



# ubuntu<sup>®</sup>

Powerful Hacks and Customizations

Neal Krawetz





**Ubuntu<sup>®</sup>**

---

**Powerful Hacks and Customizations**

Dr. Neal Krawetz



WILEY

Wiley Publishing, Inc.

## Ubuntu® Powerful Hacks and Customizations

Published by  
Wiley Publishing, Inc.  
10475 Crosspoint Boulevard  
Indianapolis, IN 46256  
[www.wiley.com](http://www.wiley.com)

Copyright © 2010 by Wiley Publishing, Inc., Indianapolis, Indiana

Published by Wiley Publishing, Inc., Indianapolis, Indiana

Published simultaneously in Canada

ISBN: 978-0-470-58988-5

Manufactured in the United States of America

10 9 8 7 6 5 4 3 2 1

No part of this publication may be reproduced, stored in a retrieval system or transmitted in any form or by any means, electronic, mechanical, photocopying, recording, scanning or otherwise, except as permitted under Sections 107 or 108 of the 1976 United States Copyright Act, without either the prior written permission of the Publisher, or authorization through payment of the appropriate per-copy fee to the Copyright Clearance Center, 222 Rosewood Drive, Danvers, MA 01923, (978) 750-8400, fax (978) 646-8600. Requests to the Publisher for permission should be addressed to the Permissions Department, John Wiley & Sons, Inc., 111 River Street, Hoboken, NJ 07030, (201) 748-6011, fax (201) 748-6008, or online at <http://www.wiley.com/go/permissions>.

**Limit of Liability/Disclaimer of Warranty:** The publisher and the author make no representations or warranties with respect to the accuracy or completeness of the contents of this work and specifically disclaim all warranties, including without limitation warranties of fitness for a particular purpose. No warranty may be created or extended by sales or promotional materials. The advice and strategies contained herein may not be suitable for every situation. This work is sold with the understanding that the publisher is not engaged in rendering legal, accounting, or other professional services. If professional assistance is required, the services of a competent professional person should be sought. Neither the publisher nor the author shall be liable for damages arising herefrom. The fact that an organization or Web site is referred to in this work as a citation and/or a potential source of further information does not mean that the author or the publisher endorses the information the organization or Web site may provide or recommendations it may make. Further, readers should be aware that Internet Web sites listed in this work may have changed or disappeared between when this work was written and when it is read.

For general information on our other products and services please contact our Customer Care Department within the United States at (877) 762-2974, outside the United States at (317) 572-3993 or fax (317) 572-4002.

Wiley also publishes its books in a variety of electronic formats. Some content that appears in print may not be available in electronic books.

**Library of Congress Control Number:** 2010922555

**Trademarks:** Wiley and the Wiley logo are trademarks or registered trademarks of John Wiley & Sons, Inc. and/or its affiliates, in the United States and other countries, and may not be used without written permission. Ubuntu is a registered trademark of Canonical Ltd. All other trademarks are the property of their respective owners. Wiley Publishing, Inc. is not associated with any product or vendor mentioned in this book.

*To my parents, for systematically crushing my dreams of becoming a cartoonist while encouraging my interest in computers.*





## About The Author

**Neal Krawetz** earned his Ph.D. in Computer Science from Texas A&M University and Bachelors degree in Computer and Information Science from the University of California, Santa Cruz. In 2002, he founded Hacker Factor ([www.hackerfactor.com](http://www.hackerfactor.com)), where he specializes in non-classical computer forensics, online profiling, and computer security. He is the author of three books (including this one) and numerous articles. He is a popular speaker at local and national conferences. Neal has been active in the security community for more than 20 years and has worked with the open source community for more than 25 years.

While most people have sane hobbies like bird watching or drinking beer at football games, Neal collects operating systems. He currently runs Fedora, Ubuntu, Mac OS X, OpenBSD, Solaris, HP-UX, and Microsoft Windows (with dozens of other operating systems ready to go). He has been a Linux user since 1993 and has enjoyed Ubuntu since 2005 (Hoary Hedgehog). Neal has configured Ubuntu on everything from personal workstations and netbooks to archival database systems and mission-critical servers.



**Executive Editor**

Carol Long

**Project Editor**

Kenyon Brown

**Technical Editor**

Timothy Boronczyk

**Production Editor**

Eric Charbonneau

**Copy Editor**

Foxxe Editorial Services

**Editorial Director**

Robyn B. Siesky

**Editorial Manager**

Mary Beth Wakefield

**Production Manager**

Tim Tate

**Vice President and Executive  
Group Publisher**

Richard Swadley

**Vice President and Executive  
Publisher**

Barry Pruett

**Associate Publisher**

Jim Minatel

**Project Coordinator, Cover**

Lynsey Stanford

**Proofreader**

Jen Larsen, Word One

**Indexer**

Johnna VanHoose Dinse

**Cover Designer**

Ryan Sneed





# Acknowledgments

I have never thought of myself as a writer; I am a programmer. Yet, when Jenny Watson at Wiley contacted me and asked if I wanted to update the first edition of *Hacking Ubuntu*, I jumped at the opportunity. The first edition was a wild ride—a full book in less than five months with a focus on Ubuntu’s Dapper Drake 6.06 (June 2006). But that was three years ago, and the operating system has evolved. I was eager to rewrite the book.

Writing a book takes time and commitment. I sincerely thank my friends and family for standing by me and giving me words of encouragement (between playful insults).

This book is intended for power users. However, I am only one type of power user: I usually turn off all the glitz and flash in lieu of speed and robustness. Fortunately, my friends are different types of power users: they love graphics, flash, bang, wow, and cutting edge. They provided a wealth of information that really helped cover all types of advanced Linux and Ubuntu needs. Many enlightening discussions were incorporated into parts of this text. To all of these people, I offer my sincerest thanks: Bill Tucker, Kyle Teague, Mark Litscher, Mark Rasch, Valdis Kletnieks, Paul Ferguson, Joe Battin, Erik Lillestolen, Paul Hummer, Jamie Leben, and the Northern Colorado Linux Users Group, as well as the people who helped with the first edition: Bill Hayes, Ragavan Srinivasan, LaMont Jones, Jer/ Eberhard, Paul Whyman, April Lorenzen, Marc Sachs and his band of Internet Storm Center handlers, the Department of Defense’s Cyber Crime Center, and all of the folks who put together the Blackhat Briefings security conference. I must also thank my father, Howard, for all of the hardware he sent my way, including the various graphic cards and network interfaces. And my mother, Sharon, for her words of encouragement.

Although I have done my best to make this book as complete, accurate, and understandable as possible, I must offer my gratitude to the people who have reviewed, tested, and helped enhance this manuscript: Timothy Boronczyk for his thoroughness and ideas, and Michelle Mach for, well, *everything*. Their patience, feedback, and helpful comments have been an invaluable asset. Any errors in this book are strictly my own, but without them, there would be many more errors. I thank Carol Long, Kenyon Brown, Jenny Watson, Foxxe Editorial Services, and the staff at Wiley Publishing for this opportunity. And most importantly, I thank Neil Salkind and StudioB for the advice, assistance, and support.

Finally, nobody can use Linux without using software created by literally thousands of developers. I offer my deepest respect and gratitude to the entire open source community, and to Mark Shuttleworth and Canonical Ltd. for packaging up the best of the best into one distribution: Ubuntu.



# Contents at a Glance

<b>Introduction</b>		<b>xxiii</b>
<b>Part I</b>	<b>Optimizing Your System</b>	<b>1</b>
<b>Chapter 1</b>	<b>Hacking the Installation</b>	<b>3</b>
<b>Chapter 2</b>	<b>Customizing the User Environment</b>	<b>43</b>
<b>Chapter 3</b>	<b>Configuring Devices</b>	<b>75</b>
<b>Chapter 4</b>	<b>Adapting Input Devices</b>	<b>117</b>
<b>Part II</b>	<b>Working with Compatibility</b>	<b>149</b>
<b>Chapter 5</b>	<b>Managing Software</b>	<b>151</b>
<b>Chapter 6</b>	<b>Communicating Online</b>	<b>183</b>
<b>Chapter 7</b>	<b>Collaborating</b>	<b>223</b>
<b>Part III</b>	<b>Improving Performance</b>	<b>269</b>
<b>Chapter 8</b>	<b>Tuning Processes</b>	<b>271</b>
<b>Chapter 9</b>	<b>Multitasking Applications</b>	<b>305</b>
<b>Chapter 10</b>	<b>Getting Graphical with Video Bling</b>	<b>331</b>
<b>Part IV</b>	<b>Securing Your System</b>	<b>369</b>
<b>Chapter 11</b>	<b>Locking Down Ubuntu</b>	<b>371</b>
<b>Chapter 12</b>	<b>Advanced Networking</b>	<b>403</b>
<b>Chapter 13</b>	<b>Enabling Services</b>	<b>451</b>
<b>Index</b>		<b>485</b>





# Contents

<b>Introduction</b>	<b>xxiii</b>
<b>Part I      Optimizing Your System</b>	<b>1</b>
<b>Chapter 1    Hacking the Installation</b>	<b>3</b>
What's In This Chapter?	3
Before You Begin	3
Selecting a Distribution	4
Understanding Ubuntu Names	5
Selecting the Ubuntu Version	7
Configuring Dual Boot	8
Using the Desktop CD-ROM	9
Using the Alternate CD-ROM	11
Text Mode Installation	11
OEM Installation	12
Networkless Upgrades and Repairs	12
Installing an LTSP Server	12
Using the Server CD-ROM	13
Changing Options	14
Installing a Minimal System	14
Installing over the Network	16
Using a USB Drive	18
Formatting a USB Drive	18
Sharing Files with a USB Drive	19
Booting from a USB Drive	21
Different USB Devices	21
The 10-Step Boot Configuration	22

Starting the Network Install from a USB Drive	23
Using the Boot Image	24
Installing a Full File System from USB	26
Using the Live CD from a USB Floppy Drive	26
Using the Live CD from a USB Hard Drive	27
Booting Variations and Troubleshooting	30
Tweaking the BusyBox	31
Using Ubuntu on a Netbook	32
Installing on a Netbook	33
Creating the Netbook Installation Media	33
Installing with Only a Netbook	35
Upgrading Ubuntu	36
Determining the Version	37
Performing the Upgrade	37
Upgrading Issues with Ubuntu	37
Configuring GRUB	39
Altering Boot Parameters	39
Updating GRUB	40
Summary	41
<b>Chapter 2 Customizing the User Environment</b>	<b>43</b>
What's In This Chapter?	43
Logging in for the First Time	43
Changing the Startup Music	44
Converting Audio Files	44
Modifying Audio Files	46
Changing Sounds under Karmic Koala	46
Changing the Background	47
Changing the Background As Needed	49
Using Informative Colors	49
Changing the Fonts	50
Changing the DPI	51
Helping with Big Fonts	52
Tuning the Shell	52
Completing Completion	54
Awesome Aliases	55
Fun Functions	56
Cool Commands	57
Tweaking the Desktop	57
Adding a Prompt Button	57
Adding Panels	59
Adding Menus	60
Selecting Themes and Skins	61
Navigating Nautilus	62

Embracing Emblems	63
Technical Details	64
Stretching Icons	65
Technical Details	66
Adjusting Fonts	67
Tuning Templates	67
Scripting Menus	68
Replacing Nautilus	71
Altering the Login Screen	71
Modifying Login Scripts	72
Summary	73
<b>Chapter 3</b>	<b>75</b>
<b>Configuring Devices</b>	<b>75</b>
What's In This Chapter?	75
Working with Device Drivers	75
Loading Modules	76
Viewing Modules	77
Installing and Removing Modules	78
Optimizing Modules	80
Starting Services	80
Using Init.d	81
Understanding Upstart	82
Configuring Services with the GUI	84
Configuring Boot-Up Services with bum	85
Configuring Services from the Command Line	86
Enabling Multiple CPUs (SMP)	87
Disabling SMP	89
Missing SMP?	89
Adding Printers	90
Changing Paper Size	90
Adding a Printer	91
Sharing Your Printer	92
Sharing a Printer with CUPS	92
Sharing a Printer with LPD	94
Sharing a Printer with Windows	94
Adding Drives	96
Upgrading Drives	96
Mounting Systems	98
Using Simple Backups	100
Configuring a RAID	102
Detecting a RAID Failure	104
Adding to a RAID	106
Adjusting Default Devices	108

Disabling USB Drive Auto-Mount	108
Altering Network Interface Preferences	108
Adding Other Devices	109
Tuning TV Cards	110
Using Digital Cameras, Scanners, and Web Cameras	113
Summary	115
<b>Chapter 4 Adapting Input Devices</b>	<b>117</b>
What's In This Chapter?	117
Empowering Keyboards	117
Changing Keyboard Layouts	117
Understanding Keyboards	118
Enabling Unused Keys	119
Mapping Console Keys	119
Mapping Desktop Keys	121
Altering Keycode Assignments	121
Running Commands with the Push of a Button	123
Examples of Keyboard Shortcuts	125
Trapping Ctrl+Alt+Delete	126
Disabling Ctrl+Alt+Delete	127
Disabling Ctrl+Alt+Delete with Init	127
Disabling Ctrl+Alt+Delete with Upstart	128
Blinking Keyboard Lights	129
Changing Xorg.conf	130
Supporting Serial Mice	131
Debugging Xorg.conf	132
Enabling Extra Mouse Buttons	133
Supporting a Touch Pad	134
Tuning Ubuntu on a Macintosh	135
Using a One-Button Mouse in a Three-Button World	135
Missing Keys and Functionality	136
Remapping the Command and Alt Keys	137
Supporting USB Devices	138
Creating Static USB Devices	139
Associating Applications with USB	141
Enabling Drawing Tablets	143
Debugging the Wacom Tablet	144
Tuning the Tablet	145
Using Other Tablets	146
Summary	147



---

<b>Part II</b>	<b>Working with Compatibility</b>	<b>149</b>
<b>Chapter 5</b>	<b>Managing Software</b>	<b>151</b>
	What's In This Chapter?	151
	Understanding Package Repositories	152
	Differentiating Distributions	153
	Running Synaptic	155
	Searching with Synaptic	155
	Changing Repositories	157
	Installing from a CD-ROM or Directory	158
	Managing Updates	159
	Shopping at the Ubuntu Software Center	160
	Using the Computer Janitor	161
	Living without Synaptic	161
	Modifying Sources	162
	Adding CD-ROM Repositories	164
	Browsing the APT Cache	165
	Organizing Search Results	166
	Installing with APT	167
	Removing Packages with APT	167
	Removing Residues	168
	Tracking Removals	168
	Upgrading with APT	170
	Installing Common Functions	170
	Installing Multimedia Support	171
	Adding Proprietary Media Support	172
	Getting Flashy	174
	Installing Font Packages	174
	Compiling and Developing Software	176
	Installing Package Source Code	177
	Programming with C	178
	Enabling Java	180
	Fixing Scripts	181
	Summary	182
<b>Chapter 6</b>	<b>Communicating Online</b>	<b>183</b>
	What's In This Chapter?	183
	Hacking the Firefox Web Brower	183
	Tuning Preferences	184

Tuning the Main Preferences	184
Tuning the Tabs Preferences	185
Tuning the Content Preferences	185
Adjusting Preferred Applications	186
Tuning the Privacy Preferences	186
Adjusting the Security Settings	188
Tuning the Advanced Preferences	188
Fine-Tuning the Firefox Advanced Preferences	190
Managing Profiles	192
Extreme Firefox Tweaks with File Configurations	192
Adding Search Engines	194
Playing with Plug-ins and Extensions	196
Adding Plug-ins	196
Removing Plug-ins	197
Helping Handlers	197
Opening Remote Browsers	198
Using Other Web Browsers	199
Why Use Different Browsers?	200
Mitigating Crashes	200
Securing Web Access with SSH	201
Installing the SSH Server	202
Opening Ports	203
Starting a Proxy	204
Using Socks4-Server	204
Using Dante-Server	205
Testing the SOCKS Server	206
Establishing the Tunnel	207
Changing Ciphers for Speed	208
Managing E-Mail with Evolution	209
Configuring an Account	209
Retrieving E-mail from Gmail	210
Preparing Your Gmail Account	211
Adding a Gmail Account	211
Fetching Mail	213
Retrieving E-Mail from Yahoo!	214
Addressing with LDAP	215
Crashing and Recovering Evolution	215
Using E-Mail with Thunderbird Mail	216
Instant Messaging with Ubuntu	218
Talking with VoIP	219
Summary	220

<b>Chapter 7 Collaborating</b>	<b>223</b>
What's In This Chapter?	223
Synchronizing the Clock	224
Sharing Files	226
Enabling NFS	227
Acting as an NFS Client	228
Acting as an NFS Server	229
Exchanging Files with Samba	230
Sharing a Directory with Windows	231
Accessing a Windows Directory	232
Working with Open Office	234
Using the Word Processor	234
Making Presentations	236
Accessing Spreadsheets	237
Selecting Alternative Office Tools	237
Alternate Document Viewers	238
Alternate Presentation Viewers	239
Alternate Spreadsheet Viewers	239
Collaborating Over the Network	240
Sharing Source Code	241
Configuring Subversion	242
Using Subversion	245
Branching and Merging with Subversion	247
Sharing Documents in Real Time	247
Sharing Desktops with VNC	249
Using the VNC Viewer	250
Sharing Your Desktop	251
Sharing Your Complete Desktop	251
Sharing Independent Desktops	252
Securing VNC Connections	255
Running Software in Emulators	256
Choosing an Emulator	257
Understanding Virtual Disks	259
Differences between VNC and VM	259
Emulating with VNC	260
Using VMware (Commercial)	260
Using Qemu (Open Source)	261
Installing a Qemu VM	261
Running a Qemu VM	262
Creating Partitions	264
Converting Between Qemu and VMware	265

	Using Xen (Open Source)	265
	Sharing Files with Emulators	266
	Other Collaboration Tools	267
	Summary	268
<b>Part III</b>	<b>Improving Performance</b>	<b>269</b>
<b>Chapter 8</b>	<b>Tuning Processes</b>	<b>271</b>
	What's In This Chapter?	271
	Learning the Lingo	271
	Viewing Running Processes	273
	Killing Processes	275
	Killing All Processes	277
	Identifying Resources	278
	Accessing /proc	278
	Measuring CPU	279
	Measuring Disk Space	280
	Measuring Disk I/O	281
	Measuring Memory Usage	282
	Measuring Video Memory	283
	Measuring Network Throughput	284
	Finding Process Startups	285
	Inspecting Boot Scripts	285
	Inspecting Upstart	286
	Inspecting Device Startups	288
	Inspecting Network Services	288
	Inspecting Shell Startup Scripts	289
	Inspecting Desktop Scripts	290
	Inspecting Gnome Applications	291
	Inspecting Schedulers: at, cron, and anacron	294
	Scheduling with <i>at</i>	294
	Scheduling with <i>cron</i>	295
	Scheduling with <i>anacron</i>	296
	Tuning Kernel Parameters	296
	Computing Swap	297
	Modifying Shared Memory	299
	Changing Per-User Settings	300
	Speeding Up Boot Time	301
	Profiling the Boot Sequence	303
	Summary	304
<b>Chapter 9</b>	<b>Multitasking Applications</b>	<b>305</b>
	What's In This Chapter?	305
	Switching Applications	306

Using the Window List and Window Selector	306
Using Alt+Tab	307
Navigating the Desktop without a Mouse	308
Switching Between Tabs	309
Tweaking the Workplace Switcher	309
Switching Workspaces with Ctrl+Alt+Arrows	310
Managing Workspaces	311
Customizing Application Windows	311
Creating X-resources	312
Using Devil's Pie	314
Buffering Buffers	316
Automating Tasks	318
Tracking Projects	321
Tracking Time on Projects	322
Tracking CPU Usage	324
Tracking Disk Usage and Quotas	324
Understanding Your Limits	325
Enabling Quotas	326
Editing Quotas	327
Reporting Quotas	328
Summary	329
<b>Chapter 10 Getting Graphical with Video Bling</b>	<b>331</b>
What's In This Chapter?	331
Troubleshooting the Display	332
Hacking Around Troublesome Areas	332
Patching Nautilus	332
Enabling X11	333
Enabling Ctrl+Alt+Backspace	333
Editing xorg.conf	334
Tuning Graphics	335
Changing Screen Resolution (xrandr)	336
Thinking Safety	337
Flipping Cool!	338
Practical Uses for xrandr	339
Changing Video Drivers	340
Enabling OpenGL	340
Automated Driver Selection	341
Manually Enabling OpenGL	341
If You Have an ATI Video Card . . .	342
If You Have an NVIDIA Card . . .	343
Debugging X-Windows	344
Putting Things Back	344
Debugging the Wrong Driver	345

Forcing Drivers to Install	345	
Adjusting Video Position	345	
Improving Performance	349	
Switching Screen Savers	351	
Adding New Screen Savers	354	
Animating the Desktop Background	355	
Disabling Animated Backgrounds	357	
Configuring Dual Monitors	357	
Using Two Heads	358	
Using the Graphical Display Configuration	358	
Using Two Heads with TwinView	359	
Using Two Heads with Xinerama	361	
Using Two Computers with Different Desktops	364	
Summary	368	
<b>Part IV</b>	<b>Securing Your System</b>	<b>369</b>
<b>Chapter 11</b>	<b>Locking Down Ubuntu</b>	<b>371</b>
What's In This Chapter?	371	
Understanding Ubuntu Security Defaults	372	
Locking Down Passwords	374	
Hacking with Sudo	375	
Adding Users to Sudo	376	
Tweaking other Sudo Options	378	
Becoming Root	379	
Encrypting Data	380	
Using Gnu Privacy Guard (GPG)	381	
Creating Keys	381	
Searching Keys	384	
Transferring Keys	384	
Defining Trust	385	
Encrypting Files with GPG	387	
Signing Data	388	
Integrating with e-mail	389	
Using Other File Encryption Options	390	
Encrypting File Systems	391	
Installing and Configuring EncFS	391	
Maintaining EncFS	393	
Using EncFS	393	
Knowing EncFS Limitations	394	
Encrypting Home Directories	394	
Encrypting the Entire Disk	396	
Managing Logs and Caches	398	

Clearing Temporary Files	398
Erasing Web Caches	399
Cleaning APT Cache	400
Rotating Logs	401
Summary	402
<b>Chapter 12 Advanced Networking</b>	<b>403</b>
What's In This Chapter?	403
Using the Network Manager	404
Configuring Networks from the Command Line	405
Configuring Wireless Networks	408
Installing Wireless Devices the Easy Way	408
Looking for Drivers	409
Using ndiswrapper	409
Installing a Driver	410
Debugging Driver Problems	411
Hacking with Wireless Tools	413
Enabling Wireless Security with WEP	415
Enabling Wireless Security with WPA	416
Securing the Network	417
Configuring Firewalls with Tcpwrappers	418
Testing the Tcpwrappers Configuration	419
Enabling Tcpwrappers	419
Configuring Firewalls with IP Tables	419
Saving IP Tables Settings	422
Using the Uncomplicated Firewall	423
Disabling Pings	425
Enabling IPsec	427
Creating IPsec Keys	428
Configuring the Security Policy Database	431
Configuring IPsec	432
Enabling Proxies	434
Using the General System Proxy	434
Enabling Application-Specific Proxy Configurations	434
Enabling SOCKS Clients	437
Anonymizing with Tor	438
Using the Torbutton	439
Understanding Tor's Limitations	440
Applying Parental Controls	441
Debugging the Network	444
Using EtherApe	445
Using Wireshark	446
Using Snort and Tcpdump	447
Summary	448

<b>Chapter 13 Enabling Services</b>	<b>451</b>
What's In This Chapter?	451
Understanding Ubuntu's Default Services	452
Using netstat	452
Identifying Servers with netstat	453
Running nmap	454
Recognizing Network Threats	457
Mitigating Risks before Going Public	458
Monitoring Attacks	460
What Should You Look For?	460
What Now? After a Compromise. . .	461
Logging Logins	461
Recording Failed Logins	461
Enhancing Failed Login Records	462
Enabling Intrusion Detection Systems	463
Running Services	464
Hardening SSH	464
Using SSH Keys	466
Debugging SSH Connections	467
Enabling FTP	468
Installing VSFTPD	469
Adjusting Anonymous FTP Access	470
Adjusting Regular FTP Access	470
Securing Internet FTP	471
Enabling Postfix	473
Post-Installation Configuration	474
Testing Postfix	476
Opening Postfix	476
Enabling Apache	476
Post-Installation Configuration	477
Enabling HTTPS	480
Extending Apache	482
Creating Web Pages	483
Summary	484
<b>Index</b>	<b>485</b>





# Introduction

I started seriously using Linux in 1995. Back then, Slackware 3.0 was the popular distribution, but RedHat 2.1 and Debian 1.0 were gaining a following. Ah, the good old days of the 1.2.13 kernel . . .

Over the last decade, I have used Linux on all types of systems and platforms—from personal computers to mission-critical servers, and from Intel’s x86 to PowerPC, SGI, and Sun platforms. I view the operating system as a tool, and the right job needs the right tool. Ten years ago, the flexible Linux system filled a niche that Microsoft, Sun, and other proprietary operating systems could not fill. It had all the power and programming hooks that a developer could want but was seriously lacking in usability and support. Custom device drivers did not exist unless you built them, and compatibility with Microsoft Windows was limited to FTP and the web.

Today, the kernel is up to version 2.6 and Ubuntu is one of the fastest-growing Linux distributions available. Ubuntu combines all the desirable features—usability, security, and support—into one distribution.

## Moving Targets

---

Writing for an open source operating system is like taking a picture of a moving target. While some parts remain focused and accurate for years, others lose focus and become outdated quickly.

The first edition, titled *Hacking Ubuntu*, really contained three types of hacks: enhancements, administration, and workarounds. While most of the enhancements and administration hacks continue to work today, the open source

community has spent the last three years adding new features and addressing many of the workarounds. For example, wireless encryption (WPA) support under Dapper Drake (Ubuntu 6.06) required manual tweaking configuration files. But three years later Ubuntu's Jaunty Jackalope (9.04) included a working graphical interface. Now you only need hacks for working from the command line.

The first edition focused on the Dapper Drake 6.06 LTS version of Ubuntu. Although other versions of Ubuntu have an 18-month support life, Dapper was given five years of support from its corporate sponsor, Canonical Ltd. In this edition, I have tried to not write for a specific version of Ubuntu. These hacks are relevant for Hardy Heron (8.04 LTS) as well as Jaunty Jackalope (9.04) and Karmic Koala (9.10), and likely long past the next LTS (due in April 2010).

**NOTE** *LTS stands for Long-Term Support.*

Ubuntu is constantly changing. Knowing Hardy Heron (8.04 LTS) like the back of your hand does not mean that you know Karmic Koala (9.10). While much of the basic functionality remains the same, many of the actual implementation details have dramatically changed. Menus are altered, configuration files moved, and even core functionality, such as the default instant messaging software, is totally replaced. These details become much more noticeable when a cool hack suddenly stops working. Although I have tried not to write for specific Ubuntu versions, I do include notes and caveats about differences between versions that impact certain hacks.

## Living Dangerously

---

There are usually many ways to implement the same hack. The hacks that I include in this book are the ones that I have found to be the easiest to implement (even if "easiest" is still a complicated hack), the simplest to maintain, and the most stable of the available options.

Having said that, however, any changes you make to your operating system could result in completely screwing up the system. Unless you enjoy reinstalling the operating system or spending hours trying to undo a mistake, I strongly recommend the following precautions:

- **Make a backup!** Before editing any files or making system changes, be sure to save everything that you cannot afford to lose. Although most hacks are easy to undo, others—like upgrading the operating system—have a point of no return.

**TIP** See Chapter 3 for a simple system backup script.

- **Save system files!** Before you edit any system file, make a local copy of it. For example, before editing `/etc/ssh/ssh_config`, save a copy of the original (`sudo cp /etc/ssh/ssh_config /etc/ssh/ssh_config.bak`). This way, you can put back the original file quickly in case you mess something up. I also recommend commenting out undesirable configuration options rather than deleting them. (It's easier to uncomment a line to restore functionality than it is to remember what it looked like before you deleted it.)
- **Don't play on mission-critical systems!** If you cannot afford to have downtime, then you should not be trying new tricks on the system. Instead, tinker on a test system, make sure it works, and then apply known-stable changes to your more serious systems.

## Who This Book Is For

---

This book is written for the power user. Power users want the most out of their system: the most speed, the most glitz, the most sounds, or the most security. This book shows how to do just that.

Although you don't have to be a programmer to get the most out of this book, you should be familiar with Linux and know how to edit files. In particular, knowing how to download, install, and use the basic operating system is a must. You should be familiar enough with the Linux `bash` shell to create and traverse directories, search for applications, read man pages, and edit system files using whatever editor you are most familiar with. You should be familiar with commands like `grep`, `find`, and `sudo`.

Under Linux and Ubuntu, there are many ways to get the same results and many competing applications. There is rarely only one solution. Yet, some applications can trigger emotional responses. For example, debating the best editor (`vi` versus `emacs`) or the best desktop (e.g., Gnome, KDE, or Xfce) can quickly turn into a religious war. Although examples in this book may use one type of editor or desktop, the tasks can usually be accomplished just as easily with some other application.

**WARNING** This is *not* an introductory book on Ubuntu. Most bookstores have a shelf dedicated to introductory books on Linux. This book is for intermediate and advanced users. It contains hacks, tips, and techniques for power users.

This book does not completely encompass all the things you can do with Ubuntu. For most of the applications covered, there are dozens of alternate tools. And even the tools covered contain additional options and settings for doing more things than described here. The goal of this book is to show you some of the tricks, hacks, and tweaks that you can do with the system so that you can better customize it to your needs. I fully expect people to build on and extend these hacks.

## **How This Book Is Organized**

---

Different power users have different needs. This book is divided into four parts, depending on the type of power user.

- **Part I: Optimizing Your System**—The first part of this book focuses on usability. Chapter 1 covers the different options for installing Ubuntu. The decisions made during the installation will dramatically impact how the system functions. Chapter 2 addresses the user interface and desktop. Although the default user interface is pleasant, it can be customized into an awesome interface. Chapter 3 focuses on devices and low-level drivers, including hard drives and printers. Chapter 4 targets common input devices: keyboards, mice, touch pads, and tablets.
- **Part II: Working with Compatibility**—In today’s networked world, few people work in isolation. Part II focuses on compatibility with other systems. Chapter 5 discusses software management and how to install files for interoperability. Chapter 6 looks at networking tools such as e-mail, instant messaging, and the web. Chapter 7 covers collaboration with non-Linux systems.
- **Part III: Improving Performance**—Whereas Part I focuses on usability and Part II discusses compatibility, Part III looks at efficiency. Chapter 8 focuses on tuning the operating system’s performance. Chapter 9 shows different ways to navigate the desktop, manage windows, and multitask between applications. Chapter 10 covers performance for video and graphics systems, including how to use multiple monitors to extend your desktop.
- **Part IV: Securing Your System**—It is all fun and games until someone’s system gets compromised. This section shows tricks to check for vulnerabilities and prevent undesirable access. Chapter 11 provides different

approaches to lock down the system and protect your files. Chapter 12 looks at advanced networking options such as proxies and wireless networking. Chapter 13 provides options for safely opening up the system with external network services.

## What You Need to Use This Book

---

To use this book, you will need:

- A computer for running Ubuntu Linux. This book specifically supports versions 6.06 (Dapper Drake) through 9.10 (Karmic Koala), including the long-term support version 8.04 (Hardy Heron). This book primarily focuses on the PC (x86) platform but includes sections for the Macintosh (PowerPC). Although other platforms are not explicitly discussed, most of the hacks will work on these, too.
  - For the desktop installation, you will need at least 256 MB of RAM and 3 GB of disk space.
  - For the server installation, you will need at least 64 MB of RAM and 500 MB of disk space.
- Internet access for downloading ISO images and additional software packages from the online Ubuntu repositories. You will also need Internet access for the chapters that cover network services.
- For Chapter 1 (“Hacking the Installation”), you will need a CD-ROM burner and blank CD-R or CD-RW media. For playing with USB media, you should have one or more USB thumb drives or a USB hard drive.
- Chapter 3 (“Configuring Devices”), Chapter 4 (“Adapting Input Devices”), and Chapter 10 (“Getting Graphical with Video Bling”) cover a variety of peripherals. You will need the peripherals in order to do the hacks. For example, you cannot do a printer hack without a printer and you cannot expand your desktop across monitors if you only have one monitor.
- Chapter 7 (“Collaborating”) is best done with access to other operating systems. A computer running Apple’s MacOS X or Microsoft Windows is a good option. However, other operating systems are also acceptable. These computers should be located on the same network and have network connectivity.

## Conventions

---

I've used a few conventions throughout the book to help you get the most from the text and keep track of what's going on:

- Inline code and URLs within the text is presented with a monospaced font, like this: `System.capabilities`.
- Example blocks of source code are presented like this for code snippets:

```
statusTitle._text = "Look at the line below.";
```

or like this for code listings:

```
statusTitle._textColor = 0xFFFFFFFF;
```

In this book, you will find occasional notes, tips, and warnings. These are used to highlight subtle issues.

**NOTE** Notes point out minor items related to the topic.

**TIP** Tips provide small, helpful hints to make hacks work better.

**WARNING** Warnings alert you to possible hazards that can result from the hacks.

## Source Code

---

It would be unfair for a book on modifying an open source operating system to include complex scripts and not make them easily available to the open source community. All of the source code written for this book is available for download at <http://www.wrox.com>. Once at the site, simply locate the book's title (either by using the Search box or by using one of the title lists) and click the Download Code link on the book's detail page to obtain all the source code for the book.

**NOTE** Because many books have similar titles, you may find it easiest to search by ISBN; this book's ISBN is 978-0-470-58988-5.

Once you download the code, just decompress it with your favorite compression tool. Alternately, you can go to the main Wrox code download page at <http://www.wrox.com/dynamic/books/download.aspx> to see the code available for this book and all other Wrox books.