

preface

In a prior edition of this book the preface commenced with the paraphrase of an old adage in an era of evolving local area networking technology: Ethernet is dead — long live Ethernet!

Although advances in communications technology continue to occur at a rapid pace, that paraphrase continues to be valid. Within the past decade, the bandwidth of 10 Mbps Ethernet was advanced by a factor of one thousand with the introduction of a series of enhancements to the original Ethernet specification. First, Fast Ethernet resulted in the bandwidth of Ethernet increasing by a factor of 10 to 100 Mbps. The introduction of Gigabit Ethernet resulted in another order of magnitude increase in bandwidth to 1 Gbps. Although many persons felt that a transmission capacity of 1 Gbps would be more than sufficient for the foreseeable future, another adage states that many applications will grow to use all available bandwidth. While most organizations may be hard pressed to use 1 Gbps of bandwidth, other organizations, including Internet Service Providers and corporations and universities with large backbone LANs, were able to literally fill the 1 Gbps pipe, resulting in the development of 10 Gbps Ethernet. Thus, over the past decade Ethernet's 10 Mbps operation has increased by a factor of 1000 to 10 Gbps.

This new edition provides a significant amount of additional material to most of the chapters of this book's previous edition. New information added includes coverage of the transmission of Gigabit over copper conductors, the evolution of cabling standards that facilitate support of higher Ethernet operating rates, and the manner by which LAN switches operate on Ethernet frames transporting information at higher layers in the Open System Interconnection Reference Model.

Recognizing the importance of networking without wires, a new chapter is focused upon wireless Ethernet. This chapter describes and discusses the series of IEEE 802.11 standards and provides practical information concerning the setup and operation of a wireless LAN. Recognizing the importance of security in the modern era of networking resulted in the movement of most security related topics to a new chapter focused on this topic. This chapter considerably expands the prior disparate coverage of security by adding information covering the use of firewalls in both a wired and wireless

environment. In addition, information concerning the use of router access lists is considerably expanded, while new information covering authentication, authorization and accounting has been added to the chapter.

Other topics that have been added or significantly revised in this new edition include the operation of new versions of Windows on Ethernet LANs, the operation and utilization of LAN switches above layer 2 in the ISO Reference Model, new gateway methods you can consider to connect workstation users to mainframes, and the use of both copper and fiber optic to transport high-speed Ethernet. Thus, the scope and depth of material have been significantly revised and updated to continue to provide you with detailed information concerning the design, implementation, operation and management of different types of Ethernet networks.

This book incorporates into one reference source the material you will need to understand how Ethernet networks operate, the constraints and performance issues that affect their design and implementation, and how their growth and use can be managed both locally and as part of an enterprise network. Assuming readers have varied backgrounds in communications terms and technology, the first two chapters were written to provide a common foundation of knowledge. Those chapters cover networking concepts and network standards—two topics on which material in succeeding chapters is based. Succeeding chapters examine Ethernet concepts: frame operations; network construction; the use of bridges, routers, hubs, switches, and gateways; Internet connectivity; network backbone construction; Wireless Ethernet; Security; and the management of Ethernet networks.

In writing this book, my primary goal was to incorporate practical information you can readily use in designing, operating, implementing, and managing an Ethernet network. Although Ethernet had its origins in the 1970s and can be considered a relatively “old” technology, in reality, the technology is anything but old. Only a few years ago, the standardization of what is now known as 10BASE-T (a twisted-wire version of Ethernet) resulted in a considerable expansion in the use of this type of local area network. By 1994 the use of intelligent switches greatly enhanced the operational capability of 10BASE-T networks, providing multiple simultaneous 10 Mbps connectivity. During 1995 high-speed Ethernet technology in the form of Fast Ethernet products provided users with the ability to upgrade their Ethernet networks to satisfy emerging multimedia requirements. Within a few years industry realized that emerging applications, as well as the growth in the use of the Internet, required higher-speed backbone LANs as a mechanism to support Internet access and similar high-speed networking requirements. This realization resulted in the deployment of Gigabit Ethernet hubs and switches during

1997, which was quickly followed by 10 Gbps operations a few years later. Thus, Ethernet technology can be expected to continue to evolve to satisfy the communications requirements of business, government, and academia.

For over 30 years I have worked as a network manager responsible for the design, operation, and management of an enterprise network in which local area networks throughout the United States are interconnected through the use of different wide area network transmission facilities. This challenging position has provided me with the opportunity to obtain practical experience in designing, operating, and interconnecting Ethernet networks to Token-Ring, SNA, the Internet, and other types of networks—experience which I have attempted to share with you. This book will help you consider the practicality of different types of routing protocols, LAN switches, and gateway methods. These and other network design issues are crucial to the efficient and effective expansion of a local Ethernet so that users on that network can access resources on other networks.

As a professional author, I very much value readers' comments. Those comments provide me with feedback necessary to revise future editions so that they better reflect the information requirements of readers. I look forward to receiving your comments, as well as suggestions for information you would like to see in a future edition of this book. You can write to me directly or through my publisher, whose address you can find on page 4 of this book or communicate with me directly via electronic mail at gil_held@yahoo.com.

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