计算机科学丛书

数据通信与网络

（英文版）

Introduction to Data Communications and Networking

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机械工业出版社
China Machine Press
WCB
McGraw-Hill

RISBN: 007-1162550

本书版权登记号：图字：01-99-1093

图书在版编目（CIP）数据

数据通信与网络／（美）弗鲁赞（Forouzan, B.）著. －影印本. －北京：机械工业出版社，1999.5

（计算机科学丛书）

书名原文：Introduction to Data Communications and Networking

ISBN 7-111-07206-5

Ⅰ. 数… Ⅱ. 弗… Ⅲ. 数据通信－通信网 Ⅳ. TN919.2

中国版本图书馆CIP 数据核字(1999) 第10885号

出 版 人：马九荣（北京市百万庄大街22 号 邮政编码 100037）

北京市南方印刷厂印刷 · 新华书店北京发行所发行

1999年5月第1版第1次印刷

787mm × 1092mm 1/16 · 45印张

印数：0 001 － 5 000册

定价：59.00元

PREFACE

Networks and digital communications may be the fastest growing technologies 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. Today students wanting to understand the concepts and mechanisms underlying telecommunications and networking come from a variety of academic and professional backgrounds. To be useful, a textbook on data communication and networking must be accessible to students without technical backgrounds while still providing substance comprehensive enough to challenge more experienced readers. This text is written with this new mix of students in mind.

Features of the Book

Several features of this book are designed to make it particularly easy for students to understand data communication.

Structure

We have used the seven-layer OSI model as the framework for the text not only because a thorough understanding of the model is essential to understanding most current networking theory but also because it is based on a structure of interdependencies: Each layer builds upon the layer beneath it and supports the layer above it. In the same way, each concept introduced in our text builds upon the concepts examined in the previous sections.

The first eight chapters emphasize the physical layer, which is essential for understanding the rest of the layers. These chapters are particularly needed for students with no background in networking or telecommunication.

Chapters 9 through 13 describe all issues related to the data link layer. Chapters 14 to 20 discuss topics associated with the network layer. Chapter 21 describes the transport layer. Chapter 22 focuses on upper layers, which are normally combined in most protocols.

Chapter 23 describes one of the most important protocols, TCP/IP.

Visual Approach

The book presents highly technical subject matter without complex formulas, using a balance of text and figures. The approximately 700 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, both often more easily grasped visually than verbally.

Highlighted Points

Important concepts have been repeated in colored 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, real-life applications have been added throughout each chapter to motivate students.

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 two parts: multiple choice questions and exercises. Multiple choice questions are designed to test students' grasp of basic concepts and terminology. Exercises require deeper understanding of the material.

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 through 12 and Chapters 14, 16, 20, 21, and 22 are fundamental to understanding the concepts of data communication and networking.
- Chapters 13, 14, 15, 20, and 23 can also be covered in a quarter or a semester.
- Chapters 17, 18, and 19, which discuss the emerging technologies, can be covered if time permits.

Acknowledgments

It is obvious that the development of a book of this scope needs the support of many people. We must first thank the hundreds of students at De Anza College who have used the text and made useful comments. We must also thank the De Anza staff: their encouragement and support materialized the project and contributed to its success. In particular, we thank Sandy Acebo, Richard Gilberg, Martha Kanter, Anne Oney, John Perry, George Rice, Mark Sherby, Orva Stewart, and John Wanlass.

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:

Russell J. Clark, *University of Dayton*
Charles K. Davis, *University of Houston*
John W. Gray, *University of Massachusetts at Dartmouth*
James M. Frazier, *University of North Carolina at Charlotte*
Thomas F. Hain, *University of South Alabama*
Paul N. Higbee, *University of North Florida*
Seung Bae Im, *California State University at Chico*
Rose M. Laird, *Northern Virginia Community College*
Jorg Liebeherr, *University of Virginia*
Wallace C. Liu, *California State University at Fresno*
T. Radhakrishnan, *Concordia University*
Peter Maggiacomo, *Sinclair Community College*
Larry D. Owens, *California State University at Fresno*
Michael Peterson, *Iowa Western Community College*
Satya Prakash Saraswat, *Bentley College*
Heidi Schmidt, *San Francisco State University*
Gordon Springer, *University of Missouri at Columbia*

Special thanks go to the staff of McGraw-Hill. Betsy Jones, our senior editor, proved how a proficient editor can make the impossible, possible. Bradley Kosirog, the assistant editor, gave us help whenever we needed it. Beth Cigler, our project manager, guided us through the production process with enormous enthusiasm. We also thank Heather Burbridge in production, Kiera Cunningham in design, and Janet Renard, the copy editor.

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