

Contents

Preface	ix
Acknowledgements	xiii
Part 1	Red Hat Linux System and Network Administration Defined
<hr/>	
Chapter 1	Duties of the System Administrator 3
	The Linux System Administrator 3
	Installing and Configuring Servers 5
	Installing and Configuring Application Software 6
	Creating and Maintaining User Accounts 7
	Backing Up and Restoring Files 7
	Monitoring and Tuning Performance 9
	Configuring a Secure System 10
	Using Tools to Monitor Security 11
	Summary 12
Chapter 2	Planning the Network 13
	Deciding What Kind of Network You Need 13
	Understanding topologies 15
	Client/server or peer-to-peer? 16
	What's in the mix? 18
	Determining system requirements 19
	Planning and Implementing Security 20
	Addressing external and internal threats 20
	Formulating a security policy 21
	Planning for Recovery from Disasters 22
	Write It Down – Good Records Can Save Your Job 24
	Summary 25
Chapter 3	Installing Red Hat Linux 27
	Exploring Your PC's Components 27
	Processor 28
	Bus 28
	Memory 28
	Video card and monitor 29
	Hard drive 29
	Floppy disk drive 29
	Keyboard and mouse 30
	SCSI controller 30
	CD-ROM drive 30

Sound card	30
Network card	30
Checking for Supported Hardware	31
Creating the Red Hat Boot Disk	31
Starting the Red Hat Linux Installation	32
Partitioning the Hard Disk for Red Hat Linux	36
Naming disks and devices	36
Mounting a file system on a device	37
Understanding the swap partition	38
Preparing disk partitions for Red Hat Linux	39
Configuring Red Hat Linux Installation	43
Installing the Boot Loader	43
Configuring the network	45
Setting the time zone	47
Setting the root password and add user accounts	48
Configuring password authentication	49
Selecting the Package Groups to Install	51
Completing the Installation	53
Using KickStart	55
KickStart Commands	57
Auth – Authentication Options	57
bootloader	58
clearpart	59
device --opts	59
driverdisk	59
firewall	59
install	60
Installation methods	60
interactive	61
keyboard	61
language	61
lilo	61
lilocheck	62
mouse	62
network	62
partition	64
raid	65
reboot	66
rootpw	66
skipx	66
timezone	66
upgrade	67
xconfig	67
zerombr – Partition table initialization	67
%packages – Package Selection	67

%pre – Pre-Installation Configuration Section	69
%post – Post-Installation Configuration Section	69
Starting a KickStart Installation	69
Summary	70
Chapter 4 Red Hat Linux File System	71
Understanding the Red Hat Linux File System Structure	71
The / directory	72
Using File System Commands	74
ls	74
cp	74
rm	74
mv	74
chown	75
chgrp	75
chmod	75
chattr	76
ln	76
symlinks	76
stat	77
lsof	77
mknod	78
macutil	78
Working With Linux—Supported File Systems	79
Standard disk file systems	79
Nonstandard Linux file systems	82
Memory file systems and virtual file systems	83
Linux Disk Management	88
Partitioning an x86 machine	89
Mounting other OS partitions/slices	89
Metadevices	90
Summary	91
Chapter 5 Red Hat System Configuration Files	93
Examining the System Configuration Files	94
Systemwide shell configuration scripts	94
System environmental settings	97
System configuration files in the /etc/sysconfig directory	105
Examining the Network Configuration Files	105
Files to change when setting up a system	
or moving the system	106
Starting up network services from xinetd	111
Starting up network services from the rc scripts	112
Other important network configuration files	
in the /etc/sysconfig directory	113
Network configuration files in /etc/sysconfig/network-scripts ..	113

	Managing the init Scripts	114
	Managing rc scripts by hand	116
	Managing rc scripts using chkconfig	118
	Summary	120
Part II	Red Hat Linux Network Services	
Chapter 6	TCP/IP Networking	123
	TCP/IP Explained	123
	Understanding Network Classes	125
	Setting Up a Network Interface Card (NIC)	127
	Configuring the network card	128
	Configuring an internal network	129
	Understanding Subnetting	131
	Interpreting IP numbers	133
	Before you subnet your network	134
	Classless InterDomain Routing (CIDR)	137
	Gateways and Routers	139
	Configuring Dynamic Host Configuration	
	Protocol (DHCP)	141
	Setting up the server	141
	Configuring the client	142
	Configuring a Point-to-Point Protocol (PPP) Connection	142
	Configuring a PPP server	143
	CHAP security	144
	Configuring a PPP client	145
	Setting up a PPP connection	145
	Configuring IP Masquerading	150
	Summary	151
Chapter 7	The Network File System	153
	NFS Overview	153
	Understanding NFS	153
	NFS advantages	155
	NFS disadvantages	156
	Configuring an NFS Server	156
	Overview of server configuration	157
	Designing an NFS server	157
	Key files, commands, and daemons	159
	Example NFS server	172
	Configuring an NFS Client	173
	Overview of client configuration	173
	Key files and commands	173
	Example NFS client	176
	Tuning NFS	176
	Troubleshooting NFS	179

	Examining NFS Security	181
	General NFS security issues	181
	Server security considerations	183
	Client security considerations	183
	Summary	184
Chapter 8	The Network Information System	185
	Understanding NIS	185
	Configuring an NIS Server	189
	Key files and commands	190
	Setting the NIS domain name	190
	Configuring and starting the server daemon	191
	Initializing the NIS maps	193
	Starting the NIS password daemon	194
	Starting the server transfer daemon	195
	Starting the NIS servers at boot time	195
	Configuring an example NIS server	197
	Configuring an NIS Client	199
	Setting the NIS domain name	199
	Configuring and starting the client daemon	199
	Configuring the client startup files	204
	Key NIS client files and commands	205
	Testing your NIS configuration	206
	Configuring an example NIS client	207
	Strengthening NIS Security	208
	Summary	208
Chapter 9	Connecting to Microsoft Networks	209
	Installing Samba	209
	Configuring the Samba Server	211
	[global]	212
	[homes]	213
	[printers]	213
	[nancy]	214
	Using SWAT	214
	Configuring the Samba Client	222
	Using a Windows Printer from the Linux Computer	230
	Testing the Samba Server	232
	Summary	233
Chapter 10	Connecting to Apple Networks	235
	Understanding AppleTalk	235
	AppleTalk addressing	235
	Apple zones	236
	Installing the AppleTalk Software	236
	The AppleTalk DDP kernel module	236
	Installing Netatalk	237
	Configuring /etc/services	237
	Configuring Netatalk	238

Configuring the Daemons	239
Configuring atalkd	239
Configuring AppleTalk Interfaces	239
Additional configuration	241
Configuring AppleTalk file sharing	242
Setting up AFP Accounts	244
Configuring AFS to work with AppleTalk	244
Configuring AppleTalk printer sharing	244
Configuring Red Hat as an AppleTalk Client	246
Accessing Apple printers	246
Finding the printer's zone	246
Summary	249

Part III Red Hat Linux Internet Services

Chapter 11	What are Internet Services?	253
	Secure Services	254
	ssh	254
	scp	255
	sftp	256
	Less Secure Services	256
	telnet	256
	ftp	256
	rsync	257
	rsh	257
	rlogin	257
	finger	257
	talk and ntalk	258
	Using Your Linux Machine as a Server	258
	http	258
	sshd	258
	ftpd	259
	dns	259
	The Inetd Server	259
	Xinetd	262
	Inetd and Xinetd vs. Stand-Alone	264
	Inetd- or xinetd-started services	265
	Stand-alone services	266
	Linux Firewall Packages	267
	tcp-wrappers	267
	ipchains	268
	Summary	269
Chapter 12	The Domain Name System	271
	Understanding DNS	271
	Installing the Software	274
	Understanding Types of Domain Servers	275

	Examining Server Configuration Files	277
	The named.conf file	278
	Options	278
	The named.ca file	286
	The named.local file	286
	Zone files	287
	The reverse zone file	289
	Configuring a Caching Server	290
	Configuring a Slave Server	292
	Configuring a Master Server	293
	Using DNS Tools	296
	Summary	300
Chapter 13	Configuring FTP Services	301
	What FTP Software is Available?	301
	Red Hat Linux's choice: WU-FTPD	302
	Alternative FTP servers	302
	Installing WU-FTPD	303
	Installing the binary RPM	304
	Installing and building the source RPM	304
	Installing and building the source distribution	304
	Installing the anonftp package	306
	Configuring the Server	307
	Configuring user and host access	308
	Configuring ftpd	310
	The enhanced /etc/ftpaccess file	320
	Administering WU-FTPD with KWuFTPd	321
	Maintaining the Server	326
	Strengthening FTP Security	330
	Understanding and mitigating the risks	331
	Reconfiguring the system log	331
	Monitoring the server	334
	Summary	334
Chapter 14	Configuring Mail Services	335
	E-Mail Explained	335
	Mail User Agent (MUA)	336
	Mail Transfer Agent (MTA)	336
	Local Delivery Agent (LDA)	337
	Introducing SMTP	337
	Understanding POP3	338
	Understanding IMAP4	338
	Configuring Sendmail	339
	Checking that Sendmail is installed and running	339
	Configuring Sendmail	340
	The m4 Macro Processor	341
	Understanding and managing the mail queue	341
	Configuring POP3	342

Configuring IMAP4	343
Setting up aliases to make life easier	343
Using other files and commands with Sendmail	345
Configuring the E-Mail Client	346
Configuring Netscape Messenger	346
Filling Out the Messenger Forms	347
Using Netscape Messenger	349
Sending e-mail from the command line	351
Reading mail with Mail	352
Using Elm	354
Creating mail aliases in elm	355
Using Pine	355
Working with Pine attachments	356
Maintaining E-Mail Security	357
Protecting against eavesdropping	357
Using encryption	357
Using a firewall	357
Don't get bombed, spammed, or spoofed	358
Be careful with SMTP	358
Using Newsgroups	359
Configuring the NNTP server	359
Reading newsgroups in Pine	360
Configuring Netscape for news	361
Summary	364
Chapter 15	
Configuring a Web Server	365
Introducing Apache	365
A short history of Apache	365
Apache features	367
Finding more information about Apache	369
How Web Servers Work	370
Installing Apache	371
Installing the binary RPMs	371
Installing and building the source RPMs	372
Installing and building the source distribution	372
Additional packages to install	375
Configuring Apache	376
Apache's startup process	376
Configuring global Apache behavior	377
Configuring the default server	380
Configuring virtual servers	391
Configuring Apache for SSI	392
Enabling SSI	392
Testing the configuration	393
CGI Scripts	394
Creating a Secure Server with SSL	396
Generating the encryption key	397

	Generating a self-signed certificate	398
	Testing the self-signed certificate	399
	Summary	400
Part IV	Red Hat Linux System Maintenance	
Chapter 16	Using the Red Hat Network	403
	Registering Your System	403
	Configuring the Red Hat Update Agent	407
	Using the Red Hat Update Agent	410
	Using the Red Hat Network via the Internet	413
	Red Hat Network Main page tab	414
	Your Network page tab	414
	Search Errata Alerts tab	417
	Preferences tab	417
	Help Desk tab	418
	Summary	418
Chapter 17	Upgrading and Customizing the Kernel	419
	Should You Upgrade to a New Kernel?	419
	Upgrading versus customizing	421
	Checking your current kernel version	421
	Building a New Kernel	423
	Obtaining the latest kernel version	424
	Patching the kernel	430
	Customizing the kernel	433
	Compiling and installing the new kernel	459
	Configuring GRUB	460
	Booting the custom kernel	460
	Summary	461
Chapter 18	Configuring the System on the Command Line	463
	Administering a System at the Command Line	463
	Administering Users and Groups	465
	Working with user accounts	465
	Working with group accounts	469
	Modifying multiple accounts simultaneously	470
	Viewing login and process information	471
	Managing the File System	472
	Creating and maintaining file systems	472
	Working with files and directories	478
	Managing disk space usage	481
	Administering Processes	484
	Obtaining process information	484
	Terminating processes	488
	Modifying process priorities	489
	Tracking and Controlling System Usage	490

	Maintaining the Date and Time	492
	Creating and Restoring Backups	497
	Summary	501
Chapter 19	Using Scripts to Automate Tasks	503
	Understanding Bash Programming	504
	Wildcards and special characters	504
	Using variables	508
	Bash operators	511
	Flow control	522
	Shell functions	530
	Processing input and output	532
	Working with command line arguments	537
	Using Processes and Job Control	538
	Creating Backups	543
	Automating Scripts	545
	Using at for one-shot jobs	545
	Using cron for regularly scheduled jobs	546
	Writing, Testing, and Debugging Scripts	548
	Selecting a Scripting Language	549
	Summary	550
Chapter 20	Performance Monitoring	551
	Diagnosing Performance Problems	552
	Overall System Status	553
	Monitoring Running Processes	556
	Monitoring Memory Utilization	558
	Monitoring Disk Usage and Performance	563
	Tracking CPU Usage	568
	Monitoring Network Traffic	572
	Summary	574
Chapter 21	Administering Users and Groups	575
	Understanding the Root Account	575
	Implementing Sudo	576
	Deciphering Sudo's configuration file	578
	Sudo configuration and usage tips	581
	Working With Users and Groups	581
	Understanding user private groups	582
	Adding, modifying, and deleting users	584
	Adding, modifying, and deleting groups	597
	Using the Red Hat User Manager	601
	Using File System Quotas	607
	Preparing the system for quotas	608
	Creating the quota files	608
	Enabling quotas	609

	Setting and modifying quotas	609
	Reviewing quota utilization	611
	Summary	613
Chapter 22	Backing up and Restoring the File System	615
	What Should Be Backed Up?	615
	Choosing Media for Backups	616
	Understanding Backup Methods	617
	Using Backup Tools	619
	Command line tools	619
	Advanced tools	627
	Summary	642
Chapter 23	Installing and Upgrading Software Packages	643
	Using the Red Hat Package Manager	643
	General options	644
	Query mode	645
	Package installation and removal	654
	Verifying RPMs	657
	Building RPMs	660
	RPM administrative commands	661
	Checking Software Versions	663
	Obtaining Newer Software	665
	Using rpmfind.org	666
	Using Freshmeat	667
	Using Ibiblio.org	668
	Using Gnome-RPM	669
	Additional software repositories	670
	Installing Software	671
	Installing software from source	671
	Building and installing source RPMs	677
	Using RPM with source tarballs	680
	Summary	681

Part V Security and Problem Solving

Chapter 24	Security Basics	685
	Introducing Basic Security Concepts	685
	Security as loss prevention	686
	Security: a distributed venture	688
	The fundamental mindset: shades of grey	689
	Understanding the enemy	690
	Developing a Security Policy	690
	Beware the security assertions ploy	691
	Creating the policy: a first iteration	692
	The policy itself	695

	Recovery plans	697
	Social engineering	699
	Finding Security-Related Resources	701
	Web sites	701
	Recommended reading	702
	Links	702
	Summary	703
Chapter 25	Implementing Local Security	705
	Exploring the Nature of Physical Security	706
	Building construction	707
	Boot security	708
	Maintaining User and Password Security	715
	Passwords: theory and practice	716
	Those pesky users	722
	Checking logs	723
	Securing File Integrity	725
	Using Tripwire	726
	Not for everybody, or every computer	726
	Setting up Tripwire	727
	Fine-tuning Tripwire	728
	Summary	730
Chapter 26	Firewalls and Internet Security	731
	Limiting Network Services	731
	What services are running?	732
	Stopping running services	736
	Monitoring network traffic	740
	A Firewall Primer	743
	Firewall policy	743
	Basic layout	745
	Designing the firewall	746
	Summary	748
Chapter 27	Detecting Intrusions	749
	Understanding Host-Based Intrusion Detection Software	749
	Using Tripwire	750
	Installing Tripwire	751
	Configuring Tripwire	751
	Running Tripwire	756
	Detecting intrusions using Tripwire	757
	Additional Tripwire resources	758
	Using LogWatch	758
	Detecting Intrusions with ipchains	762
	Detecting Intrusions with iptables	764
	Summary	765

Chapter 28	Troubleshooting and Problem Solving	767
	Solving Installation Problems	768
	Unable to log in after installation	768
	Installing Star Office	768
	Hardware-related installation problems	769
	Solving File System Problems	772
	Cannot delete a file	772
	Commands with multi-word arguments	773
	Accessing Windows file systems	774
	Working with floppy disks	774
	Cannot mount a partition	774
	Avoiding file system checks at each system reboot	775
	Getting a Zip drive to work	775
	Solving Networking Problems	776
	Getting online with a modem	777
	What to do when the boot process hangs	779
	Using two Ethernet cards	779
	Solving Boot Problems	780
	Solving Miscellaneous Problems	783
	Getting sound to work	783
	Using screensavers and power management	784
	Starting the X Window System	785
	Summary	785
	Appendix: What's on the CD-ROM?	787
	Index	791
	End-User License Agreement	847