Chapter 1

An Overview of Red Hat Linux

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Linux was a phenomenon waiting to happen. The computer industry suffered from a rift. In the 1980s and 1990s, people had to choose between inexpensive, market-driven PC operating systems from Microsoft and expensive, technology-driven operating systems such as UNIX. Free software was being created all over the world, but lacked a common platform to rally around. Linux has become that common platform.

For several years, Red Hat Linux has been the most popular commercial distribution of Linux. With the latest versions of Red Hat Linux (reflected in the Fedora Core and Red Hat Enterprise Linux distributions), Red Hat, Inc. has taken steps to offer both free-flowing community versions and well-supported commercial versions of Red Hat Linux.

NOTE: Because of significant overlap between Fedora Core and Red Hat Enterprise Linux, I use the term *Red Hat Linux* to refer to technology in both distributions. If software I describe is missing (primarily from Enterprise, which doesn't include many games and personal software), you can add the software later. Check your CDs, then check yum repositories described in Chapter 5 to find software RPMs.

Introducing Red Hat Linux

With the recent split between community (Fedora) and commercial (Red Hat Enterprise Linux) versions of Red Hat Linux, Red Hat has created a model that can suit the fast-paced changes in the open source world, while still meeting the demands for a well-supported

commercial Linux distribution. (Later in this chapter I discuss differences between the Fedora and Enterprise versions of Red Hat Linux.)

Technical people have chosen Red Hat Linux because of its reputation for solid performance. With the new Fedora Project, Red Hat hopes to create an environment where open source developers can bring high-quality software packages to Red Hat Linux that would be beyond the resources of Red Hat, Inc. to test and maintain on its own.

Over 1,400 individual software packages (compared to just over 600 in Red Hat Linux 6.2) are included in the latest release of Red Hat Linux, referred to as Fedora Core. These packages contain features that would cost you hundreds or thousands of dollars to duplicate if you bought them as separate commercial products. These features let you:

- Connect your computers to a LAN or the Internet.
- Create documents and publish your work on paper or on the Web.
- Work with multimedia content to manipulate images, play music files, view video, and even burn your own CDs.
- Play games individually or over a network.
- Communicate over the Internet using a variety of Web tools for browsing, chatting, transferring files, participating in newsgroups, and sending and receiving e-mail.
- Protect your computing resources by having Red Hat Linux act as a firewall and/or a router to protect against intruders coming in through public networks.
- Configure a computer to act as a network server, such as a print server, Web server, file server, mail server, news server, and a database server.

This is just a partial list of what you can do with Red Hat Linux. Using this book as your guide, you will find that there are many more features built into Red Hat Linux as well.

Support for new video cards, printers, storage devices, and applications are being added every day. Linux programmers around the world are no longer the only ones creating hardware drivers. Every day more hardware vendors are creating their own drivers, so they can sell products to the growing Linux market. New applications are being created to cover everything from personal productivity tools to programs that access massive corporate databases.

Remember that old Pentium computer in your closet? Don't throw it away! Just because a new release of Red Hat Linux is out doesn't mean that you need all new hardware for it to run. Support for many old computer components get carried from one release to the next. There are old PCs running Red Hat Linux today as routers (to route data between your LAN and the Internet), firewalls (to protect your network from outside intrusion), and file servers (to store shared files on your LAN) — with maybe an Ethernet card or an extra hard disk added.

At this point, you may feel that Linux is something you want to try out. This brings us to the basic question: What is Linux?

What Is Linux?

Linux is a free operating system that was created by Linus Torvalds when he was a student at the University of Helsinki in 1991. Torvalds started Linux by writing a *kernel* — the heart of the operating system — partly from scratch and partly by using publicly available software. (For the definition of an operating system and a kernel, see the sidebar "What Is an Operating System?" later in this chapter.) Torvalds then released the system to his friends and to a community of "hackers" on the Internet and asked them to work with it, fix it, and enhance it. It took off.

> **CROSS-REFERENCE:** See Chapter 14 for a discussion about the difference between hackers (who just like to play with computers) and crackers (who break into computer systems and cause damage).

Today, there are hundreds of software developers around the world contributing software to the Linux effort. Because the source code for the software is freely available, anyone can work on it, change it, or enhance it. Developers are encouraged to feed their fixes and improvements back into the community so that Linux can continue to grow and improve.

On top of the Linux kernel effort, the creators of Linux also drew on a great deal of system software and applications that are now bundled with Linux from the GNU software effort (GNU stands for "GNU is Not UNIX"), which is directed by the Free Software Foundation (`www.gnu.org`). There is a vast amount of software that can be used with Linux, all of which includes features that can compete with or surpass those of any other operating system in the world.

If you have heard Linux described as a free version of UNIX, there is good reason for it. Although much of the code for Linux started from scratch, the blueprint for what the code would do was created to follow POSIX standards. POSIX (Portable Operating System Interface for UNIX) is a computer industry operating system standard that every major version of UNIX complied with. In other words, if your operating system was POSIX-compliant, it was UNIX. See the next section describing Linux's roots in the UNIX operating system.

Linux's Roots in UNIX

Linux grew within a culture of free exchange of ideas and software. Like UNIX — the operating system on which Linux is based — the focus was on keeping communications open among software developers. Getting the code to work was the goal, without much concern about who owned the code, and the Internet was the primary communications medium. What, then, were the conditions that made the world ripe for a computer system such as Linux?

What Is an Operating System?

An operating system is made up of software instructions that lie between the computer hardware (disks, memory, ports, and so on) and the application programs (word processors, Web browsers, spreadsheets, and so on). At the center is the kernel, which provides the most basic computing functions (managing system memory, sharing the processor, opening and closing devices, and so on). Besides the kernel, an operating system provides other basic services needed to operate the computer, including:

- **File systems** — The file system provides the structure in which information is stored on the computer. Information is stored in files, primarily on hard disks inside the computer. Files are organized within a hierarchy of directories. The Linux file system holds the data files that you save, the programs you run, and the configuration files that set up the system.
- **Device drivers** — These provide the interfaces to each of the hardware devices connected to your computer. A device driver enables a program to write to a device without needing to know details about how each piece of hardware is implemented. The program opens a device, sends and receives data, and closes a device.
- **User interfaces** — An operating system needs to provide a way for users to run programs and access the file system. Linux has both graphical and text-based user interfaces. GNOME and KDE provide graphical user interfaces, whereas shell command interpreters (such as `bash`) run programs by typing commands and options.
- **System services** — An operating system provides system services, many of which can be started automatically when the computer boots. In Linux, system services can include processes that mount file systems, start your network, and run scheduled tasks. In Linux, many services run continuously, enabling users to access printers, Web pages, files, databases, and other computing assets over a network.

Without an operating system, an application program would have to know the details of each piece of hardware, instead of just being able to say, “open that device and write a file there.”

In the 1980s and 1990s, while Microsoft flooded the world with personal computers running DOS and Windows operating systems, power users demanded more from an operating system. They ached for systems that could run on networks, support many users at once (multiuser), and run many programs at once (multitasking). DOS (Disk Operating System) and Windows didn’t cut it.

UNIX, on the other hand, grew out of a culture where technology was king and marketing people were, well, hard to find. Bell Laboratories in Murray Hill, New Jersey, was a think tank where ideas came first and profits were somebody else's problem. A quote from Dennis Ritchie, co-creator of UNIX and designer of the C programming language, in a 1980 lecture on the evolution of UNIX, sums up the spirit that started UNIX. He was commenting on both his hopes and those of his colleagues for the UNIX project after a similar project called Multics had just failed:

> *What we wanted to preserve was not just a good environment in which to do programming, but a system around which a fellowship could form. We knew from experience that the essence of communal computing as supplied by remote-access, time-shared machines, is not just to type programs into a terminal instead of a keypunch, but to encourage close communication.*

In that spirit, the first source code of UNIX was distributed free to universities. Like Linux, the availability of UNIX source code made it possible for a diverse population of software developers to make their own enhancements to UNIX and share them with others.

By the early 1980s, UNIX development moved from the organization in Murray Hill to a more commercially oriented development laboratory in Summit, New Jersey (a few miles down the road). During that time, UNIX began to find commercial success as the computing system of choice for applications such as AT&T's telephone switching equipment, for supercomputer applications such as modeling weather patterns, and for controlling NASA space projects.

Major computer hardware vendors licensed the UNIX source code to run on their computers. To try to create an environment of fairness and community to its OEMs (original equipment manufacturers), AT&T began standardizing what these different ports of UNIX had to be able to do to still be called UNIX. To that end, compliance with POSIX standards and the AT&T UNIX System V Interface Definition (SVID) were specifications UNIX vendors could use to create compliant UNIX systems. Those same documents also served as road maps for the creation of Linux.

Today, Linux continues to aim toward POSIX compliance, as well as compliance with standards set by the new owner of the UNIX trademark, The Open Group (`http://www.unix-systems.org/`).

Common Linux Features

No matter what version of Linux you use, the piece of code common to all is the Linux kernel. Although the kernel can be modified to include support for the features you want, every Linux kernel can offer the following features:

- **Multiuser** — Not only can you have many user accounts available on a Linux system, you can also have multiple users logged in and working on the system at the same time. Users can have their own environments arranged the way they want: their own home

directory for storing files and their own desktop interface (with icons, menus, and applications arranged to suit them). User accounts can be password-protected, so that users can control who has access to their applications and data.

- **Multitasking** — In Linux, it is possible to have many programs running at the same time, which means that not only can you have many programs going at once, but that the Linux operating system can itself have programs running in the background. Many of these system processes make it possible for Linux to work as a server, with these background processes listening to the network for requests to log in to your system, view a Web page, print a document, or copy a file. These background processes are referred to as *daemons*.
- **Graphical User Interface (X Window System)** — The powerful framework for working with graphical applications in Linux is referred to as the X Window System (or simply X). X handles the functions of opening X-based graphical user interface (GUI) applications and displaying them on an X server process (the process that manages your screen, mouse, and keyboard).

  On top of X, you use an X-based desktop environment to provide a desktop metaphor and window manager to provide the look-and-feel of your GUI (icons, window frames, menus, and colors, or a combination of those items called *themes*). There are several desktop environments and several desktop managers to choose from. (Red Hat provides a few desktop managers, but focuses on GNOME and KDE desktop environments.)
- **Hardware support** — You can configure support for almost every type of hardware that can be connected to a computer. There is support for floppy disk drives, CD-ROMs, removable disks (such as DVDs and Zip drives), sound cards, tape devices, video cards, and most anything else you can think of.

NOTE: Not every hardware manufacturer provides Linux drivers with their peripheral devices and adapter cards. Although most popular hardware will be supported eventually in Linux, it can sometimes take a while for a member of the Linux community to write a driver.

- **Networking connectivity** — To connect your Linux system to a network, Linux offers support for a variety of local area network (LAN) boards, modems, and serial devices. In addition to LAN protocols, such as Ethernet (both wired and wireless), all the most popular upper-level networking protocols can be built-in. The most popular of these protocols is TCP/IP (used to connect to the Internet). Other protocols, such as IPX (for Novell networks) and X.25 (a packet-switching network type that is popular in Europe), are also available.
- **Network servers** — Providing networking services to the client computers on the LAN or to the entire Internet is what Linux does best. A variety of software packages are available that enable you to use Linux as a print server, file server, FTP server, mail server, Web server, news server, or workgroup (DHCP or NIS) server.

- **Application support** — Because of compatibility with POSIX and several different application programming interfaces (APIs), a wide range of freeware and shareware software is available for Linux. Most GNU software from the Free Software Foundation will run in Linux (although some may take a bit of tweaking).

NOTE: Because of the popularity of the Red Hat Package Management (RPM) format for packaging software, many software packages are available on the Internet in RPM format. If the RPM version matches your processor type (most have i386 and or i686 versions available), you can install the package without building and compiling the package. See Chapters 2 and 5 for information on working with RPM packages.

Primary Advantages of Linux

When compared to different commercially available operating systems, Linux's best assets are its price and its reliability. Most people know that its initial price is free (or at least under $50 when it comes in a box or with a book). However, when people talk about Linux's affordability, they are usually thinking of its total cost, which includes the capability of using inexpensive hardware and compatible free add-on applications. Although commercial operating systems tend to encourage upgrading to later hardware, Linux doesn't (although faster hardware and larger disks are nice to have).

In terms of reliability, the general consensus is that Linux is comparable to many commercial UNIX systems but more reliable than most desktop-oriented operating systems. This is especially true if you rely on your computer system to stay up because it is a Web server or a file server. (You don't have to reboot every time you change something.)

Another advantage of using Linux is that help is always available on the Internet. There is probably someone out there in a Linux newsgroup or mailing list willing to help you get around your problem. Because the source code is available, if you need something fixed you can even patch the code yourself! On the other hand, I've seen commercial operating system vendors sit on reported problems for months without fixing them. Remember that the culture of Linux is one that thrives on people helping other people.

NOTE: If you have general questions about Red Hat Linux, try the `linux.redhat.misc` newsgroup. For specific questions about networking or hardware, try the following newsgroups: `comp.os.linux.networking` and `comp.os.linux.hardware`, respectively.

What Is Red Hat Linux?

Having directories of software packages floating extraneously around the Internet was not a bad way for hackers to share software. However, for Linux to be acceptable to a less technical population of computer users, it needed to be simple to install and use. Likewise, businesses that were thinking about committing their mission-critical applications to a computer system would want to know that this system had been carefully tested.

To those ends, several companies and organizations began gathering and packaging Linux software together into usable forms called *distributions*. The main goal of a Linux distribution is to make the hundreds of unrelated software packages that make up Linux work together as a cohesive whole. For the past few years, the most popular commercial distribution has been Red Hat Linux.

In September 2003, Red Hat, Inc., changed its way of doing business. That change resulted in the formation of the Red Hat–sponsored Fedora Project to take the development of Red Hat Linux technology into the future. But what does that mean to individuals and businesses that have come to rely on Red Hat Linux?

Red Hat forms the Fedora Project

The announcement of the Fedora Project by Red Hat, Inc. at first it prompted more questions than answers about the future direction of the company and its flagship Red Hat Linux product. In fact, it seemed that nothing named Red Hat Linux even existed anymore. Instead, what was Red Hat Linux would be reflected by Linux distributions coming from two paths:

- **Fedora Project** (`http://fedora.redhat.com`) — An open source project, beginning from a Red Hat Linux 9 base, that produces its own Linux distribution. While the project is sponsored by Red Hat, Inc., there is no official support for the Linux distribution (called Fedora Core) that the project produces.
- **Red Hat Enterprise Linux** (`www.redhat.com/software/rhel`) — An official, commercial Linux product from Red Hat, Inc. that is offered on an annual subscription basis. Red Hat backs up its Enterprise product line with technical support, training, and documentation.

The primary result of the Fedora Project (at least at first) is a set of three binary CDs and three source code CDs of a Linux distribution referred to as the Fedora Core. Before it was called Fedora Core, that distribution was being tested simply as the next in the series of Red Hat Linux distributions (presumably, Red Hat Linux 10). The three binary, installation CDs resulting from that effort are the same CDs that are included with this book.

The name change from Red Hat Linux to Fedora Core wasn't the only differences between the two distributions, however. Red Hat, Inc. also changed its association with the Fedora Core distribution in the following ways:

- **No boxed sets** — Red Hat decided to not sell Fedora Core through retail channels. The ever-shortening release cycle was making it difficult to manage this, and Red Hat believed that most of its customers were clever enough to download the software.
- **No technical support offerings** — There are no technical support programs available from Red Hat for Fedora Core, although at the moment you can still purchase the $60/year update service entitlement for Fedora.

- **No Red Hat documentation** — The set of manuals that came with the previous Red Hat Linux product is not being brought over to Fedora. Instead, a series of small task-oriented documents will be collected for the project in article format.

By not creating a whole support industry around Fedora Core, that project is free to produce software release on a much shorter schedule (possibly two or three times per year). This allows Fedora Core users to always have the latest software features and fixes included with a recent version of the operating system.

Another potential upside to Fedora Core is that the Fedora Project hopes to encourage community software developers to create compatible software. By including software download and installation tools (such as the yum utility) in Fedora Core, the Fedora Project hopes to encourage people to contribute to software repositories that Fedora Core users can rely on to download additional software packages.

Red Hat shifts to Enterprise Linux

The major shift of attention to Red Hat Enterprise Linux as the focus of Red Hat, Inc.'s commercial efforts has been on the horizon for some time. Some characteristics of Red Hat Enterprise Linux are:

- **Longer release intervals** — Instead of offering releases every 4 to 6 months, Enterprise software will have a 12 to 18 month update cycle. Customers can be assured of a longer support cycle without having to upgrade to a later release.
- **Multiple support options** — Customers will have the choice of purchasing different levels of support. All subscriptions will include the Update Module, which allows easy access to updates for Red Hat Enterprise Linux systems. The Management Module lets customers develop custom channels and automate management of multiple systems. The Monitoring Module allows customers to monitor and maintain an entire infrastructure of systems.
- **Documentation and training** — Manuals and training courses will center on the Red Hat Enterprise Linux distribution.

Red Hat Enterprise Linux install types focus on three different types of computer systems, referred to as WS (for workstations), AS (for high-end systems), and ES (for small/mid-range servers). Each system in the Red Hat Enterprise Linux family is meant to be compatible with the others. There are Basic, Standard and Premium editions of these Enterprise systems. While Basic offers only software downloads, standard and premium editions offer hard copy documentation and additional technical support.

Choosing between Fedora and Enterprise

If you bought this book to try out Linux for the first time, rest assured that what you have on the three CDs with this book is a solid, battle-tested operating system. Because (at the moment

at least) there is so much overlap between Fedora Core and Red Hat Enterprise Linux, Fedora Core provides a way to test out much of the software that is in Enterprise editions.

Although Fedora Core may not be right for everyone, Fedora Core is still great for students, home users, most small businesses, and anyone just wanting to try out Red Hat Linux technology. Larger businesses should seriously consider the implications to support, training, and future upgrade paths before choosing whether to go the Fedora route or sign on with Red Hat Enterprise Linux.

Why Choose Red Hat Linux?

To distinguish themselves from other versions of Linux, each distribution adds some extra features. Because many power features included in most Linux distributions come from established open source projects (such as Apache, Samba, KDE, and so on), often enhancements for a particular distribution exist to make it easier to install, configure, and use Linux. Also, because there are different software packages available to do the same jobs (such as window managers or a particular server type), a distribution can distinguish itself by which packages it chooses to include and feature.

Red Hat Linux traditionally has set itself apart from other Linux distributions with these features:

- **Software packaging** — Red Hat, Inc. created the Red Hat Package Management (RPM) method of packaging Linux. RPMs allow less technically savvy users to easily install Linux software. With RPM tools, you can install from CD, hard disk, over your LAN, or over the Internet. It's easy to track which packages are installed or to look at the contents of a package. Because RPM is available to the Linux community, it has become one of the de facto standards for packaging Linux software.

CROSS-REFERENCE: Chapter 5 describes how to install RPM packages.

- **Easy installation** — The Red Hat Linux installation process (called anaconda) provides easy steps for installing Linux. During installation, Red Hat also helps you take the first few steps toward configuring Linux. You can choose which packages to install and how to partition your hard disk. You can even get your desktop GUI ready to go by configuring your video card, user accounts, and even your network.

CROSS-REFERENCE: Chapter 2 covers Red Hat Linux installation.

- **UNIX System V–style run-level scripts** — To have your system services (daemon processes) start up and shut down in an organized way, Red Hat Linux uses the UNIX System V mechanism for starting and stopping services. Shell scripts (that are easy to read and change) are contained in subdirectories of `/etc`. When the run level changes, such as when the system boots up or you change to single-user mode, messages tell you

whether each service started correctly or failed to execute properly. Chapter 12 describes how to use run-level scripts.

- **Desktop environments (GNOME and KDE)** — To make it easier to use Linux, Red Hat Linux comes packaged with GNOME and KDE desktop environments. GNOME is installed by default and offers some nice features that include drag-and-drop protocols and tools for configuring the desktop look and feel. KDE is another popular desktop manager that includes a wide range of tools tailored for the KDE environment, such as the KDE Control Center for configuring the desktop.
- **Desktop look-and-feel** — With the latest Red Hat Linux distributions, whether you use KDE or GNOME as your desktop environment, you can expect to see many of the same icons and menus to help standardize how you use your Red Hat Linux system. Tools you can launch from those environments help you configure your network, set up servers, watch log files, and manage system services.
- **GUI Administration tools** — There are some helpful Red Hat configuration tools for setting up some of the trickier tasks in Linux. Several different GUI tools provide a graphical, form-driven interface for configuring networking, users, file systems, and initialization services. Instead of creating obtuse command lines or having to create tricky configuration files, these graphical tools can set up those files automatically.

NOTE: There are advantages and disadvantages of using a GUI-based program to manipulate text-based configuration files. GUI-based configuration tools can lead you through a setup procedure and error-check the information you enter. However, some features can't be accessed through the GUI, and if something goes wrong, it can be trickier to debug. With Linux, you have the command-line options available as well as the GUI administration tools.

- **Testing** — The exact configuration that you get on a Red Hat Linux distribution has been thoroughly tested by experts around the world. The simple fact that a software package is included in the Red Hat Linux distribution is an indication that Red Hat believes it has achieved a certain level of quality. Although Fedora Core will transition to a community-based approach to testing, at least for the first release Fedora Core was put through the same basic testing process as previous versions of Red Hat Linux.
- **Automatic updates** — The software packages that make up Red Hat Linux are constantly being fixed in various ways. To provide a mechanism for the automatic selection, download, and installation of updated software packages, Red Hat created the Red Hat Network. Using the Red Hat Network Web site or the `up2date` command, you can receive critical security fixes and patches very simply over the Internet. Fedora Core still allows automatic updates through Red Hat Network for the time being.

Features in Red Hat Linux

The major components in the Fedora Core include (with version numbers):

- Linux kernel: version 2.4.22
- GNOME (desktop environment): version 2.4
- KDE (desktop environment): version 3.1.4
- GCC (GNU C language compilation system): version 3.3
- Apache (Web server): version 2.0.47
- Samba (Windows SMB file/printer sharing): version 3.0
- CUPS (print services): version 1.1.19
- Sendmail (mail transport agent): version 8.12
- vsFTPd (secure FTP server): version 1.2
- INN (Usenet news server): version 2.3.5
- MySQL (database server): version 3.23.58
- BIND (Domain name system server): version 9.2.2

TIP: If you want the latest features in Linux when looking at different Linux distributions, compare the version numbers shown above. Version numbers and names that Linux distributors such as Mandrake, SUSE, and Red Hat associate with their releases can be arbitrary. By comparing versions of the kernel, KDE and GNOME desktops, and GNU compiler they are using, you can tell which distribution actually has the latest features.

As Red Hat continues to consolidate its distribution, some popular packages have been dropped from Fedora Core since the previous version of Red Hat Linux, such as the following:

- **LPRng** — This printing service was dropped, making CUPS the preferred (and only) printing service included with Red Hat Linux.
- **exmh** — This e-mail handling system was dropped from this release.
- **galeon** — This Web browser was replaced by the epiphany Web browser.
- **pine** — This e-mail reader was dropped due to maintenance and licencing concerns.
- **LILO** — This boot loader has been replaced by GRUB by and removed from the distribution.
- **tripwire** — This software for checking the integrity of your Red Hat Linux system was removed from this version. (You can find information on tripwire on the *Red Hat Linux Bible* Web site: `www.wiley.com/compbooks/negus`.)

Here are a few other packages that are noted as deprecated (slated to be dropped in the future):

- **Glide3** — This package supports 3D graphics for Mesa and 3Dfx Voodoo hardware.
- **sndconfig** — Redhat-config-soundcard is recommended for configuring sound cards.
- **ncpfs**— This package is used to set up NetWare servers in Linux.

See Appendix B for information on other packages no longer included in Red Hat Linux.

> **NOTE:** Just because a package has been dropped from Red Hat Linux doesn't mean that you can't still get and use the package. In fact, I tell how to find and install packages like wine and WuFTPd in this book that have been dropped from previous versions of Red Hat Linux.

The following paragraphs describe many of the major features in both Fedora Core and Red Hat Enterprise Linux.

Red Hat config tools

Red Hat has added to its growing arsenal of graphical administrative tools. Since dropping the linuxconf and bypassing the Webmin graphical administrative interfaces, Red Hat has been steadily developing and adding its own administrative tools to its distribution. As a result, a systems administration can often skip running shell commands and editing plain-text configuration files to set up servers, manage system resources, or add users.

The following is a list of Red Hat GUI packages and what each is used to configure:

- **redhat-config-bind:** Domain Name System server.
- **redhat-config-date:** System time and date.
- **redhat-config-httpd:** Apache Web server.
- **redhat-config-language:** Languages for Red Hat Linux.
- **redhat-config-keyboard:** Keyboard selection.
- **redhat-config-kickstart:** Kickstart files for unattended Red Hat Linux installations.
- **redhat-config-mouse:** A mouse.
- **redhat-config-network:** Network interfaces.
- **redhat-config-nfs:** Network File System shared directories.
- **redhat-config-packages:** Red Hat Linux software.
- **redhat-config-printer:** Printers.
- **redhat-config-printer-gui:** Printers (GUI).
- **redhat-config-printer-tui:** Printers (text-based).
- **redhat-config-proc:** Kernel tunable parameters.
- **redhat-config-rootpassword:** Change your root password.
- **redhat-config-samba:** Samba Windows file/printer sharing (new in Red Hat Linux 9).
- **redhat-config-securitylevel:** Iptables firewalls.
- **redhat-config-services:** System services.
- **redhat-config-soundcard:** Sound card.

- **redhat-config-time:** Set time and date.
- **redhat-config-users:** User accounts.
- **redhat-config-xfree86:** X display and monitor.
- **redhat-logviewer:** System log file viewer.

You can launch the tools associated with the previous packages either from the main Red Hat menu or from a Terminal window. In most cases, the name of the command you run to launch the window is the same name as the package it comes in.

Red Hat desktop interfaces

KDE and GNOME are desktop environments that provide a framework for running and developing graphical applications and offer a full range of preferences to allow users to tailor the exact desktop look-and-feel. There was some hubbub surrounding the new "Red Hat" look-and-feel implemented in Red Hat Linux 8, which gave both GNOME and KDE similar menus, icons, and colors. Die-hard GNOME and KDE users, however, are free to change their desktops however they like.

Unlike previous releases of Red Hat Linux, you have to work a bit to get the KDE desktop. If you choose to install Red Hat Linux as a Personal Desktop or Workstation system, you get the GNOME desktop by default. You must specifically ask to install additional packages to get KDE. By default, it is only included in an Everything install.

Additional software packages

By far, most of the enhancements to Fedora Core over previous versions of Red Hat Linux have come in existing packages. Some new packages have been added, however. Along with those mentioned in previous sections, the following list gives you an idea of some of the new software packages added to Red Hat Linux:

- **acpid** — Provides tools for the Advanced Configuration and Power Interface feature.
- **Bluetooth** — The bluez-bluefw, bluez-hcidump, bluez-pan, and bluez-sdp packages offer support for Bluetooth wireless networking.
- **brltty** — Contains support for braille terminal access to console.
- **dovecot** — Contains the dovecot secure IMAP server.
- **dvd+rw-tools** — Contains tools for mastering DVD content.
- **epiphany** — A Web browser that replaces the galeon Web browser in this release.
- **freeradius** — Contains the remote authentication dial-in user service authentication protocol..
- **gnome-pilot-conduits** — Contains the Palm OS PDA conduits.
- **nano** — Contains the nano text editor.

- **yum** — Contains the yum command for downloading and installing selected software packages in RPM format.

There are other new packages in this release of Fedora Core as well. For a complete list of packages in this release of Red Hat Linux (all of which are on the CDs that come with this book), see Appendix B.

The Culture of Free Software

I would be remiss to not say something about the culture of free software development from which Linux has thrived and will continue to thrive. The copyright for Red Hat Linux is covered under the GNU public license. That license, which most free software falls under, provides the following:

- **Author rights** — The original author retains the rights to his or her software.
- **Free distribution** — People can use the GNU software in their own software, changing and redistributing it as they please. They do, however, have to include the source code with their distribution (or make it easily available).
- **Copyright maintained** — Even if you were to repackage and resell the software, the original GNU agreement must be maintained with the software. This means that all future recipients of the software must have the opportunity to change the source code, just as you did.

It is important to remember that there is no warranty on GNU software. If something goes wrong, the original developer of the software has no obligation to fix the problem. However, the Linux culture has provided resources for that event. Experts on the Internet can help you iron out your problems, or you can access one of the many Linux newsgroups to read how others have dealt with their problems and to post your own questions about how to fix yours. Chances are that someone will know what to do — maybe even going so far as to provide the software or configuration file you need.

NOTE: The GNU project uses the term *free software* to describe the software that is covered by the GNU license. On occasion, you may see the term *open-source software* being used to describe software. Though source code availability is part of the GNU license, the GNU project claims that software defined as open source is not the same as free software because it can encompass semi-free programs and even some proprietary programs. See `www.opensource.org` for a description of open-source software.

Summary

Linux is a free computer operating system that was created by Linus Torvalds in 1991 and has grown from contributions from software developers all over the world. Fedora Core and Red Hat Enterprise versions of Red Hat Linux are distributions of Linux that package together the software needed to run Linux and makes it easier to install and run.

Features in Red Hat Linux distributions include a simplified installation procedure, Red Hat Package Management (RPM) tools for managing the software, and easy-to-use GNOME and KDE desktop environments. You can get Red Hat Linux from the Internet or from distributions that come with books such as this one.

Linux is based on a culture of free exchange of software. Linux's roots are based in the UNIX operating system. UNIX provided most of the framework that was used to create Linux. That framework came in the form of the POSIX standard, which defined the interfaces a UNIX system needs to support in order to be a UNIX system.