Christine Bresnahan and Richard Blum

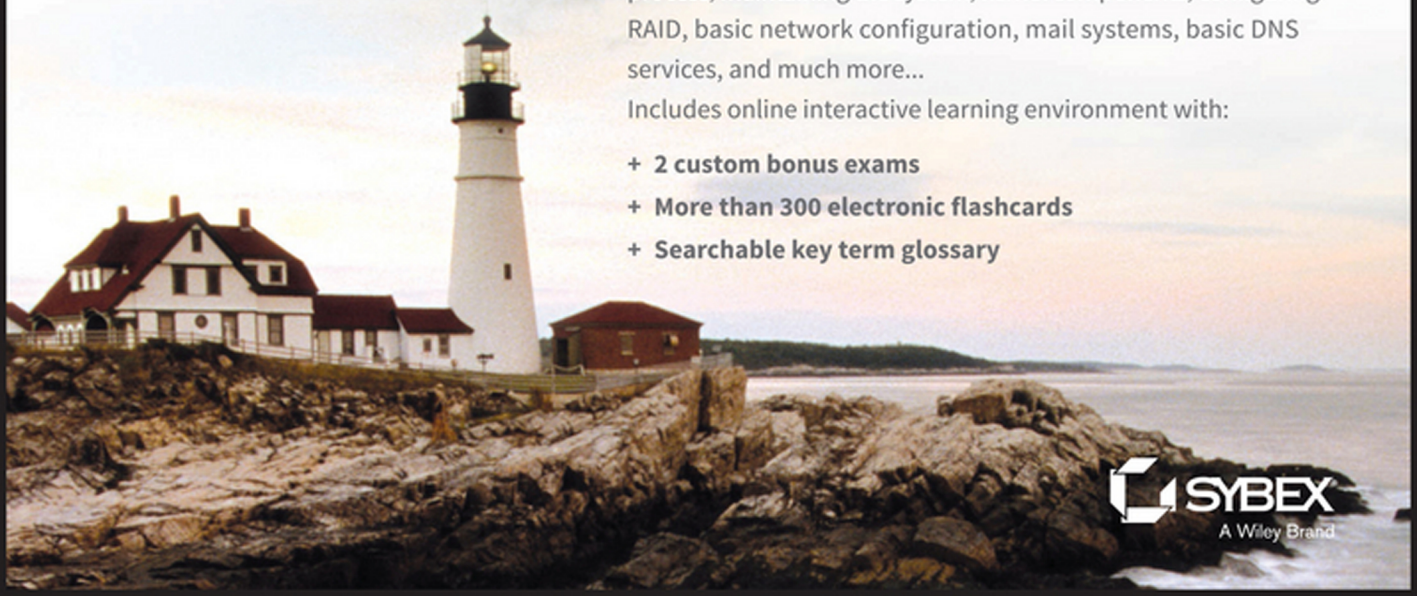
LPIC-2

Linux Professional Institute Certification

STUDY GUIDE

Second Edition

EXAM 201 AND EXAM 202



Covers 100% of exam objectives, including the Linux boot process, maintaining the system, kernel components, configuring RAID, basic network configuration, mail systems, basic DNS services, and much more...

Includes online interactive learning environment with:

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To those looking to further their knowledge of Linux. "A wise man is full of strength, and a man of knowledge enhances his might." Prov 24:5 (ESV)

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About the Authors

Christine Bresnahan started working with computers more than 25 years ago in the IT industry as a systems administrator. Christine is an adjunct professor at Ivy Tech Community College, where she teaches Linux certification and Python programming classes. She also writes books and produces instructional resources for the classroom.

Richard Blum has worked in the IT industry for more than 25 years as both a system and network administrator, and he has published numerous Linux and open source books. Rich is an online instructor for Linux and web programming courses that are used by colleges and universities across the United States. When he is not being a computer nerd, Rich enjoys spending time with his wife, Barbara, and his two daughters, Katie and Jessica.

Contents at a Glance

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Introduction

Welcome to the *LPIC-2: Linux Professional Institute Certification Study Guide*. If you used our *LPIC-1: Linux Professional Institute Certification Study Guide* to study for your LPIC-1 exam, welcome back! We're glad that you decided to stay with us for your LPIC-2 study resources.

Just like our LPIC-1 Study Guide, this book contains detailed explanations for all of the LPIC-2 exam objectives, along with example questions, flashcards for self-study, and practice questions. The purpose of this book is to help you pass both of the LPIC-2 exams, 201 and 202. These exams cover more advanced topics than the LPIC-1 exam, such as the Linux kernel, system startup, filesystems, network operations, DNS servers, web servers, file servers, email servers, network client management, and security. This book will walk you through all of these topics, helping prepare you for the LPIC-2 exam questions.

LPI's Certification Program

The purpose of the Linux Professional Institute's (LPI) LPIC-2 program is to define the basic knowledge required to administer small to medium-sized mixed (Microsoft and Linux) networks, focusing on the Linux operating system. The program guides professionals wishing to build on knowledge gained from the LPIC-1 program.

It is expected that you have already passed the LPI Linux Essentials (optional) exam and the LPIC-1 (or CompTIA Linux+) exam and have at least five years' experience in administering a Linux server(s) in a mixed network environment.

The successful LPIC-2 candidate should have at a minimum knowledge and experience concerning the following topics:

- Administering multiple Linux servers
- Advising management on computerization and purchasing
- Planning and managing a small, mixed-network environment, which includes the following:
  - LAN server:
    - Client management
    - DHCP
    - DNS
    - NFS
    - Samba
  - Internet gateway:
    - Firewall
    - Mail

        - OpenSSH
        - VPN
        - Web cache/proxy
    - Internet server:
        - FTP server
        - Web server
        - Web server with a reverse proxy
- Team supervision skills

If you've already passed the LPIC-1 exam, you've proven to the world that you're proficient with the basic operation of Linux, along with the basic Linux commands. But don't stop there. When you pass the LPIC-2 exam, that will demonstrate that you have the skills that companies look for when hiring Linux administrators. Having the LPIC-2 certification validates your skills, and it helps prepare you for working with Linux servers in a commercial environment.

How to Become Certified

The LPIC-2 certification is available to anyone who has an active LPIC-1 certification and who passes the two required exams: 201 and 202.

To take an LPI exam, you must first register with LPI to obtain an LPI ID number (if you already did this for the LPIC-1 exam, you must use your existing LPI ID number for the LPIC-2 exam). If you need to register, you can do this online at `https://cs.lpi.org/caf/Xamman/register`. LPI will email your LPI ID number to you. With that you can log into the LPI Marketplace to purchase an exam voucher.

The exams are administered by Pearson VUE. The exam can be taken at any Pearson VUE testing center. If you pass, you will get a certificate in the mail saying that you have passed. Call (877) 619-2096 for Pearson VUE contact information.

To register for the exam with Pearson VUE, go to `http://www.vue.com`. Enter the exam voucher number that you received from the LPI Marketplace, and schedule the time and place to take the exam.

Who Should Buy This Book

Anyone who wants to pass the LPIC-2 certification exams may benefit from this book. You should already have a basic knowledge of Linux, as covered by the LPIC-1 exam material. If not, you should start with our *LPIC-1: Linux Professional Institute Study Guide* book and then move on to this book. This book focuses on the more advanced Linux topics covered by the LPIC-2 201 and 202 exams. Once you obtain your certification, this book

will continue to be useful by serving as a handy resource for information on installing and maintaining Linux servers.

Even if you don't plan to take the LPIC-2 exams, this book makes an excellent resource for understanding advanced Linux server topics. It covers topics such as creating your own web server, email server, and file server. These skills are required by Linux administrators in small and medium-sized network environments.

This book is written with the assumption that you have a basic knowledge of Linux. You should be familiar with how Linux works and be able to work in the Linux command line, including the core commands such as `ls`, `cp`, `mv`, `cat`, `less`, `ps`, `free`, and `uptime`. You should also already know how to install a default Linux distribution environment, because that is not covered in this book.

You'll need a Linux system with which to practice and perform the chapter activities. Any Linux desktop or server distribution will work for the activities in this book; however, we focus on the Ubuntu and CentOS Linux desktop distributions for our examples.

How This Book Is Organized

This book consists of 12 chapters plus supplementary information: an online glossary, this introduction, and the assessment test after the introduction.

Part I of the book, Chapters 1 through 6, covers the LPIC-2 201 exam topics. Part II, Chapters 7 through 12, covers the 202 exam topics. Each chapter begins with a list of the exam objectives that are covered in that chapter. However, the book doesn't cover the objectives in order.

Part I: The LPI 201 Exam

Chapter 1: Starting a System This chapter covers how Linux boots from the system BIOS. It discusses the Linux bootloader program and how to create a dual-boot Linux environment.

Chapter 2: Maintaining the System This chapter describes how to install and manage resources on a Linux system. It also covers how to back up Linux systems and communicate with system users to warn of system issues or downtime.

Chapter 3: Mastering the Kernel This chapter focuses on the core of the Linux system—the kernel. It walks you through how to install a custom kernel, as well as how to create and maintain kernel modules required to support the hardware on your Linux system.

Chapter 4: Managing the Filesystem This chapter explores the different Linux filesystems and how to manage and maintain them, as well as how to troubleshoot them when problems occur.

Chapter 5: Administering Advanced Storage Devices This chapter takes a look at two of the more advanced storage methods used in Linux environments. It focuses on how to use RAID devices in Linux, either as hardware devices or using a software RAID emulator. It also demonstrates how to implement a Logical Volume Manager in a Linux environment.

Chapter 6: Navigating Network Services This chapter takes a deeper look at how Linux interacts in a network environment. It covers how to use the Linux command-line commands to set up a network interface and how to troubleshoot basic network problems.

Part II: The LPI 202 Exam

Chapter 7: Organizing Email Services This chapter examines how to run an Internet email server using Linux. It covers the two most popular email servers—sendmail and Postfix, as well as walking you through how to use the most popular Linux email client packages—Courier and Dovecot.

Chapter 8: Directing DNS This chapter covers the basics of the DNS system and how to configure your Linux server to offer DNS services on your network.

Chapter 9: Offering Web Services This chapter covers how to run your own web server using a Linux server. It discusses how to install and manage the Apache web server—the most popular web server on the Internet. It also covers the nginx web server, a newer up-and-coming web server that's quickly gaining in popularity. Also, this chapter dives into the basics of Squid, a popular web proxy server used by many companies as a web firewall to block users from accessing inappropriate websites.

Chapter 10: Sharing Files This chapter discusses how to use your Linux server as a file server in a local network. It covers using both FTP and NFS to serve files, as well as the popular Samba package to serve files to Microsoft Windows clients on a network.

Chapter 11: Managing Network Clients This chapter explores how to use a Linux server to provide basic network services to clients on a local network. It shows how to create a DHCP server for serving dynamic IP addresses, how to create an LDAP server for providing simple network directory services, and how to use PAM to provide authentication services to local applications.

Chapter 12: Setting Up System Security This chapter explores some ways to use your Linux server security in a network environment. It covers using the `iptables` program as a firewall, OpenSSH for remote communication with clients, and OpenVPN to provide a secure tunnel for remote clients to get to your network.

At the end of each chapter, you'll find a couple of elements that you can use to prepare for the exam:

Exam Essentials This section summarizes important information that was covered in the chapter. You should be able to perform each of the tasks or convey the information requested.

Review Questions Each chapter concludes with 20 review questions. You should answer these questions and check your answers against the ones provided after the questions. If

you can't answer at least 80 percent of these questions correctly, go back and review the chapter, or at least those sections that seem to be giving you difficulty.

The review questions, assessment test, and other testing elements included with this book are *not* derived from the actual exam questions, so don't memorize the answers to these questions and assume that doing so will enable you to pass the exam. You should learn the underlying topic, as described in the text of the book. This will let you answer the questions provided with this book *and* pass the exam. Learning the underlying topic is also the approach that will serve you best in the workplace—the ultimate goal of a certification.

To get the most out of this book, you should read each chapter from start to finish and then check your memory and understanding with the end-of-chapter elements. Even if you're already familiar with a topic, you should skim the chapter; Linux is complex enough that there are often multiple ways to accomplish a task, so you may learn something even if you're already competent in an area.

Interactive Online Learning Environment and Test Bank

The authors have worked hard to provide some really great tools to help you with your certification process. The interactive online learning environment that accompanies the *LPIC-2: Linux Professional Institute Certification Study Guide: Exam 201 and Exam 202* provides a test bank with study tools to help you prepare for the certification exams—and increase your chances of passing them the first time! The test bank includes the following:

Sample Tests All of the questions in this book are included, including the assessment test at the end of this introduction and the 240 questions from the review sections at the end of each chapter. In addition, there are two 72-question practice exams. Use these questions to test your knowledge of the study guide material. The online test bank runs on multiple devices.

Electronic Flashcards The online text bank includes over 300 flashcards specifically written to hit you hard, so don't get discouraged if you don't ace your way through them at first. They're there to ensure that you're really ready for the exams. And no worries—armed with the review questions, practice exams, and flashcards, you'll be more than prepared when exam day comes. Questions are provided in digital flashcard format (a question followed by a single correct answer). You can use the flashcards to reinforce your learning and provide last-minute test prep before the exam.

Glossary In addition, a glossary of key terms from this book is available as a fully searchable PDF.

Readers can access these tools by visiting `http://www.wiley.com/go/sybextestprep`.

Conventions Used in This Book

This book uses certain typographic styles in order to help you quickly identify important information and to avoid confusion over the meaning of words such as on-screen prompts. In particular, look for the following styles:

- *Italicized text* indicates key terms that are described at length the first time they are used in a chapter. (Italics are also used for emphasis.)
- `A monospaced font` indicates the contents of configuration files, messages displayed at a text-mode Linux shell prompt, filenames, text-mode command names, and Internet URLs.
- *`Italicized monospaced text`* indicates a variable—information that differs from one system or command run to another, such as the name of a client computer or a process ID number.
- Bold monospaced text is information that you're to type into the computer, usually at a Linux shell prompt. This text can also be italicized to indicate that you should substitute an appropriate value for your system. (When isolated on their own lines, commands are preceded by non-bold monospaced `$` or `#` command prompts, denoting regular user or system administrator use, respectively.)

In addition to these text conventions, which can apply to individual words or entire paragraphs, a few conventions highlight segments of text:

A note indicates information that's useful or interesting but that's somewhat peripheral to the main text. A note might be relevant to a small number of networks, for instance, or it may refer to an outdated feature.

A tip provides information that can save you time or frustration and that may not be entirely obvious. A tip might describe how to get around a limitation or how to use a feature to perform an unusual task.

Warnings describe potential pitfalls or dangers. If you fail to heed a warning, you may end up spending a lot of time recovering from a bug, or you may even end up restoring your entire system from scratch.