

Red Hat Enterprise Linux 4

Red Hat Enterprise Linux Step By Step Guide



Red Hat Enterprise Linux 4: Red Hat Enterprise Linux Step By Step Guide

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Introduction

Welcome to the *Red Hat Enterprise Linux Step By Step Guide*!

By now, you should have read the *Red Hat Enterprise Linux Installation Guide* and successfully installed Red Hat Enterprise Linux. This manual is designed to help new and intermediate Linux users navigate and perform common tasks. Keep in mind that Linux looks, feels, and performs differently from other operating systems you may have used. Forget about the conventions of other operating systems and, with an open mind, approach Red Hat Enterprise Linux as a new, interesting, and versatile alternative.

This manual is task-oriented. You will find useful tips, hints, warnings, and screen shots interspersed throughout. First, you will learn the basics of using Red Hat Enterprise Linux, such as familiarizing yourself with the desktop, learning to use the shell prompt, and navigating through files and folders. Once the basics are covered, the manual moves on to more advanced topics including setting up an internet connection, configuring a printer, and working with documents.

Most users choose to work within either the GNOME or KDE graphical desktop environments (other desktop environments are also available). The *Red Hat Enterprise Linux Step By Step Guide* focuses primarily on how to perform tasks in these two environments.

Topics discussed include:

- Using the graphical desktop environment
- Managing files and directories
- Working with documents
- Using the Web and email
- Working with a digital camera

After conquering the basics of your Red Hat Enterprise Linux system, you may need information on more advanced topics. You can find this information in the *Red Hat Enterprise Linux System Administration Guide*, the *Red Hat Enterprise Linux Reference Guide*, the *Red Hat Enterprise Linux Introduction to System Administration*, and the *Red Hat Enterprise Linux Security Guide*.

HTML, PDF, and RPM versions of the manuals are available on the Red Hat Enterprise Linux Documentation CD and online at <http://www.redhat.com/docs/>.



Note

Although this manual reflects the most current information possible, read the *Red Hat Enterprise Linux Release Notes* for information that may not have been available prior to our documentation being finalized. The Release Notes can be found on the Red Hat Enterprise Linux CD #1, online at <http://www.redhat.com/docs/>, or in the `/usr/share/doc/redhat-release-4<product>/` directory after installation, where `<product>` is AS, ES, WS, or Desktop.

1. Architecture-specific Information

Unless otherwise noted, information contained in this manual applies only to the x86 processor and processors featuring the Intel® Extended Memory 64 Technology (Intel® EM64T) and AMD64 technologies. For architecture-specific information, refer to the *Red Hat Enterprise Linux Installation Guide* for your respective architecture.

2. Changes to This Manual

This manual was previously published under the title *Red Hat Linux Getting Started Guide*. It has been renamed and incorporated into the Red Hat Enterprise Linux documentation set. It has been modified to include new features in Red Hat Enterprise Linux 4 and to reflect changes in documented procedures that are not supported in Red Hat Enterprise Linux. Changes to this manual include:

Removable Media

The title and contents of this chapter have been changed from *Diskettes and CD-ROMs* to reflect expanded media options: both DVD-ROMs and USB flash drives are now included in this chapter.

Web Browsers

Firefox has replaced **Mozilla** as the default web browser.

Email Applications

Thunderbird has replaced **Mozilla Mail**.

3. Document Conventions

When you read this manual, certain words are represented in different fonts, typefaces, sizes, and weights. This highlighting is systematic; different words are represented in the same style to indicate their inclusion in a specific category. The types of words that are represented this way include the following:

command

Linux commands (and other operating system commands, when used) are represented this way. This style should indicate to you that you can type the word or phrase on the command line and press [Enter] to invoke a command. Sometimes a command contains words that would be displayed in a different style on their own (such as file names). In these cases, they are considered to be part of the command, so the entire phrase is displayed as a command. For example:

Use the `cat testfile` command to view the contents of a file, named `testfile`, in the current working directory.

file name

File names, directory names, paths, and RPM package names are represented this way. This style should indicate that a particular file or directory exists by that name on your system. Examples:

The `.bashrc` file in your home directory contains bash shell definitions and aliases for your own use.

The `/etc/fstab` file contains information about different system devices and file systems.

Install the `webalizer` RPM if you want to use a Web server log file analysis program.

application

This style indicates that the program is an end-user application (as opposed to system software). For example:

Use **Mozilla** to browse the Web.

[key]

A key on the keyboard is shown in this style. For example:

To use [Tab] completion, type in a character and then press the [Tab] key. Your terminal displays the list of files in the directory that start with that letter.

[key]-[combination]

A combination of keystrokes is represented in this way. For example:

The [Ctrl]-[Alt]-[Backspace] key combination exits your graphical session and returns you to the graphical login screen or the console.

text found on a GUI interface

A title, word, or phrase found on a GUI interface screen or window is shown in this style. Text shown in this style is being used to identify a particular GUI screen or an element on a GUI screen (such as text associated with a checkbox or field). Example:

Select the **Require Password** checkbox if you would like your screensaver to require a password before stopping.

top level of a menu on a GUI screen or window

A word in this style indicates that the word is the top level of a pulldown menu. If you click on the word on the GUI screen, the rest of the menu should appear. For example:

Under **File** on a GNOME terminal, the **New Tab** option allows you to open multiple shell prompts in the same window.

If you need to type in a sequence of commands from a GUI menu, they are shown like the following example:

Go to **Applications** (the main menu on the panel) => **Programming** => **Emacs Text Editor** to start the **Emacs** text editor.

button on a GUI screen or window

This style indicates that the text can be found on a clickable button on a GUI screen. For example:

Click on the **Back** button to return to the webpage you last viewed.

computer output

Text in this style indicates text displayed to a shell prompt such as error messages and responses to commands. For example:

The **ls** command displays the contents of a directory. For example:

Desktop	about.html	logs	paulwesterberg.png
Mail	backupfiles	mail	reports

The output returned in response to the command (in this case, the contents of the directory) is shown in this style.

prompt

A prompt, which is a computer's way of signifying that it is ready for you to input something, is shown in this style. Examples:

\$

#

[stephen@maturin stephen]\$

leopard login:

user input

Text that the user has to type, either on the command line, or into a text box on a GUI screen, is displayed in this style. In the following example, **text** is displayed in this style:

To boot your system into the text based installation program, you must type in the **text** command at the **boot:** prompt.

<replaceable>

Text used for examples, which is meant to be replaced with data provided by the user, is displayed in this style. In the following example, <*version-number*> is displayed in this style:

The directory for the kernel source is `/usr/src/kernels/<version-number>/`, where <*version-number*> is the version and type of kernel installed on this system.

Additionally, we use several different strategies to draw your attention to certain pieces of information. In order of how critical the information is to your system, these items are marked as a note, tip, important, caution, or warning. For example:

**Note**

Remember that Linux is case sensitive. In other words, a rose is not a ROSE is not a rOsE.

**Tip**

The directory `/usr/share/doc/` contains additional documentation for packages installed on your system.

**Important**

If you modify the DHCP configuration file, the changes do not take effect until you restart the DHCP daemon.

**Caution**

Do not perform routine tasks as root — use a regular user account unless you need to use the root account for system administration tasks.

**Warning**

Be careful to remove only the necessary partitions. Removing other partitions could result in data loss or a corrupted system environment.

4. Copying and Pasting Text With X

Copying and pasting text is easy using your mouse and the X Window System. To copy text, click and drag your mouse over the text to highlight it. To paste the text somewhere, click the middle mouse button in the spot where the text should be placed.

5. Using the Mouse

Red Hat Enterprise Linux is designed to use a three-button mouse. If you have a two-button mouse, you should have selected three-button emulation during the installation process. If you are using three-button emulation, pressing both mouse buttons at the same time equates to pressing the missing third (middle) button.

In this document, if you are instructed to click with the mouse on something, that means click the left mouse button. If you need to use the middle or right mouse button, that will be explicitly stated. (This will be reversed if you have configured your mouse to be used by a left handed person.)

The phrase "drag and drop" may be familiar to you. If you are instructed to drag and drop an item on your GUI desktop, click on something and hold the mouse button down. While continuing to hold down the mouse button, drag the item by moving the mouse to a new location. When you have reached the desired location, release the mouse button to drop the item.

6. We Need Feedback!

If you spot a typographical error in the *Red Hat Enterprise Linux Step By Step Guide*, or if you have thought of a way to make this manual better, we would love to hear from you! Please submit a report in Bugzilla: <http://bugzilla.redhat.com/bugzilla/> against the component *rhel-sbs*.

When submitting a bug report, be sure to mention the manual's identifier:

`rhel-sbs (EN)-4-Print-RHI (2005-02-16T01:05)`

If you have a suggestion for improving the documentation, try to be as specific as possible when describing it. If you have found an error, please include the section number and some of the surrounding text so we can find it easily.

I. Starting Out

To begin the journey of using your Red Hat Enterprise Linux system, you need to learn the basics. This part introduces the concepts and terms that help you get the most out of Red Hat Enterprise Linux, and learn some of its exciting features. From configuring your system with Setup Agent to using your graphical desktop and the shell prompt, this part helps you get acquainted with your Red Hat Enterprise Linux system.

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Chapter 1.

Getting Started

From booting up to shutting down, whether you are working or playing, Red Hat Enterprise Linux provides tools and applications to help you get the most out of your computing environment. This chapter guides you through some basic tasks that you can perform on your Red Hat Enterprise Linux system.

1.1. Setup Agent



Figure 1-1. Setup Agent

The first time you start your Red Hat Enterprise Linux system, the **Setup Agent** is presented. The **Setup Agent** guides you through the configuration of your Red Hat Enterprise Linux system. Using this tool, you can set your system time and date, add users to your system, install software, register your machine with the Red Hat Network, and more. **Setup Agent** allows you to configure your environment at the beginning, so that you can get started using your Red Hat Enterprise Linux system quickly.



Figure 1-2. License Agreement

The **Setup Agent** first prompts you to read and agree to the License Agreement, which discusses your rights in using Red Hat Enterprise Linux. Click **Yes, I agree to the License Agreement** and click **Next** to continue.

Important

You *must* agree to the License Agreement to continue using Red Hat Enterprise Linux. If you choose **No, I do not agree** at the License Agreement screen, the machine prompts you to either re-read the agreement or decline and shutdown your system. You cannot use Red Hat Enterprise Linux without first agreeing to the License Agreement.

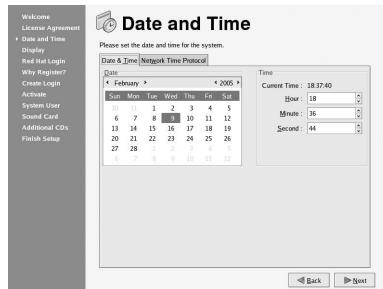


Figure 1-3. Date and Time Configuration

The **Setup Agent** allows you to manually set your machine's date and time, which adjusts the clock on your computer's *BIOS* (Basic Input Output System). To set the day, month, and year on your system, use the calendar interface. To set your time in hours, minutes, and seconds, use the provided text boxes.

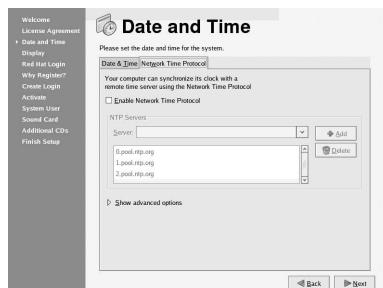


Figure 1-4. Network Time Protocol

You may also synchronize your date and time automatically with a *network time server* — a computer that sends accurate date and time settings to your system through a network connection. Select, the **Network Time Protocol**, check the box labeled **Enable Network Time Protocol**, and use the drop-down menu to select a time server. Once you have set your time and date, click **Next** to continue.



Figure 1-5. Display

Next, configure your display. Red Hat Enterprise Linux auto-detects your monitor and loads the correct driver. If you would like to choose another driver, click on the **Configure...** button and browse the list of available drivers. Select the resolution of your screen and click **Next** to continue.

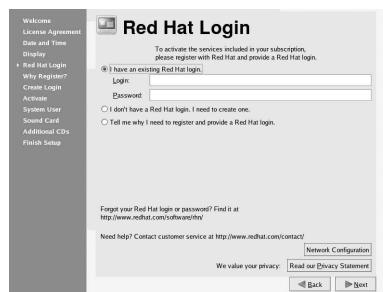


Figure 1-6. Red Hat Network Registration Client

You must register your system with Red Hat Network to continue. Red Hat Network provides automatic updates of your Red Hat Enterprise Linux system, including security updates. If you have already registered with Red Hat Network, enter your account information in the appropriate field. If you have never registered, choose **I don't have a Red Hat login. I need to create one..** Click **Next** — if you need to create a Red Hat login, the **Red Hat Update Agent** launches. After you have entered your Red Hat login information, the **Setup Agent** continues to the next screen.



Figure 1-7. Activation

To activate an existing Red Hat subscription, enter the **Activation Number** in the appropriate field. Otherwise, select **I do not have a subscription number**. Click **Next** to continue.



Figure 1-8. User Account

Next, you should create a user account to use on a routine basis. It is not recommended to log in to your root account for common computing tasks, as you may damage your system or unintentionally delete a file. The **Setup Agent** lets you enter a username, an optional full name for the account, and a password (which you must enter twice). This creates a user account that you can use to log into your Red Hat Enterprise Linux system and which has its own home directory on the system to store files.



Figure 1-9. Sound Card

The **Setup Agent** probes your system for sound cards and attempts to configure the correct settings for use with Red Hat Enterprise Linux. You can then click the **Play test sound** button to play a sound sample. If you can hear the sample, select **OK** and your sound card configuration is complete.



Figure 1-10. Installing Additional Software

To install Red Hat Enterprise Linux RPM packages that you did not install during installation, software from third-party providers, or documentation from the Red Hat Enterprise Linux Documentation CD, you can do so at the **Additional CDs** screen. Insert the CD containing the software or documentation you want to install, click the **Install...** button, and follow the instructions.



Note

If you are installing a package from the Red Hat Enterprise Linux Installation CDs, you must insert CD 1, click the **Install...** button, choose the package(s) or component you want to install, and, *if prompted*, change the CD.



Figure 1-11. Finish Setup

Now that your system is configured, you are ready to log in and start using Red Hat Enterprise Linux. Press **Forward** to exit the **Setup Agent**.

1.2. Introductory Terms

When you learn about a new operating system, you should also learn new terminology. This section defines a few basic terms you should learn. You will see these terms often throughout all Red Hat Enterprise Linux documentation including the Red Hat Enterprise Linux Step By Step Guide:

- **Command:** An instruction given to the computer, most often with the keyboard or mouse.
- **Command line:** The space at the shell prompt where commands are typed.
- **Graphical Desktop:** The most visible area of a GUI. The desktop is where your user **Home** and **Computer** icons are located. You can customize your desktop to have special backgrounds, colors, and pictures to add a personal touch.
- **Graphical User Interface (GUI):** A general term for interactive windows, icons, menus, and panels which allow a user to initiate actions such as starting applications and opening files using a mouse and keyboard.
- **Icons** are small images representing an application, folder, *shortcut* or system resource (such as a diskette drive). **Launcher** icons usually refer to application shortcuts.
- **Man page and Info page:** Man (short for manual) and Info pages give detailed information about a command or file (man pages tend to be brief and provide less explanation than Info pages). For example, to read the man page for the `su` command, type `man su` at a shell prompt (or type `info su` for the info page). To close man or Info pages, press [q].
- **Panel:** A desktop toolbar, located across the top and bottom of your desktop (such as Figure 1-12). The panel contains the **Applications** menu and shortcut icons to start commonly used programs. **Panels** can also be customized to suit your needs.

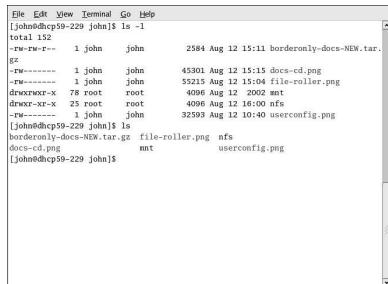


Figure 1-12. The Desktop Panel

- **Root:** Root is an administrative user account created during installation that has complete access to the system.(Root is also known as the superuser.) You must be logged in as root to accomplish certain system administration tasks, such as changing administrative passwords and running system configuration tools. User accounts are created so that typical user tasks can be done without

using the root account, which can reduce the chance of damaging your Red Hat Enterprise Linux installation or applications permanently.

- **RPM:** RPM stands for *RPM Package Manager* and is how Red Hat builds and delivers its software files. An RPM is a software package file you can install on your Red Hat Enterprise Linux computer.
- **Shell prompt:** A command line interface between the user and the operating system (Figure 1-13). The shell interprets commands entered by the user and passes them on to the operating system.



```
[john@dhcp59-229 john]$ ls -l
total 132
-rw-rw-r--  1 john   john      2584 Aug 12 15:11 borderonly-docs-NEW.tar.
prw-r-----  1 john   john      45301 Aug 12 15:15 docs-cd.png
-rw-r-----  1 john   john      55215 Aug 12 15:04 file-roller.png
drwxr-xr-x  25 root   root     4096 Aug 12 2002 mnt
drwxr-xr-x  25 root   root     4096 Aug 12 16:00 nfs
-rw-r-----  1 john   john      32593 Aug 12 10:40 userconfig.png
[john@dhcp59-229 john]$ ls
borderonly-docs-NEW.tar.gz  file-roller.png  nfs
docs-cd.png                mnt              userconfig.png
[john@dhcp59-229 john]$
```

Figure 1-13. A Shell Prompt

- **su and su -:** The command `su` (switch user) gives you access to the root account or other accounts on your system. When you type `su` to switch to your root account while still inside your user account shell, you have access to important system files that you can change (or damage if you are not careful). Logging in with the `su -` command makes you root within the root account shell. *Use caution when you are logged in as root.*
- **X or X Window System:** These terms refer to the graphical user interface environments. If you are "in X" or "running X", you are working in a GUI rather than a console environment.

Although the emphasis throughout this book is on navigation and productivity using the graphical desktop environment, both the graphical and shell prompt methods of logging in and using your Red Hat Enterprise Linux system are discussed for your reference.

1.3. Logging In

The next step to using your Red Hat Enterprise Linux system is to log in. When you log in, you are introducing yourself to the system (also called *authentication*). If you type the wrong user name or password, you will not be allowed access to your system.

Unlike some other operating systems, your Red Hat Enterprise Linux system uses accounts to manage privileges, maintain security, and more. Not all accounts are created equal: some accounts have fewer rights to access files or services than others.



Note

Red Hat Enterprise Linux applications and files are case sensitive, which means that typing `root` refers to a different account than `Root`. By default, `root` refers to the root user (also known as the superuser), or system administrator.

If you have already created and logged in to a user account, you can skip ahead to Chapter 2 *Using the Graphical Desktop*. If you created only the root account, refer to Section 1.6 *Creating a User Account* to learn how to set up a user account.

If you did not create a user account using the **Setup Agent**, you must log in as root. After you create a user account, it is highly recommended that you log in as that user instead of root to prevent accidental damage to your Red Hat Enterprise Linux installation.



Caution

Because your Red Hat Enterprise Linux system creates the root account during installation, some new users are tempted to use only this account for all of their activities. This is a dangerous idea, because the root account is allowed to do anything on the system. You can easily damage your system by accidentally deleting or modifying sensitive system files. You may be tempted to forego creating and using a user account during or after installation, but it is *not* recommended.

1.3.1. Graphical Login

When your system has booted, a graphical login screen is displayed as shown in Figure 1-14. Again, unless you have chosen to give your machine its own hostname, which is primarily used in a network setting, your machine will probably be called `localhost`.



Figure 1-14. The Graphical Login Screen

To log in as root from the graphical login screen, type `root` at the login prompt, press [Enter], type the root password that you chose during installation at the password prompt, and press [Enter]. To log in as a normal user, type your username at the login prompt, press [Enter], type your password that you selected when creating the user at the password prompt, and press [Enter].

Logging in from the graphical login screen automatically starts the graphical desktop for you.

1.3.2. Virtual Console Login

During installation, if you selected an installation type other than Workstation or Personal Desktop and chose text as your login type, you will see a login prompt similar to the following after booting your system:

```
Red Hat Enterprise Linux release 4
```

```
Kernel 2.4.21-3.EL on an i686
```

```
localhost login:
```

Unless you have chosen to give your machine its own hostname, which is primarily used in a network setting, your machine will probably be called `localhost.localdomain`.

To log in as root from the console, type `root` at the login prompt, press [Enter], then type the root password that you chose during installation at the password prompt and press [Enter]. To log in as a normal user, type your username at the login prompt, press [Enter], type your password that you selected when creating the user at the password prompt, and press [Enter].

After logging in, you can type the command `startx` to start the graphical desktop.

1.4. Graphical Interface

When you installed Red Hat Enterprise Linux you had the opportunity to install a graphical environment. Once you start the **X Window System**, you will find a graphical interface known as a *desktop* similar to Figure 1-15. Unless you specified otherwise, Red Hat Enterprise Linux installs GNOME as the default desktop. In this manual, desktop-related tasks will first be explained in relation to GNOME. We will come back to the desktop in Chapter 2 *Using the Graphical Desktop*.

For more information about the KDE desktop, see Appendix A *KDE: The K Desktop Environment*.



Figure 1-15. The Graphical Desktop

1.5. Opening a Shell Prompt

The desktop offers access to a *shell prompt*, an application that allows you to type commands instead of using a graphical interface for all computing activities. While the *Red Hat Enterprise Linux Step By Step Guide* primarily focuses on performing tasks using the graphical interface and graphical tools, it is sometimes useful and faster to perform tasks from a shell prompt. Refer to Chapter 4 *Shell Prompt Basics* for further details.

You can open a shell prompt by selecting **Applications** (the main menu on the panel) => **System Tools** => **Terminal**.

You can also start a shell prompt by right-clicking on the desktop and choosing **Open Terminal** from the menu.

To exit a shell prompt, click the **X** button on the upper right corner of the shell prompt window, type **exit** at the prompt, or press [Ctrl]-[D] at the prompt.

1.6. Creating a User Account

When you first started your Red Hat Enterprise Linux system after installation, you were given the opportunity to create one or more user accounts using the **Setup Agent**. If you did not create at least one account (not including the root account) you should do so now. You should avoid working in the root account for daily tasks.

There are two ways to create new and/or additional user accounts: using the graphical **User Manager** application or from a shell prompt.

To create a user account graphically using the **User Manager**:

1. Select **Applications** (the main menu on the panel) => **System Settings** => **Users & Groups** from the panel.

You can also start the **User Manager** by typing `redhat-config-users` at a shell prompt.

2. If you are not logged in as root, you will be prompted for your root password.
3. The window shown in Figure 1-16 will appear. Click **Add User**.

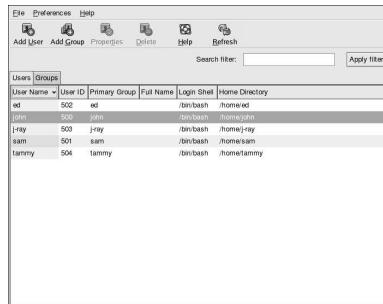


Figure 1-16. The Red Hat User Manager

4. In the **Create New User** dialog box, enter a username (this can be an abbreviation or nickname), the full name of the user for whom this account is being created, and a password (which you will enter a second time for verification). The name of this user's home directory and the name of the login shell should appear by default. For most users, you can accept the defaults for the other configuration options. Refer to the *Red Hat Enterprise Linux System Administration Guide* for details about additional options.
5. Click **OK**. The new user will appear in the user list, signaling that the user account creation is complete.

To create a user account from a shell prompt:

1. Open a shell prompt.
2. If you are not logged in as root, type the command `su -` and enter the root password.
3. Type `useradd` followed by a space and the username for the new account you are creating at the command line (for example, `useradd jsmith`). Press [Enter]. Often, usernames are variations on the user's name, such as `jsmith` for John Smith. User account names can be anything from the user's name, initials, or birthplace to something more creative.
4. Type `passwd` followed by a space and the username again (for example, `passwd jsmith`).
5. At the `New password:` prompt enter a password for the new user and press [Enter].

6. At the `Retype new password:` prompt, enter the same password to confirm your selection.



Important

You should take precautions when you choose a password. The password is the key to your account, so it should be both unique and easy for you to remember. Your password should be at least six characters. You can use both uppercase and lowercase letters, as well as numbers and characters. Avoid easy selections, such as `qwerty` or `password`. If you want to pick an easy-to-remember but somewhat unique password, consider a variation of a word, such as `a1rPl4nE` for `airplane`.

1.7. Documentation and Help

There are several resources available to get the information you need to use and configure your Red Hat Enterprise Linux system. Along with the Red Hat Enterprise Linux documentation there are *manual pages*, documents that detail usage of important applications and files; *Info pages* which break information about an application down by context-sensitive menus; and *help files* that are included in the main menubar of graphical applications. You can choose any method of accessing documentation that best suits your needs, as all of these resources are either already installed on your Red Hat Enterprise Linux system or can be easily installed.

1.7.1. Manual Pages

Applications, utilities, and shell prompt commands usually have corresponding manual pages (also called man pages) that show the reader available options and values of file or executable. Man Pages are structured in such a way that users can quickly scan the page for pertinent information, which is important when dealing with commands that they have not previously encountered.

1.7.1.1. Using `man`

Man Pages can be accessed via shell prompt by typing the command `man` and the name of the executable. For example, to access the man page for the `ls` command, type the following:

```
man ls
```

The **NAME** field shows the executable's name and a brief explanation of what function the executable performs. The **SYNOPSIS** field shows the common usage of the executable, such as what options are declared and what types of input (such as files or values) the executable supports. The **DESCRIPTION** field shows available options and values associated with a file or executable. **See Also** shows related terms, files, and programs.

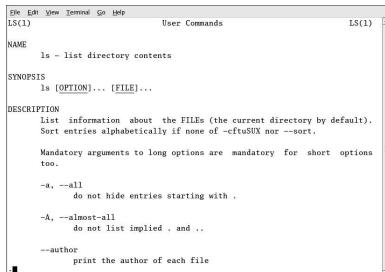


Figure 1-17. Reading a Man Page with the Shell Prompt

To navigate the man page you can use the "arrow" keys or use the [Spacebar] to move down one page and [B] to move up. To exit the man page, type [Q].

To search a man page for keywords type [/] and then a keyword or phrase and press [Enter]. All instances of the keyword will be highlighted throughout the man page, allowing you to quickly read the keyword in context.

1.7.1.2. Printing a Man Page

Printing man pages is a useful way to archive commonly used commands, perhaps in bound form for quick reference. If you have a printer available and configured for use with Red Hat Enterprise Linux (refer to the *Red Hat Enterprise Linux System Administration Guide* for more information), you can print a man page by typing the following command at a shell prompt:

```
man command | col -b | lpr
```

The example above combines separate commands into one unique function. `man command` will output the contents of the `command` man page to `col`, which formats the contents to fit within a printed page. The `lpr` command sends the formatted content to the printer.

1.7.1.3. The `man` Man Page

Just like other commands, `man` has its own man page. Type `man man` at the shell prompt for more information.

1.7.2. Red Hat Enterprise Linux Documentation

If you have the Red Hat Enterprise Linux boxed set, remember to take a look at the Red Hat Enterprise Linux Documentation CD. All of the Red Hat Enterprise Linux manuals are on this CD. Individual downloads of our documentation in HTML, RPM, PDF, and compressed *tarball* format (*.tar.gz*) are also available at <http://www.redhat.com/docs/>. Once you have logged in to your user account, inserting the Documentation CD in your CD-ROM drive should automatically start the **Package Management Tool** and allow you to install any of the Red Hat Enterprise Linux documentation. Follow the instructions and choose the documentation you would like to install.

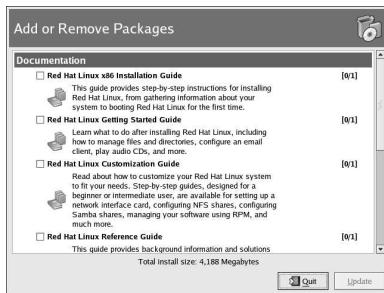


Figure 1-18. Package Management Tool Displaying Documentation Available for Installation

If you have downloaded individual documentation RPM packages from the Red Hat website at <http://www.redhat.com/docs/> you can install these manuals from a shell prompt. Open a shell prompt, and type the following at the command line:

```
su -
```

Press [Enter]. You will be asked for your root password. Enter the password at the prompt and press [Enter]. You are now logged in as root. To install all of the Red Hat Enterprise Linux manuals, change to the directory that contains the RPM files and type the following:

```
rpm -ivh rhl-* .rpm
```

Press [Enter].

To install only certain manuals, replace `rhl-* .rpm` with the full file name of the manual that you want to install. For example, the file name for the *Red Hat Enterprise Linux Step By Step Guide* will look something like `rhl-gsg-en-4.noarch.rpm`, so you would type the following to install it on your system:

```
rpm -ivh /mnt/cdrom/rhl-gsg-en-4.noarch.rpm
```

Press [Enter]. Type **exit** at the command line and press [Enter]. This logs you out of the root account and back to your user account.

1.8. Logging Out

1.8.1. Graphical Logout

To log out your graphical desktop session, select **Actions (the second menu on the top panel) => Log Out**.

When the confirmation dialog appears as shown in Figure 1-19, select the **Logout** option and click the **OK** button. To save the configuration of your desktop, as well as any programs which are running, check the **Save current setup** option.



Figure 1-19. Logout Confirmation

1.8.2. Virtual Console Logout

If you are not using the X Window System, and you logged in at the console, type `exit` or [Ctrl]-[D] to log out of the console session.

1.9. Shutting Down your Computer

Before turning off your computer, it is important to properly shut down Red Hat Enterprise Linux. *Never* turn your computer off without shutting down first, as you may lose unsaved data or damage your system.

1.9.1. Graphical Shutdown

If you are in the graphical desktop, log out of your session as described in Section 1.8 *Logging Out*. From the graphical desktop logout screen shown in Figure 1-19, select **Shutdown** and click **OK** to confirm.

Some computers automatically turn the power off after shutting down Red Hat Enterprise Linux. If your computer does not, you can safely turn off the power to your computer after you see the message:

Power down.

1.9.2. Virtual Console Shutdown

To shutdown your computer at a shell prompt, type the following command:

```
halt
```

Some computers automatically turn the power off after shutting down Red Hat Enterprise Linux. If your computer does not, you can safely turn off the power to your computer after you see the message:
`System halted.`

Chapter 2.

Using the Graphical Desktop

Red Hat Enterprise Linux includes a powerful graphical desktop environment where you can easily access your applications, files, and system resources. Both new and experienced users can take full advantage of their Red Hat Enterprise Linux systems using the graphical desktop.

This chapter covers the fundamentals of the desktop and how to configure it for your needs.

2.1. Using Nautilus

Your first view of the graphical desktop looks something like Figure 2-1. The desktop offers the following tools, represented as desktop icons: **Computer**, **User's Home**, and **Trash**. Each of these tools is an application of the **Nautilus** file manager.



Figure 2-1. The Graphical Desktop

Nautilus provides a graphical display of your system and personal files. **Nautilus** is designed to be much more than a visual listing of files, however. It allows you to configure your desktop, configure your Red Hat Enterprise Linux system, browse your photo collection, access your network resources and more — all from one integrated interface. In essence, **Nautilus** becomes a shell for your entire desktop experience.

Working in **Nautilus** provides an alternative to using a shell prompt to navigate the file system. The following sections explain how to use **Nautilus** to enhance your desktop experience.

2.1.1. Using the Computer icon

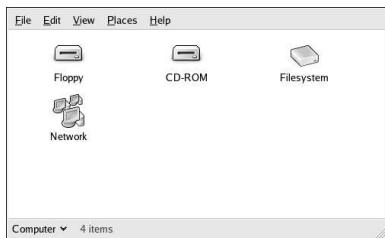


Figure 2-2.

Double-clicking the **Computer** icon takes you to a list of all of the *devices* on your system. A device is anything connected to your computer to which data is sent or from which it is received. (You have probably heard of a 'device driver' before - this is a piece of software that allows a device to talk to your computer.) Most modern systems have the following devices: a floppy drive, a CD-ROM drive, and at least one hard drive. Other devices may be listed depending on the makeup of your system.

Removable Media

Double-click either the **Floppy** icon or the **CD-ROM** icon to mount the drive with **Nautilus** and open a new window with the drive's contents. You can also right-click on the drive and then select **Mount Volume** from the menu. Note: you must first unmount a floppy before you eject it. Refer to Chapter 13 *Diskettes and CD-ROMs* for more information.

Disk

This references the hard drive. If you are using Linux, your hard drive is already mounted, and may not be accessible from this window. If you have other hard drives available on your system (possibly used for other operating systems), they may be mountable here.

Filesystem

Double-click on the **Filesystem** icon and **Nautilus** opens a window that shows the entire file system, starting from the / directory. This is a quick way to reach such useful folders as /tmp/ and /usr/bin/. If you are not logged in as root, some folders will be unavailable. This is to prevent accidental damage to your system.

Network

Double-click the **Network** icon to bring up a list of all systems on your network. Linux systems are listed individually. Systems running other operating systems are grouped under an icon that reflects this. (For example, **Windows** systems on your network appear under a **Windows Network** icon.) You are only able to browse those machines you have permission to access.

2.1.2. User's Home



The tool associated with the icon is referred to as **User's Home** in this manual. The label

under the icon varies according to your user name. If you are logged in as root, the label reads **root's Home**. User "joe" would see the label **joe's Home**.

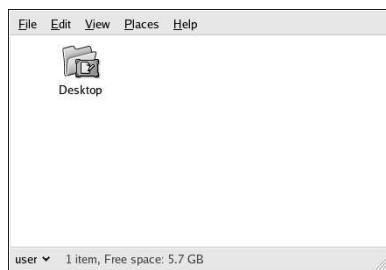


Figure 2-3. User's Home

Double-clicking on the **User's Home** icon allows you to navigate through your home directory or the rest of the file system.

The browser window opens in icon view. The icons are designed to allow easy recognition of file types; directories are represented by folders, music files have musical notes, and so on. **Nautilus** automatically sorts your files by name and arranges them neatly. When you open a directory it opens in a new browser window.

To move a file from one directory to another, drag and drop the file into the new location, or cut and paste it. Note that in **Nautilus**, dragging and dropping a file moves it rather than placing a copy in the new location. If you wish to copy a file instead, right-click on the icon, select **Copy**, and paste the file in the new directory.

Most of these settings can be configured to meet your preferences. (Refer to Section 2.1.4 *Customizing Nautilus* for more information.)

2.1.3. Trash

Nautilus includes a **Trash** icon similar to that of other operating systems; files inside the **Trash** are not deleted until you choose to do so. The **Trash** bin can be opened by double-clicking on the desktop icon. It opens as a **Nautilus** window, which allows you to easily move files in and out. To empty the **Trash**, right-click on the desktop icon and select **Empty Trash Bin**.

2.1.4. Customizing Nautilus

You can also change the way **Nautilus** behaves. To do so, select **Edit => Preferences** from an open **Nautilus** window. A new configuration window opens with many customization options. These customization options are categorized by the tabs at the top of the window.

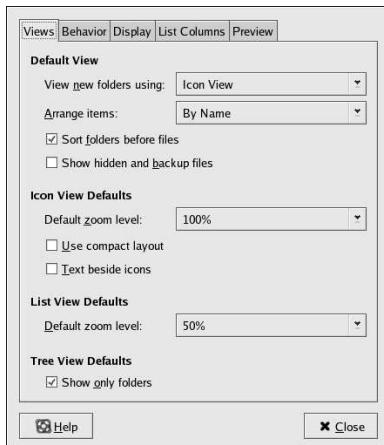


Figure 2-4. Customizing Nautilus - View Tab

Views Tab

The **Views** tab allows you to choose how your files and folders are displayed. You can also choose a **Default Zoom Level**. Zooming in on icons not only increases the size of the icons, but adds to the displayed information about each file or folder.

Behavior Tab

The **Behavior** tab allows you to specify that **Nautilus** should **Always open in browser windows**. If you check this option, opening a folder displays the directory's contents in the current window. This behavior may be more familiar to those users accustomed to using the **Start Here** icon. You can also choose to include a delete option that bypasses the **Trash** bin.

Display Tab

The **Display** tab features a series of drop-down boxes listing various file details. Selecting these options sets the order in which these details appear as you zoom in. You can also set the format for dates and times within **Nautilus**.

(This only changes the time format for **Nautilus**. To change the date and time format of the clock on the **Panel**, right-click on it and choose **Preferences**.)

List Columns Tab

The **List Columns** tab allows you to select which details are shown when folder contents are displayed as a list. If you click on the description of a detail, you can then change the order in which it is displayed by clicking **Move Up** or **Move Down**.

Preview Tab

The **Preview** tab allows you to select the types of files that are *previewed* by **Nautilus**. For text files, this means that part of the text is visible on the icon. For image files, this means that **Nautilus** displays a *thumbnail* (or scaled-down view) of the file. For sound files, **Nautilus** plays the sound while your mouse pointer hovers over the file. If **Nautilus** seems to be sluggish on your machine, try turning these resource-intensive features off to increase the speed.

2.2. Using the Desktop

Other icons on the desktop can be shortcuts to files, folders, and application launchers. To open a folder or launch an application, double-click on its icon.



Figure 2-5. The Graphical Desktop

2.2.1. Adding Application Launchers

Some users prefer to access favorite applications directly from the **Desktop**, rather than hunting through menus. To do this, you must create an application launcher. There are several ways to go about this:

- Applications can be dragged and dropped from the Main Menu onto the desktop.
- Applications can be dragged and dropped from the Panel to the desktop.
- Application launchers can be created manually.

Creating a launcher manually can be tricky. In most cases, it is best to drag and drop an application from the **Applications** or the **Panel**.

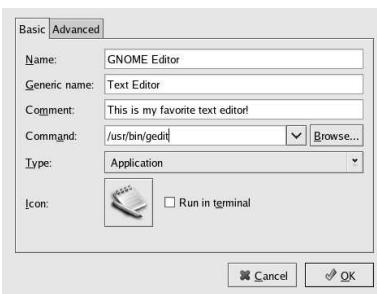


Figure 2-6. Launcher window with gedit information

To manually create an application launcher:

1. First, you must know the name of the application for which you are creating a launcher. For the purpose of this example, assume the application is **gedit**.
2. Next, locate the application. Use the `which` command from a shell prompt to locate the executable file for the application. Refer to Section 4.7.3 *Which, whereis, whatis* for more information on the `which` command.
3. Right-click on a blank area of the desktop and choose **Create Launcher**.
4. When the dialog opens, fill in the following fields:
 - **Name:** Enter a name for the launcher. For this example, a good name would be "GNOME Editor".
 - **Generic Name:** (Optional) Enter the type of program. For this example, "Text Editor" is appropriate.
 - **Comment:** (Optional) Enter a short piece of information about the launcher - this text is displayed when your mouse hovers over the icon on your desktop. For this example, use "This is my favorite text editor!"
 - **Command:** Enter the results of the `which` command (ex: `/usr/bin/gedit`).
 - **Type:** Choose the type of launcher to create. Choose **Application** in this case.
 - **Icon:** Click on the **No Icon** button to choose the icon for your launcher. You can either pick one of the icons it suggests, or browse the `/usr/share/icons` directory to select another. Click the **OK** button to save your selection.
 - Click **OK**.
5. This places the launcher on your desktop. Double-clicking the new icon launches the application.

2.2.2. Adding File Links

To place a link to a file or directory on the desktop:

1. Open **User's Home** and navigate to the appropriate directory.
2. Right-click on the icon of the file or directory and select **Make Link**. This creates a new icon with the phrase "link to ..." in its name.
3. Drag and drop this new icon to the desktop. If you were to drag and drop the actual file or directory, you would move it from its current location to the desktop.



Figure 2-7. Example of a link to a file

2.3. Using the Panel

The long gray bars across the top and bottom of the screen are the **Panels**.

The top **Panel** contains both the **Applications** and **Actions** menus. It also contains application launchers, the notification area, and the time and date.



Figure 2-8. The Top Panel

The bottom **Panel** contains the **Workspace Switcher** and the **Taskbar**.

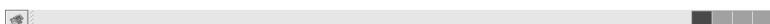


Figure 2-9. The Bottom Panel

Both can contain *applets* - small applications that generally run only on the panel. Applets handle simple tasks like controlling sound volume and displaying the status of your system.

The **Panels** are independently configurable. To alter the default settings, right-click in an unused area of the **Panel** you wish to alter and select **Configure Panel**. This allows you to change the color, size, and position of the **Panel**. You may also choose to hide the **Panel** automatically or manually. If you choose to hide the **Panel**, it does not appear on the desktop until your mouse pointer hovers over the **Panel** area.

Application launchers may be moved between the **Panel** and the **Desktop**. Dragging and dropping application launchers from the **Desktop** to the **Panel** (or from the **Panel** to the **Desktop**) creates a copy of the launcher in the new location rather than moving it. In general, applets may not be copied from the **Panel** to the **Desktop**.

2.3.1. Standard Applets

There are a few applets that run on the panels by default. These important applets are covered in the following sections.

2.3.1.1. Workspace Switcher



Figure 2-10. The Workspace Switcher

The graphical desktop allows for the use of multiple *workspaces*. Workspaces are virtual desktops — each workspace has the same background, panel, and desktop shortcuts. Using the workspaces allows you to separate your applications and avoid a cluttered desktop area. Using workspaces can also organize your work flow. For example, some users will choose one workspace for potential distractions like email and instant messengers and choose another workspace for their office applications. This allows them to ignore the distractions until they are ready for a break.

The **Workspace Switcher** represents the workspaces as small squares and shows the applications running on each. Clicking on one of the squares moves you to that desktop. By right-clicking on the **Workspace Switcher** and choosing **Preferences**, you can configure your workspaces. You can have up to thirty-six, although few people use that many. You may also want to name your workspaces. Double-click on any of the **Workspace names** and type in the new name. Click the **OK** button to save your changes and exit.

2.3.1.2. Taskbar



Figure 2-11. The Taskbar

Next to the **Workspace Switcher** is the **Taskbar**. The **Taskbar** is an applet that shows you the titles of running applications on any one virtual desktop. This is helpful if you decide to minimize an application, as it seems to disappear from the desktop. Once it disappears, you can bring it back by clicking on its title in the Taskbar.

2.3.1.3. Notification Area



If you cannot see any of the notification icons, then the notification area was removed from the desktop panel. To add it back to your panel, right-click on the panel and choose **Add to Panel...**. When the new window opens, select **Notification Area**.

Red Hat Network Alert Notification Tool

Part of the **Notification Area**, the **Red Hat Network Alert Notification Tool** provides you with an easy way to make sure your system is up-to-date with current errata and security updates from Red Hat Network. The applet displays different icons to indicate whether your system is fully updated: a red exclamation point indicates that there are updates available, and a green check mark indicates that your system is up-to-date. Double-click on either icon to launch the **Red Hat Update Agent**. If you are not registered with Red Hat Network, the registration component launches. Right-click on the applet icon for a list of options from which to choose.

If the icon is missing from the **Notification Area**, open the **Applications** menu and select **System Tools => Red Hat Network Alert Icon**.

The Authentication Icon

The key icon that is sometimes displayed in the **Notification Area** is a security notification. It is displayed whenever you have gained root authentication for your system (such as running a graphical system configuration tool). It disappears when the authentication times out.

Printer Notification Icon

The **Printer Notification Icon** allows you to manage your print jobs. Click on the icon to view running print jobs, and cancel jobs by right-clicking on the job and selecting **Cancel**. The **Printer Notification Icon** only appears during an active print job. If the print job you have is small, you may not see the icon appear.

2.3.2. Adding Applets and Application Launchers



Figure 2-12. A list of applets and applications for the Panel

You may add more applets and launcher icons to either **Panel** in order to suit your needs. Right-click in an unused area of a **Panel** and select **Add to Panel**. This opens a window that allows you to choose either an applet or an application launcher. Clicking once on an icon navigates through the list of applications, and double-clicking adds an application to the panel. Figure 2-13 shows the **Panel** with the **Weather Report** added to show the current local weather and temperature.



Figure 2-13. The Weather Report Applet on the Panel

Individual applets may also be configured. By right-clicking on any applet icon on the **Panel**, you are given a short menu that includes **Preferences**. These preferences are different for each applet.

2.3.3. Configuring the Panel

You can hide the panel automatically or manually, place it on any edge of your desktop, change its size and color, and change the way it behaves. To alter the default panel settings, right-click in an unused area of the panel and select **Properties**. If you choose to hide the panel, it does not appear on the desktop until you move your mouse pointer over the panel area.

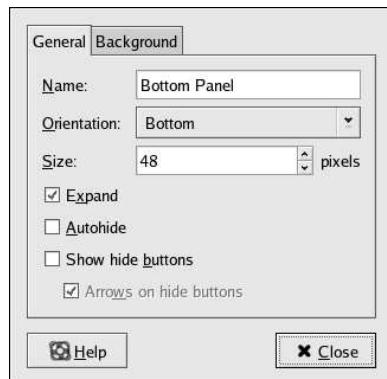


Figure 2-14. Configuration Dialog for the Panel

2.3.4. Adding Additional Panels



Figure 2-15. The Desktop with two additional Panels

It may at times be convenient to have additional **Panels**. It is easy to add as many panels to your desktop as fits on the screen. Right-click on an unused area of the existing panel and choose **New Panel**. A blank panel is placed on the **Desktop**. Once it has been created, the steps above allow you to configure it and to place on it whatever applets and applications you like.

2.4. Using the Applications and Actions Menus

On the top panel are two menus, the **Applications** menu and the **Actions** menu. The **Applications** menu expands into a large set of menus that allow you to access the applications on your system. The **Actions** menu expands into a list of actions you can perform on your session.

2.4.1. The Applications Menu

The categories of the **Applications** menu are self-explanatory. For example, the **Games** sub-menu holds games like **Same GNOME**; the **Sound and Video** sub-menu holds CD players, volume controls, and the **Helix** media player. For these directories, a few moments spent browsing the contents is sufficient to familiarize yourself with your system. A few sub-menus are worth additional explanation:

Preferences

Preferences contains applications that allow you to customize your system. Most of the applications in this sub-menu do not require root privileges to access. Refer to Section 2.5 *Customizing your GNOME session* for more information about customizing your **GNOME** session.

System Settings

System Settings contains higher-level configuration tools. Most of the applications in this sub-menu require root privileges to access. You should use caution when using these applications. For details on these applications, refer to the Red Hat Enterprise Linux System Administration Guide.

- **Date & Time:** This tool allows you to set the date, time, and timezone for your system.

- **Printing:** The **Printer Configuration Tool** allows you to add a new printer to your system, whether it is connected to your computer or is available on a network.
- **Soundcard Detection:** The **Sound Card Configuration Tool** tool probes your system for available sound devices. Refer to Section 10.3 *Troubleshooting Your Sound Card* for more details on configuring your sound hardware.
- **Users and Groups:** The **User Manager** tool allows you to add and remove users from your system. Refer to Section 1.6 *Creating a User Account* for details.

System Tools

System Tools contains applications for utilizing and maintaining your system. This sub-menu includes the **Terminal** application, the **Floppy Formatter**, and other applications discussed elsewhere in this manual.

2.4.2. The Actions Menu

The **Actions** menu contains tasks you will most likely execute on a daily basis. These include: **Lock screen**, **Log Out**, and **Search for Files....**

Lock screen

This action starts a password-protected screen saver. You must enter your password to return to the normal desktop.

Search for Files...

This action opens a **Nautilus** window that allows you to search for files according to letters in the name of the file.

Log Out

This action opens the **Log Out** dialog window, which terminates your **GNOME** session.

2.5. Customizing your GNOME session

The **Preferences** sub-menu of the **Applications** menu offers many customization options for your **GNOME** session. Below are some of the highlights.

2.5.1. Configuring your Background

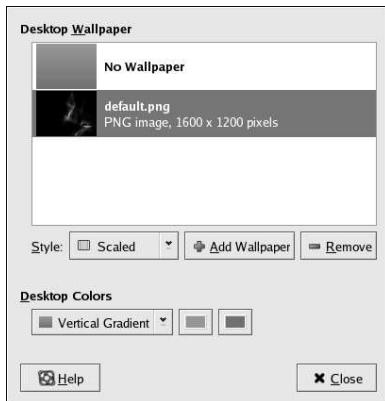


Figure 2-16. The Desktop Background Preferences tool

One way to dramatically alter the appearance of your graphical desktop is to change the background using the **Desktop Background Preferences** tool. You can choose from several background images included with Red Hat Enterprise Linux in the `/usr/share/backgrounds/` directory, or you can use your own image. To start the **Desktop Background Preferences** tool, right-click on the desktop and choose **Change Desktop Background** from the menu.

The **Desktop Background Preferences** tool allows you to load a background from a directory of provided images (`/usr/share/backgrounds/images/`). To add images to the list of available backgrounds, you can either drag them from your directory into the list (which does not move the file) or you can click the **Add Wallpaper** button and select image files on your system.

There are several ways to display your images. The **Tiled** option displays multiple instances of your image across the desktop, which is useful if you use a small image or if you use a tile (or pattern) image from `/usr/share/backgrounds/tiles/` (or from your own image collection). The **Centered** option places your image in the center of the desktop, leaving the default background colors to fill in any remaining desktop space. To fill the desktop with an image without tiling it, use the **Scaled** or **Stretched** options.

To create a background with your own custom colors and no images, choose the **No Wallpaper** option and adjust your colors below **Desktop Colors**. You can choose either a solid color or a gradient of two colors. Clicking on the color buttons allows you to change the colors. Click **Close** to save and exit the **Background Preferences** tool.



Figure 2-17. The Desktop with a new background

2.5.2. Keyboard Shortcuts

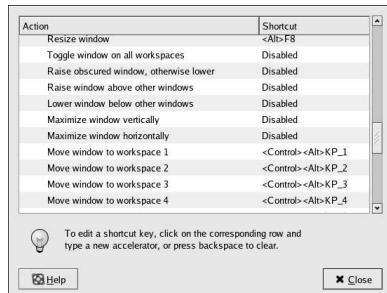


Figure 2-18. The Keyboard Shortcuts application

You can create keyboard shortcuts — pressing a combination of keys on the keyboard — to perform actions within an application or on your desktop. Open the **Keyboard Shortcuts** application from the **Applications => Preferences** sub-menu. The application provides a list of every action to which you can assign a shortcut. It might be helpful to spend a few moments looking at the default shortcuts; using them can be a great time-saver. Scroll through the list until you find the action you would like to assign a shortcut. Click once on the description of the action, and then press the keystrokes that you would like to use as a shortcut.

To create a keyboard shortcut to switch between workspaces by pressing [Ctrl]-[Alt] and workspace number:

1. Click on **Switch to workspace 1**
2. Press [Ctrl]-[Alt]-[1].
3. The **Keyboard Shortcut** application records that these were the keys pressed, and lists that under the **Shortcut** column. (The application notifies you if the keystrokes you have chosen are already used for another action.)
4. Repeat this process for workspaces 2-4, assigning each of them similar keystrokes.
5. Close the **Keyboard Shortcuts** application to save your changes.

6. Pressing [Ctrl]-[Alt]-[2] at any time takes you to Workspace 2. Likewise, pressing [Ctrl]-[Alt]-[3] takes you to workspace 3, [Ctrl]-[Alt]-[4] takes you to workspace 4, and [Ctrl]-[Alt]-[1] takes you back to workspace 1.

2.5.3. Sound

The **Sound** preference tool allows you to set sounds to accompany events. For example, your system can play a certain sound every time you login. When you first open this tool, you should see a series of tabs across the top of the window. Under the **General** tab, check that the **Enable sound server startup** box is checked.

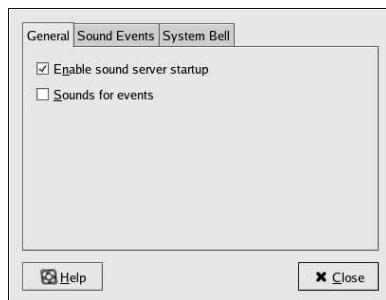


Figure 2-19. The Sound Configuration tool

Click on the **Sound Events** tab, to display a list of actions that can be accompanied by a sound. To change or add a sound to an event, click on the description of the event, then click on the **Browse...** button. Choose a sound located in the file system, and then click **Open**. Sound files installed with Red Hat Enterprise Linux are located in `/usr/share/sounds/`. You may also choose a sound file from your home directory. Any file with a .wav extension can be used for an event sound. To listen to a sound that has been selected, click the **Play** button. (If you do not hear a sound, follow the steps in Section 10.3 *Troubleshooting Your Sound Card*.) When you are finished, close the **Sound** tool, and your changes are saved.

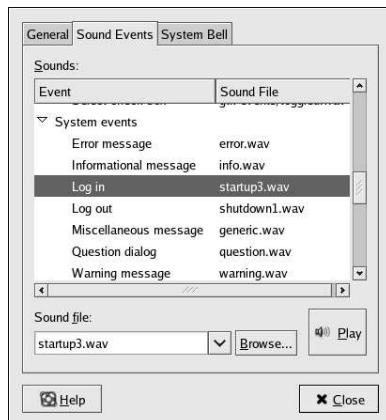


Figure 2-20. Selecting sounds to accompany events

2.5.4. Screensaver

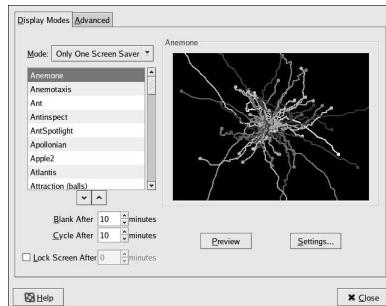


Figure 2-21. The screensaver tool

Double-click the **Screensaver** icon to launch the **Screensaver Preferences** tool. The list on the left displays the available screensavers. Nearly all screensavers can be customized by clicking on the **Settings...** button. To see if this is the screensaver you would like to use, click on the **Preview** button. When you have seen enough, click the mouse anywhere on the screen and you will return to **Screensaver Preferences**. When you are finished, close the window to save your changes and exit.

2.5.5. Removable Storage

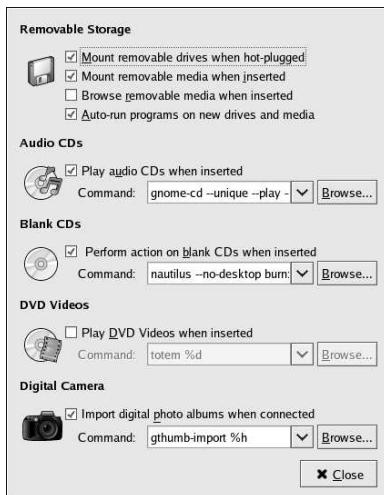


Figure 2-22. Options for usage of removable storage

Launch the **Removable Storage** tool from the **Applications => Preferences** sub-menu. The application opens a list of options for the way your system handles removable storage media such as floppy diskettes and CD-ROMs. One default option is *auto-mounting*. Auto-mount means that the data on your removable media is automatically available a few moments after you insert it; manual mounting is not necessary. For more information on removable media, refer to Chapter 13 *Diskettes and CD-ROMs* or the *Red Hat Enterprise Linux System Administration Guide*.

2.6. Logging Out

To exit your **GNOME** session, choose **Log Out** from the **Actions** menu. You are presented with the choice of logging out (leaving the system running), restarting the machine, or halting the system completely. To quit the graphical desktop, select the **Log Out** radio button and click **OK**.

2.7. Switching Desktops

Switching desktops refers to switching between **GNOME** and **KDE**. There are slight differences in the look and feel of these two graphical desktops. Choose the desktop that best suits your preferences.

There are two ways to switch desktops. You can either switch for a single session or use the **Desktop Switching Tool** to change your default desktop.

To login with a different desktop for a single session:

1. Select **Session** from the menu at the bottom left of the login screen. A window appears with a list of several different desktop environments.
2. Choose one, and select **OK**.
3. Enter your login and password as usual. A dialog box appears, warning you that this change is for the current session only.
4. Click **OK** to continue.

To change the default desktop for your system:

1. From the **Applications** menu, select **Preferences => Desktop Switching Tool**.
2. Select from the list of available desktops and click **OK**. A dialog box opens confirming that the changes were successful.
3. In order for the changes to take place, you must restart your X Window System. The easiest way to accomplish this is to log out of X and log back in. Log out of the graphical desktop, then log back in.

Chapter 3.

Managing Files and Directories

This chapter explores the general format of your Red Hat Enterprise Linux file system. It bridges the differences between using **Nautilus** to manage the files on your system and using a shell prompt to manage them. It does not go into the minute details of using a shell prompt; those will be covered in Chapter 4 *Shell Prompt Basics*. This chapter orients you to the system as a whole, and then you can choose which method of management you prefer.



Note

Due to system security, unless you are root, you are not allowed to gain access to all system-level files and directories. If you do not have the permission to open, delete, or execute a file, an error message is displayed showing your access has been denied. This is normal behavior and is used to prevent non-privileged users from modifying or deleting important system files.

3.1. File System Terms

Below are a few terms to know before we begin our discussion of the file system.

extension

An extension is that part of a filename that is found after the final ". ". In the filename `foo.txt` "`.txt`" is the file's extension. Extensions are used to indicate file type.

path

A path is the string of directories and sub-directories you would have to navigate through in order to reach a given location in the file system.

root access (or root privileges)

To have root access means to be logged in using the root account. This can be done from the main login screen, a shell prompt, or any application that requires your root password. Root access means that the user has permission to do *anything* on the system, so use root access with care.

root directory

The root directory is the top-most directory of the file system. All other files and directories exist in this directory or one of its sub-directories. Do not confuse the root directory, `/`, with root's home directory, `/root/`.

3.2. A Larger Picture of the File System

Every operating system has a method of storing data in files and directories so that it can keep track of additions, modifications, and other changes. In Red Hat Enterprise Linux, every file is stored in a directory. Directories can also contain directories: these *subdirectories* may also contain files and other subdirectories.

You might think of the file system as a tree and directories as branches. There would be no tree without a root, and the same is true for the Red Hat Enterprise Linux file system. No matter how far away the directories branch, everything is connected to the root directory, which is represented as a single forward slash (/).



Tip

Red Hat Enterprise Linux uses the term *root* in several different ways, which might be confusing to new users. There is the root account (the superuser, who has permission to do anything), the root account's home directory (`/root`) and the root directory for the entire file system (`/`). When you are speaking to someone and using the term *root*, be sure to know which root is being discussed.

3.2.1. Paths

To continue the tree analogy from Section 3.2 *A Larger Picture of the File System*, imagine navigating the file system as climbing around in the branches of the tree. The branches you would climb and traverse in order to get from one part of the tree to another would be the *path* from one location to another. There are two kinds of paths, depending on how you describe them. A *relative path* describes the route starting from your current location in the tree. An *absolute path* describes the route to the new location starting from the tree trunk (the root directory).

Graphic file browsers like **Nautilus** use an absolute path to display your location in the file system. At the top of a **Nautilus** browser window is a location bar. This bar indicates your current location starting with a forward slash (/) — this is an absolute path. You can navigate the file system by entering the absolute path here. Press [Enter] and **Nautilus** moves immediately to the new location without navigating through the intervening directories one at a time.

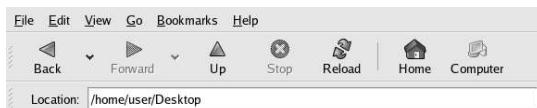


Figure 3-1. The Nautilus location bar

Navigating via the shell prompt utilizes either relative or absolute paths. In some instances, relative paths are shorter to type than absolute paths. In others, the unambiguous absolute path is easier to remember.

There are two special characters used with relative paths. These characters are `.` and `..`. A single period, `.`, is shorthand for "here". It references your current working directory. Two periods, `..`, indicates the directory one level up from your current working directory. If your current working directory is your home directory, `/home/user/`, `..` indicates the next directory up, `/home/`.

Consider moving from the `/usr/share/doc/` directory to the `/tmp/` directory. The relative path between the two requires a great deal of typing, and requires knowledge of the absolute path to your current working directory. The relative path would look like this: `../../../../tmp/`. The absolute path is much shorter: `/tmp/`. The relative path requires you to move up three directories to the `/` directory before moving to the `/tmp/` directory. The absolute path, which always starts at the `/` directory, is much simpler.

However, the relative path between two closely-related directories may be simpler than the absolute path. Consider moving from `/var/www/html/pics/vacation/` to

/var/www/html/pics/birthday/. The relative path is: `../birthday/`. The absolute path is: `/var/www/html/pics/birthday/`. Clearly, the relative path is shorter in this case.

There is no right or wrong choice: both relative and absolute paths point to the same branch of the tree. Choosing between the two is a matter of preference and convenience. Remember, the **Nautilus** location bar does not recognize the `..` symbol — you must use an absolute path.

3.3. Managing Files

If you are new to Linux, file names may look strange to you. Linux file names may include extensions you haven't seen before, may have multiple extensions, or may not have any at all. File names may begin with a `.` or may have other symbols in their names, including spaces. Below are some guidelines regarding file names in Linux.

3.3.1. File Types

Below are the most common file types in Red Hat Enterprise Linux.

3.3.1.1. Compressed and Archived Files

- `.bz2` — a file compressed with `bzip2`
- `.gz` — a file compressed with `gzip`
- `.tar` — a file archived with `tar` (short for *tape archive*), also known as a *tar file*
- `.tbz` or `.tar.bz` — a tarred and bzipped file
- `.tgz` or `.tar.gz` — a tarred and gzipped file
- `.zip` — a file compressed with ZIP compression, commonly found in MS-DOS applications; most compressed files for Linux use the `gzip` compression, so finding a `.zip` archive for Linux files is rare

For information on working with `bzip2`, `gzip`, and `tar` files, refer to Section 3.4 *File Compression and Archiving*.

3.3.1.2. File Formats

- `.au` — an audio file
- `.gif` — a GIF image file (short for Graphics Interchange Format)
- `.html` or `.htm` — an HTML file (short for Hyper Text Markup Language)
- `.jpg` — a JPEG image file (short for Joint Photographic Experts Group)
- `.pdf` — an electronic image of a document; PDF stands for Portable Document Format
- `.png` — a PNG image file (short for Portable Network Graphic)
- `.ps` — a PostScript file; formatted for printing
- `.txt` — a plain ASCII text file
- `.wav` — an audio file
- `.xpm` — an image file (short for X Pixelmap)

3.3.1.3. System Files

- `.conf` — a configuration file; configuration files sometimes use the `.cfg` extension, as well
- `.lock` — a *lock* file; determines whether a program or device is in use
- `.rpm` — a Red Hat Package Manager file used to install software

3.3.1.4. Programming and Scripting Files

- `.c` — a C program language source code file
- `.cpp` — a C++ program language source code file
- `.h` — a C or C++ program language header file
- `.o` — a program object file
- `.pl` — a Perl script
- `.py` — a Python script
- `.so` — a library file
- `.sh` — a shell script
- `.tcl` — a TCL script

3.3.2. Naming Conventions

3.3.2.1. Dot Files

Files whose name begins with a ".", called "dot" files, are hidden files. These files can be viewed in both graphical file managers like **Nautilus** and from the shell prompt, but require an extra step to reveal them. In **Nautilus**, select **View => Show Hidden Files**. From a shell prompt, list the files in your home directory by entering the command `ls -al`. If you view the hidden files in your home directory, you may be surprised by the number of files in what you thought was an empty directory. These hidden files are usually configuration files for applications. They are hidden to prevent accidental changes and to remove clutter from the user's home directory.

3.3.2.2. Using Spaces in File Names

While Linux allows file names with spaces in them, manipulating these files from a shell prompt can be quite cumbersome. The shell prompt expects a space to separate two files or commands, and may mis-interpret such a filename. To manipulate files with spaces in their names, surround the name with quotation marks.

3.3.2.3. Using Symbols in File Names

It is possible to use punctuation marks in your file names. However, be aware that these special characters have special meaning to the shell and may cause errors at a shell prompt. It is generally recommended that you avoid using special characters in file names for this reason. If you choose to use file names with special characters, use quotes around the file names when manipulating them from a shell prompt.

There are a few special characters you cannot use in file names. You cannot use a "/" — this indicates a directory. You cannot name a file "." or "..", for reasons discussed in Section 3.2.1 *Paths*.

3.3.2.4. Files with Multiple Extensions

Filenames can have multiple extensions. There may be a "." in the middle of a file name, or there may actually be multiple extensions. These multiple extensions usually arise when processing a file through multiple programs or commands. The most common file type with multiple extensions is a compressed archive. Compressed files are discussed in detail in Section 3.4 *File Compression and Archiving*.

3.3.3. Finding the Correct File Extension

File extensions are not always used, or used consistently. What happens when a file does not have an extension, or the file does not seem to be what the extension says it is supposed to be? That is when the `file` command can be helpful.

For example, you find a file called `saturday` without an extension. The `file` command enables you to see what type of file it is. Enter `file saturday` at a shell prompt. In this example, the command responds with ASCII text. Any file that is designated as a text file should be readable by using the `cat`, `more`, or `less` commands, or by using a text editor such as `gedit` or `vi`. Refer to Section 4.8 *Viewing text files from the shell prompt* for more information on `cat`, `more`, and `less`. Refer to Chapter 9 *Working with Other Text Applications* for more information on `gedit` and `vi`.

3.4. File Compression and Archiving

It is useful to store a group of files in one file for easy backup, for transfer to another directory, or for transfer to another computer. It is also useful to compress large files; compressed files take up less disk space and download faster via the Internet.

It is important to understand the distinction between an *archive file* and a *compressed file*. An archive file is a collection of files and directories stored in one file. The archive file is not compressed — it uses the same amount of disk space as all the individual files and directories combined. A compressed file is a collection of files and directories that are stored in one file *and* stored in a way that uses less disk space than all the individual files and directories combined. If disk space is a concern, compress rarely-used files, or place all such files in a single archive file and compress it.



Note

An archive file is not compressed, but a compressed file can be an archive file.

3.4.1. Using File Roller

Red Hat Enterprise Linux includes a graphical utility called **File Roller**. **File Roller** can compress, decompress, and archive files in common Unix and Linux formats. It has a simple interface and extensive help documentation. To start **File Roller**, select **Archive Manager** from the **Applications** (the main menu on the panel) => **System Tools** sub-menu. **File Roller** is also integrated into the desktop environment and **Nautilus**.

**Tip**

If you are using a file manager (such as **Nautilus**), you can double-click the file you wish to unarchive or decompress to start **File Roller**. The **File Roller** browser window appears with the decompressed/unarchived file in a folder for you to extract or browse.

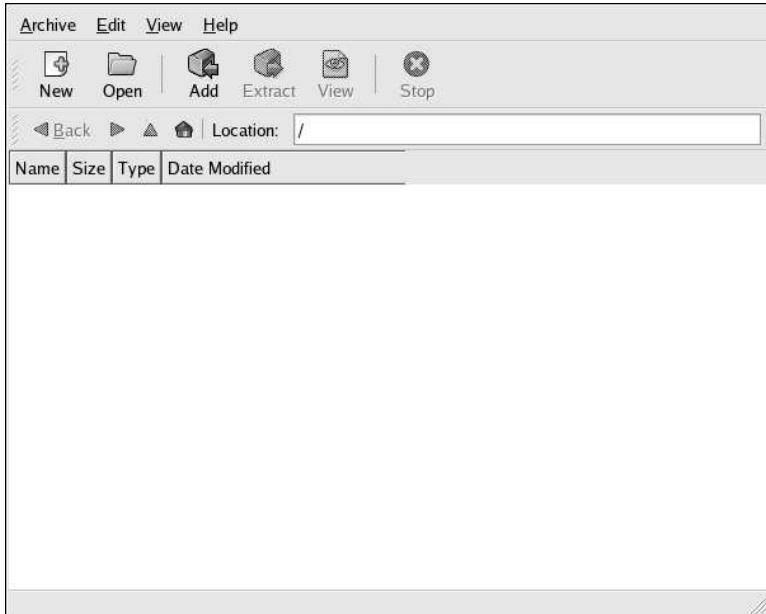


Figure 3-2. File Roller in Action

3.4.1.1. Decompressing and Unarchiving with File Roller

To unarchive and/or decompress a file, click the **Open** button on the main toolbar. A file menu pops up, allowing you to choose the archive you wish to manipulate. For example, if you have a file called `foo.tar.gz` located in your home directory, highlight the file and click **OK**. The file appears in the main **File Roller** browser window as a folder, which you can navigate by double-clicking the folder icon. **File Roller** preserves all directory and subdirectory structures, which is convenient if you are looking for a particular file in the archive. You can extract individual files or entire archives by clicking the **Extract** button, choosing the directory in which to save the unarchived files, and clicking **OK**.

3.4.1.2. Creating Archives with File Roller

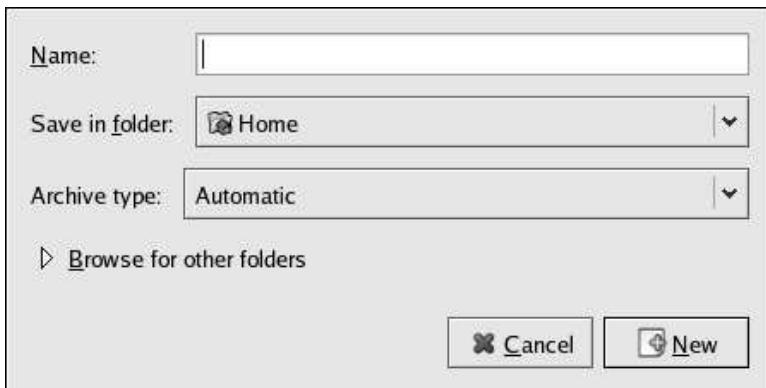


Figure 3-3. Creating an Archive with File Roller

File Roller allows you to create archives of your files and directories. To create a new archive, click **New** on the toolbar. A file browser pops up, allowing you to specify an archive name and the compression technique. For example, you may choose a **Tar Compressed with gzip (.tar.gz)** format from the drop-down menu and type the name of the archive file you want to create. Click **OK** and your new archive is ready to be filled with files and directories. To add files to your new archive, click **Add**, which opens a browser window that you can navigate to find the file or directory to add to the archive. Click **Add** when you are finished, and click **Archive => Close** to close the archive.



Tip

There is much more you can do with **File Roller** than is explained here. Refer to the **File Roller** manual (available by clicking **Help => Manual**) for more information.

3.4.2. Compressing Files at the Shell Prompt

Red Hat Enterprise Linux provides the `bzip2`, `gzip`, and `zip` tools for compression from a shell prompt. The `bzip2` compression tool is recommended because it provides the most compression and is found on most UNIX-like operating systems. The `gzip` compression tool can also be found on most UNIX-like operating systems. To transfer files between Linux and other operating system such as MS Windows, use `zip` because it is more compatible with the compression utilities available for Windows.

Compression Tool	File Extension	Decompression Tool
<code>bzip2</code>	<code>.bz2</code>	<code>bunzip2</code>
<code>gzip</code>	<code>.gz</code>	<code>gunzip</code>
<code>zip</code>	<code>.zip</code>	<code>unzip</code>

Table 3-1. Compression Tools

By convention, files compressed with `bzip2` are given the extension `.bz2`, files compressed with `gzip` are given the extension `.gz`, and files compressed with `zip` are given the extension `.zip`.

Files compressed with `bzip2` are uncompressed with `bunzip2`, files compressed with `gzip` are uncompressed with `gunzip`, and files compressed with `zip` are uncompressed with `unzip`.

3.4.2.1. Bzip2 and Bunzip2

To use `bzip2` to compress a file, enter the following command at a shell prompt:

```
bzip2 filename
```

The file is compressed and saved as `filename.bz2`.

To expand the compressed file, enter the following command:

```
bunzip2 filename.bz2
```

The `filename.bz2` compressed file is deleted and replaced with `filename`.

You can use `bzip2` to compress multiple files and directories at the same time by listing them with a space between each one:

```
bzip2 filename.bz2 file1 file2 file3 /usr/work/school
```

The above command compresses `file1`, `file2`, `file3`, and the contents of the `/usr/work/school/` directory (assuming this directory exists) and places them in a file named `filename.bz2`.



Tip
For more information, enter `man bzip2` and `man bunzip2` at a shell prompt to read the man pages for `bzip2` and `bunzip2`.

3.4.2.2. Gzip and Gunzip

To use `gzip` to compress a file, enter the following command at a shell prompt:

```
gzip filename
```

The file is compressed and saved as `filename.gz`.

To expand the compressed file, enter the following command:

```
gunzip filename.gz
```

The `filename.gz` compressed file is deleted and replaced with `filename`.

You can use `gzip` to compress multiple files and directories at the same time by listing them with a space between each one:

```
gzip -r filename.gz file1 file2 file3 /usr/work/school
```

The above command compresses `file1`, `file2`, `file3`, and the contents of the `/usr/work/school/` directory (assuming this directory exists) and places them in a file named `filename.gz`.

**Tip**

For more information, enter `man gzip` and `man gunzip` at a shell prompt to read the man pages for `gzip` and `gunzip`.

3.4.2.3. Zip and Unzip

To compress a file with `zip`, enter the following command:

```
zip -r filename.zip filesdir
```

In this example, `filename.zip` represents the file you are creating and `filesdir` represents the directory you want to put in the new zip file. The `-r` option specifies that you want to include all files contained in the `filesdir` directory *recursively*.

To extract the contents of a `zip` file, enter the following command:

```
unzip filename.zip
```

You can use `zip` to compress multiple files and directories at the same time by listing them with a space between each one:

```
zip -r filename.zip file1 file2 file3 /usr/work/school
```

The above command compresses `file1`, `file2`, `file3`, and the contents of the `/usr/work/school/` directory (assuming this directory exists) and places them in a file named `filename.zip`.

**Tip**

For more information, enter `man zip` and `man unzip` at a shell prompt to read the man pages for `zip` and `unzip`.

3.4.3. Archiving Files at the Shell Prompt

A `tar` file is a collection of several files and/or directories in one file. This is a good way to create backups and archives.

Some of `tar`'s options include:

- `-c` — create a new archive
- `-f` — when used with the `-c` option, use the filename specified for the creation of the `tar` file; when used with the `-x` option, unarchive the specified file
- `-t` — show the list of files in the `tar` file

- `-v` — show the progress of the files being archived
- `-x` — extract files from an archive
- `-z` — compress the `tar` file with `gzip`
- `-j` — compress the `tar` file with `bzip2`

To create a tar file, enter:

```
tar -cvf filename.tar directory/file
```

In this example, `filename.tar` represents the file you are creating and `directory/file` represents the directory and file you want to put in the archived file.

You can `tar` multiple files and directories at the same time by listing them with a space between each one:

```
tar -cvf filename.tar /home/mine/work /home/mine/school
```

The above command places all the files in the `work` and the `school` subdirectories of `/home/mine` in a new file called `filename.tar` in the current directory.

To list the contents of a tar file, enter:

```
tar -tvf filename.tar
```

To extract the contents of a tar file, enter:

```
tar -xvf filename.tar
```

This command does not remove the `tar` file, but it places copies of its unarchived contents in the current working directory, preserving any directory structure that the archive file used. For example, if the tarfile contains a file called `bar.txt` within a directory called `foo/`, then extracting the archive file results in the creation of the directory `foo/` in your current working directory with the file `bar.txt` inside of it.

Remember, the `tar` command does not compress the files by default. To create a tarred and bzipped compressed file, use the `-j` option:

```
tar -cjvf filename.tbz file
```

`tar` files compressed with `bzip2` are conventionally given the extension `.tbz`; however, sometimes users archive their files using the `.tar.bz2` extension.

The above command creates an archive file and then compresses it as the file `filename.tbz`. If you uncompress the `filename.tbz` file with the `bunzip2` command, the `filename.tbz` file is removed and replaced with `filename.tar`.

You can also expand and unarchive a `bzip tar` file in one command:

```
tar -xjvf filename.tbz
```

To create a tarred and gzipped compressed file, use the `-z` option:

```
tar -czvf filename.tgz file
```

tar files compressed with gzip are conventionally given the extension .tgz.

This command creates the archive file `filename.tar` and compresses it as the file `filename.tgz`. (The file `filename.tar` is not saved.) If you uncompress the `filename.tgz` file with the `gunzip` command, the `filename.tgz` file is removed and replaced with `filename.tar`.

You can expand a gzip tar file in one command:

```
tar -xzvf filename.tgz
```



Tip

Enter the command `man tar` for more information about the `tar` command.

3.5. Managing Directories

In many ways, directories are treated like files. They can be created, deleted, moved and copied from **Nautilus** or from a shell prompt, using commands similar to those for files.

3.5.1. Creating Directories

You must have write permissions in a directory in order to create a new sub-directory. Most users have these permissions in their home directory (and its sub-directories) and the `/tmp` directory.

To create a new directory with **Nautilus**, navigate to the location of your new directory. Right-click in a blank portion of the window and select **Create Folder**. A new folder icon appears with the highlighted text **untitled folder**. Type a name for your folder and press [Enter].

To create a new directory using a shell prompt, use the command `mkdir`. Enter: `mkdir <directory-name>`, replacing `<directory-name>` with the intended title of the new directory.

3.5.2. Deleting Directories

To delete a directory from **Nautilus**, right click on it and choose **Move to Trash**, or click and drag the icon to the **Trash** on the Desktop.

To delete an empty directory from a shell prompt, enter the command `rmdir`. To delete a directory that may not be empty (and consequently everything inside that directory), enter the command `rm -rf <directory>`. Refer to Section 4.5.5 *Delete files with rm* for more information regarding the `rm` command.

3.5.3. Dot Directories

Applications create "dot" directories as well as dot files. Dot files are a single hidden configuration file — a dot directory is a hidden directory of configuration and other files required by the application. The non-configuration files in these directories are generally user-specific, and will be available only to the user who installed them.

Chapter 4.

Shell Prompt Basics

4.1. Why Use a Shell Prompt

Graphical environments for Linux have come a long way in the past few years. You can be perfectly productive in the X Window System and only have to open a shell prompt to complete a few tasks.

However, many Red Hat Enterprise Linux functions can be completed faster from the shell prompt than from a graphical user interface (GUI). In less time than it takes to open a file manager, locate a directory, and then create, delete, or modify files from a GUI, a task can be finished with just a few commands at a shell prompt.

A shell prompt looks similar to other command line interfaces with which you might be familiar. Users type commands at a shell prompt, the shell interprets these commands, and then the shell tells the OS what to do. Experienced users can write shell scripts to expand their capabilities even further.

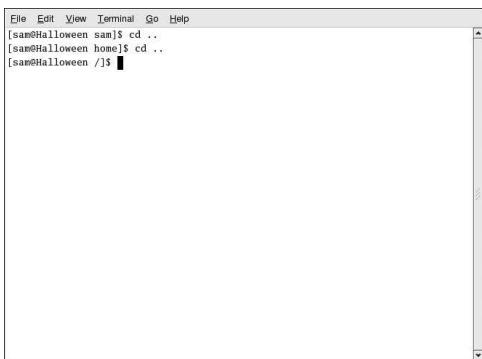


Figure 4-1. A Shell Prompt

This chapter explains how to navigate the file system, manipulate files, perform simple administration tasks, and other shell prompt basics.

4.2. The History of the Shell

When AT&T software engineers Dennis Ritchie and Ken Thompson were designing UNIX™, they wanted to create a way for people to interact with their new system.

Operating systems at that time came with command interpreters, which could take commands from the user and interpret them into something computers could use.

But Ritchie and Thompson wanted something more, something that offered better features than the command interpreters available at that time. This led to the development of the Bourne shell (known as `sh`), created by S.R. Bourne. Since the creation of the Bourne shell, other shells have been developed, such as the C shell (`csh`) and the Korn shell (`ksh`).

When the Free Software Foundation sought a royalty-free shell, developers began to work on the language behind the Bourne shell as well as some of the popular features from other shells available at the time.

The result was the Bourne Again Shell, or `bash`. Although your Red Hat Enterprise Linux system includes several different shells, `bash` is the default shell for interactive users. You can learn more about `bash` by reading the `bash` man page (type `man bash` at a shell prompt).

4.3. Basics

This chapter starts by introducing some general information about working with the command line. From there, it explains how to: locate yourself in the file system, move and manipulate files, browse to other directories, and view their contents. Finally, it moves on to more complicated issues including re-direction and permissions.

4.3.1. Shell Prompt Terms

Below are a few terms to know before beginning the discussion of the shell prompt.

command line

The command line is where options to a command are placed. The following is an example of a command line:

```
command -options <filename>
```

shell prompt

The shell prompt is the marker on the screen that shows where the command line should be placed. The following is an example of a shell prompt:

```
[username@localhost.localdomain username]$
```

shell

The shell is the program that interprets commands so that the operating system can understand them.

terminal window

The terminal window is the window that contains the shell prompt, command line, and output from the shell.

4.3.2. Opening and using a Shell Prompt

Recall from Section 1.5 *Opening a Shell Prompt* that a terminal window is opened from the **Applications** (the main menu on the panel), or by right-clicking on the desktop and selecting **Open Terminal**.

Entering or *running* a command refers to typing a given command and pressing [Enter]. To close a terminal window, either click on the [X] in the upper right corner of the screen or enter the `exit` command at the shell prompt.

The shell prompt within a terminal window looks something like this:

```
[username@localhost.localdomain username]$
```

There are any number of symbols that can be used to indicate the end of the shell prompt, and you can customize what your prompt looks like. However, there are two symbols that you will see more often

than any others, "\$" and "#". The first symbol, "\$", is the last character in the prompt when you are logged in as a normal user. The shell prompt for a normal user looks something like this:

```
[username@localhost.localdomain username]$
```

The second symbol, "#", is the last character in the prompt when you are logged in as root. This is true whether you logged in as root from the initial screen or if you executed the **su** – command to become root. The shell prompt for root looks something like this:

```
[root@localhost.localdomain root]#
```

This slight difference can help remind you what privileges you currently have.

4.3.3. Structure of shell prompt commands

In general, a command run from the shell prompt will have the following format:

```
command -options <filename>.
```

Both **-options** and **<filename>** are optional: the command may not require either one, or it may require multiple options and files. When specifying multiple options, list them as a group. For example, to see a long listing of information (-l) about all files (-a) in a directory, you would run the command:

```
ls -la
```

There are many variations in required information types for individual commands. If you aren't sure about a command and how it is used, you can do one of three things:

- Enter the command alone at a shell prompt and press [Enter]. For example, entering **cp** alone returns a brief description of the command and its usage. Other commands, such as **cat**, require no arguments or files to run as normal. To quit such a command, press [Ctrl]-[D]. If that does not work, press [Ctrl]-[C].
- Enter **man command** at a shell prompt. This opens the *manual page* for that command. A man page is a manual written by the command's developer explaining how it is used and what each option means. You can also enter **man man** at a shell prompt for more information on man pages. Navigate through the man page using the directional keys on your keyboard. The [Space] bar moves you down a page, [B] moves you up a page. To quit, press [Q]. If the man page for a command is either unavailable or does not provide enough information, the info system may provide additional information.
- Enter **info command** at a shell prompt. Some info pages have the same information as man pages, but navigation is slightly different. For more information, enter **info info** at a shell prompt.

4.3.4. Useful tips for the bash shell

Below are a few useful features of the bash shell that reduce the amount of typing required at a shell prompt. The first of these is tab completion, the second is command history, and the third is useful keystrokes.

4.3.4.1. Tab Completion

Tab completion is one of the most useful shortcuts available at the command line. Red Hat Enterprise Linux has the ability to "guess" what command, directory, or filename you are entering at the shell prompt. Press the [Tab] key, and the shell offers possible completions for partial words. The more letters typed before pressing [Tab], the closer the shell comes to the intended command.

If there are multiple solutions to the partial text on the command line, the shell presents them as a list. If the list is very long, the shell will first ask if you would like to display all matches. Navigate long lists of potential matches by pressing the [Space] bar to go down one page, the [B] key to go back one page, the directional (or "arrow") keys to move one line at a time, and [Q] to quit.

The shell assumes that the first word entered at the prompt is a command. The possible completions it offers are the names of commands or applications. This can be helpful if you are not sure of the exact spelling of a command or if you are searching for a certain command. It can also serve to help a new user become familiar with the available commands.

For example:

1. Type the letter **g** at a prompt and press [Tab] twice.
2. The shell asks if you want to see all 379 possibilities. This means that there are 379 commands that start with the letter "g". Searching through this list would take too much time.
3. Press [N] for no.
4. Entering more of the command name will produce a shorter list of possible matches. For this example, type **gnome** and press [Tab] twice. A list of every command that starts with "gnome" appears. This is a much shorter list, and can be scrolled through using the same keys as man pages. Scroll to the end of the list to return to the shell prompt. The letters "gnome" are still entered.
5. To finish entering a command with tab completion, enter just a few more characters, "-ca", and press [Tab] twice. The shell returns a match of gnome-calculator, and if you then press [Enter], the **GNOME Calculator** application starts.

Tab completion also works on filenames and directories. The shell prompt assumes that the second word on the command line is a filename or directory. Typing a partial word and pressing [Tab] twice will generate possible completions according to the files and sub-directories in your current working directory. The command line "knows" your directory structure. You can use tab completion to enter a long string of sub-directories by typing the first few letters of each directory and pressing [Tab] instead of navigating to one subdirectory at a time.

For example, reaching the sub-directory

```
example/sub-dir1/sub-dir2/sub-dir3/
```

would take a great deal of repetitive typing. However, with tab completion, a user would only have to enter a few keystrokes:

```
$ cd ex[Tab]su[Tab]su[Tab]su[Tab]
```

4.3.4.2. Command History

It is unnecessary to type the same command over and over. The bash shell remembers your past commands. These commands are stored in the `.bash_history` file in each user's home directory. To use the history, press the up arrow to scroll backward through the commands you have already entered. The [Ctrl]-[R] shortcut searches through your previous commands. Press [Ctrl]-[R] and type the beginning of the command you previously issued. The command history stops at the most recent version of that command.

Commands that you only typed partially and did not follow with [Enter] are not saved into your command history file. To clear your command history, type **history -c**.

By default, Red Hat Enterprise Linux stores 1000 commands. Each terminal window or shell prompt stores a separate set of commands. If you gain root privileges by using the command **su -**, the history file (and thus the commands) you access are root's, not the user's.

4.3.4.3. [Ctrl]-[Z] and running processes in the background

Applications and processes can be started from the command line. When an application starts from the command line, that particular shell is taken up with standard output for that application until the application closes. The screen fills with gibberish or messages that can be ignored. To continue to use the current shell while running an application from the same shell, add the ampersand, "&", to the end of the command line. For example, **oowriter &** starts **OpenOffice.org Writer** and allows you to continue entering commands on the command line. This is known as running a process in the *background*.

If you have started an application or process and forgotten to add the &, first press [Ctrl]-[Z] — this suspends the application. To allow it to continue running without displaying standard output, type **bg** and press [Enter]. This is referred to as running the application in the background.

4.3.4.4. Wildcards

Wildcards are place holders used to allow users to search for or use multiple files with similar names. The subject of wildcards is part of the larger subject of regular expressions. Two of the most common wildcards are "*" and "?".

The asterisk, "*", represents any character or string of characters. The entry **a*.txt** could refer to **ab.txt** as well as **aardvark.txt**.

The question mark represents a single character. The entry **a?.txt** could refer to **ab.txt** and **a1.txt**, but not **aardvark.txt**.

What if you forget the name of the file you are looking for? Using wildcards or regular expressions, you can perform actions on a file or files without knowing the complete file name. Type out what you know, substituting a wildcard for the remainder.



Tip

To read more about wildcards and regular expressions, take a look at the **bash** man page (**man bash**). You can save the file to a text file by typing **man bash | col -b > bash.txt**. Then, you can open and read the file with **less** or with an editor such as **vi** (**vi bash.txt**). If you want to print the file, be aware that it is quite long.

For example, to find a file called "sneak*something*.txt," enter:

```
ls sneak*.txt
```

The shell lists every file that matches that pattern:

```
sneakers.txt
```

Regular expressions are more complex than the straightforward asterisk or question mark.

When an asterisk, for example, just happens to be part of a file name, as might be the case if the file **sneakers.txt** was called **sneak*.txt**, that is when regular expressions can be useful.

Using the backslash (\), you can specify that you do not want to search out *everything* by using the asterisk, but you are instead looking for a file with an asterisk in the name.

If the file is called `sneak*.txt`, type:

```
sneak\*.txt
```

Here is a brief list of wildcards and regular expressions:

- * — Matches all characters
- ? — Matches one character
- * — Matches the * character
- \? — Matches the ? character
- \) — Matches the) character

4.3.4.5. Useful Keystrokes

While working from the command line, there are a few useful keystrokes that can help you with your session.

The following keystrokes are useful shortcuts at a shell prompt.

Keystroke	Action
[Ctrl]-[K]	While editing a command on the command line, this key combination deletes everything that has been typed in from the cursor's current position forward.
[Ctrl]-[D]	Pressing this key combination once ends the current application or process. Pressing it twice exits the shell.
[Ctrl]-[R]	At the command line, [Ctrl]-[R] searches through the command history to find the entry that starts with the letters you type.
[Ctrl]-[Z]	Suspends the current application. Entering <code>bg</code> after [Ctrl]-[Z] causes a program to run in the background.
[Ctrl]-[C]	"Kills" a program. This should be a last resort. Try stopping a program with other methods first.
[Ctrl]-[L]	Clears the terminal window.

Table 4-1. Useful shell prompt keystrokes

4.3.4.6. Clearing and Resetting the Terminal

The terminal window begins to look crowded very quickly. You can always exit from the terminal window and open a new one, but there is a quicker and easier way to remove the contents displayed in the terminal.

To clear the terminal, enter the command `clear` at the shell prompt. The `clear` command clears the terminal, leaving only a new shell prompt at the top of the window.

You can also clear the screen using the keystroke [Ctrl]-[L].

Sometimes, you may accidentally open a program file or some other non-text file in a terminal window. When you close the file, you could find that the text you are typing does not match the output on the monitor.

In such cases, enter `reset` to return the terminal window to its default values.

4.4. Determining Your Current Directory with `pwd`

As you browse directories, it is easy to get lost or forget the name of your current directory. By default, the Bash prompt in Red Hat Enterprise Linux shows only your current directory, not the entire path. For example, the path to the application `gedit` is `/usr/bin/gedit`. The path to user `someone`'s home directory is `/home/someone/`. Refer to Section 3.2.1 *Paths* for more information on paths.

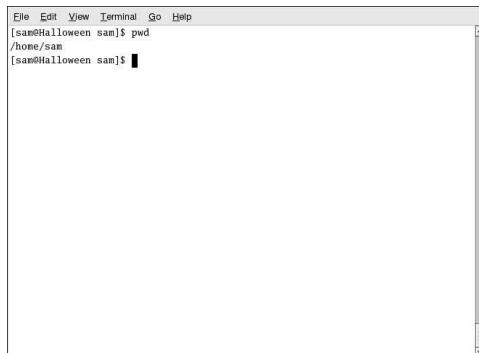


Figure 4-2. The Command `pwd` Displays Your Location

To display the location of your current working directory, enter the command `pwd`.

The output should look similar to:

```
/home/user
```

4.5. Manipulating Files in Your Current Working Directory

Below is a summary of basic shell commands:

Action	Command	Format	Details
Copy a file	<code>cp</code>	<code>cp filename destination</code>	Copies the file <code>filename</code> to the location <code>destination</code> .
List Directory Contents	<code>ls</code>	<code>ls</code>	The <code>ls</code> command lists files in the current working directory.

Action	Command	Format	Details
Move a file	mv	<code>mv which_file destination</code>	To move a file from one directory to another, use <code>mv</code> .
Rename a file	mv	<code>mv oldname newname</code>	The use of the <code>mv</code> command changes the name of the file from <code>oldname</code> to <code>newname</code> .

Table 4-2. Commands for Manipulating Files

Each of the commands listed above have options that may be specified on the command line. More information about each is provided below.

4.5.1. Viewing Directory Contents with ls

To see what is in your current working directory, use the `ls` command.

Many options are available with the `ls` command. The `ls` command, by itself, does not show all of the files in the directory. Some files are hidden files (also called dot files) and can only be seen with an additional option specified to the `ls` command.



Tip

To view all `ls` command options, read the man page by entering `man ls` at a shell prompt. To print the man page, enter `man ls | col -b | lpr` at the prompt.

Enter the command `ls -a`. Now you can view the hidden "dot" files.

Viewing all the files using the `ls -a` command can give you plenty of detail, but you can view still more information by using multiple options.

To see the size of a file or directory, when it was created, and so on, add the *long* option (`-l`) to the `ls -a` command. This command shows the file creation date, its size, ownership, permissions, and more.

You do not have to be in the directory whose contents you want to view to use the `ls` command. For example, to see what is in the `/etc/` directory from your home directory, type:

```
ls -al /etc
```

```

File Edit View Terminal Go Help
[sam@Halloween sam]$ ls -al /etc
total 2996
drwxr-xr-x  87 root    root     8192 May 21 22:16 .
drwxr-xr-x  22 root    root     4096 May  4 14:31 ..
-rw-r--r--  1 root    root    15228 Jan 24 16:14 a2ps-site.cfg
-rw-r--r--  1 root    root    2562 Jan 24 16:14 a2ps-site.cfg
-rw-r--r--  1 root    root     47 May  4 14:21 adjtime
drwxr-xr-x  2 root    root     4096 Mar 23 20:23 aep
-rw-r--r--  1 root    root     688 Feb  4 06:20 aep.conf
-rw-r--r--  1 root    root     703 Feb  4 06:20 aelog.conf
drwxr-xr-x  4 root    root     4096 Mar 23 20:24 alchemist
-rw-r--r--  1 root    root    1343 Mar 26 09:56 aliases
-rw-r----- 1 smmsp   smmsp   12288 May  4 14:31 aliases.db
drwxr-xr-x  2 root    root     4096 May 19 23:10 alternatives
-rw-r--r--  1 root    root     688 Feb  4 05:49 and.conf
-rw-r--r--  1 root    root     105 Feb  4 05:49 and.net
-rw-r--r--  1 root    root     317 Jan 24 16:26 anacrontab
drwxr-xr-x  3 root    root     4096 Mar 23 20:59 atalk
-rw-r--r--  1 root    root     1 Jan 24 16:45 at.deny
-rw-r--r--  1 root    root     156 May  4 14:21 .aumixrc
-rw-r--r--  1 root    root     212 Jan 27 23:22 auto.master
-rw-r--r--  1 root    root     575 Jan 27 23:22 auto.misc
-rw-r--r--  1 root    root     1497 Aug 29 2002 bashrc
lrwxrwxrwx  1 root    root    21 Mar 23 20:48 bg5ps.conf -> bg5ps.conf

```

Figure 4-3. Sample 1s Output for the /etc Directory

The following is a brief list of options commonly used with `ls`. Remember, you can view the full list by reading the `ls` man page (`man ls`).

- `-a` (all) — Lists all files in the directory, including hidden files (`./filename`). The `..` and `.` at the top of your list refer to the parent directory and the current directory, respectively.
- `-l` (long) — Lists details about contents, including permissions (modes), owner, group, size, creation date, whether the file is a link to somewhere else on the system and where its link points.
- `-F` (file type) — Adds a symbol to the end of each listing. These symbols include `/`, to indicate a directory; `@`, to indicate a symbolic link to another file; and `*`, to indicate an executable file.
- `-r` (reverse) — Lists the contents of the directory in reverse sort order.
- `-R` (recursive) — Lists the contents of all directories below the current directory recursively.
- `-S` (size) — Sorts files by their sizes.

The `ls` command can also be used with wildcards to display information on files or directories that match a certain pattern. To list all files and directories that begin with the letter "a", enter the following command.

`ls -al a*`

Remember that Linux is case-sensitive. The above command will not display information on files that start with "A".

4.5.2. Copying files with cp

To create a copy of an existing file, use the `cp` command.

While `cp` does have options, they are not used as often as those of other commands. To view these options, read the man page by entering `man cp` at a shellprompt.

To copy a file within the current directory specify the new name as the third word on the command line.

`cp original_file new_file`

This command creates a new file, named `new_file`, with the same content as the original file.

To copy a file to a different directory, specify a path as the third word on the command line:

```
cp original_file /dir1/dir2/
```

This command creates a copy of `original_file` in `dir2/`. If the last part of the path is a filename instead of a directory, the copy has that new name.

```
cp original_file /dir1/dir2/new_file
```

This creates a new file named `new_file` with the contents of `original_file` in `dir2/`.

Alternatively, if you know where the file is and would like to place a copy of it in your current directory, enter the path as word two and `."` as the third word.

```
cp /dir1/dir2/filename .
```

The above command places a copy of `filename` in your current working directory.

4.5.3. Moving files with mv

To move a file or directory from one location to another, use the command `mv`.

Common useful options for `mv` include:

- `-i` (interactive) — Prompts you if the file you have selected overwrites an existing file in the destination directory.
- `-f` (force) — Overrides the interactive mode and moves without prompting. Be very careful about using this option.
- `-v` (verbose) — Shows the progress of the files as they are being moved.

To move a file from the current directory to another location, enter a path as the third word on the command line.

```
mv filename /dir1/
```

This command would remove `filename` from the current working directory and place it in `/dir1/`.

Alternatively, a path to the location of the file may be entered as the second word and `."` as the third word. This moves the file from the location specified in word two into your current working directory.

```
mv /tmp/filename .
```

The above command moves the file `filename` from the `/tmp/` directory into your current working directory.

Finally, both words two and three may be paths.

```
mv ../../filename /tmp/new_name
```

The command above moves the file `filename` from a directory two levels up to the `/tmp/` directory while renaming the file `new_name`.

**Note**

You can only move files to a directory that already exists: Linux will not create a new directory with the `mv` command.

4.5.4. Renaming files with mv

To rename a file or directory, use the `mv` command.

To rename a file with `mv`, the third word on the command line must end in the new filename.

```
mv original_name new_name
```

The above command renames the file `original_name` to `new_name`.

```
mv ../original_name new_name
```

The above command moves the file `original_name` from one directory up to the current directory and renames it `new_name`.

```
mv original_name /dir1/dir2/dir3/new_name
```

The above command moves the file `original_name` from the current working directory to directory `dir3/` and renames it `new_name`.

4.5.5. Delete files with rm

**Caution**

Deleting a file with `rm` is permanent — you *cannot* un-delete it.

To delete a file using `rm` enter the following at a shell prompt:

```
rm filename
```

The second word can also be a path, but must end in a file.

```
rm ../../filename
```

There are many options to `rm`. To view them all, enter `man rm` at the shell prompt.

- `-i` (interactive) — Prompts you to confirm the deletion. This option can stop you from deleting a file by mistake.
- `-f` (force) — Overrides interactive mode and removes the file(s) without prompting. This might not be a good idea, unless you know exactly what you are doing.
- `-v` (verbose) — Shows the progress of the files as they are being removed.
- `-r` (recursive) — Deletes a directory and all files and subdirectories it contains.

**Tip**

The interactive, or `-i`, option for `rm` causes it to ask if you are sure before permanently deleting a file or directory. You can make this the default behavior for `rm` by editing the `.bashrc` file. This file is located in your home directory. You can edit the file with any text editor.

```
gedit /home/user/.bashrc
```

Add the following line somewhere in the file. The end of the file is a good location.

```
alias rm='rm -i'
```

Save the file. At the command line, enter the following command.

```
source .baschrc
```

Now you will be asked to enter [Y] before deleting a file or directory with `rm`.

4.5.6. Deleting directories

There are two commands that can be used to delete directories. The first is `rmdir` and the second is `rm`.

The `rmdir` command will only delete directories that are empty. If you are concerned about accidentally deleting a directory that is not empty, use this command.

```
rmdir directory/
```

The above command permanently deletes `directory/` if it is empty.

If you want to delete a directory and all of its contents, use the command `rm -rf`. Note that if you enter `rm -rf`, the shell will not ask if you are sure before permanently deleting the directory.

```
rm -rf /dir1/
```

The above command deletes `/dir1/` and every file and sub-directory that exists inside.

4.6. Leaving your Current Working Directory

To change directories from your current working directory, use the command `cd`.

```
cd /tmp/
```

The above command changes directories to the `/tmp/` directory. The second word on the command line must be a path. It can either be relative or absolute, and can move one directory or many. If the `cd` command is entered at the shell prompt with no options or path specified, the default action is to move the user into their home directory. For example, user `someone` would be moved to the `/home/someone/` directory.

The `cd` has many useful options. You can see all of these options by entering `man cd` at the shell prompt. The most commonly used options are listed below.

- `cd` — Returns you to your login directory
- `cd -` — Returns you to your previous working directory

- `cd ~` — Also returns you to your login directory
- `cd /` — Takes you to the entire system’s root directory.
- `cd /root` — Takes you to the home directory of the root user. You must be the root user to access this directory.
- `cd /home` — Takes you to the home directory, where user login directories are usually stored
- `cd ..` — Takes you to the directory one level up.
- `cd ~otheruser` — Takes you to *otheruser*’s home directory, if *otheruser* has granted you permission.

Below are a few examples of the use of `cd`.

- `cd /dir1/dir2` — Regardless of which directory you are in, this absolute path takes you directly to `dir2`, a subdirectory of `/dir1/`.
- `cd ../../dir2/dir3` — This relative path takes you up two directories, then to `dir2/`, and finally into its subdirectory `dir3/`.

If you attempt to `cd` into a directory you do not have permission to access, you are *denied permission* to access that directory.

Denying access to the root and other users’ accounts (or home directories) is one way your Red Hat Enterprise Linux system prevents accidental or malicious tampering. Refer to Section 4.11 *Ownership and Permissions* for more information.

4.7. Locating Files and Directories

There may be times when you know a file or directory exists but you do not know where to find it. There are several commands you can use to search for it, including `find`, `locate`, and `which`.

4.7.1. Find

The format of the `find` command is:

```
find path pattern
```

If you do not specify a path, `find` starts in the current working directory and looks through all subdirectories for the specified pattern.

The `find` command has many options that you can review by entering `man find` at a shell prompt. The most common option is `-name`, which tells `find` to search for all files and directories with a certain string of letters in their name.

```
find . -name foo
```

The above command searches through the current working directory for all files with "foo" in their name.

4.7.2. Locate

The format of the `locate` command is:

```
locate pattern
```

With `locate`, you can see every file or directory whose name contains the search criterion. For example, to search for all files with the word `finger` in the name, type:

```
locate finger
```

The `locate` command uses a database to locate files and directories that have the word `finger` in the file or directory name. The search results could include a file called `finger.txt`, a file called `pointerfinger.txt`, a directory named `/fingerthumbnails/`, and so on. To learn more about `locate`, read the `locate` man page (type `man locate` at a shell prompt).

The `locate` command works very quickly, as long as the database is up to date. That database is automatically updated on a nightly basis through a `cron` job. `cron` is a small program that runs in the background, performing various tasks (such as updating the `locate` database) at regularly scheduled intervals. Refer to the Red Hat Enterprise Linux System Administration Guide for more information on `cron`.

To update the database manually, log in as root (type `su -` at a shell prompt and then your root password) and type the command `updatedb`.

After a few minutes, the `slocate` database that is used by the `locate` command is updated.

When you are done working as root, type `exit` at the prompt; you are returned to your user account.

4.7.3. Which, whereis, whatis

`which`

The format of the `which` command is:

```
which command
```

`which` returns the location of binary, or executable, shell commands. The information provided by `which` is useful for creating application launchers. Refer to Section 2.2.1 *Adding Application Launchers* for more information.

```
which gedit
```

The above command returns the information `/usr/bin/gedit`.

`whereis`

The format of the `whereis` command is:

```
whereis command
```

The following command returns the locations of: the binary of `find`, the location of the source code, and the location of the `find` man page.

```
whereis find
/usr/bin/find /usr/share/man/man1/find.1p.gz /usr/share/man/man1/find.1.gz
```

`whatis`

The format of the `whatis` is:

```
whatis command
```

This command returns information about the command from each of its man pages.

```
whatis lp
```

The above command returns:

```
lp (4) - line printer devices
lp(lp-cups) (1) - print files
```

**Tip**

Checking the usage of a command using `whatis` before reading the man page can save you some time.

4.8. Viewing text files from the shell prompt

Red Hat Enterprise Linux has several applications that allow you to view and manipulate text files at the shell prompt. These applications are fast and best suited to manipulating the plain text files of configuration files.

4.8.1. The `head` Command

The `head` command displays the beginning of a file. The format of the `head` command is:

```
head <filename>
```

By default, you can only read the first ten lines of a file. You can change the number of lines displayed by specifying a number option.

```
head -20 <filename>
```

The above command would display the first 20 lines of a file named `<filename>`.

4.8.2. The `tail` Command

The reverse of `head` is `tail`. Using `tail`, you can view the last ten lines of a file. This can be useful for viewing the last ten lines of a log file for important system messages. You can also use `tail` to watch log files as they are updated. Using the `-f` option, `tail` automatically prints new messages from an open file to the screen in real-time. For example, to actively watch `/var/log/messages`, enter the following at a shell prompt (as the root user):

```
tail -f /var/log/messages
```

Press [Ctrl]-[C] when you are finished.

4.8.3. The `more` Command

The `more` command is a "pager" utility used to view text in the terminal window one page or screen at a time. The [Space] bar moves forward one page and [Q] quits.

4.8.4. Viewing Files with `less`

The format of the `less` command is:

```
less <filename>
```

The main difference between `more` and `less` is that `less` allows backward and single-line movement using the same navigation as man pages: press the [Space] bar to go down one page, the [B] to go back one page, the directional (or "arrow") keys to move one line at a time, and [Q] to quit.

To search the output of a text file using `less`, press [/] and enter the keyword to search for within the file.

```
/stuff
```

The above command would search through the file for all instances of "stuff" and highlight them in the text.

4.8.5. Viewing and creating files with `cat`

The `cat` command is a versatile utility. It can be used to view text, to create text files, and to join files. Its name is short for *concatenate*, which means to combine files.

Using `cat` alone echoes on the screen any text you enter. It will continue to do so until you exit with the [Ctrl]-[D] keystroke.

Entering the `cat` command followed by a file name displays the entire contents of the file on the screen. If the file is long, the contents scroll off the screen. You can control this by using the *redirection* techniques that are discussed in Section 4.9 *Manipulating Information from the Shell*.

4.8.6. The `grep` Command

The `grep` command is useful for finding specific character strings in a file. For example, to find every reference made to "pattern" in the file <filename>, enter:

```
grep pattern <filename>
```

Each line in the file that includes the pattern "pattern" is located and displayed on the screen/

4.9. Manipulating Information from the Shell

From the shell's point of view, there are three kinds of information: standard input, standard output, and standard error. In simple terms, *standard input* is the information that a user enters from the keyboard for the shell to use, such as commands and filenames. *Standard output* is essentially the information the shell prints on the screen after evaluating a user's commands. *Standard error* is the information that indicates that something has gone wrong. Collectively, these three types of information are referred to as *standard I/O* (input/output).

The ability to manipulate and use information from the shell is one of the strengths of Red Hat Enterprise Linux. This section discusses the simpler aspects of standard I/O manipulation.

4.9.1. Pipes and Pagers

In Section 4.8.5 *Viewing and creating files with cat*, we saw that using `cat` to view a large file causes the contents to scroll off the screen. Using a *pipe*, we can control that behavior. A pipe is the (|) symbol. It is used to connect the standard output of one command to the standard input of another command. Essentially, it allows a user to string commands together. Pagers are commands (such as `less`) that display text in the terminal window.

Using `cat`, the pipe (`|`), and `less` together displays the file one page at a time. You can then use the up and down arrow keys to move backward and forward through the pages.

```
cat <filename> | less
```

The above command opens the file named `<filename>` using the `cat` command, but does not allow it to scroll off the screen.

Using the pipe with a pager is also useful when examining large directories with `ls`. For example, view the `/etc/` directory with the `ls` command.

```
ls -al /etc/
```

Notice that the contents scroll past too quickly to view. To get a closer look at the output of the `ls` command, pipe it through `less`.

```
ls -al /etc/ | less
```

Now you can view the contents of `/etc/` one screen at a time. Remember that you can navigate forward and backward through the screens and even search for specific text using the `[/]` key.

You can combine redirection with wildcards.

```
ls -al /etc/ a* | less
```

The above displays all files and directories in `/etc/` that start with the letter "a" one screen at a time.

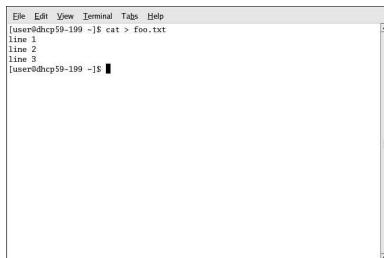
4.9.2. Using Redirection

Redirection means changing where standard input comes from or where the standard output goes.

To redirect standard output, use the `>` symbol. Placing `>` after the `cat` command (or after any utility that writes to standard output) redirects its output to the file name following the symbol.

Remember that the `cat` command echoes the text you enter on the screen. Those echoes are the standard output of the command. To redirect this output to a file, type the following at a shell prompt and press Enter: `cat > foo.txt`. Enter a few more lines of text, and use the `[Ctrl]-[D]` key combination to quit `cat`.

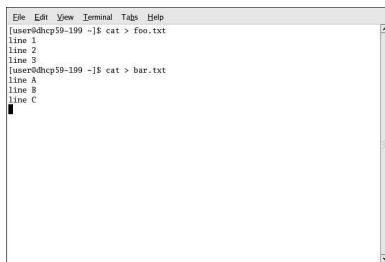
The following screen is an example, redirecting three lines of text into the file `foo.txt`.



A screenshot of a terminal window titled "Terminal". The window has a menu bar with "File", "Edit", "View", "Terminal", "Tabs", and "Help". The main area shows the command `cat > foo.txt` being typed. After the command, three lines of text ("line 1", "line 2", "line 3") are entered and displayed. The bottom status bar shows the path `/user@dhcp59-199 ~$`.

Figure 4-4. Redirecting Output to a File

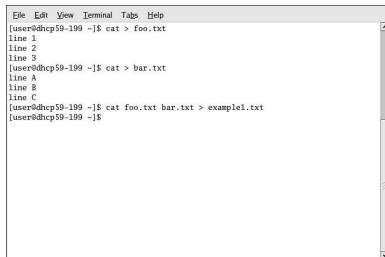
The following screen is another example, redirecting three more lines of text to create the file `bar.txt`.



```
File Edit View Terminal Tabs Help
[user@dhcp59-199 ~]$ cat > bar.txt
line 1
line 2
line 3
[user@dhcp59-199 ~]$ cat > bar.txt
line A
line B
line C
[
```

Figure 4-5. Redirecting Output to a Second File

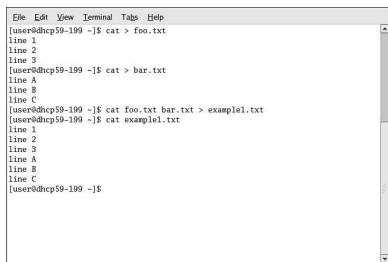
The following screen demonstrates `cat`'s concatenate function, adding the contents of `bar.txt` to the end of `foo.txt`. Without redirection to the file `example1.txt`, `cat` displays the concatenated contents of `foo.txt` and `bar.txt` on the screen.



```
File Edit View Terminal Tabs Help
[user@dhcp59-199 ~]$ cat > foo.txt
line 1
line 2
[user@dhcp59-199 ~]$ cat > bar.txt
line A
line B
line C
[user@dhcp59-199 ~]$ cat foo.txt bar.txt > example1.txt
[user@dhcp59-199 ~]$
```

Figure 4-6. Concatenating Two Files

The following screen displays the contents of `example1.txt`, so that the user can see how the files were added together.



```
[user@dhcp59-199 ~]$ cat > foo.txt
line 1
line 2
line 3
[user@dhcp59-199 ~]$ cat > bar.txt
line 1
line 2
line 3
line A
line 4
line B
line C
[user@dhcp59-199 ~]$ cat foo.txt bar.txt > example1.txt
[user@dhcp59-199 ~]$ cat example1.txt
line 1
line 2
line 3
line A
line 8
line C
[user@dhcp59-199 ~]$
```

Figure 4-7. Contents of example1.txt



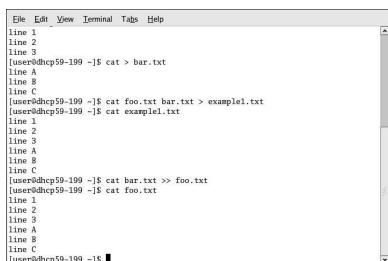
Caution

Be careful when you redirect the output to a file, because you can easily overwrite an existing file! Make sure the name of the file you are creating does not match the name of a pre-existing file, unless you want to replace it.

4.9.3. Appending Standard Output

The symbol `>>` appends standard output. This means it adds the standard output to the end of a file, rather than over-writing the file.

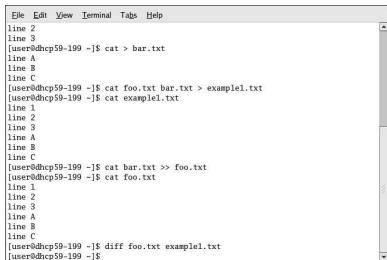
The following screen shows the command to append `bar.txt` to `foo.txt`. The contents of `bar.txt` are now permanently added to the end of `foo.txt`. The `cat` command is called a second time to display the contents of `foo.txt`.



```
[user@dhcp59-199 ~]$ cat > bar.txt
line 1
line 2
line 3
[user@dhcp59-199 ~]$ cat > foo.txt
line A
line 4
line B
line C
[user@dhcp59-199 ~]$ cat foo.txt bar.txt > example1.txt
[user@dhcp59-199 ~]$ cat example1.txt
line 1
line 2
line 3
line A
line 4
line B
line C
[user@dhcp59-199 ~]$ cat bar.txt >> foo.txt
[user@dhcp59-199 ~]$ cat foo.txt
line 1
line 2
line 3
line A
line 8
line C
[user@dhcp59-199 ~]$
```

Figure 4-8. Appending bar.txt to foo.txt

To compare `example1.txt` and the modified `foo.txt`, use the `diff` command. `diff` compares text files line-by-line and reports the differences to standard output. The following screen shows the comparison between `example1.txt` and `foo.txt`. Because there are no differences, `diff` returns no information.



```

File Edit View Terminal Tabs Help
line 2
line 3
[user@dhcp59-199 ~]$ cat > bar.txt
line A
line B
line C
[user@dhcp59-199 ~]$ cat foo.txt bar.txt > example1.txt
[user@dhcp59-199 ~]$ cat example1.txt
line 2
line 3
line A
line B
line C
[user@dhcp59-199 ~]$ cat bur.txt >> foo.txt
line 1
line 2
line 3
line A
line B
line C
[user@dhcp59-199 ~]$ cat foo.txt
line 1
line 2
line 3
line A
line B
line C
[user@dhcp59-199 ~]$ diff foo.txt example1.txt
[user@dhcp59-199 ~]$
```

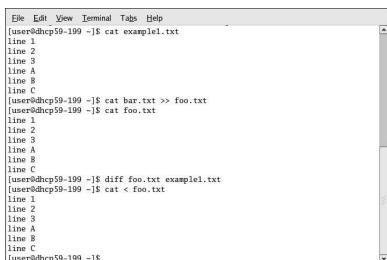
Figure 4-9. diff Comparison of example1.txt and foo.txt

4.9.4. Redirecting Standard Input

You can also perform the same type of redirection with standard input.

When you use the redirect standard input symbol <, you are telling the shell that you want a file to be read as input for a command.

The following screen shows `foo.txt` being redirected as input for `cat`:



```

File Edit View Terminal Tabs Help
[user@dhcp59-199 ~]$ cat example1.txt
line 1
line 2
line 3
line A
line B
line C
[user@dhcp59-199 ~]$ cat bar.txt >> foo.txt
[user@dhcp59-199 ~]$ cat foo.txt
line 1
line 2
line 3
line A
line B
line C
[user@dhcp59-199 ~]$ diff foo.txt example1.txt
[user@dhcp59-199 ~]$ cat < foo.txt
line 1
line 2
line 3
line A
line B
line C
[user@dhcp59-199 ~]$
```

Figure 4-10. Redirecting Standard Input

4.10. Using Multiple Commands

Linux allows you to enter multiple commands at one time. The only requirement is that you separate the commands with a semicolon.

Suppose you have downloaded a new file called `foobar-1.3-2.i386.rpm` and you want to put it in a new subdirectory within your home directory called `rpms/`, but the subdirectory has not been created. You can combine both the creation of the `rpms/` directory and the moving of your downloaded file into the directory by typing the following at a shell prompt:

```
mkdir rpms/; mv foobar-1.3-2.i386.rpm rpms/
```

Running the combination of commands creates the directory and moves the file in one line.

4.11. Ownership and Permissions

As a regular user, try to enter root's home directory by entering the command `cd /root/`. Note the error message:

```
-bash: cd: /root/: Permission denied
```

That was one demonstration of Linux's security features. Linux, like UNIX, is a multi-user system and file permissions are one way the system protects against malicious tampering.

One way to gain entry when you are denied permission is to enter the command `su -`. This is because whoever knows the root password has complete access.

However, switching to the superuser is not always convenient or recommended, since it is easy to make mistakes and alter important configuration files as the superuser.

All files and directories are "owned" by the person who created them. You created the file `foo.txt` (refer to Section 4.9.2 *Using Redirection*) in your login directory, so `foo.txt` belongs to you.

That means you can specify who is allowed to read the file, write to the file, or (if it is an application instead of a text file) who can execute the file.

Reading, writing, and executing are the three main settings in permissions. Since users are placed into a group when their accounts are created, you can also specify whether certain groups can read, write to, or execute a file.

Take a closer look at `foo.txt` with the `ls` command using the `-l` option (refer to Figure 4-11).

A lot of detail is provided here. You can see who can read (r) and write (w) the file, as well as who created the file (user), and to which group the owner belongs (user). (By default, the name of your group is the same as your login name.)

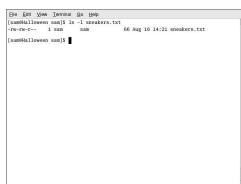


Figure 4-11. Permissions for `foo.txt`

Other information to the right of the group includes file size, date and time of file creation, and file name.

The first column shows current permissions; it has ten slots. The first slot represents the type of file. The remaining nine slots are actually three sets of permissions for three different categories of users.

For example:

```
-rw-rw-r--
```

Those three sets are the owner of the file, the group in which the file belongs, and "others," meaning other users on the system.

```
- (rw-) (rw-) (r--) 1 user user
```

The first item, which specifies the file type, will probably be one of the following:

- `d` — a directory
- `-` (dash) — a regular file (rather than directory or link)
- `l` — a symbolic link to another program or file elsewhere on the system

Others are possible, but are beyond the scope of this manual. Refer to the Red Hat Enterprise Linux System Administration Guide for more information.

Beyond the first item, in each of the following three sets, you may see one of the following:

- `r` — file can be read
- `w` — file can be written to
- `x` — file can be executed (if it is a program)
- `-` (dash) — specific permission has not been assigned

When you see a dash in owner, group, or others, it means that particular permission has not been granted. Look again at the first column of `foo.txt` and identify its permissions.

```
ls -l foo.txt
-rw-rw-r--    1 user user    150 Mar 19 08:08 foo.txt
```

The file's owner (in this case, `user`) has permission to read and write to the file. The group, `user`, has permission to read and write to `foo.txt`, as well. It is not a program, so neither the owner or the group has permission to execute it.

4.11.1. The `chmod` Command

Use the `chmod` command to change permissions. This example shows how to change the permissions on `foo.txt` with the `chmod` command.

The original file looks like this, with its initial permissions settings:

```
-rw-rw-r--    1 user user    150 Mar 19 08:08 foo.txt
```

If you are the owner of the file or are logged into the root account, you can change any permissions for the owner, group, and others.

Right now, the owner and group can read and write to the file. Anyone outside of the group can only read the file (`r--`).



Caution

Remember that file permissions are a security feature. Whenever you allow anyone else to read, write to, and execute files, you are increasing the risk of files being tampered with, altered, or deleted. As a rule, you should only grant read and write permissions to those who truly need them.

In the following example, you want to allow everyone to write to the file, so they can read it, write notes in it, and save it. That means you must change the "others" section of the file permissions.

Take a look at the file first. At the shell prompt, type:

```
ls -l foo.txt
```

The previous command displays this file information:

```
-rw-rw-r--    1 user user    150 Mar 19 08:08 foo.txt
```

Now, type the following:

```
chmod o+w foo.txt
```

The `o+w` command tells the system you want to give others write permission to the file `foo.txt`. To check the results, list the file's details again. Now, the file looks like this:

```
-rw-rw-rw-    1 user user    150 Mar 19 08:08 foo.txt
```

Now, everyone can read and write to the file.

To remove read and write permissions from `foo.txt` use the `chmod` command to take away both the read and write permissions.

```
chmod go-rw foo.txt
```

By typing `go-rw`, you are telling the system to remove read and write permissions for the group and for others from the file `foo.txt`.

The result looks like this:

```
-rw-----    1 user user    150 Mar 19 08:08 foo.txt
```

Think of these settings as a kind of shorthand when you want to change permissions with `chmod`, because all you really have to do is remember a few symbols and letters with the `chmod` command.

Here is a list of what the shorthand represents:

Identities

- u — the user who owns the file (that is, the owner)
- g — the group to which the user belongs
- o — others (not the owner or the owner's group)
- a — everyone or all (u, g, and o)

Permissions

- r — read access
- w — write access
- x — execute access

Actions

- + — adds the permission
- — removes the permission
- = — makes it the only permission

Want to test your permissions skills? Remove all permissions from `foo.txt` — for everyone.

```
chmod a-rwx foo.txt
```

Now, see if you can read the file with the command `cat foo.txt`, which should return the following:

```
cat: foo.txt: Permission denied
```

Removing all permissions, including your own, successfully locked the file. But since the file belongs to you, you can always change its permissions back with the following command:

```
chmod u+rwx foo.txt
```

Use the command `cat foo.txt` to verify that you, the file owner, can read the file again.

Here are some common examples of settings that can be used with `chmod`:

- `g+w` — adds write access for the group
- `o-rwx` — removes all permissions for others
- `u+x` — allows the file owner to execute the file
- `a+rwx` — allows everyone to read and write to the file
- `ug+r` — allows the owner and group to read the file
- `g=rx` — allows only the group to read and execute (not write)

By adding the `-R` option, you can change permissions for entire directory trees.

Because you can not really "execute" a directory as you would an application, when you add (or remove) the execute permission for a directory, you are really allowing (or denying) permission to search through that directory.

Examine the `dir1/` directory you created in section `FIXME` by listing all of the files in your home directory.

```
ls -l /home/>user</
```

The permissions on this directory are:

```
drwxrwxr-x  2 mgoldin mgoldin 4096 Jan  6 15:05 dir1
```

If you do not allow others to have execute permission on the `dir1/` directory, it does not matter who has read or write access. No one can access the directory unless they know the exact file name.

For example, type

```
chmod a-x dir1/
```

to remove everyone's execute permissions.

Here is what happens when you try to change directories using the `cd dir1/` command after removing everyone's execute permissions:

```
bash: dir1/: Permission denied
```

Next, restore your own and your group's access:

```
chmod ug+rx dir1/
```

If you check your work with `ls -l`, you can see that only others are denied access to the `/dir1/` directory.

4.11.2. Changing Permissions With Numbers

Another way to change permissions uses numeric representations.

Go back to the original permissions for `foo.txt`:

```
-rw-rw-r--    1 user user   150 Mar 19 08:08 foo.txt
```

Each permission setting can be represented by a numerical value:

- r = 4
- w = 2
- x = 1
- - = 0

When these values are added together, the total is used to set specific permissions. For example, if you want read and write permissions, you would have a value of 6; 4 (read) + 2 (write) = 6.

For `foo.txt`, here are the numerical permissions settings:

```
- (rw-) (rw-) (r--)
```

The total for the user is six(4+2+0), the total for the group is six(4+2+0), and the total for others is four(4+0+0). The permissions setting is read as 664.

If you want to change `foo.txt` so those in your group do not have write access, but can still read the file, remove the access by subtracting two (2) from that set of numbers.

The numerical values then become six, four, and four (644).

To implement these new settings, type:

```
chmod 644 foo.txt
```

Now verify the changes by listing the file. Type:

```
ls -l foo.txt
```

The output should be:

```
-rw-r--r-- 1 user user 150 Mar 19 08:08 foo.txt
```

Now, neither the group nor others have write permission to `foo.txt`. To return the group's write access for the file, add the value of w (2) to the second set of permissions.

```
chmod 664 foo.txt
```

Warning

Setting permissions to 666 allows everyone to read and write to a file or directory. Setting permissions to 777 allows everyone read, write, and execute permission. These permissions could allow tampering with sensitive files, so in general, it is not a good idea to use these settings.

Here is a list of some common settings, numerical values and their meanings:

Setting	Numerical	Meaning
<code>-rw-----</code>	(600)	Only the owner has read and write permissions.
<code>-rw-r--r--</code>	(644)	Only the owner has read and write permissions; the group and others have read only.

Setting	Numerical	Meaning
-rwx-----	(700)	Only the owner has read, write, and execute permissions.
-rwxr-xr-x	(755)	The owner has read, write, and execute permissions; the group and others have only read and execute.
-rwx---x--x	(711)	The owner has read, write, and execute permissions; the group and others have only execute.
-rw-rw-rw-	(666)	Everyone can read and write to the file. (Be careful with these permissions.)
-rwxrwxrwx	(777)	Everyone can read, write, and execute. (Again, this permissions setting can be hazardous.)

Table 4-3. File permissions settings, numerical values, and their meanings

Here are some common settings for directories:

Setting	Numerical	Meaning
drwx-----	(700)	Only the user can read, write in this directory.
drwxr-xr-x	(755)	Everyone can read the directory; users and groups have read and execute permissions.

Table 4-4. Directory permissions settings, numerical values, and their meanings

II. Using Your System

Now that you have begun exploring your Red Hat Enterprise Linux system, you can start using some of the many applications that are included with it. From Internet surfing and personal productivity, to games and beyond, this part details some popular software programs that help you become more productive with your computer, and tap the power of the Internet for your research and communications.

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Chapter 5.

Connecting to the Internet

Perhaps the most important change in communication since the telephone, the Internet is a large part of our world today. Red Hat Enterprise Linux has the tools necessary to allow you to connect to that world.

There are many types of Internet connections, including:

ISDN Connection

An ISDN (Integrated Services Digital Network) connection uses high-speed, high-quality digital telecommunication lines as opposed to an analog modem connection. This special phone line must be installed by a phone company.

Modem Connection

A modem connection uses a normal phone line to establish a connection to the Internet. Digital data is modulated into analog signals and sent over phone lines.

Wireless Connection

A wireless connection uses a wireless access point (WAP) or peer-to-peer network with a wireless network card.

xDSL Connection

An xDSL (Digital Subscriber Line) connection uses high-speed transmissions through telephone lines. There are different types of DSL such as ADSL, IDSL, and SDSL. **Internet Configuration Wizard** uses the term xDSL to mean all types of DSL connections.

Ethernet Connections

Some xDSL and cable modem connections require users to set up their connections via Ethernet. The ethernet card in your Red Hat Enterprise Linux system communicates with the xDSL or cable modem, which communicates in turn with your ISP.

This chapter discusses setting up a modem (or dial-up) connection in detail. The procedures for creating connections of the remaining types is similar, but may require additional steps or information from your Internet Service Provider (ISP).

Your own ISP may have specific connection requirements for their service which differ from the instructions in this chapter. Before connecting, check with your ISP for any specific instructions that they provide, including the following information:

- The phone number that your modem must dial to connect to your ISP if you are using a modem.
- Your login name and password for your account if you are using an xDSL or modem connection.
- A *gateway address*. Some ISPs may require you to configure a master address (called the gateway) that authenticates your computer and allows it to connect to the Internet.
- *DNS entries*: DNS means *Domain Name System*. DNS servers act as a road map for the Internet. When you use the Internet, the DNS tells your machine where to send its traffic. DNS tracks *IP* (Internet Protocol) addresses; each computer connected to the Internet must have an IP address, which is a unique set of numbers like *2xx.2xx.2x.2*. You may receive one or more DNS entries from your Internet provider when you sign up.

5.1. The Internet Configuration Wizard

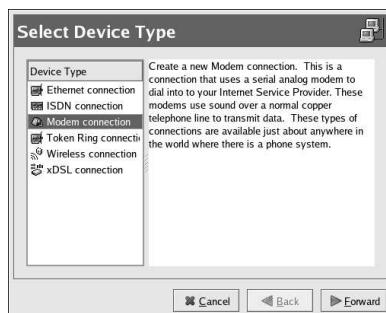


Figure 5-1. Internet Configuration Wizard

Red Hat Enterprise Linux includes the **Internet Configuration Wizard**. The **Internet Configuration Wizard** is available from the **Applications** (the main menu on the panel) => **System Tools** sub-menu, or from a shell prompt via the command `internet-druid`. This tool guides you step-by-step through the process of establishing a new Internet connection.

When you first start the **Internet Configuration Wizard**, you are required to enter your root password.

Each of the types of connections are listed in the left pane of the window. Select the type of connection to establish, then follow the steps of the wizard.

The next section of this chapter goes through the details of creating a dial-up connection as an example.

5.2. Creating a Dial-Up Connection

A dial-up connection requires your computer's modem to dial a phone number that connects to your Internet Service Provider (ISP). Your computer may have a modem built in, or you may have to use a modem card if your system is a laptop.



Note

If your computer has a software-based modem such as **WinModem**, you may not be able to use it in Linux.

To create a new modem connection:

1. From the **Applications** (the main menu on the panel) menu, choose **System Tools => Internet Configuration Wizard**.
2. A window opens requesting your root password. Enter it and click **OK**.
3. The **Add new Device Type** window opens.

4. The left pane lists each of the possible connections. Choose **Modem connection** and click the **Forward** button.
5. Red Hat Enterprise Linux probes for a working modem installed on your computer. If it does not find one, make sure that you have a hardware modem, and that it is installed correctly.
6. The next screen contains three drop-down boxes.
 - **Modem Device** — This menu lists all modems installed on your system. Select the correct modem for this connection.
 - **Baud Rate** — Select the speed of your modem. This list is in bytes: a 56.6K modem is listed as 56700.
 - **Flow Control** — Select **Hardware** if your modem is a hardware device installed on your system.

When finished making your selections, click the **Forward** button.

7. The next screen requires information about your ISP. For users in the United States, type the correct information in each field:
 - **Prefix** — Enter any prefix necessary to reach your access number. This might be "1" if the call is long distance, or "9" to reach an outside line.
 - **Area Code** — Enter the area code of your access number, if necessary.
 - **Phone Number** — Enter the access number for your ISP. Do not enter "dashes" in the number.
 - **Provider Name** — Enter the name of your ISP.
 - **Login Name** — Enter the login your ISP has given you.
 - **Password** — Enter the password for your account.

Finally, click the **Forward** button.

8. On the next screen, select whether your system must automatically obtain your IP address settings or whether your system must use the same IP address every time you connect. To use the same address every time, enter the address your ISP gave you into the **Manual IP Address Settings** fields. Click the **Forward** button to continue.
9. The final screen is a summary of the values you have entered. Review them to be sure that all settings are correct. Click the **Apply** button to create your new connection.
10. The **Network Configuration** screen appears, showing your new connection along with a list of all other connections on your machine.
11. Test your new connection by clicking the **Activate** button. If your connection works, go to **File => Save** from the **Network Configuration** main toolbar, then exit the application. If your connection does not work, click the **Edit** button to change the settings.

To access your connection later, select **Applications** (the main menu on the panel) => **System Settings => Network**. The **Network Configuration** window opens. Select the appropriate connection and click **Activate**.

5.3. Creating a High Speed Connection

Creating a high-speed connection is similar to connecting a modem. There are, however, a few additional complications. Ask your ISP which of the following configurations is appropriate for your connection.

DHCP

You may be required to configure your system to obtain an IP address through DHCP. To configure this type of connection, start the **Internet Configuration Wizard**, select **Ethernet Connection**, and select DHCP from the **Configure Network Settings** screen. Some DSL providers and most cable modem providers use this configuration.

PPPoE

Alternatively, some DSL providers require your system to use a PPPoE (Point-to-Point Protocol over Ethernet) connection. To configure this type of connection, start the **Internet Configuration Wizard**, select **xDSL Connection**, and follow the steps in the wizard. If you must supply a username and password to connect, you are probably using PPPoE.



Tip

For advanced configuration of client DHCP options such as protocol timing, lease requirements and requests, dynamic DNS support, aliases, as well as a wide variety of values to override, prepend, or append, refer to the `dhclient` and `dhclient.conf` man pages. You may also refer to the Red Hat Enterprise Linux System Administration Guide for more information.

5.4. Creating a Wireless Connection

If you are connecting your Red Hat Enterprise Linux system to a wireless access point (WAP) or a peer-to-peer (also called *ad-hoc*) network with a wireless (802.11.x) network card, you must configure your wireless device.

Start the **Internet Configuration Wizard**, select **Wireless Connection**, and follow the prompts. You can then configure the device for DHCP or fixed IP addresses.

5.5. Additional Resources

Speak to your ISP to see if they support setting up your connection with Linux. There are also several web sites available that will help you in setting up your connection.

- <http://linuxnewbies.edithispage.com/tips/20020219>
- <http://en.tldp.org/HOWTO/HOWTO-INDEX/networking.html#NETPROTOCOLS>
- <http://oob.freeshell.org/nzwireless/LWAP-HOWTO.html>

Chapter 6.

Web Browsing

Once you have configured your Internet connection (refer to Chapter 5 *Connecting to the Internet*), you are ready to browse the Internet. Red Hat Enterprise Linux comes with several *Web browsers*, graphical applications that use your Internet connection to access the World Wide Web: news, research, shopping, banking, and more. This chapter briefly explains how to surf the Web using **Firefox**. For information about using the **Konqueror** Web browser, refer to Section A.6 *Browsing the Web with Konqueror*.

6.1. Firefox

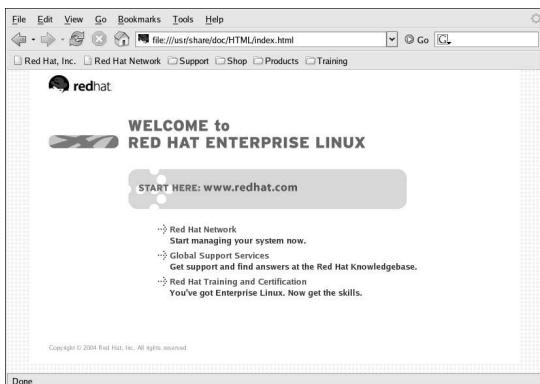


Figure 6-1. Mozilla Firefox

Firefox is part of the mozilla.org organization's wide range of Open Source Internet application developments. **Firefox** is powerful, integrated, and standards-compliant. It features tabbed browsing, the use of plug-ins, and available extensions and themes for the browser. This section shows you how to use the **Firefox** web browser to explore the Internet.

Mozilla.org provides excellent documentation and help at:

- <http://www.mozilla.org/support/firefox>.
- <http://www.mozilla.org/community>.

6.1.1. Using Firefox

Firefox functions like any Web browser you may have used before. It has the standard navigational toolbars, buttons, and menus.

The **Navigation** toolbar contains navigation icons, the address bar, and a search field.

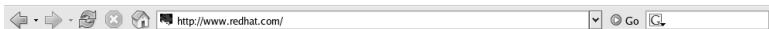


Figure 6-2. Navigation Toolbar

Enter a Uniform Resource Locator (URL) — the name or address of a web site — into the address field. **Firefox** moves immediately to the web site.

The **Search** field uses the most popular search engines to look for sites related to the keywords you enter. Select the search engine **Firefox** should use by clicking on the icon at the left of the field. Enter the keywords and press [Enter] to perform the search.



Figure 6-3. Search field

Firefox has a sidebar to aid in navigation. Select **View => Sidebar** from the main **Firefox** toolbar, then choose the detail to display. You can choose from your bookmarks or the history of websites you have visited.

Finally, the **Personal Toolbar** can be customized with the web sites that you visit most often. Web sites added to this toolbar become buttons — one click, and **Firefox** moves to that web site. To add a site to the **Personal Toolbar**, drag the site's icon from the address field to the **Toolbar**.

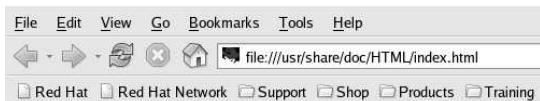


Figure 6-4. Personal Toolbar

6.1.2. Tabbed Browsing

Firefox offers tabbed browsing. Tabbed browsing allows a user to flip quickly between web pages without opening another instance of **Firefox**. Right-click a link and choose **Open Link in New Tab** to use this feature. Open a new tab by selecting **File => New Tab** or by pressing [Ctrl]-[T].

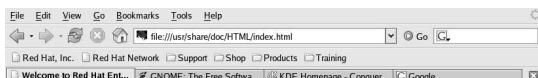


Figure 6-5. Open Tabs

6.1.3. Plug-ins

Plug-ins, applications that expand the abilities of **Firefox**, are available for download. A full list of plugins can be found at :

<http://channels.netscape.com/ns/browsers/plugins.jsp>.

6.1.4. Extensions and Themes

There are many extensions and themes available for **Firefox**. Extensions are small applets (smaller than plug-ins) that provide additional functionality to **Firefox**. For example, there is an extension called **ForecastFox** that adds a small toolbar at the bottom of **Firefox** that includes the local weather forecast. This and other extensions are available by going to the **Tools** menu and selecting **Extensions**. To add new extensions to your **Firefox** browser, click the **Get More Extensions** link in the bottom right of the window.

Themes allow you to change the way your browser looks. They change the color of the browser window and the icons on your toolbars. To download and install new themes, open the **Themes** tool by selecting **Tools => Themes** from the main toolbar. Click the **Get More Themes** link in the bottom right of the window.

Chapter 7.

Email Applications

Email is a very popular way of communicating with others over the Internet. An application that allows users to send, receive, and read email is called an *email client*. Red Hat Enterprise Linux includes several email applications, including graphical email clients like **Evolution** and **Thunderbird**, and text-based clients like **mutt**. Each of the email client applications is designed to suit specific types of users; so, you can choose one with the features that best suits your particular needs.

The purpose of this chapter is to demonstrate how to use some of the popular email applications included in Red Hat Enterprise Linux. Since all email clients perform the same basic tasks (send and receive email), you should choose one that is convenient and easy to use.

This chapter briefly discusses the following email clients:

- **Evolution**
- **Thunderbird**
- **Mutt**, a text-based email client

Before you launch an email client, you need information from your Internet Service Provider (ISP) to configure the client properly. The following is a list of important configuration information:

Your email address

The email address you use to send and receive mail. This is usually in the form of `<yourname>@<example.com>`. In this example, `<yourname>` is your user name and `<example.com>` is the domain name for your ISP.

Server type for receiving email

In order to receive mail, you must know what type of server the ISP is using, *POP* or *IMAP*.

POP, short for *Post Office Protocol*, is used to send email from a mail server to your email client's *inbox*, the place where incoming email is stored. Most ISP email servers use the POP protocol, although some use the newer IMAP protocol. POP mail is downloaded to your email client directly and *does not stay* on the server by default (although most email clients can be configured to leave email on the server as well).

IMAP, short for *Internet Message Access Protocol*, is a protocol for retrieving email messages from your ISP's email server. IMAP differs from POP in that email from IMAP servers are stored on the server and not downloaded to the mail client.

Address for receiving email

In order to receive mail, you must obtain the address of the POP or IMAP server from your ISP. This address is usually in the form of `mail.example.com`.

Server type for sending email (SMTP)

The *Simple Mail Transfer Protocol* (SMTP) is a protocol for sending email messages between mail servers. Most email systems use SMTP to send messages over the Internet; the messages can then be retrieved with an email client using either POP or IMAP. SMTP is also used to send messages from a mail client to a mail server. This is why you need to specify both the POP or IMAP server and the SMTP server when configuring an email application.

If you have any questions regarding what information you need, contact your ISP or network administrator. Unless properly configured, you cannot make full use of the email clients discussed in this chapter.

7.1. Evolution

Evolution is more than just an email client. It provides all of the standard email client features, including powerful mailbox management, user-defined filters, and quick searches. Additionally, it features a flexible calendar/scheduler which allows users to create and confirm group meetings and special events online. **Evolution** is a full-featured personal and work group information management tool for Linux and UNIX-based systems, and is the default email client for Red Hat Enterprise Linux.

To launch **Evolution** from the desktop panel, go to **Applications => Internet => Email**, or click on the **Email** icon on your **Panel**.



Figure 7-1. Evolution Welcome Screen

The first time you start **Evolution** you are presented with the Welcome Screen (Figure 7-1), which allows you to configure your email connection. Follow the on-screen instructions and fill in the information you collected from your ISP or administrator in the text boxes provided. When you are done, click **Finish**. **Evolution** proceeds to the Main Screen as shown in Figure 7-2.

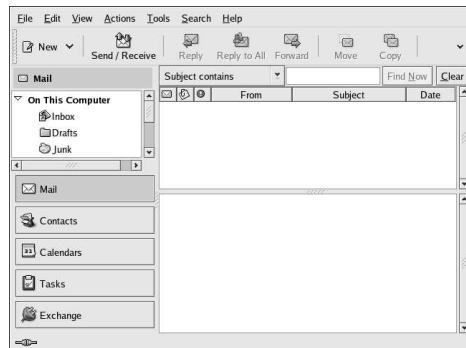


Figure 7-2. Evolution Main Screen

To view what is in your inbox or to send an email, click on the **Mail** button in the left toolbar, then select the **Inbox** icon from the list of folders.

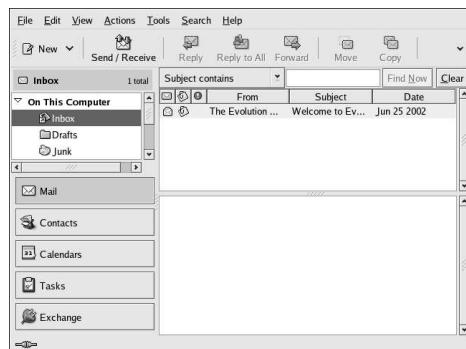


Figure 7-3. Evolution Inbox Screen

To compose a new message, click on the down arrow beside the **New** icon. Select **Mail Message** from the drop-down list. You can also press [Shift]-[Ctrl]-[M]. Enter the address of the recipient in the **To** field, the subject of the email in the **Subject** field, and the text of your message in the large pane below. You can spell check your email before sending by going to **Edit => Spell Check Document** or by pressing [Shift]-[Ctrl]-[L]. You can attach documents by clicking on the **Attach** icon. A window opens that allows you to navigate to the file you would like to attach. Click on the name of the file to highlight it, then click on the **Open** button. Finally, when you are finished, click the **Send** button to send.

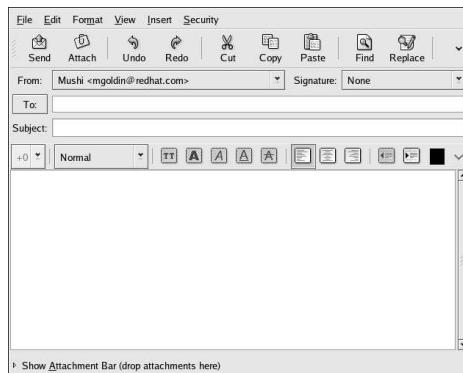


Figure 7-4. Evolution New Email Message Screen

While **Evolution** does much more than read and send email, this chapter focuses exclusively on its email capabilities. To learn more about **Evolution**'s other features, refer to the **Help** text.

7.2. Thunderbird

This section briefly covers the basic steps for sending and receiving email with **Thunderbird**. For more information about using **Thunderbird**, the **Help** contents are located under **Help** on the main menu.

To start **Thunderbird**, select **Applications => Internet => Thunderbird Mail**.

You are presented with a **New Account Setup** screen. You are first asked whether you would like to import information from other email programs. Make your selection and click on the **Next >>** button. On the next screen, select **Email account**, which allows you to configure your email connection. Follow the on-screen instructions and fill in the information you collected from your ISP or administrator in the text boxes provided.

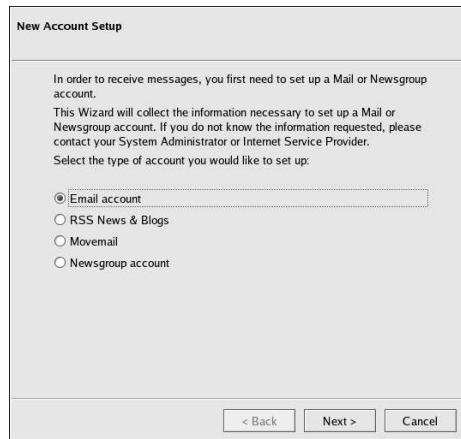


Figure 7-5. Account Setup

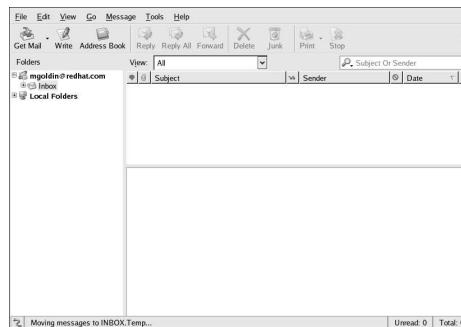


Figure 7-6. Thunderbird Mail

To create a new email message, click the **Write** button. A blank message will open in a new window. Enter the address(es) of the recipient(s) of your email in the **To** field(s). Enter the subject of your email in the **Subject** field. In the large bottom pane, enter the text of your email. You can spell check your email by clicking on the **Spell** icon or by pressing [Ctrl]-[Shift]-[K]. You can attach files by clicking on the **Attach** icon, or by going to **File => Attach => File(s)**. Finally, when you are finished with your email, click the **Send** icon. The email window closes and returns you to the main screen.

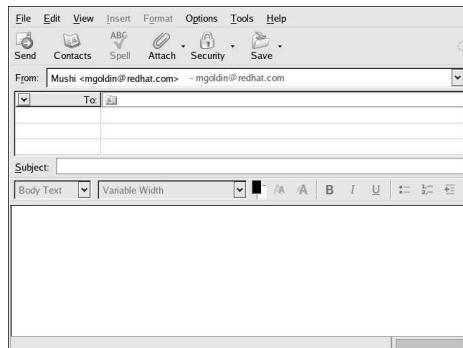


Figure 7-7. Thunderbird Mail New Email Message Screen

To read email, click on the **Get Mail** icon to check for new mail. Click on the folders in the left sidebar to open them. If there are any messages in that folder, they appear as a list in the top-right pane of the window. As you click on each email in the list, a preview of its contents appears in the pane directly below. If there are any attachments to your email, a field labelled **Attachments** lists the names of the files. Double-click the file name to open or save the file.

Once you read a message, you can delete it, save it to a separate folder, and more.

7.2.1. Thunderbird and Newsgroups

Newsgroups are Internet discussion groups with specific topics. The discussions are in threaded format (which means all topics and responses to the topic are sorted and organized for convenient reading) and subscribing to a group is easy. You are not required to post messages; instead, you can just *lurk*, which is a Newsgroup term for reading without posting messages. There are a great many newsgroups on the Web with topics ranging from politics to computer games to random strange thoughts. You can even post and download pictures and files to Newsgroups (although your ISP may restrict Newsgroups to text-based postings only).

To join a newsgroup, you first need to set up a newsgroup account. Click on your mail account name in the sidebar and select **Create a new account** from the options that appear on the right of the screen. The **New Account Setup** screen appears again. Select **Newsgroup account** and then click **Next**.

Enter your name and email address in the blank fields and click **Next**. On the following screen, enter the name of your news server (if you do not know the name of your news server, contact your Internet service provider or network administrator for this information). On the last few screens, you can determine the name of this account and review your settings.

The newsgroup account you created appears in the sidebar of the **Thunderbird** mail screen. Right-click on this account name and select **Subscribe**. A dialog box appears, listing all the newsgroups available. Select the groups you are interested in reading and click **Subscribe**. When you are done, click on **OK**.

Double-click on the newsgroup account name and the list of groups you are subscribed to appears beneath. Select the newsgroup you want to access and a dialog box appears with information about downloading and reading existing messages. Posting to a newsgroup is just like writing an email, except that the newsgroup name appears in the **To** field rather than an email address. To unsubscribe from a newsgroup, right-click on the group name and select **Unsubscribe**.

7.3. Plain Text Email Clients

Most modern email clients allow the user to select whether they want to send their emails in *plain text* or in *HTML*. *HTML* formatted email can contain formated text, graphics, and interactive links to Web sites. The particular font can be specified, the layout is very controllable, textures, and pictures or backgrounds can be added; all this makes for a visually appealing message when it gets to the recipient.

On the other hand, plain text email is just that — plain text. There is nothing fancy, there are no pictures embedded in the email, and there are no special fonts.

The term plain text refers to textual data in ASCII format. Plain text (also called *clear text*) is the most portable format because it is supported by nearly every email application on various types of machines.

This chapter discusses the **mutt** plain text email client.

7.3.1. Using Mutt

Mutt is a small but very powerful text-based mail client for UNIX operating systems.

The configuration file for **Mutt**, `~/.muttrc`, is highly configurable. Because a user can control nearly all of the functions within **Mutt**, new users sometimes run into problems with initial configuration.

Most of the options for **Mutt** are invoked using the `set` or `unset` commands, with either boolean or string values, e.g. `set folder = ~/Mail`.

All configuration options can be changed at any time by typing a [:] followed by the relevant command. For example `:unset help` turns off the keyboard command hints at the top of the screen. To turn those hints back on, type `:set help`.

If you cannot remember the command, there is always tab-completion to help.

You do not have to type all your preferred configuration commands each time you run **mutt**, you can save them in a file which is loaded every time the program starts up. This configuration file must exist in your home directory, and it must be named either `~/.muttrc` or `~/.mutt/muttrc`.

When you launch **mutt** (by typing `mutt` at a shell prompt), a screen appears with a list of email messages. This initial menu is called the index.

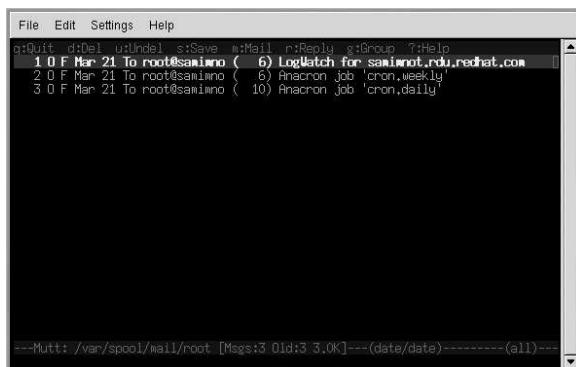


Figure 7-8. **mutt** Main Screen

These messages are in a default mail folder, called the inbox or *mailspool*. Use the [K] and [J] keys on your keyboard to move the highlighted cursor up and down the list of messages.

In the index or pager views, use the [R] key to reply to a message or the [M] key to create a new one. **Mutt** prompts for the **To:** address and the **Subject:** line. A text editor (defined by your \$EDITOR environmental variable in the configuration file) then launches, allowing you to compose your message. Type your message, save your file and exit the editor.

After editing the email, **Mutt** displays the compose menu, which allows you to customize your message headers, change the encoding, add file attachments or press the [Y] key to send your email on its way.

To learn more about **mutt**, refer to the man pages for `muttrc` and **mutt** (type `man muttrc` or `man mutt` at the shell prompt). You may also find the **mutt** manual to be very helpful. The **mutt** manual is installed in `/usr/share/doc/mutt-1.2.x/`, where `x` is the version number of **mutt** installed on your system.

Chapter 8.

Working with OpenOffice.org

8.1. Feature overview of OpenOffice.org

OpenOffice.org is a powerful office suite that includes word processing, spreadsheets, and slides. It has all of the functionality of the best-known office suites, and uses some powerful additional tools to help you easily create professional-looking documents.

One of the benefits of using an open source office suite is the vibrant community of **OpenOffice.org** users who share their templates, tutorials, and other information on the web. Extensive documentation for the **OpenOffice.org** suite is available online, both at their website and on various user sites.

This chapter takes a quick look at features that apply to the suite as a whole, and then goes more in-depth to each of the applications within the suite. For more information, you can always take a look at the help menus in **OpenOffice.org**, which include handbooks and extensive information.

8.1.1. Compatibility with other formats

OpenOffice.org is compatible with most common document formats, including:

- MS Office, from 6.0 through the present version
- RTF (Rich Text Format)
- StarWriter
- HTML (Hyper Text Markup Language)
- PDF (Portable Document Format)

Currently, **OpenOffice.org** is not compatible with a few formats, including:

- MS Works
- WordPerfect

In the case of **WordPerfect**, a filter can be installed that will allow you to work with **WordPerfect** documents. It is called **WriterPerfect** and is available at SourceForge: <http://libwpd.sourceforge.net/>.

8.1.2. Styles

The use of styles is one of the most powerful aspects of **OpenOffice**. A *style* is a set of formating instructions that are used throughout a document.

Many users format their documents manually, highlighting each block of text individually and selecting formatting options each time a change is made. This practice is reasonable for short documents, but is time-consuming and inconsistent for longer documents.

When consistency in appearance is important, formatting with styles is more efficient. Creating a style that fits your specific needs requires an initial investment of time — but once the style has been created, it saves effort in two ways. First, a style can be applied to any document created in **OpenOffice.org**, immediately creating identical documents. Second, making a single change in the style creates changes across the entire document.

Use the Stylist to apply styles to text. It can be reached by clicking on the yellow diamond icon on your toolbar, by going to **Format => Styles**, or by pressing [F11]. To apply a style, highlight a block of text, then double-click on the appropriate style in the **Stylist**, such as **Heading1** or **Text body**.

To change a style throughout a document:

1. Highlight a representative block of text, such as a **Heading1** block of text.
2. Make formatting changes — color, font, etc.
3. With the text still highlighted, press the **Update Style** button on the Stylist.
4. All text that has the same style applied will now have the formatting that you just applied.

For more information, refer to the documentation available at the OpenOffice.org web site: <http://documentation.openoffice.org/manuals/oooauthors/IntroStyles.sxw>.

8.1.3. Templates

A template is essentially a blank form that a user fills with content. A common example of a template is letterhead, which has the sender's postal information at the top and a blank body for the letter text. In **OpenOffice.org**, templates can contain text, images, and formatting. If you find yourself frequently re-creating a relatively simple document, creating a template can save you time.

To create a template:

1. Create a normal file containing the text and formatting you would like to use for your template using one of the **OpenOffice.org** applications.
2. Save the file as a template by choosing **File => Templates => Save**.
3. Enter a name for your new template and click the **OK** button.

To use a template:

1. Start **OpenOffice.org**.
2. Go to **File => New => Templates and Documents**
3. A window will open with three template folders. Your template will most likely be in the folder marked **Default**.
4. Open the folder and select the template you wish to use.
5. Edit the file and add whatever content you choose.
6. Save normally. You will create a new file instead of over-writing your template.

For more information, refer to **OpenOffice.org's** documents at: http://documentation.openoffice.org/HOW_TO/word_processing/HowTo_Work_with_Templates.sxw.

8.1.4. Special Tools of OpenOffice.org

Spell Check

OpenOffice.org Writer includes an extensive, customizable dictionary for spell-checking. Also included is the ability to **AutoSpellcheck** - check spelling as you type. With **AutoSpellcheck**, a potentially misspelled word will be underlined in red. If you right-click on the word, the best matches for that word are provided. Select the correct word from the list. To spell check an entire document, go to **Tools => Spellcheck => Check**. To turn off the auto spell checker, go to **Tools**

=> **Spellcheck => AutoSpellcheck** and remove the checkmark there by clicking on it once. To turn it back on, click on it again.

Thesaurus

OpenOffice.org also includes a thesaurus. Click on the word to replace or double-click it to highlight the word. Go to **Tools => Thesaurus**. You will see a list of synonyms in the right pane. Scroll through the list of synonyms. When you find the one you are looking for, either double-click on it or click once to select and then click the **OK** button to insert it into your text. If the list of words does not include the word you want, you can select a word from the list by clicking once and then clicking the **Search** button. A new list of related words will be provided.

AutoCorrect / AutoFormat

The **AutoCorrect / AutoFormat** feature is one that automatically corrects common typing mistakes and applies formatting to certain types of text. Users can determine to what extent this feature assists them by going to **Tools => AutoCorrect / AutoFormat**. This opens a dialog with tabs that allow you to customize this feature's behavior. The **Options** tab allows users to select whether certain standard substitutions are made. The **Word Completion** tab allows users to turn this feature on and off, and to specify additional options. If at any time you make changes to **AutoCorrect / AutoFormat** and don't feel it has been applied to your text, highlight the area of text and select **Format => AutoFormat => Apply**.

8.1.5. More Help and Documentation

OpenOffice.org has excellent documentation, including tutorials, FAQs, and setup guides. Try the following helpful links:

- http://documentation.openoffice.org/HOW_TO/word_processing/Word-to-OOo.html has information especially helpful to those users who are accustomed to **Microsoft Office**.
- <http://documentation.openoffice.org/> has a list of the various documentation projects being maintained. This is where you will find FAQs, tutorials, and more.
- Be sure to check out the extensive **Help** menu. Go to **Help => Contents**, and choose the **Find** tab. This allows you to search through the help files for a keyword or phrase. Selecting the **Contents** tab allows you to search for your topic by browsing through subjects.
- Search for a keyword or phrase plus "OpenOffice.org" with your favorite search engine.

8.2. OpenOffice.org Writer

A word processor is like a text editor but has several additional features that allow you to format, design, and print your documents without the need to memorize complex formatting tags or codes. **OpenOffice.org Writer** is a powerful word processor that features *WYSIWYG* formatting - what you see in the **OpenOffice.org Writer** window is what you get if you print or share the document.

8.2.1. Overview of OpenOffice.org Writer

Writing documents using **OpenOffice.org** is similar to other word processing applications you may have used before. To start **OpenOffice.org Writer**, you can either start it from the **Applications** by selecting **Applications => Office => OpenOffice.org Writer**, or start it from a shell prompt by entering **owriter**.

When **OpenOffice.org Writer** opens, you are presented with a blank document. The margins of the document are represented by the gray box drawn on the main screen. You can start entering text immediately.



Tip

You may notice as you type that **OpenOffice.org Writer** fills in the rest of a word you are typing. **OpenOffice.org Writer** guesses the word you are typing based on longer words used earlier in the document. This auto-complete text is highlighted. To accept the suggested word ending, press the [Enter] key. If, however, this is not the word you wish to type, keep typing as normal. To turn off this feature, go to **Tools => Autocorrect / AutoFormat**. This opens a dialog box. Click the **Word Completion** tab and un-check the **Enable Word Completion** box.

To create a new file in **OpenOffice.org Writer**

1. Go to **File => New => Text Document** or click on the **New** document icon in the upper left. (The small arrow in the upper right of the icon allows you to select the type of document to create.)
2. Begin entering text.

To open an existing file:

1. Go to **File => Open**, click on the folder icon, or press [Ctrl]-[O].
2. A file browser window opens.
3. Use the navigation icons in the upper right or click through the folders in the window pane to find the file you wish to open.
4. Either double-click on the file or click once to highlight it and then click on the **Open** button to open the file.

To save a file:

1. Click on the floppy disk icon, go to **File => Save**, or go to **File => Save As**.
2. A window opens that shows your file system. If you have already saved this file before, you will not have to do anything else.
3. Navigate to the location where you would like to save your file.
4. Enter a name for your file in the **File name** field.
5. Select the format for your file from the **File type** drop down menu.
6. Click on the **Save** button.



Note

To save a document in a format other than **OpenOffice.org Writer**'s native format (.sxw), you must select the file type from the **File type** drop down list. If you also check the **Automatic file name extension** box, **OpenOffice.org Writer** will automatically add the correct extension (such as .doc or .txt) to the end of your file name. If you do not choose a file type from the drop down list, **OpenOffice.org Writer** will save in its native format, even if you type in the extension you would like for your file.

To save your document as a .pdf file, go to **File => Export as pdf**. While **OpenOffice.org Writer** can save as a .pdf, it cannot read or edit them. To view a .pdf file, see **FIXME**.

To print a document:

1. Click on the printer icon or go to **File => Print** or press [Ctrl]-[P]
2. A window opens with print configuration options.
3. Select the options you would like.
4. Click on the **OK** button.

To preview a file before printing:

1. Go to **File => Page Preview**.
2. A new window opens, displaying your file.
3. Examine your document: zoom in and out with the magnifying glass icons or scroll through the pages with the page icons near the upper left.
4. You may print from this screen the same way as from the main screen.
5. When you are finished examining your document, click the **Close Preview** button to return to the main screen.

To change text formatting:

1. Highlight the text you would like to format.
2. Either apply a style to the text with the **Stylist** (refer to **FIXME**) or
3. Choose formatting options from the toolbar, such as bold, alignment, line spacing, font color, etc.

To add lists to your text:

1. Either highlight existing text you would like to make into a list or move your cursor to the blank line where you would like to start the list.
2. Click either the **Numbering** icon or the **Bullets** icon.
3. For existing text, your list will automatically be created and formatted. For new text, enter each list item and press [Enter].
4. To exit the list, press [Enter] twice.

To format a page:

1. Go to **Format => Page**.
2. A window opens with several tabs of page options. The **Page** tab allows you to change your margins.
3. Select the formatting options you would like to change for your page.
4. Click on the **OK** button to apply the changes.

To undo changes:

1. Click on the **Undo** icon, go to **Edit => Undo**, or press [Ctrl]-[Z].
2. If you click on the blue arrow at the top right of the **Undo** icon, a list of the previous actions appears. Choosing one of these items undoes all actions back to that point.

8.3. OpenOffice.org Calc

8.3.1. Overview of OpenOffice.org Calc

OpenOffice.org Calc functions similarly to other spreadsheet applications. It is useful for creating forms as well as calculations.

To create a new spreadsheet:

1. Start **OpenOffice.org Calc** from the **Applications** menu by going to **Application => Office => OpenOffice.org Calc** or enter **oocalc** at a shell prompt.
2. Enter text, numbers, or functions.

To open an existing spreadsheet:

1. With **OpenOffice.org Calc** open, go to **File => Open**, click on the **Folder** icon, or press [Ctrl]-[O].
2. Navigate to the location of the spreadsheet.
3. Double-click on the spreadsheet name or click once to highlight it and then click the **OK** button.

To save a spreadsheet:

1. Click on the floppy disk icon, go to **File => Save**, or go to **File => Save As**.
2. A window opens that shows your file system. If you have already saved this file before, you won't have to do anything else.
3. Navigate to the location you would like to save your file in.
4. Enter a name for your file in the **File name** field.
5. Select the format for your file from the **File type** drop down menu.
6. Click on the **Save** button.

To print a spreadsheet:

1. Click on the printer icon or go to **File => Print** or press [Ctrl]-[P].
2. A window opens with print configuration options.
3. Select the options you would like.
4. Click on the **OK** button.

To manually enter a function:

1. Select the cell where the function should be placed.
2. Enter the function: start with an "=" sign and enter the name of the function.
3. To use cells in the *argument* of the function (the part of the function that is operated on), enter an open parenthesis, "(", and then highlight the cells with your mouse. You can also type in the cell names after the open parenthesis.
4. Press [Enter] to enter the function and calculate the result.

To enter a function using the **Function AutoPilot**:

1. Select the cell where the function should go.
2. Go to **Insert => Function** or press [Ctrl]-[F2].

3. The **AutoPilot** window opens.
4. Select the function you would like to use from the pane on the left. You select by double-clicking on the name of the function.
5. In the right pane, information about the selected function is displayed. Fields for the data are just below the function information. Lastly, a box displays the result of your calculation.
6. To select cells to use in your function, click on the **Shrink** icon next to the field these cells will be entered.
7. Highlight the cells with your mouse. Press [Enter] to return to **AutoPilot**
8. When finished, click the **OK** button.

To use conditional formatting:

1. Go to **Format => Conditional Formatting...**
2. A window opens with formatting options.
3. Select whether the condition applies to a cell or a function in the far left.
4. Select the condition of the relationship in the next drop-down box.
5. In the next field, either enter a value or select cells.
6. In the **Cell Style** drop-down menu, select what the resulting style should be.

To change cell format:

1. Select the cells to outline by highlighting them with the mouse.
2. Go to **Format => Cells** and select the **Borders** tab, or click the **Borders** icon on the **Object Bar** toolbar.
3. On the **Borders** tab, choose the color, position, weight, and line type of your borders. Click the **OK** button to apply these borders.
4. The small blue arrow in the upper right of the **Borders** icon opens a drop-down menu. Double-click the image that represents the borders to apply to your selection.

To create a chart:

1. Select the data to use for the chart by highlighting with the mouse.
2. Go to **Insert => Chart**.
3. The **AutoFormat Chart** window opens.
4. Select where you want your chart displayed and click **Next >>**.
5. Choose a chart type and click **Next >>**.
6. Choose a variant and click **Next >>**.
7. Enter titles for your chart and click **Create**.

8.4. OpenOffice.org Impress

OpenOffice.org Impress is a presentation application. It allows users to create what are commonly referred to as *slides* — text and graphics used to illustrate key points in a presentation. **Impress** can be used for print slides, or in conjunction with projectors to reach a large crowd. **Impress** has the functions you have come to expect from other presentation applications.

To start **Impress**, go to **Applications => Office => OpenOffice.org Impress**. When the application first starts, the **AutoPilot** guides you through the initial set up of your slide show. Make your selections and click **Create**. A blank slide opens and you can edit your presentation.

1. Download or create a new template for **OpenOffice.org Impress**.
2. Open the file in **OpenOffice.org Impress**.
3. Go to **File => Templates => Save**.
4. A window opens. Enter the name of the new template, and click the **OK** button.

To use a new Template:

1. Go to **File => New => Templates and Documents**.
2. A window opens with panes showing the template directories on the left and the templates inside those directories on the right. Look inside the **Default** folder for templates that you have saved.
3. Press the **OK** button.

To Display your Presentation:

1. Go to **Slide Show**. Inside this menu are various options for customizing your presentation, including the type of display, the transitions, and other effects. Browse through the various tools available from the menu.
2. Once your transition and other selections have been made, either go to **Slide Show => Slide Show** or press [F9].
3. To move through the slides of your presentation, click with the mouse or use the directional keys on your keyboard.

8.5. OpenOffice.org Draw and Math

8.5.1. OpenOffice.Org Draw

OpenOffice.org includes a drawing program for the creation of vector graphics. It can be accessed from inside other applications in the **OpenOffice.org** suite or as a separate application.

To open **OpenOffice.org Draw** from another application:

1. Go to **File => Object => OLE Object**.
2. When the **Insert OLE Object** window opens, select the **Create new from file** radio button, highlight **OpenOffice.org Draw**, and click **OK**.
3. **OpenOffice.org Draw** opens as a frame inside your document.
4. Create your drawing using the tools along the left-most toolbar.
5. When finished, click on your document outside of the drawing frame. The drawing is finished and inserted in your document.

To create a drawing with **OpenOffice.org Draw**:

1. Start the application by going to **Applications => Office => OpenOffice.org Draw**, entering **oodraw** from a shell prompt, or inserting a drawing from another application as described above.
2. Select a tool from the **Main Toolbar** by clicking on it once.

3. Select a variant of the tool from the list by clicking on it once.
4. Move your mouse pointer to the blank page and use the drawing tool.

8.5.2. OpenOffice.org Math

OpenOffice.org Math is a useful tool for creating properly formatted functions to import for display in any of the **OpenOffice.org** applications. Note that these functions cannot be imported to **OpenOffice.org Calc** for evaluation.

To create a function:

1. Open **OpenOffice.org Math** by going to **Applications => Office => OpenOffice.org Math**, entering **oomath** from a shell prompt, or inserting it as an OLE Object as described for **OpenOffice.org Draw**.
2. Select a type of function from the top half of the **Selection** window.
3. Select one of the functions from the bottom half of the **Selection** window.
4. The bottom pane of the main window contains the code for your selection. The variables of the function are represented by the symbols **?>**.
5. Replace the boxes with variables by deleting the **?>** symbols and replacing them with text.
6. Update the display screen by clicking inside it.
7. To nest selections, use parentheses. **OpenOffice.org Draw** uses the same order of operations as algebra.

Chapter 9.

Working with Other Text Applications

Text editors fall somewhere between word processors like **OpenOffice.org Writer** and pager applications like **less**. These programs are useful for tasks like writing HTML, C, or SGML; they are best suited for any task that is text-oriented, and is not necessarily intended for print.

Programs that allow you to view PDF and PS files are referred to as text viewers. They do not allow a user to edit the text directly, but do allow the user to view the pre-formatted text.

9.1. Working with Text Editors

Red Hat Enterprise Linux comes with several applications that can be used to write and edit program code. These programs are *text editors*, programs that provide the user with helpful highlighting and formatting options without making changes or additions to the text. The most common of these text editors are **vi** and **Emacs**. Two additional useful editors are **gedit** and **kate**.

9.1.1. vi

vi is a shell prompt text editor. This means that like **less**, opening an instance of **vi** does not open a GUI window. Instead, the contents of the file being edited appear in the current terminal window. Because **vi** works without a GUI, it can be used to edit text files even when X is not working.

vi operates via keystrokes — listed below is a small set of the keystrokes necessary to work with text in **vi**.

Key	Action
[i]	With a file open, press [i] to enter Insert mode. This mode allows you to move the cursor and to delete and add text anywhere in the file.
[Esc]	Pressing the [Esc] key at any time takes you out of Insert mode and into Normal mode.
[w]	[w] writes your changes to the file. Enter Normal mode, press [Shift]-[:, [w], and finally press [Enter].
[q]	[q] quits vi . Enter Normal mode, press [Shift]-[:, [q], and finally press [Enter]. To save your changes before exiting, enter : wq . To quit without saving your changes, enter : q! .
[!]	[!] forces vi to execute the commands that precede it.

Table 9-1. Useful keys in **vi**

vi uses many more keystrokes. To learn more about **vi**, view the manual page by entering `man vi` at a shell prompt. You can also access the **vim tutorial** but entering `vimtutor` command at a shell prompt.

9.1.2. Emacs

Emacs is a text editor that includes a GUI component. Like **vi**, **Emacs** also makes use of keyboard shortcuts to manipulate text. Users can choose between working with the mouse or the keyboard; all

commands are available via either method.

Emacs can be customized extensively. Programs that customize syntax highlighting or add other functionality can be written and installed. **Emacs** even contains several games available from the **Tools => Games** menu, and a "psychiatrist" available from the **Help** menu.

An **Emacs** tutorial is available by selecting **Help => Emacs Tutorial** from the main toolbar.

9.1.3. gedit

gedit is the **GNOME** text editor. It has highlight modes for HTML, Perl, C, PHP, and many other languages. **gedit** features print preview, the ability to undo your changes, and tabbed editing. **gedit** is fully integrated with **Nautilus**.

9.1.4. kate

kate is the **KDE** text editor. It also has highlight modes for multiple programming languages. **kate** uses split screens to display multiple files. **kate** also has the ability to open a terminal window within the application. **kate** is fully integrated with **Konqueror**.

9.2. Viewing PDF and PS files

Red Hat Enterprise Linux provides applications that allow you to view both PDF and PS files. To view PDF files, use the **gpdf** application. For PS files, use **ggy**.

Both **gpdf** and **ggy** are integrated into **Nautilus**. Double-clicking on a PDF or PS file while in **Nautilus** opens the file in the large pane of the **Nautilus** window. You can then scroll through and even print the files.

Both applications can be reached from a shell prompt by entering the name of the application followed by the path to the file.

```
gpdf /home/user/PDF/foo.pdf
```

The above command opens the file `foo.pdf`, located in user's `PDF/` directory, with the **gpdf** application.

```
ggy /home/user/PS/bar.ps
```

The above command opens the file `bar.ps`, located in user's `PS/` directory, with the **ggy** application.

Chapter 10.

Audio, Video, and Games

This chapter presents you with the lighter side of Red Hat Enterprise Linux. From games and toys to multimedia applications, Red Hat Enterprise Linux provides many packages to assist you in having some fun with your computer.

10.1. Playing Audio CDs

To play an audio CD, place it in your CD-ROM drive. The **CD Player** application should appear automatically and begin playing the first audio track. If the interface does not appear, click **Applications** (the main menu on the panel) => **Sound & Video** => **CD Player** to launch the **CD Player** application.

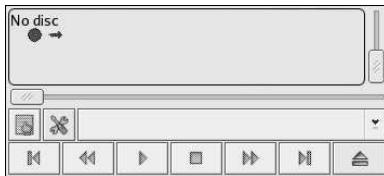


Figure 10-1. CD Player Interface

The **CD Player** interface acts similar to a standard CD player, with play, pause, and stop functions. There is even a sliding bar that allows you to adjust the volume. Press the **Next track** and **Previous Track** buttons to skip forward or backward one track; you can also use the **Track List** drop down menu to select a track from the available listing.

You can edit the track listings for your CDs by clicking the **Open track editor** button. You can also change the way the application functions by clicking on the **Open Preferences** button. Here you can set themes for the player as well as set the behavior of the CD-ROM drive when you open or quit the **CD Player** application.



Figure 10-2. CD Player Preferences

10.2. Playing Digital Audio Files

Digital audio has become very popular in recent years. Users enjoy the technology because the sound quality is excellent compared to analog tape or records, and the files are compact (audio files can easily be transferred across the Internet).

To take advantage of this technology, Red Hat Enterprise Linux includes the powerful *X Multimedia System (XMMS)*, a cross-platform multimedia player which allows you to play several digital audio file formats.



Figure 10-3. XMMS Interface

XMMS can be used for more than just playing digital audio files. By default **XMMS** can play Ogg Vorbis, RIFF wave, and most module formats. Additionally, **XMMS** can be extended via plugins to play a number of other digital multimedia formats.

To launch **XMMS**, go to **Main Menu => Sound & Video => Audio Player**.

To launch **XMMS** from a shell prompt, type the command `xmms`.

10.2.1. Using XMMS

To play an audio file with **XMMS**, click the **Open** button and choose a file from the **Load File(s)** window.

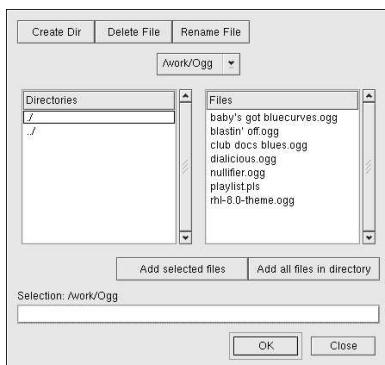


Figure 10-4. The Load File(s) Window

In Figure 10-4, you see that there are several files to choose from. The files that end in `.ogg` are *Ogg Vorbis* files, a popular new audio file format, while the `.pls` file is an audio *playlist* file. You can use **XMMS** to add audio files into a list and then save it as a playlist. This can be convenient if you have several audio files and you want to categorize them (for example, by genre or artist). Highlight the file you wish to play (if you have multiple files, click and hold the mouse button and drag it over all of the files you want to open) and click **OK**. Notice that **XMMS** begins to play your audio files immediately. To adjust the volume click and drag the volume slider (the long slider above the **Open** button) to the left to lower the volume or to the right to increase it, like you would when using a CD player. There are also buttons to stop, pause, and skip (backward and forward) your audio files.

To learn more about using **XMMS** and its many options, refer to the man page by entering `man xmms` at a shell prompt.

10.3. Troubleshooting Your Sound Card

If, for some reason, you do not hear sound and know that you do have a sound card installed, you can run the **Sound Card Configuration Tool** utility.

To use the **Sound Card Configuration Tool**, choose **Applications => System Settings => Sound-card Detection**. A window opens, prompting you for your root password.



Note

Most sound cards are supported by Red Hat Enterprise Linux, but there are some sound cards that are not completely compatible or may not work at all. If you are having trouble configuring your sound card, check the Hardware Compatibility List at <http://hardware.redhat.com/hcl/> to see if your card is supported.

The **Sound Card Configuration Tool** utility probes your system for sound cards. If the utility detects a plug and play sound card, it automatically tries to configure the correct settings for your card. You can then click the **Play test sound** button to play a sound sample. If you can hear the sample, select **OK** and your sound card configuration is complete.



Tip

It is possible that your sound has been muted. To check this, click on the Volume Control icon on the top Panel. Check the Volume Control application available from the **Applications** (the main menu on the panel) => Sound & Video => Volume Control. If any of the mute boxes have been checked, un-check them and try the Sound Card Configuration Tool again.



Figure 10-5. Sound Card Configuration Tool

10.3.1. If Sound Card Configuration Tool Does Not Work

If the **Sound Card Configuration Tool** does not work (if the sample does not play and you still do not have audio sounds), there are alternatives, although they are not quite as simple as running the **Sound Card Configuration Tool**. You can edit your `modules.conf` file as discussed in the next section (this strategy is not recommended for most new users) or refer to the documentation that came with your sound card for more information.

10.3.1.1. Manual Sound Card Configuration

If your sound card is not a plug and play card, you can manually edit your `/etc/modules.conf` file to include the sound card module that it should use. You must have root privileges to alter this file. The following is an example of the text to add to your `/etc/modules.conf` file:

```
alias sound sb
alias midi opl3
options opl3 io=0x388
options sb io=0x220 irq=7 dma=0,1 mpu_io=0x300
```

For information on configuring sound manually, refer to the *Linux Sound HOWTO* at the Linux Documentation Project webpage:

<http://www.tldp.org/HOWTO/Sound-HOWTO/>

10.4. Troubleshooting Your Video Card

Video card configuration is handled during the Red Hat Enterprise Linux installation (refer to the *Red Hat Linux Installation Guide* for more information). However, if you did not choose to configure a video card at that time, or if you need to reconfigure your settings, you can use the **X Configuration Tool** utility. Use this utility if you install a new video card.



Note

The **X Configuration Tool** backs up your system's original video configuration file to `/etc/X11/XF86Config.backup` in case you need it to switch back to a previous configuration.

To run the **X Configuration Tool**, click **Applications => System Settings => Display**. A pop-up window prompts you for your root password. You can also start from a shell prompt by typing the command `system-config-xfree86`, which then prompts you to enter your root password. If you are working from a shell prompt and X is not working, `system-config-xfree86` attempts to start a minimal X session to allow you to continue your configuration.



Note

If you have recently entered your root password for a different application, you may not be prompted to enter it again.

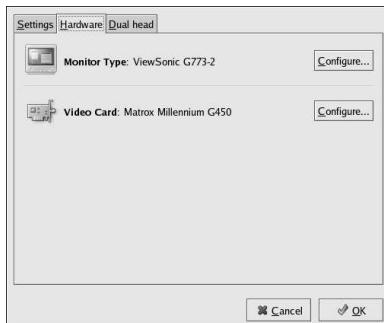


Figure 10-6. X Configuration Tool

To configure your monitor manually, click the **Hardware** tab, then click the **Configure...** button next to the **Monitor Type** entry. A pop-up window displays a list of monitor models. Choose your model and click **OK**. You can also let the **X Configuration Tool** probe your monitor for the correct model and vertical/horizontal frequency settings.

To configure your video card manually, click the **Hardware** tab, then click the **Configure...** button next to the **Video Card** entry. A pop-up window displays a list of video card models. Choose your model and click **OK**. You can also let the **X Configuration Tool** probe your video card for the correct model and settings by clicking the **Probe Videocard** button.

When you have finished reconfiguring your video card and monitor, you should be able to start an X session and enjoy your graphical desktop environment.

10.5. Games

Playing games under Red Hat Enterprise Linux is a fun way to pass the time.

Game availability depends on the variant of Red Hat Enterprise Linux you installed. You must have those game packages installed before they appear under the **Applications => Games** menu. Refer to the *Red Hat Enterprise Linux System Administration Guide* for details on installing additional packages.

To start a game, click **Applications => Games** and select the game of your choice. Figure 10-7 shows a fun game for kids of all ages called **Same GNOME**. In this game you point your mouse at matching marbles until they start to spin; then, you can click them to make them disappear. The object of the game is to make all the marbles disappear.

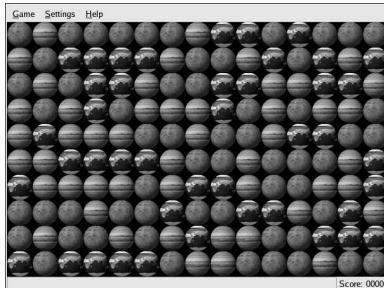


Figure 10-7. Same GNOME — Match the Marbles Game

10.6. Finding Games Online

There are many games available within Red Hat Enterprise Linux and online. For more information, here are a few suggestions:

- <http://www.tuxgames.com/> — A store where you can buy games just for Linux.
- <http://www.linuxgames.com/> — T Linux gaming news site.
- <http://happypenguin.org/> — The Linux gaming repository.

You can also browse the Internet for linux games using a search engine, such as <http://www.google.com/>.

Chapter 11.

Working with Digital Cameras

Digital cameras have recently grown in popularity because of their increasing image quality and easy interaction with desktop PCs. Digital cameras create high-quality images that you can share with others over the Internet or print on a color printer. Red Hat Enterprise Linux supports several brands of digital cameras and has applications that help you access, view, and modify your digital photographs.

11.1. Nautilus and Digital Cameras

Nautilus has the built-in ability to work with USB devices. If your digital camera connects via a USB connection, Red Hat Enterprise Linux may not require special software or configuration to access the images stored on your camera.

To use Nautilus to access your camera:

1. Plug the USB cable into your camera and to your computer.
2. Turn your camera on and put it in the settings recommended by your manufacturer for connecting to a computer.
3. If Nautilus recognizes your camera, a new icon appears on the Desktop. This icon will be named **Type of memory card Removable Media**.
4. You can browse through this folder as with any other directory; double-click on the icon to open the folder.
5. Your images may exist a few directories down, inside the initial directory. Recall that Nautilus displays images as thumbnails, so your pictures are easy to recognize.
6. To save the images to your computer, copy and paste the thumbnails to your preferred directory.
7. When you are finished, right-click on the icon and select **Unmount Volume** before disconnecting your camera.

11.2. Using gThumb

Red Hat Enterprise Linux supports over 100 digital camera models. So, whether your camera uses a USB or serial port to communicate with your computer, it is likely that Red Hat Enterprise Linux supports it.

gThumb is a graphical application that allows you to interface with your digital camera. **gThumb** works directly with your digital camera, allowing you to open, view, save, and delete images directly. You can also download the images to your computer and modify them with image manipulation programs such as **The GIMP** (refer to Chapter 12 *Working with Images* for more information about image manipulation tools).

To start **gThumb**, choose **Applications** (the main menu on the panel) => **Graphics** => **Photo Tool**. You can also start **gThumb** by typing `gthumb` at a shell prompt.

Before you begin using **gThumb**, configure it to work with your digital camera. From the **File** menu, select **Import Photos....** The **Import Photos** window opens. On the left is an icon of a camera. If you have not configured **gThumb** before, the icon has a red slash through it and the label **No camera detected**. Click on the icon to open the **Camera Model** window. This window has two drop-down menus: the first allows you to select your camera model from an extensive list, and the second allows you to select the type of port your camera uses to connect to your computer. Make your selections and

click the **OK** button. At the **Import Photos** screen, select the destination of your photos and click the **Import** button.

FIXME - Image of Import Screen

FIXME - Image of Camera Model Screen

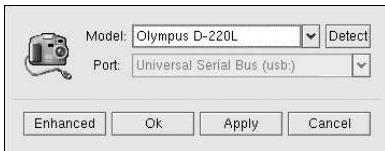


Figure 11-1. Adding a Camera in gThumb

Imported photos are listed in the right pane of the main screen. To view an individual image, double-click on its thumbnail. To return to viewing all images, click on the **Folders** icon at the top left of the screen.

gThumb can also categorize your photos. Double-click on a thumbnail to open the image in **gThumb**'s main screen. Select the **Categories** icon from the toolbar. Scroll through the list of categories and click on the ones to associate with your image. You can create and deleted categories by clicking on the **New** and **Delete** icons. When you are finished, click the **OK** button.

gThumb has many more features. Refer to the **Help Contents** or view the documentation at <http://gthumb.sourceforge.net> for additional information.

Chapter 12.

Working with Images

Digital images are ubiquitous — they are available on the Internet, through email, and even on CD from film developers. These images are files, and can be manipulated with software available on your Red Hat Enterprise Linux system. Red Hat Enterprise Linux allows you to save, view, edit, and create image files.

12.1. Saving Images

Images that are not copyrighted can be saved directly from many web pages. Right click on an image and select either **Save Image** or **Save Image As**, depending on the browser you use to view the web pages. Some web sites have disabled this function because their images are copyrighted.

Images in email messages may also be saved on your system. These images arrive as *attachments* to the email message. An attachment is any extra file that is sent together with an email. Depending on the type of attachment and the email program you use, the attachment may be displayed as part of the message. Check the **Help** contents of the email program you use to determine how to save attachments to your computer.

Images you receive on a CD or other removable media device can be copied and pasted from that medium to a new location on your system. Refer to Chapter 13 *Diskettes and CD-ROMs* for more information on removable media and **Nautilus**.

12.2. Viewing Images

This section discusses some of the common tools for viewing image files. Red Hat Enterprise Linux contains light, fast applications that display images as well as full-featured applications that display and edit images.

12.2.1. Nautilus

As discussed in Section 2.1 *Using Nautilus*, **Nautilus** displays image files as thumbnails. To view a larger display of the image, double-click on the thumbnail. **Nautilus** opens the file in the default image viewing application, **Eyes of GNOME**.

12.2.2. gThumb

gThumb is a powerful image viewer for graphical desktop users that supports several image file formats.

gThumb is useful for viewing individual image files as well as browsing collections of files in folders. It supports zoom in and zoom out functions, as well as thumbnails of all image files within a directory. It also supports several advanced options not found in **Nautilus**.

gThumb can be started from your desktop panel by selecting **Applications => Graphics => Photo Tool**. Start the application from a shell prompt by entering the command `gthumb`. **gThumb** will browse your user home directory by default. If you have any images in this directory, the gallery panel will automatically generate thumbnails in the main display area.

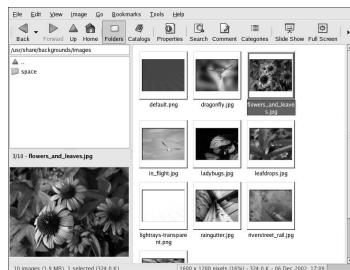


Figure 12-1. gThumb Displaying a Folder of Images

The **gThumb** interface has a text field for you to enter a particular path to your image directories. Right-clicking on an image in the display area opens a pop-up menu of file management options such as renaming, moving, copying, and converting an image from one file format to another. You can also set an image as your desktop wallpaper within the pop-up menu.

You can combine functions within **gThumb** and create a dynamic presentation effect for groups of images within a directory. In the text field below the toolbar, type the path to the directory where your images are located and highlight the first image in the main gallery panel. Clicking the **Slide Show** button on the toolbar starts a full-screen slide show. By default, each image in the slide show is presented for 4 seconds. You can stop the slide show at any time by pressing [Esc] or by moving your mouse cursor and clicking the **Restore Normal View** pop-up button that appears on the top left corner of the screen.

12.2.3. GIMP

To start the GIMP, select **Applications => Graphics => The GIMP**. The first time the application starts, you must go through an installation process. Select **Continue** to accept the default options of the installation. Once the **GIMP** has installed, use it to display your image file by selecting **File => Open** and navigating to the file on your system. Double-click on the file to display it.

12.3. Editing and Creating Images with the GIMP

The GNU Image Manipulation Program (**GIMP**) is a powerful application that can alter, manipulate, enhance, and create digital image files. **FIXME** discusses how to start the application. The following sections discuss the main features of the application.

12.3.1. Saving an Image

To save an image file, right-click on the image, choose **File**, and select either **Save** or **Save As**. The **Save Image** window opens. Navigate to the directory where you would like to save your file. Enter a name for your file in the field at the bottom of the window.

You must choose a file type for your image. By default, the **GIMP** will save your file according to the extension you type at the end of your file name. You may also select the file type from the **Determine File Type** drop-down menu above the file name field. When you are ready to save, click the **OK** button.

Depending on the file type you selected, another window with options may open. In general, it is a good idea to accept the settings that the **GIMP** suggests. Click the **OK** button again to complete the save process.

12.3.2. Editing an Image

To crop an image:

1. Open the image.
2. Right click on the image and select **Tools => Transform Tools => Crop and Resize**.
3. Left-click and drag the mouse pointer to create a frame that fits the part of the image to keep.
4. Click the **Crop** button in the window that opens as you drag the frame across the image.
5. If you are unhappy with the cropped image, press [Ctrl]-[Z].

To Rotate an Image:

1. Open the image.
2. Right-click on the image and select **Image => Transform**, then select any of the **Flip** or **Rotate** options.
3. If you are unhappy with the changes, press [Ctrl]-[Z].

To Add Text to an Image:

1. Open the image.
2. Right-click on the image and select **Tools => Paint Tools => Text**.
3. Left-click where the text should begin.
4. Type the text into the **GIMP Text Editor** window.
5. Click the **OK** button.
6. Your text appears on the image.
7. If you are unhappy with the changes, press [Ctrl]-[Z].

To apply a filter:

1. Open the file.
2. Right-click on the image and select **Filters**.
3. Choose any of the filters available.
4. Choose options for the filter.
5. Click the **OK** button.
6. If you are unhappy with the changes, press [Ctrl]-[Z].

To create a new image:

1. Choose **File => New**.
2. Enter the image size, image type, and fill type of the file.
3. Click the **OK** button.
4. Edit and manipulate the image with the **GIMP**'s various tools.

5. Save your file.

While this chapter covers image applications briefly, there is much more detailed information available. Refer to the following resources if you are interested in learning more about the applications in this chapter.

The **GIMP** has a help browser accessible by choosing **Help => Help...** from the **GIMP** toolbar menu. This is an excellent place to begin searching for answers. However, if the **Help** menu does not provide enough information, try the following resources:

12.3.2.1. Useful Websites

The Web has several sites of interest if you are looking for more detailed information about an application covered in this chapter:

- <http://www.gimp.org/> — The official **GIMP** website.
- <http://www.rru.com/~meo/gimp/faq-user.html> — A **GIMP** Frequently Asked Questions (FAQ) list by **GIMP** users (as opposed to developers).
- <http://gimp-savvy.com/> — The companion website to the book *Grokking the GIMP*, by Carey Bunks. The entire book is also available on the site for download
- <http://tigert.gimp.org/gimp/> — The **GIMP** website of tigert (Tuomas Kuosmanen).

12.3.2.2. Related Books

If you need in-depth information about the many capabilities of the **GIMP**, try your favorite bookstore. The following books were available at the time of this writing:

- *The Artists' Guide to the GIMP* by Michael J. Hammel; Frank Kasper and Associates, Inc.
- *GIMP Essential Reference* by Alex Harford; New Riders Publishing
- *GIMP for Linux Bible* by Stephanie Cottrell Bryant, et al; Hungry Minds, Inc.
- *GIMP: The Official Handbook* by Karin Kylander and Olof S. Kylander; Coriolis Group
- *Grokking the GIMP* by Carey Bunks; New Riders Publishing
- *Sams Teach Yourself GIMP in 24 Hours* by Joshua and Ramona Pruitt; Sams
- *GIMP Pocket Reference* by Sven Neumann; O'Reilly and Associates

Chapter 13.

Diskettes and CD-ROMs

Using removable media with Red Hat Enterprise Linux requires some explanation. This chapter discusses how to read and write files to and from diskettes, CD-ROMs, and USB Flash Drives.

13.1. Using Diskettes

Diskettes are one of the oldest removable media solutions available for the personal computer (PC). Diskettes are ideal as a portable storage solution for small files that need to be physically moved around. For example, if two PCs are not on the same network, diskettes are a great solution to transfer files from one computer to the other. Diskettes degrade with time, and should not be used for long term storage.

13.1.1. Mounting and Unmounting a Diskette

Diskettes must be *mounted* before use and unmounted before they are ejected from the drive. To mount a diskette means to attach it to your current file system. Strictly speaking, Red Hat Enterprise Linux attaches the contents of the diskette to your computer's file system under the directory `/media/floppy/`. Diskettes may be mounted manually from a shell prompt. **Nautilus** also has the ability to auto-mount diskettes.

To manually mount a diskette:

1. Insert the diskette in the diskette drive.
2. At a shell prompt, enter the command `mount /media/floppy/`.
3. The diskette drive activity light should blink as it is mounted to `/media/floppy/`.
4. You can access the contents of the diskette by browsing to that directory from a shell prompt or through a file browser like **Nautilus**.

To mount a diskette with **Nautilus**:

1. Insert the diskette into the drive.
2. Double-click on the **Computer** icon on your desktop. The **Computer** window opens.
3. Double-click the **Floppy** icon. **Nautilus** automatically mounts the diskette and opens a window with the diskette's contents.
4. At the same time, a diskette icon appears on the desktop. Double-click this icon at any time to open a window with the diskette's contents. Files dragged onto the icon are copied to the diskette.

To unmount a disk manually:

1. Open a terminal window.
2. At the shell prompt, enter the command `umount /media/floppy/`.

To unmount a diskette with **Nautilus**:

1. Right-click on the diskette icon on the desktop.

2. Select **Unmount Volume** from the menu.

Once the diskette has been unmounted, you can safely eject it from the drive.



Note

If you do not unmount a diskette before ejecting it, the files you meant to transfer to it will not actually be written on the diskette. You may also be unable to mount a new diskette, or the old data may be written over the new diskette. Be certain to unmount your diskettes before removing them.

13.1.2. Putting Linux Files on an MS-DOS Diskette

To copy files from a Red Hat Enterprise Linux system to an MS-DOS formatted diskette so that a Windows machine can read it, be certain that the diskette is formatted with an MS-DOS (FAT) file system. Diskettes that are pre-formatted by the manufacturer are generally formatted with a FAT file system. You can also format the diskette with the Windows OS or with **gfloppy**. Refer to Section 13.1.3 *Formatting a Diskette* for more detail on formatting.

Files may be copied to and deleted from the diskette with the same shell prompt commands or actions in **Nautilus** as described in Section 4.5 *Manipulating Files in Your Current Working Directory*. You can then unmount the diskette and eject it from the drive. The files on the diskette should now be accessible from the Windows machine.

13.1.3. Formatting a Diskette

The native file system for exclusively Red Hat Enterprise Linux diskettes is ext2. Once you have created an ext2 file system on your diskette, you can manipulate its contents the same ways that you manipulate directories and files on your hard drive.



Warning

Formatting a diskette will permanently erase all of its contents. Be sure to backup any files that you need before performing any of the following operations on your diskettes.

13.1.3.1. Formatting with **gfloppy**

To start **gfloppy**, choose **Applications => System Tools => Floppy Formatter**. From a shell prompt, type `/usr/bin/gfloppy`. **gfloppy** will not format a diskette that is mounted to your file system. Make certain that the diskette icon is not visible on your desktop before proceeding. If the diskette is mounted, right-click on the icon and choose **Unmount Volume** before proceeding.

As shown in Figure 13-1, the **gfloppy** interface is small and has few options. The default settings are sufficient for most users and needs; however, you can format your diskette with an MS-DOS file system type if necessary. You can also choose the density of your diskette (if you are not using the usual high density 3.5" 1.44MB diskette). You can also elect to *quick format* the diskette if it was previously formatted as ext2.

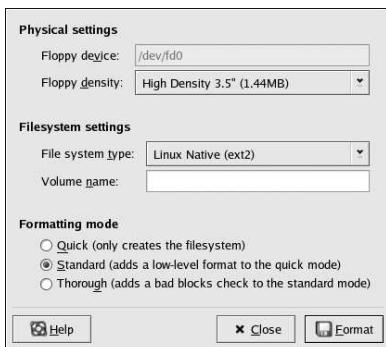


Figure 13-1. gfloppy

Change the settings in **gfloppy** to suit your needs; then click **Format**. A status box appears on top of the main window, showing you the status of formatting and verification. Once complete, close **gfloppy** and either eject or mount and use the diskette.

13.1.3.2. Using `mke2fs`

The `mke2fs` command is used to create a Linux ext2 file system on a device such as a hard drive partition or (in this case) a diskette. `mke2fs` essentially formats the device and creates an empty, Linux-compatible device which can then be used for storing files and data.

Insert your diskette into the drive and issue the following command at a shell prompt:

```
/sbin/mke2fs /dev/fd0
```

On Linux systems, `/dev/fd0` refers to the first diskette drive. If your computer has more than one diskette drive, your primary diskette drive is `/dev/fd0`, your second `/dev/fd1`, and so on.

The `mke2fs` utility has a number of options. The `-c` option makes the `mke2fs` command check the device for bad blocks before creating the file system. The other options are covered in the `mke2fs` man page.

Once you have created an ext2 file system on the diskette, it is ready to be used with your Red Hat Enterprise Linux system.

13.2. CD- and DVD-ROMs

The CD-ROM format is a popular medium for software, music, and data file. As the costs involved plummet, DVD-ROMs are also becoming more popular. This section discusses how to use CDs and DVDs with your Red Hat Enterprise Linux system.

13.2.1. Using CD-ROMs with Your File Manager

Nautilus automatically mounts both Compact Discs (CDs) and Digital Versatile Discs (DVDs) by default. **Nautilus** will then do one of the following, depending on the type of CD or DVD: for audio

CDs, **Nautilus** starts **CD Player**; for data CDs and DVDs, **Nautilus** opens a file browser window that displays the contents of the disk.

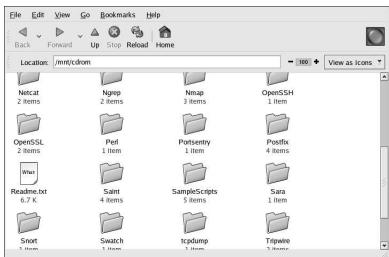


Figure 13-2. Contents of a CD-ROM in Nautilus

When **Nautilus** auto-mounts a CD or DVD, it places an icon on the desktop that matches the type of media inserted. Double-clicking the icon performs the default action for that medium: for example, double-clicking the **Audio CD** starts the **CD Player** application.

You can also access the CD or DVD by double-clicking on the **Computer** icon on your desktop, then double-clicking on the appropriate icon inside the **Computer** window.

This icon can also be used to unmount and eject your CD or DVD. Right-click on the icon and select **Eject** to remove the disk from your system.



Tip

Nautilus will not let you browse an audio CD. To copy files from an audio CD to your computer, use **Sound Juicer**.



Tip

If any applications, file browsers, or terminal windows have the CD or DVD open, or any of its files, **Nautilus** will not eject the media. Close all such files and terminal windows before proceeding.

13.2.2. CDs and DVDs From the Shell Prompt

If the CD or DVD is not currently mounted, you can mount it manually.

1. Insert a CD or DVD into the appropriate drive.
2. Open a terminal window.
3. At the shell prompt, enter the command `mount /media/cdrom/`.

The CD or DVD is now mounted and available for use. You can unmount and eject the CD or DVD by entering the command `umount /media/cdrom/`. You can then safely press the eject button on your CD or DVD drive to retrieve the disk.

13.3. CD/DVD-Rs and CD/DVD-RWs

CD-writable (CD-R) media are an inexpensive way to back up as much as 760MB of data, including applications, personal files, and multimedia files. CD-rewritable (CD-RW) media are also very common, and allow the user to write files to the media multiple times.

Recently, the DVD equivalents of these media have become more common and more affordable. They behave similarly to CDs, but can store up to 4.7GB of information. DVDs, in general, cannot be read by CD-ROM drives, though most DVD-ROM drives can read CDs. Refer to the manufacturer of your drive for more information regarding compatible formats.

Below, we discuss tools for both CDs and DVDs.

13.3.1. Using CD/DVD Creator

Nautilus has an integrated tool, **CD/DVD Creator**, that allows you to write to CDs and DVDs.

CD/DVD Creator allows you to drag and drop files from a **Nautilus** window to the **CD/DVD Creator** interface. To access the **CD/DVD Creator** feature in **Nautilus**, insert a blank CD-R(W) into your drive and the **CD/DVD Creator** window automatically starts. You can also open **CD/DVD Creator** from a **Nautilus** window by selecting **Go => CD Creator**.

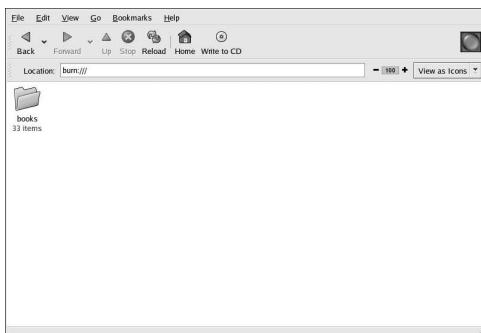


Figure 13-3. The CD/DVD Creator Interface in Nautilus

Open a new **Nautilus** window and select the files or directories you want to write to CD or DVD, then drag the files and folders to the **CD/DVD Creator** window.

When you are ready to write the files to your CD or DVD, click the **Write to CD** button in the **CD/DVD Creator** window. The **Write to Disk** window opens. Select the write speed, name the CD or DVD, and click the **Write** button when finished.

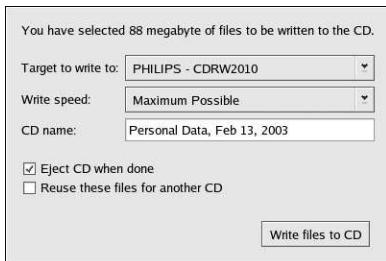


Figure 13-4. The CD/DVD Creator Write Dialog Box

By default, the CD or DVD should automatically eject from your drive when it is finished. Since it is generally recommended to periodically backup personal files, **CD/DVD Creator** can help you do so quickly.

13.3.2. Using CD-Rs and CD-RWs with Command Line Tools

There are two shell prompt applications used to write image to CDs and DVDs: `mkisofs` and `cdrecord`. These utilities have several advanced options that are beyond the scope of this guide; however, for basic image creation and writing, these tools save some time over the graphical alternatives such as **CD/DVD Creator**.

13.3.2.1. Using `mkisofs`

The `mkisofs` utility creates ISO9660 image files that can be written to a CD or DVD. The images created by `mkisofs` can include all types of files. It is most useful for archival and file backup purposes. For CDs, make sure that the total data to be written is less than 760MB. For DVDs, make sure that it is less than 4.7GB of data.

Suppose you wish to backup a directory called `/home/user/`, but exclude the subdirectory `/home/user/junk/` because it contains unnecessary files. You want to create an ISO image called `backup.iso` and write it to CD or DVD. Backing up your data as an ISO9660 image is useful in that it can be read by both Red Hat Enterprise Linux and Windows systems. This can be done with `mkisofs` by running the following command:

```
mkisofs -o backup.iso -x /home/joeuser/junk/ -J -R -A -V -v /home/joeuser/
```

The image is created in your current working directory. Table 13-1 explains each command line option. For more information on using `mkisofs`, refer to the additional resources in Section 13.4 *Additional Resources*.

You can now use the ISO image file with `cdrecord`, the command line based CD recording utility. For more information about using `cdrecord`, refer to Section 13.3.2.2 *Using cdrecord*.

Option	Function
<code>-o</code>	Specifies an output file name of the ISO image.
<code>-J</code>	Generates Joliet naming records; useful if the CD is used in Windows environments.
<code>-R</code>	Generates Rock Ridge (RR) naming records to preserve filename length and casing, especially for UNIX/Linux environments.

Option	Function
-A	Sets an Application ID — a text string that will be written into the volume header of the image which can be useful to determine what applications are on the CD.
-V	Sets a Volume ID — a name that is assigned to it if the image is burned, and the disc is mounted in Solaris and Windows environments.
-v	Sets verbose execution, which is useful for viewing the status of the image as it is being made.
-x	Excludes any directory immediately following this option; this option can be repeated (for example, ... -x /home/joe/trash -x /home/joe/delete ...).

Table 13-1. mkisofs Options

13.3.2.2. Using cdrecord

The `cdrecord` utility writes audio, data, and *mixed-mode* (a combination of audio, video, and/or data) CDs and DVDs using options to configure several aspects of the write process, including speed, device, and data settings.

To use `cdrecord`, you must first establish the device address of your CD or DVD device by running the following command as root at a shell prompt:

```
cdrecord -scanbus
```

This command shows all CD and DVD devices on your computer. It is important to remember the device address of the device used to write your CD. The following is an example output from running `cdrecord -scanbus`.

```
Cdrecord 1.8 (i686-pc-linux-gnu) Copyright (C) 1995-2000 Jorg Schilling
Using libscg version 'schily-0.1'
scsibus0:
 0,0,0      0) *
 0,1,0      1) *
 0,2,0      2) *
 0,3,0      3) 'HP      ' 'CD-Writer+ 9200 ' '1.0c' Removable CD-ROM
 0,4,0      4) *
 0,5,0      5) *
 0,6,0      6) *
 0,7,0      7) *
```

To write the backup file image created with `mkisofs` in the previous section, switch to the root user and type the following at a shell prompt:

```
cdrecord -v -eject speed=4 dev=0,3,0 backup.iso
```

The command sets the write speed (4), the device address (0,3,0), and sets write output (*verbose* [-v]), which is useful for tracking the status of the write process. The `-eject` argument ejects the media after the write process is complete. The same command can also be used for burning ISO image files downloaded from the Internet, such as Red Hat Enterprise Linux ISO images.

You can use `cdrecord` to blank CD-RW or DVD-RW discs for reuse by typing the following:

```
cdrecord --dev=0,3,0 --blank=fast
```

13.4. Additional Resources

This section briefly covers several applications. Refer to the following resources for more information about the applications in this chapter.

13.4.1. Installed Documentation

- `cdrecord` man page — Discusses how to burn data, audio and mixed-mode CDs and DVDs. Offers all options and commands in detail, including some example commands for common CD and DVD burning tasks.
- `/usr/share/doc/cdrecord-<version>` (where `<version>` is the version of `cdrecord` installed on your system) — Several documentation files are included with general usage and licensing information.
- `mkisofs` man page — Comprehensive detail of the utility, including some warnings about creating certain types of ISO images. Offers all options and commands in detail, including some example commands for creating common ISO image files.
- `/usr/share/doc/mkisofs-<version>` (where `<version>` is the version of `mkisofs` installed on your system) — Several documentation files are included with general usage and licensing information.
- `/usr/share/doc/dvdrecord-<version>/` (where `<version>` is the version of `dvdrecord` installed on your system) — For users who have DVD-R(+W) devices, this set of documentation helps you get started mastering DVD-ROMs for data backup and multimedia presentation.

13.4.2. Useful Websites

- <http://freshmeat.net/projects/cdrecord/> — The `cdrecord` project page on Freshmeat is regularly updated with the newest releases, news, and user commentary.

13.5. USB Flash Drives

A recent development in removable media is the USB Flash Drive. This is a small, solid-state memory device, normally no larger than a pen. They can be carried conveniently on a key ring, and are sometimes referred to as 'USB Keys' as a result. These small drives can contain files, directories, and even software. Red Hat Enterprise Linux has the ability to use these drives through the auto-mount features of **Nautilus**.

Like diskettes, USB drives are useful for carrying files between machines not on the same network, or between computers that use different operating systems. Linux can read files from a USB drive formatted to work in Windows. However, if you encrypt the files or filesystem on your USB drive, Linux may not be able to read those files.

13.5.1. Mounting your USB drive

When you plug the drive into a USB port on your Red Hat Enterprise Linux system, several things happen. **Nautilus** recognizes the drive and auto-mounts it to the directory `/media/<manufacturer>/`, where `<manufacturer>` is the name of the maker of your drive. **Nautilus** also creates an icon of the same name on your desktop. Finally, **Nautilus** adds a similar icon to the **Computer** window.

To mount your USB drive manually:

1. Open a terminal window.
2. Enter the command `mount /media/<manufacturer>/`.

To mount your USB drive with **Nautilus**

1. Open the **Computer** window from the desktop.
2. Double-click the USB key icon, or right-click on the icon and select **Mount Volume**.

13.5.2. Accessing the USB drive

You can access your USB drive from the desktop or from a shell prompt. From the desktop, you can either double-click the icon or you can first open the **Computer** window, then double-click the USB drive icon. From a shell prompt, enter the command `cd /media/<manufacturer>`, making sure to replace `<manufacturer>` with the drive's manufacturer.

13.5.3. Unmounting the USB drive

You must unmount your USB drive before removing it from your system, or problems similar to those that can affect diskettes may afflict your USB drive.

To unmount your USB drive manually:

1. Open a terminal window.
2. Enter the command `umount /media/<manufacturer>` at the shell prompt.

To unmount your USB drive with **Nautilus**

1. Locate the USB drive icon on your desktop or inside the **Computer** window.
2. Right-click on the icon and select **Unmount Volume**.

Once the USB drive has been unmounted, you may safely remove it from your USB port.



Tip

The icon for the USB drive will remain visible from the **Computer** window as long as the drive is plugged in to the port. It will remain visible even if the drive is not mounted. If you think your drive should have files on it but cannot see them, verify that the drive is mounted.

III. Troubleshooting Your System

If you ever run into problems using your Red Hat Enterprise Linux system, there are steps you can take and tools you can use to recover from issues that get you back to using your system normally. From booting into rescue mode to changing a forgotten password, this part can show you how to troubleshoot several common issues that you may run into in the course of using Red Hat Enterprise Linux.

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Chapter 14.

Frequently Asked Questions

This chapter answers some of the most common questions about using Red Hat Enterprise Linux that you may ask as you become more familiar with it. From recovering forgotten passwords to troubleshooting package installation problems, this chapter guides you step-by-step through some common tasks to get you on your way.

14.1. Localhost Login and Password

I have installed Red Hat Enterprise Linux. After rebooting, I get a message telling me it needs a localhost login and password. What are these?

Unless you specified a hostname for your computer, or received that information from a network connection, your Red Hat Enterprise Linux installation names your machine `localhost.localdomain` by default.

When you get to that initial prompt, it is asking you to log in to your system. If you created a user account with the **Setup Agent**, you can log in using that username and password. If you did not create a user account, then you can log in as the super user, also known as **root**. The root password is the system password you assigned during installation.

It is highly recommended that you create at least one user account for regular use of your Red Hat Enterprise Linux system. You can create a new user after logging in as root with the **User Manager** graphical tool or the `useradd` shell prompt utility. For more information, refer to Section 1.6 *Creating a User Account*.

14.2. Forgotten root Password

Help! I forgot my root password. How do I log in now?

You can log in using single-user mode and create a new root password.

To enter single-user mode, reboot your computer. If you use the default boot loader, **GRUB**, you can enter single user mode by performing the following:

1. At the boot loader menu, use the arrow keys to highlight the installation you want to edit and type [A] to enter into `append` mode.
2. You are presented with a prompt that looks similar to the following:
`grub append> ro root=LABEL=/`
3. Press the Spacebar once to add a blank space, then add the word **single** to tell GRUB to boot into single-user Linux mode. The result should look like the following:
`ro root=LABEL=/ single`
4. Press [Enter] and GRUB will boot single-user Linux mode. After it finishes loading, you will be presented with a shell prompt similar to the following:
`sh-2.05b#`
5. You can now change the root password by typing
`passwd root`

You will be asked to re-type the password for verification. Once you are finished, the password will be changed. You can then reboot by typing `reboot` at the prompt; then you can log in to root as you normally would.

14.3. Forgotten user Password

I've forgotten my user password. How do I get a new one?

Passwords are stored in encrypted files on your Red Hat Enterprise Linux system: users cannot read a file and see their own or other passwords. If you forget your user password, you must create a new one.

If you realize that you have forgotten your password while logged in, you can create a new one for yourself. Open a shell prompt and enter the command `passwd`. The `passwd` command asks for the new password, which you will have to enter twice. The next time you log in, use the new password.

If you are not logged in when you realize you have forgotten your password, log in as the root user. Open a shell prompt and enter the command `passwd username`, where `username` is your normal user name. The `passwd` command requires you to enter the new password twice. Log out of your system. You can now log back in with your normal user name and your new password.

14.4. Changing Passwords

How do I change my root or user password?

The process for changing the password of root is the same as that for changing the password for a user. First, log in to the appropriate account. Open a shell prompt and enter the command `passwd`. The `passwd` command asks for the new password, which you will have to enter twice. The next time you log in, use the new password.

14.5. Password Maintenance

How often should I change my password? What should my password look like?

For security reasons, it is a good idea to change your root and user passwords regularly. Experts vary on how often this change should occur, but most agree that passwords should be changed multiple times each year.

Passwords should not be based on a dictionary word should be at least six characters, and should include: both lower-case and upper-case letters, at least one number, and at least one punctuation mark. Don't write your password down or store it in an unencrypted file. Don't give your password to anyone.

User passwords can be set to automatically expire after a certain amount of time. Refer to the Red Hat Enterprise Linux System Administration Guide for more information.

14.6. Starting Applications

I installed an application I downloaded from the Internet, and everything seemed to go fine, but I still get command not found when I type its name. I think I have the right name, so why does it not start?

If you are trying to start an application from the shell prompt and it is not working, try typing out the full directory path before the name of the application's executable (such as `/usr/local/bin/my-executable`).

For example, imagine that you have downloaded the `setiathome` client application and want to try it out. You follow the directions for installing the software, which creates a subdirectory in your home directory called `seti/`. Now, start the application using the full path to the executable file as shown below:

```
/home/joe/seti/setiathome
```

The reason you may need to type the full pathnames in order to start an application is because the executable was not placed in a directory where your user shell environment knew it could be found (such as `/usr/local/bin`).

You can customize your settings so that you are not required to use the type the full path to the application each time. To do this, you must edit your PATH environment variable.

14.6.1. Editing Your PATH

If you frequently start programs that are not located in a directory that your user shell has been configured to search, you must edit your user shell configuration file to add the directory containing the executable you wish to run. You can do this by adding the directory to your PATH environment variable.



Caution

These instructions are intended *only* for user accounts. Avoid modifying files such as the root user's `.bash_profile`, because of the potential security risks.

Start a text editor, such as `gedit` or `vi`, at a shell prompt. You can open the file called `.bash_profile` by typing the following:

```
gedit .bash_profile
```

Look for a PATH statement, similar to the one shown below.

```
PATH=$PATH:$HOME/bin:/usr/local/bin:
```

To the end of this statement, add `$HOME/seti` as shown below:

```
PATH=$PATH:$HOME/bin:/usr/local/bin/:$HOME/seti:
```

Save the file and exit the text editor.

You can then make the changes to `.bash_profile` take effect immediately by typing the following command:

```
source .bash_profile
```

By adding paths to your `.bash_profile`, you can place utilities and programs in your path and be able to execute them without having to type `./` in front of the command.



Tip

For more information about using and configuring your shell prompt refer to Chapter 4 *Shell Prompt Basics*.

14.7. Finding Commands Quickly

I was looking at a man page yesterday, but I cannot remember the name of the command I was reading about, and I did not write it down. How do I get the man page back?

The command you used is stored in a file called `.bash_history`. By default, this file records the last 500 commands you typed at the shell prompt.

You can glimpse the history of your commands by typing `history` at the shell prompt, but the results are displayed too quickly for you to read every line.

Another way to view `.bash_history` is with a utility such as `less`. Type `less .bash_history` at the shell prompt and the results will display one page at a time. To move forward a screen, press the [Space] bar; to move back a screen, press the [b] key, and to quit, press [q].

Paging through `.bash_history` to find a command can be tedious. Alternatively, you can search through the file for keywords using `grep`, a powerful search utility.

Say you were reading the man page the day before, but cannot recall its name. To search for the command, type:

```
history | grep man
```

All the commands you typed which have the word *man* in them are now highlighted.

There are many ways to use your command history. For other tips and tricks, see Section 14.8 *Tips on Using Command History*.

14.8. Tips on Using Command History

What are some other ways I can use command history?

If you type `history`, a numbered list scrolls by very quickly, showing you the previous 500 commands you have used.

You probably do not need to see all of the last 500 commands, so the command `history 20` might be useful. This way, only the previous 20 commands you typed are displayed (you can use any quantity as an argument of the `history` command).

14.8.1. Other Shortcuts

Here are other command history shortcuts which may be useful to you:

- "Bang, bang": Typing `!!` (called "bang bang") executes the last command in the history.
- "Bang *number!number (as in `!302`) executes the command which is numbered 302 in the history file.*
- "Bang *string!string (as in `!rpm`) executes a command with the most recent matching string from the history file.*
- [Up arrow] and [down arrow]: At the shell or GUI terminal prompt, you can press the up arrow to move back through previous commands in your history list (the down arrow moves you forward through the commands) until you find the command you want. Press [Enter] to execute the command, just as if you had typed it on the command line.

14.9. Keep ls Output from Scrolling

Whenever I type ls I can barely see the output of the directory because it scrolls by too quickly. How can I actually read the output?

To prevent the output of `ls` from scrolling by too quickly, pipe the output to a utility such as `less` or `more`. You are then able to see the output one screen at at time.

To read the contents of `/etc` with `less`, type the following command at the shell prompt:

```
ls -al /etc | less
```

To move forward a screen, press [Space] bar; to move back a screen, press the [b] key; to quit, press [q].

You can achieve the same results with `more`, another paging utility.

14.9.1. Printing ls Output

You can also print directory listings by piping the output to a printer in the same way that you piped the output to your screen. If you have configured a printer, type the following to pipe the output of a command to the printer:

```
ls -al /etc | lpr
```

14.10. Accessing a Windows Partition

I have a dual-boot system with Red Hat Enterprise Linux and Windows 98. Is there a way to access my Windows partition while I am running Linux?

You can access another partition on your system (for example, a Windows partition), in two different ways.

You should first determine where your Windows partition is located by determining what physical hard disk your Windows partition is located in (such as the primary master IDE drive or the the first SCSI drive). To find this information, you can use the **Hardware Browser**, which lists detailed information about the hardware in your Red Hat Enterprise Linux system.

To start the **Hardware Browser**, choose **Main Menu => System Tools => Hardware Browser**. Figure 14-1 shows **Hardware Browser** in action.

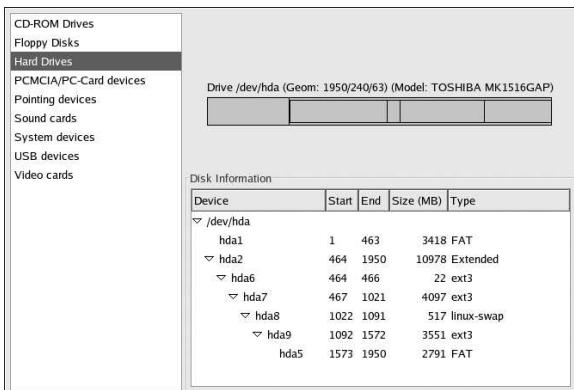


Figure 14-1. Hardware Browser hard disk device listing

Select **Hard Drives** from the panel and find your Windows partition from the **Disk Information** displayed. Windows partitions normally use the FAT or FAT32 file system type. This file system type can be mounted and read within Linux; however, if your Windows partition uses NTFS, then you cannot mount and read from it as Red Hat Enterprise Linux does not support NTFS file systems. Note the **Device** information for your Windows partition, as this is the device that you mount to access your Windows data.

Once you have determined where your Windows partition is located on your hard drive, log in as root (type **su** and then enter the root password) at a shell prompt.

Create a directory in which the Windows partition is mounted by typing the following command. For example:

```
mkdir /mnt/windows
```

Before you can access the partition, you must mount it in the directory you just created. As root, type the following command at a shell prompt (where **/dev/hda1** is the Windows partition you found via **Hardware Browser**):

```
mount -t vfat /dev/hda1 /mnt/windows
```

You may then logout of root user mode and access your Windows data by changing into the mounted Windows partition:

```
cd /mnt/windows
```

To automatically mount a Windows partition every time you boot your Red Hat Enterprise Linux system, you must modify the **/etc/fstab** file, which configures all file systems and disk device mounting options.

At a shell prompt, **su** – to root, following the above example.

Next, open the **/etc/fstab** in a text editor by typing (for example):

```
gedit /etc/fstab
```

Add the following on a new line (replacing **/dev/hda1** with the Windows partition you found via **Hardware Browser**):

```
/dev/hda1 /mnt/windows vfat auto,umask=0 0
```

Save the file and exit your text editor.

The next time the system is rebooted, the `/etc/fstab` file is read, and the Windows partition is automatically mounted in the directory `/mnt/windows`. To access the partition at a shell prompt, type the command `cd /mnt/windows`. To navigate through directories or files with spaces, surround the name of the directory or file with quotation marks, as in `ls "Program Files"`.

14.11. Error Messages During Installation of RPMs

How do I install an RPM from a CD or the Internet? I keep getting an error message when I use RPM.

If you are getting an error message similar to `failed to open /var/lib/rpm/packages.rpm`, it is because you do not have proper permission to install RPM files.

When you install software, you are often required to make system-wide changes which only root can make, such as creating new directories outside of your home directory or making changes to your system configuration. If you are using your normal user account, you do not have permission to make such changes by default.

You need to be the root user to install RPM files. At a shell prompt, switch to the root user by running the following command:

```
su -
```

After entering the root password when prompted, you should then be able to install the RPM file without further errors. For more information about using RPM and **Package Management Tool**, refer to the *Red Hat Enterprise Linux System Administration Guide* on the Red Hat Enterprise Linux Documentation CD or online at <http://www.redhat.com/docs/>.

14.12. Changing Login from Console to X at Startup

How do I change my login from the console to the graphical screen?

Instead of logging in to your system at the console and typing the `startx` command to start the X Window System, you can configure your system so that you can log in directly to X.

You must edit one file, `/etc/inittab`, by changing just one number in the runlevel section. When you are finished, reboot the computer. The next time you log in, you will have a graphical login prompt.

Open a shell prompt. If you are in your user (home) account, change to the root user by using the `su` command:

```
su -
```

Now, type `gedit /etc/inittab` to edit the file with **gedit**. The file `/etc/inittab` will open. Within the first screen, you will see a section of the file which looks like this:

```
# Default runlevel. The runlevels used by RHS are:  
#   0 - halt (Do NOT set initdefault to this)  
#   1 - Single user mode  
#   2 - Multiuser, without NFS (The same as 3, if you do not have networking)  
#   3 - Full multiuser mode  
#   4 - unused  
#   5 - X11  
#   6 - reboot (Do NOT set initdefault to this)  
#
```

```
id:3:initdefault:
```

To change from a console to a graphical login, you should change the number in the line `id:3:initdefault:` from a 3 to a 5.



Warning

Change *only* the number of the default runlevel from 3 to 5.

Your changed line should look like the following:

```
id:5:initdefault:
```

When you are satisfied with your change, save and exit the file using the [Ctrl]-[x] keys. You will see a message telling you that the file has been modified, and asking you to confirm your change. Type [Y] for yes.

Now, your next login after reboot will be from the graphical screen.

IV. Appendix

This part contains supplemental information and instruction that you may find useful during the course of your Red Hat Enterprise Linux usage. Perhaps you want to use the KDE graphical desktop environment, or learn more about configuring your system to send and receive encrypted email. This section shows you time-saving keyboard shortcuts, discusses the Red Hat Enterprise Linux directory structure, and more.

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Appendix A.

KDE: The K Desktop Environment

The *K Desktop Environment* (KDE) is a graphical desktop, similar in function to the **GNOME** desktop explored in the main text of the manual. It uses many of the same features as **GNOME**, including icons, windows, menus, and a panel.

This appendix covers the basics of using KDE: system navigation, working with files and applications, and customizing the desktop.

The KDE default desktop looks similar to Figure A-1.

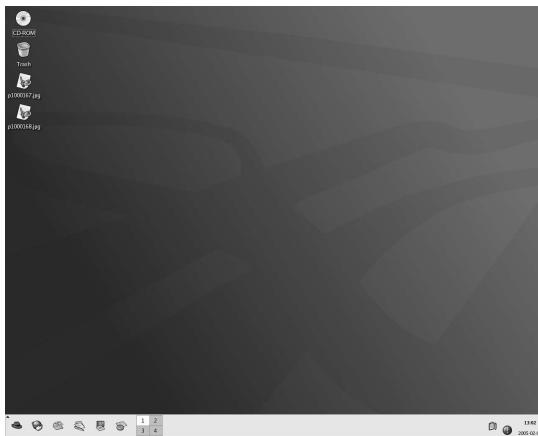


Figure A-1. A Typical KDE Desktop

If you would like to learn more about KDE, visit the official website at <http://www.kde.org/>.

A.1. Customizing KDE

The behavior and appearance of KDE is highly customizable. To open the **Control Center**, select **Main Menu => Preferences => Control Center**. The following list explains some of the configuration options in detail.

KDE Components

This section lets you configure the **Konqueror** file manager and customize certain file operations. You can also associate files to applications that you prefer (for example, assigning all digital music files to open in **XMMS** instead of the default player).

Appearance & Themes

This section allows you to customize the visual aspect of your desktop environment. You can customize background images and configure fonts, themes, icons, panel elements, screensavers,

and window border appearance. You can also customize mouse and keyboard events which makes working with the desktop as efficient for your needs as possible.

Regional & Accessibility

This section allows you to set country and language options to your particular locale. For users with sight or hearing impairments, you can also configure accessibility features such as audible and visual cues and keyboard/mouse customization.

System Administration

This section is an advanced system configuration interface. You need your root password to configure most of these options. This section allows you to install new fonts, configure login management, set system paths, and more. It is *strongly* recommended that you leave these settings at their default values unless you understand the consequences of changing them.

Web Browsing

This section allows you to configure the **Konqueror** Web browser. You can configure options such as cache sizes, website cookies, plugins, proxy settings (if available), and enhanced browsing using keyword shortcuts.

A.2. Introducing Konqueror

Konqueror is the file manager for KDE. It is equivalent to GNOME's **Nautilus**.

Konqueror provides a graphical display of your system and personal files. Like **Nautilus**, **Konqueror** allows you to configure your desktop and your Red Hat Enterprise Linux system, access network resources and more. **Konqueror** makes use of icons, the **Panel**, and **Trash**. Below are some of the tools **KDE** provides; each is an example of **Konqueror**.

A.2.1. User's Home

KDE does not place a **Home** icon on the Desktop by default. It can be reached from the **Main Menu**, however. This opens a **Konqueror** window with the contents of the user's home directory.



Tip

You can add a **Home** icon to your desktop by dragging the icon from the **Main Menu** to the desktop and selecting **Copy Here**.

Konqueror behaves as a browser by default; it opens files and directories inside the large pane of the current window rather than opening a new instance of **Konqueror**. You can open directories and files in new tabs, just as in **Firefox** or other web browsers. To do so, right-click on the file or directory to open and select **Open in New Tab**.

A.2.2. Trash

KDE includes a **Trash** icon similar to that of other operating systems; files inside the **Trash** are not deleted until you choose to do so. The **Trash** bin can be opened by double-clicking on the desktop icon. The **Trash** opens as a **Konqueror** window, which allows you to easily move files in and out. To empty the **Trash**, right-click on the desktop icon and select **Empty Trash Bin**.

A.2.3. Removable Media

KDE works with removable media, including diskettes, CD-, and DVD-ROMs.

A.2.3.1. Diskettes

Recall that diskettes must be mounted before use and unmounted after use to be sure that your files are not damaged. To mount a diskette with **Konqueror**, first open a **Konqueror** window, then choose **Devices** from the sidebar. Double-click on the **Floppy** icon to mount the diskette. When you are finished, return to the **Devices** directory, right-click on the **Floppy** icon, and select **Unmount Volume** before ejecting the diskette.

A.2.3.2. CD-ROM and DVD-ROM

CDs and DVDs auto-mount when you insert them into the appropriate drive. To display the contents of the media, open a **Konqueror** window, choose **Devices** from the sidebar, and double-click on the appropriate icon. If the media does not auto-mount, open a **Konqueror** window and choose **Devices** from the sidebar. Right-click on the appropriate icon in the large pane of the **Konqueror** window and select **Mount Volume**. **Konqueror** mounts the media and displays its contents in the large pane of the window. When you are finished, right-click on the appropriate icon in the **Devices** section of Konqueror and select **Eject**. Konqueror unmounts the media and ejects the CD or DVD.

A.2.4. Customizing Konqueror

The behavior of Konqueror can also be customized. With a Konqueror window open, select **Settings => Configure Konqueror**.

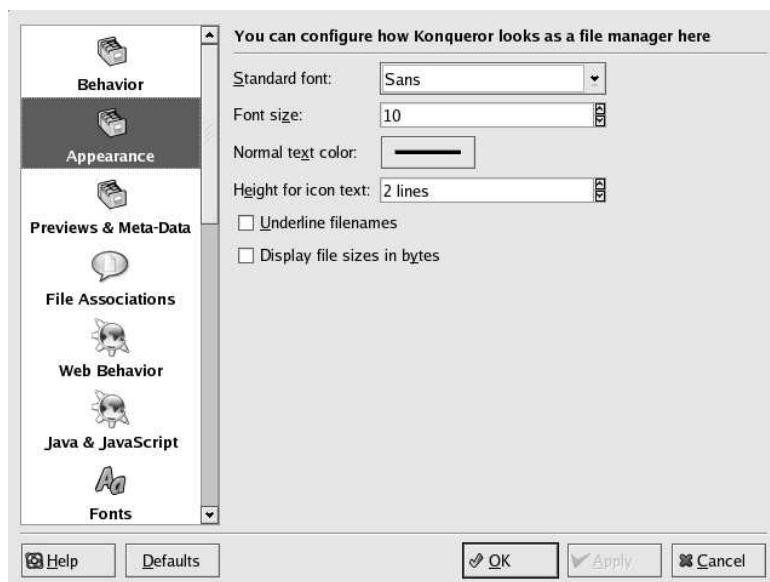


Figure A-2. The Konqueror Configuration Window

The configuration window opens. In the left pane is a list of icons representing the types of customizations you can make. Clicking on each icon in turn displays customization options. For example, the **Appearance** icon allows you to select the font face and size of your Konqueror windows. Browse through the various options and make your selections. Click the **Apply** button to save your changes, and finally click the **OK** button to exit the configuration window.

A.3. Using Konqueror

Konqueror is the file manager and a Web browser for the KDE desktop. **Konqueror** allows you to configure your KDE desktop, configure your Red Hat Enterprise Linux system, play multimedia files, browse digital images, surf the Web, and more from one interface. This section explains some of the ways **Konqueror** can help you work with and enjoy your Red Hat Enterprise Linux system.

To start **Konqueror** for file management, click on your home directory icon

Konqueror opens up in a window on your desktop, allowing you to navigate through your home directory and throughout your Red Hat Enterprise Linux file system. After exploring, you can return to your home directory by clicking the **Home** button on the toolbar.

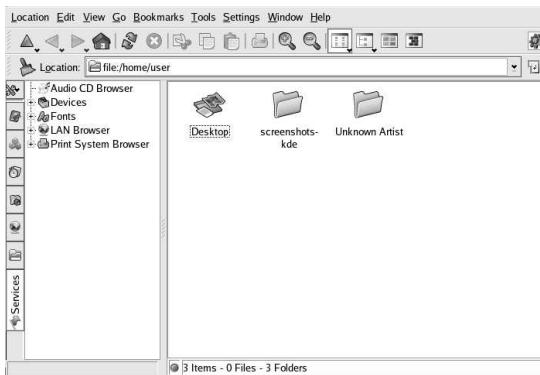


Figure A-3. The Konqueror File Manager

You can navigate through the file system by clicking on folders within the main window pane or through the hierarchical file system viewer on the navigation panel as shown in Figure A-3. Files and folders in the main window frame can be moved or copied to another folder or sent to the trash. You can also delete files and folders by right-clicking on the item and choosing **Delete**.

Konqueror also displays thumbnail icons for text, images, PostScript/PDF files, and Web files. It can also preview sounds from digital audio files.

A.3.1. The Navigation Panel

Another useful feature of **Konqueror** is the *navigation panel*. This panel appears on the left side of the **Konqueror** file browser window by default. The navigation panel makes many of your system resources available to you in convenient tabbed icons. Figure A-4 shows the navigation panel.



Figure A-4. Working with the Navigation Panel

The navigation panel lets you access your Web bookmarks, browsing history, network resources, file system, and has a built-in media player for playing multimedia files without opening a separate application. The navigation panel makes **Konqueror** an efficient solution for users who want fast and easy access to all of their files and information.

A.4. Using the KDE Desktop

As previously mentioned, the KDE graphical desktop displays the various application windows, launch icons, panels, and other tools that make up the KDE experience on Red Hat Enterprise Linux. These tools are discussed in detail in the following sections of this Appendix. This section discusses two specific features: adding new application launchers to the desktop and the customization options for the desktop itself.

A.4.1. Adding Application Launchers to the Desktop

You can add application launchers to your desktop in KDE. The procedure is the same as for GNOME. Refer to Section 2.2.1 *Adding Application Launchers* for more information.

A.4.2. Configuring the Desktop

To configure the desktop, right-click on an unused portion of the desktop and select **Configure Desktop...**.

The **Configure-Desktop** window contains the Background, Behavior, Multiple Desktops, Screen Saver, and Display configuration icons. Click each icon in turn and select the configuration options you prefer.

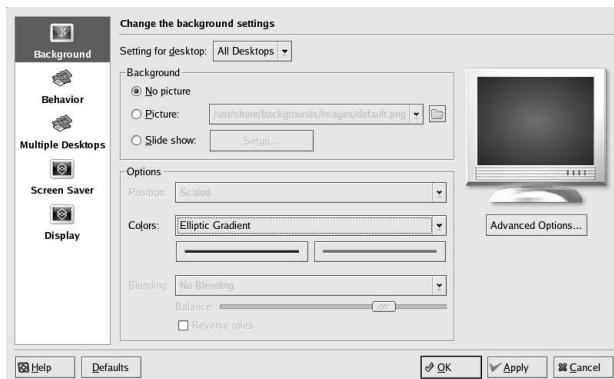


Figure A-5. Desktop Background Configuration

Two of the options you can set are the number and names of your desktops.

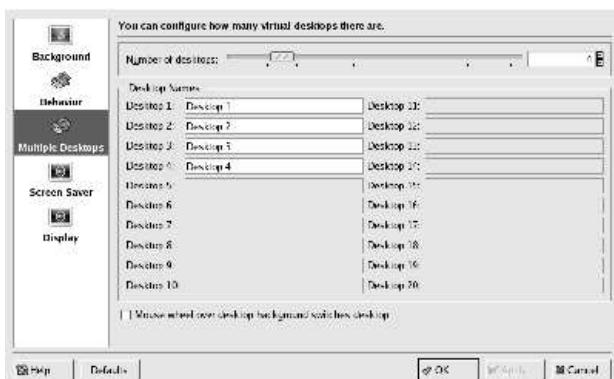


Figure A-6. Virtual Desktop Configuration

Click on the Multiple Desktops icon. Select the number of desktops available to you, then enter names for the desktops in the text fields. To save your changes, click the Apply button. To exit, click the OK button.

A.5. Using the Panel

The panel stretches across the bottom of the desktop. By default, it contains the **Main Menu** and quick-launch icons for starting a Web browser, email client, word processor, and other commonly used applications.

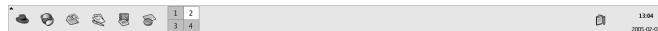


Figure A-7. The Panel

Applets are small applications that run on the panel. There are several types of applets: some perform functions such as system monitoring, time and date display, and others launch applications. Some applets run on the panel by default. This section covers them in detail.

A.5.1. The Pager

By default, KDE provides four desktops that you can use to display multiple applications without having to crowd all of them onto one desktop. Each desktop can hold icons, open applications, and be individually customized.



Figure A-8. The Pager

For example, while you are writing a message in **Evolution** on desktop one, you can have **Mozilla** browsing the Web on desktop two, the **OpenOffice.org Writer** word processor open on desktop three, and so on.

A.5.2. The Taskbar

The taskbar displays all running applications, both minimized and displayed, on all desktops.



Figure A-9. Applications on the Taskbar

You can maximize running applications or bring them to the front of your working windows by clicking on the associated item on the taskbar.



Tip
Another way to bring minimized or background windows to the front is to use the [Alt] and [Tab] keys. To pick an item from the taskbar, hold down both the [Alt]-[Tab] key. To scroll through the tasks, hold down the [Alt] key, while tapping the [Tab] key. When you have found the task you want to maximize and bring to the front, release both keys and the application appears on the desktop.

The **Taskbar** is also configurable. Right-click on the *handle* — the small arrow that appears to the left of the taskbar — and select **Configure Taskbar**.

A.5.3. The Main Menu

The Main Menu  is the central point for using KDE. Clicking on the **Main Menu** icon on the panel displays a large master menu from which you can perform tasks such as launch applications, find files, and configure your desktop. The main menu also contains several submenus that organize applications and tools into major categories, including **Graphics**, **Internet**, **Office**, **Games**, and more.

From the **Main Menu**, you can lock your session, which displays a password-protected screensaver. You can also run applications from a command line as well as logout of your KDE session.

A.5.4. Configuring the Panel

As with the other tools available with KDE, the panel is configurable. Right-click on the blank portion of the **Panel** and select **Configure Panel**. Configure the panel's orientation and size, or set the panel's hiding configuration.

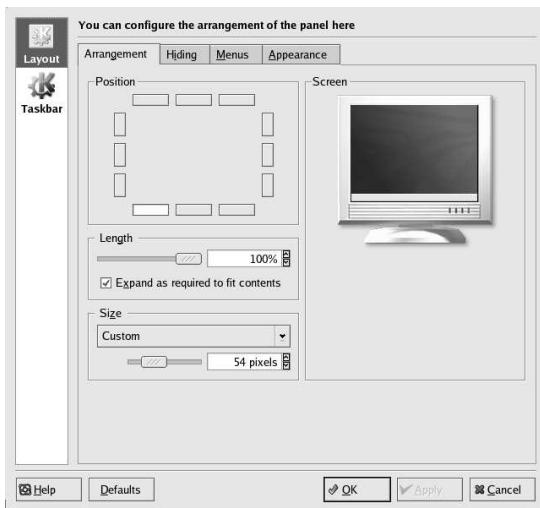


Figure A-10. Panel Settings

A.5.5. Adding Applets to the Panel

To further customize the panel for your particular needs, you can include additional launcher icons to start applications without using the **Main Menu**. To add an application launcher to the panel, right-click on an unused portion the panel and choose **Add**. Then select **Application Button** and make your choice from the menus.

To add a new launcher to the panel, right-click the panel and choose **Add => Application Button** and choose the application or resource you wish to add to the panel. This automatically adds an icon on the panel. You can move the icon anywhere you want on the panel by right-clicking the icon and choosing **Move Application Button**, where *Application* is the name of the application associated with the icon.

A.6. Browsing the Web with Konqueror

Konqueror is not only a file browser, but is also a full-featured web browser as well. To launch **Konqueror** choose **Main Menu => Internet => Konqueror**.

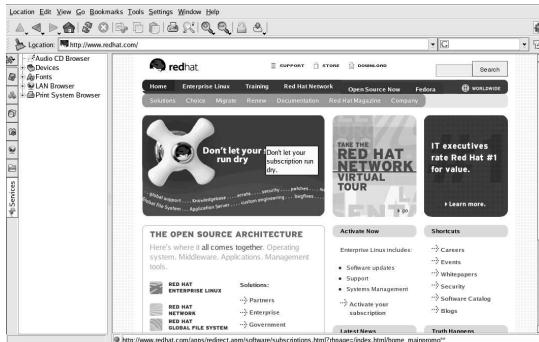


Figure A-11. Welcome to Konqueror

To begin your Web session, enter a URL in the **Location** field. For example, enter **<http://www.redhat.com/>** into the field. If your internet connection is working properly, **Konqueror** displays a web page similar to the one pictured in Figure A-11.

Press [Enter] to connect to the webpage. You can navigate the webpage using your mouse and keyboard. To scroll up and down a webpage, click the scroll bar on the right side of the browser window as you drag the mouse up and down. You can also press the arrow keys on your keyboard to move up and down the webpage.

To load any new content on the webpage, click the **Refresh** button on the toolbar or press [F5]. This reloads the page along with any new content.

To stop a page from loading, click the **Stop** button on the toolbar or press [Esc].

To move back to a previously loaded webpage or move forward to a recently loaded page, click the **Back** and **Forward** buttons or press [Alt] and the left or right arrow key to move backward or forward one webpage, respectively.

Konqueror also allows you to load multiple pages within one browser window, alleviating the need to have multiple browser windows open at the same time. **Konqueror** uses tabs to accomplish loading multiple pages in one window. To open a link in a new tab, right-click the link and choose **Open in New Tab** (or **Open in Background Tab** if you want to keep your current tab on top). The tabs appear with the header of the webpage displayed for easy reference. Click the tab of the webpage you want to display. To close a tab, right-click on it and choose **Close Tab** from the menu.

For additional information on using **Konqueror**, go to **Help** (on the top menu panel) => **Konqueror Handbook**.

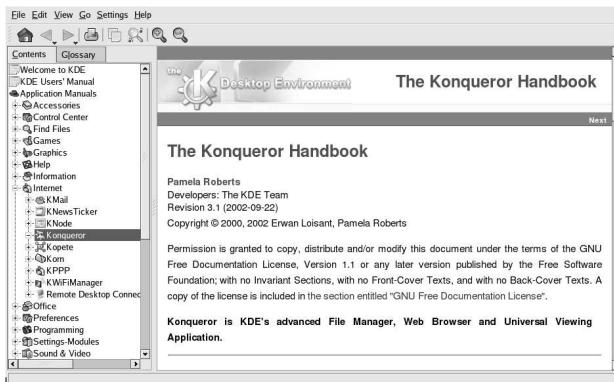


Figure A-12. The *Konqueror Handbook*

A.7. Using Konqueror to View Images

You can also use the **Konqueror** file manager to view images. Using **Konqueror** as an image browser works similarly to **Nautilus**. **Konqueror** automatically generates thumbnail preview icons within the file browser window. When you double-click on a thumbnail icon, the browser displays the image in its native size, as shown in Figure A-13.

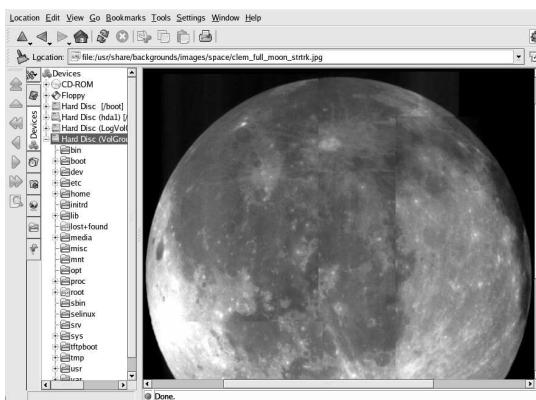


Figure A-13. Viewing an Image in Konqueror

To zoom in and out of an image, you first need to change the way **Konqueror** renders the image. From the window menu, choose **View => View Mode => Image Viewer Part**. This re-displays the image and allows you to rotate and zoom in on the image using the two magnifying glass icons or the magnification percentage drop-down menu on the toolbar, as shown in Figure A-14.



Figure A-14. Image viewing configuration on the Konqueror Toolbar

You can also open the image with more advanced image viewers, such as the **GIMP**. Right-click on the image, choose **Open With...** and select the **GIMP**. You can also select **Other...**, which opens a pop-up menu that lists all available applications. Make your selection from the various graphics applications, as shown in Figure A-15.

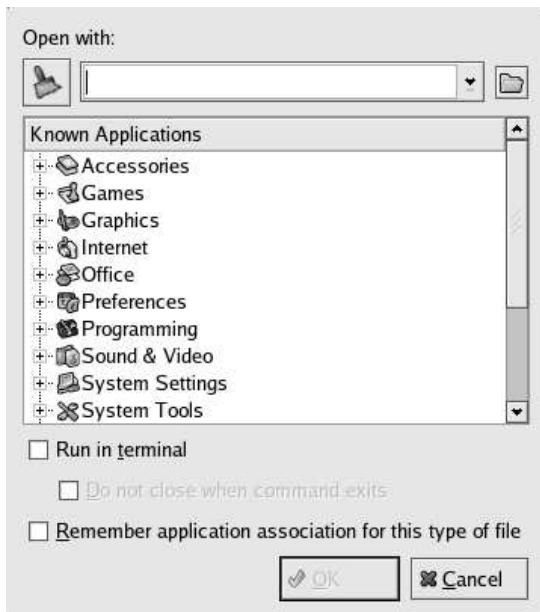


Figure A-15. The Open With... Dialog Box

A.8. KMail

KMail is an email tool for KDE. It has an intuitive graphical interface similar to **Evolution** that allows you to send and receive email using a graphical interface. To open **KMail**, click on the **Main Menu => Internet => KMail**.

Before using **KMail**, you must configure it to send and receive mail. To run the configuration tool, select **Settings** from the **KMail** toolbar, and click on **Configure KMail**.

The **Configure Mail Client** window consists of the following sections: **Identities**, **Network**, **Appearance**, **Composer**, **Security**, and **Folders**. To begin sending and receiving messages, you must change the settings in the **Identities** and **Network** tabs. Have your email information from your service provider or administrator handy to fill in the required information. For additional informa-

tion, refer to the **KMail** user manual (**Help => KMail Handbook**) or visit **KMail**'s homepage at <http://kmail.kde.org>.

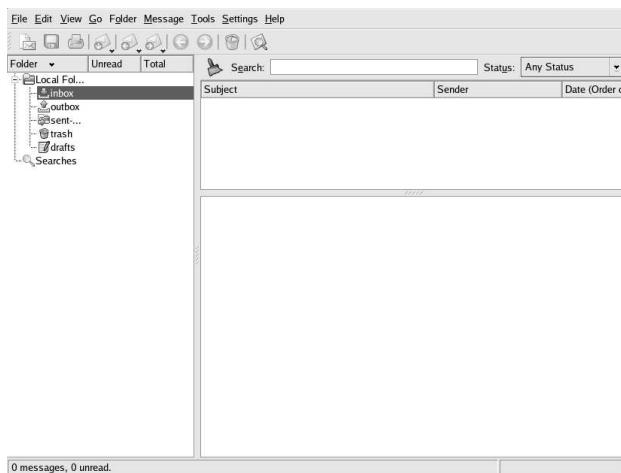


Figure A-16. KMail Main Screen

Once you have configured the email settings, begin sending and receiving email by clicking on the **Get Mail** icon in the upper left of the screen. The folders on the left side of the **KMail** screen allow you to view emails you have received, emails ready to be sent, emails you have sent, and more.



To compose a mail, click on the new message icon in the tool bar: . A new message window opens with a blank email template.

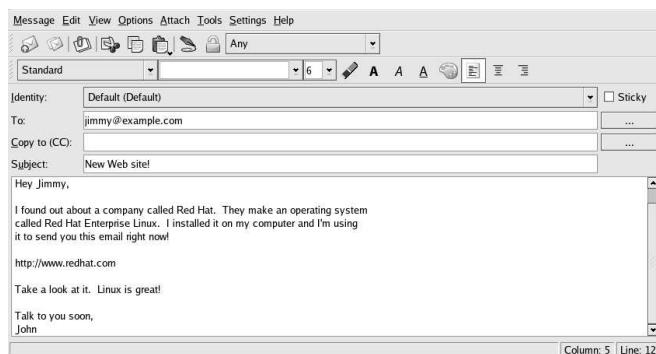


Figure A-17. KMail New Email Message Screen

Once you have composed a message and entered an email address to send the email to, click **Send** in the toolbar: .

A.9. Logging Out of KDE

There are two ways to log out of your KDE session. From the **Main Menu**, select **Logout User**, where *User* is your account username. To log out from the desktop, right-click on the desktop and, from the menu, select **Logout User** where *User* is your account username. In either case click **Logout** and your session ends.



Figure A-18. KDE Logout Screen

A.10. Finding Help

You can access a comprehensive set of documentation about KDE through the **HelpCenter**.

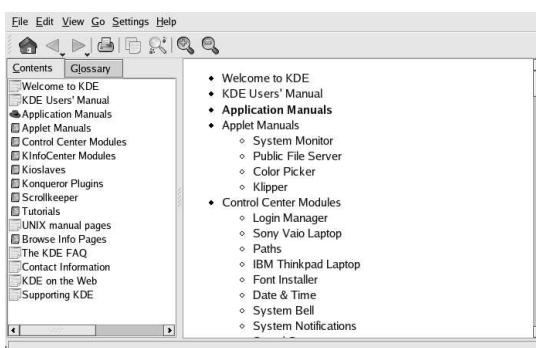


Figure A-19. The HelpCenter

You can access the **HelpCenter** from the **Main Menu** by selecting **Help**. To access **HelpCenter** from the desktop, right-click on the desktop and select the **Help => K Desktop Handbook**.

The opening screen of the **HelpCenter** browser appears like Figure A-19. From this main page, you can view help documentation on topics such as using and configuring the desktop, working with the many applications included with KDE, and working with the **Konquerer** file manager.

Appendix B.

Getting Started with Gnu Privacy Guard

Have you ever wondered if your email can be read during its transmission from you to other people, or from other people to you? Unfortunately, complete strangers could conceivably intercept or even tamper with your email.

In traditional (also known as "snail") mail, letters are usually sealed within envelopes, stamped and delivered from post office branch to branch until they reach their destination. But sending mail through the Internet is much less secure; email is usually transmitted as unencrypted text from server to server. No special steps are taken to protect your correspondence from being seen or tampered with by other people.

To help you protect your privacy, Red Hat Enterprise Linux 4 includes GnuPG, the *GNU Privacy Guard*, which is installed by default during a typical Red Hat Enterprise Linux installation. It is also referred to as *GPG*.

GnuPG is a tool for secure communication; it is a complete and free replacement for the encryption technology of PGP (Pretty Good Privacy, a widely popular encryption application). Using GnuPG, you can encrypt your data and correspondence as well as authenticate your correspondence by *digitally signing* your work. GnuPG is also capable of decrypting and verifying PGP 5.x.

Because GnuPG is compatible with other encryption standards, your secure correspondence is probably compatible with email applications on other operating systems, such as Windows and Macintosh.

GnuPG uses *public key cryptography* to provide users with a secure exchange of data. In a public key cryptography scheme, you generate two keys: a public key and a private key. You exchange your public key with correspondents or with a keyserver; you should never reveal your private key.

Encryption depends upon the use of keys. In conventional or symmetric cryptography, both ends of the transaction have the same key, which they use to decode each other's transmissions. In public key cryptography, two keys co-exist: a public key and a private key. A person or an organization keeps their private key a secret, and publishes their public key. Data encoded with the public key can only be decoded with the private key; data encoded with the private key can only be decoded with the public key.



Important

Remember that your public key can be given to anyone with whom you want to communicate securely, but you must never give away your private key.

For the most part, cryptography is beyond the scope of this publication; volumes have been written about the subject. In this chapter, however, we hope you gain enough understanding about GnuPG to begin using cryptography in your own correspondence. If you want to learn more about GnuPG, PGP and encryption technology, see Section B.8 *Additional Resources*.

B.1. Configuration File

The first time you run a GnuPG command, a `.gnupg` directory is created in your home directory. Starting with version 1.2, the configuration filename has changed from `.gnupg/options` to `.gnupg/gpg.conf`. If `.gnupg/gpg.conf` is not found in your home directory, `.gnupg/options` is used. If you only use version 1.2 or higher, it is recommended that you rename your configuration file with the following command:

```
mv ~/.gnupg/options ~/.gnupg/gpg.conf
```

If you are upgrading from a version prior to 1.0.7, you can create signature caches in your keyring to decrease the keyring access time. To perform this operation, execute the following command once:

```
gpg --rebuild-keydb-caches
```

B.2. Warning Messages

When executing GnuPG commands, you may see the following message:

```
gpg: Warning: using insecure memory!
```

This warning is because non-root users can not lock memory pages. If users could lock memory pages, they could perform out-of-memory Denial of Service (DoS) attacks; thus, it is a possible security problem. For details, refer to <http://www.gnupg.org/en/documentation/faqs.html#q6.1>.

You might also see the following message:

```
gpg: WARNING: unsafe permissions on configuration file "/home/username/.gnupg/gpg.conf"
```

This message is shown if the file permissions of your configuration file allows others to read it. If you see this warning, it is recommended that you execute the following command to change the file permissions:

```
chmod 600 ~/.gnupg/gpg.conf
```

Another common warning messages is as follows:

```
gpg: WARNING: unsafe enclosing directory permissions on configuration file  
"/home/username/.gnupg/gpg.conf"
```

This message is shown if the file permissions of the directory that contains the configuration file allows others to read its contents. If you see this warning, it is recommended that you execute the following command to change the file permissions:

```
chmod 700 ~/.gnupg
```

If you upgraded from a previous version of GnuPG, you might see the message:

```
gpg: /home/username/.gnupg/gpg.conf:82: deprecated option "honor-http-proxy"  
gpg: please use "keyserver-options honor-http-proxy" instead
```

This warning is because your `~/.gnupg/gpg.conf` file contains the line:

```
honor-http-proxy
```

Version 1.0.7 and higher prefers a different syntax. Change the line to the following:

```
keyserver-options honor-http-proxy
```

B.3. Generating a Keypair

To begin using GnuPG, you must first generate a new keypair: a public key and a private key.

To generate a keypair, at a shell prompt, type the following command:

```
gpg --gen-key
```

Since you work with your user account most frequently, you should perform this action while logged in to your user account (not as root).

You see an introductory screen, with key options, including one recommended option (the default), similar to the following:

```
gpg (GnuPG) 1.2.6; Copyright (C) 2004 Free Software Foundation, Inc.  
This program comes with ABSOLUTELY NO WARRANTY.  
This is free software, and you are welcome to redistribute it  
under certain conditions. See the file COPYING for details.
```

```
gpg: keyring '/home/user/.gnupg/secring.gpg' created
```

```
Please select what kind of key you want:  
(1) DSA and ElGamal (default)  
(2) DSA (sign only)  
(5) RSA (sign only)
```

Your selection?

Most of the screens which require you to choose an option lists the default option, within parentheses. You can accept the default options by pressing [Enter].

In the first screen, you should accept the default option: (1) DSA and ElGamal. This option allows you to create a digital signature and encrypt (and decrypt) with two types of technologies. Type 1 and then press [Enter].

Next, choose the key size, or how long the key should be. Generally, the longer the key, the more resistant against attacks your messages are. The default size, 1024 bits, should be sufficiently strong for most users, so press [Enter].

The next option asks you to specify how long you want your key to be valid. Usually, the default (0 = key does not expire) is fine. If you do choose an expiration date, remember that anyone with whom you exchanged your public key also have to be informed of its expiration and supplied with a new public key. If you do not choose an expiration date, then you are asked to confirm your decision. Press [y] and [Enter] to confirm your decision.

Your next task is to provide a user ID that consists of your name, your email address, and an optional comment. When you are finished, you are presented with a summary of the information you entered.

The next option is to make any changes to the information you just entered. If you are satisfied with your entries, press [O].

Once you accept your choices, you must enter a passphrase.



Tip

Like your account passwords, a good passphrase is essential for optimal security in GnuPG. For example, mix your passphrase with uppercase and lowercase letters, use numbers, or punctuation marks.

Once you enter and verify your passphrase, your keys are generated, and a message similar to the following is displayed:

We need to generate a lot of random bytes. It is a good idea to perform some other action (type on the keyboard, move the mouse, utilize the disks) during the prime generation; this gives the random number generator a better chance to gain enough entropy.

When the activity on the screen ceases, your new keys are made and placed in the directory `.gnupg` in your home directory. To list your keys, use the command:

```
gpg --list-keys
```

You will see something similar to the following:

/home/username/.gnupg/pubring.gpg

pub 1024D/B7085C8A 2000-06-18 Your Name <you@example.com>
sub 1024g/E12AF9C4 2000-06-18

If you created a GnuPG key with version 1.0.6 or lower, exported your private key, and imported it into a new one, you have to explicitly trust your own key to sign items with version 1.0.7 or higher. To trust your key, type the following command (replace `<user-id>`):

```
gpg --edit-key <user-id>
```

At the Command> prompt type **trust** and select 5 = I trust ultimately to trust your own key.

B.4. Generating a Revocation Certificate

Once you have created your keypair, you should create a revocation certificate for your public key. If you forget your passphrase, or if it has been compromised, you can publish this certificate to inform users that your public key should no longer be used.



Note

When you generate a revocation certificate, you are not revoking the key you just created. Instead, you are giving yourself a safe way to revoke your key from public use in case you forget your passphrase, switch ISPs (addresses), or suffer a hard drive crash. The revocation certificate can then be used to disqualify your public key.

Your signature is valid to others who read your correspondence before your key is revoked, and you are able to decrypt messages received prior to its revocation. To generate a revocation certificate, use the `--gen-revoke` option:

```
gpg --output revoke.asc --gen-revoke you@example.com
```

Note that if you omit the `--output revoke.asc` option from the above, your revocation certificate is returned to the standard output, which is your monitor screen. While you can copy and paste the contents of the output into a file of your choice using a text editor, it is probably easier to send the

output to a file in your login directory. That way, you can keep the certificate for use later, or move it to a diskette and store it someplace safe.

The output looks similar to the following:

```
sec 1024D/823D25A9 2000-04-26 Your Name <you@example.com>
```

Create a revocation certificate for this key?

Press [Y] and [Enter] to create a revocation certificate for the listed key. Next, you are asked to select the reason for revocation and provide an optional description. After confirming the reason, enter the passphrase you used to generate the key.

Once your revocation certificate has been created (`revoke.asc`), it is located in your login directory. You should copy the certificate to a diskette and store it in a secure place. (If you do not know how to copy a file to a diskette in Red Hat Enterprise Linux, see the *Red Hat Enterprise Linux Step By Step Guide*, Section 13.1 *Using Diskettes*.)

B.5. Exporting your Public Key

Before you can use public key cryptography, other people must have a copy of your public key. To send your key to correspondents or to a keyserver, you must *export* the key.

To export your key, so you can display it on a webpage or paste it in email, type the following command:

```
gpg --armor --export you@example.com > mykey.asc
```

You do not see any output, because not only did you export your public key, you redirected the output to a file called, for example, `mykey.asc`. (Without the addition of `> mykey.asc`, the key would have been displayed as the standard output on the monitor screen.)

Now, the file `mykey.asc` can be inserted into email or exported to a keyserver. To see the key, type `less mykey.asc` to open the file in a pager (type [q] to quit the pager). It should look like the following:

```
-----BEGIN PGP PUBLIC KEY BLOCK-----
Version: GnuPG v1.2.1 (GNU/Linux)
Comment: For info see http://www.gnupg.org
```

```
mQGiBDkHP3URBACkWGsyH43pkXU9wj/X1G67K8/DSr185r7dNtHNfLL/ewill0k2
q8saWJn26QZPsDwQdUModHfJ6kQTAt9NzQbgcVrxLYNfgeBsvkHF/POtnYcZRgL
t26syBBWs8JB4xt5V09iJSGAMPUQE8Jpdn2aRXPApodoDw179LM8Rq6r+gwCg5ZZa
pGN1kgfut24WM5wC1zg4TbMD/3MJCScfl99EK5HxcB3yhj+o0Lm1rGAVBg0WdrRd
BIGjQQFhV1NSwC8YhN/4nGHwpaTxgEtbn4CI1wI/G3DK9o1YMyRJinkGJ6XYfP3b
cCQmqATDF5ug1Amdditnw7deXqn/eavaMxRXJM/RQSgJJyVpbAO2OqKe6L6Inb5H
kjjcZA/9obTm499dDMRQ/CNR92fa5Pr0rziLiuow+cqIS9nt+bEb9nY1mfmuN6
SW0jCH+pIQH51erV+EookyOyq3ocUdjेRYF/d2j19xmeSyL2H3tDvnuE6vgqFU/N
sdvby4B2Iku7S/h06W6GPQAe+pzdyX9vS+Pnf8osu7W3j60WprQkUGF1bCBHYWxs
YWdoZXIgPHBndwXnYWxsQHJ1ZGhhdC5jb20+IFYEEExCABYFAjkHP3UECwoEAwMV
AwIDFgIBAhAAAoJEJECEmvGCPSWpMjQAoNF2zvRgdR/8or9pBhu95zeSnkb7AKCm
/uXVS0a5koN7J61/1vExw11poLkBDDQ5Bz+MEAQA8ztcWRjjw8cHCgLaE402jyqQ
37gDT/n4VS66nU+YItzDFScVmgbMuFrzhLB1f09TpZzxEbSF3T6p9hLlnHCQ1bD
HRSKfh0eJYMMqB3+HyUpNeqCMEEd9AnWD9P4rQt07Pes38sV01X0OSvsTyMG9wEB
vSNzK+R1+phAS5r1s8CAwUEAJjqazvk0bgFrw1OPG9m7fEeDlvPSV6HSA0fvz4w
c7ckfpuxg/URQnf3TJA00Acprk8Gg8J2CtebAyR/sP5Isrk511luGdk+10M85FpT
/cen2OdJtToAF/6fGnIKEceP105aWTbDgdAUHBRykpdWU3G7NS6923fVg5khCwQ
uwrAiEYEGBECAAYFAjkHP4wAcgkQkQka8YI9JamlwiCfXox/HjlOrMKnQRJkeBz
```

```
iLyPH1QAoI33Ft/0HBqLtqdtP4vWYQRbibjW  
=BMEC  
-----END PGP PUBLIC KEY BLOCK-----
```

B.5.1. Exporting to a Keyserver

If you are only writing to a few correspondents, you can export your public key and send it to them personally. If you correspond with many people, however, distribution of your key can be time consuming. Instead, you can use a keyserver.

A keyserver is a repository on the Internet which can store and distribute your public key to anyone who requests it. Many keyservers are available, and most try to remain synchronized with each other; sending your key to one keyserver is like distributing it to them all. A correspondent can request your public key from a from a keyserver, import that key to their keyring, and they are ready for secure correspondence with you.



Tip

Because most keyservers are synchronized, sending your public key to one keyserver is usually as good as sending it to them all. You can, however, locate different keyservers. One place to begin your search for keyservers and more information is *Keyserver.Net* available at <http://www.keyserver.net>.

You can send your public key from either the shell prompt or from a browser; of course, you must be online to send or receive keys from a keyserver.

- From the shell prompt, type the following:

```
gpg --keyserver search.keyserver.net --send-key you@example.com
```

- From your browser, go to Keyserver.Net (<http://www.keyserver.net>) and select the option to add your own PGP public key.

Your next task is to copy and paste your public key into the appropriate area on the webpage. If you need instructions on how to do that, use the following:

- Open your exported public key file (such as *mykey.asc*, which was created in Section B.5 *Exporting your Public Key*) with a pager — for example, use the `less mykey.asc` command.
- Using your mouse, copy the file by highlighting all the lines from the BEGIN PGP to END PGP notations (see Figure B-1).
- Paste the contents of the file *mykey.asc* into the appropriate area of the page on Keyserver.Net by middle-clicking with your mouse (or left- and right-clicking if you are using a two-button mouse). Then select the **Submit** button on the keyserver page. (If you make a mistake, press the **Reset** button on the page to clear your pasted key.)



```

File Edit Settings Help
-----BEGIN PGP PUBLIC KEY BLOCK-----
Version: GnuPG v1.0.1 (GNU/Linux)
Comment: For info see http://www.gnupg.org

mQGiBDkHP3URBACKWGsYh43pkXU9wJ/X1G67K8/DSr185r7dNtHNfLL/eui10k2
q8salJn26QZPsDVqdUJM0dHfJ6kQTAt9NzQbgcVrxLYNfgeBsvkHF/P0tnYcZRgL
t2bsyBBu8JB4x5V091JSCAMP08Jpdn2aRXPPd0Dw179LMBrq6r+gwCg5ZZa
pGN1kgFw424Mh5u1zg4QTbID/3MTCsxFL99E15HKcB3yhj+oOLmIrGAVBgoldrRd
BTGjQQFhW1NSu8CYhN/4nGHMpaTxgEtbn4C1IwI/G3DK9o1YmRJinkGJ6XYfp3b
cC0mqTDF5ugIAmdeditnw7dexNqneavamRXJM/RQ5gJJyVpbA020qe6L61nb5H
k jcZA/9obTn499dDMRQ/CNR92FA5pr0zriy/zuLuowcq159nt+bEb9nY1mfUN6
Sw0jCH++1QH51erV=EokyQyq5ocUdjjeRYF/d2j19xme5uL2H3tDvnvE6vgfU/N
sdvby4B21ku7S/h06u6CP04e+pzdyX9uS+PnF8osu7u3j60UprikUGF1bCBHYlwxs
Yldoz2IqPHBhdluxnVlxzQHJ1ZGhndC5jb20+FYEExECAFYFaJkHP3UECwoEAwhV
AwIDFgIBaherAAoJEJECmwGCPSwMjQa0oNF2zvRgdR/8or9pBhu95zeSnkb7AKCm
/uKVS0a5koN7J61/1vEwx11poLkBDQ5Bz+MEAQA8ztcWRJ,jlBcHCgLaE402jyqQ
37gDT/n4V566nU+YitzDFScVmMuFrzhilbb1f09TpZzxeb5F3T6p9hLLnHC01bD
HRsKfh0eJYMMqB3+HyUpNeoCMEEd9AmID9P4rQt07Pes38sV01X005vsTyMC9wEB
vSNzK+r1+phA55r1s8cAAwUEAJjqaqvk0bgFrw10PG9m7FeeD1vPSV6HSA0Fvz4w
c7ckfpuxg/URQNF3TJA00Acprk8g8J2CtebAyR/sP5IsrK5111uGdk+10M85FpT
/cen20dJtToAF/6fGnIkCeP105alwTBdgAUHBRykpdMu3GJ7NS6923fVg5khQWg
uurAiYEGBECAYFaJkHP4wACgkQkQka8Y19JamlivCfxox/HjlorMKnQRJkeBcZ
iLyPH1QAoI33Ft/OHQbLtqdtP4vWYQRibjW
=BMEc
-----END PGP PUBLIC KEY BLOCK-----
key.asc (END)

```

Figure B-1. Copying Your Public Key

Note that if you are submitting your key to another Web-based keyserver, the above transaction is essentially the same.

That is all you need to do. Regardless of whether you use the shell prompt or the Web, you see a message that your key was successfully submitted — either at the shell prompt or at the keyserver's website. From now on, users who want to communicate securely with you can import your public key and add it to their keyring.

B.6. Importing a Public Key

The other end of key exchange is importing other people's public keys to your keyring — is just as simple as exporting keys. When you import someone's public key, you can decrypt their email and check their digital signature against their public key on your keyring.

One of the easiest ways to import a key is to download the key or save it from a website.

After downloading a key and saving it to the file *key.asc*, use the following command to add it to your keyring.

```
gpg --import key.asc
```

Another way to save a key is to use a browser's **Save As** feature. If you are using a browser such as **Mozilla**, and you locate a key at a keyserver, you can save the page as a text file (go to **File => Save Page As**). In the drop-down box next to **Files of Type**, choose **Text Files (*.txt)**. Then, you can import the key — but remember the name of the file you saved. For example, if you saved a key as a text file called *newkey.txt*, to import the file, at a shell prompt, type the following command:

```
gpg --import newkey.txt
```

The output looks similar to the following:

```
gpg: key F78FFE84: public key imported
gpg: Total number processed: 1
gpg:                      imported: 1
```

To check that the process was successful, use the `gpg --list-keys` command; you should see your newly imported key listed on your keyring.

When you import a public key, you add that key to your *keyring* (a file in which public and secret keys are kept). Then, when you download a document or file from that entity, you can check the validity of that document against the key you added to your keyring.

B.7. What Are Digital Signatures?

Digital signatures can be compared to your written signature. Unlike traditional correspondence, in which it might be possible to tamper with your written signature, digital signatures can not be forged. That is because the signature is created with your unique secret key and can be verified by your recipient using your public key.

A digital signature timestamps a document; essentially, that means that the time you signed the document is part of that signature. So if anyone tries to modify the document, the verification of the signature fails. Some email applications, such as **Exmh** or KDE's **KMail**, include the ability to sign documents with GnuPG within the application's interface.

Two useful types of digital signatures are *clearsigned* documents and *detached signatures*. Both types of signatures incorporate the same security of authenticity, without requiring your recipient to decrypt your entire message.

In a clearsigned message, your signature appears as a text block within the context of your letter; a detached signature is sent as a separate file with your correspondence.

B.8. Additional Resources

There is more to encryption technology than can be covered in one slim introduction to GnuPG. Here are some resources where you can learn more.

B.8.1. Installed Documentation

- `man gpg` and `info gpg` — Quick Reference of GnuPG commands and options.

B.8.2. Useful Websites

- <http://www.gnupg.org> — The GnuPG website with links to the latest GnuPG releases, a comprehensive user's guide, and other cryptography resources.
- <http://hotwired.lycos.com/webmonkey/backend/security/tutorials/tutorial1.html> — Visit the *Encryption Tutorial* from Webmonkey to learn more about encryption and how to apply encryption techniques.
- <http://www.eff.org/pub/Privacy> — The Electronic Frontier Foundation, "Privacy, Security, Crypto, & Surveillance" Archive.

B.8.3. Related Books

- *The Official PGP User's Guide* by Philip R. Zimmerman; MIT Press
- *PGP: Pretty Good Privacy* by Simson Garfinkel; O'Reilly & Associates, Inc.
- *E-Mail Security: How to Keep Your Electronic Messages Private* by Bruce Schneier; John Wiley & Sons

Appendix C.

Applications

The following table is a quick reference guide to the applications available on your Red Hat Enterprise Linux system. While these are the recommended applications, many other commands and applicatons are available.

Category	Application	Location
Audio Playback	XMMS	Applications (the main menu on the panel) => Sound & Video => Audio Player
	Rhythmbox	Applications (the main menu on the panel) => Sound & Video => Music Player
Audio Recorder	Sound Recorder	Applications (the main menu on the panel) => Sound & Video => Sound Recorder
	Sound Juicer	Applications (the main menu on the panel) => Sound & Video => Sound Juicer
CD Recording	X Cd Roast	Applications (the main menu on the panel) => System Tools => CD Writer
	cdrecord	From a shell prompt, enter the command <code>cdrecord</code> .
Charts and Diagrams	Dia	Applications (the main menu on the panel) => Office => Dia Diagrams
	XFig	Applications (the main menu on the panel) => Graphics => Xfig
Chat	GAIM	Applications (the main menu on the panel) => Internet => IM
	Kopete	Applications (the main menu on the panel) => Internet => Kopete
Digital Cameras	gThumb	Applications (the main menu on the panel) => Graphics => Photo Tool
Email Clients	Evolution	Applications (the main menu on the panel) => Internet => Email
Email Clients, continued	Thunderbird, mutt	Applications (the main menu on the panel) => Internet => Thunderbird or enter the command <code>mutt</code> at a shell prompt.
Fax	Fax Viewer (KFax)	Applications (the main menu on the panel) => Graphics => KFax
Graphics	The GIMP	Applications (the main menu on the panel) => Graphics => GIMP Image Editor

Category	Application	Location
	Kolourpaint	Applications (the main menu on the panel) => Graphics => Kolourpaint
Image Viewers	Nautilus	Applications (the main menu on the panel) => File Browser
	KView	Applications (the main menu on the panel) => Graphics => KView
IRC	X-Chat	Applications (the main menu on the panel) => Internet => IRC
	Ksirc	Applications (the main menu on the panel) => Internet => Ksirc
PDAs	Evolution	Applications (the main menu on the panel) => Internet => Email
	KOrganizer	Applications (the main menu on the panel) => Office => KOrganizer
PDF Viewers	GNOME PDF Viewer	Applications (the main menu on the panel) => Graphics => PDF Viewer
	KPDF	Applications (the main menu on the panel) => Graphics => KPDF
PostScript Viewers	GNOME Ghostview	Applications (the main menu on the panel) => Graphics => PostScript Viewer
	KGhostView	Applications (the main menu on the panel) => Graphics => KGhostView
Presentations	OpenOffice.org Impress	Applications (the main menu on the panel) => Office => OpenOffice.org Impress
Project Management	Imendio	Applications (the main menu on the panel) => Office => Project Planner
Scanners	Kooka	Applications (the main menu on the panel) => Graphics => Kooka
	xsane	At a shell prompt, enter the command <code>xsane</code>
Spreadsheets	OpenOffice.org Calc	Applications (the main menu on the panel) => Office => OpenOffice.org Calc
Text Editors	gedit	Applications (the main menu on the panel) => Accessories => Text Editor
	nano, vi	From a shell prompt, enter the command <code>nano</code> or <code>vi</code> .
Video Players	Helix Player	Applications (the main menu on the panel) => Sound & Video => Helix Player
Volume Controls	Volume Control	Applications (the main menu on the panel) => Sound & Video => Volume Control
Web Browsers	Firefox	Applications (the main menu on the panel) => Internet => Firefox

Category	Application Konqueror, links	Location Applications (the main menu on the panel) => Internet => Konqueror or enter the command links at a shell prompt.
Word Processors	OpenOffice.org Writer	Applications (the main menu on the panel) => Office => OpenOffice.org Writer

Table C-1. Applications

Appendix D.

A Comparison of Common DOS and Linux Commands

Many Linux commands typed at a shell prompt are similar to the commands you would type in DOS. In fact, some commands are identical.

This appendix provides common commands used at the DOS prompt in Windows and their counterparts in Linux. Basic examples of how the command are used at the Linux shell prompt are also provided. Note that these commands usually have a number of options. To learn more about each command, read its associated man page (for example, type `man ls` at the shell prompt to read about the `ls` command).

Command's Purpose	MS-DOS	Linux	Basic Linux Example
Copies files	copy	cp	<code>cp thisfile.txt /home/thisdirectory</code>
Moves files	move	mv	<code>mv thisfile.txt /home/thisdirectory</code>
Lists files	dir	ls	<code>ls</code>
Clears screen	cls	clear	<code>clear</code>
Closes shell prompt	exit	exit	<code>exit</code>
Displays or sets date	date	date	<code>date</code>
Deletes files	del	rm	<code>rm thisfile.txt</code>
"Echoes" output to the screen	echo	echo	<code>echo this message</code>
Edits text files	edit	gedit(a)	<code>gedit thisfile.txt</code>
Compares the contents of files	fc	diff	<code>diff file1 file2</code>
Finds a string of text in a file	find	grep	<code>grep word or phrase thisfile.txt</code>
Formats a diskette	format a: (if diskette is in A:)	mke2fs	/sbin/mke2fs /dev/fd0 (/dev/fd0 is the Linux equivalent of A:)
Displays command help	command /?	man or info	<code>man command</code>
Creates a directory	mkdir	mkdir	<code>mkdir directory</code>
Views contents of a file	more	less(b)	<code>less thisfile.txt</code>
Renames a file	ren	mv(c)	<code>mv thisfile.txt thatfile.txt</code>

Command's Purpose	MS-DOS	Linux	Basic Linux Example
Displays your location in the file system	<code>chdir</code>	<code>pwd</code>	<code>pwd</code>
Changes directories with a specified path (<i>absolute path</i>)	<code>cd pathname</code>	<code>cd pathname</code>	<code>cd /directory/directory</code>
Changes directories with a <i>relative path</i>	<code>cd ..</code>	<code>cd ..</code>	<code>cd ..</code>
Displays the time	<code>time</code>	<code>date</code>	<code>date</code>
Shows amount of RAM in use	<code>mem</code>	<code>free</code>	<code>free</code>

Notes:

- Gedit** is a graphical text editor; other editors you can use in place of **Gedit** include **nano** and **vi**.
- The `more` pager can also be used to page through a file one screen at a time.
- The `mv` command can both move a file and, if you want to rename a file in the same directory, "move" that file to the same directory with a new name.

Table D-1. Similar Commands

Appendix E.

System Directories

This is a list of the primary Red Hat Enterprise Linux system directories. Each directory is described briefly. For additional directory information, refer to the *Red Hat Enterprise Linux System Administration Guide* and the *Red Hat Enterprise Linux Reference Guide*.

- `/bin/` — Used to store user commands. The directory `/usr/bin/` also stores user commands.
- `/sbin/` — Location of many system commands, such as `shutdown`. The directory `/usr/sbin/` also contains many system commands.
- `/root/` — The home directory of root, the superuser.
- `/misc/` — This directory is used for automatically mounting directories on removable devices (such as Zip drives) and remote directories (such as NFS shares) using `autofs`. Refer to the `autofs` manual page (type `man autofs` at a shell prompt) for more information.
- `/mnt/` — This directory typically contains the mount points for file systems mounted after the system is booted.
- `/media/` — This directory contains the mount points for removable media, such as diskettes, CD-ROMs, and USB flash drives.
- `/boot/` — Contains the kernel and other files used during system startup.
- `/lost+found/` — Used by `fsck` to place orphaned files (files without names).
- `/lib/` — Contains many device modules and library files used by programs in `/bin/` and `/sbin/`. The directory `/usr/lib/` contains library files for user applications.
- `/dev/` — Stores device files.
- `/etc/` — Contains configuration files and directories.
- `/var/` — For *variable* (or constantly changing) files, such as log files and the printer spool.
- `/usr/` — Contains files and directories directly relating to users of the system, such as programs and supporting library files.
- `/proc/` — A virtual file system (not actually stored on the disk) that contains system information used by certain programs.
- `/initrd/` — A directory that is used to mount the `initrd.img` image file and load needed device modules during bootup.

Warning

Do not delete the `/initrd/` directory. You will be unable to boot your computer if you delete the directory and then reboot your Red Hat Enterprise Linux system.

- `/tftpboot/` — Contains files and applications needed for *Preboot Execution Environment* (PXE), a service that allows client machines and machines without hard drives to boot an operating system from an image on a central PXE server.
- `/tmp/` — The temporary directory for users and programs. `/tmp/` allows all users on a system read and write access.
- `/home/` — Default location of user home directories.
- `/opt/` — Directory where optional files and programs are stored. This directory is used mainly by third-party developers for easy installation and uninstallation of their software packages.

Appendix F.

Keyboard Shortcuts

Here are a few keyboard shortcuts you can use to perform common tasks quickly. Many more are available in addition to what is listed here. For more command line and keyboard shortcuts, visit:

<http://linux-newbie.sunsite.dk/html/lnag.html>

- [Ctrl] + [Alt] + [Backspace] = kills your current X session. Kills your graphical desktop session and returns you to the login screen. Use this if the normal exit procedure does not work.
- [Ctrl] + [Alt] + [Delete] = From a non-graphical shell prompt, shuts down your Red Hat Enterprise Linux system. Use only when the normal shutdown procedure does not work. In a graphical desktop session, this shortcut displays the desktop logout screen that allows you to logout, reboot, or shut down your system.
- [Ctrl] + [Alt] + [Fn] = switches screens. [Ctrl]+[Alt] + one of the function keys displays an available screen. By default, [F1] through [F6] are text-mode shell prompt screens and [F7] is the graphical desktop screen.
- [Alt] + [Tab] = switches tasks in a graphical desktop environment. If you have more than one application open at a time, you can use [Alt] + [Tab] to switch among open tasks and applications.
- [Ctrl] + [a] = moves cursor to the beginning of a line. This works in most text editors and in the URL field in **Mozilla**.
- [Ctrl] + [d] = logout of (and close) shell prompt. Use this quick shortcut instead of typing `exit` or `logout`.
- [Ctrl] + [e] = moves cursor to end of a line. This works in most text editors and in the URL field in **Mozilla**.
- [Ctrl] + [l] = clears the terminal. This shortcut does the same thing as typing `clear` at a command line.
- [Ctrl] + [u] = clears the current line. If you are working in a terminal, use this shortcut to clear the current line from the cursor all the way to the beginning of the line.
- [Middle Mouse Button] = pastes highlighted text. Use the left mouse button to highlight the text. Point the cursor to the spot where you want it pasted. Click the middle mouse button to paste it. In a system with a two-button mouse, if you configured your mouse to emulate a third mouse button, you can click both the left and right mouse buttons simultaneously to perform a paste.
- [Tab] = command autocomplete. Use this command when using a shell prompt. Type the first few characters of a command or filename and then press the [Tab] key. It will automatically complete the command or show all commands that match the characters you typed.
- [Up] and [Down] Arrow = shows command history. When using a shell prompt, press the [up] or [down] arrow to scroll through a history of commands you have typed from the current directory. When you see the command you want to use, press [Enter].

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Colophon

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