

Table of Contents

Red Hat Linux 7.2 Bible, Unlimited Edition.....	1
Part I: Getting Started in Red Hat Linux.....	5
Chapter List.....	5
Chapter 1: An Overview of Red Hat Linux.....	6
Overview.....	6
Introducing Red Hat Linux.....	6
What Is Linux?.....	7
Linux's Roots in UNIX.....	8
Common Linux Features.....	9
Primary Advantages of Linux.....	10
What Is Red Hat Linux?.....	11
Why Choose Red Hat Linux?.....	11
New Features in Red Hat Linux 7.2.....	12
Improvements to Linux 2.4 kernel.....	12
GRUB boot manager.....	13
Journaling file system (ext3).....	14
Additional software packages.....	14
The Culture of Free Software.....	15
Summary.....	15
Chapter 2: Installing Red Hat Linux.....	17
Quick Installation.....	17
Detailed Installation Instructions.....	19
Choosing an installation method.....	19
Choosing computer hardware.....	20
Beginning the installation.....	22
Special Installation Procedures.....	31
Installing from other media.....	32
Kickstart installation.....	34
Special Installation Topics.....	39
Partitioning your disks.....	39
Reclaiming disk space from existing partitions.....	46
Creating install floppy disks.....	49
Using GRUB or LILO boot loaders.....	51
Reconfiguring the kernel.....	59
Troubleshooting Your Installation.....	62
Summary.....	64
Part II: Using Red Hat Linux.....	65
Chapter List.....	65
Chapter 3: Getting to Know Red Hat Linux.....	66
Logging in to Red Hat Linux.....	66
The login session.....	68
The shell interface.....	68
Understanding the Red Hat Linux Shell.....	72
Using the Shell in Red Hat Linux.....	72
Locating commands.....	73

Table of Contents

Chapter 3: Getting to Know Red Hat Linux	
Rerunning commands.....	75
Connecting and expanding commands.....	79
Using shell environment variables.....	82
Managing background and foreground processes.....	85
Configuring your shell.....	87
Working with the Red Hat Linux File System.....	90
Creating files and directories.....	92
Moving, copying, and deleting files.....	96
Using the vi Text Editor.....	96
Starting with vi.....	97
Moving around the file.....	99
Searching for text.....	100
Using numbers with commands.....	101
Summary.....	101
Chapter 4: Working with the Desktop.....	102
Configuring Your Desktop.....	102
Running Xconfigurator.....	102
Understanding the XF86Config file.....	103
Getting more information.....	104
Starting the X Desktop.....	104
Starting the GUI at boot time.....	105
Starting the GUI yourself.....	107
Starting the GUI at login time.....	107
Using the GNOME Desktop Environment.....	108
Using the GNOME panel.....	110
Using the Nautilus file manager.....	114
Changing GNOME preferences.....	115
Exiting GNOME.....	118
Using the KDE Desktop Environment.....	118
Starting with KDE.....	119
KDE desktop described.....	119
Managing files with the Konqueror File Manager.....	123
Configuring Konqueror options.....	127
Managing windows.....	129
Configuring the desktop.....	130
Adding application launchers and MIME types.....	133
Changing X Settings.....	135
X client command-line options.....	136
X resource files.....	138
Changing X display resources.....	140
X Application resources.....	143
Summary.....	144
Chapter 5: Accessing and Running Applications.....	145
Overview.....	145
Using Red Hat Linux as an Application Platform.....	145
Obtaining Red Hat Linux Applications.....	146
Finding applications on the Internet.....	146

Table of Contents

Chapter 5: Accessing and Running Applications	
Downloading Linux software.....	148
Understanding package names and formats.....	150
Installing Red Hat Linux Applications.....	153
Installing and managing RPM files.....	153
Building and installing from source code.....	160
Running X Window Applications.....	163
Starting applications from a menu.....	163
Starting applications from a Run Program window.....	164
Starting applications from a Terminal window.....	165
Using X Window utilities.....	167
Running remote X applications.....	171
Using Emulators to Run Applications from Other Operating Systems.....	175
Running DOS applications.....	176
Running Windows and Macintosh applications.....	178
Summary.....	180
Chapter 6: Publishing with Red Hat Linux.....	181
Overview.....	181
Choosing Red Hat Linux as Your Publishing Platform.....	181
Checklist of your document requirements.....	181
Attributes of Linux publishing.....	183
Creating Documents in Groff or LaTeX.....	184
Text processing with Groff.....	185
Text processing with TeX/LaTeX.....	193
Converting documents.....	197
Creating DocBook Documents.....	198
Understanding SGML and XML.....	198
Using Free and Commercial Word Processors.....	202
Using Anyware Office.....	203
Using Star Office.....	206
Using Corel WordPerfect.....	207
AbiWord.....	207
Printing Documents with Red Hat Linux.....	208
Printing to the default printer.....	208
Printing from the shell.....	209
Checking the print queues.....	209
Removing print jobs.....	210
Checking printer status.....	210
Displaying Documents with Ghostscript and Acrobat.....	210
Using the ghostscript and gv commands.....	211
Using Adobe Acrobat Reader.....	211
Working with Graphics.....	212
Manipulating photos and images.....	212
Taking screen captures.....	212
Creating bitmap images.....	213
Using Scanners Driven by SANE.....	214
Summary.....	215

Table of Contents

Chapter 7: Playing Games with Red Hat Linux.....	217
Overview.....	217
Basic Linux Gaming Information.....	217
Where to get information on Linux gaming.....	217
Graphical gaming interfaces.....	218
X Window Games.....	219
Gnome games.....	220
KDE games.....	221
X games you can download.....	228
Character-Based Games.....	231
The xname Gaming Emulator.....	232
Supported xname hardware.....	232
Getting and installing xname games.....	233
Commercial Linux Games.....	235
Loki Software Games Demos.....	235
Civilization: Call to Power.....	237
Myth II: Soulblighter.....	237
Quake III Arena.....	238
Summary.....	238
 Chapter 8: Multimedia in Red Hat Linux.....	 240
Overview.....	240
Listening to Audio.....	240
Configuring your sound card.....	242
Audio file conversion.....	244
CD audio players.....	245
MP3 audio players.....	250
MIDI audio players.....	254
Playing Video.....	255
Xanim viewer.....	255
RealPlayer.....	257
Using a Digital Camera with gPhoto.....	258
MultiMedia Netscape Plug-ins and Helper Apps.....	260
Recording Music CDs.....	261
Configuring an IDE CD-ROM for recording.....	262
Creating an Audio CD with cdrecord.....	263
Ripping CDs with grip.....	264
Creating CD labels with cdlabelgen.....	266
Multimedia Technologies in Waiting.....	267
DVD movies.....	267
Virtual reality.....	267
Summary.....	268
 Part III: Administering Red Hat Linux.....	 269
Chapter List.....	269
 Chapter 9: Tools for Using the Internet and the Web.....	 270
Overview of Internet Tools.....	270
Browsing the Web.....	270
Uniform Resource Locators.....	271

Table of Contents

Chapter 9: Tools for Using the Internet and the Web

Web pages.....	272
Netscape Communicator package.....	273
Using the Mozilla browser.....	284
Using text-based Web browsers.....	285
Communicating with E-mail.....	286
E-mail basics.....	286
Mozilla Mail client.....	287
Text-based mail programs.....	292
Participating in Newsgroups.....	295
Netscape Messenger for newsgroups.....	295
The Pan newsreader.....	297
The trn newsreader.....	298
The tin newsreader.....	298
Participating in AOL Instant Messaging with Gaim.....	298
Using Remote Login, Copy, and Execution.....	299
Using telnet for remote login.....	300
Copying files with FTP.....	301
Using ssh for remote login/remote execution.....	305
Using the “r” commands: rlogin, rcp, and rsh.....	306
Summary.....	309

Chapter 10: Understanding System Administration.....310

Overview.....	310
Using the root Login.....	310
Becoming Super User (The su Command).....	311
Learning About Administrative Commands, Configuration Files, and Log Files.....	312
Administrative commands.....	312
Administrative configuration files.....	313
Administrative log files.....	317
Using other administrative logins.....	318
Getting to Know Your System.....	319
Hostname and Linux version.....	319
Disk partitions and sizes.....	320
Users.....	320
The kernel.....	321
Graphical Administrative Interfaces.....	322
Using linuxconf.....	322
Reconfiguring Hardware with kudzu.....	328
Configuring Modules.....	329
Finding available modules.....	329
Listing loaded modules.....	330
Loading modules.....	331
Removing modules.....	331
Working with File Systems.....	331
Mounting file systems.....	333
Using the mkfs command to create a file system.....	338
Adding a hard disk.....	339
Checking System Space.....	342
Displaying system space with df.....	342

Table of Contents

Chapter 10: Understanding System Administration	
Checking disk usage with du.....	342
Finding disk consumption with find.....	343
Monitoring System Performance.....	343
Checking system load average with xload.....	344
Monitoring CPU usage with top and gtop.....	344
Checking virtual memory and CPU usage with vmstat.....	345
Summary.....	346
Chapter 11: Setting Up and Supporting Users.....	347
Overview.....	347
Creating User Accounts.....	347
Setting User Defaults.....	350
Supplying initial login scripts.....	352
Supplying an initial .bashrc file.....	352
Supplying an initial .tcshrc file.....	353
Configuring systemwide shell options.....	353
Creating Portable Desktops.....	354
Providing Support to Users.....	355
Creating a technical support mailbox.....	355
Resetting a user's password.....	356
Modifying accounts.....	357
Deleting User Accounts.....	358
Checking Disk Quotas.....	359
Sending Mail to All Users.....	361
Summary.....	362
Chapter 12: Automating System Tasks.....	363
Overview.....	363
Understanding Shell Scripts.....	363
Executing shell scripts.....	363
Creating user-defined variables in shell scripts.....	364
Performing arithmetic evaluation in shell scripts.....	365
Using programming constructs in shell scripts.....	366
Trying some simple shell scripts.....	370
System Initialization.....	372
The inittab file.....	372
System Start-up and Shutdown.....	376
Starting run-level scripts.....	376
Understanding run-level scripts.....	379
Understanding what startup scripts do.....	382
Changing run-level script behavior.....	383
Reorganizing or removing run-level scripts.....	384
Adding run-level scripts.....	385
Managing xinetd services.....	386
Manipulating run levels.....	387
Scheduling System Tasks.....	388
Using at.allow and at.deny.....	388
Specifying when jobs are run.....	388
Submitting scheduled jobs.....	389

Table of Contents

Chapter 12: Automating System Tasks	
Viewing scheduled jobs.....	390
Deleting scheduled jobs.....	390
Using the batch command.....	390
Using the cron facility.....	391
Summary.....	394
Chapter 13: Backing Up and Restoring Files.....	395
Overview.....	395
Selecting a Backup Strategy.....	395
Full backup.....	395
Incremental backup.....	395
Disk mirroring.....	396
Network backup.....	396
Selecting a Backup Medium.....	396
Magnetic tape.....	397
Writable CD-ROM drives.....	398
Backing Up to a Hard Drive.....	401
Getting and installing mirrordir to clone directories.....	401
Cloning a directory with mirrordir.....	402
Automating mirroring.....	402
Backing Up Files with dump.....	403
Creating a backup with dump.....	403
Understanding dump levels.....	405
Automating Backups with cron.....	405
Restoring Backed Up Files.....	407
Restoring an entire file system.....	408
Recovering individual files.....	408
Backing Up Over the Network.....	410
Performing Network Backups with Multiple Computers.....	411
Getting and installing the Amanda package.....	411
Configuring Amanda for network backups.....	411
Performing an Amanda backup.....	415
Using the pax Archiving Tool.....	416
Summary.....	418
Chapter 14: Computer Security Issues.....	419
Hacker versus Cracker.....	419
Password Protection.....	420
Choosing good passwords.....	420
Changing passwords periodically.....	421
Using a shadow password file.....	422
Protection from Break-ins.....	425
Testing your passwords with Crack.....	425
Obtaining the Crack package.....	425
Running the Crack command.....	426
Showing the progress of a Crack run.....	427
Protecting Your Computer by Filtering Network Access.....	429
Securing remote shells and logins.....	430
Disabling network services.....	431

Table of Contents

Chapter 14: Computer Security Issues

Using TCP wrappers.....	432
Protecting Your Network with Firewalls.....	434
Using filtering or proxy firewalls.....	434
Configuring Red Hat Linux as a filtering firewall.....	435
Configuring Red Hat Linux as a proxy firewall.....	440
Protection against NFS Vulnerabilities.....	444
Running Security Audits with Tiger.....	445
Detecting Intrusions from Log Files.....	447
The role of syslogd.....	447
Redirecting logs to a loghost with syslogd.....	448
Understanding the messages logfile.....	449
Using Tripwire to Detect Tampered Files.....	450
Configuring Tripwire.....	450
Initializing the Tripwire database.....	451
Rebuilding the policy file.....	451
Checking file integrity.....	452
Updating the database.....	452
Protection from Denial-of-Service Attacks.....	453
Mailbombing.....	453
Spam relaying.....	454
Smurfing.....	455
Using Encryption Techniques.....	455
Symmetric Cryptography.....	455
Public-Key Cryptography.....	456
Exporting encryption technology.....	456
Using the Secure Shell package.....	456
Using the ssh and scp commands.....	457
Monitoring Log Files with Logcheck.....	458
Downloading and installing Logcheck.....	458
Setting up Logcheck.....	459
Running Logcheck.....	459
Using Logcheck.....	459
Configuring Logcheck to suit your needs.....	460
Guarding Your Computer with PortSentry.....	465
Downloading and installing PortSentry.....	466
Using PortSentry as-is.....	466
Configuring PortSentry.....	467
Testing PortSentry.....	471
Tracking PortSentry intrusions.....	472
Restoring access.....	473
Where to Get More Information about Security.....	473
CERT.....	474
CIAC.....	475
AntiOnline.....	475
Newsgroups.....	475
Other miscellaneous tools and resources.....	476
Security-related terminology.....	477
Summary.....	478

Table of Contents

Part IV: Red Hat Linux Network and Server Setup.....	479
Chapter List.....	479
Chapter 15: Setting Up a Local Area Network.....	480
Understanding Red Hat Linux and Local Area Networks.....	480
Choosing a network topology and equipment.....	481
Choosing peer-to-peer vs. client/server models.....	484
Setting Up an Ethernet LAN.....	485
Choosing an Ethernet card.....	486
Adding Ethernet during Red Hat installation.....	487
Adding Ethernet after Red Hat is installed.....	488
Adding two Ethernet cards.....	488
Configuring Host Computers.....	488
Understanding IP addresses.....	489
Getting IP addresses.....	491
Adding host names and IP addresses.....	492
Adding other host addresses.....	494
Adding Windows computers to your LAN.....	495
Checking Your Ethernet Connection.....	497
Did Linux find your Ethernet driver at boot-time?.....	497
Can you reach another computer on the LAN?.....	497
Is your Ethernet connection up?.....	498
Watching LAN traffic with Ethereal.....	499
Starting Ethereal.....	499
Capturing Ethernet data.....	500
Interpreting captured Ethernet data.....	503
Summary.....	504
Chapter 16: Connecting to the Internet.....	505
Overview.....	505
Understanding How the Internet Is Structured.....	505
Internet domains.....	506
Hostnames and IP addresses.....	508
Routing.....	509
Proxies.....	509
Using Dial-up Connections to the Internet.....	509
Getting information.....	509
Setting up dial-up PPP.....	510
Launching your PPP connection.....	514
Checking your PPP connection.....	515
Connecting Your LAN to the Internet.....	519
Setting Up Red Hat Linux as a Router.....	520
Configuring the Red Hat Linux router.....	521
Configuring network clients.....	523
Configuring Windows network clients.....	524
Setting Up Red Hat Linux as a Proxy Server.....	525
Starting the squid daemon.....	526
Using a simple squid.conf file.....	527
Modifying the Squid configuration file.....	528
Debugging Squid.....	531

Table of Contents

Chapter 16: Connecting to the Internet	
Setting Up Proxy Clients.....	533
Configuring Netscape to use a proxy.....	533
Configuring Internet Explorer to use a proxy.....	534
Configuring Mosaic and Lynx browsers to use a proxy.....	535
Summary.....	536
Chapter 17: Setting Up a Print Server.....	537
Overview.....	537
Printing in Red Hat Linux.....	537
Understanding the lpd print daemon.....	538
Installing a local printer from the desktop.....	540
Configuring a remote printer from the desktop.....	542
Choosing a Printer.....	546
Managing Document Printing in Red Hat Linux.....	548
Using lpr to print.....	549
Removing print jobs with lprm.....	550
Controlling printers with lpc.....	551
Configuring Print Servers.....	552
Configuring a shared Linux printer in lpd.perms.....	552
Configuring a shared NetWare printer.....	552
Configuring a shared Samba printer.....	553
Summary.....	554
Chapter 18: Setting Up a File Server.....	555
Overview.....	555
Goals of Setting Up a File Server.....	555
Setting Up an NFS File Server in Red Hat Linux.....	555
Sharing NFS file systems.....	557
Using NFS file systems.....	561
Unmounting NFS file systems.....	564
Other cool things to do with NFS.....	564
Setting Up a Samba File Server in Red Hat Linux.....	565
Getting and installing Samba.....	566
Quick-starting Samba.....	566
Configuring Samba with SWAT.....	569
Creating the Samba server configuration with SWAT.....	569
Setting up Samba clients for Windows systems.....	577
Setting Up a NetWare File Server in Red Hat Linux.....	579
Creating the NetWare file server.....	579
Using NetWare client commands.....	581
Summary.....	583
Chapter 19: Setting Up a Mail Server.....	584
Overview.....	584
Introduction to SMTP and sendmail.....	584
Installing and Running sendmail.....	585
Starting sendmail.....	586
Other programs.....	586
Logging performed by sendmail.....	587

Table of Contents

Chapter 19: Setting Up a Mail Server

Configuring sendmail.....	588
sendmail component files.....	589
sendmail local info entries.....	590
sendmail options.....	593
Message precedences.....	605
Trusted users.....	605
Format of headers.....	606
Rewriting rules.....	606
Mailer definitions.....	607
Using the m4 macro preprocessor.....	607
The .forward file.....	608
The aliases file.....	609
Administering a Mailing List.....	610
Installing majordomo.....	611
Configuring majordomo.....	611
Running majordomo.....	611
Summary.....	612

Chapter 20: Setting Up an FTP Server.....613

Overview.....	613
Understanding FTP Servers.....	613
Attributes of FTP servers.....	613
FTP user types.....	614
Running the FTP Server.....	614
Creating FTP Users.....	616
The anonymous FTP user.....	617
Real users.....	617
Guest users.....	618
Setting Up FTP Directories, Message Files, and Greetings.....	619
Creating the FTP directory structure.....	619
Adding helpful information.....	620
Changing FTP login greetings.....	620
Controlling FTP access.....	621
Creating user classes.....	621
Allowing uploading of incoming files.....	622
Limiting the number of concurrent users.....	624
Limiting uploading and downloading.....	625
Denying access from hosts and users.....	626
Denying access to host computers.....	626
Limiting host access to anonymous and guest logins.....	626
Denying access to real users.....	626
Denying/allowing user access by UID and GID.....	627
Shutting Down and Restarting the FTP Server.....	627
Shutting down FTP.....	627
Restarting FTP.....	628
Monitoring the FTP Server.....	628
Logging connections.....	628
Logging file transfers.....	628
Getting More Information About FTP Servers.....	629

Table of Contents

Chapter 20: Setting Up an FTP Server	
Trying Out Your FTP Server.....	630
Summary.....	630
Chapter 21: Setting Up a Web Server.....	632
Overview.....	632
Introduction to Web Servers.....	632
Quick Starting the Apache Web Server.....	634
Configuring the Server.....	636
Configuring httpd.conf.....	636
Starting and Stopping the Server.....	664
Monitoring Server Activities.....	666
Displaying server information.....	666
Displaying server status.....	667
Further security of server-info and server-status.....	667
Logging errors.....	668
Logging transfers.....	668
Analyzing Web server traffic.....	669
Summary.....	670
Chapter 22: Setting Up a News Server.....	671
Overview.....	671
Understanding News Transports.....	671
Planning Your News Server.....	672
Do you need a news server?.....	672
Which newsgroups should you offer?.....	672
How should articles be stored?.....	672
How long are articles stored?.....	673
How are servers to provide your news feeds located?.....	673
What are your newsgroup policies?.....	673
Configuring an INN News Server.....	673
Starting with INN.....	674
Configuring the INN server.....	675
Setting Up News Feeds.....	686
Configuring hosts to feed you.....	686
Configuring hosts that you feed.....	687
Getting a list of active newsgroups.....	689
Choosing How Articles Are Stored.....	689
Activating different storage methods.....	690
Using the timehash storage method.....	691
Using the cnfs storage method.....	691
Setting Up Expiration Times.....	693
Allowing Users to Access Your Server.....	694
Summary.....	695
Chapter 23: Setting Up Boot Servers—DHCP and NIS.....	696
Overview.....	696
Using Dynamic Host Configuration Protocol.....	696
Setting Up a DHCP Server.....	697
Configuring the dhcpd.conf file.....	697

Table of Contents

Chapter 23: Setting Up Boot Servers—DHCP and NIS	
Starting the DHCP server.....	701
Setting Up a DHCP Client.....	702
Understanding Network Information Service.....	704
Setting Up Red Hat Linux as an NIS Client.....	705
Defining an NIS domain name.....	706
Setting up the /etc/yp.conf file.....	706
Configuring NIS client daemons.....	707
Checking that NIS is working.....	707
Using NIS maps.....	708
Setting Up Red Hat Linux as an NIS Master Server.....	709
Creating NIS maps.....	709
Setting Up Red Hat Linux as an NIS Slave Server.....	712
Summary.....	712
Chapter 24: Setting Up a MySQL Database Server.....	713
Overview.....	713
Finding MySQL Packages.....	713
Configuring the MySQL Server.....	714
Using mysql user/group accounts.....	714
Adding administrative users.....	715
Setting MySQL options.....	715
Using sample my.cnf files.....	720
Starting the MySQL Server.....	721
Checking that MySQL Server Is Working.....	721
Working with MySQL Databases.....	722
Starting the mysql command.....	723
Creating a database with mysql.....	723
Adding data to a MySQL database table.....	725
Understanding MySQL Tables.....	727
Displaying MySQL Databases.....	731
Displaying all or selected records.....	731
Displaying selected columns.....	732
Sorting data.....	733
Making Changes to Tables and Records.....	733
Altering MySQL tables.....	733
Updating and deleting MySQL records.....	734
Adding and Removing User Access.....	735
Adding users and granting access.....	735
Revoking access.....	736
Checking and Fixing Databases.....	736
Checking and Fixing Databases.....	738
Summary.....	739
Chapter 25: Building a Wireless Linux LAN.....	740
Overview.....	740
Understanding Wireless Networks.....	742
Choosing Wireless Hardware.....	743
Selecting wireless cards.....	743
Selecting adapter cards.....	745

Table of Contents

Chapter 25: Building a Wireless Linux LAN	
Selecting antennas.....	745
Installing Wireless Linux Software.....	747
Setting Up a Wireless LAN.....	748
Choose equipment.....	748
Insert wireless cards.....	749
Load the modules.....	749
Configure wireless cards.....	750
Restart wireless interfaces.....	754
Testing out distances.....	755
Manually Configuring Wireless Cards.....	756
Setting module options.....	756
Setting wireless extensions.....	758
Troubleshooting a Wireless LAN.....	760
Check wireless settings.....	760
Check TCP/IP.....	761
Adapt to poor reception.....	762
Use debugging tools.....	762
Summary.....	763
Chapter 26: Getting Red Hat Linux “up2date”.....	764
Checking for Updates.....	764
Red Hat Errata page.....	764
Project Web sites.....	764
Getting Updates from Red Hat Network.....	765
Running rhn_register.....	765
Running up2date.....	767
Using the Red Hat Network.....	770
Summary.....	771
Appendix A: What’s on the CD-ROMs?.....	772
Appendix B: Red Hat Linux RPMs.....	773
Package Categories.....	773
The Packages.....	774
Appendix C: Running Network Services.....	839
Checklist to Running Networking Services.....	839
Networking Service Daemons.....	840
The xinetd super-server.....	840
The init.d start-up scripts.....	841
Referencing Network Services.....	841
Web server.....	845
File servers.....	845
Login servers.....	846
E-mail servers.....	846
News server.....	846
Print server.....	847
Network administration servers.....	847
Network Time Protocol Server.....	847

Table of Contents

Appendix C: Running Network Services

Portmap server.....	847
Information servers.....	848
Database services.....	849
User services.....	849
Security services.....	851
Summary.....	851