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Red Hat® Linux

Second Edition

Covers configuration and management of Red Hat 7.2–including Gnome, KDE, and Internet applications

Explains system administration (kernel 2.4), and Internet server configurations

Addresses security methods–firewalls, encryption, integrity checks, intrusion detection, and more

Richard Petersen
Best-selling Linux book author

Red Hat Linux: The Complete Reference, Second Edition

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Red Hat Linux: The Complete Reference, Second Edition

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To my sisters-in-law,
Marylou and Valerie

About the Author

Richard Petersen holds an M.L.I.S. in library and information studies. He currently teaches Unix and C/C++ courses at the University of California, Berkeley.

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Introduction

The Red Hat Linux operating system has become one of the major Linux distributions, bringing to the PC all the power and flexibility of a Unix workstation as well as a complete set of Internet applications and a fully functional desktop interface. This book is designed not only to be a complete reference on Red Hat Linux, but also to provide clear and detailed explanations of Linux features. No prior knowledge of Unix is assumed; Linux is an operating system anyone can use.

This book identifies seven major Linux topics: basic setup, environments and applications, the Internet, servers, administration, and network administration. These topics are integrated into the different ways Red Hat presents its distribution: as a desktop workstation, network workstation, server, and development platform. The section on the Red Hat Desktop workstation covers environments and applications. As a Red Hat network workstation, Internet applications are added. For Red Hat servers, the configuration and setup of various Internet servers are discussed. Included also are detailed sections on different system and network administration topics such as configuring the kernel, accessing files systems, and setting up firewalls. Though applicable primarily to programmers, the Red Hat development section introduces you to different development tools, such as compilers, shell scripting, and GUI construction. This section is available on the Web at **www.osborne.com**, should you wish to peruse this topic.

The first two sections of the book are designed to cover tasks you would need to perform to get your system up and running. They emphasize several of the key strengths provided by Red Hat Linux such as automatic update procedures, painless software installations, an extensive suite of software applications along with Red Hat specific configurations for them, and a collection of easy-to-use administrative tools for networking, user management, and server control. Red Hat distributions also include the most recent stable Linux software, such as security applications like Tripwire and IP-Tables, and the newest stable versions of the Gnome and KDE desktops, including the Nautilus file manager.

After an introduction to the working environment, including both Gnome and KDE desktops, you learn how to quickly update your system, access CD-ROMs, and set up your printer. The Red Hat Network makes software updates nearly automatic, letting you update the software on your system, including applications, all at once, with just a couple of mouse clicks. Internet access can be set up for modems, DSL, and Ethernet networks with easy-to-use GUI tools that guide you every step of the way. Security is a primary concern for any networked system. This section shows you how to implement basic protection methods such as encryption, intrusion detection, and firewalls. Many people now use Red Hat Linux to set up a home or local business network. The steps involved to implement a basic network can now be carried out using simple software tools. All these topics are covered in greater detail later in the book.

Gnome and the K Desktop Environment (KDE) have become standard desktop Graphical User Interfaces (GUI) for Linux, noted for their power, flexibility, and ease-of-use. These are complete desktop environments that are more flexible than either Windows or the Mac/OS. They support standard desktop features such as menus, taskbars, and drag-and-drop operations. But they also provide virtual desktops, panel applets and menus, and Internet-capable file managers. Gnome has become a standard GUI interface for Red Hat Linux systems, though Red Hat also provides full support for KDE, including it in its standard distribution. You can install both, run applications from one or the other, and easily switch from one to the other. Both Gnome and KDE were designed with software development in mind, providing a firm foundation that has encouraged the development of massive numbers of new applications for these interfaces. They have become integrated components of Linux, with applications and tools for every kind of task and operation. Instead of treating Gnome and KDE as separate entities, Gnome and KDE tools and applications are presented throughout the book. For example, Gnome and KDE mail clients are discussed along with other mail clients in Chapter 17. Gnome and KDE FTP clients, editors, graphic tools, administration tools, and others are also handled in their respective chapters (Chapter 5, 15, 16, 29, and 36).

Red Hat Linux is also a fully functional Unix operating system. It has all the standard features of a powerful Unix system, including a complete set of Unix shells such as BASH, TCSH, and the Z-shell. Those familiar with the Unix interface can use any of these shells, with the same Unix commands, filters, and configuration features.

For the Internet, Linux has become a platform for very powerful Internet applications. You are able not only to use the Internet, but also, with Linux, to become a part of it, creating your own Web, FTP, and Gopher sites. Other users can access your Linux systems, several at the same time, using different services. You can also use very powerful Gnome, KDE, and Unix clients for mail and news. Linux systems are not limited to the Internet. You can use them on any local intranet, setting up an FTP or Web site for your network. The Red Hat system provided on the CD-ROMs with this book come equipped with variety of fully functional FTP and Web servers already installed and ready to use. All you need to do is add the files you want onto your site.

Red Hat Linux has the same administration features found on standard Unix systems as well as several user-friendly GUI configuration tools that make any administration task a simple matter of choosing items on a menu or clicking a checkbox. It has the same multiuser and multitasking capabilities. You can set up accounts for different users, and each can access your system at the same time. Each user can have several programs running concurrently. With Linux you can control access, set up network connections, and install new devices. Red Hat Linux includes very powerful and easy-to-use, window-based configuration tools for tasks like configuring your printers and setting up your network connections. It is also compatible with comprehensive configuration tools like Linuxconf and Webmin.

A wide array of applications operates on Linux. Many personal versions of commercial applications are available for Linux free of charge, such as WordPerfect and Sybase databases. You can download them directly from the Internet. Numerous Gnome and KDE applications are continually released through their respective Web sites. The GNU public licensed software provides professional-level applications, such as programming development tools, editors and word processors, as well as numerous specialized applications, such as those for graphics and sound. A massive amount of software is available at online Linux sites where you can download applications and then easily install them onto your system.

What many may not realize is that all standard Linux systems support a wide range of programming languages, allowing users to create their own programs easily. All Red Hat Linux distributions include a large selection of programming platforms, including support for numerous kinds of shell programming, a variety of higher level languages like Perl and Gawk, and extensive GUI programming for desktops like Gnome and KDE. Once Red Hat Linux is installed, you can start creating your own programs.

Since this book is really six books in one—an Internet book, a Gnome and KDE book, a Server book, a Networking book, a Programming book, and an Administration book—how you choose to use it depends upon how you want to use your Red Hat Linux system. Almost all Linux operations can be carried out using either the Gnome or KDE interface. You need use the Unix command line interface very little, if at all. You can focus on the Gnome and KDE chapters and their corresponding tools and applications in the different chapters throughout the book. On the other hand, if you want to delve deeper into the Unix aspects of Linux, you can check out the Shell chapters

and the corresponding shell-based applications in other chapters. If you want to use Red Hat Linux only for its Internet services, then concentrate on the Internet clients and servers, most of which are already installed for you. If you want to use Linux as a multiuser system servicing many users or integrate it into a local network, you can use the detailed system, file, and network administration information provided in the administration chapters. None of these tasks are in any way exclusive. If you are working in a business environment, you will probably make use of all three aspects. Single users may concentrate more on the desktops and the Internet features, whereas administrators may make more use of the Unix features.

Part I provides an introduction to Red Hat Linux along with a listing of Red Hat Linux resources, including software repositories, documentation sites, newsgroups, and Linux news and development sites. This part also covers the streamlined installation procedure for Red Hat, which takes about 30 minutes or less. The Red Hat installation tool provides excellent commentary, describing each step in detail. In this section, you also learn the essentials of using both Gnome and KDE, along with the basics of working on the shell command line.

Part II is designed to help you start using Linux quickly. System configuration tasks, such as mounting CD-ROMs and adding new user accounts, are presented using the easiest methods, without the complex detail described in the administration chapters. Basic network configuration tasks are discussed, such as setting up a connection to an Internet Service Provider (ISP) over a modem and entering ISP network information such as nameserver and gateway addresses. Then, a brief discussion of network security methods shows you how to quickly set up simple protection for a single system connected to the Internet, as well as where to find out more if you have more complex security requirements. Finally, you learn how to set up a small local network that could even include Windows systems. You see how each host should be connected and configured, and how to create a gateway, connecting local hosts to the Internet. You learn to quickly configure and run services, such as the Domain Name Service, Samba, Sendmail, and a Web site.

Part III of this book deals with Red Hat Linux as a Desktop Workstation. Here you are introduced to the different kinds of user environments and applications available for Linux, starting with KDE and Gnome. Different features such as applets, the Panel, and configuration tools are described in detail. Using either of these interfaces, you can run all your applications using icons, menus, and windows. Plus, at any time, you can open up a terminal window through which you can enter standard Linux commands on a command line. The new Nautilus file manager for Gnome is covered in detail. You can also use the standard Unix command-line interface to run any of the standard Unix commands. Next, the BASH shell and its various file, directory, and filter commands are examined. The remaining chapters in this section discuss the applications available for Linux, beginning with Office suites such as KOffice and Star Office. KOffice is now distributed as part of KDE and can be found on most Linux distributions. The different database management systems available are also discussed along with the Web site locations where you can download them. A variety of different text editors is also

available, including several Gnome and KDE editors, as well as the Vim (enhanced VI), gvim (graphical Vi), and GNU Emacs editors.

Part IV of this book incorporates the added features of Red Linux as a network workstation. Here the book discusses in detail the many Internet applications you can use on your Linux system. Red Hat Linux automatically installs mail, news, FTP, and Web browser applications, as well as FTP and Web servers. Both KDE and Gnome come with a full set of mail, news, FTP clients, and Web browsers. These are described in detail along with Netscape communicator, now an integrated part of all Linux systems. On your CD-ROMs, there are other mail clients, newsreaders, and Internet tools that you can easily install from your desktop. In addition, the book describes Internet clients, such as Balsa, that you can download from Internet sites and install on your system.

Part V discusses Internet servers you can run on Red Hat, including FTP, Web, and DNS servers. Internet servers have become integrated components of most Linux systems. Both the standard wu-ftpd FTP server and the newer ProFTPD server with its directive format are presented. ProFTPD covers features like guest and virtual FTP sites. The Apache Web Server chapter covers standard configuration directives such as those for automatic indexing as well as the newer virtual host directives. Apache GUI configuration tools, such as comanche, are also presented. Configuration files and features for the Domain Name System (DNS) and its BIND server are examined in detail along with features like virtual domains and IP aliases. With Linux, you can easily set up your own Domain Name Server for a home or small local network. Both sendmail and POP mail servers are covered. The INN news server, the Squid proxy server, and the ht:/DIG and WAIS search servers are also examined.

Part VI discusses system administration topics including user, software, file system, device, kernel, and X Window administration. These chapters emphasize the use of GUI system management configuration tools available on Red Hat Linux. There are also detailed descriptions of the configuration files used in administration tasks and how to make entries in them. First, basic system administration tasks are covered, such as selecting runlevels, monitoring your system, and scheduling shutdowns. Then aspects of setting up and controlling users and groups are discussed. Presentations include both the GUI tools you can use for these tasks and the underlying configuration files and commands. Software installation has been simplified with the Package Management System (RPMS). There are GUI tools like GnomeRPM that you can use to easily install and uninstall software, much as you would with the Windows Install Wizard. Different file system tasks are covered—mounting file systems, selecting device names, and accessing Windows files. Device configuration covers topics such as device files, installing printers, and using the kernel modules to support new devices. Using, updating, and configuring the Linux kernel with its modules is covered in detail along with procedures for installing new kernels. X Window system topics cover the XFree86 servers, window manager configuration, X Window system startup methods, such as the display manger, and X Window system configuration commands.

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Part VII covers network administration, dealing with topics such as configuring remote file system access and setting up firewalls. Most network administration tasks can be performed using Red Hat GUI configuration tools like netcfg. These are discussed in detail first. Next, the various network file system interfaces and services, such as NFS for Unix, NIS, and NetaTALK for AppleTalk networks, are presented. The next chapter on Samba shows how to access Windows file systems and printers. Then the different aspects of network administration are discussed, such as network connections and routers, Domain Name Service, hostname designations, IP virtual hosts, and IP masquerading. Network security topics cover firewalls and encryption using netfilter (iptables) to protect your system, the Secure Shell (SSH) to provide secure remote transmissions, and Kerberos to provide secure authentication (the older ipchains firewall system is also covered).

On the Web at **www.osborne.com**, you'll find several chapters that discuss basic components used for development on Red Hat systems, beginning with shell programming for the BASH shell where you can create complex shell scripts. Compilers, libraries, and programming tools are then covered, including such topics as the GCC compiler, managing static and shared libraries, and using development tools like make, the gdb debugger, and CVS revision manager. Then both the development tools for KDE and Gnome programming are covered, including KDevelop and Glade. Finally, a brief survey of Perl, Tcl/TK, and Gawk shows you how to easily construct programs with powerful file-management capabilities, string manipulation, and control structures, as well as GUI interfaces.

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