



Accessing the WAN, CCNA Exploration Labs and Study Guide

By John Rullan

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Accessing the WAN, CCNA Exploration Labs and Study Guide is designed to support your learning the technologies and network services required by converged applications as taught in Version 4 of the Cisco® Networking Academy® CCNA® Exploration curriculum. Each chapter contains a Study Guide section and a Labs and Activities section.

Study Guide

The dozens of exercises in this book help you learn the concepts and configurations crucial to your success as a CCNA exam candidate. Each chapter is slightly different and includes multiple-choice, fill-in-the-blank, and open-ended questions designed to help you

- Review vocabulary
- Strengthen troubleshooting skills
- Boost configuration skills
- Reinforce concepts
- Research topics

Labs and Activities

The Labs and Activities sections include all the online curriculum labs plus some additional activities to ensure that you have mastered the practical skills needed to succeed in this course.

Hands-On Labs—This icon identifies the hands-on labs created for each chapter. Work through all the Basic, Challenge, and Troubleshooting labs to gain a deep understanding of the CCNA knowledge and skills needed to ultimately succeed on the CCNA Certification Exam.

Packet Tracer Activities—This icon identifies exercises created by the author for

you to challenge yourself on specific tasks using Packet Tracer, a powerful network simulation program developed by Cisco.

Packet Tracer Companion—This icon identifies the companion activities that correspond to each hands-on lab. You'll use the Packet Tracer to complete a simulation of the hands-on lab.

Packet Tracer Skills Integration Challenge—Each chapter concludes with a culminating activity called the Packet Tracer Skills Integration Challenge. These challenging activities require you to combine several skills learned from the chapter—as well as previous chapters and courses—to successfully complete one comprehensive exercise.

John Rullan has been a Cisco Instructor since 1998. He teaches CCNA, CCNP®, and network security courses to students and teachers throughout the New York City Department of Education system.

Use this book with:
Accessing the WAN,
CCNA Exploration Companion Guide
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Companion CD-ROM

The CD-ROM provides all the Packet Tracer Activity, Packet Tracer Companion, and Packet Tracer Challenge files that are referenced throughout the book as indicated by the icons. These files work with Packet Tracer software v4.1, which is available through the Academy Connection website. Ask your instructor for access to the Packet Tracer software.

This book is part of the Cisco Networking Academy Series from Cisco Press®. Books in this series support and complement the Cisco Networking Academy curriculum.

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Introduction

The Cisco Networking Academy is a comprehensive e-learning program that provides students with Internet technology skills. A Networking Academy delivers web-based content, online assessment, student performance tracking, and hands-on labs to prepare students for industry-standard certifications. The CCNA curriculum includes four courses oriented around the topics on the Cisco Certified Network Associate (CCNA) certification.

Accessing the WAN, CCNA Exploration Labs and Study Guide is a supplement to your classroom and laboratory experience with the Cisco Networking Academy. To succeed on the exam and achieve your CCNA certification, you should do everything in your power to arm yourself with a variety of tools and training materials to support your learning efforts. This Labs and Study Guide is just such a collection of tools. Used to its fullest extent, it will help you acquire the knowledge and practice the skills associated with the content area of the CCNA Exploration Accessing the WAN course. Specifically, this book helps you work on these main areas:

- WAN technology concepts
- PPP concepts and configuration
- Frame Relay concepts and configuration
- Network security threats and mitigation techniques
- Access control list operation and configuration
- Broadband services and technologies
- Network Address Translation concepts and configuration
- DHCP operation and configuration
- IPv6 concepts
- Troubleshooting methodologies and tools

Labs and Study Guides similar to this one are also available for the other three courses: *Network Fundamentals, CCNA Exploration Labs and Study Guide*; *Routing Protocols and Concepts, CCNA Exploration Labs and Study Guide*; and *LAN Switching and Wireless, CCNA Exploration Labs and Study Guide*.

Audience for This Book

This book's main audience is anyone taking the CCNA Exploration Accessing the WAN course of the Cisco Networking Academy curriculum. Many Academies use this book as a required tool in the course, and other Academies recommend the Labs and Study Guides as an additional source of study and practice materials.

Goals and Methods

The most important goal of this book is to help you pass the CCNA exam (640-802). Passing this foundation exam means that you not only have the required knowledge of the technologies covered by the exam, but that you can plan, design, implement, operate, and troubleshoot these technologies. In other words, these exams are rigorously application-based. You can view the exam topics any time at <http://www.cisco.com/go/certifications>. The topics are divided into eight categories:

- Describe how a network works
- Configure, verify, and troubleshoot a switch with VLANs and interswitch communications
- -Implement an IP addressing scheme and IP Services to meet network requirements in a

- medium-size Enterprise branch office network
- Configure, verify, and troubleshoot basic router operation and routing on Cisco devices
- Explain and select the appropriate administrative tasks required for a WLAN
- Identify security threats to a network, and describe general methods to mitigate those threats
- Implement, verify, and troubleshoot NAT and ACLs in a medium-size Enterprise branch office network
- Implement and verify WAN links

The Accessing the WAN course focuses on the third, fifth, sixth, seventh, and eighth topics.

The Study Guide portion of each chapter offers exercises that help you learn the Accessing the WAN concepts as well as the configurations crucial to your success as a CCNA exam candidate. Each chapter is slightly different and includes some or all of the following types of exercises:

- Vocabulary matching and completion
- Skill-building activities and scenarios
- Configuration scenarios
- Concept questions
- Internet research

In the configuration chapters, you'll find many Packet Tracer Activities that work with the Cisco Packet Tracer tool. Packet Tracer allows you to create networks, visualize how packets flow in the network, and use basic testing tools to determine whether the network would work. When you see this icon, you can use Packet Tracer with the listed file to perform a task suggested in this book. The activity files are available on this book's CD-ROM; Packet Tracer software, however, is available through the Academy Connection website. Ask your instructor for access to Packet Tracer.

The Labs and Activities portion of each chapter includes all the online Curriculum Labs, some additional supplemental labs that you can perform with Packet Tracer, and a Packet Tracer Skills Integration Challenge Activity. The Curriculum Labs are divided into three categories:

- **Basic:** The Basic Labs are procedural in nature and assume that you have no experience configuring the technologies that are the topic of the lab.
- **Challenge:** The Challenge Labs cover implementations and assume that you have a firm-enough grasp on the technologies to "go it alone." These labs often give you only a general requirement that you must implement fully without the details of each small step. In other words, you must use the knowledge and skills you gained in the chapter text, activities, and Basic Lab to successfully complete the Challenge Lab. Avoid the temptation to work through the Challenge Lab by flipping back through the Basic Lab when you are unsure of a command. Do not try to short-circuit your CCNA training. You need a deep understanding of CCNA knowledge and skills to ultimately be successful on the CCNA exam.
- **Troubleshooting:** The Troubleshooting Labs ask you to fix a broken network. These labs include corrupted scripts that you purposely load onto the routers. Then you use troubleshooting techniques to isolate problems and implement the solution. By the end of the lab, you should have a functional network with full end-to-end connectivity.

Most of the Hands-on Labs include Packet Tracer Companion Activities, in which you can use Packet Tracer to complete a simulation of the lab.

Each chapter ends with a Packet Tracer Skills Integration Challenge. These activities require you to pull together several skills learned from the chapter—as well as previous chapters and courses—to successfully complete one comprehensive exercise.

A Word About Packet Tracer

Packet Tracer is a self-paced, visual, interactive teaching and learning tool developed by Cisco. Lab activities are an important part of networking education. However, lab equipment can be a scarce resource. Packet Tracer provides a visual simulation of equipment and network processes to offset the challenge of limited equipment. Students can spend as much time as they like completing standard lab exercises through Packet Tracer, and they have the option to work from home. Although Packet Tracer is not a substitute for real equipment, it allows students to practice using a command-line interface. This "e-doing" capability is a fundamental component of learning how to configure routers and switches from the command line.

Packet Tracer version 4.x is available only to Cisco Networking Academies through the Academy Connection website.

How This Book Is Organized

Because the content of this book and the online curriculum is sequential, you should work through this book in order, beginning with Chapter 1.

The book covers the major topic headings in the same sequence as the online curriculum for the CCNA Exploration Accessing the WAN course. This book has eight chapters with the same numbers and names as the online course chapters.

If necessary, a chapter uses a single topology for the exercises in the Study Guide portion. This single topology allows for better continuity and easier understanding of switching commands, operations, and outputs. However, the topology is different from the one used in the online curriculum and the Companion Guide. A different topology affords you the opportunity to practice your knowledge and skills without just simply recording the information you find in the text.

- **Chapter 1, "Introduction to WANs":** The exercises in the Study Guide portion of this chapter focus on LAN design concepts, including vocabulary and the three-layer hierarchical model. The Lab portion of the chapter includes a Basic Lab, a Challenge Lab, a Troubleshooting Lab, and a Packet Tracer Skills Integration Challenge activity.
- **Chapter 2, "PPP":** The exercises in the first part of this chapter help you understand basic Ethernet and switching concepts, including building the MAC address table and collision and broadcast domains. Then the Packet Tracer exercises cover, in detail, how to configure a switch, including basic switch management and configuring switch security. The Lab portion of the chapter includes two Basic Labs, a Challenge Lab, and a Packet Tracer Skills Integration Challenge activity.
- **Chapter 3, "Frame Relay":** The exercises in the first portion of this chapter focus on the concepts of VLANs, including benefits of VLANs and types of VLANs. The exercises then cover VLAN trunking concepts before moving into a section devoted to a VLAN and trunk configuration Packet Tracer exercise. The Lab portion of the chapter includes a Basic Lab, a Challenge Lab, a Troubleshooting Lab, and a Packet Tracer Skills Integration Challenge activity.
- **Chapter 4, "Network Security":** The exercises in this chapter focus on key network security threats, tools, and mitigation techniques for Cisco routers. Configuration practice is provided for router security tasks. The Lab portion of the chapter includes a Basic Lab, a Challenge Lab, a Troubleshooting Lab, and a Packet Tracer Skills Integration Challenge activity.
- **Chapter 5, "ACLs":** Exercises in this chapter focus on the concept of redundant LAN topologies, using STP and its variants to stop loops, and the commands to manipulate root bridge elections. The Lab portion of the chapter includes a Basic Lab, a Challenge Lab, a Troubleshooting Lab, and a Packet Tracer Skills

Integration Challenge activity.

- **Chapter 6, "Teleworker Services"**: This short chapter focuses on how to configure inter-VLAN routing, including two Packet Tracer exercises. The Lab portion of the chapter includes a Basic Lab, a Challenge Lab, a Troubleshooting Lab, and a Packet Tracer Skills Integration Challenge activity.
- **Chapter 7, "IP Addressing Services"**: The exercises in this chapter include several matching term activities, multiple choice questions, fill-in-the-blank exercises, and concept questions that test your knowledge on DHCP and scaling IP addresses with the use of NAT and PAT. It also tests your knowledge of IPv6 and routing using the next generation of RIP. The Lab portion of this chapter includes all the online curriculum labs for DHCP and NAT as well as four additional Packet Tracer activities that test your knowledge and skills in complex configurations using DHCP, Static NAT, PAT, and double NAT. A Packet Tracer Skills Integration Challenge ties all of these concepts together.
- **Chapter 8, "Network Troubleshooting"**: The exercises in this chapter begin with wireless LAN concepts, including standards, operation, and security. The exercises then cover wireless configuration for LAN access using a Linksys WRT300N, including a Packet Tracer exercise. The Lab portion of the chapter includes a Basic Lab, a Challenge Lab, a Troubleshooting Lab, and a Packet Tracer Skills Integration Challenge activity.
- **Appendix, "How to Install SDM"**: Cisco Router and Security Device Manager (SDM) is used in the security labs for this course. This appendix describes and illustrates how to install SDM on a Cisco router or PC.

About the CD-ROM

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You can find updates to these files on this book's website at
<http://www.ciscopress.com/title/9781587132018>.

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