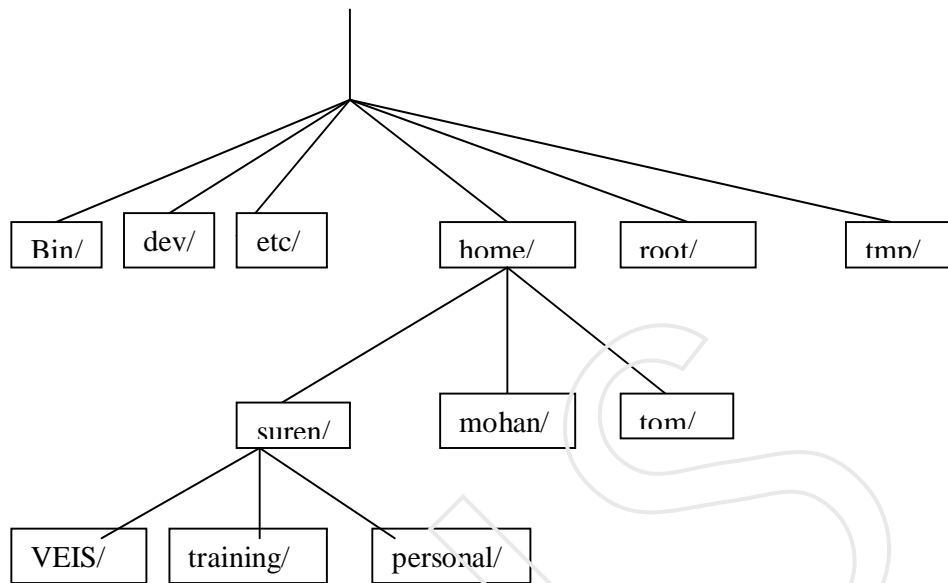
Run previous command (!) – Runs the previous command line.

Run Command Number (!n) – Replace n with the number of the command line.

Red Hat LINUX file system Structure

The Red Hat Linux file system is the structure in all the information on your computer is stored. Files are organized within a hierarchy of directories. Each directory can contain files, as well as other directories. The top is the root directory, which is

represented by a single slash(/). Below that is a set of the command directories in the Linux system, such as /bin, /dev, /home, /lib, and tmp.



Red Hat Linux directories that contain following:

- /bin – Contains command Linux user commands, such as ls, sort, data, and chmod.
- /dev – Contains files represented access points to device on your system. These include terminal devices (tty*), hard disk (hd*), RAM (mem*), and CDROM (cd*). Users normally access these devices directly through the device files).
- /etc – Contains administrative configuration files.
- /home – Contains directories assigned to each user with a long account.
- /mnt – Provides a location for mounting device, such as remote file system and removable media (with directory name of cdrom, floppy, and so on).
- /root – Represents the root user's home directory.

Metacharacters

You can use the metacharacters to match the files you want. The metacharacters are as follows:

- * - Matches any number of characters.

- ? - Matches any one character.
- [...] – This matches any one of the characters between the brackets, which can include a dash-separated range of letters or numbers.

Example of metacharacters with ls command:

Syntax 1: \$ ls a*

Displays the list of files that begins with letter a.

Syntax 2: \$ ls g*t

Displays the list of files that begins with letter a and ending with letter t.

Syntax 3: \$ ls *e*

Displays the list of files that contains letter e in the name is matched.

Syntax 4: \$ ls ???e

Displays the list of files that matches any five-character file that ends in e.

Syntax 5: \$ ls g???e*

Displays the list of files that begins with g and has e as its fifth character.

Syntax 6: \$ ls [abw]*

Displays the list of files beginning with a, b, or w is matched.

Syntax 7: \$ ls [agw] * [ne]

Displays list of files that begins with a, b, or w and also ends with either n or e.

Understanding file permissions:

File permissions are used to keep users from accessing other user's private files and to protect important system files. Permission bits appear as rwxrwxrwx. These are nine

bits. The first three bits apply to the owner's permission, the next three apply to the owner's group, and last three apply to others.

The r stands for read

the w stands for write

x stands for execute permissions.

If a dash appears instead of the letter, it means that permission is turned off that associated read, write or execute.

You can see the permission for any file or directory by typing the ls-ls command.

```
$ ls -ld ch3 test
```

```
-rw-rw-r-- 1 suren training 4983 Jan 18 22:13 letter
drwxr-xr-x 2 suren training 1024 Jan 24 13:47 VEIS
```

The first line shown a file (letter) that has read and write for the owner and the group. All users have read permission, which means they can view the file but cannot change its contents or remove it. The second line shows a directory(indicated by the letter d before the permission bits). The owner has read, write and execute permission, while the group and other users have only read and execute permissions. As a result, only the owner can add, change or delete files in that directory. Any other user, however, can only read the contents, change to that directory, and list the contents of the directory.

Chmod: The chmod command. For each of the three sets of permission on a file (read, write and execute), the r is assigned to the number 4, w to 2 and x to 1. So to make permission wide open for yourself as owner, you would set the first number to 7 (4 plus 2 plus 1). The same would be true for group and other permission. Any combination of permission can result from 0(no permission) through 7(full permission).

Example

Chmod 777 files *resulting permission* rwrwrwx

Chmod	755	files	<i>resulting permission</i>	<i>rwxr-xr-x</i>
Chmod	644	files	<i>resulting permission</i>	<i>rw- -r- -r-</i>
Chmod	000	files	<i>resulting permission</i>	<i>-----</i>

When you try to create a file, by default it is given the permission rw-r--r--. A directory is given the permission rwxr-xr-x..

Note: All the commands are available under /bin and /usr/bin directories. There are also administrative commands under /sbin or /usr/sbin directory.

STARTING WITH VI

Most often, you start vi to open a particular file. For example , to open a file called / tmp /test, type the following command:

if this is new file, you should see something similar to the following:

the box at the top represents where your cursor is . the bottom line keeps you informed about what is going on with your editing (here you just opened a new file). In between, there are tildes(~)as filler because there is no text in the file yet. Now here's the intimidating part: there are no hints, menus, or icons to tell you what to do. on top of that, you can, t just start typing. If you do ,the computer is likely to beep at you.

The first things you need to know are the different operating modes. The vi editor operates in either command mode or input mode. When you start vi , you are in command mode. Before you can add or change text in the file, you have to type a command to tell vi what you want to do. A command consists of one or two letters and an optional number .to get into input mode, you need to type an input command .to start out, type either of the following input commands:

- a-add. After you type a, you can input text that starts to the right of the cursor.
- I-insert. after you type I, you can input text that starts to the left of the cursor.

Type a few words and press enter. Repeat that a few times until you have a few lines of text. when you are done typing, press esc. You are now back in command mode.

Remember the esc key! it always places you back into command mode. Now that you have a file with some text in it, try moving around within that text with the following keys or letters:

- *Arrow keys*- use the arrow keys to move up, down, left, or right in the file one character at a time. To move left and right you can also use backspace and the spacebar, respectively. If you prefer to keep your fingers on the keyboard, use h(left), l(right), j(down), or k (up) to move the cursor.
- W-moves the cursor to the beginning of the previous word.
- B-moves the cursor to the beginning of the previous word.
- 0(zero)-moves the cursor to the beginning of the current line.
- \$-moves the cursor to the end of the current line.
- H- moves the cursor to the upper left corner of the screen(first line on the screen);
- M-moves the cursor to the first character of the middle line on the screen.
- L-moves the cursor to the lower left corner of the screen(last line on the screen)

Now that you know how to input text and move around, the only other editing you need to know is how to delete text.here are a few vi commands for deleting text:

- X-deletes the character under the cursor.
- X-deletes the character directly before the cursor.
- dw-delete from the current character to the end of the current word.
- d\$- delete from the current character to the end of the current line.
- d0- delete from the previous character to the beginning of the current word.

If you feel pretty good about creating text and moving around the file, you may want to wrap things up. Several keystrokes for saving and quitting the file follow:

- zz- save the current changes to the file and exit from vi.
- w- save the current file but continue editing.
- :wq-same as zz.
- :q-quit the current file. This works only if you don't have any unsaved changes.
- :q!-quit the current file and DON'T save the changes you just made to the file.

Tip: if you've really trashed the file by mistake, the :q! command is the best way to exit and abandon your changes. The file reverts to the most recently changed version. So, if you just did a :w, you are stuck with the changes up to that point. If you just want to undo a few bad edits, press u to back out of changes.

You have learned a handful of vi editing commands. I describe many, many more commands in the following sections. However, before I do, here are a few tips to smooth out your first trials with vi:

- **esc**- remember that esc gets you back to command mode. (I've watched people press every key on the keyboard trying to get out of a file.) esc followed by ZZ gets you out of command mode, saves the file, and exits.

Chapter II

Working with the Desktop

Desktop refers to the presentation of windows, menus, panels, icons, and other graphical elements on your computer screen. Red Hat Linux software comes with GNOME and KDE desktops. The GNOME is the default desktop.

Starting GNOME

To start the desktop the steps are as follows:

- (i) Turn on your computer and select Red Hat from the boot screen and press enter key.
- (ii) Before you log in, you can make following choices:
 - **Language** – You can choose different languages for the current session.
 - **Session** – From this session, you can select the desktop interface either GNOME or KDE, select GNOME.
 - **System** – Instead of logging in, you can choose to “shutdown the computer” or “Reboot the computer”.
- (iii) Type your User name (press enter) and password (press enter). The desktop is displayed.

NOTE: When you start desktop, the X server and graphical login screen is started by the `prefdm` script, which handles both logging in and starting the desktop environment. The `prefdm` script is launched only if the run level in the `/etc/inittab` file is set to 5, as follows: **id:5:initdefault :**

If the `initdefault` state is 3, the system boots to a text based login prompt. Use `# startx` command to start the graphical from the text based.

Exiting GNOME

To exit from GNOME, do following:

1. Open the GNOME main menu.
2. Select logout from the main menu. A pop-up menu appears, which has **Logout, Shut Down, Restart** options. Select one of these.
3. Select OK to finish existing from GNOME.

GNOME DESKTOP

GNOME desktop has following components:

- **Metacity (Window Manager)** – The name of windows manager is metacity. The windows manager provides windows borders, window controls.
- **Nautilus (File Manager/Graphical Shell)** – When you open a folder, the nautilus window opens and displays the contents of the selected folder.
- **GNOME Panel (Application/Task launcher)** – The lines at the bottom of the screen is called GNOME panel. By default this panel contains the main menu, desktop applications, browser.
- **Desktop Area** – The windows and icons are arranged on the desktop area.

Metacity Window Manager

Important metacity keyboard shortcuts are as follows:

Actions	Keystrokes
Windows focus	
Cycle forward, with pop-up icons	Alt+Tab
Cycle backwards, with pop-up icons	Alt+shift+Tab
Cycle forward, without pop-up icons	Alt+Esc
Cycle backwards, without pop-up icons	Alt+Shift+Esc
Panel Focus	
Cycle forward among panels	Alt+Ctrl+Tab
Cycle backwards among panels	Alt+Ctrl+shift+Tab
Workspace focus	
Cycle to next workspace	Ctrl+Alt+right arrow
Cycle to previous workspace	Ctrl+Alt+left arrow
Minimize/unminimize all windows	+
Show window menu	Alt-Spacebar
Close menu	Esc

You can do following with workspace switcher:

- **Choose current workspace** – Click on any of the four virtual workspaces for to become current workspace.
- **Move windows to other workspaces** – Click any window, each represented by a tiny rectangle in a workspace, drag and drop it to another workspace.
- **Add more workspaces** – Right click the workspace switcher, and select preferences. You can add upto 32 workspaces.
- **Name workspace** – Right click the workspace switcher and select preferences. Click in the workspace pane to change names of workspaces to any names you choose.

GNOME Panel

GNOME panel is used to manage the desktop and to start the applications from this.

From the GNOME panel you can perform following functions:

- **Add to panel** – You can add an applet (accessories, amusement, Internet, multimedia and utility), menu, launcher, drawer, or button.
- **Delete This Panel** -- You can delete the current panel.
- **Properties** -- Change position, size, and background of the panel.
- **New Panel** – You can add new panels to your desktop in different styles and locations.

Changing Panel Properties

The panel properties window that appears includes following values:

- **Panel Type** – Select the panel type either Edge, Aligned, Sliding, or Floating Panel.
- **Position** – You can move it to different locations.
- **Size** – You can select the size of your panel.
- **Autohide** – You can select whether or not a panel is automatically hidden.
- **Show hide button** – You can choose whether or not the Hide/Unhide buttons appears.
- **Arrows on hide buttons** – If you select “Show hide buttons” you can select the either have arrows on those buttons or not.

- **Background** – From this you can assign a colour to the background of the panel.

Nautilus File Manager

Nautilus file manager is the default file manager of GNOME. You can open the nautilus file manager by main menu or by opening the home icon or other folder on desktop.

Diagram

Important features of Nautilus are as follows:

- **Sidebar** – Click on View → Side Panel to appear sidebar in the left column of the screen.
- **Windows File and Printer Sharing** – If your computer is connected to a LAN which windows computers are sharing files and printers. Type smb: in the location box to see available workgroups. Click a workgroup to see computers from that workgroup that are sharing files and printers.
- **Drag-and-Drop** – You can drag-and-drop within the Nautilus window, between the Nautilus and the desktop, or between multiple Nautilus windows.

GNOME Preferences

You can change the setting by preference folder. You can open that folder from the Red Hat Menu by clicking Preference → Control Center or by typing *preference:* in the Nautilus location box.

Diagram

The following preferences you can change:

- **Accessibility** – If you difficulty operating mouse and keyboard, you can make changes for more accessible.

- **Background** – To change the background. To use wallpaper for your ground, open a folder containing the image you want to use.
- **CD Properties** – You can change the CD properties, even if you do not change CD properties, following happens:
 - For Data CDs, the CD is mounted when it is inserted and auto run CDs run automatically.
 - For Audio CDs, the GNOME CD Player is launched and CD begins playing or you can change different player.
 - For DVD (Video), the DVD is not set to play automatically. If you have a player installed that can play the content of DVDs that you have.
- **File Types and Program** – It helps to understand different types of data files that GNOME knows about it.
- **Screensaver** – Select the screensaver as per your choice from the list and change other required settings e.g. time, password etc.

KDE Desktop

Starting KDE

Choose **Session** → **KDE** to start the KDE desktop from the login screen. Then, type your login name and password, as prompted.

Konqueror File Manager: It is like nautilus in GNOME desktop.

Working with files:

- **Open a file** – Double click the left mouse button on a file.
- **Select an Icon** – Single click the left mouse button or right click on the file to open menu.
- **Delete a file** – Select and press del key on keyboard or single click the right mouse button → Delete.
- **Copy a file** – single click the right mouse button → Copy.
- **Paste a file** - single click the right mouse button → Paste.

- **Move a file** – open the source and target folder on the desktop. Press and hold the left mouse button on the file you want to move, drag the file to an open area of the new folder, and release the mouse button.
- **View hidden files** – Select View → Show hidden files. This allows you to see files that begin with a dot (.).
- **View file system tree** – Select View → View Mode → Tree view.
- **Change icon view** – Select View → Icon Size and then choose Large, Medium, or Small to select the size of icons that are displayed on the window.

Creating new files and folders

Choose edit → Create New (*or right click and choose new*), and select any one, which you would like to create. E.g. File, folder etc.

Moving Windows

To move a window, place the pointer on the windows title bar, move the mouse so the window goes to a new location and release the mouse button to drop the window.

Resizing Windows

To resize a window, place the pointer over a corner or side of the window border, then move it until it is the size you want.

X WINDOW SYSTEM

The X window system forms the foundation for KDE and GNOME. This is in between desktop and the Linux kernel.

CHAPTER III

ACCESSING AND RUNNING APPLICATIONS

Windows-Equivalent Linux Application

<u>Windows Application</u>	<u>Linux Application</u>
Microsoft Office	OpenOffice (Openoffice.org) Koffice StarOffice
Microsoft Word (Word Processor)	Abiword, Kword
Microsoft Excel (spreadsheet)	Gnumeric, Kspread
Microsoft PowerPoint (presentation)	Kpresenter
Microsoft Internet Explorer (Web browser)	Mozilla, Galeon, Konqueror

WEBSITES TO FIND OUT LINUX SOFTWARE

- Freshmeat.net – This site maintains index of Linux software. Type the name of a software package into the find box, you can find where it is available on the web.
- SourceForge.net – This site contains open source software package.
- linuxapps.com – This site offers more than 30 categories of applications.
- rethat.com/apps/marketplace – You can find commercial applications for Red Hat Linux.

LINUX PACKAGE NAMES AND FORMATS

Examples of Linux package:

mycoolapp-4.2.3.i386.rpm

In this example

Mycoolapp – This is the name of the package.

4.2.3 – Version of the package

i386 – Package is built to run on Intel machines (PC)

rpm – Indicates package in Red Hat Package Manager format.

Linux Archive File Formats

<u>Format</u>	<u>Suffix</u>	<u>Description</u>
---------------	---------------	--------------------

Gzip file	.gz or .z	File was compressed using the GNU gzip utility.
Tar file	.tar	File was archived using the tar command. Tar is used to gather multiple files into a single archive file.
Tar/compressed	.taz or .tz	File was archived with tar and compressed with the UNIX compress command.
Red Hat Package Manager	.rpm	File is a binary package used with Red Hat Linux.

Linux Document Formats

<u>Format</u>	<u>Suffix</u>	<u>Description</u>
Hypertext Markup Language	.html or .htm	File in hypertext format for reading by a web browser program.
SGML	.sgml	File is in standard document format.
Plain text		File without a suffix are usually plain-text files.

INSTALLING RED HAT LINUX APPLICATIONS

Installing and Managing RPM files

The **rpm** command is used to install and manage RPM files.

The rpm command has following modes of operation:

- install (-i)
- upgrade (-u)
- query (-q)
- verify (-v)
- signature check(--checksig)
- uninstall(-e)

Syntax to install RPM archive with rpm command

```
# rpm -i [options] package
```

Example:

```
# rpm -i audiofile-devel-0.1.6-1.i386.rpm
```

Along with `-i` option, you can use following options:

- `-vv` – Prints debugging information during installation.
- `--force` – Forces the contents of the current page to be installed, even if the current package is older than the one already installed.
- `--nodeps` – Skips package dependency checks and installs the package, even if packages it depends on are not installed.

Along with `-q` option, you can use following options:

- `-qa` – List all installed packages.
- `-qf file` – Lists the package that owns file.
- `-ql package` – List all the files contained in package.
- `-qd package` – List all documentation files that come in package.
- `-qc package` – Lists all configuration files that come in package.

RUNNING WINDOWS APPLICATIONS WITH WINE

WINE allows you to run windows application. It implements Win32 application-programming interface (API) and windows 3.x interfaces.

Windows Drive Letters in WINE

<u>Description</u>	<u>Drive Letter or Name</u>	<u>Linux Directory or Output Location</u>	<u>Linux Device Name</u>
Floppy Drive	A:	/mnt/floppy	/dev/fd0
Hard disk # 1	C:	/usr/share/wine-c	
CDROM	D:	/mnt/cdrom	/dev/cdrom
User's home directory	F:	\$HOME	
Root directory	Z:	/	
Serial ports	COM1 COM2 COM3		/dev/ttyS0 /dev/ttyS1 /dev/ttyS2

	COM4		/dev/ttyS3
Parallel ports	Lpt1		/dev/lp0

Setting up windows application

The WINE package should be installed.

1. If you have dual-boot system start by mounting the windows partition.
 - As the root user, from the terminal window, type **# *fdisk -l***
This lists your hard-disk partition. Windows partition look like WIN95 FAT32.
 - Make directory on which to mount your windows partition e.g. /mnt/win
 - Assuming that the windows partition is on the first partition of the first IDE hard disk (/dev/hda1), type **# *mount -t vfat /dev/hda1 /mnt/win*** to mount windows partition with win directory.
 - To make the partition permanently, add the following line to /etc/fstab file:

```
/dev/hda1      /mnt/win      vfat          defaults      0      0
```
2. Copy the mspaint.exe program (for example) from windows partition to linux partition (example under bin directory).
3. Run the Wine command with mspaint.exe

```
# wine /bin/mspaint.exe
```
4. Copy the necessary DLL (Dynamic Link List) files from the windows partition if required.
5. Type wine /bin/mspaint.exe again.
After that you can work with paint.

CHAPTER IV

MULTIMEDIA IN RED HAT LINUX

Listening to Audio

Sound card is required in your computer system to listen audio. Sound card can provide following features:

- **Sound recording and playback** – The card can convert analog sound into 8-bit or 16-bit digital numbers.
- **Full duplex Support** – This allows recording and playback occur at the same time.
- **Input/output ports** – The ports are as follows:
 - **Line-In** – This is used to connect external CD player, cassette deck for recording or playback.
 - **Microphone** – Connects a microphone for audio recording.
 - **Line-Out (Speaker)** – Connects non-powered speakers, headphones.
 - **Internal CD Audio** – This connects the sound card to your computer's internal CD-ROM board.

Configuring Sound Card

When you insert the music CD it starts working automatically, if does not start, follow following steps:

1. Run `/usr/sbin/sndconfig` (sound configuration utility starts).
2. A `sndconfig` window is displayed, asking for plug-and-play cards. Press Enter to select OK.
3. It detects automatically, if you heard the sound select 'Yes' otherwise 'No' and manually select the type of card.
4. Message displayed that a new `/etc/modules.conf` file is being created. Press Enter to select OK.

→ You can increase or decrease the volume from Sound & Video → Volume Control from the GNOME menu.

Note: If above procedure does not work open, `redhat-config-soundcards` tool from GNOME menu by clicking System Settings → Sound card Detection.

Audio File Conversion and Compression

The tools for converting and compressing audio files are as follows:

- Sox – It is used for converting audio files among a variety of formats.
- Oggenc – It is converting music files to OGG Vorbis format.

Converting Audio Files with Sox: - This converts sound file in one format to another format. Type `sox -h` to see the supported audio types. If you are not sure about the format of an audio file, you can add the `.auto` extension to the filename. Sox guess what type of auto format is contained. You can convert one file format to another format as follows:

```
$ sox file1.wav file1.au
```

Compressing Music Files with oggenc: The `oggenc` commands converts music or other audio data from uncompressed format (such as WAVE or AIFF) to the compressed OGG Vorbis format. The example is as follows:

```
$ oggenc *.wav
```

It compresses all the wave files of current directory. OGG Vorbis files can be played in many different CD players in Linux.

CD Audio Players

When you insert the CD it begins to play by `magicdev` on GNOME desktop. The `magicdev` starts a CD player to play the first track of the first drive (`/dev/cdrom`) mounted at `/mnt/cdrom`. If you have two drives, the second (`/dev/cdrom1`) is mounted on `/mnt/cdrom1` (and so on).

You can change the behaviour of `magicdev` on the CD and DVD preferences window as follows:

1. Click on Preference → CD Properties. The CD & DVD preferences window appears.
2. for Data CDs, select from the following options:

- **Mount CD when inserted:** If this is selected, when a data CD is inserted it is automatically mounted in a subdirectory of /mnt.
- **Start auto-run program on newly mounted CD:** If this is selected, runs CD automatically when inserted.
- **Open file manager window for newly mounted CD:** If this is selected, opens file manager to display the contents of the top-level directory of the CD.

3. Click Close.

Playing CDs with gnome-cd

The gnome-cd player is appears automatically when you insert a CD as you use the GNOME desktop. If does not appear automatically, from the system menu select Sound & Video → CD Player or from a terminal window, type `$ gnome-cd &`.

For track information click the Open Track Editor button.

Playing CDs with cdp

If you are working with a dumb terminal or do not have X desktop running, you can use the cdp utility to play CDs. First, insert the music CD you want to play. Then, to start cdp, at the shell prompt type: `$ cdp`, if instead first track you want to start on another track (for example, track 5), type: `$cdp play 5`.

Playing music with XMMS Audio Player

The XMMS (X Multimedia System) Audio Player provides a graphical interface for playing music files in Ogg Vorbis and WAV, and other audio formats. Basically XMMS player is designed to play MP3 files. XMMS has also equalizer and play list editor. You can start XMMS audio player by selecting Sound & Audio → Audio Player or by typing `xmms` command from the terminal window.

Using MIDI Audio Players

MIDI stands for Musical Instrument Digital Interface. MIDI files are smaller than other kind of audio files. Red Hat comes with `kmid` and `kmidi` MIDI players, which can be installed as and when required. There is also `timidity` MIDI player, which allow to run MIDI audio from a terminal window.

Watching TV

You can view the video output on your desktop using Xawtv program. The Xawtv will display, any device producing video on the /dev/video0 device by default. To start up the Xawtv viewer, type *xawtv* at the shell prompt in the terminal window.

Supported TV Cards

Video4Linux is the video interface included with Red Hat Linux. It supports a variety of TV capture cards and cameras.

To see a list of supported TV cards that you can use with Xawtv, refer:

/usr/src/linux*/documentation/video4linux/bttv/cards

CARDLIST and Insmod-options files are also included. CARDLIST file to lists the card number associated with each supported card and Insmod-options file describe options you may want to add to the TV card driver when you load it.

If your card is not working try following:

1. After inserting card type **lspci** at the shell prompt. This will show you a list of all valid PCI cards on your computer.
2. If right card is not being detected, find your card in the card list and add lines to */etc/modules.conf* file. For example, to add a Prolink PV-BT878P, revision 9B card, add ***options bttv card=72*** in the */etc/modules.conf* file. If still not detected see the permissions, to open the permissions type ***chmod 777 /dev/video0***.

Playing Video

Video players Ggle DVD player and Xine video Player works well with Linux but these are not included with Linux CD. Other video players, such as Quicktime and AVI can be down loaded from the rpmfind.net site.

CHAPTER V

TOOLS FOR USING THE INTERNET AND THE WEB

Red Hat Linux includes the Mozilla web browser along with other web client software for reading mail, creating web pages etc.

Setting up Mozilla

Add Your Home Page: You can choose which page displays when Mozilla starts and when you select to go home (Alt-Home or Go → Home). Click on Edit → Preferences to display the preference window. Click Navigator, type the address of the page you want to be your home page into the location box, and click OK.

Set up the Sidebar: The bar on the left side of the Mozilla window, called the sidebar, is where you can setup search engines and bookmarks. Press F9 function key to have the sidebar appear and disappear. The tabs appear on the side bar are as follows:

- **What's Related** – Displays links to web sites related to the content you are displaying.
- **Search** – Contains a search box. You can type keywords, then choose to search using a search engines.
- **Bookmarks** – Add packages to the bookmark list, sort them into categories, and search for the bookmark you want.
- **History** – Contains the history of the web sites you visited.

CHAPTER VI

SYSTEM ADMINISTRATION

Red Hat Linux is a multiuser operating system. Multiuser features allow many users to have account and use the computer at the same time, with their data kept secure from others. The person, who manage all these is referred as the system administrator. To do all tasks, you need to be logged in as the root user (also referred as super user). The root user can perform all function on the system. The home directory for the root user is /root and other information associated with the root user account is in /etc/passwd file. The example of entry in the /etc/passwd file:

```
root:x:0:0:root:/root:/bin/bash
```

This shows that for the user named root, the user ID is set to 0 (root user), the group ID is set to 0 (root group), the home directory is root, and the shell for root user is /bin/bash. You can change the home directory or the shell used.

Super User

The super user is root user. A normal user can become a super using su command. To become a super user type *su* at the terminal window and press enter. When you are prompted, type in the root user's password. The prompt for the regular user (\$) will be changed to the super user prompt (#). At this moment, you have full permission to use the system. While using su command, if you get the message "command not found", you can use the su command with the dash (-) option, as follows: *su -*.

You can also use the su command to become another user than root. For example, to have permission of suren user, type *su - suren* at the shell prompt.

If you are logged in as a regular user and you want to launch a GUI application that is intended only for the root user, you will be asked to enter the root password before the GUI application's window opens or you can launch the system logs window (System Tools → System Logs) from the GNOME menu as a regular user.

Administrative Commands

When you log in as root, your \$path variable is set to include directories that contains commands for the root user. These are as follows:

- /sbin – This contains commands for modifying your disk partition (such as fdisk), changing boot procedure (grub), and changing system states (init).
- /usr/sbin – This contains commands for managing user accounts (such as useradd) and configuring your mouse (mouseconfig) or keyboard (kbdconfig).

Administrative Configuration Files

Configuration files are stored in the following locations:

- \$HOME – All users store information in their home directories. Most configuration files begin with dot (.).
- /etc – This location contains most of the basic system-configuration files. Few files are as follows:
 - adjtime – To adjust the hardware clock.
 - fdprm – Sets parameters for common floppy disk formats.
 - fstab – Identifies the devices for common storage media (hard disk, CDROM etc).
 - group – Identifies group names and group Ids(GIDs) that are defined on the systems.
 - gshadow – Contains shadow passwords for the group.
 - inittab – Contains information that defines which programs start and stop when Red Hat Linux boots, shuts down, or goes into different states in between.
 - Man.config – Used by the man command to determine the default path to the location of man pages.
 - modules.conf – Contains aliases and options related to loadable kernel modules used by your computer.
 - mtab – Contains the list of file systems that are currently mounted.
 - sadow – Contsins encrypted passwords for users that are defined in the passwd file.

- /etc/x11 – Contains subdirectories that each contain system-wide configuration files used by X and different X window managers.

Administrative Log Files

Log files are used to see activities and any errors in the system. The main utilities for logging errors are the syslogd and klogd. General system logging is done by syslogd and specific to kernel activity is done by klogd. Logging is done according to information in the /etc/syslog.conf file. Messages are directed to log files that are in the /var/log directory.

Using sudo for assigning administrative privilege

Refer page no. 358

Disk Partitions and Sizes

You can view and change your disk partitions using the fdisk command.

Users

User login accounts are listed in the /etc/passwd file. The procedure to see the contents of the file is as follows:

```
# less /etc/passwd
```

The Kernel

The heart of the Linux system is called kernel. Kernel provides the interface between you and the hardware. Information about kernel are stored in the /proc file system.

To display the contents of the /proc files using cat command. Change to the /proc directory, then type the following command:

```
# cat version
```

The output of this command contains the Linux version number and other information.

Files that you can “cat” to get information:

- cpuinfo – Tells you the type of CPU in your computer.
- modules – Shows a list of modules that are currently installed in the system.
- mounts – Displays the file systems that are currently mounted in the system.
- partitions – Contains the names of your hard disk partitions, the number of blocks in each partitions.
- ioports – Shows the I/O port addresses for the devices on your computer.

- `devices` – Displays the devices currently being used on system.
- `pci` – Lists the PCI devices installed in your computer.
- `swap` – Shows the swap partitions that are currently mounted on your system

UNDER CONSIDERATION

Locating commands

If you know where a command is located in your Linux file system, one way to run it is to type the full path to that command. For example, you get the `date` command from the `/bin` directory by typing:

```
$ /bin/date
```

Of course, this can be inconvenient, especially if the command resides in a directory with a long name. The better way is to have commands stored in well-known directories, and then add those directories to your shell's `PATH` environment variable. The path consists of a list of directories that are checked sequentially for the commands you enter. To see your current path, type the following:

```
$ echo $path
```

```
/bin:/user/bin:/usr/local/bin:/usr/bin/x11:/usr/x11R6/bin:/home/chris/bin
```

The results show the default path for a regular Linux user. Directories in the path list are separated by colons. Most user commands that come with Linux are stored in the `/bin`, `/usr/bin`, or `/usr/local/bin` directories. Graphical commands (that are used with GUIs) are contained in `/usr/bin/x11` and `/usr/x11R6/bin` directories. The last directory shown is the `bin` directory in the user's home directory.

If you are the root user, directories containing administrative commands are in your path. These directories include `/sbin` and `/usr/sbin`.

The shell `history` is a list of the commands that you have entered before. Using the `history` command, you can view your previous commands. Then, using various shell features, you can recall individual command lines from that list and change them however you please.