

Table of Contents

Introduction.....	vii
1. Finding Appropriate Documentation	vii
1.1. Documentation For First-Time Linux Users.....	viii
1.2. For the More Experienced	ix
1.3. Documentation for Linux Gurus.....	x
2. Document Conventions	x
3. Using the Mouse	xii
4. Copying and Pasting Text With X.....	xiii
5. More to Come	xiii
5.1. We Need Feedback!	xiii
6. Sign Up for Support.....	xiii
I. System Reference.....	xv
1. File System Structure.....	17
1.1. Why Share a Common Structure?.....	17
1.2. Overview of File System Hierarchy Standard (FHS)	17
1.3. Special File Locations.....	21
2. The /proc File System	23
2.1. A Virtual File System.....	23
2.2. Top-Level Files in /proc	24
2.3. Directories in /proc.....	37
2.4. Using sysctl	52
2.5. Additional Resources.....	52
3. Boot Process, Init, and Shutdown	55
3.1. Introduction.....	55
3.2. Behind the Scenes of the Boot Process.....	55
3.3. Sysconfig Information.....	61
3.4. Init Runlevels	73
3.5. Running Programs at Boot Time	74
3.6. Shutting Down	74
3.7. Differences in the Boot Process of Other Architectures	75
4. GRUB.....	77
4.1. Defining GRUB.....	77
4.2. Terminology	79
4.3. Interfaces.....	81
4.4. Commands	82
4.5. The Menu Configuration File.....	83
4.6. Additional Resources	84
5. The ext3 File System	87
5.1. Features of ext3.....	87
5.2. Creating an ext3 File System	87
5.3. Converting to an ext3 File System	90
5.4. Reverting to an ext2 File System	90
6. Users and Groups	93
6.1. Tools for User and Group Administration	93
6.2. Standard Users	93
6.3. Standard Groups.....	94
6.4. User Private Groups	96
6.5. Shadow Utilities	97
7. X Servers and Clients.....	99
7.1. The Power of X	99
7.2. The XFree86 Server	99
7.3. Desktop Environments and Window Managers	104
7.4. Runlevels.....	105
7.5. Fonts.....	107

7.6. Additional Resources	109
II. Security Reference	111
8. Pluggable Authentication Modules (PAM).....	113
8.1. Advantages of PAM	113
8.2. PAM Configuration Files	113
8.3. PAM Modules	114
8.4. PAM Module Control Flags	115
8.5. PAM Module Paths	116
8.6. PAM Module Arguments	116
8.7. Sample PAM Configuration Files	116
8.8. PAM and Device Ownership.....	118
8.9. Additional Resources.....	119
9. TCP Wrappers and <i>xinetd</i>	121
9.1. Purpose of TCP Wrappers	121
9.2. Host-Based Access Control Lists.....	121
9.3. Access Control Using <i>xinetd</i>	124
9.4. Additional Resources	128
10. SSH Protocol.....	131
10.1. Introduction.....	131
10.2. Event Sequence of an SSH Connection	132
10.3. Layers of SSH Security	132
10.4. OpenSSH Configuration Files	134
10.5. More Than a Secure Shell.....	135
10.6. Requiring SSH for Remote Connections	136
11. Kerberos	139
11.1. Advantages of Kerberos.....	139
11.2. Kerberos Disadvantages.....	139
11.3. Kerberos Terminology	139
11.4. How Kerberos Works	141
11.5. Kerberos and PAM.....	142
11.6. Configuring a Kerberos 5 Server	142
11.7. Configuring a Kerberos 5 Client	144
11.8. Additional Resources	144
12. Installing and Configuring Tripwire	147
12.1. How to Use Tripwire.....	147
12.2. Installation Instructions.....	149
12.3. File Locations.....	150
12.4. Tripwire Components	150
12.5. Modifying the Policy File	151
12.6. Selecting Passphrases	152
12.7. Initializing the Database	152
12.8. Running an Integrity Check	152
12.9. Printing Reports	152
12.10. Updating the Database after an Integrity Check	155
12.11. Updating the Policy File	155
12.12. Tripwire and Email	156
12.13. Additional Resources	157

III. Network Services Reference	159
13. Network Scripts	161
13.1. Interface Configuration Files	161
13.2. Interface Control Scripts	164
13.3. Network Functions.....	165
14. Firewalling with <code>iptables</code>	167
14.1. Packet Filtering	167
14.2. Differences between <code>iptables</code> and <code>ipchains</code>	168
14.3. Options Used in <code>iptables</code> Commands	168
14.4. Storing <code>iptables</code> Information	175
14.5. Additional Resources	175
15. Apache	177
15.1. Default Modules.....	177
15.2. Starting and Stopping <code>httpd</code>	178
15.3. Configuration Directives in <code>httpd.conf</code>	179
15.4. Adding Modules to Your Server	196
15.5. Using Virtual Hosts.....	198
15.6. Additional Resources	200
16. Email	201
16.1. Protocols	201
16.2. Email Program Classifications	203
16.3. Sendmail	204
16.4. Fetchmail.....	208
16.5. Procmail	212
16.6. Security	218
16.7. Additional Resources	219
17. Berkeley Internet Name Domain (BIND).....	221
17.1. Introduction to DNS and BIND	221
17.2. BIND Configuration Files.....	222
17.3. Using <code>rndc</code>	233
17.4. BIND Advanced Features	235
17.5. Common Mistakes to Avoid	237
17.6. Additional Resources	237
18. Network File System (NFS).....	239
18.1. Methodology	239
18.2. NFS Server Configuration Files	241
18.3. NFS Client Configuration Files	243
18.4. Securing NFS	245
18.5. Additional Resources	246
19. Lightweight Directory Access Protocol (LDAP).....	249
19.1. What is LDAP?	249
19.2. Pros and Cons of LDAP	249
19.3. Uses for LDAP	249
19.4. LDAP Terminology.....	250
19.5. OpenLDAP 2.0 Enhancements	251
19.6. OpenLDAP Files	251
19.7. OpenLDAP Daemons and Utilities	253
19.8. Modules for Adding Extra Functionality to LDAP	254
19.9. OpenLDAP Setup Overview	254
19.10. Configuring Your System to Authenticate Using OpenLDAP	255
19.11. Additional Resources	256

IV. Appendixes	259
A. General Parameters and Modules	261
A.1. Specifying Module Parameters	261
A.2. CD-ROM Module Parameters.....	262
A.3. SCSI parameters.....	264
A.4. Ethernet Parameters	267
Index.....	273