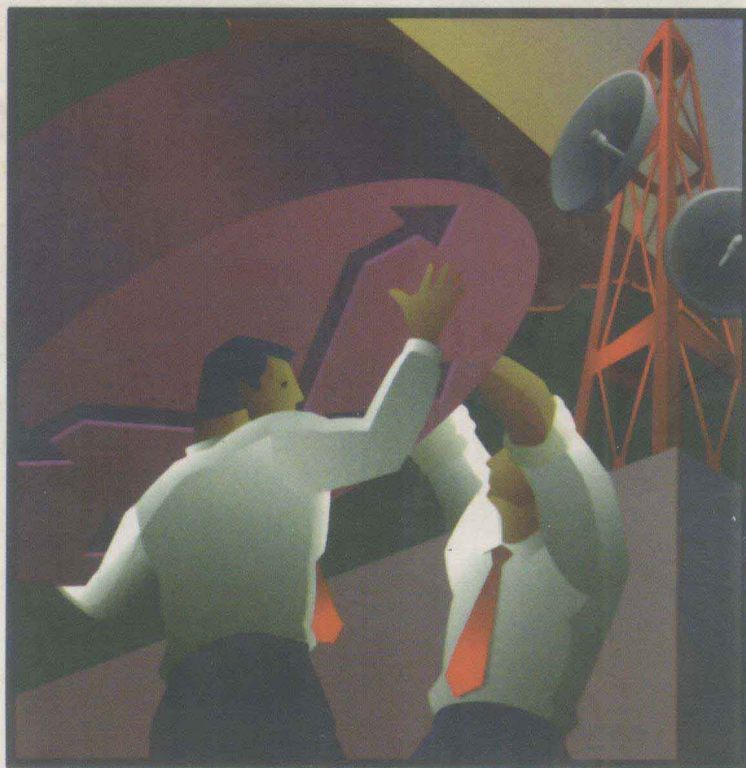


CISCO系列丛书（影印版）
CISCO CERTIFIED INTERNETWORK EXPERT



Jeff Doyle

A detailed examination of interior routing protocols

CCIE PROFESSIONAL DEVELOPMENT:
ROUTING TCP/IP
VOLUME I

TCP/IP路由技术
卷 I

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CCIE Professional Development:

Routing TCP/IP, Volume I

TCP/IP 路由技术, 卷 I

Jeff Doyle

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CCIE Professional Development: Routing TCP/IP, Volume I

Jeff Doyle

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出版前言

21 世纪将会是一个信息高速公路四通八达的时代,信息产业发展的水平亦将是评估一个国家综合国力的重要依据。世界各国将会在信息技术的研究开发和信息产业的发展方面展开激烈的竞争。这既是一种挑战也是一种机遇。有鉴于此,我国已经开始全面快速地发展网络技术和因特网。

Cisco Systems 公司是世界领先的全球 Internet, Intranet 以及电信网络设备及解决方案的供应商,1996 年名列世界十大电信公司之一。Cisco Systems 的联网操作系统(IOS)是支持网络服务和网络应用的坚实基础。该公司与麦克米伦计算机出版公司合作创立了 Cisco Press,出版了一系列关于最新的网络技术的权威著作。这些著作不仅兼顾建网与网际互联的基础理论和实际应用,为网络专业人员和用户提供必要的技术支持,还有一部分是为 Cisco CCIE 考试和 CCNA,CCNP,CCDA 及 CCDP 职业考试认证准备的自学和培训教材。Cisco 公司早于 1994 年就进入中国,已为国内信息产业界所熟悉。我们引进其中部分著作组成“CISCO 系列丛书(影印版)”影印出版,以祈对我国信息产业的发展稍尽绵薄之力,并衷心希望这套丛书对从事建网,网际互联的专业人员;有志于我国信息产业发展的读者,以及参加 Cisco 培训和准备 Cisco 考试认证的人员有所裨益。

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Dedications

This book would not have been possible without the concerted efforts of many dedicated people. I would like to thank the following people for their contributions:

First, thanks to Laurie McGuire, development editor, who not only improved the book but improved me as a writer.

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Introduction

Routing is an essential element of all but the smallest data communications networks. At one level, routing and the configuration of routers are quite simple. But as internetworks grow in size and complexity, routing issues can become at once both large and subtle. Perversely, perhaps, I am grateful for the difficult problems large-scale routing can present—as a network systems consultant, these problems are my bread and butter. Without them, the phrase “You want fries with that?” could be an unfortunate part of my daily vocabulary.

Cisco Certified Internetwork Experts are widely recognized for their ability to design, troubleshoot, and manage large internetworks. This recognition comes from the fact that you cannot become a CCIE by attending a few classes and then regurgitating some memorized facts onto a written test. A CCIE has proven his or her expertise in an intense, famously difficult hands-on lab exam.

OBJECTIVES

This book is the first in a series designed to aid you in becoming a Cisco Certified Internetwork Expert and the first of two volumes that focuses on TCP/IP routing issues. Early in the project, Kim Lew, Cisco Systems program manager, said, “Our objective is to make CCIEs, not to make people who can pass the CCIE lab.” I entirely

agree with that statement and have used it as a guiding principle throughout the writing of this book. Although the book includes many case studies and exercises to help you prepare for the CCIE lab, my primary objective is to increase your understanding of IP routing—both on a generic level and as it is implemented on Cisco routers.

AUDIENCE

The audience for this book is any network designer, administrator, or engineer who needs a full understanding of the interior routing protocols of TCP/IP. Although the practical aspects of the book focus on Cisco's IOS, the information is applicable to any routing platform.

The book is not only for readers who plan to become Cisco Certified Internetwork Experts, but for anyone who wishes to advance his or her knowledge of TCP/IP routing. These readers will fall into one of three categories:

- The “beginner” who has some basic networking knowledge and wishes to begin a deep study of internetworking
- The intermediate-level networking professional who has experience with routers, Cisco or otherwise, and plans to advance that experience to the expert level
- The highly experienced networking expert. This individual has extensive hands-on expertise with Cisco routers and is ready to take the CCIE lab; however, he or she wants a structured review and series of exercises for verification and validation.

CCIE Professional Development: Routing TCP/IP, Volume I focuses primarily on the intermediate-level networking professional while offering to the beginner a structured outline of fundamental information and to the expert the required challenges to hone his or her skills.

ORGANIZATION

The fourteen chapters of the book are divided into three parts.

Part I examines the basics of networks and routing. Although more advanced readers may wish to skip the first two chapters, I recommend that they at least skim Chapter 3, “Static Routing,” and Chapter 4, “Dynamic Routing Protocols.”

Part II covers the TCP/IP Interior Gateway Protocols. Each protocol-specific chapter begins with a discussion of the mechanics and parameters of the protocol. This general overview is followed by case studies on configuring and troubleshooting the protocol on Cisco routers in various network topologies.

The Exterior Gateway Protocols, as well as such topics as multicast routing, Quality of Service routing, router security and management, and routing IPv6 will be covered in Volume II.

Part III examines the tools available for creating and managing interoperability with multiple IP routing protocols, as well as such tools as default routes and route filtering. These chapters, like the ones in Part II, begin with concepts and conclude with case studies.

CONVENTIONS AND FEATURES

Most chapters conclude with a set of review questions, configuration exercises, and troubleshooting exercises. The review questions focus on the theoretical aspects of the chapter topic, whereas the configuration and troubleshooting exercises address Cisco-specific aspects of the chapter topic.

Also at the end of each chapter is a table with a brief description of all important Cisco IOS commands used in that chapter. The conventions used to present these commands are the same conventions used in the IOS Command Reference. The Command Reference describes these conventions as follows:

- Vertical bars (|) separate alternative, mutually exclusive, elements.
- Square brackets [] indicate optional elements.
- Braces {} indicate a required choice.
- Braces within square brackets [{}] indicate a required choice within an optional element.
- **Boldface** indicates commands and keywords that are entered literally as shown.
- *Italics* indicate arguments for which you supply values.

Important concepts are called out in margin notes for quick reference.

Figure I.1 shows the conventions used in the illustrations throughout the book.

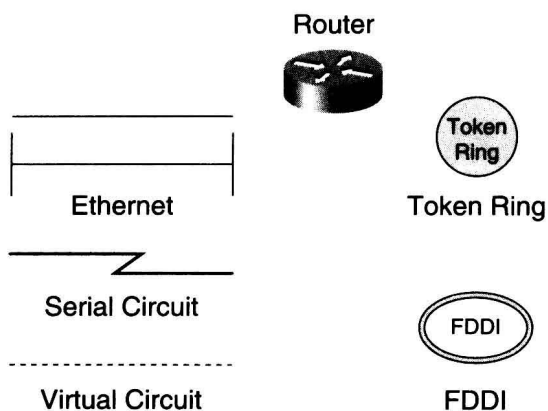


Figure 0.1

Illustration conventions used in this book.

All protocol analyzer displays shown in the book are taken from a Wandel & Goltermann DA-320 DominoLAN Internetwork Analyzer.

Table of Contents

Introduction xxiv

Objectives xxv

Audience xxvi

Organization xxvii

Conventions and Features xxviii

Foreword 1

Part I Routing Basics 3

Chapter 1 Basic Concepts: Internetworks, Routers, and Addresses 4

Bicycles with Motors 6

Data Link Addresses 7

Repeaters and Bridges 11

Routers 18

Network Addresses 22

Looking Ahead 25

Recommended Reading 25

Review Questions 26

Chapter 2 TCP/IP Review 28

The TCP/IP Protocol Layers 29

The IP Packet Header 32

IP Addresses 40

The First Octet Rule 45

Address Masks 48

Subnets and Subnet Masks 51

Designing Subnets 55

Breaking the Octet Boundary 57

Troubleshooting a Subnet Mask 62

ARP 63

Proxy ARP 69

Gratuitous ARP 72

Reverse ARP 72

ICMP 73

The Host-to-Host Layer 78

TCP 78

UDP 83

Looking Ahead 84

Summary Table: Chapter 2 Command Review 85

Recommended Reading 85

Review Questions 86

Configuration Exercises 87

Troubleshooting Exercises 88

Chapter 3 Static Routing 90

The Route Table 92

Configuring Static Routes 97

Case Study: Simple Static Routes 97

Case Study: Summary Routes 101

Case Study: Alternative Routes 103

Case Study: Floating Static Routes 105

Case Study: Load Sharing	109
Per Destination Load Sharing and Fast Switching	110
Per Packet Load Sharing and Process Switching	111
Case Study: Recursive Table Lookups	113
Troubleshooting Static Routes	114
Case Study: Tracing a Failed Route	115
Case Study: A Protocol Conflict	121
Looking Ahead	126
Summary Table: Chapter 3 Command Review	126
Review Questions	127
Configuration Exercises	128
Troubleshooting Exercises	130

Chapter 4 Dynamic Routing Protocols 136

Routing Protocol Basics	138
Path Determination	138
Metrics	141
Hop Count	142
Bandwidth	142
Load	143
Delay	143
Reliability	143
Cost	144
Convergence	144
Load Balancing	146
Distance Vector Routing Protocols	146
Common Characteristics	148
Periodic Updates	148
Neighbors	148
Broadcast Updates	148
Full Routing Table Updates	149