Switching Basics and Intermediate Routing CCNA 3 Labs and Study Guide

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Introduction

Switching Basics and Intermediate Routing CCNA 3 Labs and Study Guides is a supplement to your classroom and laboratory experience with the Cisco Networking Academy Program. Specifically, this book covers the third of four courses. In order to be successful 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 Guides* is just such a collection of tools. Used to its fullest extent, it will help you learn the knowledge as well as practice the skills associated with the content area of v3.1.1 of the CCNA 3 Switching Basics and Intermediate Routing course.

Specifically, this book will help you work on these main areas of CCNA 3:

- Advanced IP addressing techniques (VLSM)
- Routing protocols: RIPv2, single-area OSPF, and EIGRP
- Switching technologies and LAN design
- Switch configurations: security, STP, VLANs, and VTP

Labs and Study Guides similar to this one are also available for the other three courses: *Networking Basics CCNA 1 Labs and Study Guides*, *Routers and Routing Basics CCNA 2 Labs and Study Guides*, and *WAN Technologies CCNA 4 Labs and Study Guides.*

Goals and Methods

The most important goal of this book is to help you prepare for either the CCNA exam (640-801) or the ICND exam (640-811). Whether you are studying for the full exam or the second part of your CCNA, passing either of these exams 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. In fact, if you view the topics for the CCNA exam at http://www.cisco.com/web/learning/le3/current_exams/640-801.html, you will see the following four categories:

- Planning & Designing
- Implementation & Operation
- Troubleshooting
- Technology

Although Technology is listed last, a CCNA student cannot possibly plan, design, implement, operate and troubleshoot networks without first fully grasping the technology. So you need to devote a certain amount of time and effort in the Study Guide section of each chapter learning the concepts and theories before applying them in the Lab Exercises.

The Study Guide section offers exercises that help you learn the concepts and 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
- Journal entries
- Internet research

The Lab Exercises sections include a Command Reference table, all the online Curriculum Labs, and brand-new Comprehensive Labs and Challenge Labs. The Curriculum Labs typically walk you through the configuration tasks step by step. The Comprehensive Labs combine many, if not all, of the configuration tasks of the Curriculum Labs without actually providing you with the commands. The Challenge Labs take this a step further, often only giving you 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 Curriculum Labs to successfully complete the Comprehensive and Challenge Labs. In fact, you should not attempt the Comprehensive or Challenge labs until you have worked through all the Study Guide activities and the Curriculum Labs. When you work through the Comprehensive and Challenge Labs, avoid the temptation to flip back through the Curriculum Labs when you are not sure of a command. Do not try to short-circuit your CCNA training. Study the chapter's topics until you can do the Comprehensive and Challenge Labs without any help. You need a deep understanding of CCNA knowledge and skills to ultimately be successful on the CCNA exam.

How This Book Is Organized

Chapters 1, 2, and 3 cover Intermediate Routing and focus on VLSM and routing configuration. Chapters 4 and 5 cover Switching and Design path and focus on switching technologies and LAN design. Chapters 6, 7, 8 and 9 cover Switching Configuration and focus on basic switching protocols and configurations. Appendix D provides you with three different CCNA 3 Skills-Based Assessment practice labs.

Work through the Study Guide and Lab Exercises in the sequence they are presented. The sequence is designed to take you from a basic understanding of the knowledge through the full application and implementation of skills. Individually, the chapters and appendixes include exercises and labs covering the following knowledge and skills:

Chapter 1, "Introduction to Classless Routing"—Variable-Length Subnet Masking (VLSM) is arguably one of the most challenging skills you must master as a CCNA candidate. Therefore, we spend a great deal of time on this topic. Use the large variety of exercises to solidify your VLSM skills. In the RIPv2 portion of the Study Guide section, you will compare and contrast RIPv1 and RIPv2 and complete an Internet Research exercise. In the Lab Exercises section of this chapter, you will find a Command Reference exercise to help you review all the commands covered in the chapter. The five

Curriculum Labs focus your attention on the configuration tasks covered in the chapter. Two additional labs, a Comprehensive Lab and Challenge Lab, will help you review the commands and skills learned in the Curriculum Labs.

Chapter 2, "Single-Area OSPF"—This chapter has plenty of vocabulary exercises to help you get a firm grasp of OSPF terminology. Additional exercises focus on specific concepts and skills. For example, the DR/BDR Election exercise concentrates on this challenging OSPF topic. Concept questions round out your study of the operation of OSPF. In the Lab Exercises section of this chapter, you will find a Command Reference exercise to help you review all the commands covered in the chapter. The six Curriculum Labs focus your attention on the configuration tasks covered in the chapter. Two additional labs, a Comprehensive Lab and Challenge Lab, will help you review the commands and skills learned in the Curriculum Labs.

Chapter 3, "EIGRP and Troubleshooting Routing Protocols"—This chapter covers the concepts and configurations of Cisco's proprietary Enhanced Interior Gateway Routing Protocol (EIGRP). Exercises cover vocabulary and the EIGRP packet types. In the EIGRP Configuration section, you work through a comprehensive EIGRP configuration exercise. Finally, you work on your troubleshooting skills in the Troubleshooting Routing Protocols section. In the Lab Exercises section of this chapter, you will find a Command Reference exercise to help you review all the commands covered in the chapter. The two Curriculum Labs focus your attention on the configuration tasks covered in the chapter. Two additional labs, a Comprehensive Lab and Challenge Lab, will help you review the commands and skills learned in the Curriculum Labs.

Chapter 4, "Switching Concepts"—This chapter is in many ways a review of concepts you have already learned in previous course work. Therefore in addition to some vocabulary exercises, additional exercises concentrate on a few of the more difficult concepts including CSMA/CD, the MAC address table, collision and broadcast domains, and cabling. There are no Lab Exercises for this chapter.

Chapter 5, "LAN Design and Switches"—This chapter is mostly vocabulary and concepts. The exercises in this chapter ensure you have a firm grasp of the vocabulary and concepts pertaining to LAN design and the Three Layer Hierarchical mode. There are no Lab Exercises for this chapter.

Chapter 6, "Catalyst Switch Configuration"—This chapter includes some vocabulary and a switch LED identification exercises. Most of the Study Guide section is devoted to a basic switch configuration exercise. In the Lab Exercises section of this chapter, you will find a Command Reference exercise to help you review all the commands covered in the chapter. The ten Curriculum Labs focus your attention on the configuration tasks covered in the chapter. A Challenge Lab will help you review the commands and skills you learned in the Curriculum Labs.

Chapter 7, "Spanning Tree Protocol"—This chapter covers the need for redundancy in today's production networks and how the Spanning Tree Protocol avoids switching loops in a redundant configuration. Study Guide exercises include vocabulary, concept questions, determining the root bridge and spanning-tree recalculation. Since commands are limited to configuring the root bridge and verifying STP operation, the Lab Exercises are limited to the two online Curriculum Labs. However, STP configuration and verification commands are used in the Comprehensive and Challenge Labs of both Chapter 8 and Chapter 9.

Chapter 8, "Virtual LANs"—This begins the study of VLANs, which are increasingly becoming more prominent in production networks. Exercises focus on vocabulary, concepts, configuration, and troubleshooting. In the Lab Exercises section of this chapter, you will find a Command Reference exercise to help you review all the commands covered in the chapter. The three Curriculum Labs focus your attention on the configuration tasks covered in the chapter. An additional Challenge Lab combines VLAN configuration with port security (Chapter 6) and STP (Chapter 7).

Chapter 9, "VLAN Trunking Protocol"—This chapter rounds out your CCNA study of VLANs with the VLAN Trunking Protocol. Exercises include vocabulary, concept questions, Internet research and a Journal Entry. Also included are configuration exercises covering trunk configuration, VTP configuration, and inter-VLAN configuration. In the Lab Exercises section of this chapter, you will find a Command Reference exercise to help you review all the commands covered in the chapter. The four Curriculum Labs focus your attention on the configuration tasks covered in the chapter. Two additional labs, a Comprehensive Lab and Challenge Lab, help you review the commands and skills learned in the Curriculum Labs as well as reinforce commands from Chapters 6, 7, and 8.

Appendix A, "Router Interface Summary Chart"—This appendix has a table you can reference for the appropriate IOS interface names to use on Cisco 800, 1600, 1700, 2500 and 2600 series routers.

Appendix B, "Erasing and Reloading the Switch"—Since many of the labs require a clean switch configuration, this appendix includes the procedures you should complete before beginning.

Appendix C, "Erasing and Reloading the Router"—Since many of the labs require a clean router configuration, this appendix includes the procedures you should complete before beginning.

Appendix D, "CCNA 3 Skills-Based Assessment Practice"—This appendix contains three practice labs for the skills-based assessment. The first lab focuses on routing. The second lab focuses on switching. The third lab is comprehensive including most of the commands and configurations you must master as a CCNA 3 student.

TABLE OF CONTENTS

Lab Exercises

Command Reference

Curriculum Lab 1-1: Calculating VLSM Subnets (1.1.4)
Curriculum Lab 1-2: Review of Basic Router Configuration with RIP (1.2.3)
Curriculum Lab 1-3: Converting RIP v1 to RIP v2 (1.2.4)
Curriculum Lab 1-4: Verifying RIP v2 Configuration (1.2.5)
Curriculum Lab 1-5: Troubleshooting RIP v2 using debug (1.2.6)

Comprehensive Lab 1-6: Default Routing and RIPv2

Challenge Lab 1-7: VLSM Design, RIPv2, and Default Routing

CHAPTER 2 Single-Area OSPF

Study Guide

Link-State Routing Protocol
- Vocabulary Exercise: Matching
- Vocabulary Exercise: Completion
- Compare and Contrast Exercise
- Concept Questions
- Journal Entry

Single-Area OSPF Concepts
- Vocabulary Exercise: Completion
- Build the Loop-Free Topology

Single-Area OSPF Configuration
- Learn the OSPF Commands Exercise
- DR/BDR Election Exercise
- Journal Entry

Lab Exercises

Command Reference

Curriculum Lab 2-1: Configuring the OSPF Routing Process (2.3.1)
Curriculum Lab 2-2: Configuring OSPF with Loopback Addresses (2.3.2)
Curriculum Lab 2-3: Modifying OSPF Cost Metric (2.3.3)
Curriculum Lab 2-4: Configuring OSPF Authentication (2.3.4)
Curriculum Lab 2-5: Configuring OSPF Timers (2.3.5)
Curriculum Lab 2-6: Propagating Default Routes in an OSPF Domain (2.3.6)

Comprehensive Lab 2-7: OSPF Configuration

Challenge Lab 2-8: OSPF Design and Configuration

CHAPTER 3 EIGRP

Study Guide

EIGRP Concepts
- Vocabulary Exercise: Matching
- Vocabulary Exercise: Completion
- EIGRP Packet Type Exercise

EIGRP Configuration
- d)Learn the EIGRP Commands Exercise

Troubleshooting Routing Protocols
- The Problem Solving Cycle
- Troubleshooting RIP
- Troubleshooting EIGRP
- Troubleshooting OSPF
- Internet Research

Lab Exercises

Command Reference

Curriculum Lab 3-1: Configuring EIGRP Routing (3.2.1)
Curriculum Lab 3-2: Verifying Basic EIGRP Configuration (3.2.3)

Comprehensive Lab 3-3: Comprehensive EIGRP Configuration

Challenge Lab 3-4: EIGRP Design and Configuration

CHAPTER 4 Switching Concepts

Study Guide

Introduction to Ethernet/802.3 LANs
- Vocabulary Exercise: Matching
- Vocabulary Exercise: Completion
- CSMA/CD Process Flow Chart Exercise
- Concept Questions
- Journal Entry

Introduction to LAN Switching
- Vocabulary Exercise: Completion
- Building the MAC Address Table Exercise
- Concept Questions
- Journal Entry

Switch Operation
- Vocabulary Exercise: Completion
- Collision and Broadcast Domains Exercise
- Choose the Correct Cable Exercise

Lab Exercises

There are no Lab Exercises for this chapter.

CHAPTER 5 Switches

Study Guide

LAN Design
- Vocabulary Exercise: Matching
- Vocabulary Exercise: Completion
- Concept Questions

LAN Switches
- Vocabulary Exercise: Completion
- Three Layer Hierarchical Model Exercise
- Concept Questions

Lab Exercises

There are no Lab Exercises for this chapter.

CHAPTER 6 Switch Configuration

Study Guide

Starting the Switch
- Vocabulary Exercise
- Switch LED Identification Exercise
- Concept Questions

Configuring the Switch
- Learn Basic Switch Commands Exercise

Lab Exercises

Command Reference

Curriculum Lab 6-1: Verifying Default Switch Configuration (6.2.1)
Curriculum Lab 6-2: Basic Switch Configuration (6.2.2)
Curriculum Lab 6-3: Managing the MAC Address Table (6.2.3)
Curriculum Lab 6-4: Configuring Static MAC Addresses (6.2.4)
Curriculum Lab 6-5: Configuring Port Security (6.2.5)
Curriculum Lab 6-6: Add, Move, and Change MAC Addresses (6.2.6)
Curriculum Lab 6-7: Managing Switch Operating System Files (6.2.7a)
Curriculum Lab 6-8: Managing Switch Startup Configuration Files (6.2.7b)
Curriculum Lab 6-9: Password Recovery Procedure on a Catalyst 2900 Series Switch (6.2.8)
Curriculum Lab 6-10: Firmware Upgrade of a Catalyst 2950 Series Switch (6.2.9)

Challenge Lab 6-11: Basic Switch Configuration with Port Security

CHAPTER 7 Spanning-Tree Protocol

Study Guide

Redundant Topologies

About the Author

Allan Johnson entered the academic world in 1999 after ten years as a business owner/operator to dedicate his efforts to his passion for teaching. He has an M.B.A. and a M.Ed. in occupational training and development. Allan is currently pursuing an M.S. in information security. He is an information technology instructor at Mary Carroll High School and Del Mar College in Corpus Christi, TX. Since 2003, Allan has committed much of his time and energy to the CCNA Instructional Support Team, providing services for instructors worldwide and creating training materials. He is a familiar voice on the Cisco Networking Academy Community forum "Ask the Experts" series. He currently holds CCNA and CCAI certifications.

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