CISCO系列丛书（影印版）

H.Kim Lew
Spank McCoy
Tim Stevenson
Kathleen Wallace
Kevin Downes

An essential reference to solving difficult networking problems

INTERNETWORKING TROUBLESHOOTING HANDBOOK

网络互联排错手册

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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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About the Authors

H. Kim Lew is a program manager for Cisco Press. He has worked as a writer, course developer, marketing manager, and editorial columnist in the internetworking industry for more than a decade. Since 1990, he has worked at Cisco Systems in various program management, management, and information product development roles. He now telecommutes full-time from Redmond, Washington.

Spank McCoy has created technical documentation for all aspects of data networking technologies since 1979. His interest in computer communications began with his work on the unmanned space program at NASA Jet Propulsion Laboratories in the early 70s. Currently employed at Cisco Systems, Inc., he has worked as a consultant and staff writer for Apple Computer, Hewlett-Packard, Sony Microsystems, Ungermann-Bass, and Zilog. Mr. McCoy is a co-author of *PC LAN Primer.*

Tim Stevenson is a writer, course developer, and web technology specialist in Cisco Systems Knowledge Products organization. While at Cisco, he has developed router troubleshooting and technology-oriented material and is one of the department's key web technology experts.

Kathleen Wallace is co-founder of Wallace Technical Communications, an Internet service provider serving the small business and home office professionals in the San Francisco Bay Area. She has worked as a programmer, staff technical writer, and contract writer for a

variety of computing and networking firms, including Apple Computer Inc., Cisco Systems, and National Semiconductor Corporation.

Kevin Downes is a senior network systems consultant with International Network Services (INS). His network certifications include Cisco CCIE, Bay Networks CRS, Certified Network Expert (CNX) Ethernet, Novell CNE, and Banyan Systems CBE. He has published several articles on the subjects of network infrastructure design, network operating systems, and Internet Protocol. He completed his B.S. in Computer Information Systems from Strayer University in 1993.

Acknowledgments

As with several derivative Cisco publications brought to Cisco Press, *Internetworking Troubleshooting Handbook* owes much of its content to the collaborative efforts of many Cisco employees over a number of iterations. In its original form, this book was referred to as *Troubleshooting Internetworking Systems*, which was originally developed by H. Kim Lew, later updated by Kim and Spank McCoy, and then again updated by Kathleen Wallace. Tim Stevenson built on this foundation to create the *Internetwork Troubleshooting Guide*. Both these publications live on as legacy Cisco documents. Kevin Downes updated Cisco's *Internetwork Troubleshooting Guide* to create Cisco Press's *Internetworking Troubleshooting Handbook*.

Our intent in updating this material and presenting it via Cisco Press is to deliver practical information to our customer community and the networking community at large. It is our hope that you find this material useful in your daily operations.

The authors acknowledge the many current and former Cisco employees who contributed in building the content of this publication. Key participants included Jim Young, Amir Khan, John Wright, Keith Redfield, Won Lee, Pasvorn Boonmark, Steve Cunningham, Nga Vu, Imran Qureshi, Atif Khan, Arun Sastry, John Bashinski, Dave Katz, Dino Farinacci, Larry Bowden, Praveen Akkiraju, Steve Russell, Srinivas Vegesna, Phil Remaker, Priscilla Oppenheimer, Bruce Pinsky, Joanna Gardner, Dennis Peng, Charlie Justus, Morris Ng, Sue Phelan,

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The nature of this publication's development required substantial management support to coordinate the subject matter expert time spent in creating the material. The authors acknowledge Joe Pinto, Brad Wright, Doug Allred, and Charles Baugh as instrumental management sponsors who recognized the importance of this kind of material to customers and nurtured its creation during its early development stages.

Preface

No single troubleshooting resource can anticipate every possible glitch that can be encountered in internetworks. But any significant contribution that can be made toward preventing connectivity blockages is a step in the right direction. We hope that this publication contributes to the body of knowledge that makes networks more manageable.

AUDIENCE

Internetworking Troubleshooting Handbook is intended for network administrators who are responsible for troubleshooting internetworks that implement Cisco products and Cisco-supported protocols.

Administrators should have hands-on experience in configuring, administering, and troubleshooting a network, should know how to configure routers, switches and bridges, and should be familiar with the protocols and media that their hardware has been configured to support. Awareness of the basic topology of their network is also essential.

DOCUMENT ORGANIZATION

The *Internetworking Troubleshooting Handbook* provides the information necessary to troubleshoot many problems commonly encountered in internetworks using Cisco hardware and software products. This publication consists of the following six parts:

- The chapters in Part 1, "Introduction to Troubleshooting," provide an introduction to troubleshooting techniques and an overview of common troubleshooting tools.
- The chapters in Part 2, "Hardware, Booting, and Media Problems," provide information for troubleshooting hardware problems, LAN media problems, and booting (system initialization) problems.
- The chapters in Part 3, "Troubleshooting Desktop and Entreprise Routing Protocols," provide information on troubleshooting common connectivity and performance problems in TCP/IP, Novell IPX, AppleTalk, IBM, and other widely-implemented network environments.
- The chapters in Part 4, "Troubleshooting Serial Lines and WAN Connections," provide information on troubleshooting problems that commonly occur on serial lines and WAN links such as ISDN, Frame Relay, and X.25.
- The chapters in Part 5, "Troubleshooting Bridging and Switching Environments," provide information on troubleshooting problems commonly encountered in ATM switching, LAN switching, and bridging environments.
- The chapters in Part 6, "Troubleshooting Other Internetwork Problems," provide information on troubleshooting CiscoWorks installations, and on troubleshooting security implementations, including TACACS troubleshooting and password recovery.
- Appendixes provide supplemental troubleshooting information, including information on creating core dumps, memory maps for different Cisco routers, technical support information, and a list of references and recommended reading. In addition, at the end of the book are several perforated troubleshooting worksheets to assist you in gathering information when problems occur.

Using This Publication

This publication is designed to provide users with the information needed to troubleshoot *common* problems encountered in Cisco-based internetworks. Most chapters focus on describing symptoms, identifying their causes, and suggesting specific actions to resolve the problem. Some material describes preventative measures or tips for identifying problems by interpreting command output.

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DOCUMENT CONVENTIONS

Our software and hardware documentation uses the following conventions:

- The symbol ^ represents the key labeled *Control.*

For example, ^*D* means hold down the *Control* key while you press the *D* key.

- A string is defined as a nonquoted set of characters. For example, when setting up a community string for SNMP to "public," do not use quotes around the string, or the string will include the quotation marks.

Command descriptions use these conventions:

- Examples that contain system prompts denote interactive sessions, indicating that the user enters commands at the prompt. The system prompt indicates the current command mode. For example, the prompt `router(config)#` indicates global configuration mode.
- Commands and keywords are in **boldface** font.
- Arguments for which you supply values are in *italic* font.
- Elements in square brackets ([ ]) are optional.
- Alternative but required keywords are grouped in braces ({ }) and separated by vertical bars (|).

Examples use these conventions:

- Terminal sessions and information the system displays are in `screen` font.
- Information you enter is in **`boldface screen`** font.
- Nonprinting characters, such as passwords, are in angle brackets (< >).
- Default responses to system prompts are in square brackets ([ ]).
- Exclamation points (!) at the beginning of a line indicate a comment line.
- When part of the command output has been omitted (to conserve space), the deleted output is indicated with italicized brackets and ellipsis (*[...]*)

This is a special paragraph that means *reader take note.* It usually refers to helpful suggestions, the writer's assumptions, or reference to materials not contained in this manual.

Means *reader be careful*. In this situation, you might do something that could result in equipment damage or loss of data.

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