

大学计算机教育丛书（影印版）

TCP/IP

Protocol Suite

Behrouz A. Forouzan
Sophia Chung Fegan

TCP/IP 协议族



清华大学出版社

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今天,我们的大学生、研究生和教学、科研工作者,面临的是一个国际化的信息时代。他们将需要随时查阅大量的外文资料;会有更多的机会参加国际性学术交流活动;接待外国学者;走上国际会议的讲坛。作为科技工作者,他们不仅应有与国外同行进行口头和书面交流的能力,更为重要的是,他们必须具备极强的查阅外文资料获取信息的能力。有鉴于此,在原国家教委所颁布的“大学英语教学大纲”中有一条规定:专业阅读应作为必修课程开设。同时,在大纲中还规定了这门课程的学时和教学要求。有些高校除开设“专业阅读”课之外,还在某些专业课拟进行英语授课。但教、学双方都苦于没有一定数量的合适的英文原版教材作为教学参考书。为满足这方面的需要,我们陆续精选了一批国外计算机科学方面最新版本的著名教材,进行影印出版。我社获得国外著名出版公司和原作者的授权将国际先进水平的教材引入我国高等学校,为师生们提供了教学用书,相信会对高校教材改革产生积极的影响。

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Preface

Technologies related to networks and internetworking may be the fastest growing in our culture today. One of the ramifications of that growth is a dramatic increase in the number of professions where an understanding of these technologies is essential for success—and a proportionate increase in the number and types of students taking courses to learn about them.

This is a book about TCP/IP. It provides the information necessary for students who seek a degree in data communications and networking. It is also a reference for professionals who are supporting or preparing to work with networks based on TCP/IP. In short, this book is for anyone who needs to understand the TCP/IP protocols.

The book assumes the reader has no prior knowledge of the TCP/IP protocols, although a previous course in data communications is desirable.

Organization

This book is divided into five parts. The first part, comprising Chapters 1 to 3, reviews the basic concepts and underlying technologies that, although independent from the TCP/IP protocols, are needed to support them.

The second part of the text discusses the protocols in the network and transport layer. Chapters 4 to 7 emphasize the IP protocol. Chapters 8 to 10 define protocols that give services to IP. Transport layer protocols are fully described in Chapters 11 and 12. Chapter 13 is devoted to a detailed description of routing protocols.

The text's third part discusses the application programs that use the network and transport layer protocols. Chapter 14 gives a brief review of the client-server paradigm and lays the foundation for Chapters 15 to 23, which discuss the application protocols.

The fourth part (Chapter 24) introduces network programming by giving a few examples using one of the interfaces, the socket interface. This chapter provides information to motivate those who intend to take courses in network programming.

The fifth part of the book (Chapter 25) is devoted to the next generation of TCP/IP. We describe IPv6, ICMPv6, and the transition strategies from version 4 to version 6.

Features

Several features of this text are designed to make it particularly easy for students to understand TCP/IP.

Visual Approach

The book presents highly technical subject matter without complex formulas by using a balance of text and figures. The approximately 550 figures accompanying the text provide a visual and intuitive opportunity for understanding the material. Figures are particularly important in explaining networking concepts, which are based on connections and transmission. These are both often more easily grasped visually than verbally.

Highlighted Points

We have repeated important concepts in boxes for quick reference and immediate attention.

Examples and Applications

Whenever appropriate, we have included examples that illustrate the concept introduced in the text. Also, we have added real-life applications throughout each chapter to motivate students.

Protocol Design

Although we have not tried to give the detailed code for implementing each protocol, many chapters contain a *design* section that discusses the general idea behind the implementation of each protocol. These sections provide an understanding of the ideas and issues involved in each protocol. They are optional.

Summary

Each chapter ends with a summary of the material covered by that chapter. The summary is a bulleted overview of all the key points in the chapter.

Practice Set

Each chapter includes a practice set designed to reinforce salient concepts and encourage students to apply them. It consists of three parts: multiple-choice questions, exercises, and programming exercises. Multiple-choice questions test students' grasp of basic concepts and terminology. Exercises require deeper understanding of the material. The programming exercises are for those students or readers who have taken one or two programming courses in C or a similar language. These exercises prepare students for client-server programming courses.

Appendixes

The appendixes are intended to provide quick reference material or a review of materials needed to understand the concepts discussed in the book.

Glossary and Acronyms

The book contains an extensive glossary and a list of acronyms.

How to Use the Book

This book is written for both an academic and a professional audience. The book can be used as a self-study guide for interested professionals. As a textbook, it can be used for a one-semester or one-quarter course. The chapters are organized to provide a great deal of flexibility. The following are some suggestions:

- Chapters 1 to 3 can be skipped if students have already taken a course in data communication and networking.
- Chapters 4 through 13 are essential for understanding TCP/IP.
- Chapters 14 to 23 can be covered in detail in a semester system and briefly in a quarter system.
- Chapter 24 can be skipped if there are time constraints.
- Chapter 25 can be used as a self-paced chapter.

Acknowledgments

It is obvious that the development of a book of this scope needs the support of many people. We must first thank Catherine Coombs for her many contributions. We must also thank the De Anza students and staff; their encouragement and support enabled the project to materialize and contributed to its success. In particular, we thank Richard Gilberg, Martha Kanter, Anne Oney, John Perry, George Rice, and Orva Stewart. We especially thank Scott Demouthe for his tremendous assistance in correcting and clarifying the material.

The most important contribution to the development of a book such as this comes from peer reviews. We cannot express our gratitude in words to the many reviewers who spent numerous hours reading the manuscript and providing us with helpful comments and ideas. We would especially like to acknowledge the contributions of the following reviewers:

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