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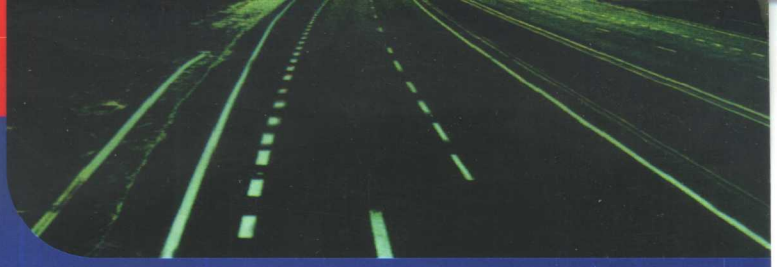

CCNP Cisco LAN Switch Configuration Study Guide

(EXAM 640-404)

CCNP学习指南：

Cisco

（英文版）

局域网交换配置技术

(美) Syngress Media 公司 著

机械工业出版社
China Machine Press

OSBORNE

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FOREWORD

From Global Knowledge

At Global Knowledge we strive to support the multiplicity of learning styles required by our students to achieve success as technical professionals. In this series of books, it is our intention to offer the reader a valuable tool for successful completion of the CCNP Certification Exam.

As the world's largest IT training company, Global Knowledge is uniquely positioned to offer these books. The expertise gained each year from providing instructor-led training to hundreds of thousands of students worldwide has been captured in book form to enhance your learning experience. We hope that the quality of these books demonstrates our commitment to your lifelong learning success. Whether you choose to learn through the written word, computer-based training, Web delivery, or instructor-led training, Global Knowledge is committed to providing you the very best in each of those categories. For those of you who know Global Knowledge, or those of you who have just found us for the first time, our goal is to be your lifelong competency partner.

Thank you for the opportunity to serve you. We look forward to serving your needs again in the future.

Warmest regards,

Duncan Anderson
President and Chief Executive Officer, Global Knowledge

The Global Knowledge Advantage

Global Knowledge has a global delivery system for its products and services. The company has 28 subsidiaries, and offers its programs through a total of 60+ locations. No other vendor can provide consistent services across a geographic area this large. Global Knowledge is the largest independent information technology education provider, offering programs on a variety of platforms. This enables our multi-platform and multi-national customers to obtain all of their programs from a single vendor. The company has developed the unique CompetusTM Framework software tool and methodology which can quickly reconfigure courseware to the proficiency level of a student on an interactive basis. Combined with self-paced and on-line programs, this technology can reduce the time required for training by prescribing content in only the deficient skills areas. The company has fully automated every aspect of the education process, from registration and follow-up, to "just-in-time" production of courseware. Global Knowledge, through its Enterprise Services Consultancy, can customize programs and products to suit the needs of an individual customer.

Global Knowledge Classroom Education Programs

The backbone of our delivery options is classroom-based education. Our modern, well-equipped facilities staffed with the finest instructors offer programs in a wide variety of information technology topics, many of which lead to professional certifications.

Custom Learning Solutions

This delivery option has been created for companies and governments that value customized learning solutions. For them, our consultancy-based approach of developing targeted education solutions is most effective at helping them meet specific objectives.

Self-Paced and Multimedia Products

This delivery option offers self-paced program titles in interactive CD-ROM, videotape and audio tape programs. In addition, we offer custom development of interactive multimedia courseware to customers and partners. Call us at 1 (888) 427-4228.

Electronic Delivery of Training

Our network-based training service delivers efficient competency-based, interactive training via the World Wide Web and organizational intranets. This leading-edge delivery option provides a custom learning path and "just-in-time" training for maximum convenience to students.

ARG

American Research Group (ARG), a wholly-owned subsidiary of Global Knowledge, one of the largest worldwide training partners of Cisco Systems, offers a wide range of internetworking, LAN/WAN, Bay Networks, FORE Systems, IBM, and UNIX courses. ARG offers hands on network training in both instructor-led classes and self-paced PC-based training.

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- Cabling Voice and Data Networks
- Introduction to LAN/WAN protocols
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- Network Troubleshooting
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- Bay Networks Hub Connectivity
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- FORE ATM Theory
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- UNIX Level II
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- AlphaServer 2100 Server Maintenance
- AlphaServer 4100, Troubleshooting Techniques and Problem Solving

ABOUT THE CONTRIBUTORS

About Syngress Media

Syngress Media creates books and software for Information Technology professionals seeking skill enhancement and career advancement. Its products are designed to comply with vendor and industry standard course curricula and are optimized for certification exam preparation. You can contact Syngress via the Web at http://www.syngress.com.

About the Contributors

Ryan Russell (CCNA, CCNP) has been employed in the networking field for more than 10 years, including more than five years working with Cisco equipment. He has held IT positions ranging from help desk support to network design, providing him with a good perspective on the challenges that face a network manager. Recently, Ryan has been doing mostly information security work involving network security and firewalls. He has completed his CCNP and holds a Bachelors of Science degree in Computer Science

Tony Costa (CCIE #4140, MCSE, CNE) started his career in networking in 1979 working extensively with IBM SNA and TCP/IP networks. He teaches the CLSC course to Cisco employees and the public through Chesapeake Computer Consultants, Inc. He also develops new courses for Cisco, recently contributing to the Interconnecting Cisco Network Devices (ICND) and the IP/TV 3.0 course. Tony lives near the "Silicon Mesa" in New Mexico with his wife Karen, their five children, and a rapidly growing number of pets. You can contact him at tcosta@msn.com.

Glenn Lepore is a Senior Network Engineer with Niche Networks, LLC a network services and training firm in Herndon, Virginia. He has more than 13 years of experience in LAN and WAN design, installation, and troubleshooting. His background includes Frame Relay, X.25, TCP/IP, IPX, and SNA. His experience includes Novell and Unix administration,

Web page design, and Internet Service Provider (ISP) network operations. He is working toward CCIE certification as well as MCSE.

John Dyer (CCIE) is a partner at Niche Networks, LLC, an Internetwork Consulting and Training firm in Herndon, Virginia. He has13 years of experience in systems integration and networking in the information technology industry, including design and installation of LAN/WAN infrastructures, network management and network security platforms. John is a Cisco Certified Instructor teaching Introduction to Cisco Router Configuration, Advanced Cisco Router Configuration, CiscoWorks, and Managing Cisco Switched Internetworks.

Stace Cunningham (CCNA, MCSE, CLSE, COS/2E, CLSI, COS/2I, CLSA, MCPS, A+) is a systems engineer with SDC Consulting in Biloxi, Mississippi. SDC Consulting specializes in the design, engineering, and installation of networks. Stace received his MCSE in October 1996, and is also certified as an IBM Certified LAN Server Engineer, IBM Certified OS/2 Engineer, IBM Certified LAN Server Administrator, Microsoft Certified Product Specialist, IBM Certified LAN Server Instructor, and IBM Certified OS/2 Instructor.

Stace has participated as a Technical Contributor for the IIS 3.0 exam, SMS 1.2 exam, Proxy Server 1.0 exam, Exchange Server 5.0 exam, Exchange Server 5.5 exam, Proxy Server 2.0 exam, IIS 4.0 exam, IEAK exam, and the revised Windows 95 exam. He recently was an instrumental force in the design and engineering of a 1,700-node Windows NT network that is located in more than 20 buildings at Keesler Air Force Base in Mississippi. Among his current projects is assisting in the design and implementation of a 10,000-node Windows NT network, also located at Keesler Air Force Base.

His wife Martha and daughter Marissa are very supportive of the time he spends on the computers located throughout his house.

About the Series Editor

Mark Buchmann (CCIE #3556, CCSI #95062) is a Cisco Certified Internetworking Expert and has been a Certified Cisco Systems Instructor since 1995. He is the owner of MAB Enterprises, Inc, a company providing

consulting, network support, training, and various other services. Mark is also a co-owner of www.CertaNet.com, a company providing online certification assistance for a variety of network career paths including all the various Cisco certifications. In his free time he enjoys spending time with his family and boating. He currently lives in Raleigh, North Carolina. Mark is Series Editor for Syngress Cisco books.

Technical Review and From the Classroom Sidebars by:

Neil Lovering (CCIE #1772, CCSI #95010) is a CCIE-certified network consultant and Cisco-certified instructor. He has helped with many large and small network design and optimization projects throughout the United States and Canada, specializing in OSPF configuration and migration. Neil has taught thousands of students over the last few years how to configure Cisco routers and switches, how to design and troubleshoot complex networks, and how to earn various Cisco network certifications. Neil has also authored the first in a series of Cisco-based computer-based training courses offered through Global Knowledge. He is currently working on some Web-based educational sites.

Technical Review by:

Richard D. Hornbaker (CCIE #3355, MCSE, MCNE) is a consultant with the Forté Consulting Group, based in Phoenix, Arizona. He specializes in large-scale routing and switching projects for Fortune 500 companies. Recent projects include a 12,000-node campus network using a combination of routing, switching, and ATM. Richard is currently designing the network for a major corporate merger.

Richard has more than 10 years of internetworking experience and holds several certifications. His skills are diverse, ranging from operating systems and software to telephony systems and data networks. Protocol analysis and troubleshooting are among his strong suits.

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- Richard Kristof of Global Knowledge for championing the series and providing us access to some great people and information. And to Shelley Everett and Chuck Terrien for all their cooperation.
- Imran Qureshi and Tina Dupart at Cisco for their time and insight.
- To all the incredibly hard-working folks at Osborne/McGraw-Hill: Brandon Nordin, Scott Rogers, Gareth Hancock, Tara Davis, and Jody McKenzie for their help in launching a great series and being solid team players.

PREFACE

This book's primary objective is to help you prepare for and pass the required CLSC exam so you can begin to reap the career benefits of CCNP certification. We believe that the only way to do this is to help you increase your knowledge and build your skills. After completing this book, you should feel confident that you have thoroughly reviewed all of the objectives that Cisco has established for the exam.

In This Book

This book is organized around the topics covered within the Cisco exam administered at Sylvan Testing Centers. Cisco has specific objectives for the CLSC exam: we've followed their list carefully, so you can be assured you're not missing anything.

In Every Chapter

We've created a set of chapter components that call your attention to important items, reinforce important points, and provide helpful exam-taking hints. Take a look at what you'll find in every chapter:

- Each chapter begins with the **Certification Objectives**—what you need to know in order to pass the section on the exam dealing with the chapter topic. The Certification Objective headings identify the objectives within the chapter, so you'll always know an objective when you see it!

EXERCISE

- **Certification Exercises** are interspersed throughout the chapters. These are step-by-step exercises that mirror vendor-recommended labs. They help you master skills that are likely to be an area of focus

on the exam. Don't just read through the exercises; they are hands-on practice that you should be comfortable completing. Learning by doing is an effective way to increase your competency with a product.

- **From the Classroom** sidebars describe the issues that come up most often in the training classroom setting. These sidebars give you a valuable perspective into certification- and product-related topics. They point out common mistakes and address questions that have arisen from classroom discussions.
- Q & A sections lay out problems and solutions in a quick-read format:

QUESTIONS AND ANSWERS

My network is growing rapidly and I would like to segment the network at Layer 2 of the OSI model...	Segment the network using a bridge. Bridges function at Layer 2 of the OSI model.
When I configure my RSM with a new subinterface, I often find that I can't ping it right away. The #SHOW INTERFACE display says that it is up and up. What's up?	You are experiencing an interaction between the Catalyst CAM table learning function and the RSM software. The fastest way to clear this condition is to ping the Catalyst SC0 IP client address from the RSM. This forces the RSM's MAC address into the CAM table, resolving the problem.

- The **Certification Summary** is a succinct review of the chapter and a re-statement of salient points regarding the exam.
- The **Two-Minute Drill** at the end of every chapter is a checklist of the main points of the chapter. It can be used for last-minute review.
- **Tables** are liberally sprinkled throughout the chapters. You'll find that these provide an easy way to look up information and show material you may find worthy of memorization:

Protocol	Familiar Name	Port
Trivial File Transfer Protocol	TFTP	69
Domain Name System	DNS	53
Time Service	-	37
NetBIOS Name Server	-	137
NetBIOS Datagram Server	-	138
Boot Protocol (Client and Server)	BOOTP	67 and 68
TACACS	TACACS	49

- The **Self Test** offers questions similar to those found on the certification exams. The answers to these questions, as well as explanations of the answers, can be found in Appendix A. By taking the Self Test after completing each chapter, you'll reinforce what you've learned from that chapter, while becoming familiar with the structure of the exam questions.

Some Pointers

Once you've finished reading this book, set aside some time to do a thorough review. You might want to return to the book several times and make use of all the methods it offers for reviewing the material:

1. Re-read all the Two-Minute Drills, or have someone quiz you. You also can use the drills as a way to do a quick cram before the exam.
2. *Review all the Q & A scenarios* for quick problem solving.
3. *Re-take the Self Tests.* Taking the tests right after you've read the chapter is a good idea, because it helps reinforce what you've just learned. However, it's an even better idea to go back later and do all the questions in the book in one sitting. Pretend you're taking the exam. (For this reason, you should mark your answers on a separate piece of paper when you go through the questions the first time.)

4. Complete the exercises. Did you do the exercises when you read through each chapter? If not, do them! These exercises are designed to cover exam topics, and there's no better way to get to know this material than by practicing.
5. *Check out the Web site.* Global Knowledge invites you to become an active member of the Access Global Web site. This site is an online mall and an information repository that you'll find invaluable. You can access many types of products to assist you in your preparation for the exams, and you'll be able to participate in forums, online discussions, and threaded discussions. No other book brings you unlimited access to such a resource. You'll find more information about this site in Appendix C.

INTRODUCTION

How to Take a Cisco Certification Examination

By Richard D. Hornbaker (CCIE #3355, CNX, MCSE, MCNE), Forté Consulting Group

This chapter covers the importance of your CCNP certification and prepares you for taking the actual examination. It gives you a few pointers on methods of preparing for the exam, including how to study, register, what to expect, and what to do on exam day.

Catch the Wave!

Congratulations on your pursuit of Cisco certification! In this fast-paced world of networking, few certifications compare to the value of Cisco's program.

The networking industry has virtually exploded in recent years, accelerated by non-stop innovation and the Internet's popularity. Cisco has stayed at the forefront of this tidal wave, maintaining a dominant role in the industry.

Since the networking industry is highly competitive, and evolving technology only increases in its complexity, the rapid growth of the networking industry has created a vacuum of qualified people. There simply aren't enough skilled networking people to meet the demand. Even the most experienced professionals must keep current with the latest technology in order to provide the skills that the industry demands. That's where Cisco certification programs can help networking professionals succeed as they pursue their career.

Cisco started its certification program many years ago, offering only the designation of Cisco Certified Internetwork Expert, or CCIE. Through the CCIE program, Cisco provided a means to meet the growing demand for experts in the field of networking. However, the CCIE tests are brutal, with

a failure rate over 80 percent. (Fewer than five percent of candidates pass on their first attempt.) As you might imagine, very few people ever attain CCIE status.

In early 1998, Cisco recognized the need for intermediate certifications, and several new programs were created. Four intermediate certifications were added: CCNA (Cisco Certified Network Associate), CCNP (Cisco Certified Network Professional), CCDA (Cisco Certified Design Associate), and CCDP (Cisco Certified Design Professional). Two specialties were also created for the CCIE program: WAN Switching and ISP Dial-up.

I would encourage you to take beta tests when they are available. Not only are the beta exams less than the cost of the final exams (some are even free!), but also, if you pass the beta, you will receive credit for passing the exam. If you don't pass the beta, you will have seen every question in the pool of available questions, and can use this information when preparing to take the exam for the second time. Remember to jot down important information immediately after the exam, if you didn't pass. You will have to do this after leaving the exam area, since materials written during the exam are retained by the testing center. This information can be helpful when you need to determine which areas of the exam were most challenging for you as you study for the subsequent test.

Why Vendor Certification?

Over the years, vendors have created their own certification programs because of industry demand. This demand arises when the marketplace needs skilled professionals and an easy way to identify them. Vendors benefit because it promotes people skilled in their product. Professionals benefit because it boosts their career. Employers benefit because it helps them identify qualified people.

In the networking industry, technology changes too often and too quickly to rely on traditional means of certification, such as universities and trade associations. Because of the investment and effort required to keep network certification programs current, vendors are the only organizations suited to