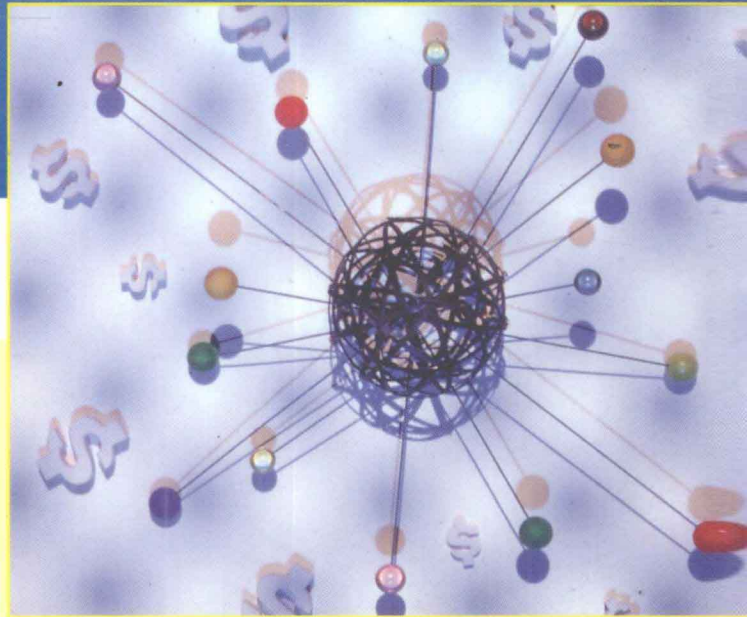


# DESIGNING SYSTEMS FOR INTERNET COMMERCE



**G. Winfield Treese**  
**Lawrence C. Stewart**

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Lawrence C. Stewart**



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## *Preface*

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In 1994, *The Economist* ranked the Internet between the telephone and the printing press in its long-term impact on the world. Just as those inventions transformed society, so the Internet has already begun a transformation—one that is happening much faster than the earlier revolutions. Commerce, of course, is one arena already feeling the effects of the Internet. In the past few years, we have seen dramatic changes in some businesses, the creation of new businesses, and significant effects on others.

In the nineteenth century, fast transportation—the railroad—fundamentally changed commerce. At the end of the twentieth century, the Internet is making fundamental changes to commerce for the next century. We are just at the beginning of the revolution. It is a revolution made possible by technology, offering a tremendous variety of new business opportunities. The technology will continue to change, and change at a rapid pace. New markets will appear and old ones will be transformed or disappear entirely. The short-term changes in technology and markets are important, but the reaction to them must be balanced with a long-term business vision. The challenge is using the technology effectively to achieve business goals.

The audience for this book is what we call the “Internet commerce team.” This team includes people responsible for business and those responsible for technology. It includes those who develop the strategic vision for a company and those who put the strategy into action. In other words, the Internet commerce team is the group of people who work to make Internet commerce happen, from vision to implementation.

Our focus is on making Internet commerce happen and making it successful over the long term. In some ways, Internet commerce seems deceptively simple: companies think, “Let’s put up a Web site and watch the money roll in.” A year later they’re wondering what happened and why it wasn’t successful. As anyone involved in

running a business knows, nothing is ever that easy. The basic rules of business haven't changed, but the Internet does change the playing field. It offers new markets, new ways to get close to customers, and new ways to work with partners.

For some, the excitement over Internet commerce has created a “credibility gap” between grand visions of change and the day-to-day problems of running computer systems for a business. It is easy to paint an exciting vision of the future, yet often difficult to figure out how to get there. This book aims to help bridge this gap, grounding the vision of change with what is possible for businesses to achieve with the changing technology.

Throughout the book, we emphasize both *practice* and *principles*—the what and the why. Practices are the actions—the specific ideas for specific circumstances. Principles are the general rules—the elements on which practices are built. As technology changes (or, for that matter, as business models change), the practices will need to change. The principles, in contrast, change more slowly and can be applied in a wide variety of circumstances. When a team understands the principles underlying what they do, they can adapt to changing circumstances and develop new practices for it. Without that understanding, they can become incapacitated when the situation changes and different practices are needed to be successful.

What the technology brings is a combination of new opportunities, changing cost structures, new customers, and faster response times. The technology opportunities must be combined with and tempered by the business goals. This book is about that combination—designing computer systems for doing business on open networks.

When we say this book is about design, we mean that it is intended to help with the design process. It doesn't give all the answers; the actual design for your business requirements is likely to be very different from someone else's. Nonetheless, we can explore some of the common issues and critical questions to ask when planning any system for Internet commerce. In the process, we look at some of the key technologies of today and apply those technologies in several examples.

A word of warning: at times it may seem that we are overly concerned with potential problems—the things that can go wrong. These are not reasons to avoid Internet commerce. Rather, we think it is important to approach Internet commerce as you would any other business proposition, understanding the downside as well as the upside, the risks as well as the benefits. On balance, using the Internet for commerce can be a tremendous asset for businesses. Doing everything possible to maximize the chances for success is merely good business.

We have created a Web site for this book at <http://www.treese.org/Commerce/>.

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## *Acknowledgments*

This book is an attempt to write down what we have learned about Internet commerce so far. Much of our experience in this area is drawn from our association with Open Market, which began operations in April 1994, but we have applied many of the lessons learned about the Internet and about systems design during our earlier careers at Xerox, Digital Equipment, and MIT, as well as from our academic associations with MIT, Harvard, and Stanford University.

We would first like to acknowledge the great contributions and support we have received in this endeavor from Shikhar Ghosh, Gary Eichhorn, Andrew Payne, Peter Woon, and the rest of our colleagues at Open Market. In one way or another, everyone at Open Market has contributed to this work.

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Writing a book is a challenge not only for the authors, but for our families as well. To our wives, Marie Briasco and Cathy Briasco, and our daughters, Erica Briasco Treese and Samantha Marie Briasco-Stewart, go our thanks and our love. We are truly blessed.

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For I dipped into the future, far as human eye could see,  
Saw the Vision of the world, and all the wonders that would be;  
Saw the heavens fill with commerce, argosies of magic sails

—Alfred, Lord Tennyson<sup>1</sup>

---

Internet commerce has become the new frontier for businesses around the world. Though what is now the Internet began over 25 years ago, only in the past few years have we seen significant use of the Internet for commerce. The explosion of the Internet has been accompanied by claims of business revolution, ways to “make money fast working out of your home,” and even the end of the nation-state. But what is the substance behind the sizzle?

We believe that the convergence of the global Internet with commerce will fundamentally change the way business is done, and this book is about making Internet commerce successful. Internet commerce brings some new technology and new capabilities to business, but the fundamental business problems are those that merchants have faced for hundreds—even thousands—of years: you must have something to sell, make it known to potential buyers, accept payment, deliver the goods or services, and provide appropriate service after the sale. Most of the time, you want to build a relationship with the customer that will bring repeat business.

---

1. Alfred, Lord Tennyson. *Locksley Hall*, 1842.

## *Why the Internet and Why Now?*

In the short term, there are two reasons for a company to get involved in Internet commerce:<sup>2</sup>

- The top line: the ability to reach new customers and create more intimate relationships with all customers.

On the Internet, every business has a global presence. Even small and medium-sized companies can now easily reach customers around the world. The technology of computing and communications enables a business to know more about its customers, share more of its information with customers, and apply that information to improving relationships and creating sales.

- The bottom line: drastic cost reductions for distribution and customer service.

The Internet dramatically lowers the distribution costs for information, and dramatically improves the ability to keep information current. In a world where customers of all kinds are demanding more information about the products and services they purchase, the ability to deliver that information (and do it cheaply) becomes an important part of making the sale. And on the Internet, information may *be* the product.

Over the long term, the Internet may well change the structure of the competitive landscape. Instant communications will transform the relationship between businesses and their customers and the conversion from physical to digital will displace the source of business value. In many cases we cannot yet see the nature of the changes. For example, will the network lead to great consolidation of suppliers or to a flowering of thousands of small merchants each newly capable of global distribution? There are powerful arguments for both. Even more fundamentally, businesses will face competition from companies in completely different industries, requiring fundamental reassessment of their value propositions for the customer.

These considerations follow almost naturally from the technical and economic nature of the Internet. Following are some of the key properties of the Internet.

- The Internet is interoperable.

Almost by definition, a computer is connected to the Internet if it can communicate with any other computer connected to the Internet. There are two factors that make this possible: the use of standardized protocols and the availability of universal naming, addressing, and routing. The standards of the Internet make this communication possible, without requiring prearranged agreements about how computers will communicate.

---

2. An alternate view is that the two reasons for a company to get involved in Internet commerce are the same as those for many areas of business: fear and greed.

- The Internet is global.

Because the Internet structure is based on standardized and universal connectivity, it has rapidly become a global network. Since the network itself is used to distribute software, there is a readily available worldwide base of users with a common set of software, forming a foundation for business systems with a broad base of potential users.

- The Web makes it easy.

The World Wide Web<sup>3</sup> has made highly functional multimedia content easily available to users worldwide. People with little or no computer experience can get connected to the Internet and use Web browsers very successfully.

- The costs of the network are shared across multiple applications and borne by the end users.

Most businesses and consumers connected to the Internet pay for their own connections, and they are then free to use the network for any number of purposes. In consequence, a provider of information does not need to pay for a distribution system, other than its own connection to the network. The users of the service pay for the distribution. Because the network is shared among many users, the cost of this essential infrastructure is amortized across a wide variety of applications.

### Access to a Global Market

“Globalization” is a common word these days, as advances in communication and transportation make it possible for businesses to operate worldwide. Suppliers and customers may be located anywhere. In many cases, countries are lowering or removing barriers to trade, encouraging more and more international commerce.

The Internet is accelerating this trend. By providing worldwide, high-bandwidth communications, the Internet makes it possible to work more effectively with customers, partners, and suppliers around the world. But it also does more than that. Because the cost of the communication is essentially the same whether the parties are down the street or halfway around the world, the Internet makes such collaboration and commerce much more efficient.

In effect, everyone on the Internet can have a global presence. More to the point, everyone on the Internet actually does have a global presence, whether they think of it that way or not. Anyone on the Internet can view your Web page, for example, and you don’t have to do anything special to enable him or her to do so.

---

3. Like many technologies, the Internet comes in layers. The base layer of the Internet includes the fundamental naming, addressing, routing, and communications machinery. Above that, the World Wide Web is a particular, extremely popular, application that uses the Internet for communications. In turn, business applications can run layered on top of Web technologies.

This is not to say that the Internet makes international trade worry free. As we shall see, there are still issues of payment, currencies, shipping, and differing national, regional, and local regulations. But for many businesses, the experience may well be like any number of small bookstores who put up Web sites and suddenly received orders from Indonesia or Nepal. That the Internet is already making the world smaller is not an overstatement—it's the daily experience of millions of Internet users.

### **Dramatic Reduction in Distribution Costs**

In the U.S., sending a printed brochure or catalog in bulk through the postal service can cost several dollars for each recipient. Sending the equivalent in electronic mail, or simply providing the same “brochureware” on a Web site, requires some up-front investment to be on the network, but the per-recipient cost is nearly zero.

One of the most intriguing possibilities of the low distribution costs is the ability to provide even more information at lower cost and to have that information be up-to-the-minute accurate and searchable. Customers of all kinds are demanding more and accurate information about what they buy. Electronics engineers are interested in detailed specifications, sample schematics, and design notes for components that they might use for a new product. Consumers want to know how the product works, how it compares to others, even its environmental impact. The low cost of providing such information over the Internet makes it possible to do so—any other way would be prohibitively expensive.

Of course, the same ideas hold for selling information or software online. These “digital goods” can be delivered over the network cheaply and efficiently. For some products, that can mean eliminating expensive packaging (boxes, CD-ROMs, packing material, etc.) entirely. For others, it is a new distribution channel that complements the channels already in place. The cost, low to begin with, is the same for customers all over the world.

---

## *Strategic Issues*

We believe the advent of the Internet brings with it two strategic issues: concentration versus empowerment, and new competitive challenges.

### **Concentration versus Empowerment**

The Internet permits direct access from creators of value to consumers, and greatly reduces the costs associated with distribution. This could lead to great concentration of suppliers or to the opposite—the creation of tens of thousands of small and medium-sized suppliers to global niche markets. It seems likely that both will happen. On the one hand, there may be a handful of music supersites combining excellent prices, great customer service, and worldwide distribution, but there won't be hundreds. On



the other hand, easy access to a global community can enable marginal niche markets to reach a critical size capable of supporting a profitable business. For example, an electronic store serving the global market for antique buggy whips could be a viable business.

### **New Competitive Challenges**

The Internet short circuits traditional distribution chains in a way that can change the nature of competition. The most obvious changes are those of geography and cost structure. Because it is not necessary to create an expensive distribution channel to enter a new territory, the Internet can bring formerly disjoint enterprises into direct competition. For the consumer these lowered barriers of entry can create advantages, but for the producer costs and efficiencies must become competitive worldwide.

More interesting things start to happen when competition crosses between whole industries. Consider the example of selling financial instruments. Traditionally, banks and brokerages have provided trading services, whereas publishers have provided comparative information. On the Internet, these lines become blurred and may disappear entirely. Because content can be linked directly to transaction, a user who links to a financial information site could place an order on the spot. Is the publisher in the trading business or is the brokerage now a publisher? Sometimes the situation defies analysis, but thinking through who owns the customer relationship is a good place to start. As always, keep a very clear view of the value provided by your business to your customers.

---

### *What Do We Mean by “Internet Commerce”?*

So far, we have used the term *Internet commerce* generally, without being specific about what it means. Internet commerce means many things to many different people, so we want to be precise about what it means in this book. By Internet commerce, we mean the use of the global Internet for purchase and sale of goods and services, including service and support after the sale. The Internet may be an efficient mechanism for advertising and distributing product information (sometimes called *brochureware* in the trade), but our focus is on enabling complete business transactions.

### **Other Types of Electronic Commerce**

Internet commerce is but one type of the more general “electronic commerce.” Electronic commerce has a much longer history, though much of it was behind the scenes, typically linking suppliers to large manufacturers or service organizations. Speaking broadly, electronic commerce includes the use of computing and communication technologies in the financial business, online airline reservation systems, order processing, inventory management, and so on.