

SYNGRESS®



1 YEAR UPGRADE
BUYER PROTECTION PLAN

HACK PROOFING LINUX™

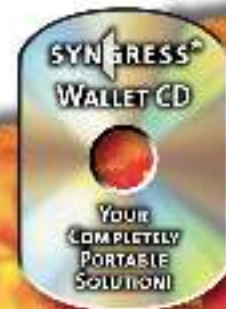
Your Guide to Open Source Security

- Step-by-Step Instructions for Deploying Open Source Security Tools
- Hundreds of Tools & Traps and Damage & Defense Sidebars, Security Alerts, and Exercises!
- Bonus Wallet CD with Configuration Examples, Packet Captures, and Programs

James Stanger, Ph.D.
Patrick T. Lane
Edgar Danielyan Technical Editor



Global Knowledge
RECOMMENDED READING



With more than 1,500,000 copies of our MCSE, MCSD, CompTIA, and Cisco study guides in print, we continue to look for ways we can better serve the information needs of our readers. One way we do that is by listening.

Readers like yourself have been telling us they want an Internet-based service that would extend and enhance the value of our books. Based on reader feedback and our own strategic plan, we have created a Web site that we hope will exceed your expectations.

Solutions@syngress.com is an interactive treasure trove of useful information focusing on our book topics and related technologies. The site offers the following features:

- One-year warranty against content obsolescence due to vendor product upgrades. You can access online updates for any affected chapters.
- "Ask the Author"™ customer query forms that enable you to post questions to our authors and editors.
- Exclusive monthly mailings in which our experts provide answers to reader queries and clear explanations of complex material.
- Regularly updated links to sites specially selected by our editors for readers desiring additional reliable information on key topics.

Best of all, the book you're now holding is your key to this amazing site. Just go to **www.syngress.com/solutions**, and keep this book handy when you register to verify your purchase.

Thank you for giving us the opportunity to serve your needs. And be sure to let us know if there's anything else we can do to help you get the maximum value from your investment. We're listening.

www.syngress.com/solutions



HACK PROOFING™



1 YEAR UPGRADE
BUYER PROTECTION PLAN

Linux: A Guide to Open Source Security

The Only Way to Stop a Hacker Is to Think Like One

James Stanger
Patrick T. Lane

SYNGRESS®

Syngress Publishing, Inc., the author(s), and any person or firm involved in the writing, editing, or production (collectively “Makers”) of this book (“the Work”) do not guarantee or warrant the results to be obtained from the Work.

There is no guarantee of any kind, expressed or implied, regarding the Work or its contents. The Work is sold AS IS and WITHOUT WARRANTY. You may have other legal rights, which vary from state to state.

In no event will Makers be liable to you for damages, including any loss of profits, lost savings, or other incidental or consequential damages arising out from the Work or its contents. Because some states do not allow the exclusion or limitation of liability for consequential or incidental damages, the above limitation may not apply to you.

You should always use reasonable care, including backup and other appropriate precautions, when working with computers, networks, data, and files.

Syngress Media®, Syngress®, and “Career Advancement Through Skill Enhancement®,” are registered trademarks of Syngress Media, Inc. “Ask the Author™,” “Ask the Author UPDATE™,” “Mission Critical™,” and “Hack Proofing™” are trademarks of Syngress Publishing, Inc. Brands and product names mentioned in this book are trademarks or service marks of their respective companies.

KEY	SERIAL NUMBER
001	NFKA4UR934
002	DFTGEGHFG6
003	9456VMPDSP
004	MKC8EWR535
005	ZL94V343BB
006	AS56J89HGE
007	MJTY3D29H6
008	ADQW9UU6NN
009	5TGBXDQ7TN
010	KRF4W2F6P9

PUBLISHED BY
Syngress Publishing, Inc.
800 Hingham Street
Rockland, MA 02370

Hack Proofing Linux: A Guide to Open Source Security

Copyright © 2001 by Syngress Publishing, Inc. All rights reserved. Printed in the United States of America. Except as permitted under the Copyright Act of 1976, no part of this publication may be reproduced or distributed in any form or by any means, or stored in a database or retrieval system, without the prior written permission of the publisher, with the exception that the program listings may be entered, stored, and executed in a computer system, but they may not be reproduced for publication.

Printed in the United States of America

1 2 3 4 5 6 7 8 9 0

ISBN: 1-928994-34-2

Technical Editors: Edgar Danielyan and Larry Karnis	Freelance Editorial Manager: Maribeth Corona-Evans
Co-Publisher: Richard Kristof	Cover Designer: Michael Kavish
Acquisitions Editor: Catherine B. Nolan	Page Layout and Art by: Shannon Tozier
Developmental Editor: Kate Glennon	Copy Editor: Beth A. Roberts and Darren Meiss
CD Production: Michael Donovan	Indexer: Jennifer Coker

Distributed by Publishers Group West in the United States.



Acknowledgments

We would like to acknowledge the following people for their kindness and support in making this book possible.

Richard Kristof and Duncan Anderson of Global Knowledge, for their generous access to the IT industry's best courses, instructors, and training facilities.

Ralph Troupe, Rhonda St. John, and the team at Callisma for their invaluable insight into the challenges of designing, deploying and supporting world-class enterprise networks.

Karen Cross, Lance Tilford, Meaghan Cunningham, Kim Wylie, Harry Kirchner, Bill Richter, Kevin Votel, and Kent Anderson of Publishers Group West for sharing their incredible marketing experience and expertise.

Mary Ging, Caroline Hird, Simon Beale, Caroline Wheeler, Victoria Fuller, Jonathan Bunkell, and Klaus Beran of Harcourt International for making certain that our vision remains worldwide in scope.

Anneke Baeten, Annabel Dent, and Laurie Giles of Harcourt Australia for all their help.

David Buckland, Wendi Wong, Daniel Loh, Marie Chieng, Lucy Chong, Leslie Lim, Audrey Gan, Charlotte Chan, and Joseph Chan of Transquest Publishers for the enthusiasm with which they receive our books.

Kwon Sung June at Acorn Publishing for his support.

Ethan Atkin at Cranbury International for his help in expanding the Syngress program.

Joe Pisco, Helen Moyer, Paul Zanolli, Alan Steele, and the great folks at InterCity Press for all their help.

Philip Allen at Brewer & Lord LLC for all his work and generosity.



Contributors

Patrick T. Lane (MCSE, MCP+I, MCT, Network+, i-Net+, CIW) is a Content Architect for ProsoftTraining.com, a leading Internet skills training and curriculum development company. He is the author of more than 20 technical courses and is the Director of the CIW Foundations and CIW Internetworking Professional series. While at ProsoftTraining.com, Patrick helped create the Certified Internet Webmaster (CIW) program and the i-Accelerate program for Intel, Novell, and Microsoft professionals.

Patrick consults as a mail, news, FTP, and Web Administrator for several organizations, including jCert Initiative Inc. and ProsoftTraining.com. He is also a network security consultant and writer who specializes in TCP/IP internetworking, LAN/WAN solutions, network and operating system security, and the Linux and Windows NT/2000 platforms. He has consulted for the University of Phoenix/Apollo Group, Novell, Intel, NETg, WAVE technologies, KT Solutions, SmartForce, and Futurekids. Patrick is a member of the CompTIA Network+ Advisory Committee, and co-author of Syngress Publishing's *E-mail Virus Protection Handbook* (ISBN: 1-928994-23-7). His work has been published in eight languages and he has been a featured speaker for the SmartForce Seminar Series on E-Business, the Internet World PING Series on Internet Protocol version 6, and the Information Technology Association of America (ITAA). He holds a master's degree in education.

James Stanger (Ph.D., MCSE, MCT) directs the Linux, Security, and Server Administrator certification tracks for ProsoftTraining.com. Since receiving his Ph.D. in 1997, he has focused on auditing Internet servers and writing courseware, books, and articles about administering and securing Internet servers. James has consulted for IBM, Symantec, Evinci

(www.evinci.org), Pomeroy (www.pomeroy.com), Securify (www.securify.com), Brigham Young University, and California State, San Bernardino. He specializes in troubleshooting firewalls, intrusion detection, DNS, e-mail, and Web server implementations.

James was the Technical Editor of Syngress Publishing's *E-mail Virus Protection Handbook* (ISBN: 1-928994-23-7) and has been an instructional designer of security and A+ courses for NetG, Thompson/WAVE learning, and ComputerPREP. Active in the Linux community, James sits on the Linux Professional Institute (www.lpi.org), SAIR (www.linuxcertification.org), and CompTIA Linux+ (www.comptia.org) advisory boards, each of which is dedicated to creating and maintaining industry-respected certifications. As the Vice Chair of the Linux Professional Institute (LPI) Advisory Council, he acts as liaison between the LPI and companies such as IBM, Compaq, and Intel.



Technical Editors

Edgar Danielyan (CCNA) is a self-employed developer specializing in GCC, X Window, Tcl/Tk, logic programming, Internet security, and TCP/IP; as well as having worked with BSD, SVR4.2, FreeBSD, SCO, Solaris, and UnixWare. He has a diploma in company law from the British Institute of Legal Executives as well as a paralegal certificate from the University of Southern Colorado. He is currently working as the Network Administrator and Manager of a top-level Armenian domain. He has also worked for the United Nations, the Ministry of Defense of the Republic of Armenia, and Armenian national telephone companies and financial institutions. Edgar speaks four languages, and is a member of ACM, IEEE CS, USENIX, CIPS, ISOC, and IPG.

Larry Karnis (RHCE, Master ACE, CITP), is a Senior Consultant for Application Enhancements, a Unix, Linux, and Internet consulting firm located in Toronto, Canada. His first exposure to Unix was over 20 years ago where he used Unix Version 6 while completing a bachelor's degree in computer science and mathematics. Larry deploys and manages Linux-based solutions such as Web and file and print servers, and Linux firewalls.

About the CD

This book is accompanied by a CD containing files and open source programs used throughout the book. The files include configuration examples, packet captures, and additional resources. We have included the specific open source programs used in the book so you can follow the chapter demonstrations step-by-step on your own systems.

Each file on the CD is discussed in detail and referenced throughout the book with the CD icon below. When a specific file or program is required, it directs you to the accompanying CD. The book also directs you to the Web site where you can download the most current version, and find additional resources relating to that program. For instance, you can download Free Secure Wide Area Network (FreeS/WAN) at www.freeswan.org, or use the version located on the CD. It is recommended that you use the version included on the CD because this will increase the chances that the book demonstrations will be successful, as some of the programs may have changed since this book was printed.

The book is written to Red Hat Linux 7.x. Therefore, most of the CD files are Red Hat Package Manager (.rpm) files. There are also many Tape Archive (.tar) files and GNU Zip (.gzip) files. Instructions for unpacking and installing these files are included in their respective locations throughout the book. To mount the CD onto your Linux system, you would issue the following command (for Red Hat systems):

```
mount -t iso9660 /dev/cdrom /mnt/cdrom
```

And to unmount:


```
umount /mnt/cdrom
```

It is recommended that you copy the CD files to your hard drive before working with them. If you use other versions of Linux, you may need to modify the demonstrations, or download a portable version of the open source programs to work with your version of Linux.



Look for this CD icon when obtaining files used in the book demonstrations.

Contents

	Foreword	xxvii
Using the GNU General Public License	Chapter 1 Introduction to Open Source Security	1
	Introduction	2
The GNU General Public License (GPL) is the basis of the open source movement. This license is provided by the Gnu is Not Unix (GNU) organization, which develops various software packages. The most important element of this license is that instead of protecting a particular person or company, it protects the software code that creates the application.	The Tools Used in This Book	3
	Using the GNU General Public License	3
	Fee-Based GPL Software	5
	Can I Use GPL Software in My Company?	5
	Soft Skills: Coping with Open Source Quirks	6
	General Lack of Installation and Configuration Support	6
	Infrequent or Irregular Update Schedules	6
	Command-Line Dominance	6
	Lack of Backward Compatibility and No Regular Distribution Body	7
	Inconvenient Upgrade Paths	7
	Conflicts in Supporting Libraries and Limited Platform Support	7
	Interface Changes	8
	Partially Developed Solutions	8
	Should I Use an RPM or Tarballs?	10
	Tarball	10
	Red Hat Package Manager	11
	Debian	11
	Obtaining Open Source Software	12
	SourceForge	12
	Freshmeat	13
	Packetstorm	14
		xi

SecurityFocus	15
Is That Download Safe?	16
A Brief Encryption Review	16
Symmetric Key Encryption	17
Asymmetric Key Encryption	18
Public Key and Trust Relationships	19
One-Way Encryption	20
GNU Privacy Guard	21
Deploying GNU Privacy Guard	21
Skipping Public Key Verification	29
Using GPG to Verify Signatures on Tarball Packages	30
Using Md5sum	30
Auditing Procedures	31
Locking Down Your Network Hosts	31
Securing Data across the Network	32
Protecting the Network Perimeter	33
Summary	35
Solutions Fast Track	35
Frequently Asked Questions	38
Chapter 2 Hardening the Operating System	41
Introduction	42
Updating the Operating System	42
Red Hat Linux Errata and Update Service Packages	42
Handling Maintenance Issues	43
Red Hat Linux Errata: Fixes and Advisories	44
Bug Fix Case Study	46
Manually Disabling Unnecessary Services and Ports	47
Services to Disable	47
The xinetd.conf File	48
Locking Down Ports	50
Well-Known and Registered Ports	50
Determining Ports to Block	52

Determining Which Ports to Block

When determining which ports to block on your server, you must first determine which services you require. In most cases, block all ports that are not exclusively required by these services. This is tricky, because you can easily block yourself from services you need, especially services that use ephemeral ports. If your server is an exclusive e-mail server running SMTP and IMAP, you can block all TCP ports except ports 25 and 143, respectively. If your server is an exclusive HTTP server, you can block all ports except TCP port 80.

Blocking Ports	53
Xinetd Services	53
Stand-Alone Services	54
Hardening the System with Bastille	55
Bastille Functions	55
Bastille Versions	63
Implementing Bastille	64
Undoing Bastille Changes	74
Controlling and Auditing Root Access with Sudo	77
System Requirements	79
The Sudo Command	79
Downloading Sudo	80
Installing Sudo	82
Configuring Sudo	86
Running Sudo	90
No Password	92
Sudo Logging	93
Managing Your Log Files	96
Using Logging Enhancers	97
SWATCH	97
Scanlogd	100
Syslogd-ng	101
Summary	103
Solutions Fast Track	104
Frequently Asked Questions	107
Chapter 3 System Scanning and Probing	109
Introduction	110
Scanning for Viruses Using the AntiVir Antiviru	
Application	110
Understanding Linux Viruses	110
Using AntiVir	112
Key Mode and Non-Key Mode	114
Licensing AntiVir	114
Exercise: Updating AntiVir	114
Using TkAntivir	116
Required Libraries and Settings	117

Learn How to Set Preferences For TkAntivir



- Scanning Systems for Boot Sector and E-Mail Viruses 117
- Additional Information 120
- Exercise: Using TkAntivir 120
- Scanning Systems for DDoS Attack Software
- Using a Zombie Zapper 123
- How Zombies Work and How to Stop Them 124
- When Should I Use a Zombie Zapper? 125
- What Zombie Zapper Should I Use? 125
- What Does Zombie Zapper Require to Compile? 127
- Exercise: Using Zombie Zapper 127
- Scanning System Ports Using the Gnome Service
- Scan Port Scanner 129
- Required Libraries 130
- Why Use a Port Scanner? 131
- Exercise: Using Gnome Service Scanner 131
- Using Nmap 133
- Isn't Nmap Just Another Port Scanner? 134
- Acquiring and Installing Nmap 136
- Common Nmap Options 136
- Applied Examples 137
- Scanning Entire Networks and Subnets 138
- Selective Scanning 139
- Adding More Stealth 139
- Saving to Text and Reading from Text 140
- Testing Firewalls and Intrusion Detection Systems 141
- Example: Spoofing the Source Address of a Scan 142
- Timing Your Scan Speeds 142
- Example: Conducting a Paranoid Scan 143
- Exercise: Using Nmap 143
- Using Nmap in Interactive Mode 144
- Exercise: Using Nmap in Interactive Mode 144

Using NmapFE as a Graphical Front End	146
Exercise: Using NmapFE	147
Using Remote Nmap (Rnmap) as a Central Scanning Device	147
Exercise: Scanning Systems with Rnmap	148
Deploying Cheops to Monitor Your Network	151
How Cheops Works	153
Obtaining Cheops	154
Required Libraries	154
The Cheops Interface	155
Mapping Relations between Computers	157
Cheops Monitoring Methods	157
Connectivity Features	159
Exercise: Installing and Configuring Cheops	160
Deploying Nessus to Test Daemon Security	165
The Nessus Client/Server Relationship	167
Windows Nessus Clients	169
Required Libraries	169
Order of Installation	170
Configuring Plug-Ins	173
Creating a New Nessus User	174
The Rules Database	174
Exercise: Installing Nessus and Conducting a Vulnerability Scan	175
Updating Nessus	179
Understanding Differential, Detached, and Continuous Scans	180
Exercise: Conducting Detached and Differential Scans with Nessus	182
Summary	185
Solutions Fast Track	185
Frequently Asked Questions	189

Chapter 4 Implementing an Intrusion Detection System 191

Introduction	192
Understanding IDS Strategies and Types	194
IDS Types	195
Host-Based IDS Applications	196
Network-Based IDS Applications	196
IDS Applications and Fault Tolerance	197
What Can an IDS Do for Me?	200
Which IDS Strategy Is Best?	203
Network-Based IDS Applications and Firewalls	203
IDS Applications	204
Installing Tripwire to Detect File Changes on Your Operating System	206
Tripwire Dependencies	207
Availability	208
Deploying Tripwire	208
Tripwire Files	208
Tripwire Installation Steps	209
Configuring the Tripwire Policy File	209
Creating the Tripwire Policy File	212
Database Initialization Mode	212
Testing E-Mail Capability	214
Integrity Checking Mode	214
Specifying a Different Database	215
Reading Reports	215
Updating Tripwire to Account for Legitimate Changes in the OS	215
Updating the Policy	216
What Do I Do if I Find a Discrepancy?	217
Configuring Tripwire to Inform You Concerning Changes	217
Exercise: Installing Tripwire	217
Exercise: Securing the Tripwire Database	219
Exercise: Using Cron to Run Tripwire Automatically	220

SECURITY ALERT!

Although Tripwire has a “file integrity mode,” Tripwire is not really an integrity checker in the classic sense. It does not, for example, test the file’s stability or inode number or any other aspect in regards to file storage. Tripwire simply compares a file’s new signature with that taken when the database was created. Other tools may be used to check the integrity of a file’s permissions and ownership information.

Deploying PortSentry to Act as a Host-Based IDS	220
Important PortSentry Files	221
Installing PortSentry	222
Configuring PortSentry to Block Users	222
Optimizing PortSentry to Sense Attack Types	223
Exercise: Installing and Configuring PortSentry	224
Exercise: Clearing Ipchains Rules	227
Exercise: Running an External Command Using PortSentry	227
Installing and Configuring Snort	229
Availability	229
Supporting Libraries	229
Understanding Snort Rules	230
Snort Variables	230
Snort Files and Directories	231
Snort Plug-Ins	232
Starting Snort	233
Logging Snort Entries	236
Running Snort as a Network-Based IDS	236
Ignoring Hosts	237
Additional Logging Options: Text files, Tcpcdump, and Databases	237
Configuring Snort to Log to a Database	238
Controlling Logging and Alerts	239
Getting Information	240
Exercise: Installing Snort	240
Exercise: Using Snort as an IDS Application	241
Exercise: Configuring Snort to Log to a Database	243
Exercise: Querying a Snort Database from a Remote Host	251
Identifying Snort Add-Ons	251
SnortSnarf	252

Exercise: Using SnortSnarf to Read Snort Logs 252

Analysis Console for Intrusion Databases 252

Summary 254

Solutions Fast Track 254

Frequently Asked Questions 258

Chapter 5 Troubleshooting the Network with Sniffers 261

Introduction 262

Understanding Packet Analysis and TCP Handshakes 264

TCP Handshakes 265

Establishing a TCP Connection 265

Terminating a TCP Connection 266

Creating Filters Using Tcpcmdump 268

Tcpcmdump Options 268

Tcpcmdump Expressions 271

Boolean Operators 275

Installing and Using Tcpcmdump 276

Configuring Ethereal to Capture Network Packets 279

Ethereal Options 281

Ethereal Filters 283

Configuring Ethereal and Capturing Packets 283

Viewing Network Traffic between Hosts Using EtherApe 288

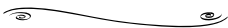
Configuring EtherApe and Viewing Network Traffic 289

Summary 293

Solutions Fast Track 294

Frequently Asked Questions 296

Learn the Flags Used in TCP Connections



Flag	Description
SYN	Synchronize sequence numbers. Used for connection establishment.
FIN	The sender is finished with the connection. Used for connection termination.
RST	Reset the connection.
PSH	Push the data.
ACK	Acknowledgment
URG	Urgent

Chapter 6 Network Authentication and Encryption 299

Introduction 300

Understanding Network Authentication 300

Answer Your Questions about Kerberos

Q: I wish to remove a principal from the keytab of one of my Kerberos clients. How do I do this?

A: Enter `kadmin` as an administrative user on the Kerberos client (not the KDC) and use the `ktremove` option. For example, if you wanted to remove the principal for the user named `james`, you would do the following:

```
terminal$ /usr/
kerberos/sbin/kadmin
kadmin: ktremove
-p james
kadmin: quit
terminal$
```

Attacking Encrypted Protocols	301
Creating Authentication and Encryption Solutions	303
Implementing One-Time Passwords (OTP and OPIE)	305
What Files Does OPIE Replace?	305
How Does OPIE Work?	305
OPIE Files and Applications	306
<code>opiepasswd</code>	307
Password Format	308
Using <code>opiekey</code>	309
Using <code>opieinfo</code> and <code>opiekey</code> to Generate a List	310
Installing OPIE	310
Configuration Options	310
Installation Options	311
Uninstalling OPIE	312
Exercise: Installing OPIE	312
Exercise: Installing the OPIE Client on a Remote Server	315
Exercise: Using <code>opie-tk</code> and Allowing Windows Users to Deploy OPIE.	316
Exercise: Installing <code>opieftpd</code>	318
Implementing Kerberos Version 5	319
Why Is Kerberos Such a Big Deal?	320
Kerberos Terms	321
Kerberos Principals	322
The Kerberos Authentication Process	323
How Information Traverses the Network	324
Creating the Kerberos Database	325
Using <code>kadmin.local</code>	325
Using <code>kadmin</code>	326
Using <code>kadmin</code> on the Client	328
Using <code>kadmin</code> and Creating Kerberos Client Passwords	329
Setting Policies	330
Using <code>Kinit</code>	330

The kinit Command and Time Limits	332
Managing Kerberos Client Credentials	333
The kdestroy Command	333
Exercise: Configuring a KDC	334
Establishing Kerberos Client Trust Relationships with kadmin	337
Additional Daemon Principal Names	339
Logging On to a Kerberos Host Daemon	340
Common Kerberos Client Troubleshooting Issues and Solutions	340
Kerberos Client Applications	341
Kerberos Authentication and klogin	342
Exercise: Configuring a Kerberos Client	342
Summary	345
Solutions Fast Track	345
Frequently Asked Questions	348

Chapter 7 Avoiding Sniffing Attacks through Encryption 353

Secure E-Commerce Transactions

If hackers were alerted to an unsecure server, they could capture packets going in and out of the server to gain the data they sought. For example, if an e-commerce server does not use any type of network encryption for transactions, there is a great deal of data to be gained by a hacker. Unfortunately, many small companies or entrepreneurs set up their own Web servers, unaware of potential security problems, and set up simple scripts to process payment forms.

Introduction	354
Understanding Network Encryption	354
Capturing and Analyzing Unencrypted Network Traffic	355
Using OpenSSH to Encrypt Network Traffic between Two Hosts	361
The OpenSSH Suite	362
Installing OpenSSH	364
Configuring SSH	367
How SSH Works	368
Insecure r-command Authentication	368
Secure SSH Authentication	371
Implementing SSH to Secure Data Transmissions over an Insecure Network	373
Distributing the Public Key	376
Capturing and Analyzing Encrypted Network Traffic	381
Summary	385

Solutions Fast Track	386
Frequently Asked Questions	388
Chapter 8 Creating Virtual Private Networks	391
Introduction	392
Secure Tunneling with VPNs	392
Telecommuter VPN Solution	392
Router-to-Router VPN Solution	394
Host-to-Host VPN Solution	395
Tunneling Protocols	395
Explaining the IP Security Architecture	396
Using IPsec with a VPN Tunneling Protocol	400
Internet Key Exchange Protocol	401
Creating a VPN by Using FreeS/WAN	402
Downloading and Unpacking FreeS/WAN	404
Compiling the Kernel to Run FreeS/WAN	407
Recompiling FreeS/WAN into the New Kernel	417
Configuring FreeS/WAN	420
Testing IP Networking	420
Configuring Public Key Encryption for Secure Authentication of VPN Endpoints	424
Starting the Tunnel	434
Capturing VPN Tunnel Traffic	436
Closing the VPN Tunnel	438
Summary	439
Solutions Fast Track	440
Frequently Asked Questions	441
Chapter 9 Implementing a Firewall with Ipchains and Iptables	445
Introduction	446
Understanding the Need for a Firewall	447
Building a Personal Firewall	449
Understanding Packet Filtering Terminology	450

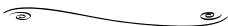
Secure Tunneling with Virtual Private Networks (VPNs)

VPNs provide a private data network over public telecommunication infrastructures, such as the Internet, by providing authentication and encryption through a data “tunnel” between devices. All data transmitted between the devices through the tunnel is secure, regardless of what programs the devices are running.

	Choosing a Linux Firewall Machine	452
	Protecting the Firewall	452
Understand Essential Linux Firewall Functions	Deploying IP Forwarding and Masquerading	453
	Masquerading	456
	Configuring Your Firewall to Filter Network Packets	458
■ IP address conservation and traffic forwarding	Configuring the Kernel	460
■ Network differentiation	Packet Accounting	460
■ Protection against denial-of-service, scanning, and sniffing attacks	Understanding Tables and Chains in a Linux Firewall	461
■ IP and port	Built-In Targets and User-Defined Chains	462
■ Content filtering	Specifying Interfaces	463
■ Packet redirection	Setting Policies	464
■ Enhanced authentication and encryption	Using Ipchains to Masquerade Connections	467
■ Supplemented logging	Iptables Masquerading Modules	468
	Using Iptables to Masquerade Connections	468
	Iptables Modules	470
	Exercise: Masquerading Connections	
	Using Ipchains or Iptables	471
	Logging Packets at the Firewall	471
	Setting Log Limits	472
	Adding and Removing Packet Filtering Rules	472
	ICMP Types	473
	Exercise: Creating a Personal Firewall and Creating a User-Defined Chain	475
	Redirecting Ports in Ipchains and Iptables	477
	Configuring a Firewall	478
	Setting a Proper Foundation	478
	Creating Anti-Spoofing Rules	479
	Counting Bandwidth Usage	483
	Listing and Resetting Counters	484
	Setting Type of Service (ToS) in a Linux Router	484
	Setting ToS Values in Ipchains and Iptables	486
	Using and Obtaining Automated Firewall Scripts and Graphical Firewall Utilities	488

Firewall Works in Progress	490
Exercise: Using Firestarter to Create a Personal Firewall	490
Exercise: Using Advanced Firestarter Features	498
Summary	500
Solutions Fast Track	500
Frequently Asked Questions	505
Chapter 10 Deploying the Squid Web Proxy Cache Server	507
Introduction	508
Benefits of Proxy Server Implementation	508
Proxy Caching	508
Network Address Translation	510
Differentiating between a Packet Filter and a Proxy Server	512
Implementing the Squid Web Proxy Cache Server	513
System Requirements Specific to Proxy Caching	516
Installing Squid	517
Configuring Squid	520
The http_port Tag	522
The Cache_dir Tag	523
The acl Tag	525
The http_access Tag	526
Starting and Testing Squid	528
Configuring Proxy Clients	529
Configuring Netscape Navigator and Lynx	530
Configuring Netscape Navigator	530
Configuring Lynx	532
Configuring Internet Explorer (Optional)	533
Summary	535
Solutions Fast Track	536
Frequently Asked Questions	538

Configure Squid with the /etc/squid/squid.conf file



- [read online Forest of Stars \(The Saga of Seven Suns, Book 2\) pdf, azw \(kindle\), epub](#)
- [Don't Look Now \(Don't Turn Around Trilogy, Book 2\) online](#)
- [download online Passion Play pdf, azw \(kindle\), epub, doc, mobi](#)
- [A Game of Dress-Up online](#)
- [download online Plant-Powered Families: Over 100 Kid-Tested, Whole-Foods Vegan Recipes here](#)
- [download Expert Performance Indexing in SQL Server pdf, azw \(kindle\), epub](#)

- <http://test.markblaustein.com/library/Don-t-You-Wish.pdf>
- <http://ramazotti.ru/library/The-Bunny-Years--The-Surprising-Inside-Story-of-the-Playboy-Clubs--The-Women-Who-Worked-as-Bunnies--and-Where-T>
- <http://wind-in-herleshausen.de/?freebooks/Tied-Up-In-Tinsel--Roderick-Alleyn--Book-27-.pdf>
- <http://damianfoster.com/books/Cutting-Edge-Fashion-Illustration--Step-by-step-Contemporary-Fashion-Illustration--Traditional--Digital-and-Mixed>
- <http://patrickvincitore.com/?ebooks/Migration.pdf>
- <http://conexdx.com/library/Expert-Performance-Indexing-in-SQL-Server.pdf>