Introduction

Supporting the Linux operating system are thousands of open source initiatives, building code for everything from word processors, to Web servers, to programming tools. While many of these initiatives help to make Linux the world's most powerful operating system, others produce software that is just flat-out fun.

Linux® Toys II is here to show you some of the fun stuff!

In *Linux Toys II*, I give you the software, the shopping list, and the steps to put together interesting projects using open source software and PC hardware. Some projects will run even on a 486 machine with 32MB of memory (for example, a client in the Linux Terminal Server project), while others encourage you to build a completely tricked-out entertainment system–style PC (for example, the MythTV project).

Most projects will run on any standard PC built in the past ten years . . . so you can decide how fancy a computer you want to use. Once you have built your *Linux Toys II* projects, you don't have to stop there. You can further enhance your projects because of the way open source works:

- **The building block nature of Linux**—You can continue to add software from the thousands of open source software components available for Linux. So you can add your favorite applications to your custom Linux pen drive, incorporate a database application to store images or music for a server, or include a graphical front end to control your home lighting.
- **Thriving open source communities**—Most of the *Linux Toys II* projects are built on open source initiatives that have active, thriving communities supporting them. You can learn more about each project by participating in forums or joining mailing lists. You can become a contributor to each effort by creating software or documentation . . . or buying a T-shirt.

If you are new to Linux, you can learn the basics of using Linux in Appendix B and procedures for installing a particular version of Linux (Fedora Core) in Appendix C. All the projects should run on most Linux systems (if you are willing to compile them yourself). However, if you are a first-time Linux user, following instructions for Fedora Core Linux and using the pre-built software packages (in RPM format) can save you some trouble.

So, welcome to *Linux Toys II!* To get started, all you need is this book and a PC for the most basic projects. In fact, in some cases, you can just boot the *Linux Toys II* CD itself (which contains a custom version of Damn Small Linux) to get started. For other projects, you need an installed Linux system and some extra hardware that I describe throughout the book.

How This Book Is Organized

There are five parts to this book. Part I has introductory material. Parts II, III, and IV contain the actual projects. The appendixes contain information on getting and installing software, as well as a few basics on using Linux (in particular, Fedora Core or Red Hat Enterprise Linux). Here's a larger description of those sections.

Part I: The Basics

Chapter 1 lays out the approach to the *Linux Toys II* projects. Chapter 2 goes into detail about finding hardware and software.

Part II: Multimedia Projects

Chapters in this part contain sound, video, and digital image projects. Chapter 3 describes how to set up a Gallery, a Web-based server for sharing digital images over a network. Chapter 4 shows you how to put together the hardware and software to make a MythTV personal video recorder that's suitable for your home entertainment unit. Chapter 5 shows you how to use eMoviX to turn your personal videos into bootable movies. It then covers how to play a variety of multimedia content using MoviX[2].

Part III: Home Projects

These chapters contain fun and useful personal and home projects. Chapter 6 describes how to create a customized Linux distribution from Damn Small Linux that runs on a pen drive. Chapter 7 shows you how to use Heyu and BottleRocket software to control lights and devices in your home using the X10 protocol. Chapter 8 describes how to set up a gaming server with the BZFlag tank battle game, which you can play in your home, small office, or even over the Internet. To protect your home or small office computer network, Chapter 9 describes how to build and configure a custom firewall device using Devil-Linux.

Part IV: Small Business Projects

While intended more as exercises than as real business opportunities, the projects in this section help you configure a couple of useful server types. Chapter 10 describes how to set up an Icecast server so you can create your own streaming radio station on the Internet or other network. Chapter 11 tells how to use the Linux Terminal Server project to fill a home, school, or small business with fully functional thin client computers for a fraction of the cost of complete computer workstations.

Appendixes

The appendixes contain supporting information for the rest of the book. Appendix A describes the *Linux Toys II* CD that is included with the book. Appendix B describes some of the basic Linux skills you need to use this book. Appendix C walks you through installing Linux (using Red Hat Fedora Core or Enterprise Linux as examples).

Conventions Used in This Book

On occasion, there will be code or commands I want to highlight during a procedure. Here are some examples of text that is marked differently along the way.

Sometimes in a procedure, I want to make a distinction between what you type and what is returned. In those cases, the entire input and output is marked as code, while the part that you type is marked in bold. For example:

```
# ssh toy
root@toy's password: *******
Last login: Tue Nov 22 12:58:49 2003 from music.linuxtoys.net
#
```

In this example, someone typed ~~ssh toy~~, and then typed a password (indicated by the asterisks in bold). The rest are the responses from the computer. This example shows a command typed to the shell. If you are new to Linux, remember that you typically open a Terminal window to get to the shell. When you see a prompt ending in a pound sign (#), it means you should be the root user when you run the command; when you see a dollar sign ($), you can be any user.

Special icons for Note, Caution, and Cross-Reference appear from time to time. Those paragraphs contain an extra bit of information or a special way of doing something, something to watch out for, or a pointer to another chapter, respectively. Here's an example:

A Note contains an extra bit of information.

What You Need for the Projects

For all the projects, you need a PC, the accompanying CD, and this book. Because the book includes a bootable Linux operating system on the CD, you can do a few of the projects without having Linux installed (most notably, the bootable pen drive project in Chapter 6). Most other projects require that you have a Linux operating system installed. I recommend Red Hat Enterprise Linux or Fedora Core. Other Linux systems will work as well, but you will need to either compile the software yourself (the CD includes the source code) or get pre-built binaries from somewhere else.

The projects in this book were all built and tested using Red Hat Fedora Core 4 (although they should work on Red Hat Enterprise Linux 4 as well). If you are unfamiliar with Linux, I recommend my book *Red Hat Fedora and Enterprise Linux 4 Bible* (Wiley, 2005). It includes the complete Fedora Core 4 Linux operating system as well as more than 1,000 pages of descriptions for using Fedora Core and Red Hat Enterprise Linux.

Check Chapter 2 for an overview of the hardware and software requirements for *Linux Toys II*. Then refer to each project chapter to determine the special requirements for each particular project.

The Linux Toys II CD

The CD that comes with this book contains the software you need to complete the *Linux Toys II* projects. Each chapter describes which packages from the CD you need for the project. Most of the *Linux Toys II* software is in RPM format (which is the format used to install software in Fedora Core and Red Hat Enterprise Linux).

Although binaries of *Linux Toys II* software were built and tested to run on Fedora Core, the source code is included on the *Linux Toys II* CD as well. If you are predisposed to do so, it should be possible to build most projects on other Linux distributions. (See Appendix A for descriptions of the software included on the *Linux Toys II* CD.)

The Linux Toys (and Linux Toys II) Web sites

There are two separate Web sites associated with *Linux Toys II*:

- **Linux Toys at Wiley** (`www.wiley.com/go/negus`)—Wiley Publishing, Inc., the publisher of *Linux Toys* and *Linux Toys II*, maintains a Web page that pertains to issues surrounding the purchase and features of the book.
- **Linux Toys Web Site** (`www.linuxtoys.net`)—Come to the LinuxToys.net site for further information about the *Linux Toys II* projects.

On with the Show

I hope that you are as excited to try out these projects as I am to bring them to you. If you are a Linux expert, feel free to jump right into the project of your choice. If you are new to Linux, be sure to go through the introductory materials and step through the appendixes to get a feel for how to use Linux. Okay, let's go!