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Emerging Communications Technologies 2nd Edition

现代通信最新技术

（第2版）

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ATM与B-ISDN技术丛书（版）

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Uyless Black

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出版前言

90年代中期掀起了信息高速公路的浪潮。宽带综合业务数字网络(B-ISDN)代表着国家信息基础设施的最高网络层次，将在下一世纪发挥非常重要的作用。ATM是B-ISDN的核心技术，已经得到了迅速地发展。广大科技人员和大专院校的师生为了掌握该领域最新发展的知识，迫切需要一套全面、系统地介绍ATM与B-ISDN详细技术的文献，为此我们精选了一些最新英文版图书，组成一套《ATM与B-ISDN技术丛书》，影印奉献给广大读者。

本套丛书既系统全面，又分工明确，各有侧重。在内容安排上包括ATM与B-ISDN技术基础、宽带网信令、宽带网性能分析、ATM网的规划与管理、ATM网与其它网的互通以及ATM网络的应用等技术。希望这套丛书对从事ATM和B-ISDN研究的广大科技人员和大专院校师生有所帮助。

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Preface

Like most of the more recent books I have written, I decided to write this book as part of my ongoing work with my clients because of the absence of a systematic analysis of the subject matter. In this case, my clients could not find a book that provided a description and comparison of the new technologies that are appearing in the telecommunications industry. Generally, some books are available that are accurate, and well-written, but they treat only one, two, or three of the technologies. Obviously, the problem was not specific to my clients alone, so I decided to prepare this book for other interested readers as well.

The book is the culmination of a series of lectures I have been conducting in North America and Europe, the fruition of my lecture notes, and a reflection of ongoing consulting work with my clients. I thank those people who attended these lectures; in effect, they were my "referees" of the technical content of this book.

The book is intended for readers who are interested in the fields of telecommunications and computer-based networks. It can also serve as supplemental reading for advanced networking classes in colleges and universities.

My goals in writing this book are threefold. First, I wish to provide the reader a general description of how the emerging communications technologies operate and where they fit in a computer/communications network and in customer equipment. Second, I wish to provide the reader with a general comparison of the technologies, their pros and cons, where

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they do or do not compete with each other, and their targeted applications. Third, I wish to provide the reader with a general explanation of the international standards that are published for these emerging communications technologies. I have attempted to achieve a balance between a detailed and general treatment of the subject matter.

Each technology-specific chapter contains a worksheet that the reader can fill in after reading the chapter. I have included a completed worksheet with an explanation of the reasons for my answers.

Tutorial information is also provided for the reader—Appendix A is a basic tutorial on communications systems and networks; Appendix B is a tutorial on layered protocols; Appendix C is a tutorial on management information bases (MIBs); and Chapter 2 is a tutorial on how to analyze a communications protocol. Even though Chapter 2 can be considered as a tutorial, I think that it will be useful to all readers, because it provides a systematic approach to the analysis of communications protocols.

The emphasis of this book is on the wire-based emerging communications technologies, and the principal focus is on the role of optical fiber in these technologies. The emerging communications technologies using wireless media, such as cellular and cordless systems, are of such scope to warrant another book. Notwithstanding, for purposes of comparisons and completeness, I have included an overview of this subject in Chapter 9.

The reader will notice that I have included some topics that could be considered as "old," not emerging technologies—as example, frame relay. I chose to include frame relay because, while the underlying technology is not new, the service offerings are new, and the ideas of committed information rate and traffic tagging, for example, are also new.

The very nature of the subject matter of this book—emerging communications technologies—makes it difficult to write about the topic as if these systems and protocols were cast in stone. Nonetheless, this book reflects the most up-to-date information available at the time the book went to press. The latest information from the ATM Forum, the Frame Relay Forum, the Network Management Forum, the SMDS Interest Groups, the standards groups, and my ongoing work are included in this book.

Notes for the Reader

The International Telegraph and Telephone Consultative Committee (CCITT) has changed its name to the International Telecommunication Union-Telecommunication Standardization Sector (ITU-T).

Unless identified otherwise, the term bandwidth is used in this book to describe a channel's capacity in bits per second, and not a frequency spectrum.

The term NNI is used in this book to mean the network-to-network interface. NNI is also known as the network-node or node-to-node interface. NNI is supposed to describe a switch-to-switch interface, which could operate within a network or between networks. The major goal of an NNI is to allow switches from different vendors to interwork with each other.

The initials ICI mean intercarrier interface, and is used in this book to describe the interface between two networks operated by different network operators.

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