

# IMPLEMENTING PRODUCTION-QUALITY CLIENT/SERVER SYSTEMS

Barbara Bochenski



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To my mother,
Lillian S. Bochenski,
and
to the loving memory of my father,
Stanley J. Bochenski

# **ABOUT THE AUTHOR**

Barbara Bochenski is President of The Bolden Group which specializes in client/server technology. She has over thirty years experience in information systems as a developer, analyst, manager, and consultant. Her consulting accounts have included many Fortune 500 firms and government agencies including the Executive Office of the President of the United States. Seeing the importance of client/server computing in its infancy, she has been writing about this technology since the mid-to-late-1980s. Known for her ability to take complex subjects and make them easy to understand, her feature articles have appeared in *Client/Server Computing*, *Software Magazine*, *Computerworld*, *Data Management Review*, and other IS journals.

## **PREFACE**

Client/server computing is the most important change that has ever occurred in computing technology. While the very early client/server applications fell only into only certain categories—such as data access and decision support—as the related technologies improve, the variety of applications that are now being implemented as client/server systems continues to expand. Now, nearly all computing systems are being affected.

What we are witnessing is a complete restructuring of our industry. We are transferring from a monolithic architecture where all the work is done on a mainframe to one where many computers—smaller and more economical—are cooperating via a network to achieve the same goals previously accomplished by far more expensive hardware and software. It is no longer a matter of whether we should get involved with client/server and networked computing, but rather a matter of when and how.

## WHO THE BOOK IS FOR

It is important for information systems (IS) professionals and end users to understand what is happening today, and why. This book was written to help readers gain that understanding.

The book provides an overall introduction to the subject of client/server systems. Managers and developers must understand all the basic concepts that are involved with this technology to gain maximum benefit from it. It is still a relatively new approach to computing—especially for those sites that are accustomed to mainframe computing as opposed to distributed computing approaches. However, this technology is also ready for mission-critical production systems. The hardware and the software exists to build excellent client/server systems. Thousands and thousands

of successful client/server production systems are in use today. In the increasing competitiveness of today's marketplace, it is vital that an enterprise be in a position to benefit from this technology.

This book emphasizes the fact that high-quality, industrial-strength client/server systems have been installed, continue to be installed every day, and will dramatically increase in numbers in the future. This book will explain both basic and advanced client/server computing.

### CONTENTS OF BOOK

Chapter 1 provides an overall introduction to client/server computing. It explains why this approach is gaining in appeal right now, and why different people define terms in different ways. It offers ten characteristics that are widely accepted as representing a client/server architecture and compares client/server computing with cooperative processing, distributed computing, and peer-to-peer processing. Chapter 2 describes each of the components that are part of client/server systems. It discusses clients, servers, graphical user interfaces, networks, and interconnectivity techniques.

Chapter 3 describes how various companies are getting started with client/server computing. It discusses the learning curve involved with this new combination of technologies and how enterprises are overcoming it. This chapter also describes which systems are the best candidates for client/server systems and ways of migrating to this new architecture. Chapter 4 explains the affinity between open systems and client/server systems. The client/server architecture is modular with different software components working together. It is to vendors' benefit to have their software products work with complementary products from other vendors. This is an incentive to make products with high interoperability capabilities, a major component of open systems.

Chapter 5, on downsizing, discusses the similarities between client/server systems and downsizing and points out issues related to downsizing such as its hidden costs and what applications are candidates for downsizing. This chapter also describes an installation's experience with downsizing that resulted in a \$2,000,000 a year savings.

Several of the chapters that follow provide detailed descriptions of the major components of the client/server architecture. Client tools are discussed in Chapter 6, graphical user interfaces are covered in Chapter 7, database servers are described in Chapter 8, and networking concepts are introduced in Chapter 9. Examples of products in each category are provided and major issues are explained. The role of object-oriented

techniques and how they are related to client tools, graphical user interfaces, and databases is covered in each relevant chapter.

Communication techniques and intercommunication among modules are vital ingredients in client/server systems. Chapter 9 describes basic networking concepts and standards related to networking, and Chapter 10 contains information about network operating systems and server operating systems. The major server operating systems such as LAN Server, LAN manager, Novell's NetWare, Banyan Vines, OSF/1, and Microsoft's NT, are described, as are peer-to-peer systems. Chapter 11 provides direction for interconnecting different networks with bridges, routers, and gateways. The subject of Chapter 12 is intercommunication among the client and server modules. The two most commonly-used techniques are SQL and remote procedure calls, which are explained and compared in this chapter.

An important issue is the difference between distributed databases, distributed processing, and client/server systems. A distributed client/server system does not necessarily imply a distributed database system, as explained in Chapter 13. Another important issue when building client/server systems is the area of systems management which is explored in Chapter 14. The primary management areas such as change management, configuration management, storage management, and network management are discussed. Security, a critical part of client/server systems, is saved for later in the book; Chapter 21 is devoted to the subject.

Chapter 15 explains the background, technical features, and growing importance of UNIX, while Chapter 16 describes UNIX networking. Many enterprises that have long been IBM shops are installing UNIX client/server systems. Many client/server systems include a combination of UNIX and Windows, UNIX and NT, and other combinations. The Internet, the world's largest network of networks, is also described.

Networking is impacting the computing industry in many ways. We will continue to find new ways to take advantage of networking while reengineering businesses. Chapter 17 describes the basics of electronic mail and how E-mail and client/server systems relate to each other. Chapter 18 describes the importance of standards when building E-mail systems, especially if the E-mail systems are to stand the test of time. Standards like X.400 and X.500 are described and put in context. Chapters 19 and 20 describe new approaches to working together that are now available through networking and the client/server architecture. The more familiar groupware and workgroup computing concepts and products are described in Chapter 19, while the newer workflow, smart E-

mail, and mail enabled applications are put into a client/server context. The growing importance of electronic data interchange among businesses and how EDI relates to client/server systems is also covered.

Chapter 21 is dedicated to security in client/server systems. Since many mainframe systems developers have not had to provide security themselves—it was already provided by others in the enterprise—a review of some basic security concepts is given with an explanation of how they fit into a client/server architecture.

Examples of existing production client/server systems are provided in the final chapter. Chapter 22 describes various client/server implementations according to some of their main features. For example, mission-critical systems are described along with systems that provide improved customer service and those that emphasize connectivity as a critical success factor for an enterprise. Open client/server systems and prepackaged client/server software implementations are also discussed.

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