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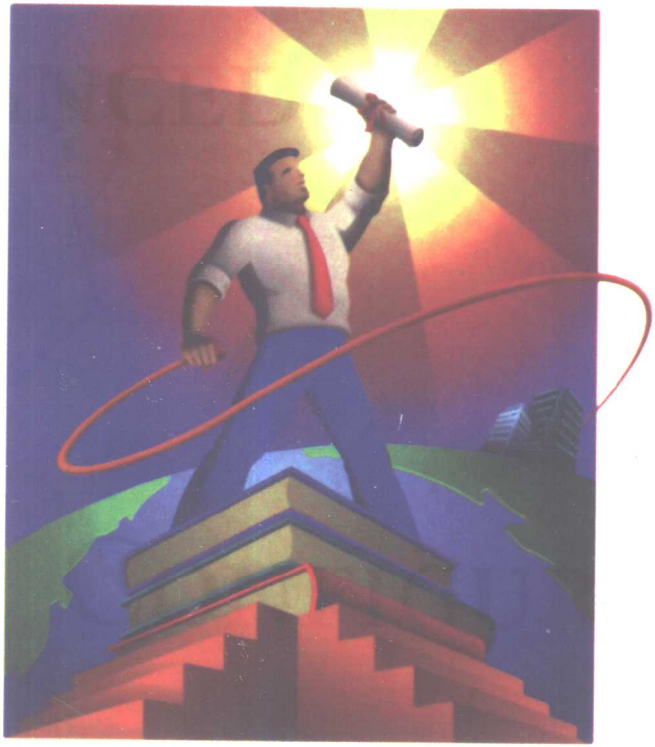

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ADVANCED CISCO ROUTER CONFIGURATION

Cisco高级路由器配置技术

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Advanced Cisco Router Configuration

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(京)新登字 158 号

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书　名:Cisco 高级路由器配置技术
作　者:Laura Chappell, Editor
出版者:清华大学出版社(北京清华大学学研楼,邮编 100084)
　　http://www.tup.tsinghua.edu.cn
印刷者:清华大学印刷厂
发行者:新华书店总店北京发行所
开　本:787×960 1/16　印张:42
版　次:2000 年 1 月第 1 版　2000 年 1 月第 1 次印刷
书　号:ISBN 7-302-01094-3/TP·2211
印　数:0001～5000
定　价:58.00 元

Introduction

With the dramatic increase in network size and complexity, harnessing the power and potential of internetworking devices becomes essential to ensuring the health and longevity of the network. As the premier internetworking company, Cisco understands how internetworking device configurations affect network performance.

This book is designed, structured, and written based on Cisco's highly successful "Advanced Cisco Router Configuration" course, which is offered worldwide and is considered one of the premier courses on internetworking LANs and WANs using Cisco routers. This book is the follow-up work to the Cisco Press title *Introduction to Cisco Router Configuration.*

This book provides details on how to manage traffic and network access for the most popular internetworking protocols today, such as TCP/IP and Novell's IPX/SPX. You'll learn the difference between link-state and distance vector routing protocols and decide which routing method is best suited in various configurations. This book also focuses on WAN configurations and the methods for controlling WAN traffic and ensuring access security.

Each chapter ends with a test to evaluate your understanding of the concepts in each of the chapters and your ability to apply the configuration techniques available for Cisco routers.

WHO SHOULD READ THIS BOOK

This book contains a broad range of technical details on routing protocols, configurations, access methods, security, traffic control, and management. As an advanced title, this book can be used as a general reference for anyone designing, implementing, or supporting an internetwork with TCP/IP or IPX/SPX over a LAN or WAN. As well, this book provides in-depth study for Cisco certification candidates who are studying for their ACRC exams.

Even if you're not using Cisco routers, this book can increase your awareness of the underlying technologies affecting network communications and security and provide you with the simple rules for defining internetworking configurations.

VERSION INFORMATION

This book is based on the Cisco "Advanced Cisco Router Configuration" course which covers IOS v11.3. Although some references are made to earlier versions of IOS, the examples shown throughout this course are based on IOS v11.3. For more information on Cisco router configuration options and commands, refer to the Cisco documentation maintained online at www.cisco.com.

PART I: OVERVIEW OF SCALEABLE INTERNETWORKS

This section provides the foundation knowledge required to characterize scalable networks.

Chapter 1, "Overview of Scalable Internetworks," examines the three levels of internetworking that connects the local offices with the corporate backbone and campus internetwork. Readers are provided with the configuration considerations that should be taken into account when setting up internetworking devices.

PART II: INTRODUCTION TO MANAGING TRAFFIC AND ACCESS

This section examines the elements of internetwork traffic and access that should be considered when configuring network devices. It will examine the two most popular network protocols, TCP/IP and IPX/SPX, to see how network access should be managed.

Chapter 2, "Introduction to Managing Traffic and Congestion," focuses on network congestion and access control. In this chapter, you'll learn the affects of network congestion and how to reduce the drain on network bandwidth and device resources by controlling network traffic.

Chapter 3, "Managing IP Traffic," looks specifically at IP traffic patterns and the methods used to control the IP traffic patterns. Standard and extended IP access lists, virtual terminal restrictions, and helper addresses are defined and used as examples and options to help preserve precious network bandwidth.

Chapter 4, "Managing Novell IPX/SPX Traffic," delves into the specific methods available for managing NetWare's IPX/SPX traffic. Traffic filtering, IP tunneling, and access lists are shown as possible traffic management methods.

Chapter 5, "Configuring Queuing to Manage Traffic," defines how to provide Quality of Service (QOS) traffic flows through traffic prioritization. This chapter defines weighted fair queuing, priority queuing, and custom queuing techniques.

PART III: CONFIGURING SCALABLE ROUTING PROTOCOLS

This section will focus on the actual steps required to configure scaleable routing protocols such as OSPF and IGRP. It will examine the basic characteristics of a scalable routing protocol and explain how to extend IP addressing using variable-length subnet masking and configure OSPF routers within a single area or to interconnnect multiple areas. Finally, we examine Cisco's IGRP routing protocol as another option for scalable routing.

Chapter 6, "Routing Protocol Overview," defines the fundamentals of routing protocols and a provides a brief comparison between common routing protocols.

Chapter 7, "Extending IP Addresses Using VLSMs (Variable-Length Subnet Masks)," lists some of the issues that occur with restrictive IP addresses and the methods used to extend IP addresses using variable-length subnet masks. This chapter will look at several sample network configurations to see how these VLSMs help resolve IP addressing problems.

Chapter 8, "Configuring OSPF in a Single Area," examines the basic design of OSPF routing and provides details on how to configure OSPF within a single area. Finally, this chapter provides details on verifying OSPF configurations.

Chapter 9, "Interconnecting Multiple OSPF Areas," defines how to create multiple OSPF areas and configure OSPF operations across multiple areas. Finally, you'll learn how to verify and validate your OSPF configuration.

Chapter 10, "Configuring Enhanced IGRP," examines the advantages and uses of enhanced IGRP, as well as the configuration and verification of EIGRP configurations.

Chapter 11, "Optimizing Routing Update Operation," focuses on how to control routing update traffic and mixing routing protocols on a single network segment. This chapter also defines routing information redistribution techniques.

Chapter 12, "Connecting Enterprises to an Internet Service Provider," shows how Cisco BGP can be used to connect an internetwork to the Internet.

PART IV: CONFIGURING DIALUP CONNECTIVITY

This section focuses on various WAN connectivity options and encapsulation protocols. It will look at how to configure ISDN dial-on demand routing and PPP connections and multilink PPP connections.

Chapter 13, "WAN Connectivity Overview," will look at encapsulation methods for providing single-protocol WAN communications.

Chapter 14, "Configuring Dial-on Demand Routing," defines the elements of ISDN communication and how DDR routing is configured. It will also look at dialer profiles as a method of customizing ISDN connections.

Chapter 15, "Customizing DDR Operation," defines methods to change the default operation of DDR links including multilink PPP configuration and setting up snapshot routing. This section also details options available for IPX DDR routing.

PART V: INTEGRATING NONROUTED SERVICES

This section moves down the OSI stack to the data link layer by providing details on bridging operations and configurations. It examines transparent and source-route bridging operations and internetwork designs.

Chapter 16, "Bridging Overview," provides the technical details of bridging and routing functionality and defines when one operations is preferred over the other.

Chapter 17, "Configuring Transparent Bridging and Integrated Routing and Bridging," covers simple transparent bridging operations and how to set up a hybrid type of device that can perform bridging and routing simultaneously.

Chapter 18, "Configuring Source-Route Bridging," examines the operations of source routing and defines how to verify current SRB configurations.

APPENDIXES

The appendixes include the chapter test answer key and details on managing AppleTalk traffic, configuring NLSP (NetWare Link Services Protocol), T1/E1 and ISDN options, and an SMDS configuration overview. A comprehensive glossary is also included for your reference.

COMMAND CONVENTIONS

The conventions used to present commands in this book 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.

Commands that are too long to fit on one line in the book are shown with an indented second line:

```
access-list access-list-number {permit | deny} protocol source source-wildcard
    destination destination-wildcard [log]
```

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