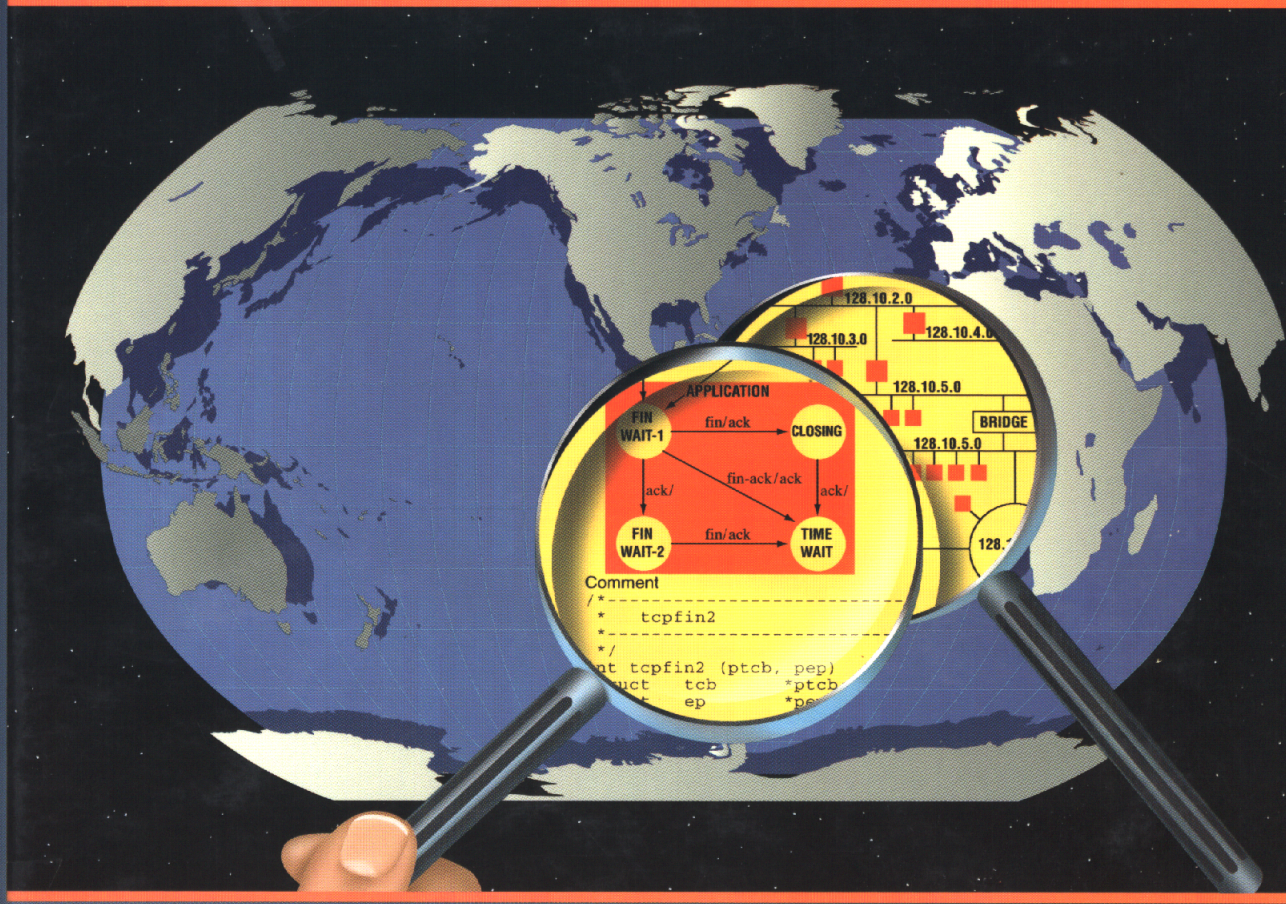
Third Edition

ANSI C Version

INTERNETWORKING WITH TCP/IP

VOLUME II

DESIGN, IMPLEMENTATION, AND INTERNALS



DOUGLAS E. COMER
DAVID L. STEVENS

Internetworking With TCP/IP

Vol II:

Design, Implementation, and Internals

THIRD EDITION

DOUGLAS E. COMER

Department of Computer Sciences
Purdue University
West Lafayette, IN 47907

and

DAVID L. STEVENS

Sequent Computer Systems, Inc.
Beaverton, OR 97006

PRENTICE HALL
Upper Saddle River, New Jersey 07458

Library of Congress Cataloging-in-Publication Data
(Revised for vol. 2)

Comer, Douglas
Internetworking with TCP/IP.

Vol. 2 by Douglas E. Comer and David L. Stevens.
Includes bibliographical references and index.
Contents: Vol. 1. Principles, protocols, and architecture—v. 2. Design, implementation, and internals.
1. Computer networks. 2. Computer network protocols. 3. Data transmission systems. I. Stevens, David L., 1962- . II. Title.
TK5105.5.C39 1991 004.6 90-7829
ISBN 0-13-468505-9 (v. 1)
ISBN 0-13-472242-6 (v. 2)

Publisher: **ALAN APT**
Development Editor: **SONDRA CHAVEZ**
Editor-in-chief: **MARCIA HORTON**
Production editor: **JOAN SKIDMORE - ICC OREGON**
Managing editor: **EILEEN CLARK**
Director of production and manufacturing: **DAVID W. RICCARDI**
Cover director: **HEATHER SCOTT**
Manufacturing buyer: **DONNA M. SULLIVAN**
Manufacturing manager: **TRUDY PISCIOTTI**
Editorial assistant: **TONI HOLM**

Prentice Hall

Upper Saddle River, New Jersey 07458

Printed in the United States of America

10 9 8 7 6 5 4

ISBN 0-13-973843-6

Prentice-Hall International (UK) Limited, *London*
Prentice-Hall of Australia Pty. Limited, *Sydney*
Prentice-Hall Canada Inc., *Toronto*
Prentice-Hall Hispanoamericana, S.A., *Mexico*
Prentice-Hall of India Private Limited, *New Delhi*
Prentice-Hall of Japan, Inc., *Tokyo*
Pearson Education Asia Pte. Ltd., *Singapore*
Editora Prentice-Hall do Brasil, Ltda., *Rio de Janeiro*

To the memory of net 10 and our connections: 10.0.0.37 and 10.2.0.37

The Comer Series Of Books On Networking And Internetworking

Internetworking With TCP/IP Volume 1: Principles Protocols, and Architecture, third edition, 1995, by Douglas Comer ISBN 0-13-468505-9

Internetworking With TCP/IP Volume II: Design, Implementation, and Internals, second edition, 1998, by Douglas Comer and David Stevens ISBN 0-13-973843-6

Internetworking With TCP/IP Volume III: Client-Server Programming and Applications, BSD Socket Version, second edition 1996, by Douglas Comer and David Stevens ISBN 0-13-260969-X

Internetworking With TCP/IP Volume III: Client-Server Programming and Applications, AT&T TLI Version, 1993, by Douglas Comer and David Stevens ISBN 0-13-474230-3

Internetworking With TCP/IP Volume III: Client-Server Programming and Applications, Window Sockets Version, 1997, by Douglas Comer and David Stevens ISBN 0-13-848714-6

Computer Networks And Internets, 1996, by Douglas Comer (with a CD-ROM by Ralph Droms) ISBN 0-13-239070-1

The Internet Book: Everything you need to know about computer networking and how the Internet works, second Edition 1997, by Douglas Comer ISBN 0-13-890161-9

Contents