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TCP/IP 路由技术

(第一卷)(英文版)

Routing TCP/IP

Volume I

A detailed examination of interior routing protocols

[美] Jeff Doyle, CCIE #1919 著

 人民邮电出版社
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内容提要

本书是第一本详细而又完整地介绍互联网内部网关路由选择协议（IGRP）的专业书籍，堪称有关 IGRP 方面不可多得的经典之作。本书共分三个部分。第一部分主要介绍了网络和路由选择的基本知识，对 TCP/IP 和静态、动态路由选择技术作了一个整体的回顾。第二部分是本书的精华，这一部分详细深入地讲述了各种常用的内部网关路由选择协议，如静态路由、RIP、RIPv2、IGRP、EIGRP、OSPF、ISIS 等，每一章除了对该协议的实现机制和参数详尽阐述，使读者对协议的实现原理有一个清晰的理解外，还通过在实际网络环境中的实例，详细地论述了该协议在 Cisco 路由器上的配置和故障处理方法，使读者获取大量解决实际问题的专业技能。第三部分介绍了如缺省路由、路由过滤等多种有效的路由控制工具，用来创建和管理多个 IP 路由选择协议的协调工作。

本书不仅适合那些需要准备通过 CCIE 考试的考生，而且也适合任何需要完整理解 TCP/IP 内部路由选择协议的网络设计和工程人员阅读。本书中对协议细节的讲解和对网络实例的探讨相信会让读者受益匪浅。

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.

Thanks to Jenny DeHaven Carroll and Mike Tibodeau for their careful technical editing. I would also like to thank the following people, who provided technical advice or reviews on selected sections of the book: Howard Berkowitz, Dave Katz, Burjiz Pithawala, Mikel Ravizza, Russ White, and Man-Kit Yueng.

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Finally, I want to thank my wife, Sara, and my children: Anna, Carol, James, and Katherine. Their patience, encouragement, and support were critical to the completion of this book.

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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 internet-working
- 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.

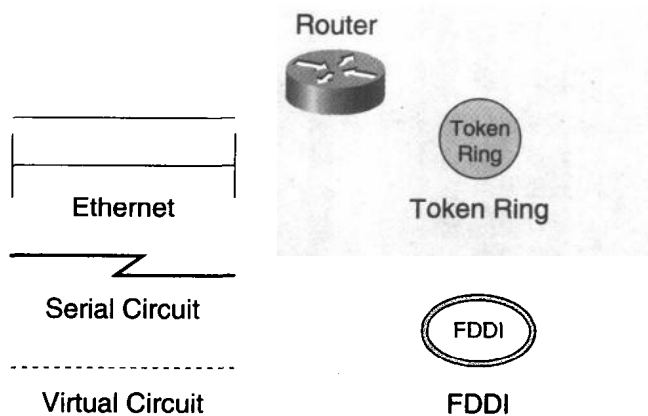


Figure 0.1

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.

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