Introduction

Welcome to CCNA! Recently Cisco Press came to me and told me, albeit very quietly, that there was going to be some changes made to the CCNA certification exam, and asked whether I would be interested in updating my *CCNA Portable Command Guide* for release around the time of the announcement of the new exam. I was already working on the various command guides for the new CCNP certification exams, but I felt that a revision wouldn't take a lot of time, as hopefully there would still be a lot of concepts that hadn't changed.

I have long been a fan of what I call the "Engineering Journal"—a small notebook that can be carried around and that contains little nuggets of information—commands that you forget, the IP addressing scheme of some remote part of the network, little reminders about how to do something you only have to do once or twice a year (but is vital to the integrity and maintenance of your network). This journal has been a constant companion by my side for the past eight years; I only teach some of these concepts every second or third year, so I constantly need to refresh commands and concepts and learn new commands and ideas as they are released by Cisco. My journals were the best way for me to review because they were written in my own words—words that I could understand. At least, I had better understand them, because if I didn't, I had only myself to blame.

The journals that I would create for my Academy classes would always be different from the journals I would create when I was teaching from a different curriculum or if I was out in the industry working on some production network. I could understand that the Academy needed to split topics into smaller, more manageable chunks, but for me out in the real world, I needed these concepts to follow a different approach—I needed all the routing protocols together in one place in my journals, and not spread across some two-year outline of knowledge.

This book is my "Industry" edition of the Engineering Journal. It contains a different logical flow to the topics, one more suited to someone working in the field. Like topics are grouped together: routing protocols, switches, troubleshooting. More-complex examples are given. New topics have been added, such as IPv6, wireless, and the Security Device Manager (SDM). The popular "Create Your Own Journal" appendix is still here—blank pages for you to add in your own commands that you need in your specific job. We all recognize the fact that no network administrator's job can be so easily pigeonholed as to being just working with CCNA topics—you all have your own specific jobs and duties assigned to you. That is why you will find those blank pages at the end of the book—make this book your own; personalize it with what you need to make it more effective. That way your journal will not look like mine.

The Cisco Networking Academy Program and This Guide

The first book that I ever published for Cisco Press was a command guide that was specially designed to follow the Cisco Networking Academy Program curriculum. The *CCNA Command Quick Reference* was released in 2005 and was organized in such a way that if you were working on CCNA 3, Chapter 8 in the online curriculum, the commands for that chapter were in Part 3, Chapter 8 of that book. However, the Cisco Networking Academy Program has now released two different *flavors* of the Academy curriculum: CCNA

Discovery and CCNA Exploration. The two courses take decidedly different paths in their delivery of content, but they both end up at the same destination—a place where a student completing either set of courses is ready to take the CCNA certification exam. Because there is such a variety in how the courses teach content, Cisco Press believed that creating two books for the Cisco Academy would not be viable, because most of the content would be the same, just in a different order. Therefore, this book can be used with either CCNA Discovery or CCNA Exploration. A quick perusal of the table of contents, or the inside back cover (where I have my "What Do You Want to Do?" list of the more commonly asked questions), should take you to the section with the command(s) that you are looking for. There is even a section in Chapter 15, "Implementing a Wireless LAN," that deals with topics that are only presented in the Academy curriculum—provisioning a Linksys wireless access point and wireless client card. This topic is not covered on the certification exam, but it is part of the Academy courseware, so I have included it in this book, too.

Networking Devices Used in the Preparation of This Book

To verify the commands in this book, I had to try them out on a few different devices. The following is a list of the equipment I used when writing this book:

- C2620 router running Cisco IOS Software Release 12.3(7)T, with a fixed Fast Ethernet interface, a WIC-2A/S serial interface card, and an NM-1E Ethernet interface
- C2821 ISR with PVDM2, CMME, a WIC-2T, FXS and FXO VICs, running 12.4(10a) IPBase IOS
- WS-C2960-24TT-L Catalyst Switch, running 12.2(25)SE IOS
- WS-C2950-12 Catalyst switch, running version C2950-C3.0(5.3)WC(1) Enterprise Edition software

These devices were not running the latest and greatest versions of Cisco IOS Software. Some of it is quite old.

Those of you familiar with Cisco devices will recognize that a majority of these commands work across the entire range of the Cisco product line. These commands are not limited to the platforms and Cisco IOS Software versions listed. In fact, these devices are in most cases adequate for someone to continue his or her studies into the CCNP level, too.

Private Addressing Used in this Book

This book makes use of RFC 1918 addressing throughout. Because I do not have permission to use public addresses in my examples, I have done everything with private addressing. Private addressing is perfect for use in a lab environment or in a testing situation, because it works exactly like public addressing, with the exception that it cannot be routed across a public network. That is why you will see private addresses in my WAN links between two routers using serial connections, or in my Frame Relay cloud.

Who Should Read This Book

This book is for those people preparing for the CCNA exam, whether through self-study, on-the-job training and practice, or even through study within the Cisco Networking

Academy Program. There are also some handy hints and tips along the way to hopefully make life a bit easier for you in this endeavor. It is small enough that you will find it easy to carry around with you. Big, heavy textbooks might look impressive on your bookshelf in your office, but can you really carry them all around with you when you are working in some server room or equipment closet somewhere?

Optional Sections

A few sections in this book have been marked as "Optional." These sections cover topics that are not on the CCNA certification exam, but they are valuable topics that I believe should be known by someone at a CCNA level. Some of the optional topics might also be concepts that are covered in the Cisco Networking Academy Program courses, either the CCNA Discovery or the CCNA Exploration segments.

Organization of This Book

This book follows what I think is a logical approach to configuring a small to mid-size network. It is an approach that I give to my students when they invariably ask for some sort of outline to plan and then configure a network. Specifically, this approach is as follows:

- Part I: TCP/IP Version 4

    — **Chapter 1, "How to Subnet"**—An overview of how to subnet, examples of subnetting (both a Class B and a Class C address), the use of the binary AND operation, the Enhanced Bob Maneuver to Subnetting

    — **Chapter 2, "VLSM"**—An overview of VLSM, an example of using VLSM to make your IP plan more efficient

    — **Chapter 3, "Route Summarization"**—Using route summarization to make your routing updates more efficient, an example of how to summarize a network, necessary requirements for summarizing your network

- Part II: Introduction to Cisco Devices

    — **Chapter 4, "Cables and Connections"**—An overview of how to connect to Cisco devices, which cables to use for which interfaces, and the differences between the TIA/EIA 568A and 568B wiring standards for UTP

    — **Chapter 5, "The Command-Line Interface"**—How to navigate through Cisco IOS Software: editing commands, keyboard shortcuts, and help commands

- Part III: Configuring a Router

    — **Chapter 6, "Configuring a Single Cisco Router"**—Commands needed to configure a single router: names, passwords, configuring interfaces, MOTD and login banners, IP host tables, saving and erasing your configurations

- Part IV: Routing
    - **Chapter 7, "Static Routing"**—Configuring static routes in your internetwork
    - **Chapter 8, "RIP"**—Configuring and verifying RIPv2, how to see and clear your routing table
    - **Chapter 9, "EIGRP"**—Configuring and verifying EIGRP
    - **Chapter 10, "Single Area OSPF"**—Configuring and verifying Single Area OSPF
- Part V: Switching
    - **Chapter 11, "Configuring a Switch"**—Commands to configure Catalyst 2960 switches: names, passwords, IP addresses, default gateways, port speed and duplex; configuring static MAC addresses; managing the MAC address table; port security
    - **Chapter 12, "VLANs"**—Configuring static VLANs, troubleshooting VLANs, saving and deleting VLAN information.
    - **Chapter 13, "VLAN Trunking Protocol and Inter-VLAN Communication"**—Configuring a VLAN trunk link, configuring VTP, verifying VTP, inter-VLAN communication, router-on-a-stick, and subinterfaces
    - **Chapter 14, "STP and EtherChannel"**—Verifying STP, setting switch priorities, and creating and verifying EtherChannel groups between switches
- Part VI: Extending the LAN
    - **Chapter 15, "Implementing a Wireless LAN"**—Configuring a Linksys wireless access point, configuring a Linksys wireless client card
- Part VII: Network Administration and Troubleshooting
    - **Chapter 16, "Backing Up and Restoring Cisco IOS Software and Configurations"**—Boot commands for Cisco IOS Software, backing up and restoring Cisco IOS Software using TFTP, Xmodem, and ROMmon environmental variables
    - **Chapter 17, "Password-Recovery Procedures and the Configuration Register"**—The configuration register, password-recovery procedure for routers and switches
    - **Chapter 18, "Cisco Discovery Protocol (CDP)"**—Customizing and verifying CDP
    - **Chapter 19, "Telnet and SSH"**—Commands used for Telnet and SSH to remotely connect to other devices
    - **Chapter 20, "The ping and traceroute Commands"**—Commands for both **ping** and extended **ping**; the **traceroute** command
    - **Chapter 21, "SNMP and Syslog"**—Configuring SNMP, working with syslog

Did I Miss Anything?

I am always interested to hear how my students, and now readers of my books, do on both certification exams and future studies. If you would like to contact me and let me know how this book helped you in your certification goals, please do so. Did I miss anything? Let me know. My e-mail address is ccnaguide@empson.ca.