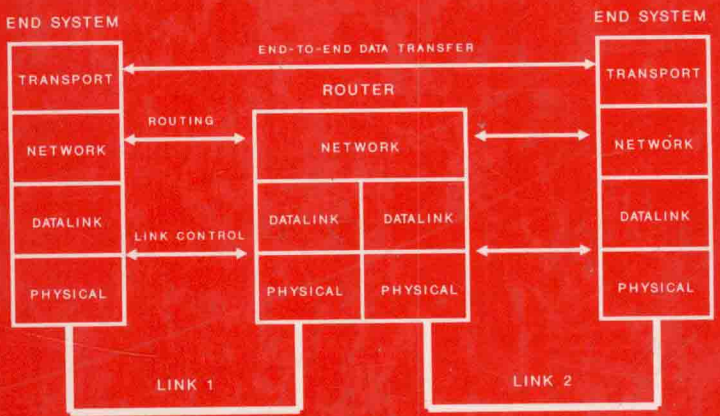
INTEGRATED COMPUTER NETWORK SYSTEMS



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Preface

This book is for computer-literate readers who desire to become computer-*network* literate. When I decided to write a book about computer networks, I discovered that two categories of network documentation exist: protocol specifications and detailed technical literature. Standards organizations and vendors produce the former, highly-skilled technologists produce the latter. The problem is, if you are a computer technician that wants to understand networks, where do you begin? I am familiar with this problem, because I had to struggle through the process of converting my computer knowledge into computer *network* knowledge.

Integrated Computer Network Systems is a technical overview of the terms and concepts of computer network implementations. As computer networks become more and more important in our daily business lives, network expertise attracts the interest of the computer-competent society. For most people, comprehending protocol specifications is a formidable, tedious task. Protocol experts produce various technical literature that assumes the reader has network experience, and again, this material challenges computer engineers and managers.

Computer specialists have various levels of interest in networks. Some want to become experts in protocols, others desire only to become knowledgeable enough to talk to and work with protocol experts. This book satisfies the second criterion and is an excellent place to start. If your goal is protocol expertise, you are ready for protocol specifications and detailed technical literature after you complete this book.

Although I have written articles for the computer network magazines, this is my first book. I do not think I could have completed it without the technical support of my editor and partner, Judy Lee Aguiar. Judy writes for a living and evidence of her writing quality appears throughout the text.

Judy is a consulting technical writer and editor. Judy studied English as an undergraduate and graduate at Arizona State University and plans to continue her studies to obtain a Ph.D. in English. She has been working as a writer and editor for approximately 15 years and has written major publications for such firms as Intel Corporation, Honeywell, and National Semiconductor. Being fluent in German, Judy also provides technical translation services (English-

German) for the computer and semiconductor industry. Judy is currently completing a punctuation and grammar style guide for mass publication and also is working on a fictional novel. Aside from her talents in writing, Judy also is becoming a specialist in hypertext and multimedia integration with text. During the past two years, Judy has been working as a consultant for Intel Corporation. At Intel Corporation, Judy has been writing documentation, developing training courses and materials, and implementing on-line hypertext for the network products being developed in the Network Instrumentation and Services Group in Phoenix, Arizona.

Thanks also to Chris Thomas and numerous other network experts who reviewed and commented on this work. I would like to thank especially Colleen, Fred, and Meghan for giving up so many weekends that we could have spent at the lake, for your encouragement, and for keeping the house quiet.

Frank Welch

INTEGRATED COMPUTER NETWORK SYSTEMS

Contents

DATA COMMUNICATIONS

NETWORK FAMILIES

UPPER-LAYER COMPONENTS

MIDDLE-LAYER COMPONENTS

LOWER-LAYER COMPONENTS

CONNECTING DEVICES

NETWORK MANAGEMENT

NETWORK SUPPORT GROUPS

FIGURES

FIGURES (Continued)

TABLES

Chapter 1

Introduction

1.1 Enterprise Networks

Computing devices affect virtually everyone in an enterprise such as a large business, corporation, or government agency. If you are a member of such an enterprise, you have learned to take every advantage possible using computers in your everyday activities and you know that only when these devices communicate, can you realize their maximum potential. Networks allow computing devices to communicate with each other, which enables distributed processes. Distributed processes provide valuable continuity to otherwise disparate computing activities throughout any enterprise.

In the past, you probably thought of your enterprise computer power as a group of isolated machines, often primarily mainframes with limited connectivity to smaller computers. The mainframes performed most of the large business applications, while desktop computers served private, special applications for individuals. Now you view your enterprise computer resources as mainframes, mini-computers, and desktop computers, all interconnected and interworking with each other via networks. This trend is reflected in the success of desktop computer lines and a relative slowing of mainframe sales.

All networks are not the same: some are effective, others are not. Several factors affect the success of your enterprise network:

- **Applications**—You use your network only if you perceive value in using it. Useful network applications drive you to learn how to access the network.

- **Reliability**—You do not use a network that is always under repair. You do not allow yourself to become dependant on a tool that is available only on occasion.

- **Widespread Connectivity**—After you learn to depend on the enterprise network, you tend to expect to use it with any system on your network. Otherwise, you must maintain two ways of doing business; use the network in some cases and use the old-fashioned way in other cases.