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● Kent Information Services

Graves Justice

The CPA's Guide to Web Commerce

AMERICAN INSTITUTE OF CERTIFIED PUBLIC ACCOUNTANTS

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The CPA's Guide to Web Commerce

*John Graves, CPA
Jacqueline Justice, Ph.D.*

Published for the AICPA by



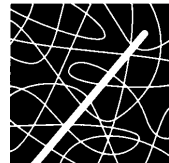
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AICPA Technology Series

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Title:

THE CPA'S GUIDE TO WEB COMMERCE

Authors:

John Graves, CPA
Jacqueline Justice, Ph.D.

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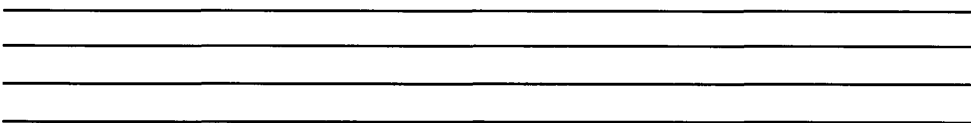
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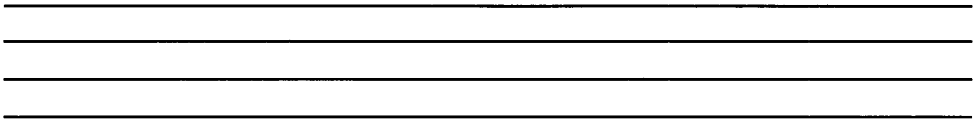
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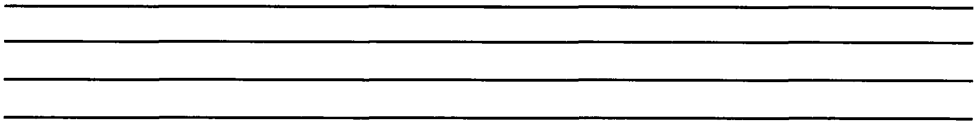
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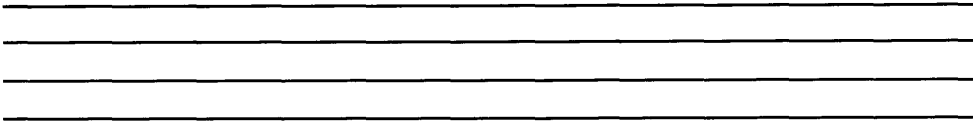
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October 1, 1996
John Graves, CPA
Jacqueline Justice, PhD



Chapter One

Electronic Commerce and the Evolution of the Internet

Sheila Scott, Vice President of Communications at Wilhelp Yoo Advertising, has been traveling back and forth between the East and West Coasts, trying to get the West Coast office up and running. As a result, she has had no time to shop for her daughter's birthday present. On the way back from Los Angeles, she logs into her Internet account, desperate to find a gift appropriate for her daughter, who is a sophomore at Oberlin College.

She browses through one of the most popular online clothing stores, Netwear International, Inc., and finds a floor-length purple velvet skirt with black embroidered roses and lace inlays that her daughter, who is into both purple and strange clothes, will just love. Sighing and shaking her head at what has become of the younger generation, Sheila fills out the form at Netwear International, Inc., ordering a size ten "Purple Passion" skirt. She notices that Netwear accepts Online Cash, and, rather than send her Visa card number from the airplane telephone connection, she decides to use her account with that service. A part of the form she fills out to order the skirt asks for her Online Cash account ID number, which she types in the proper box. She sends the form and then settles down to work on the report she will submit to the President of Wilhelp Yoo Advertising.

The server computer at Netwear receives Sheila's email and kicks into action. It processes the information Sheila typed in the form, adds Sheila's name and buying preferences to the marketing database, and automatically confirms the validity of her Online Cash account. After successfully completing the login and verification procedures that establish Netwear's computer as a legitimate client, the Online Cash server computer asks for Netwear's Accounts Receivable account number, so Netwear's computer sends that information. Online Cash's computer also requests Sheila's account number as the account to be debited. A final query by Online Cash's computer requires a description of the merchandise being sold; the Netwear computer sends Sheila's order for a size ten "Purple Passion" skirt. Netwear's computer then logs out and breaks the connection.

After receiving the incoming information from Netwear, Online Cash's computer proceeds to email Sheila Scott at the address that she specified when she established her Online Cash account. The email message lists the buyer (Sheila Scott), the seller (Netwear International, Inc.), a description of the product, and the amount to be transferred and the currency in which the transfer is to take place.

As the plane is beginning its final landing pattern, Sheila logs in to her email account once more in order to respond to the confirmation query she knows Online Cash will send her. She finds the message waiting for her. After verifying the terms of the purchase, she clicks on the return button and types "YES" in the text of the message. She then logs off and returns her laptop to its carrying case in preparation for landing at La Guardia.

In a matter of microseconds, Online Cash's computer system receives Sheila's email confirmation and, after verifying that her account has the proper amount of credits, transfers the virtual

cash from her account into the Accounts Receivable that Netwear International specified. At the same time, the computer sends a message to inform the Netwear server computer that the money has been transferred successfully.

Once the Netwear computer system receives that transfer notification, it sends an order to the stock room for a size ten "Purple Passion" skirt to be shipped to the address specified by Sheila Scott on her initial order form. The computer in the stockroom creates an invoice for the skirt. A stock clerk reads the invoice and pulls a size ten skirt off the rack and packages it for shipment. Meanwhile, the computer uses the information that Sheila typed in her electronic order form to print a birthday message and the mailing label needed to ship the package. The stock clerk wraps the package with the birthday message, attaches the mailing label, and tosses the wrapped box in the bin full of packages ready to go to the post office in the morning. The clerk clicks on the electronic invoice's "Sent" button. The computer system processes the inventory reduction and automatically updates the stockroom database.

As it is updating the stock list, Netwear's computer system recognizes that the inventory of size ten "Purple Passion" skirts has dropped below the number established as minimum stock in the software setup. The computer's logging and statistical program notes the number of skirts recently shipped and calculates, based on probability, how many new skirts it will need from the manufacturer in order to meet the projected demand without overloading the warehouse. Netwear's computer then places a reorder for one thousand skirts from the manufacturing company, We Specialize In Velvet.

The manufacturer's computer receives the reorder form from Netwear. It sends an electronic invoice to the head of the

Women's Sportswear department, and, as it processes the supplies necessary to complete the order, it recognizes that Women's Sportswear has just enough purple velvet and black lace to complete their current order for "Wild Witch Capes" and for the "Purple Passion" skirt. As it has been programmed to do in such instances, We Specialize in Velvet's computer system automatically submits an order to their velvet supplier, asking for a special shipment of purple velvet to be drop-shipped immediately.

Penny Justis, CA, the outside financial consultant for Plush & Sons, Velvet Suppliers to the World, arrives early at the Liverpool factory of the London-based company. It is the end of the month, her time to begin the monthly review of transactions on the electronic commerce site that she helped Plush & Sons install last year. Before she begins her check of the logins by internal employees this month, she notes with satisfaction the new orders that came in the night before: five orders from the United States, two from Belgium, six from Japan, and ten from Australia. One year ago, she fought long and hard to convince the fairly conservative Plushes to implement an electronic commerce site. Today, however, she and they are seeing the fruits of her labor. While Plush & Sons used to receive orders solely from the United States and Britain, the electronic commerce site has opened up a whole new world of trade possibilities. She boots up the logging program and goes to the employee break room to get her morning cup of tea, satisfied with a job well done.

Today's Business Environment

Today's financial professionals are in the midst of a technology explosion. The expanding information superhighway has

revolutionized the ways that organizations deliver and retrieve vital information both internally and externally. High-performance computers and powerful software programs are available to both small and large businesses. The growing use of computers in organizations has resulted in an ever-increasing need for personal computers to communicate with one another:

1. To access shared data.
2. To exchange information.
3. To make the most of limited resources by distributing applications across more than one computer.

Networking technologies allow communication between computers connected across very large distances (such as the Internet) and computers connected across short distances (such as local area networks).

In addition to technological advances that challenge business professionals to expand their skills and change the way they think about information dispersal, today's business environment is characterized by organizational efforts to analyze and redesign existing business processes. Small and large organizations are pushed to achieve improvements and to streamline the business processes they use to create, manipulate, transfer, and store business-critical information. This movement towards restructuring for quality and efficiency is commonly known as BPR, or business process redesign. Among other things, BPR suggests that organizations can achieve these improvements by examining all transactions, internal and external, in terms of customers that need to be served efficiently. For example, in BPR terms, Netwear's order-processing department is an internal "customer" served by the stockroom. The Netwear stockroom is an external "customer" served by the We Specialize in Velvet order-processing department, which is an internal "customer"

served by the Women's Sportswear department. The Women's Sportswear department is an external customer served by Plush and Sons, and various other suppliers, and so on. Notice that when each "customer" is identified in this way, the individual transactions that occur at each step can be examined for efficiency.

You may have already participated in a BPR or other quality-improvement initiative (TQM or ISO 9000, for example), or you may be facing such a project now or in the future. In either case, the Internet and its related technologies are sure to be a factor in your thinking about business process improvements. One of the most exciting applications of Internet technology today is electronic commerce.

Put simply, electronic commerce is the computer-to-computer exchange of business information and transactions. At its best, it enables the flow of information—orders, payment, delivery, and inventory—without human intervention. Once data has been entered into a computer system, the flow of information is seamless from the beginning to the end of a business transaction, reducing opportunities for errors by eliminating the data-entry steps as often as possible.

A CPAs Guide to Web Commerce will prepare you to succeed in the evolving business environment described in the "Netwear" example above. You will learn how to evaluate the usefulness of electronic commerce technologies for your company, your firm, and your clients; you will also learn how to manage electronic commerce projects from start to finish. Whether you work in an accounting firm, the accounting department of a large organization, or are a consultant for an organization, such as Plush & Sons, considering electronic commerce options to enhance their current business strategies, ***A CPAs Guide to Web***

Commerce will help you understand the applications of this rapidly growing and infinitely useful new technology.

The Internet

As you probably guessed, the scenario with Sheila Scott ordering a birthday present for her daughter is fictional; however, the technology described in that example is quite real. And, it is being used by a growing number of technology-wise professionals in diverse organizations, including

- Banking
- Entertainment
- Government
- Manufacturing
- Retail
- Computers
- Financial Services
- Health care
- Publishing
- And many more

As with other important inventions (the telephone, the light bulb, and the automobile, for example), the inventors of the Internet probably had no idea that the technology they were creating would, quite literally, change the world. If you are among those people who have been watching the development of the Internet, you have probably been impressed by its rapid growth and its clear advantages as a communication tool. But you may also have been wondering what the technology has to offer accounting professionals. The Internet has been and will continue to be a resource for peer networking and research that no accountant can afford to ignore; it offers valuable discussion groups devoted to professional issues, provides access to government documents and forms, and is a rapidly growing marketing medium for generating referrals and new client leads.

But the Internet has also become the key to solving the business workplace problems that plague financial and other business professionals. Indeed, the Internet is a technology that can boast flexibility across computer platforms and software, reasonable stability, ease of use, effective information distribution channels, cost-effectiveness, and enormous growth capabilities.

The History of the Internet

The model for the Internet came from a 1964 paper prepared by the RAND Corporation (America's foremost Cold War think-tank) in response to military concerns about the Cold War erupting into an all-out military confrontation. The RAND plan proposed the construction of a military computer network with (1) no central point, that is, no one target that was more important than any other, and (2) continued functionality even if major sections were destroyed, presumably by a nuclear attack.

To meet these two criteria, the RAND plan proposed a system built on a technology called "packet-switching." In this type of system, all nodes (terminals in a computer network) are equal in status, with equal authority, and all nodes are equally capable of originating, passing, and receiving electronic messages. The messages themselves are divided into small pieces called "packets," and each packet is separately addressed. Every packet begins at some source computer terminal, and ends at some specified destination computer terminal. Each packet makes its way through the network on an individual basis. The particular route chosen by any packet is unimportant. In this way, the network is insured to continue to function even if some major part of it is destroyed. Although this system may seem inefficient and repetitive on the surface, its decentralized structure is certainly rigorous—blastproof, so to speak.

In 1969, three years after the RAND proposal, the Advanced Research Projects Agency (ARPA) was commissioned to build a network based on this packet-switching model. The first problem they were forced to overcome was the diverse array of computer hardware distributed over scattered geographic areas. To solve this problem, ARPA developed a set of protocols, or rules, that could be used with these various computers. The protocols act as a kind of translator that allows the computers to “talk” to one another. The NCP (Network Control Protocol) was developed and by 1972 the first packet-switching network, called ARPANET, was demonstrated publicly at the International Conference of Computer Communications. Although at the time ARPANET consisted of only 40 computers, this early model paved the way for the development of TCP (Transmission Control Protocol) and IP (Internet Protocol) that control the transmission of data on the Internet today. These two protocols share the responsibility of formatting packets for transmissions, directing packets to their destinations, and then structuring the packets for use at the destination site.

By the second year of ARPANET’s operation, it became clear that the main use of the network was not long-distance computing, but news and personal messages. ARPANET researchers were using the network to collaborate on projects, to trade notes, and sometimes simply to gossip. It wasn’t long before the first mailing list was created (called SF-LOVERS and devoted to discussions of science fiction). Although ARPANET administrators discouraged this non-work related activity, as you can guess by the thousands of mailing lists operating on the Internet today, non-work activity on the network didn’t stop.

Throughout the seventies, the network grew. Because of its decentralized structure, unlike corporate computer networks built on proprietary systems, the ARPANET could accommodate any

type of machine, as long as it understood TCP/IP protocols. Since the TCP/IP software is public domain (available for free to anyone), it was relatively simple for anyone to join the network. As early as 1977, TCP/IP was being used to link other networks to ARPANET, and in 1982, the Department of Defense endorsed TCP/IP as the networking standard and the Internet was defined as a connected set of networks using TCP/IP protocols.

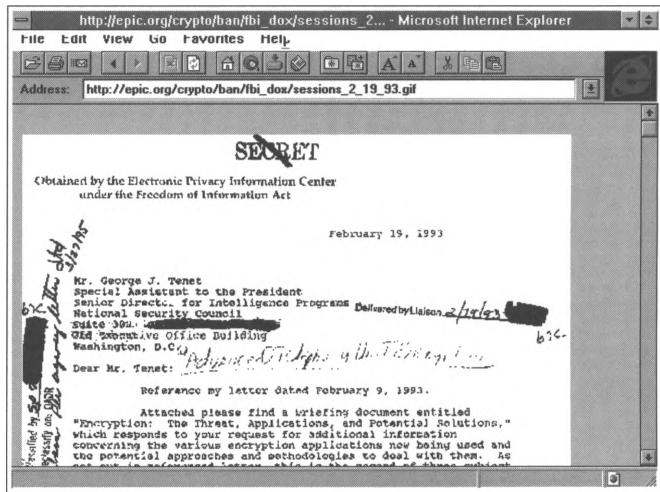
As the Internet grew, ARPANET became a smaller and smaller segment of the entire network structure and eventually broke off and became MILNET. Since that time, the Internet has continued to grow as a communications medium for business, government, and personal users, expanding at a phenomenal rate never imagined by the original inventors.

Perhaps the most important Internet tool that has developed, the tool that has done the most to bring the Internet into offices and living rooms around the world, is the World Wide Web. In addition to being the most popular of all the tools currently used on the Internet, the World Wide Web is also the most powerful resource for document management that Internet technology offers business users. The World Wide Web was initiated by American academic Tim Berners-Lee at the European Laboratory for Particle Physics in Geneva, Switzerland. He developed the concept of a universal library of knowledge connected across computers and networks with easy-to-use point-and-click links. This library was visualized to contain text, graphics, and sound—a true multimedia network on a global scale. The World Wide Web is that library realized and functioning today.

Of course, as with any other rapidly growing organism, the Internet has experienced some growing pains. As early as the early seventies, debates were raging in Congress about whether or not the government or law enforcement officials should have

complete access to the electronic information being relayed on the Internet. These debates continue today. According to the Director of the FBI, Louis Freeh, in his speech given before the Congress on September 21, 1995, this debate is essentially about the same issues that the Congress was facing in 1968. The Omnibus Crime Act, passed by the Congress that same year, allowed law enforcement agencies to conduct electronic surveillance. In brief, the Congress had decided, and believes even today, that “the public safety interests [are] important enough within the confines of the Fourth Amendment to warrant extremely strict regimes of control to be implemented, adhered to, and vigorously enforced” (<http://www.fbi.gov/crypto.htm>) in regards to who is allowed to encrypt information, what types of information is encrypted, and how rigorously information is allowed to be encrypted. At the core, the government is worried that encryption techniques that allow information to be encoded too well will allow all manner of “bad guys” (such as terrorists, organized criminals, nuclear smugglers, drug traffickers, or spies) to send messages and make plans over the phone lines—right under the government’s nose.

Figure 1.1
Government memo concerning encryption and its threats.



To combat the possibility of criminals using the Internet as a communications source, the American government has maintained a policy of only allowing 40-bit encryption on messages transferred outside of the US. In comparison, within the US, companies are allowed a 128-bit encryption scheme. Furthermore, US companies are forbidden to sell encryption systems of over 40-bits to other countries, a policy that has harmed, and continues to harm, the growth of international electronic commerce.

“‘The whole law’s kind of ridiculous,’ said Peter Trei, a senior software engineer at Process Software Corporation of Framingham, Massachusetts. Trei said 40-bit encryption technology is not good enough to safeguard commercial transactions and to protect against industrial espionage” (<http://techweb.cmp.com/cwi/current/50n1.html>). Witness to this statement is Damien Doligez, a French researcher who cracked the encryption code of the non-US version of Netscape *Navigator* in just eight days. “Once the bugs are worked out,” Doligez said, “a group of computers will be able to crack Netscape’s 40-bit code in as little as half a day.” (See Doligez’s Web page at <http://pauillac.inria.fr/~doligez/ssl/> for his original and revised statements, Netscape’s response, and links to related documents.)

The debate over encryption and the loss of international trade due to the lack of appropriate encryption software has been a hot issue during the Clinton administration. In 1994, a product developed by the National Security Agency, the “Clipper Chip,” was touted by the Clinton administration as the answer to international encryption problems. The Clipper system is based on the idea of key-escrow. Basically, for any company subscribing to the Clipper Chip, two government agencies would

hold the keys to encryption in “escrow.” Then, anytime a law-enforcement official desires to view the company’s electronic records, the two government agencies would supply the keys to unlock the code—all subject to court order, of course.

All of this controversy has caused businesses wanting to implement electronic commerce sites to be, legitimately, skeptical and somewhat fearful about implementation. However, a solution to the government encryption ban is in sight. According to CMP Media, Inc., the Clinton administration announced in August of 1996 that it would “soon release an alternative to the US government’s Clipper Chip system that would allow companies to export software with 64-bit encryption capabilities” (<http://techweb.cmp.com/cwi/current/50n1.html>). This 64-bit system, being longer than the 40-bit system currently available, would require more time and computing power to decode, according to Mike Homer, Vice President of Marketing at Netscape. While this 64-bit system is a far cry from the 128-bit encryption allowed within US territory, it is secure enough to protect most electronic transfers, say top officials at Netscape and other industry experts (<http://techweb.cmp.com/cwi/current/50n1.html>).

Electronic Commerce

Financial professionals who have been working on the Internet, and have become accustomed to the friendly and easy-to-use interface offered by Web browsers, are not surprised that this exciting technology is now being used to conduct electronic commerce transactions among different types of businesses and across computer platforms. After all, one of the remarkable aspects of Web browsing is that it is easy. Even creating Web

documents is easier than most users expect. Using hypertext mark-up tags and a simple text editor, anyone can produce documents that combine text and graphics, readable by any Web browser. Many electronic commerce sites use this simple document-creation method as an economical way to take their businesses onto the Web.

Although World Wide Web technology is one of the most visible and publicized aspects of electronic commerce, the World Wide Web is only one of the Internet resources that can be useful to businesses implementing electronic commerce sites. Internet sites also improve company performance by facilitating collaboration and data sharing, even among employees working in different offices or different countries. An Internet site can even solve the problem many companies have been struggling with for years—sharing data across different computer types running different software.

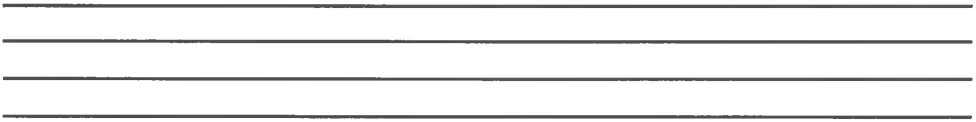
Electronic Commerce Statistics

The Gartner Group Internet Strategies Section (<http://www.gartner.com/whatsnew/inettv.html>), a research and consulting firm that concentrates on the potential of the Internet and the World Wide Web for electronic commerce, claims that “the Internet is going through adolescence in 1996: experiencing tremendous growth spurts, shedding some of the insouciance of youth, acquiring some of the maturity, disciplines and responsibilities of adulthood; the promise and appeal of universal connectivity and access to people and information is overwhelmingly compelling, and will continue to drive Internet growth in a rapid upward trend (despite the Internet’s flaws), accompanied by interim corrections.” The stages for Internet growth that Gartner predicts indicate that electronic commerce will be “a must for most businesses” by 2000.

Forrester, Inc. (<http://www.forrester.com/>) predicts that the Internet will continue to grow, both in size and in sales volume. They also assume that some areas of the economy, especially computers, communications, publishing, retail, information services, entertainment, and financial services, (identified by Forrester as “core” users) will be greatly changed by the emerging Internet. Forrester expects this type of growth to continue and estimates that “\$45.8 billion of US Internet-related revenues [will be] created in these sectors and \$46.2 billion of financial assets [will be] managed on the Net.” This growth has already begun in some business areas. 1-800-FLOWERS reports that its Web site is the fastest growing part of its business. Their sales on the Web have tripled in the last three months, according to chairman Richard Thalheimer, who also maintains that security is not a worry for either the company or the clients.

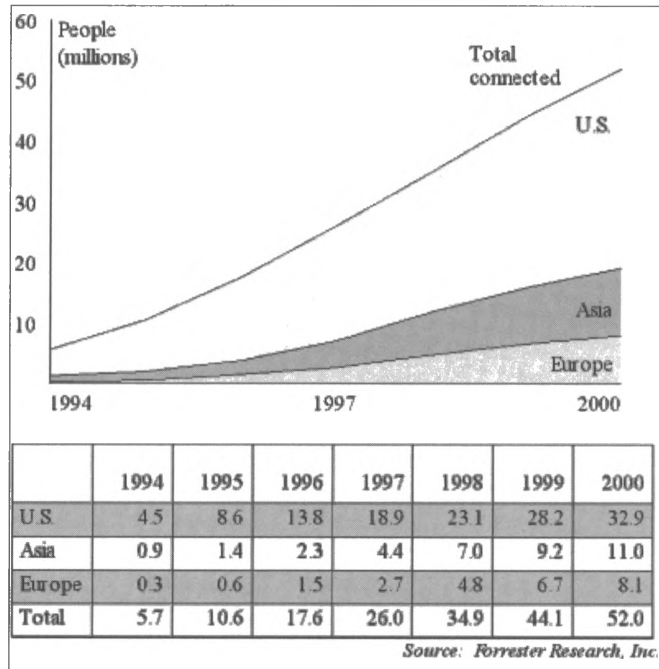
From now until 2000, the Internet can do nothing but expand. As home PCs become less expensive and more and more families go online, the Net will become the infrastructure for transactions that we can only begin to imagine. In fact, Forrester predicts that:

- The Internet’s population will grow fivefold, will become more international, will be better balanced between men and women users, and will be more home-based rather than work-based.
- Businesses and schools will offer connections to their employees and students. “By 2000, Forrester expects half the American university population to be wired, as well as over 10% of the labor force.”
- The infrastructure will stabilize as telecommunications become faster and tools become more sophisticated.
- Governance will come from national governments who won’t allow illegal activity within their countries and from online service providers who will police illegal activity from within.



The chart below illustrates Forrester's growth predictions:

Figure 1.2
Forrester's
predictions for
Internet user
growth.



Forrester also published an analysis of how the Internet will impact the major industrial sectors of the US. Again, they expect \$45.8 billion in revenues by the turn of the century, \$14.2 billion in the Internet infrastructure, \$2.8 billion in consumer content (advertising and subscription fees), \$6.9 billion in business content (business information that is now provided on paper), \$21.9 billion in online trade. And, Forrester expects an additional \$46.2 billion in financial services (self-service mutual funds).

While these numbers represent expected growth just within the Internet economy, the impact the Internet will have on the physical economy has not been, and probably cannot be, measured. Forrester also expects that the Net will ease communications—between people, between companies, and

within companies. An email message to a client advising him to buy a certain type of stock or an email message from a prospective buyer asking for a brochure listing your organization's consultants and the projects they undertake will cause a growth in the physical economy.

The bottom line is that moving aggressively into the Information Age will have benefits for accounting professionals—whether the profits are actualized online or in the physical world. Hambrecht & Quist (<http://www.hamquist.com>) predict that, in fact, the “Expertise” section of the online market—business consultants—will be earning \$700,000,000 by the year 2000. Moreover, according to Data Corporation International, we can expect an increase in both users who buy from home (from 28% in 1995 to 67% in 2000) and business buyers (from 19% in 1995 to 45% in 2000). The online economy is beginning to move, and CPAs comfortable in cyberspace will be moving with it!

1.18 ELECTRONIC COMMERCE AND THE EVOLUTION OF THE INTERNET



Chapter Two

Electronic Commerce: Why Bother?*

In this chapter, we will describe the ability of electronic commerce technology to alter current market strategies. The basic question we will attempt to answer is: What are the business benefits of electronic commerce? You may be asking this question yourself, or perhaps you've been asked to answer this question for your organization or your client's organization. You may even be skeptical about the ability of electronic commerce to live up to the promises of commerce software vendors.

Frankly, you have good reason to be skeptical. According to Jim Ho's study of 1000 electronic commerce sites, "Use of the Web to process business transactions is largely undeveloped. Online ordering, with or without secured payment, is, in most cases, only a slight extension of electronic mail." (For more information about Professor Ho's study, visit his Web site at <http://www.uic.edu/~jimho>). In large part, this may be because secure payment technologies are still developing, but, in this chapter, you will begin to see that electronic commerce is more than online transactions—it is an entirely new way of thinking about your business activities, both internal and external.

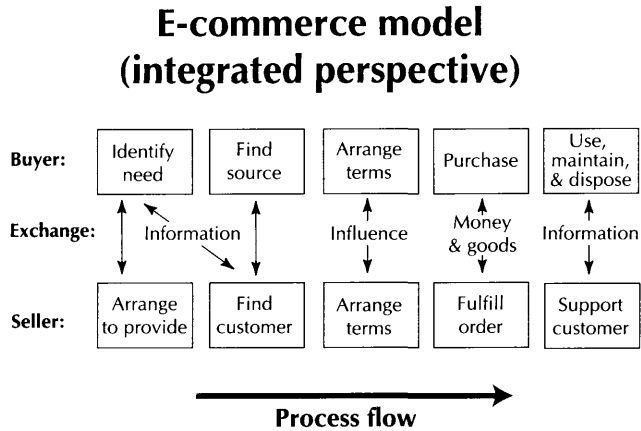
* This chapter is an adaptation of "On the Road of Electronic Commerce—a Business Value Framework, Gaining Competitive Advantage, and Some Research Issues" reprinted with the permission of the authors, Michael Bloch (a doctoral candidate at the University of Lausanne, Switzerland), Yves Pigneur (a Professor at the Business School of the University of Lausanne, Switzerland), and Arie Segev (a Professor at the Walter A. Haas School of Business, at the University of California at Berkeley).

What is Electronic Commerce?

Let's begin with the basics. Electronic commerce has been defined many ways. For the purposes of this text, we define electronic commerce as "support for any kind of business transaction over a digital infrastructure." This matches the broader use some companies make of electronic commerce. For instance, Silicon Graphics (<http://www.silicon.com>), a global manufacturer of high-end computing equipment, uses its presence on the World Wide Web as a way to provide information to its customers (access to product brochures and price lists), as a marketing tool (allowing a customer to contact a sales office), as a sales channel (online ordering of software products), and as a support line (making available software patches and frequently asked questions and answers). Another example is the Bank of America's (<http://www.bofa.com>) recent introduction of financial data exchange transactions over the Internet.

Seen from a buyer-seller perspective, electronic commerce can be used in all the phases of a commerce transaction, as is illustrated in the diagram below:

Figure 2.1
A model of
electronic
commerce.



Features of Electronic Commerce Systems

Electronic commerce systems can be of significant value for new customer-management strategies, mainly because they

- Directly connect buyers and sellers.
- Support fully digital information exchange between buyers and sellers.
- Suppress time and place limits.
- Support interactivity and dynamically adapt to customer behavior.
- Can be updated in real-time, and, therefore, are always up-to-date.

In this chapter, we will consider mostly consumer-oriented electronic commerce systems, that is, systems which interact directly with end-customers, rather than business-to-business systems (for instance, EDI, which is covered in the appendix to this book). But, as you know, current BPR efforts have refined our working definition of "customer" to include internal as well as external customers. Keep this expanded definition of your customer and client base in mind as you consider the

applications of electronic commerce to your own organization and to the organizations of your clients.

Not everybody is convinced of the value of electronic commerce for an organization. Some, for instance, think the Internet is like the Gold Rush in the 1800s, where only Levis, the jeans sellers, and pick sellers were making money. Others believe that businesses investing in the World Wide Web today may benefit, but only at some unspecified future date.

Our belief is quite different, and the objective of this chapter is to demonstrate the value an organization can derive **today** from using electronic commerce. This belief is supported by consultants, including McKinsey, which predicts that home shopping will be a \$ 4-5 billion market by 2003 (*The McKinsey Quarterly* 1995). Companies such as Silicon Graphics are living proof of the value of such projects; with more than 15,000 user visits a day, the brand awareness and communication possibilities created by their Internet presence would be unachievable by any other means, with a similar advertising budget.

Gregory Wester and Stephen Franco outline the shakeout expected in the Internet industry in 1996 in the Yankee Group's Interactive Commerce Research Bulletin. They argue that too many companies started investing in the Internet without first having developed sound business strategies. As the costs of running an online presence increased, these organizations were forced to leave the Web, since they could not justify a continuing online presence without solid business benefits. While these types of experiences have been frequent in these frontier days of online business, do not conclude that business on the Internet is a passing fad. Rather, the Internet is here to stay and the key to business success on the Internet is shaping a clear strategy before investing. A crucial part of developing a working plan is to

understand the value of electronic commerce. This chapter will help you to understand the benefits that electronic commerce can offer both large and small organizations.

Typically, we evaluate new technologies in an existing context, by exploring how the technologies can be used to increase the efficiency of current processes. In the case of electronic commerce, for example, we would focus on the ways that electronic commerce could replace traditional methods for finding vendors, ordering goods and services, and paying for purchases. But electronic commerce also enables new possibilities, unfeasible before, especially through its interactive nature, and you should be certain to include these new possibilities in your thinking about the market strategies that electronic commerce will make possible for you and your clients.

Electronic Commerce and Business Value

Making money from direct sales is certainly the most obvious way of profiting from an electronic commerce site. Nevertheless, there are many others. The following table describes the various components of the three major ways that electronic commerce can benefit an organization—by improving current processes, by transforming current processes, or by redefining the organization.

Figure 2.2
*The components
of the business
value of
electronic
commerce.*



The three main categories in the chart—improving, transforming, and redefining—refer to changes in the global business model of an organization and the impact of electronic commerce in terms of business results. Transforming an organization requires more creativity, more work, an additional level of risk, and a different timeline than simply improving it. Obviously, the expected rewards match the additional burden. Note that, in some cases, an “improvement” of a business component (for example, sales channel) will actually lead to a redefinition of the core business. The categories we propose in the chart, therefore, should be understood to be flexible, inter-related, and overlapping. In addition, these large groups can also be broken into ten more specific business benefits that we will describe in this chapter:

1. Enhanced product promotion
2. New sales channel for existing products
3. Lower costs for delivering information
4. Reduced time lag for delivering information
5. Improved customer service
6. Enhanced corporate image
7. Advanced technology knowledge
8. Personalized customer relationships

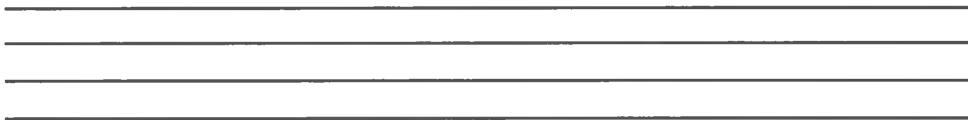
-
-
-
-
9. New and customized products
 10. Innovative business models

Product Promotion

Through a direct, information-rich, and interactive contact with customers, electronic commerce can enhance the promotion of products. The first use of electronic commerce is to provide product information to customers, through online electronic brochures or buying guides. This can be seen as an additional marketing channel that will allow you and your clients to reach a maximum number of customers. The primary advantage of electronic commerce as a way to deliver product information is its availability anytime and anywhere, provided the customer has the right infrastructure (PC, modem, online service). But using an electronic medium also allows for interactivity and customization. Some of the ways businesses can customize the advertising content, based on the customer profile or input, are

- Change the content description (simple or complex).
- Display only a range of products that are relevant to the particular customer.
- Change the price (such as, discounts for club members or frequent buyers).
- Allow for new functionalities in some cases (such as, a coupon available only under certain conditions).
- Change the path used to navigate the site.

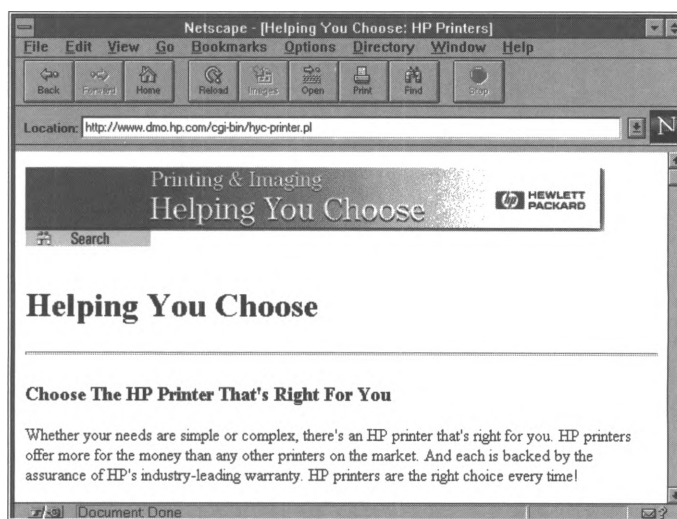
For instance, an electronic store could provide different graphical user interfaces for children, teenagers, or homemakers, with a look appealing to each of these segments. The advertisements appearing on the pages would also be different, with toys for the kids, music for the teens, and household products for homemakers. This is consistent with trends in marketing, such as micro-marketing or one-to-one marketing, which try and target



each consumer with a specific message, according to specific needs and desires.

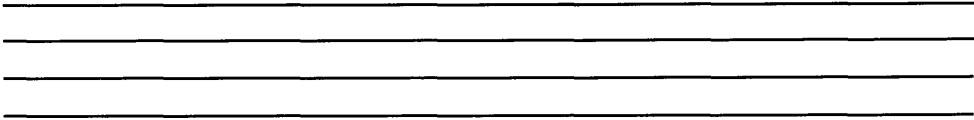
Another good example is Hewlett-Packard (<http://www.dmo.hp.com>) and its reference guide to buying a printer.

Figure 2.3
The Hewlett-Packard “Helping You Choose” page.



The system asks the customer to identify his/her needs (price range, need for color, etc.) and presents a customized version of the catalog, selecting only the printer models which match the stated needs. In the service industry, Bank of America enables the customization of its “home page” on the Web, allowing the customer to bundle all the information services the bank provides in one convenient, easy-to-access page.

In a world where products are increasingly difficult to differentiate and have shorter life-cycles, electronic commerce offers an opportunity for new promotion strategies and enhancing the brand recognition of products. As such, the quality of the electronic “advertisement” is of primary importance in product promotion at an electronic commerce site.



New Sales Channel

Thanks to their direct reach to customers and their bi-directional nature in communicating information, electronic commerce systems represent a new sales channel for existing products. Considering *electronic commerce*, and in particular the World Wide Web, as a sales channel makes sense for two kinds of products:

1. Physical products, sometimes also sold in conventional stores, which can be advertised and ordered online, such as computer hardware or wine.
2. Products which can be delivered over the electronic commerce medium, such as information or software.

Examples of the first type include the electronic store that provides online catalogs, such as the Internet Shopping Network (<http://www.eit.com/services/consulting/isn/isn.html>), selling all sorts of electronic and computer-related goods, or Virtual Vineyards (<http://www.virtualvin.com/>), selling wine and food products. These electronic stores use their catalogs to offer information about the products. They support online ordering and payment, and, sometimes, they offer online customer service.

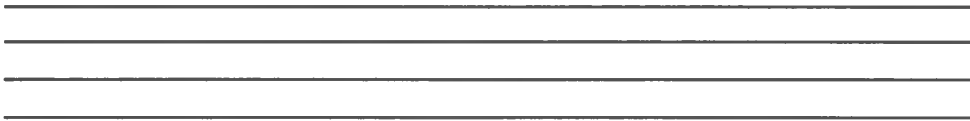
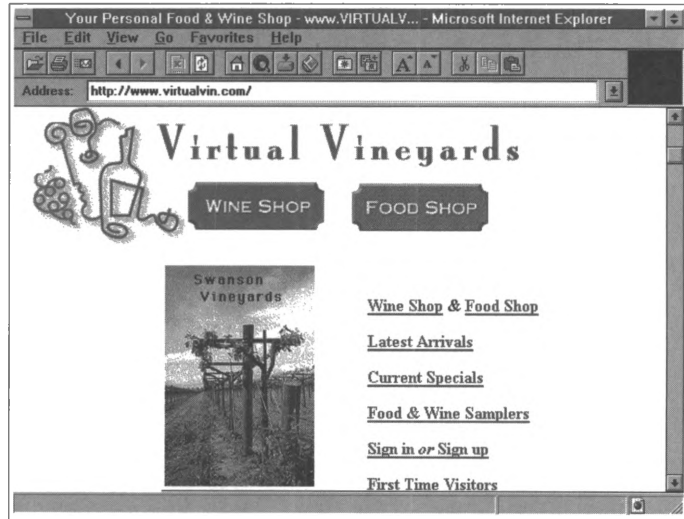


Figure 2.4
*The Virtual
Vineyards home
page.*

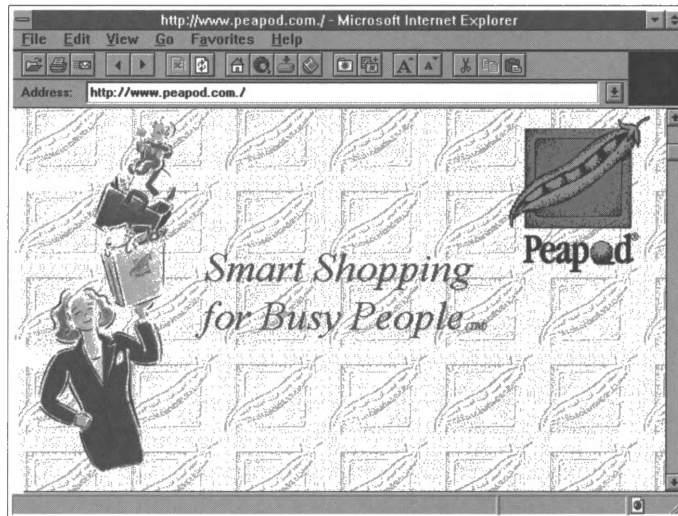


Electronic commerce strategies are of primary value in markets where information adds significant value to the products being bought. For instance, in the wine industry, information on the winery, the type and quality of the wine, or the food with which certain types of wine go well, are of significant value to customers, and are usually hard to obtain through the traditional sales channels (supermarkets and liquor stores). Centralizing this information digitally is, therefore, of significant value for customers.

The right packaging of information supporting the buyer's decision can also be a significant advantage. For instance, in the case of Peapod (<http://www.peapod.com/>), an "online grocery" selling traditional supermarket products through a computer interface, the ability to store, recall, and modify shopping lists significantly decreases the time a customer needs to shop, adding to the perceived value of the service. Similarly, the ability of the shopping software to automatically propose a substitute item with a reduced price or to offer a coupon adds value by reducing the customer's final bill. These features are only possible when all the

information used in the purchase is digitally available and processed.

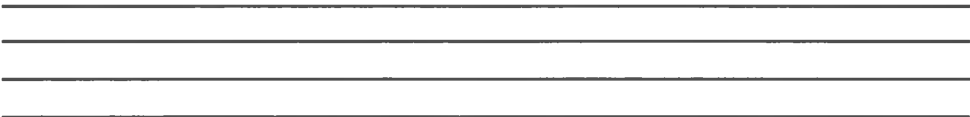
Figure 2.5
The Peapod
online grocery
shopping site.



In the case of information products, the electronic commerce medium actually becomes the delivery medium. As such, an electronic newspaper does not use paper anymore and can be fully delivered digitally. In some cases, (for instance ZDNet, a service reporting on the computer industry at <http://home.zdnet.com>), there is actually no paper version of the service. In another case, software.net (<http://www.software.net>) currently sells more than 300 software packages, which can be delivered digitally and used, literally, minutes after the purchase is completed.

By extending the notion of selling “informed” products, we see new product categories emerging. For instance, *PC Week* (September 1994) lists four ways of making money on the Web, the two last being new forms of products:

1. Direct selling (selling products).
2. Content selling (selling information).

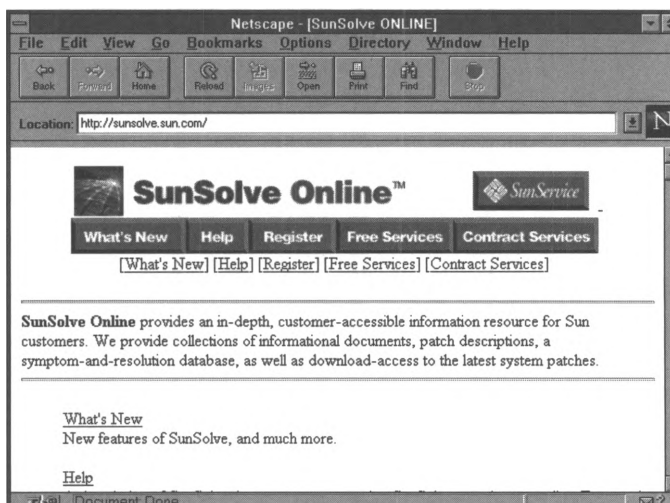


3. Advertising (giving out information such as news or directories for free, to drive traffic and sell it to advertisers).
4. Transaction and links (charging a fee for a transaction, such as selling an airline ticket online, or charging to link with a service provider, as in a yellow pages service).

Direct Savings

The third component of the business value of electronic commerce is in its opportunity to save on costs. By sharing a digital infrastructure, such as the Internet, rather than owning a physical one, marketing, distribution, and customer service costs can be drastically reduced. SunSolve, for instance, Sun Microsystems' online support service on the Web, is widely reported to have saved Sun over \$4 million.

Figure 2.6
Sun Microsystems's SunSolve support page.



By using automated systems and a digital transmission architecture, personnel, phone, postage, and printing costs, can be reduced. This is especially important in service industries, where the cost of customer service usually exceeds the product

costs (for example, banks, credit card companies, and telecommunications companies). Checking order status, retrieving a usage statement, or even reviewing a bill are examples of activities that can be delivered much more cheaply using electronic commerce. In each case, the value to the customer is also higher, through a quicker reporting time, or through the added information value (such as, delivering a statement with historical statistics or graphics, or adding advice to reduce some of these costs).

Time to Market

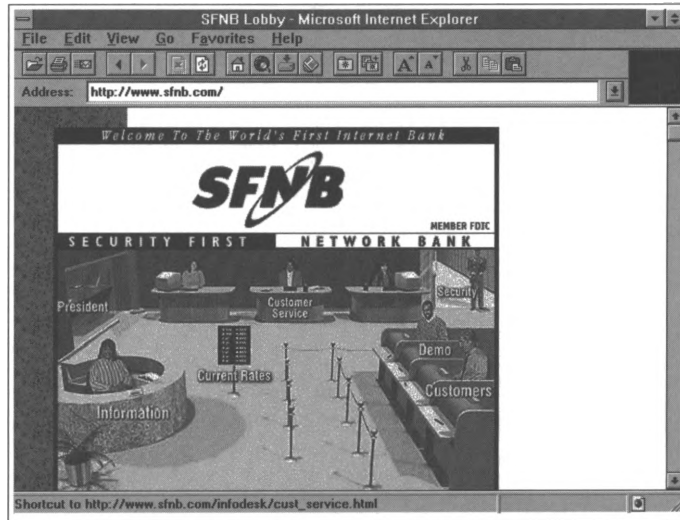
Due to their instantaneous nature, electronic commerce systems allow a reduction of the cycle time associated with producing and delivering information and services. In some markets or for some products, the ability to distribute or receive a product as soon as it's been created is of primary importance. This is obviously the case for information distribution. A company such as Newpage (<http://newpage.com>), for instance, distributes information on hundreds of topics using electronic mail or the Web, to make sure the news reaches its targets (usually decision makers in corporations) as soon as it is available.

In the financial market, which very often leads the way in terms of complexity of the technological environment, some financial products have return on investment in a matter of hours. Their life-cycle is often not much longer. In this type of environment, which will increasingly become routine for other industries, speed is achieved by electronic commerce systems that quickly gather information on customer needs and assemble a product by adapting existing ones or assembling "building blocks" and distributing them. Linking networks of organizations, each doing part of that assembly work, is currently a growing research area, as initiatives such as Commerce Net's CALS (Continuous Acquisition and Life-cycle Support) demonstrate.

Customer Service

Through intelligence built into systems and the extended availability of intelligent support systems, electronic commerce systems can enhance customer service. We already mentioned the examples of Silicon Graphics and Sun Microsystems using the Web to provide customer support. The ability to provide online answers to problems, through resolution guides, archives of commonly encountered problems, electronic mail interaction (and in the future audio and video support), and all that 24 hours a day, 365 days a year, builds customer confidence and retention. Monitoring how customers use this support information also provides insights on areas that may need improvement in current products. The list of issues encountered with products can be a significant source of feedback when an organization is designing new products. As consumers start using these systems in growing numbers, industries other than software will take note of these opportunities and deliver online customer service. Today, the Wells Fargo (<http://www.wellsfargo.com>) and the Security First Network Bank (<http://www.sfnb.com>) are two examples of banks offering online statements and answering electronic mail queries on bank accounts.

Figure 2.7
The Security First
Network Bank
home page.



Two likely developments in this area are

1. Products which diagnose themselves and use an online connection to call a support specialist who can arrive on-site, either physically or electronically, with the full knowledge of the problem that needs fixing.
2. Knowledge-based systems which assist customers in finding solutions for their problems.

Both have already been seen in specialized fields (such as high-end copiers from Xerox, mainframe computers from IBM, and minicomputers assembly from Digital), but are likely to become accessible to a broader range of customers and for a wider range of products.

Corporate Image

Electronic commerce systems will become one of the components of a brand or corporate image, especially when targeting technology-friendly customer segments. This might be one of the most intangible aspects of business success to

measure, but building a brand or corporate image is of great importance in some industries—especially those with commodity products or high competition. For instance, in the soft-drinks industry, Coca-Cola and Pepsi spend huge amounts of money to try to differentiate basically similar products (or to take a less controversial example, AT&T, MCI, and Sprint in the telecommunications business). Others, such as Levi Strauss in the fashion industry compete with others in being seen as young, fashionable, and “hip.” All of these brands use their Web presences to affirm their corporate identities and their brand images, in addition to providing useful product information to their customers.

Technology Learning

Rapid progress in the area of electronic commerce will force companies to adapt quickly and offer them opportunities to experiment with new products, services, and processes. This particular development will have a large and durable impact on the strategies of most organizations. Therefore, it is critical that accountants and financial managers, as well as other business professionals, quickly become familiar with the technology. The learning curve of mastering such technologies and understanding their power to reshape customer relationships is steep and can't be achieved overnight. It is, very often, an iterative process, requiring organizations to try new offerings, and tweak them according to customer feedback.

Similarly, new technologies require new organizational approaches. For instance, the structure of the team dealing with electronic commerce might need to be different from the one typically used in the organization. The team must be more flexible and responsive to the market and willing to put new processes in place, for instance to deal with authorization for publishing corporate information on the Internet. This type of

corporate change needs to be planned and managed, and, before getting it right, organizations might struggle with different experiments.

The value of both types of learning resides in the new capabilities the organization acquires, and the potential of using these capabilities in the future, as the market develops and customer expectations become more clear. The product and process innovation which appears in one area of an organization can also be reused across divisions.

Customer Relationships

Electronic commerce systems will allow for more personalized relationships between suppliers and their customers, due to their ability to collect information on customer needs and behavioral patterns. According to Rayport and Sviokla, "In today's world of overcapacity, in which demand, not supply, is scarce" there needs to be a shift from supply-side to demand-side thinking, and organizations need to "sense and respond" to customers' desires rather than simply make and sell products or services ("Managing in the Marketplace." *Harvard Business Review* 72.6: 141). The focus is, therefore, on establishing relationships with customers (based on learning their needs and desires) proposing the right products, and keeping these relations active for the long term.

Electronic commerce technology makes it easy to learn about customers through its ability to record every event in the relationship, such as customers asking for information about a product, buying one, requesting customer service, etc. Throughout these interactions, either over the phone, in person, or online, the needs of the customer are identified and can feed and enhance future marketing efforts. For instance, if we use the example of the online travel agency, its ability to store and remember customer habits (such as, always flies out of this

specific airport, likes window seats, and requests vegetarian meals) and particular data (frequent flyer numbers or a preference for a particular rental car company) will establish a relationship where the customer feels particularly comfortable in dealing with this specific travel agency.

The data that an organization gathers about customers also provides a “switching barrier,” since customers would need to “teach” a competitor all that information in order for the competitor to meet the same needs. Moreover, a historical analysis of the data will reveal who are the most profitable customers (usually 20% of an organization’s customers generate 80% of the benefits) and products. The organization can then reduce the scope of products, to focus on the most profitable ones, and extend a product line by adding products likely to cater to the needs of these most profitable customers. Then, by understanding the segment of customers that are most profitable, specific marketing efforts can be targeted to similar individuals, who are not currently customers (see Alan W.H. Grant and Leonard A. Schlesinger’s, “Realize Your Customers’ Full Profit Potential.” *Harvard Business Review*. September 1995: 59-72).

Becoming a trusted partner of a customer is the key factor in maintaining these relationships. This kind of relationship can be achieved by providing valuable information. That pro-activity is likely to generate additional sales volume. Pro-activity is the ability to use a direct channel with customers to inform them of specific offers which would match their needs and buying patterns. For instance, early in the summer, you could propose special offers to a customer who buys swimming suits through an online catalog. This could be done by an electronic email message sent to the customer’s address, with a link to a specific page of the electronic catalog, and maybe a discount coupon to thank him for his loyalty.

Another example of such a strategy is currently used by Amazon (<http://www.amazon.com>), an electronic bookstore on the Web. Amazon allows its customers to program agents, which will send them relevant information. Let's suppose you're looking for a book on technology and strategy. Amazon will provide you with a list of the existing books, but also offers to keep your request "in mind," and send you information on titles published as they arrive. This information is sent through electronic mail and links with the online bookstore.

Electronic commerce enhances these types of strategies by automating the customer profile—needs, buying patterns, etc. All that data can then be analyzed through computer applications that generate statistics to help vendors select appropriate service approaches. Personalized service strategies which were only possible with a small number of customers suddenly become possible on a wide scale (see David Ing and Andrew A. Mitchell's, "Point-of-sale Data in Consumer Goods Marketing: Transforming the Art of Marketing into the Science of Marketing" in *The Marketing Information Revolution*. Harvard Business School Press, 1994). For instance, in the past, the corner video-rental store owner might well have known your viewing preferences, and could advise you on new movies, but only through automated systems does this strategy stay feasible on a large scale. In this video example, a national chain could use that system to differentiate itself and increase customer retention by maintaining a global database of customer preferences. If you moved to a different city, for instance, you would still be able to insert your membership card in a multimedia kiosk and get advice on which new rental choices best suit your tastes.

On a more commercial level, CompuBooks, another bookstore on the *CompuServe* online service, sends electronic mail messages to customers when they haven't visited the store for a

while. The incentive to return is a few dollars of usage credit if they buy a book.

New Product Capabilities

The information-based nature of electronic commerce processes allows for new products to be created or existing products to be customized in innovative ways. A large source of the business value electronic commerce can provide comes from changing the products themselves, in addition to the way they are advertised, ordered, or delivered. This is mainly due to the potential for collecting information, which will be used to customize products.

Mass customization has been used for some time now. For instance, thanks to an information network and advanced production techniques, Motorola can gather customer needs and specifications for a pager, transmit them to the manufacturing plant, manufacture a specific model (varying the form factor, color, features, etc.), and send it by overnight mail—all in a few hours. Levi's, the jeans manufacturer, has brought similar techniques to the apparel industry. Levi's can custom produce a pair of jeans, based on specific customer requirements, by using an electronic network that links the retail shop (where the customer chooses the type of jeans and has measurements taken), the producers of the various parts of the jeans, the assembler, and the shipping company. In both of these cases, success depends on the ability to gather and store customer preferences, to use a flexible manufacturing technique to adapt a product to the customer's particular needs, and to operate a network of suppliers that will join together to manufacture and deliver a product.

In the future, electronic commerce links between customers and suppliers will suppress the need for a storefront where customer data is gathered and will allow customers to shop from their homes, their offices, or on the road. This direct link also allows

the supplier to gather very detailed data on customer profiles, their needs, patterns of buying, etc. Database marketing techniques (see Jonathan Berry's, "A Potent New Tool for Selling: Database Marketing." *Business Week*, [Sep 5, 1994] n338: 56-62) can then be used to analyze this data, in order to improve new product development and target specific offers to certain customers. Gateway 2000 (<http://www.gw2k.com>) is a good example of a supplier custom-manufacturing personal computers and offering product information that can be adapted to personal needs through their Web site.

Another opportunity in mass customization is to have the customer design part of the product himself. For instance, we could imagine a watch manufacturer with advanced production techniques, such as Swatch, providing its customers with computer-based tools allowing them to design part of the watch (such as the drawing on the background of the watch) and send these designs through a computer network to the watch manufacturing robot, before shipping the personalized watch to the customer. The ability to sell unique-design watches to customers at a retail-like price would be a great differentiating factor.

This move towards customization creates a paradigm shift in the design of products, which is not yet perceived by organizations where it could be most valuable. For instance, the Credit Card Network (<http://www.creditnet.com/>) is a Web site that lists different types of credit cards offered by US banks, both online and offline. All of these cards offer different features, such as interest rates, membership fees, credit limits, insurance, assistance programs, and frequent-flyer bonuses. The customer is asked to look at the different offerings and then choose the package which best conforms to his or her interests. The business model of this service could be easily changed to take advantage of customizing

products. Imagine a service where the customer would be asked to check the features which matter most to him/her. For example, a frequent traveler paying his invoices in full every month might choose only frequent flyer bonuses and rental car insurance. A custom credit card package could then be designed especially for this customer, who would receive exactly the features he asks for, and no more, thereby avoiding fees for services he doesn't use. The interest rates and annual fees would be adjusted for each customer, based on the services that need to be provided and the expected revenue for the credit card company. This is similar to the Swatch example above, in the sense that customers design the products they want to buy.

New Business Models

Changing industry structures and electronic commerce systems allow for new business models, based on the wide availability of information and its direct distribution to end-customers. Key among these new business models are new forms of intermediaries, or information brokers (see P. Resnick, R. Zeckhauser and C. Avery's, "Roles for Electronic Brokers" in *Toward a Competitive Telecommunication Industry: Selected Papers* from the 1994 Telecommunications Policy Research Conference, available at <http://ccs.mit.edu/ccswp179.html>). Although it is true that electronic commerce will eliminate the need for intermediaries in some industries, by directly connecting buyers and sellers, new opportunities for organizations repackaging information will also begin to evolve. The early examples are currently the directory providers or the search engines, such as Yahoo (<http://www.yahoo.com>) and Lycos (<http://www.lycos.com>). Also, in the car industry, DealerNet (<http://www.dealernet.com>) offers comparisons between any type of car, with pictures, product specifications and third-party reviews.

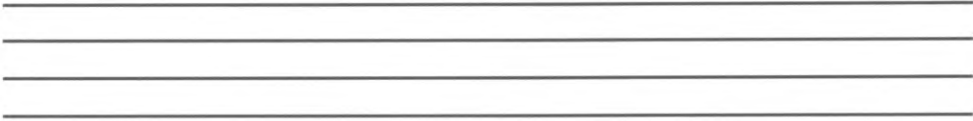


Figure 2.8
The DealerNet
Web site.



Disadvantages of Electronic Commerce

Intermediation

Intermediaries traditionally provided an infrastructure (such as a sales network and specialized personnel) and managed the complexity of customer requests. Electronic commerce can replace some of the functions traditionally performed by these intermediaries. For instance, Southwest Airlines has tried to replace the usual network of travel agencies by providing timetables, detailed fares, and reservation capabilities on the Web.

But direct connections between buyers and sellers are not always the optimum form of commerce for customers:

1. When doing comparison shopping, the cost and time required to access the systems of multiple suppliers often results in the infamous information overload problem.

2. Most often, customers look for total solutions, whereas suppliers are specialized in one area.
3. Customers need a trusted third-party to provide them with information about the reputation of a particular supplier; this is a role that magazine reviews play well.

As a result, advanced forms of information intermediaries will soon emerge too. These new players will reduce the cost of looking for the cheapest or most attractive product, will integrate various services to provide one-stop shopping, and will use third-party content to validate the quality or reputation of their offerings.

Integration will be a key point for these organizations—the ability to sell a package of products to customers, based on a very fine understanding of their needs. For instance, in the travel industry, once they understand a customer's needs for a specific travel, an online travel agency service could dynamically put together a package of air travel tickets, hotel reservations, car reservations, travelers' checks, and restaurant guides, which would serve these needs. In the banking industry, integration would mean the ability for a bank to analyze its customers' records and offer integrated services to those with certain revenue levels, demographic profiles, or complexity of financial activities. The bank would then offer them mutual funds to maximize their savings, life insurance to protect their futures, and tax preparation services to simplify their lives. The Security First Network Bank, the first bank on the Internet, seems to be moving quickly towards such systems.

The emergence of these new information-based competitors is not without danger for current industry actors. The ability of non-industry competitors to take a significant part of the business

should not be under-estimated. For instance, in the banking industry, a recent report from Killen & Associates, entitled, "Non-Banks and High Tech Companies' Electronic Payment Strategies," predicts that 25% of the global electronic payment market will be taken by non-banks and high-technology companies.

Another danger we can forecast after the emergence of these intermediaries is their reliance on brand names to take a big part of their industry market. For instance, in the personal computer market, if *PC Magazine*, which owns a great brand and achieves recognition in the marketplace, were to create an electronic catalog with its Editor's Choice (the computers the magazine recommends as best buys), customers might go to the most reputable magazine, to buy the most renowned computers, maybe from the most well-known mail-order company. This could create a competition barrier for smaller organizations.

As these opportunities for new intermediaries appear, current third-parties should look very carefully at their business models, in order to reposition themselves, especially when the added value they provide over an electronic commerce system is minimal. In the travel industry for instance, repeat business travelers see no point in using a traditional travel agency when an automated system can handle a simple request just as well, with the added convenience of an automated information and reservation platform, accessible anytime. Soon, increasingly complex requests will be handled by these systems, and travel agencies will need to find new ways of differentiating themselves.

SABRE is an example of a company that is currently repositioning itself. At one time, SABRE leveraged a huge data network and computer operations in travel agencies around the world, providing them with information and reservation services. The advent of cheap computer hardware and open computer

networks (such as the Internet) makes it much more feasible for travel agencies and for airlines to go directly to consumers. Therefore, SABRE is repositioning its added value by outsourcing its computer and network operations and focusing more on the added value of their information database.

Product suppliers could also potentially lose ground in the marketplace with the emergence of electronic commerce systems. Earlier in this chapter, we described the value of information on the profiles of customers—their buying patterns, their needs and desires. If that information is kept by the intermediary, which simply compiles customer requests before passing them on to the product supplier, the supplier loses touch with the market.

In the banking industry, the emergence of online banking platforms from suppliers such as Intuit (<http://www.intuit.com>) raises interesting questions. Through their personal finance management software, Intuit has created enormous customer recognition in the marketplace (they have about seven million very dedicated users). They currently have links between their software and 37 US banks to allow customers to retrieve online statements, transfer money between accounts, pay bills, and get portfolio updates. Other banks, most notably the Bank of America, the second largest bank in the country, have chosen to develop their own electronic banking platform, through the acquisition of another software supplier. Some of the urgent issues that these banks now face are

1. How will these banks, whose online services look exactly similar since they use the same software platform, be able to differentiate themselves?
2. If a customer is a long-time Intuit user and the Bank of America chooses another supplier, will the customer switch banks in order to keep using her favorite software package?

-
-
-
-
3. If the contract between Intuit and one of these banks ends, will customers switch banks to keep their access to the service?
 4. What prevents Intuit from creating its own bank and “stealing” all the customers it currently serves on behalf of other banks? (That is, who appears as a bank to the customer—Intuit, which is the interface, or the bank, which is the real service provider?)

These issues are also transposable to other industries. In the insurance business, consumers will soon be able to post their needs on a Web site, and have online insurance companies provide them with quotes for tailor-made policies. This will definitely change the rules of competition in the insurance industry.

Pure Price Competition

Pure price competition is a form of competition that will arise in the electronic world with the emergence of electronic storefronts that offer similar products with various levels of services. Let's imagine we have two different online travel agencies, both selling airline tickets through the Web. One of them, named El Cheapo, will provide a bare-bones service, offering very cheap tickets to customers who know exactly what they want. The other, MSDTA (Multi Service Digital Travel Agency) is much closer to our description in the previous section—it provides customers with multimedia information on various products, offers customized travel plans, etc. In order to cover the costs associated with the development and maintenance of such a system, MSDTA has slightly higher prices. How does MSDTA prevent potential customers from getting information from MSDTA, for free, before buying from El Cheapo to take advantage of their better prices?

Strategic Disadvantage

New technologies allow organizations to quickly catch up with competing organizations. If a company offers services or products through the Internet, for instance, and its competitor does not, customers might well switch suppliers, especially in industries where switching barriers are low. For instance, an “early adopter” customer might decide to switch banks if one can offer him electronic banking capabilities, such as electronic bill payment, interactive online (and therefore always up-to-date) bank statements with statistics, or information on companies where he owns stock.

Some large companies are well aware of that phenomenon: when Federal Express launched its Web site (November 1994), allowing customers to track packages on the Web (<http://www.fedex.com>), United Parcel Service (UPS), its major competitor, quickly accelerated its development efforts, which resulted in launching a similar service (<http://www.ups.com>), although six months after FedEx. Today, both services are very close functionally. The third major competitor in the express package delivery industry, DHL, plans to have a similar service available soon, having been slowed by technical integration problems (<http://www.dhl.com>). Although the potential strategic disadvantage for followers is clear, the value of the competitive advantage for the leader is also, unfortunately, time-limited. The only source of sustained competitive advantage comes from having an infrastructure, both technical and organizational, which allows for continuous innovation, to always stay in front of the competition.

Issues in Electronic Commerce

In this section, we will discuss some pitfalls and issues that impact organizations on the road to electronic commerce. And, we will offer some potential solutions. In this section, we discuss the following issues

- Customer relations
- Privacy and security
- Electronic payment systems
- Mass-market adoption
- Implementation issues
- Organizational commitment

Customer Relations

Early experiences with electronic commerce in the banking industry, which has been a pioneer in the use of electronic systems, can be used to learn about some potential dangers and issues you should take into account when planning to implement electronic commerce systems in your organization. The use of Automated Teller Machines and electronic home banking systems has increasingly allowed customers to bank outside of traditional bank facilities, for most of their usual transactions. This was consistent with the cost-savings strategy of most banks, which discovered that electronic transactions were about seven times less costly than the manual handling of these transactions by a bank teller.

Nevertheless, the fact that customers' only contact with their banks was through (rather unsophisticated) electronic interfaces, and the major difficulties in integrating the legacy systems of a typical bank, prevented banks in many cases from cross-selling additional products to customers. In some European markets, the

insurance companies took advantage of this weakness to grab business from banks, selling savings products to customers through their extensive distribution networks. Similarly, the decrease in human interaction with customers could also lead to a less sophisticated understanding of their needs, since they're not always able to express comments, criticisms, or requests for new products while interacting with ATM machines.

When planning your own electronic commerce system, be certain to incorporate customer feedback features and proactive selling capabilities.

Privacy and Security

Some customers may be reluctant to provide their suppliers with demographics information, buying patterns, or product needs. Unfortunately, this data is critical in many of the strategies we described earlier (mass-customizing, customer relations, proactivity, etc.) There are two ways of handling these concerns: (1) Customers can be made aware of the benefits of volunteering this data (e.g. products better suited to their needs, reduction of the junk mail as commercial offers become closer to their real needs), or (2) material incentives can be offered to customers. This is already used in contests or coupon offers, and most customers would be ready to volunteer personal data if offered, for instance, frequent-flyer miles in exchange for information.

Another potential source of trouble in electronic commerce systems is customer concerns with privacy and security. These concerns could lead to a backlash against suppliers using such systems, or simply to customers avoiding the use of these systems. Although many specialists consider it to be a matter of perception rather than reality (see David Kline's, "False Alarm: Credit Card Security." *Hotwired* October 23, 1995), customer perceptions are really what matters in terms of new technology

adoption. The security of online systems is evolving quickly, and new technical solutions emerge everyday. At this stage, most security systems are good enough to be used for most commercial transactions, and the evolving legislation in the field will soon allow the development of better systems and their export worldwide.

Electronic Payment Systems

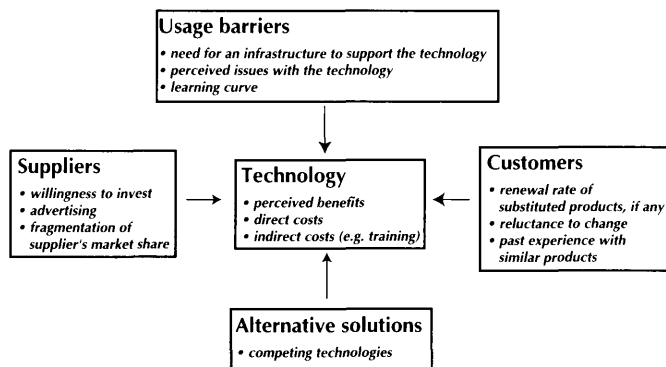
Electronic business transactions can only be successful if financial exchanges between buyers and sellers can occur in a simple, universally accepted, safe, and inexpensive way. Various systems have been proposed, some of them based on traditional mechanisms (credit card accounts), while others rely on new designs, such as electronic money. The key for success in your organization will be to find a few widely accepted mechanisms, which can be used by most clients. The recent agreement between Mastercard and Visa on one security standard for credit card transactions over the Internet, and its backing by most major software vendors is a step in the right direction. This doesn't diminish the need for more specialized systems, for instance to allow micro-transactions, the exchange of very small amounts of money (a few cents) in exchange for information or services. These new payment mechanisms will, in turn, enable new business models such as pay-per-article newspapers. (See Chapter Four, "An Introduction to Electronic Payments.")

Mass-Market Adoption

Another important factor in the success of consumer electronic commerce systems is certainly wide customer adoption of the technologies. It is not clear when this will happen and, although there are many benefits customers could derive now, the mass-market adoption of electronic commerce technologies will probably take a few more years. The following figure shows some

of the factors linked to new technology adoption by consumers (the factors adversely affecting adoption are in italics). Use this chart to assess the rapidity with which you can expect your own customer base to be ready for electronic commerce:

Figure 2.9
Factors affecting
new technology
adoption.



People's general reluctance to change is certainly a key issue, as is the availability of appropriate technological platforms in every home. The emergence of the low-cost "Internet computer" and interactive television will undoubtedly quickly change the marketplace. As with most new technologies, adoption is linked to the supply of the right products, rather than demand. This is because customers who are unfamiliar with the new technologies cannot define their needs and will understand the technological possibilities only through innovative products.

Implementation Issues

This section discusses some implementation issues and the managerial implications of creating, managing, and benefiting from an electronic commerce system. You must first realize that technology alone will not solve issues or create advantages. The technology must be integrated in an organization, and the change management issues linked to people resisting new concepts and ideas must be resolved. And the technology must support a clearly defined and well-communicated business strategy.

The issues of alignment or balance relevant to electronic commerce systems are

- Balance between strategy and technology.
- Balance between technology and the organizational processes.
- Balance between technology and people.

We've already discussed the link between technologies and the strategies they enable earlier in this chapter. It should be clear by now that these systems can be important factors in differentiating an organization from its competitors. Nevertheless, technology in itself is not enough; the level of service provided to customers and the relationship that can be established with them is also critical in preventing customers from switching providers. Only when the loyalty of customers is high, through their investment in the relationship with their suppliers and, sometimes, the integration of the supplier in their customer processes, will a sustainable competitive advantage be created.

There are two ways of planning for the alignment between technology and the organizational processes. The first of these redefines some processes after the introduction of electronic commerce systems, so that these systems become fully integrated in the way an organization does business. Three examples of this type of alignment strategy are

1. *When a Web system is used to broadcast corporate information, each specific piece (or class) of information that becomes public must be authorized. Therefore, the process of handling corporate communications needs to be refined.*
2. *The logistics processes (the back-end) need to be integrated with the online ordering systems (the front-*

end) to provide uniform and seamless service. There is little use for an online system if orders must be manually re-keyed in another system before they can be processed. This often requires integration with legacy information systems.

- 3. Whenever customer contact becomes possible through an online medium, the customer expectations of the organization's reactions change. By using electronic mail, which is usually answered in a few hours, the customer expects a similar response time from business organizations. But it often happens that questions/comments coming through email take the same path as written queries, traditionally answered in a matter of days. The advantages of online communications therefore disappear, so the organization must adjust the question/comments response systems.*

The other way of aligning processes and technology is to use the technology to enable a redesign of the processes, thereby reducing the cost, time, and number of errors associated with the process, while increasing the service level. This is often the focus of business process reengineering methodologies. When information technology and processes become fully integrated, new business models will emerge for organizations—"digital organizations" relying on information technology both for customer interaction and internal management. The Internet Shopping Network and Virtual Vineyards are two examples of such companies, where order taking, inventory, and order management, as well as financial systems are all tightly integrated.

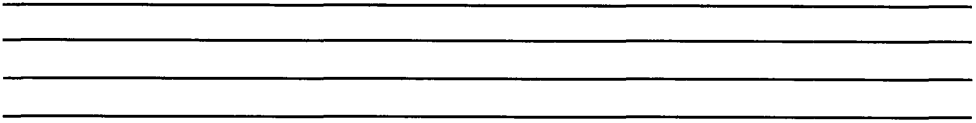
Keep these issues of alignment in mind while designing your electronic commerce strategy and implementation plans.

Organizational Commitment

The final issue we will mention is the organizational commitment necessary to successfully run an electronic commerce system. Although it is true that the Web today represents a great way to test some commercial ideas with a low cost of entry, and thus is a great equalizer and a real marketplace for innovation, a working system very soon requires additional resources, in terms of technology and skills (professional design, integration of legacy systems, process integration, etc.).

With large organizations present in the market, customers become accustomed to increasingly higher quality systems. New technologies, such as interactive “applets” or the integration of audio and video also increase the complexity of developing an online presence. The cost of such systems is often higher than start-up businesses can manage. As an example, a popular online music store, allowing customers to sample music online before ordering, is built using the most powerful Silicon Graphics Web server, uses 400 gigabytes of disk space, and has a hardware budget of roughly half a million US dollars. The most popular publishing site on the Web today, Time-Warner’s Pathfinder, currently employs about 100 people to develop and maintain its content.

Obviously, some Web sites are very successful without the use of systems as sophisticated as those described above, but a sustained presence in cyberspace requires a strong organizational commitment.



Your Electronic Commerce Vision

Building any kind of electronic commerce system requires a vision—a clear perception of the goal to achieve, a realistic idea of the business value you can expect, a picture of the process needed to achieve the a goal, and strategies for avoiding common pitfalls. Your vision should include an understanding of the impact of electronic commerce on an industry structure, the potential for new business models, and the opportunities for competitive advantage.

Some organizations have rushed into the fray and built electronic presences without regard for the benefits and dangers. This lack of vision has led to the disillusionment of many companies and may be the reason for some predictions of a decline in Web usage for commercial companies. Only clear planning and a commitment to truly transforming current business models and customer interaction through electronic commerce systems will enable organizations to construct and use beneficial electronic commerce sites. Use the Electronic Commerce Vision worksheet on the following page to begin to plan your electronic commerce site. List activities you'd like to support at your commerce site and the benefits and dangers associated with those activities. If you are helping a client plan a site, photocopy the worksheet and use it to stimulate a realistic dialogue about goals and limitations.

2.38 ELECTRONIC COMMERCE: WHY BOTHER?



Chapter Three

Understanding Electronic Commerce

Before we begin to address the implementation of your electronic commerce Web site, it may be useful to review some of the basic concepts of network computing and how Web technology works. Although you do not need to know networking or system architecture in detail, you do need to know the basics of TCP/IP and networks to have some idea of the type of electronic commerce site that will best suit the needs of your organization and to efficiently coordinate your implementation strategy with your systems staff or consulting professionals.

In this chapter we will describe

- Transmission Control Protocols (TCP)
- Internet Protocols (IP)
- Clients and servers
- Middleware
- World Wide Web
- Hypertext Mark-Up Language
- Web servers
- Web browsers

Transmission Control Protocol and Internet Protocol

The protocols used for network communications on the Internet are TCP/IP. For the sake of simplicity, protocols are usually considered as a group, sometimes referred to as a “suite” or “stack,” that includes a cluster of related protocols. Actually the TCP/IP suite includes Transmission Control Protocol (TCP), Internet Protocol (IP), Address Resolution Protocol (ARP), Internet Control Message Protocol (ICMP), User Datagram Protocol (UDP), and others.

Every TCP/IP-supported transmission is simply an exchange of data, and electronic data is exchanged using methods not very different from those used to deliver US postal mail. Your mail carrier walks a route that is a collection of houses or individual addresses. This small route originates at the local post office, one of many offices that make up another network of district offices. The address that you put on an envelope contains enough information to help the US Postal Service move the envelope to the right district office and then out to the correct route. At various points in its journey, different parts of the address are used to move the envelope to other points in the postal service network, until it finally arrives in your mailbox.

TCP/IP networks range in size and complexity from a few small computers on internal networks to the actual Internet “core” network, consisting of large mainframe computers handling millions of bytes of data each minute. The actual physical connections between the various networks that make up the Internet take many forms, from T3 links, high-speed communications pipes that act as “backbones” between major locations and carry 45 MBPS loads of traffic, to SLIP/PPP connections that carry Internet traffic over high-speed modems

through dedicated ports supplied by service providers, and even the cabling that connects two computers on a LAN. Every site connected to a TCP/IP network has a unique Internet address, just like destinations on typical postal routes have individual addresses that make it possible for mail carriers to deliver letters to particular destinations.

IP Addresses

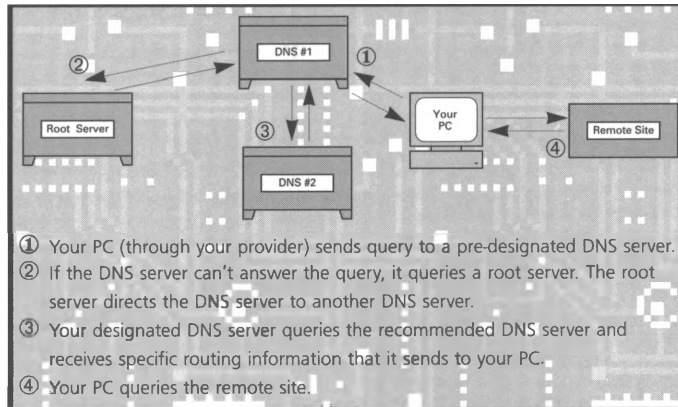
To send a message to another computer on a TCP/IP network, your message must be addressed to the person or machine to which you wish to send it, just as letters sent through postal mail must be addressed to the intended recipient. Any message sent across a network is broken into parts and each part is placed in a packet that functions like an electronic envelope. Each packet includes a header that functions like the addressing information on a regular postal envelope—it identifies the message's destination, source address, and provides other information that computers on the network need to correctly route, process, and reconstruct the packets into messages.

The addresses used by computers to route messages across a network, called IP addresses, are numeric and are typically difficult to remember. As a result, we often assign text names to the numbers to make them easier to remember. So, for instance, instead of 165.247.199.62, we call the Kent Information Services, Inc., World Wide Web address **www.kentis.com**. Even though people prefer these memorable text-based addresses, computers still require the numeric address to complete Internet transmissions. Names are assigned to numbers on the Internet through the Domain Name System (DNS). The Domain Name System (1) translates text domain names into IP addresses (and vice versa) and (2) maintains routing information for transmissions.

The Domain Name System is made up of two types of computer programs—resolvers and servers. Resolvers run on all computers using the Internet. They simply send queries to DNS servers, which store routing information, whenever they need to send messages. There are many DNS servers on the Internet, each storing routing information about a particular section of the Internet. When you set up your Internet software, you must explicitly tell your resolver the address(es) of the DNS server(s) used by your service provider.

Unlike the resolver, the DNS server does two things. First, it contains information about some part of the entire DNS database. Second, it acts as a powerful resolver to find answers to DNS queries that resolvers running on PCs might send. If the DNS server does not contain a particular IP address in its database, it sends a query to a root server (a server that stores information about the addresses housed on other DNS servers). The root servers may not know the IP address of a specific computer, but the root servers will know the DNS servers on which information about particular domains can be found. The root server sends back information something like this: “Go to *some particular DNS server* to find the information you requested.” The DNS server that originally sent the query then sends another query to the new DNS server and receives specific routing information. Then, your DNS sends the routing information to the PC from which the original query was launched. The PC’s resolver can then send the transmission using the IP address retrieved through the Domain Name System.

Figure 3.1
Resolving a query using the DNS system.



As a message is transmitted across the Internet, it moves from one subnetwork to another through “gateways,” computers that are connected to two or more of these small subnetworks. Just as mail moves from the collection of district offices to your mail carrier through your local post office, Internet traffic moves to your local subnetwork through a gateway. Computers on the Internet examine the header information attached to each packet and then move it along to the next site, a process called “routing.” Internet host computers maintain tables of information called “routing tables” that are lists of instructions, such as “packets for subnet x are sent to gateway a.” When packets are passed along the Internet, the hosts use the routing tables and the destination address contained in the packet header to move the information along on its journey. The header also supplies information that allows Internet computers to choose alternate paths for the packet to follow if some part of the Internet has failed. When the packets have arrived at their destination, the computer that receives them uses the information contained in the header to assemble the packets into the completed message.

Although it may seem overly complicated, the recursive aspect of this delivery process assures that if one server is down, queries can be answered by other servers, distributing the control across

the system so that no one computer or network can disrupt the functionality of the Internet at large.

Layered Communication

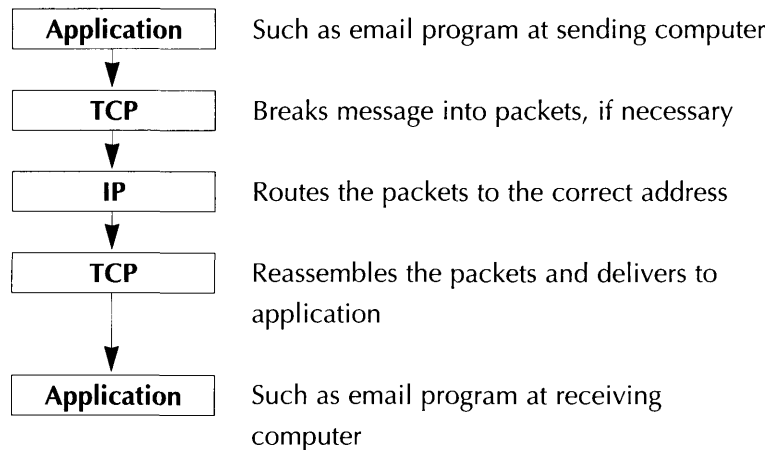
Like most forms of sophisticated communication, TCP/IP relies on a layered model. This layered method is similar to the methods we use to communicate ideas to one another every day. For example, when we communicate with one another, we typically require at least a three-layer communication process in which we

1. Formulate a thought or idea to communicate to someone.
2. Establish and conform to a common set of rules for communicating ideas.
3. Express ideas in voice, written, or hand signals according to the established rules.

Likewise, TCP/IP protocols are layered, and an electronic message must use different layers that include formulating data, establishing protocols, and finally physically transmitting the data to another computer.

For example, to send a simple email message, you use the protocols of the mail program being run on your computer to create the message and send it on to TCP. TCP is responsible for breaking the message into packets that are small enough to move through the network without monopolizing resources, assigning identifying information in the header of each packet, and formatting the packets into a common “language.” Then TCP moves the message on to the IP level, which physically delivers the message. IP adds its own set of header information that is needed to route the message appropriately. Once the message has arrived at the correct email address, IP turns the packets over to TCP again. Then TCP reassembles the packets and makes a

connection with the appropriate application program—the mail program on the destination computer. The diagram below illustrates this layering:



In most TCP/IP transmissions, the header information is stripped out when a transmission has been successful. As a result, this level of protocol and decision making is invisible to the typical user, just as the processing and routing that takes place between your mail box and your letter's destination is invisible, though not really very mysterious.

One of the greatest benefits of TCP/IP for conducting electronic commerce is the fact that transmissions are not restricted by data type, by computer or platform type, or by hierarchical menu-based designs. Instead, TCP/IP offers a flexible platform for delivering and presenting a wide range of content and multimedia information to any type of computer connected to the Internet running any kind of Internet software. In large part, these advances were made possible by the advent of the sophisticated and flexible transport and addressing protocols described above.

Clients and Servers

Another key factor in the usefulness of TCP/IP is the distributed processing technique that makes it possible for two computers to share the work load for a task—called client/server applications. By using high-speed communication lines and special distributed-processing software, processing tasks can be shared by computers both technologically diverse and spread over wide geographic areas.

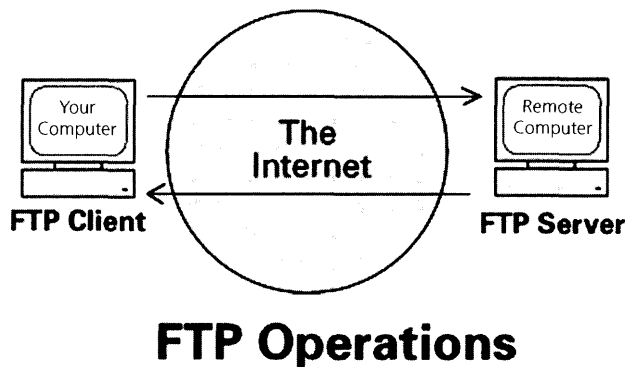
As early as 1986, Sybase, a database software developer, used the terms client/server to describe a software product that linked databases and applications. As business computing evolved, requiring more flexibility than was possible using mainframes and complex centralized computer systems, the computing infrastructure that was used in business workplaces began to take advantage of the increasingly powerful PCs that were also developing to distribute the workloads across business systems between software programs residing on different computers.

Client/server computing is an extension of an approach to programming called “modular.” Modular programming assumes that separating pieces of large software programs into smaller parts, called “modules,” makes development and maintenance simpler by spreading the workload necessary to complete sophisticated computer tasks over more than one computer. The client module of a distributed system is a program that sends a message to a server program requesting that the server perform a task or service (such as sending a document). Client programs manage the user-interface portion of an application—sending requests, validating data, and displaying results. Client software also manages the user’s interaction with local resources (such as keyboards). The server module of a distributed process fulfills the

request sent by a client by performing whatever task is requested (such as file retrieval).

For example, FTP (file transfer protocol) is the procedure used to transfer files from a remote computer to a local computer. Using an FTP client program, a user can access a remote site's FTP server program and request files to download. In return the FTP server retrieves the information requested from the file system and sends it to the FTP client software. The FTP client software then reads the information and displays it in a useable form.

Figure 3.2
*A typical
client/server
application.*



Similarly, WWW client software, called a Web browser, allows a user to send a request to a WWW server in the form of a URL that is keyed into the browser. The server software at the WWW site responds by sending the requested document. The Web browser then reads the document's special tags (hypertext mark-up language) and displays it in a useable form on the user's screen.

Some client/server applications run on two-tiered architectures, where a client communicates directly with a server. More typically, client/server applications are three-tiered, requiring some type of software to run between the client and the server,

sometimes called middleware. Middleware is the collection of protocols and programs that make communication between clients and servers possible. Middleware connects clients and servers by providing: (1) a Network Operating System that performs basic network management services (such as routing and printing), (2) a transport system (such as TCP/IP) that provides end-to-end communication across the network, and (3) applications or services protocols that control the ways clients request information and the ways servers reply.

As a result of this division of labor, client/server systems built on this modular approach offer many benefits, including

- Resources are shared among computers.
- System architectures are open and compatible.
- Systems can grow as user needs grow.
- Applications can run concurrently.
- Systems can continue to function when part of a network fails.

The World Wide Web

As we noted in Chapter One, “Electronic Commerce and the Evolution of the Internet,” when Tim Berners-Lee began working on his plan for the World Wide Web in the late 1980s, he was attempting, among other things, to solve a problem that continues to frustrate many businesses—using different workstations, procedures, and commands to access information on various systems. Berners-Lee reasoned that it must be possible to use a single interface to access all these different kinds of information. His proposal for dealing with this issue, “World Wide Web:

Proposal for a Hypertext Project,” paved the way for the creation of the World Wide Web and its supporting protocols.

The system that Berners-Lee envisioned was a client/server model. On the client side there was to be a Web browser, a common interface to display information that was neither platform-dependent nor proprietary—so that the already existing information servers could remain unchanged, for the most part. The key to the Berners-Lee model, then, was in the creation of a middleware protocol that offered a workable addressing scheme and a way for clients and servers to negotiate document format.

Hypertext Transport Protocol

Designed to run as a layer on top of TCP/IP, Hypertext Transport Protocol (HTTP) is the core communication protocol between Web clients and servers. HTTP allows clients to send requests for documents stored at specific server locations and to negotiate format presentation with the servers. By sending a list of the types of data the client understands and the data transfer protocol to be used, the server can select a suitable format and use the correct transfer protocol (such as Gopher, FTP, or WWW). Locations and formats of objects on the World Wide Web are specified by Uniform Resource Locators (URL). A URL specifies the server type (such as `http://`, `gopher://`, or `ftp://`), the location of the server (such as `www.kentis.com`), the name of a directory (such as `/pub/`), and the file type (such as `filename.html` or `filename.txt`). For example, if you type the URL **`http://www.kentis.com/design/design.html`** in the URL box in your Web client software you are requesting a service that meets these specifications:

`http://` indicates that the document is stored on a WWW server. **`www.kentis.com`** is an IP address that indicates the location of the server.

/design/ indicates a specific directory on the server.

design.html indicates a specific HTML (hypertext mark-up language) document stored on the server.

Or, if you type the URL **ftp://ftp.kentis.com/cpe/commerce.txt** in the URL box in your Web client software you are requesting a service that meets these specifications:

ftp:// indicates that the document is stored on an FTP server.

ftp.kentis.com is an IP address that indicates the location of the server.

/cpe/ indicates a specific directory on the server.

commerce.txt indicates a specific text document stored on the server.

Hypertext Mark-Up Language (HTML)

The main mechanism for formatting and displaying World Wide Web documents is the system of formatting tags called HTML, which stands for Hypertext Mark-Up Language. HTML is derived from the Standard Generalized Mark-Up Language (SGML) which has been used for years as a means of open document interchange in industry and government. HTML is simply a series of tags that are included in a document to define qualities and formatting conventions, so that the document can be read across platforms and software types.

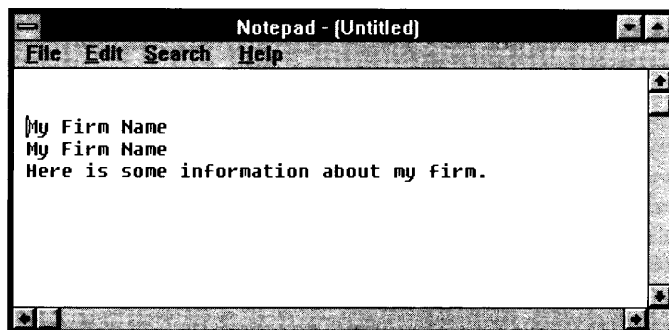
Although Web pages often seem sophisticated and complex, HTML is surprisingly easy to learn and implement. HTML tags are simple words or abbreviations enclosed in greater-than and less-than brackets (< >). These tags tell a Web browser how to treat the text within the tags—from defining appearance to creating links to other sites. Often, HTML tags are paired, surrounding the text that the tags will affect, but HTML tags never appear in the document that is displayed by a Web browser. For

example, you can surround text with the paired HTML tags `` to tell a Web browser to represent the text between the tags more strongly than the other text in the document. Most browsers will treat this tag sequence as a command to display the text between the tags in boldfaced lettering. Word-processed documents are similarly defined by codes that tell the word processor how to represent text, but those codes are typically invisible to users. In the near future, HTML tags may become as transparent a means to format Web documents as word-processor codes are in other kinds of documents.

HTML documents can be created with simple text editors (like *Notepad* on a *Windows* PC) or with any of many HTML editors currently available. Using HTML editors makes Web-page design remarkably simple, since the programs prompt appropriate HTML tag selections. (Many good basic editors are available for free on the Internet. See “Electronic Commerce Resources” for a listing.)

The placement of the text, its relative size, and other qualities of appearance in a Web document are determined by creating a plain ASCII file (ASCII refers to a standard numerical code for characters used so that any computer can read word-processed or text-based documents) and then adding HTML tags. The ASCII file looks like this:

Figure 3.3
Using *Notepad* to
create a simple
ASCII document.

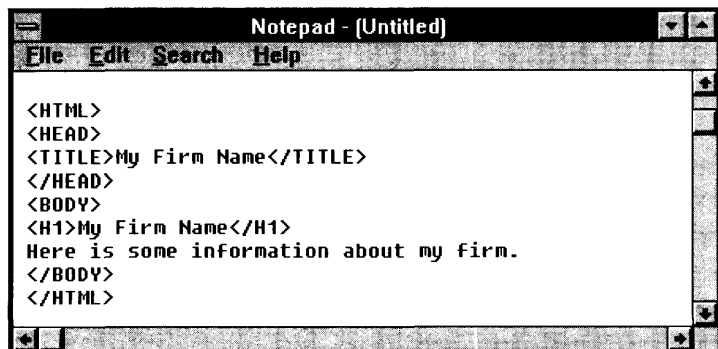


To display this text in a Web browser, HTML tags must be added to define the purpose of each of these three separate pieces of text in the document. The HTML tags needed to identify the purpose of each ASCII element are

<i>TAG PAIRS</i>	<i>FUNCTION</i>
<HTML> </HTML>	Surrounds the entire HTML document.
<Head> </Head>	Contains information about the document, like the title. Surrounds one of the two main parts of an HTML document, the Head.
<Title> </Title>	Contains the document's title which is usually displayed in the frame of the Web browser's window.
<Body> </Body>	Surrounds the text that is to be displayed in the window. The body is the second of the two main parts of an HTML document.
<H1> </H1>	The largest of the six headline sizes. The others are named H2, H3, etc. Surrounds the text you wish to display in the largest type size.

The finished HTML document (the text file with the HTML tags) that indicates the way the document should appear when displayed in a Web browser looks like this:

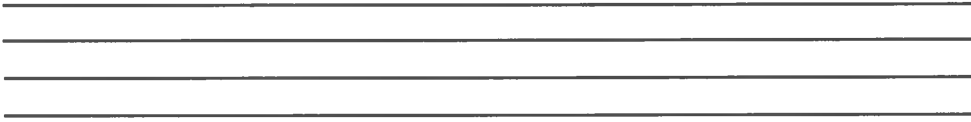
Figure 3.4
Using HTML to
"mark up" an
ASCII file.



```

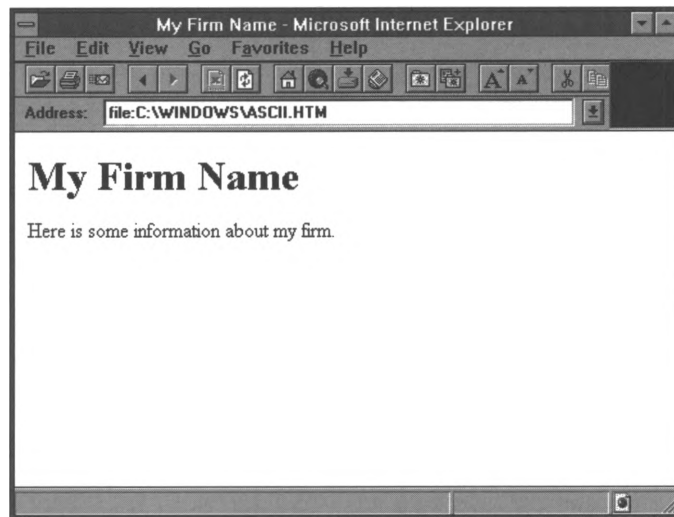
Notepad - (Untitled)
File Edit Search Help
<HTML>
<HEAD>
<TITLE>My Firm Name</TITLE>
</HEAD>
<BODY>
<H1>My Firm Name</H1>
Here is some information about my firm.
</BODY>
</HTML>

```



When displayed in Microsoft's *Internet Explorer* Web browser, the HTML document above looks like this:

Figure 3.5
Opening the HTML document in Internet Explorer.



The greatest appeal of HTML lies in the ability to specify a Uniform Resource Locator (URL) as a link to other documents on the Web (called a hyperlink). When a user clicks on a hyperlink, there is always an underlying URL that sends a request to retrieve the hyperlinked document. These hyperlinks have revolutionized reading and research, allowing users to follow their thoughts to related documents rather than being forced to read a document from top to bottom, beginning to end.

There are HTML tags that allow nearly any effect you may wish to create in a document—listing, italicizing, paragraph breaks, headings, and many many others. While the number of effects that can be created in HTML documents are growing daily, these examples indicate how simple it can be to create a Web document for the Internet—for a personal home page or an electronic commerce site. See Chapter Six, "Developing Content for Your Commerce Site," for a discussion of developing basic

HTML documents, and Chapter Seven, “Enhancing Your Commerce Site,” for a discussion of more advanced Web-site design.

Web Servers

Web servers are the central internal storage areas that manage and distribute information in response to client requests. In Berners-Lee’s plan for the World Wide Web, Web servers have only one job—to respond to client requests. Servers do not need to know anything about other servers, or about the network on which they are running. Some organizations invest in a dedicated computer to act as a Web server for maintaining a commerce site. Other organizations even choose to have multiple servers depending on the complexity of the electronic commerce transactions they will be completing. More typically, organizations use an Internet Service Provider’s Web server as a host for the site, avoiding the costs of installing and maintaining the server internally. Some organizations use the same server for their internal network and public Internet documents, since most servers allow reasonable security by permitting the Web Master to specify that certain IP addresses, user names, or passwords are allowed or not allowed entry into designated areas.

Actually, Web servers have two parts: (1) hardware and (2) software. Almost any modern computer system equipped for networking can host a Web server. If you decide to purchase a dedicated server for your commerce site, the hardware you select will depend on the traffic levels you anticipate at your site, the ease of setup you require, and the technical background of your in-house staff. After you’ve selected hardware, you must also select server software to load on the host machine. Server software stores and distributes documents and programs, and as you might imagine, many different types of server software are

available from various software vendors. See “Electronic Commerce Resources” for a listing of server software vendors.

Web Browsers

Web browsers do two things: (1) they act as viewers that display documents, and (2) they serve as client programs that send requests to a server on a network. As a viewer, a Web browser interprets the HTML tags in a file and displays formatted documents on the user’s computer screen.

Web browsers can access and display a wide variety of documents and objects found on computers including

- HTML tagged text
- Full-color graphics
- Video files
- Sound files
- Externally viewable files
- Interactive forms
- Transaction interfaces

Originally, only the formatted HTML text and compatible graphics were displayed within a browser’s window. Other types of files automatically triggered the appropriate viewing software needed to read and playback other information formats like video, sound, and PostScript. However, enhanced with special software plug-ins that install on top of the basic browser software and expand the Web browser’s functionality, many browsers can display other data types directly inside a browser window.

Actually, what is happening when you view a Web document is that your Web browser (your client software) is accessing a server somewhere. Highlighted links (a word, phrase, or picture) can be activated by positioning the cursor on the link and clicking the

mouse button. This triggers the browser's client function, sending a request to the URL specified in the hypertext link statement and initiating a Web client/server transaction. (The server is typically a WWW server but may also be a Gopher server, FTP server, or Telnet server, if the browser is enabled to retrieve documents from other server types.)

The Web client has all the mechanisms it needs to access the specified server and retrieve files from it. The server and the files being served may exist on any computer linked to the client via internal or external networks. The linked computer could be located anywhere in the world, and could be any type. The only requirement is that the network must use TCP/IP as the underlying protocol for communications. The Web client/server transaction has four distinct steps:

1. The client (Web browser) uses a URL to send a signal to establish a connection with the server where the desired document is stored.
2. A message is sent to the server requesting that a particular document (identified in the URL) be sent to the client.
3. The server fulfills the request by sending the document.
4. The connection is closed.

Once a client has made a request of the server, the incoming documents are retrieved and identified by their file extensions. In any Web browser setup there is a file (the *INI* file in *Windows*) that cross references file extensions to document types. Most Web browsers can internally display plain text or HTML files, as well as any image that has been saved in either GIF (Graphics Interchange Format) or JPEG (Joint Photographic Expert Group) formats and stored on a server. For example, when Sheila Scott decides to go shopping online for her daughter's birthday present

at Netwear International, Inc., she types the URL of the online store into the client software running on her laptop. The client software, the Web browser, uses this information to establish a connection between her laptop and the server software in the computer where Netwear's collection is being housed. The Web browser requests the home page of Netwear from that particular server computer. This home page is an HTML document that is sent to Sheila's laptop and displayed on her screen. The connection is then closed.

If, on the other hand, the incoming file is not an HTML file or if it contains images other than GIF or JPEG, the file or its images will be handled as external files. Sheila Scott could still view these files, but she would need to do so through the services of a helper application. For example, if Sheila wanted to see a video clip of a woman modeling the "Purple Passion" skirt that she bought for her daughter, she would need a helper application, or a browser plug-in, to view movies or video files. If she has these helper applications, the appropriate file will be downloaded from the server computer and the Web browser will launch the helper application to allow her to view the video file.

As you are probably beginning to see, electronic commerce sites offer impressive opportunities, and they require minimal investments in infrastructure and training because they make use of the world-wide Internet—already in place, well tested, and familiar to users. In addition to the Internet environment described in this chapter, your electronic commerce site needs some form of payment support. In Chapter Four, "An Introduction to Electronic Payments," you will learn more about payment options on the Internet.

3.20 UNDERSTANDING ELECTRONIC COMMERCE



Chapter Four

An Introduction to Electronic Payments

The history of money is long, interesting, and anything but stable. At one time, shells and beaver pelts were accepted as currency. At another time, a central bank issuing a single gold-backed currency was accepted. And then, at other times, many banks issued their own currencies. In fact, only in recent years has the currency used in the US been reasonably stable, due in large part to the work of the Federal Reserve Bank. One thing that financial professionals can learn from this diverse and changeable history is that the commerce marketplace can support many different currencies, even digital currency—strings of complex numbers and algorithms that represent certain fixed amounts of money. In this chapter, we will describe the evolution of the Internet as a marketplace and some of the types of transactions that the Internet supports today.

The Internet Marketplace

Until recently, there was no way to collect debts over the Internet. In fact, the Internet evolved as a place where people gave away information—for free! Sharing and free exchange were the standards of Internet communication. You could, if you chose, transmit a megabyte of data across the country in seconds, but you could not exchange a coin in the same way. However,

many people who gave away information on the Internet have reaped other rewards. For example, in the academic arena, publishing a scholarly article on the Internet—giving it away to your professional peers—can result in professional recognition, invitations to speak, write, or teach on the topic, and other types of reputation enhancements that, indirectly, lead to financial gains.

Some enterprising organizations have recognized that similar benefits can arise from using the Web as a marketing tool, while continuing to process transactions in the usual ways—phone, fax, and postal mail. By giving away information for free (product specifications and troubleshooting advice, for instance), organizations can bring users to their commerce sites where they can also offer contact information for future and continuing sales. In most cases, the actual purchase of products or services takes place through traditional means, but the Internet broadens the reach of the organizations and offers a marketing method that leads to new clients and customers who might never have seen a newspaper advertisement, catalog, or other traditional marketing materials.

Internet Payments

The two most common payment methods on the Internet today are phone-in orders and credit card orders. Many organizations use the Web as a type of interactive billboard for promoting products and services. When a customer visits a Web site to read an article about, say, home repairs, she may also find information about a great new 5-in-1 home repair tool kit. If she wants to order an item, she might be given a toll-free number to call. An operator then processes the order, just as if the customer saw an

advertisement on TV, in a magazine, or through a catalog. Some organizations also support customer orders through Web-based CGI forms (see Chapter Seven, "Enhancing Your Commerce Site," for more information about creating forms). Using these forms, customers can fill out their order information online and then provide their credit card numbers. The credit card numbers are sent over the Internet using security technology, such as Secure Sockets Layer (SSL), that protects the card number through a system of secure encryption.

By setting up a commerce site on a server that supports the SSL protocols, vendors can offer secure transactions to customers who are using an SSL capable browser, such as *Microsoft Explorer* or *Netscape Navigator*. When a customer links to a Web page from which a secure transmission is necessary, HTML coding embedded in the document initiates the transmission of a public security key to the customer's browser. Security keys are simply computer programs that encrypt and decrypt messages. The key that the server sends to the customer's browser is used to encrypt the information that the customer types into the order form. The encrypted message is sent to the server where a private key is used to decrypt the order information. (See Chapter Ten, "Security and Your Commerce Site," for more information about SSL and the public-key system on which it is based.) Customers using older browsers without SSL capabilities may be advised to phone in their orders.

As you might imagine, there are many server packages available to merchants who are about to enter the Web commerce arena. Two popular and versatile packages are *Microsoft Site Server, Enterprise Edition* and *WebSite Professional*. Although you will want to review others before purchasing a server package for your electronic commerce site, the descriptions below will give

you an idea of the types of features available in these software packages.

Microsoft Site Server

Microsoft's Site Server (<http://www.microsoft.com/commerce/>) package provides all the software necessary to set up a secure, dedicated server to support Web transactions. The software includes utilities that manage catalogs, order processing, and the creation of product and price promotions that can be dynamically updated. The *Processing Pipeline* feature provides for managing order payment, integration with existing accounting and transaction systems, and integration with software from independent software developers. A new component of this commerce support package is the *Microsoft Wallet* that adds on to a user system and enables *Internet Explorer* for commerce transactions. In short, the *Wallet* stores payment and address information and includes a credit card payment module that uses SSL-based security. It also allows for interfaces between various other protocols and third-party payment methods (such as digital cash and electronic checks).

WebSite Professional

Like *Site Server*, *WebSite Professional* (http://website.ora.com/wspro/features_main.html) is a sophisticated software package that includes tools for creating and maintaining a commerce Web site. Features include support for relational databases, searchable indexes, and advanced Web site programming modules (Java, Perl, Visual Basic, API, and SSI, for example). Secure transactions are supported through SSL and S-HTTP. Users of *WebSite Professional* also benefit from the Web Site Wizards that offer

step-by-step guidance for building your commerce site. And Web masters find the *WebView* tree-like display of the Web site an invaluable tool for updating links and managing the growth of a sophisticated commerce site.

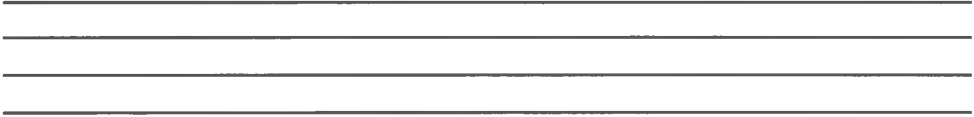
Southwest Airlines

An example of an organization making very good use of this type of encrypted transaction is Southwest Airlines (<http://www.iflyswa.com>). When a customer arrives at the Southwest Airlines site, called the “Home Gate,” she can select the service she requires from an image map designed to look like a reservation desk:

Figure 4.1
The Southwest
Airlines Home
Gate.

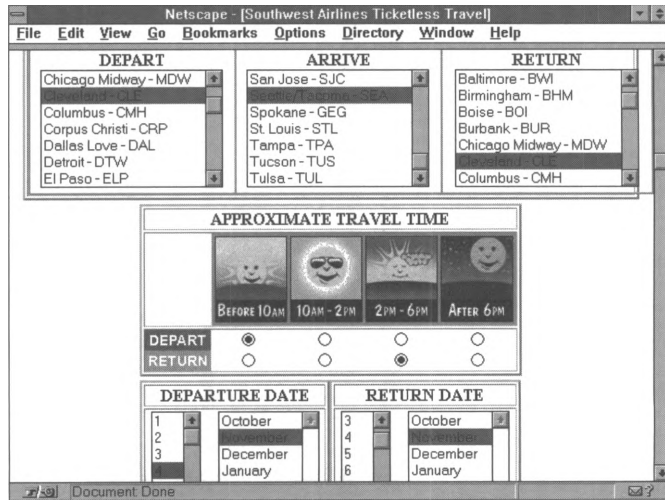


To make a flight reservation, a customer simply clicks on the reservation telephone and initiates a “ticketless travel” transaction. The first step is to tell Southwest where the customer intends to fly from, the destination the customer intends to fly to, and when she wishes to make the flight. The customer indicates



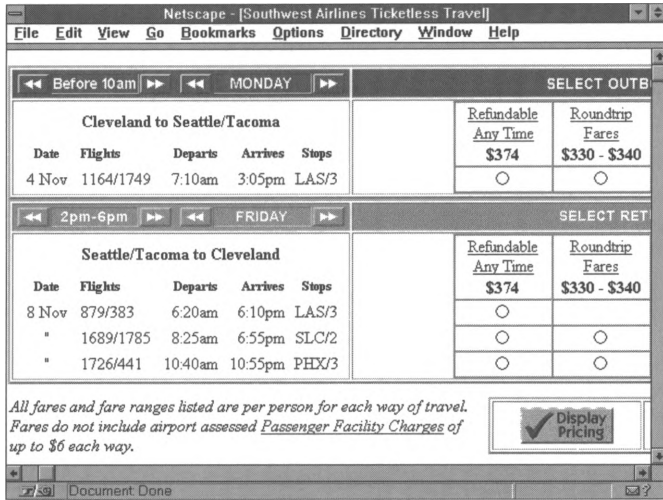
these details in a Web-based form by simply using a mouse to click on the appropriate selections:

Figure 4.2
Building an itinerary with Southwest Airlines.



After sending these preferences to Southwest Airlines' server (again, with a simple click of the mouse), Southwest's server processes the customer's preferences and then returns a list of possible flights that fit the customer's requests, with a pricing form from which the customer selects the applicable pricing rates:

Figure 4.3
 Selecting flight times and prices with Southwest Airlines.

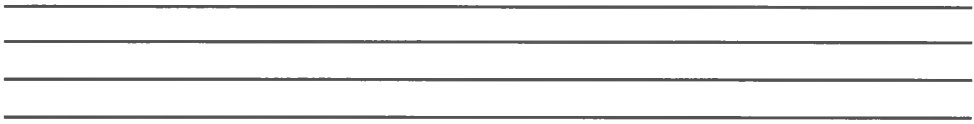


After selecting the flight times and prices, the customer sends this information to Southwest's server and receives an itinerary that includes descriptions of layovers, restrictions, and complete pricing information:

Figure 4.4
 Southwest Airlines' itinerary screen.



If the itinerary, restrictions, and pricing are acceptable, the customer simply clicks on a button to accept and purchase the



proposed package. At this point, the Southwest Airlines' server displays a secure form in which the customer can type credit card and other personal information that will be encrypted and sent to Southwest Airlines for processing:

Figure 4.5
Southwest
Airlines' secure
payment screen.

The screenshot shows a Netscape Navigator window titled "Netscape - [Southwest Airlines Ticketless Travel]". The browser's menu bar includes "File", "Edit", "View", "Go", "Bookmarks", "Options", "Directory", "Window", and "Help". The main content area is divided into several sections:

- NOTICE:** Contains two paragraphs: "Unless you purchase this itinerary with a credit card, you will not have a reservation." and "This is a ticketless transaction. You will not need a ticket to travel."
- FORM OF PAYMENT:** Features logos for VISA, MasterCard, DISCOVER, AMERICAN EXPRESS, and Club International. Below the logos are six radio buttons for selection.
- Number:** A text input field.
- Expiration (mm/yy):** A text input field.
- CARDHOLDER INFORMATION:** Contains several input fields:
 - Last Name: [] First Name: []
 - Address: []
 - City: [] State: [] Zip: [] []
 - Country: USA Phone Number: [] [] []

The status bar at the bottom of the browser window shows "Document Done" and a small key icon in the lower-left corner, indicating a secure connection.

The customer is assured that the transaction is secure by the solid key icon that is displayed in the lower left corner of this *Netscape Navigator* screen. (Customers using *Microsoft Explorer* would see a padlock in the lower right corner of their browsers.)

VeriFone

The VeriFone system uses a combination of SSL encryption and the Secured Electronic Transaction (SET) protocol to provide secure transactions for users of VeriFone software (<http://www.verifone.com>). This protocol has been developed by MasterCard and Visa, and, as you might guess, is an encryption key/certificate system specifically designed to support the various participants in a credit card transaction completed on the Internet: the customer, the merchant, and the processor or

acquiring bank. The SET system is also structured to be as flexible as possible to suit the needs of as many customers, merchants, and processors as possible. (For more information about the SET protocol, visit the informative document "Secure Electronic Transaction Protocol: Issues and Solutions," at <http://www.verifone.com/products/software/icommerce/html/setpaper.html>.) The VeriFone system, for example, consists of three parts:

1. *vWallet* (the purchaser's software).
2. *vPOS* (the point-of-sale vendor software).
3. *vGate* (the third-party processor or bank's software).

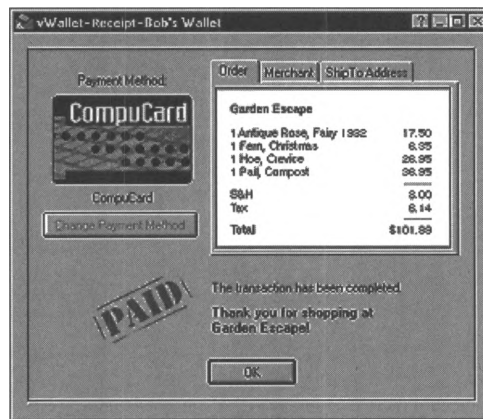
The first step in a transaction supported by VeriFone is that the customer visits the merchant's site and selects an item or items to purchase from the Web catalog. The buyer then opens their *vWallet* software, shown below. (All VeriFone software illustrations are reproduced with permission. 1996, 1997. VeriFone, Inc. All rights reserved. VeriFone is a registered trademark of VeriFone, Inc. *vWALLET*, *vPOS*, and *vGATE* are trademarks of the company.)

Figure 4.6
The vWallet displays on the customer's computer.



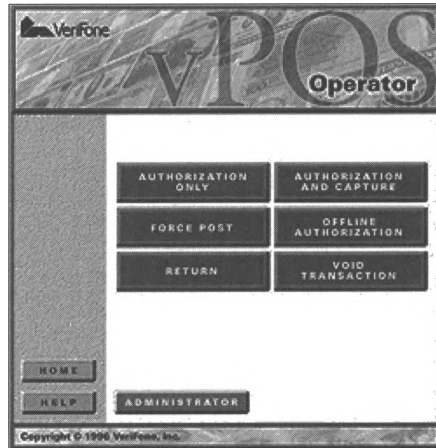
The *vWallet* software stores customer data, such as credit card numbers, eliminating the need to reenter this information for every purchase. The software can support multiple wallets for various members of a household or for various budget areas. This software also manages the encryption on the user's end of the transaction. When the customer selects a payment method and sends the payment information to the merchant (via a transmission secured by SSL protocols), the software produces a receipt that can be exported to personal finance programs or printed for the customer's hard-copy records.

Figure 4.7
*A digital receipt
in the vWallet
software.*



At the merchant's end of the transaction, the *vPOS* software is used to process the purchase.

Figure 4.8
The VeriFone
vPOS module.



When the merchant receives the purchase and payment information from the customer, the merchant sends an authentication request to the credit card processor or bank (via a transmission secured by SET protocols). The processor receives the VeriFone request through vGate software, which acts as a “gateway” through which the VeriFone data can be passed and used with the processor’s host computer system. The processor or bank then processes the request and, through its existing host system, confirms and authorizes the purchase. The authorization is sent back to the merchant who posts the transaction and sends a confirmation back to the customer.

Anacom Merchant Services

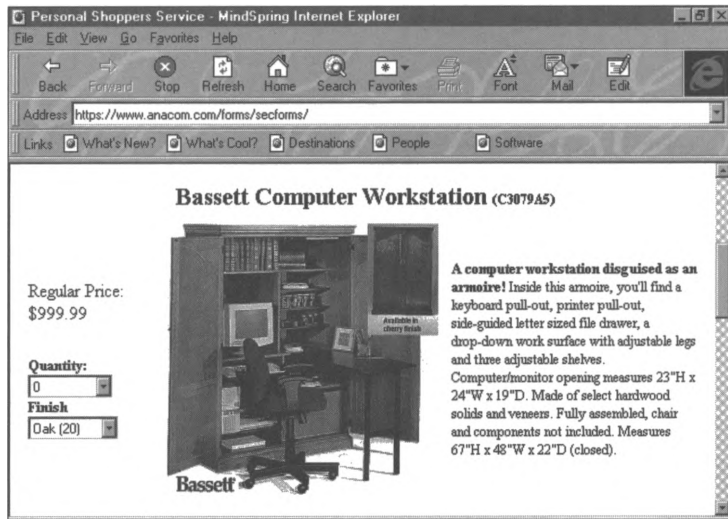
For small organizations that may not yet need nor be ready for sophisticated systems such as those illustrated in the Southwest Airlines and VeriFone examples, systems like Anacom Merchant Services are a reasonable alternative for secure Internet payments (<http://www.anacom.com>). Using the Anacom system, a merchant creates an Anacom order form that is stored on Anacom's server—secure and equipped to manage transactions in various ways. Using a Form Wizard, merchants are guided through the process of creating an HTML order form that can support up to 50 products, calculate taxes, offer various shipping options, calculate order totals, and capture credit card payment information.

The way that purchase information is processed depends on the level of service the merchant purchases from Anacom. For example, the least expensive version of the service (\$49.95 setup and \$29.95 monthly) simply collects the payment information and stores it on the server. The merchant downloads the information and manages the transactions in whatever ways the business can support. On the other hand, a more sophisticated option (\$179.95 setup and \$39.95 monthly plus .25 per transaction) allows merchants to take advantage of Anacom's ability to automatically interface with account processors to retrieve authorization for a purchase while the customer is online. The purchase funds are then deposited to the merchant's account and the merchant and customer receive email messages confirming the transaction.

Anacom's *WebCart* option (\$529.95 setup and \$79.95 monthly plus .25 per transaction) goes one step further by allowing merchants to create sophisticated electronic shopping environments, complete with illustrated and detailed descriptions

of products and a “shopping cart” that the customer fills by selecting various items from the catalog.

Figure 4.9
The Anacom
WebCart
shopping
environment.



The merchant maintains the catalog through Anacom’s Database Administration Utility and various levels of processing are available for *WebCart* merchants. Visit the Anacom site (<http://www.anacom.com>) for current pricing information and samples of catalogs and order forms.

A Sampling of Payment Software

Unfortunately, many customers are still uncomfortable sending credit card information over the Internet, even when the information is secured by SSL encryption. As a result, other types of software have been developed to support credit card and other types of transactions over the Internet.

CyberCash (<http://www.cybercash.com>) is a software solution that extends traditional credit card transactions to the Internet. A customer using the *CyberCash* system to make a purchase fills out the merchant's order form and receives an invoice and payment request from the vendor. Then the customer uses *CyberCash Wallet* software to select a credit card (for which information has been provided when the customer registered for a *CyberCash Wallet*). When the customer then clicks on **Pay**, the merchant software sends a special message to the customer's PC which activates the *Wallet*. The customer can then click on the chosen method of payment that will activate a series of encrypted automatic messages that travel between the customer, the vendor, the credit card processor, and then to the *CyberCash* server where the transaction is completed.

Similarly, *First Virtual* (<http://www.fv.com>) offers a two-stage ordering and payment system. In a *First Virtual* transaction, a prospective customer phones *First Virtual*, provides credit card information, and sends a confirming email message. *First Virtual* then emails a password that the customer uses to make purchases from any Internet merchant that accepts *First Virtual* for payments. When the customer makes a purchase, *First Virtual* sends an email message listing what was purchased and the price, and then asks the customer to confirm the authenticity of each purchase with an email reply. After receiving the confirmation, *First Virtual* bills the credit card and pays the merchant.

Although not specifically Internet dependent, *Online Checks System* (<http://www.onlinecheck.com/>) offers an attractive alternative to credit-card based payment systems. The *Online Checks System* allows merchants to accept and reproduce checks over the phone or fax for customers as one of their selection of customer payment options. The *Online Check System* prints a

check that replaces the next check in the customer's checkbook and is processed through the customer's bank, just as a check written by the customer would be processed. Customers receive the canceled check with their bank statements, just as if they had written and presented the check in person.

Open Market (<http://www.openmarket.com>), on the other hand, uses a proprietary server to support online transactions. To complete a transaction, an *Open Market* client first sends a request to the *Open Market* Web server. The Web server initiates a complex series of steps utilizing a specially defined URL that can be transmitted between the server, the customer, and the vendor. The Web server sends this specially defined "payment URL" to a "payment switch" that requests the customer's name and password and gathers other information (such as IP addresses, the channel's security, and the software used by the customer). Then, the payment switch returns the authenticated request to the customer who can forward it to the vendor whose address is part of the information encapsulated in the URL. While the descriptions above will give you an idea of the types of software that are being used on the Internet today, we have listed only a few. Be sure to look at "Electronic Commerce Resources," for a listing of commerce software developers and vendors who maintain WWW sites where you can access more information about various transaction support options.

Electronic Money

Perhaps the most important development in the arena of electronic commerce is the creation of digital cash systems that allow micropayments on the Internet—payments of smaller amounts than are usual for credit card transactions. One of the

leaders in digital money development is DigiCash
(<http://www.digicash.com>).

Figure 4.10
*The DigiCash
home page.*



DigiCash has developed a digital cash system, called Ecash, that is currently supported by a number of banks.* In the sections that follow, we will

- Describe how Ecash works.
- Describe how funds move in Ecash transactions.
- Show some sample transactions using Ecash software.

How Ecash Works

There are two essential components to the Ecash system:

1. Customers must open special accounts with banks that support Ecash. Ecash accounts are traditional banking accounts in which customers deposit money.

* Much of the Ecash descriptive material included in this chapter has been adapted with permission from the very useful Ecash tutorial provided by the Mark Twain Bank at http://marktwain.com/Ecash_in.html.

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2. Customers and vendors obtain and install the Ecash software by DigiCash. In conjunction with their banking accounts, customers and vendors can move money to their computers' hard drives from the Ecash Mint, which translates money value into Ecash "coins."

When customers set up Ecash accounts and send money to deposit in the accounts (through check or wire), the banks will automatically move some of the money to the Ecash Mint. Customers may also request transfers to the Ecash Mint by phone, fax, or email. As soon as the money is in the Mint, it is available for spending with Ecash software. In effect, the money has been withdrawn from the bank account in the form of digital money.

To make Ecash "coins" available for spending, customers follow instructions in the Ecash software to request that the Ecash Mint "coin" some money and place it on their computers. This can be some or all of the money in the Ecash Mint. Once the money is on the customers' hard drives, they can hold it (until some predetermined expiration date), or spend it.

When customers and vendors want to turn the Ecash back into money, they return the money to the Ecash Mint and then call, fax, or email the supporting bank to initiate the process of moving the money back into the traditional demand deposit account. Once it is there, customers and vendors can leave it (to spend later), deposit it to another bank account, or request that a check or wire be made payable to the account holder and sent to the address of record.

Inside Ecash

Like banknotes, Ecash can be withdrawn from and deposited to transaction demand deposit accounts. And, like banknotes, one person can transfer possession of a given amount of Ecash to

another person. But unlike cash, during customer-to-customer transfers, banks will have an unobtrusive but essential role to play, which we will describe below.

The following examples explain

- How an Ecash withdrawal works.
- How vendors are paid.
- Person-to-person transactions.
- Blind signatures.

The figure below shows the two participants in an Ecash withdrawal transaction: the bank and customer. Also shown are the digital coins that have been withdrawn from the customer's account at the bank and are on their way to the customer's PC. When they arrive, they will be stored, along with the few coins left over from earlier transactions, on the customer's hard drive.

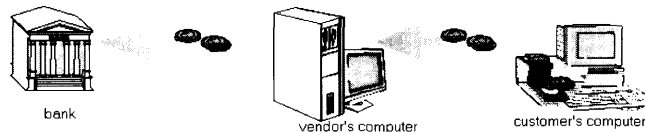
Figure 4.11
Ecash withdrawal.



Although, of course, no physical coins are involved in the Ecash system, the messages sent include strings of digits, each string corresponding to a different digital coin. Each coin has a denomination, or value, so that a portfolio of digital coins is managed automatically by the customer's Ecash software. The software decides which denominations to withdraw and which to use to make particular payments. (The Ecash software contacts the bank in the rare event that change is needed before a withdrawal, to allow it to restructure its portfolio of coin denominations.)

Now that the customer has some Ecash on his hard drive, he can make purchases from Ecash shops. Once the customer has agreed to pay a certain amount to a shop, the Ecash software chooses coins with the desired total value from the portfolio on the customer's hard disk. Then it removes these coins from the customer's computer and transmits them over the network to the vendor's shop. When the vendor's software receives the coins, it automatically sends them on to the bank and waits for acceptance before sending the electronic goods to the customer.

Figure 4.12
Ecash purchase.



To assure that each coin is used only once, the bank uses the serial number of each coin to point to where it should be stored in the "spent coin database" maintained by the bank. If the coin serial number is already stored at that position, the bank has detected someone trying to spend the coin more than once and informs the vendor that the coin is worthless. If, as will be the usual case, no serial number has been recorded at that position, the bank stores it at that position and informs the vendor that the coin is valid and the deposit is accepted.

When a vendor or a consumer receives a payment, the process could be the same. But, in some cases, as in a transaction between two consumers, users may prefer that money be made available on their hard drive as soon as it is received, ready for spending—just as if someone hands you a five dollar bill. This user preference can be realized using the process illustrated below. The only difference between this payment, from one consumer to another consumer, and the one between a consumer

and a vendor is what happens after the bank accepts the cash (since a vendor is more likely to deposit the Ecash payments into a business account at the bank). In the figure below, the payee has configured her software to request the bank to withdraw the Ecash and send it to her PC as soon as the coins are accepted. (Actually the payee's bank will check with the payer's bank to make sure that the coins deposited are good.) When the payer sends the payee five dollars, that money is immediately available to spend from the payee's PC.

Figure 4.13
Person-to-person
payment with
Ecash.



How Privacy Is Protected

Currently, the issue of financial privacy is a topic of heated discussion. On one side of the debate are people like Stewart Baker, the former general counsel for the National Security Agency, which provides electronic intelligence to the government and the military. In an interview that appears in Peter Wayner's, *Digital Cash: Commerce on the Net* (AP Professional, 1996), Baker argues that

Anonymous digital cash poses the same dangers as ordinary cash, but it adds to those dangers by giving criminals the convenience of digital payment systems. Right now, cash allows drug dealers to move large amounts of money around without the police being able to trace the organization and its customers. It allows people to carry on illegal businesses and to conduct illegal transactions anonymously. (229)

On the other side of the debate are Electronic Privacy Activists, such as Dave Banisar who fears that government and law

enforcement officers would be given too much power to invade the privacy of consumers if all purchases were traceable:



The danger is that a lot of financial information is not really in any kind of context that can be used to properly evaluate it. If you go to a grocery store and buy a pack of cigarettes, then an insurance company might interpret this to mean that you're a smoker and raise your rates. But you could have bought them for a neighbor or a friend. (228)

Although the debate continues, DigiCash has opted for consumer privacy. In a simple withdrawal, the bank creates unique blank digital coins, validates them with its special digital stamp, and supplies them to the customer. This would normally allow the bank, at least in principle, to recognize the particular coins when they are later accepted in a payment. And this would tell the bank exactly which payments were made by the customer.

By using "blind signatures," however, the bank can be prevented from recognizing the coins as having come from a particular account. The idea is shown in the figure below. Instead of the bank creating a blank coin, the customer's computer creates the coin itself, at random. Then, it hides the coin in a special digital envelope and sends it off to the bank. The bank withdraws the requested dollar from the customer's account and makes its special "worth-one-dollar" digital validating stamp on the outside of the envelope before returning it to the customer's computer.

Figure 4.14
*Blinded
withdrawal with
Ecash.*



When the customer's computer removes the envelope, it has obtained a coin of its own making, validated by the bank's stamp. When the customer spends the coin, the bank must honor it and accept it as a valid payment because of the stamp. But because the bank is unable to recognize the coin, since it was hidden in the envelope when it was stamped, the bank cannot tell who made the payment. Thus the blind signature mechanism lets the validating signature be applied through the envelope. The signer can verify that it must have made the signature, but it cannot link it back to a particular object signed.

The use of the word "coin" to describe the digital money the customer creates suggests a useful analogy to the way the transaction actually works in the Ecash software. When the customer's computer creates a blank coin it chooses a random number. The bank's validating stamp on the coin is a public key digital signature formed by the bank with the random coin number serving as the message signed. (See Chapter Ten, "Security and Your Commerce Site" for more information about digital signatures and public-key encryption.) Checking the validity of a coin involves the verification of the digital signature using the bank's corresponding public key. The blinding operation is a special kind of encryption that can only be removed by the party who placed it there. It commutes with the public key digital signature process, and can thus be removed without disturbing the signature.

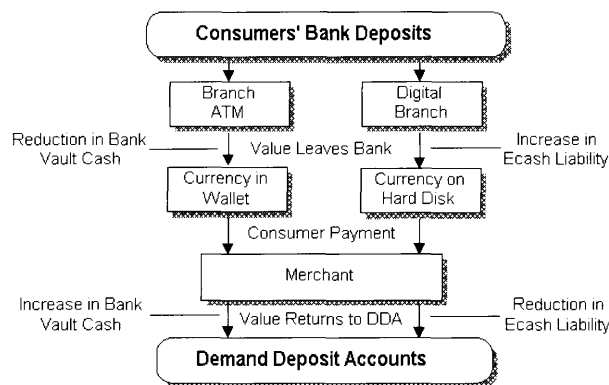
How Ecash Funds Move

While, for the consumer, Ecash is functionally equivalent to cash, to a bank, its properties are somewhat different. As can be seen in the figure below, the first step in each case is when value comes out of a customer's account. In an ATM transaction, the currency given to the consumer is a reduction in vault cash; in an Ecash withdrawal, however, the value is moved within the bank and

becomes an Ecash liability that will be reversed when the Ecash is presented for deposit.

The second step is the spending of the value. Here cash and Ecash are very similar. In each case, the merchant (or other party receiving it) has the option of accumulating or depositing it. When the merchant takes the final step and deposits the cash, it results in an increase in vault cash. A deposit of Ecash reduces the Ecash liability and increases deposit liability.

Figure 4.15
Cash flow in an
Ecash
transaction.



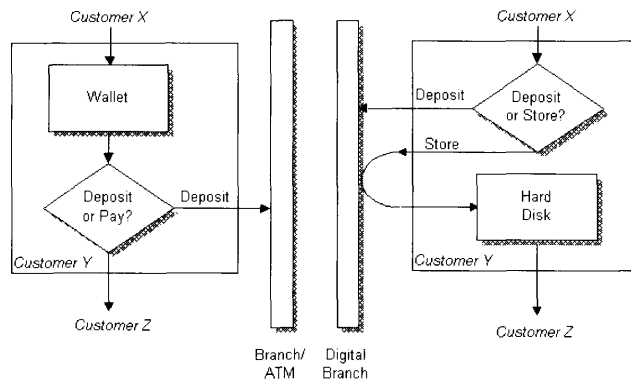
The chart below shows, in more detail, the difference in the actual transaction path for a cash payment and an Ecash payment, particularly in the case where they are made from consumer to consumer. While the main difference is invisible to the consumer, it is necessary to protect the integrity of Ecash.

The left side of the chart shows a cash payment from Customer X, who may have originally withdrawn it, to Customer Y. The payment goes directly from X to Y's wallet, and, at some later time, Y has the option of either depositing the cash in the bank or using the cash to pay Customer Z. The process continues indefinitely until the cash is deposited. The right side of the chart shows an Ecash payment from X to Y. Before the payment is



accepted, Y verifies the validity of the Ecash with the issuing bank, the main step which is not necessary with cash. Customer Y chooses at this time whether to store the Ecash or deposit it immediately in the bank. If Y chooses to store the Ecash, it may then later be used to pay Z, and so on.

Figure 4.16
Cash and Ecash
transaction paths.



Sample Ecash Transactions

Ecash has been designed for ease of use. Consumers are given a simple “point-and-click” graphical user interface that is simpler to use than many bank ATMs. To demonstrate the ease of using Ecash, various actual transaction screens are shown below (Version 2.1 of the *Microsoft Windows* Ecash client is shown throughout).

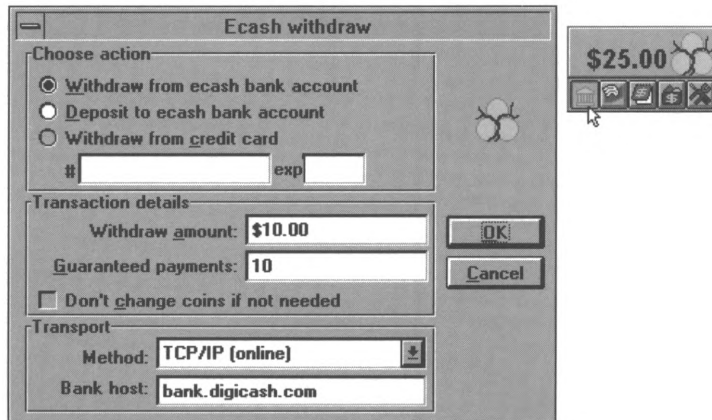
When a customer runs the Ecash software, it runs on her PC in the background much like a memory monitor or clock program. While Ecash is running, a small window, called the status window in Ecash documentation, is displayed. The status window shows the amount of Ecash available to spend along with an optional toolbar that allows the customer to initiate various functions.

Figure 4.17
Ecash status
window.

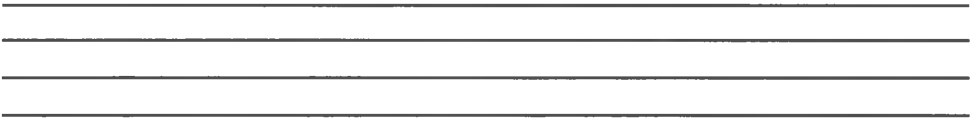


In order to use Ecash to purchase goods or services, Ecash must first be available on the payer's computer hard drive, just as cash is needed in a wallet to pay for goods or services in the physical world. Withdrawing Ecash is as simple as withdrawing regular cash from an ATM. The customer simply clicks on the bank icon in the status window toolbar, enters the amount to be withdrawn from the bank into the form that opens on her screen, and then she clicks the **OK** button. The amount of Ecash the customer typed into her form is then transferred to her hard drive. The screen below shows the actual dialog box used to withdraw Ecash:

Figure 4.18
Withdrawing
Ecash from the
supporting bank.

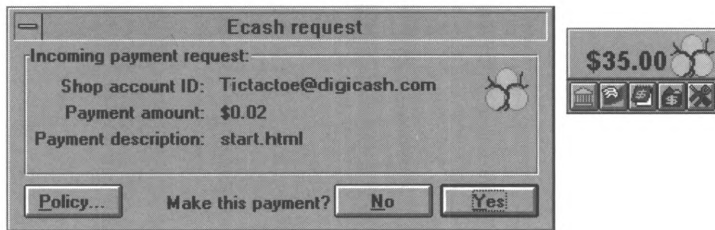


There are two ways to make a payment using Ecash. The customer can respond to a payment request issued by someone else, or initiate a payment. For example, a vendor may send a payment request to a customer who has asked to buy something. (Vendors' software will send such requests automatically.) In the dialog box below, a customer is being asked to make a payment



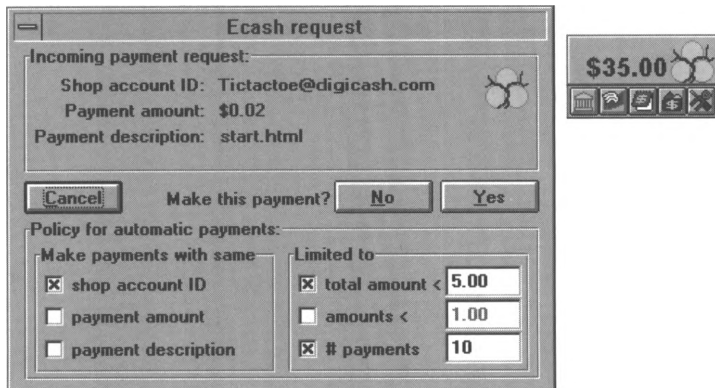
of \$0.02 to start a tic-tac-toe game. If the customer wants to make the payment, the **Yes** button is clicked; similarly, clicking the **No** button will refuse the payment.

Figure 4.19
Incoming payment request.



Customers who make online transactions often, may also instruct their systems to respond automatically to payment requests. When the **Policy** button is clicked in the window above, the dialog box is extended downwards as shown below. Customers can set the policy under which payments are to be made automatically in this extended window. Automatic payment policies include restrictive features to allow the customers to limit the types of transactions that are handled automatically. These **Policy** settings are a nice feature that can simplify certain repetitive payments.

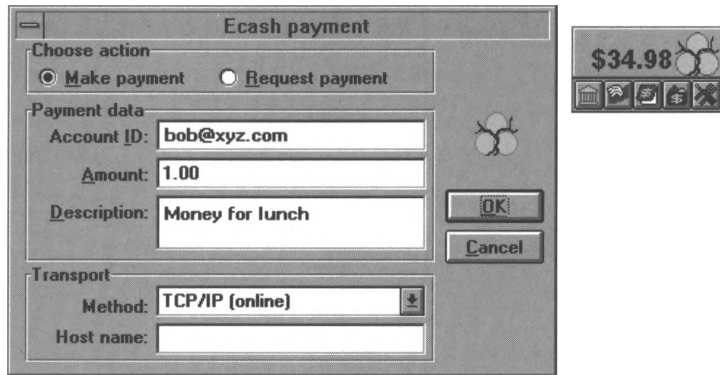
Figure 4.20
Setting a policy to perform payments automatically.





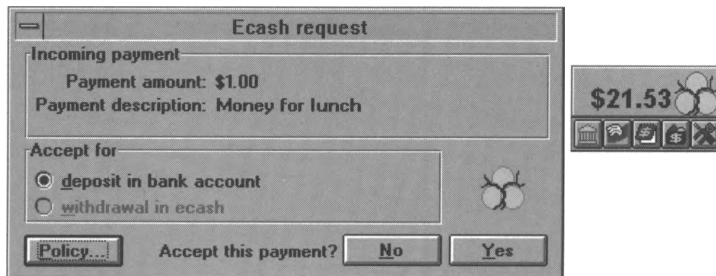
To make an unsolicited payment directly, the customer brings up the payment dialog box from the toolbar and fills in the blanks, much like writing a check.

Figure 4.21
Making an outgoing payment request.



When the customer sends payment, vendors have the option of depositing Ecash into the bank or retaining Ecash on their hard drives for future use. When payment arrives, the dialog box shown below will appear:

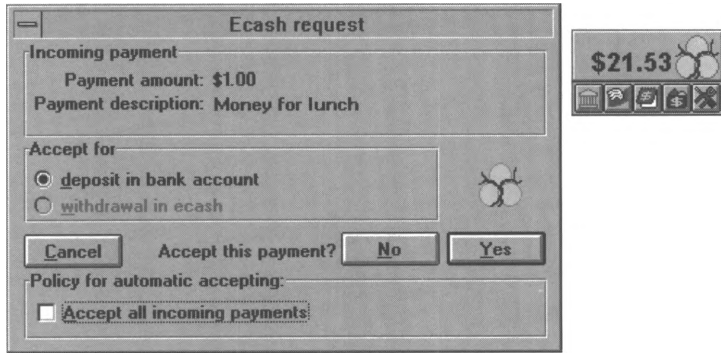
Figure 4.22
Incoming payment notice.



Just as the customers can set policies for automatic responses to payment requests, vendors can also set a simple policy for automatic handling of incoming payments, as shown below.

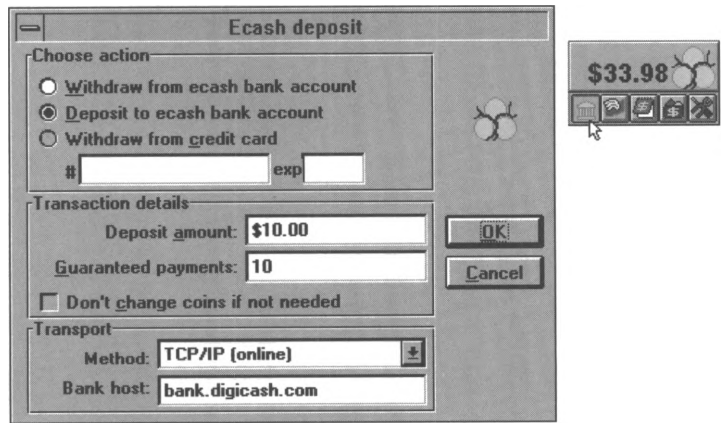


Figure 4.23
Setting a policy to accept payments automatically.



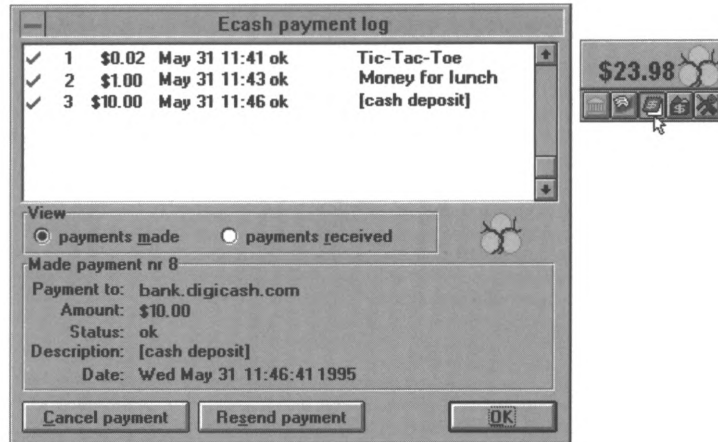
Ecash can, of course, be deposited in the bank. Again, a simple dialog box is used. (Actually this is the same box used for withdrawals opened by clicking on the bank icon on the status box toolbar.)

Figure 4.24
Depositing Ecash.



Ecash automatically tracks withdrawals, payments, receipts, and deposits, and can create various electronic statements for receipts and record keeping, as shown in the payment log below:

Figure 4.25
Ecash payment log.



Selecting Transaction Software

In this chapter, we've described some of the most popular transaction processing software available today. But before you can choose specific software, you should consider the payment styles that the customers using your system will be most comfortable with. Many research groups indicate that electronic commerce will be taking off in the next few years. For example, Forrester Research conducted a study that indicates that, although only about 518 million dollars in expenditures are completed over the Internet today, spending on the Internet will increase to 6.6 billion dollars by the turn of the century. Although Forrester's research is promising, current online consumers have some reservations about online transactions. In fact, despite the rapid development of innovative online transaction methods, a survey by Ernst & Young shows that many consumers still prefer to pay by the old-fashioned cash method; credit card and check payments rank as second and third choices.

What does this mean to you when you're planning transaction methods for your commerce site? Well, if you are setting up a site for technology-comfortable users who trust the software and security measures that are being implemented on the Internet every day, your task is much easier. However, more traditional clients may be wary of innovative transaction methods. To meet the needs of these clients and set them at ease about Internet commerce, give them several options and select transaction methods that are closest to their familiar payment schemes.

Cash

Since the most popular method of payment is cash, you can use a system that exchanges paper cash for electronic cash, such as the Ecash system demonstrated in this chapter. Electronic cash supports secure payments from any personal computer to any other workstation, through email or across the Internet, or even person to person. Because electronic cash works much like paper cash, electronic commerce sites can instantly provide goods and services, without processing or confirmation delays. With electronic cash, customers can pay for database access, buy software by email, receive money owed them by friends or employers, and even order a pizza and have it delivered!

The client software for a typical electronic cash transaction withdraws electronic cash from a bank and stores it on the client's computer. The client can spend the digital money at any vendor that accepts electronic cash, without the hassles of opening an account with the vendor first or transmitting credit card numbers in advance. Electronic cash provides security by using public key digital signature techniques and passwords only known by users (not even the bank knows the user's password).

Credit Cards

To support credit card transactions at your site, you can accept encrypted credit card numbers from your clients over the Internet, as in the Southwest Airlines example, or use a personal identification number (PIN) instead of a credit card number. By using this “alias,” credit card numbers are never sent over the Internet.

In a PIN system, users register credit card numbers with a company, such as First Virtual, over the phone. The company then issues a unique PIN. To make a purchase over the Internet, users simply give their PIN number to the seller. The seller sends a message to the issuing company containing the buyer’s PIN and the sale amount. The issuing company will then send the buyer an email to confirm the purchase. If the buyer confirms the sale, the credit card transaction is processed.

Another method for supporting credit card transactions is to use software that stores credit card information supplied during an initial secure registration process. The customer can then place an order and activate a series of encrypted messages that travel between the vendor, the client, and the credit card processor.

Checks

Another comfortable payment option you can offer at your electronic commerce site is online checks and checking. In an online check transaction, a form that resembles an ordinary check is attached to your client’s order form. Your client then fills out the check form and it is submitted to the institution that issued you the check form. The institution then converts the form into a paper check and sends it to you or your bank. Checks, unlike electronic cash and some credit cards, are browser dependent. That means that your client must have a secure

browser, such as Netscape *Navigator* or the 32-bit version of Microsoft's *Internet Explorer* to safely complete this type of transaction online.

Other check systems, such as the *Online Checks System* described in this chapter, allow you to accept and reproduce checks for customers over the phone or fax. The system prints a check that replaces the next check in the customer's checkbook. The check is processed through the customer's bank and the customer receives the canceled check with the monthly bank statement, just as if the checks were written and presented in person.

The payment technologies that you choose to implement at your site will depend on the type of products and services that you offer and the level of technology with which your customers and clients are at ease. But, no matter what type of project you are facing, the methods described in this chapter demonstrate that there is a suitable payment system available for every commerce project. Use the Payment Systems worksheet on the following page to investigate the costs and benefits of various Internet payment systems. You may begin your research by visiting the Internet sites listed in this chapter for various software developers.

4.34 AN INTRODUCTION TO ELECTRONIC PAYMENTS



Chapter Five

Setting Up Your Server

When you are ready to implement your electronic commerce server, you may follow two possible methods:

1. Set up an internal server and connect it to the Internet through an Internet Service Provider.
2. Lease server space from an Internet Service Provider on which to display your Web pages.

Each approach has benefits and drawbacks. If your organization plans a large site with many complex pages, and has a large IT staff with the time and training to implement and maintain a server, then setting up an internal server may be the best choice. On the other hand, many small businesses are turning to off-site providers for their Internet sites because they cost less than buying an internal server, pose no security threat to internal LANs, and provide twenty-four hour monitoring, seven days a week. In this chapter, we will describe some guidelines for both approaches to setting up your commerce site.

Installing a Server

So, you've evaluated your organization's internal resources and the goals of your commerce site, and you've decided that setting up a server at your site is the best way to proceed. The main steps involved in the installation of an electronic commerce server are listed below:

- Select a computer to host the World Wide Web (WWW) server software.
- Select an operating system for your server and select the WWW server software.
- Identify the categories of users that may wish to access your server and what their rights and restrictions are.
- Install the operating system and the WWW server software.
- Establish an account with an Internet Service Provider that can connect your server to the Internet.
- Apply to the InterNIC for a TCP/IP domain name and address for your server.
- Install and configure TCP/IP software on the server.
- Configure the WWW software to identify the directory where the initial Web home page resides.
- Decide on the file name for the initial home page and configure the WWW server to recognize that file as the initial home page.
- Develop a default home page that will answer inquiries from users.
- Select and install transaction software.
- Build the rest of the pages.

You will also need to decide how to secure your server with a firewall, screening router, or other means. You may have a router at your Internet connection that will direct email and responses from servers to your local area network and Web inquiries to your Web site. (We discuss Web site security in more detail in Chapter Ten.)

In the sections below, we will describe these steps, the decisions that you will face when implementing these steps for your organization, as well as some of the online resources where you can learn more.

Selecting Your System

Your choice of the computer and operating system software may reflect your organization's need for software which offers special features. But, you must also consider the capabilities of the personnel that will be maintaining the system. If your computer personnel are well-versed in *Windows*, but are not familiar with *Unix*, there is no need to force them to learn a new operating system just to install a *Unix* server. In fact, that would be counter-productive. Instead, you may wish to choose *Windows NT* as your server's operating system and one of the *Windows NT*-compatible servers, such as *Microsoft's Internet Information Server*. If you have a computer systems group with *Unix* experience, they may prefer to install the server on a *Unix* platform because of the mature *Unix* tools that are available for assisting in the management of a World Wide Web-type server.

If you are going to use your server to receive confidential information, such as credit card data when acting as a point-of-sale site, you will want to select a server that implements one of the several technologies that will facilitate secure Web browsers, such as *Microsoft Internet Explorer* or *Netscape Navigator*, to encrypt the data it sends to your server. When you browse the Web with one of these secure browsers that can encrypt and send encrypted data, you can tell when you are connected to a secure server. A padlock icon will appear on the lower window bar of *Microsoft Internet Explorer* or the broken key on the lower window bar of *Netscape Navigator* will become solid. This visual indication of a secure link occurs when a secure server successfully sends a public key to a secure browser. The browser uses that public key to encrypt data that can only be decrypted by the secure server's private or secret key. In many cases, you need to purchase a license from the publisher of the security software, such as RSA, so that your server will be able to create

the public and secret encryption keys necessary to communicate securely.

Configuring a Web Server

Configuring commercial WWW servers and commercial operating systems for use as commerce servers is generally well-explained in the system documentation. Because each system is different, any global description of configuration steps we could provide here would not be practical in your own configuration process. Nevertheless, as an example, it may be useful to describe some of the configuration issues that users of the popular and freely distributed NCSA *HTTPd* server software face when configuring the server software:

- After downloading and decompressing the software, users must first copy a small set of distribution configuration files from the configuration directory.
- Users must edit the *http.conf* file to indicate elements such as: (1) the type of server being used, (2) the port used by the server, (3) some user restrictions, (4) the mail address of the server administrator, (5) the root directory where executable, configuration, and log files are stored, and (6) the server's name.
- Users must configure the resource configuration file, *srm.conf*, to identify the document root, which identifies the directory in which files will be stored, and the *ScriptAlias*, which identifies the location where the CGI scripts that control your site's interactive features are stored.
- Users must configure the access configuration file, *access.conf*, which allows administrators to control access to specific server directories.

Depending on the type of software you select and the level of control you will need, your configuration process may include more or less steps than those described above. When making these decisions, you can supplement system documentation with online resources devoted to Web server configuration and maintenance. For example, when you use freeware, such as *Linux Slackware* as the *Unix* operating system and the *NCSA HTTPd* server, you must rely on documentation contributed by users. The newsgroups listed below are devoted to discussions of various types of Web server software. These newsgroups can be excellent sources of information, advice, and support:

- **comp.infosystems.www.servers.ms-windows**
- **comp.infosystems.www.servers.unix**
- **comp.infosystems.www.servers.mac**
- **comp.infosystems.www.servers.misc**

Server Security

There will probably be four basic categories of access to your electronic commerce server. First, an administrator must have access to all executable programs including the system software. Second, the HTML files will probably be edited by various groups within the company. Those groups need access to the directories that contain the files they are responsible for maintaining, but not to the operating system software. Password-enabled users comprise the third group, and the general public comprises the fourth group. Limit server access to the first group (administrators) as much as possible.

While each system has its own method for administering these details (some of which were described above), the identification, classification, and rights of these groups, must be identified and documented so that the system's security can be properly

configured. Be certain that you address these issues with the appropriate decision makers and team members.

In addition, assure that groups accessing password-protected areas choose difficult passwords. Since hackers use sophisticated dictionaries to break through password-protected systems, assure that passwords are

- At least eight characters long.
- Mixed-case alphanumeric.
- Not recognizable as a word.

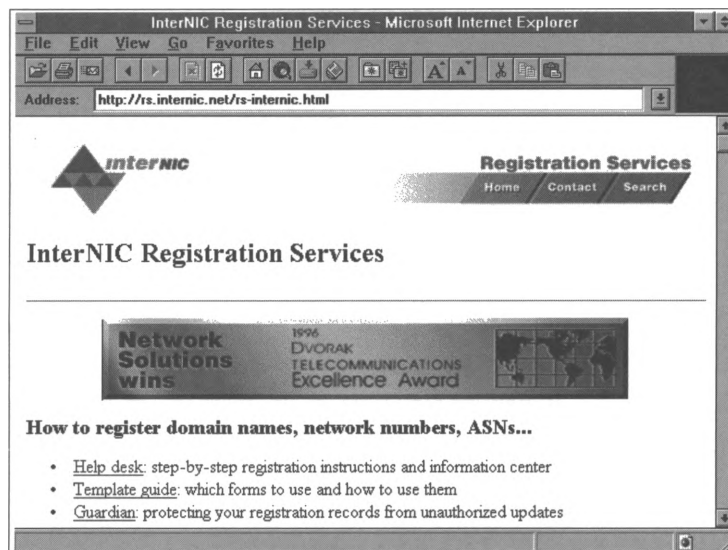
See Chapter Ten, “Security and Your Commerce Site” for more information about Web server security and passwords.

TCP/IP Addressing

Since your electronic commerce server runs on the TCP/IP protocols, you will need to implement TCP/IP addressing and establish an account with an Internet Service Provider who can connect your server to the Internet (see the discussion of selecting a provider below). As we discussed in Chapter Three, “Understanding Electronic Commerce,” requests typed into a Web browser’s **Address** or **Location** box using a numerical IP address would look something like **http://38.115.11.90**, instead of a more understandable text address, such as **http://www.corp.com**. The process of changing a commonly understood name into an IP number is called name resolution. You may have noticed a message that appears at the bottom of your Web browser that says something like “resolving www.kentis.com” when you type a new address (such as **http://www.kentis.com**) into your Web browser. This message tells you that your computer is looking for the IP number related to the name you input.

To get assistance with obtaining a domain name, visit the InterNIC Web site at <http://rs.internic.net/rs-internic.html>. Your Internet Service Provider will assist you in obtaining a domain name.

Figure 5.1
The InterNIC
Registration
Services Web
site.



A domain name is a description of a computer's "location" on the Internet. It contains several components, separated by periods, called "dots." Each piece of the domain name tells you something about the location of the site. For example, in the domain name `www.kentis.com`, `www` is the name of the host computer at the site, or the hostname. The next item (`kentis`) is the second-level domain name, and is registered with InterNIC Registration Services. The last item (`com`) is a top-level domain name, and describes the purpose of the organization or entity that owns the second-level name. A domain name may include other components between the hostname and the second-level domain name, called subdomains.

After you've registered your domain name and have obtained your IP numbers, TCP/IP software must be installed on the server and configured with the IP number you obtained from the InterNIC.

Installing Your Home Page

After you have installed your WWW server software onto your server, you must identify, in the initial configuration, the name of the directory where the server looks to find the default home page. For example, you may wish to create a directory called "WWW" to house your default home page. Next, you need to identify the file (called the default file or initial home page) that will be sent to inquiring client computers when no particular file is specified in the client's request. In other words, what HTML page will the server send back to a client that makes an inquiry when that inquiry does not identify the name of the file that it wants returned? For example, when you enter the address **http://www.kentis.com** into your Web browser, you have identified only where your browser should send the request for the file. In this case, you may be expecting the initial home page to be returned to you, but you have not specifically identified the file that the server should send back to display in your browser. Instead, you are relying on the convention that says that when an inquiring client sends a request to a WWW server, and doesn't specifically identify the file it wants returned, the WWW server will send back the initial home page, also called the default file. The convention of most server configurations is to use the file name *index.html* or *index.htm* as the default file name, but you can (and must) decide on the name you wish to use. The next time you surf the World Wide Web, type in the name of a WWW site, wait until you connect, and then look at the name of the file that is displayed in the **Address** or **Location** box in your browser. The file name at the end is the default file of that server.

Installing Your Transaction Software

Every day, commerce software vendors are introducing new methods for online transactions, so deciding on a software option can be a difficult task. In this section, we will overview some of the fundamental characteristics that you should consider when deciding which commerce software system to use on your server:

- Transaction security
- Vendor needs
- Customer convenience
- Technical challenges

Transaction Security

The offline world offers various options for payment (cash, checks, credit cards, etc.), and most of these payment methods are computerized, at least in part (computers back up paper records and keep transaction documents organized and accessible). However, these existing payment mechanisms assume that the parties involved in the transaction will either meet physically, or that a sufficient time delay will allow frauds, overdrafts, or other problems to be identified and corrected. Electronic transactions, on the other hand, are real-time transactions, and so new methods of authentication and authorization are developing daily.

When completing a transaction over the Internet, customers and vendors must be sure that transactions are authentic, nonrefutable, and secure. Users must be sure that their transactions cannot be forged or altered. Perhaps the biggest problem for online transaction software developers is the ease of copying digital information. Only complex audit methods can insure that a particular packet of bits is spent only once. Users must be able to verify that an electronic transaction has taken place, perhaps through some receipt or proof-of-purchase mechanism. Finally, users must be sure that they cannot easily be

scammed, cheated, or implicated in fraudulent transactions by eavesdroppers, impostors, and counterfeiters.

Customer Convenience

Most people are called upon to keep certain numbers memorized to authenticate their identities and access private accounts (social security numbers, PIN numbers for automated teller machines, passwords for computer accounts, etc.), but when numbers get too long, or procedures become too complicated, users are likely to look for other methods of completing tasks. Although sophisticated algorithms and complicated number systems can offer strong protection against security breaches, they are not likely to make customers happy. In fact, customers may find it easier to use a simpler, more familiar offline transaction process—or another vendor.

When deciding on transaction choices, you must consider how convenient the software will make transactions for customers. First, the software must be easily accessible to the customers. When completing a transaction online, users must find the exchange process to be simple and fast, but the user must also be certain that the transaction software protects their privacy, keeping all transactions confidential.

Vendor Needs

Depending on the type of product or service that your organization offers, different transactions systems may be used. In the most typical types of offline transactions, a client approaches a vendor, asks for a product or service, receives the product or service, pays the vendor, and leaves. Other kinds of transactions are also common, such as advance payment for a product or service.

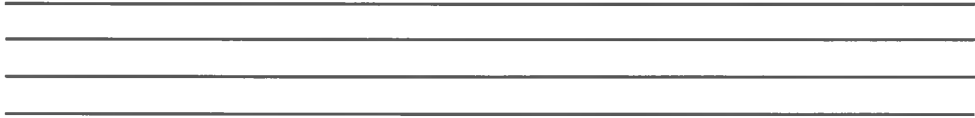
Online transactions may take these, or other forms, but in each case the software must provide auditing and control features to meet the needs of the vendors as well as the customers. For example, a vendor who sells and delivers information online needs a different kind of transaction processing than a vendor who takes orders online, but delivers through US postal mail. When deciding on software for your organization, or assisting a client choosing transaction software, consider the types of services and transactions that will be necessary. The software must allow flexible policies and controls for the various products and services offered by today's Internet vendors.

Technical Challenges

The Internet is a rapidly growing and changing technical medium. When choosing transaction software, consider typical technical challenges and the measures offered by the software to overcome difficulties. Users must be reasonably certain that the infrastructure on which the transaction is being carried out is reliable, regardless of hardware failures or system-load conditions. For instance, if your transaction system requires a third party, such as a bank, how do your customers complete transactions if the bank's computer goes down due to a power outage? Be sure you understand the types of hardware needed to make the transaction system work and the backup measures that are available.

Integrated Accounting Systems

When you are ready to integrate your commerce site with your accounting system, you have several options to consider. Three Web packages that are integrated into accounting systems are *WebTrader* by SBT (<http://www.sbtcorp.com>), the Web Server features of the *Big Business* accounting package by Big Business



(<http://www.bigbusiness.com>), and the *Peachtree Business Internet Suite* (<http://www.peachtree.com>).

SBT's *WebTrader* software integrates into the Web server and facilitates the creation of a sales database from Web site leads.

Figure 5.2
SBT's *WebTrader*
Web site.



Specific features of this *Windows* software include the following:

- The ability to create an electronic storefront with order forms for products and services.
- Automatic processing of orders.
- Email confirmation for customers.
- Direct instant connections between merchants and customers.
- A parsing program that automatically transfers information collected at the Web site to SBT accounting-system software.
- RSA encryption for secure transactions.

WebTrader is a favorite among consultants like Rick Kostopoulos, CPA, of NewGen Information Systems. Kostopoulos believes *WebTrader* offers significant benefits over other transaction software: "Much transaction software is written by Web masters who try to build accounting systems into their HTML storefronts as an afterthought. In *WebTrader*, SBT offers a fully developed accounting system that has been modified for the World Wide Web environment. *WebTrader* seamlessly passes crucial data from the Web storefront to the business's accounting documents" ("Rick Kostopoulos, CPA: VAR on the Internet," *Internet Bulletin for CPAs* [March 1996]: 5).

Another excellent accounting package with advanced Internet integration for electronic commerce is *Big Business for Windows*. *Big Business* is an inexpensive accounting, distribution, and marketing package targeted at small and growing businesses (less than 100 employees). It is built on a relational database, which offers multi-user access, strong querying and reporting capabilities, and full integration among all its parts.

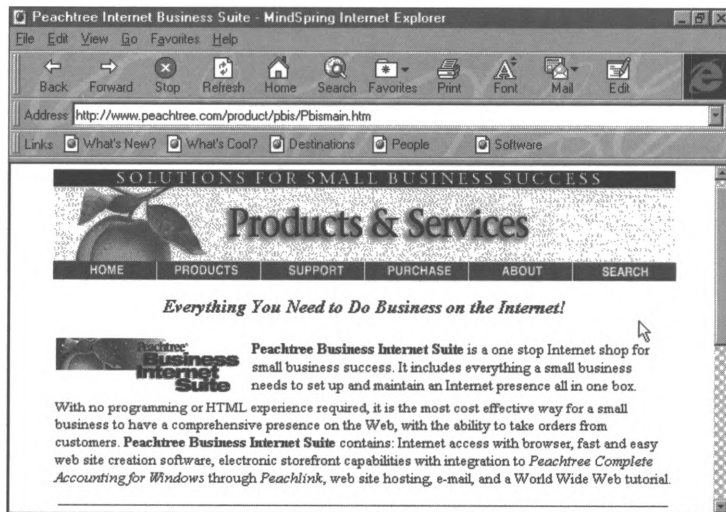
Big Business offers a number of special features, such as those listed below:

- Built-in communication and scheduling system.
- Integrated contact management tool.
- Accounts Payable that itemizes unpaid open invoices, schedules payments, lists outstanding items in a calendar format, and creates checks quickly when necessary.
- International formats and VAT (Value Added Tax) support.
- Supports multiple "bill to" and "ship to" addresses for each customer.

In addition, the system can automatically create catalogs of your products in HTML format. Each item record allows you to add detailed descriptions and identify both thumbnail and regular-sized graphic files for the catalog. *Big Business* then creates a three-level catalog. For more power, you can get the Web server add-on for direct access to the system. The add-on permits merchants to query the system, and view and print forms from the Web. The Web pages closely simulate the look and feel of the software, so staff members do not need to relearn the system in order to have remote access.

The *Peachtree Business Internet Suite* has teamed up with an Internet Service Provider, Harbinger (<http://www.harbinger.com>) to offer a comprehensive commerce package that integrates with Peachtree accounting software.

Figure 5.3
The *Peachtree Business Internet Suite* Web site.



The package includes the following features:

- Site-creation software, which allows you to create Web pages even if you have no HTML knowledge.

-
-
-
-
- The PeachLink order processor, for importing orders into *Peachtree*.
 - One month of secure Web hosting, provided by Harbinger.
 - One month of email and Internet access, also provided by Harbinger.
 - A copy of *Netscape Navigator* for Web browsing and email.
 - A user's guide covering Web site creation and the *Peachlink Order Processor*.
 - A copy of *Netmarketing: Your Guide to Profit & Success on the Net*, by Bruce Judson.

Although the software was designed to work seamlessly with Harbinger's Web hosting services, merchants can also use their own Internet Service Providers; however, some of the security features will be more difficult to implement. For merchants who are using *Peachtree*, the site-creation software can retrieve information about your products from the Peachtree database automatically. The transaction server, the *PeachLink Order Processor*, collects orders from a special data-only email account and allows merchants to assign valid customers to the orders and post them to *Peachtree*. When the merchant retrieves the orders, an email message, acting as an order confirmation, is sent to those customers.

While these examples can give you a good idea of the types of features currently available in these commerce/accounting packages, the integration of commerce software, Web servers, and accounting software will continue to evolve as electronic commerce grows. Be certain to explore the various options available before making your choice.

Using a Service Provider

Internet Service Providers (ISPs) are companies that lease lines from large telecommunications companies and then sell parts of the lines' capacity to their clients. In addition to providing connections to the Internet, it is becoming more and more commonplace for Internet Service Providers to offer server space to customers as part of their basic service packages. Even the commercial online services (*America Online*, *CompuServe*, and *Prodigy*) have jumped onto this bandwagon offering Web space to all subscribers. After evaluating your organization's needs, you may decide to offer your commerce site through your Internet Service Provider's server, instead of running an internal server, in which case, your most important decision will be the selection of a provider who can fulfill the organization's needs.

There are obvious benefits to taking this route to establish your electronic commerce site:

1. Your organization will avoid the costs of purchasing a computer to act as a server and the software necessary to make the server run.
2. Your organization will avoid the costs of training staff members to maintain the server, since the ISP will have staff members maintaining the server.
3. Your provider may offer programming scripts for customers as well as assistance in obtaining IP addresses and domain names from the InterNIC.

After you've selected your provider, the steps you take to implement your site are not very different from those described above—develop guidelines for authorization and restrictions, install application software for your staff who will be developing

documents or interacting with the site in other ways, and develop a default home page.

Selecting an ISP

Whether you are connecting an internally maintained server, or seeking an ISP that can offer you server space, the first step to take when choosing an ISP is to assess what types of services you will need. For example, if you only require a connection from a single office site, then your choice may be simpler than a company that needs to be able to access their server through the Internet from various locations, or an organization that hopes to provide information and services using the ISP's server. Take some time with your team and other decision makers to clearly identify and describe, in as much detail as possible, the services you will need from your ISP. After you've identified your organization's needs, you'll be in a better position to choose an ISP that can give you the best service.

When deciding on an ISP, the first decision you will make is whether to use a local or national provider. National providers offer the benefit of being able to connect to the Internet from POPs (points of presence) all over the country, and if part of your typical business activity is traveling, or you will have staff members accessing the server from various distant locations, this can be a real value. For example, members of the Kent Information Services, Inc., staff present Internet seminars at locations all over the country. Using a national provider insures that we can connect to the Internet from various locations with reasonable ease and reliability. If your company does not require this type of flexibility, you might consider a local provider that offers the benefit of fewer clients, and, sometimes, more personal service. The most important factor when choosing an ISP is the ability to connect to the provider with a local phone call and avoid long-distance charges.

Another issue to consider when choosing your ISP is the technical capabilities of the company. Although a small local provider may offer enthusiasm and customized service, they must also prove that they can offer the crucial technical capabilities you will need to be assured reliable service. If your commerce site is inaccessible because the ISP's server is busy, you are losing potential customers. Some typical considerations when selecting your ISP include

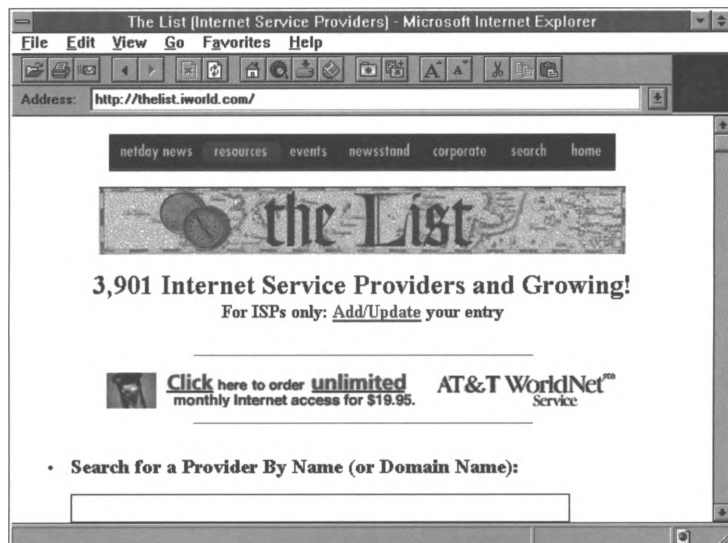
- The ability to make a successful connection when you dial in (the ratio of customers to modems).
- Multiple connections to Internet backbone providers to insure service in the event that one of the ISP's lines goes down.
- Training, consulting, and technical support services.
- Experience with business customers.
- Security precautions.
- Transaction methods supported by the server.
- POPs near your location.
- The amount of Web space available to customers.
- The availability of typical and useful programs such as image map scripts.

When you have identified ISPs that can offer the services you require and have the technical capabilities to provide that service reliably, then you must consider and compare the costs of various ISPs. The costs of services offered by ISPs are remarkably variable so ask colleagues, friends, and other business users about their ISPs. Typically, ISPs offer a certain number of hours of service for a monthly fee (MindSpring, for example, offers unlimited Internet access and 10 MB of Web server space to customers for \$24.95 per month), but some ISPs tack on hidden costs (such as additional charges for each email message). Be certain that you

are clearly informed about the services that are included in the initial and monthly fees. If you already have a service provider, inquire about Web server space availability. Although you may have used the service for Internet access only, you may find that your ISP already offers Web server space with some accounts.

A good place to start your search for an ISP that can offer the type of account you will need is *Online Connection* at <http://www.accessone.com/~shwaap/onlinec/index.html>. This site provides cost-comparison charts for major national providers and commercial online services. More comprehensive lists of Internet Service Providers are available in both print and electronic forms, such as the listing in the *CPA's Internet Reference Guide* and the very extensive listing entitled, "The List" maintained at <http://www.thelist.com>.

Figure 5.4
"The List" of
Internet Service
Providers.



Although the specific steps involved in configuring and implementing an electronic commerce site will be different for every organization, the topics described above are a good place

to begin your planning. We've summarized these decision points in the "Server Checklist" that appears at the end of this chapter. You may want to use this sheet as you plan, or copy and distribute it among your team members.

After you have installed and configured your server, or have established an account with a provider that supplies server space, you can begin using HTML and the other Web-design tools described in Chapters Six and Seven to build the content of your electronic commerce site.

Server Checklist

<i>ISSUE</i>	<i>RESOLUTION</i>
Decide whether to use an internal server or server space provided by an Internet Service Provider.	
If using an internal server:	
Select a computer to host the World Wide Web (WWW) server software.	
Select an operating system for your server and select the WWW server software.	
Identify the categories of users that may wish to access your server and what their rights and restrictions are.	Administrator— HTML Editors— Authorized Users— Unauthorized Users—
Install the operating system.	
Install the WWW server software.	
Research and select an Internet Service Provider.	
Contact Internet Access Provider and the InterNIC to obtain TCP/IP blocks.	
Install and configure TCP/IP software on the server.	
Select and install client software on each workstation.	
Identify the directory on the server where the initial Web home page resides.	
Decide on the file name for the initial home page and configure the WWW server to recognize that file as the initial home page.	
Develop a default home page that will answer inquiries from users.	
Research, select, and install transaction software.	
If using server space provided by an Internet Service Provider:	
Identify the ways the organization will use the server space.	
Research and select an Internet Service Provider.	
Identify the categories of users that may wish to access your server, what their rights and restrictions are, and the access control methods supported by your ISP.	Administrator— HTML Editors— Authorized Users— Unauthorized Users—
Develop a default home page that will answer inquiries from users and install it on your ISP's server.	

5.22 SETTING UP YOUR SERVER



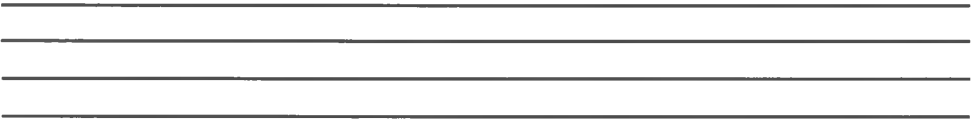
Chapter Six

Developing Content for Your Commerce Site

As we learned in Chapter Three, “Understanding Electronic Commerce,” electronic commerce sites are typically run from Web servers accessible to users through Web browsers. Although, obviously, you will have various commerce-related goals for your site—marketing, collecting demographics, and even transaction processing—WWW clients are a breed apart from those clients you’ve marketed to in the past. WWW shoppers want information, and they expect to see more than scanned business cards and brochures. So how do you create these Web documents?

The most typical Web documents consist of text and HTML, a series of tags that define document layout and presentation. These tags are special embedded directions that are not displayed by the browser, but tell the browser how to display the contents of the document, including text, images, and other support media. HTML is not a programming language, a desktop publishing tool, or a word-processing program. Its fundamental purpose is to define the structure and appearance of documents so that they can be quickly and easily accessed across computers, even computers using different operating systems and running different software.

In this chapter, we will outline the steps for creating simple HTML documents and discuss how to make your HTML



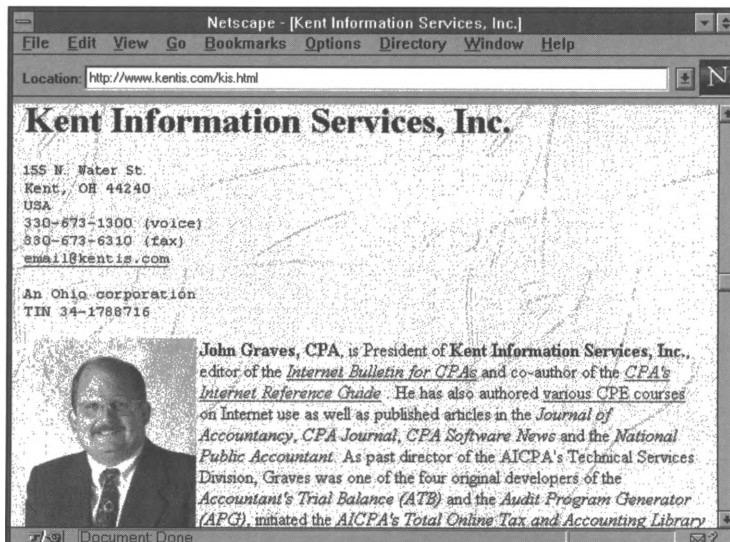
documents effective and useful for your clients and business partners. Key topics include

- Web browser variations
- Building HTML documents
- Helper applications
- Design guidelines
- Converting documents

Web Browser Variations

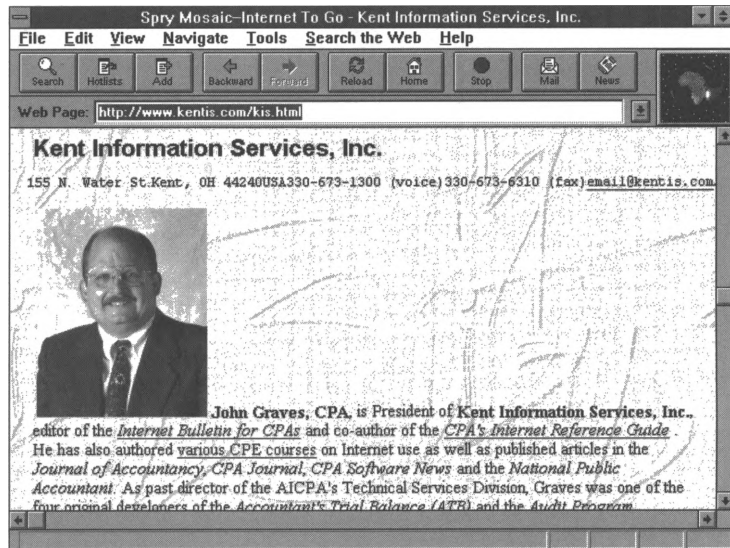
Although most Web browsers can read HTML tags that conform to HTML 2.0 standards, each browser will display documents with slight variations. In fact, many special features used commonly in Netscape-compliant documents use standards that are not HTML 2.0, and cannot be displayed in all browsers. For instance, look at this Netscape *Navigator* display of a Kent Information Services, Inc., Web page:

Figure 6.1
Kent Information Services, Inc.,
Web page displayed in Netscape Navigator.



Now, compare the *Navigator* display to the same document displayed in *Spry Mosaic*:

Figure 6.2
Kent Information Services, Inc.,
Web page displayed in *Spry Mosaic*.



Notice that the HTML tags that tell the browser to break the lines of the address and phone number information in the *Navigator* display are ignored by *Mosaic*. As a result, the information runs off the *Mosaic* display page. Notice also that the HTML tag that tells the browser to run display text next to the image is ignored by *Mosaic*, so the text is displayed below the picture instead. When developing HTML documents for your electronic commerce site, keep these variations in mind. Recognize that clients, potential clients, competitors, and business partners, who visit your site may be using various browsers, so whenever possible, design your documents so that they display well in as many browsers as possible.

In addition to design and presentation features, you should also consider other applications that can be run through some Web browsers (such as email) and the security features of browsers

(such as the encryption features available with *Navigator* and *Internet Explorer*). When considering methods of transmission, coach your clients on how they can make use of these built-in security options.

Using Helper Applications

As you have learned from your own Web surfing, Web browsers are very powerful and very versatile software tools—but they do have limits. Computer users create a vast number of files in various programs and save them with any number of file extensions that identify the programs needed to open them again. Web browsers recognize HTML and some other types of files (such as text and GIF files), and users may even add plug-ins to browser software that will allow it to display non-HTML documents in the Web browser window. But to display some types of documents, Web browsers require help.

As you know, the driving ideal in the development of the WWW is the integration of various kinds of data into a single, user-friendly interface. To meet this goal, Web developers rely on MIME (Multi-Purpose Internet Mail Extension). Originally, MIME was used to enhance the abilities of electronic mail. Using headers attached to the email message, MIME identifies the type of content in the message and, when necessary, delivers the message into the application program associated with the content type. MIME can be used in the same way to associate files retrieved through a Web browser with the application files that can read them.

Users may have already configured their Web browsers to play sound files or, perhaps, to display video or motion files. But they

can also configure browsers to recognize the extensions of the files used most often in your industry and to “hand off” these non-HTML files to the appropriate program. For example, if your organization develops many *Microsoft Word* files, and you anticipate that visitor’s to your site may also use *Microsoft Word*, you could make various *Word* files available on your server and advise your clients to configure their Web browsers to recognize the *Word* files, run the *Word* programs loaded on their own computers, and open the retrieved files in *Word* where they can read, print, or edit them.

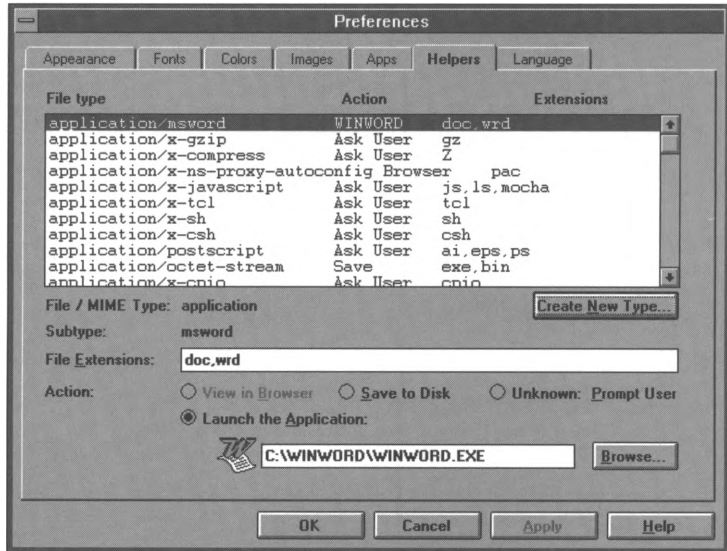
For example, to add a helper application to those recognized by *Navigator*, open the **Options** pull-down menu on the *Navigator* menu bar and select **General Preferences**. From the tabbed selections, choose **Helpers**, and you will see a screen that lists helper applications currently recognized by your browser. To add a new application, click on **Create New Type**. In the form that opens, identify the basic MIME type (in this example, an application program) and identify the more specific MIME subtype (*MS Word*):

Figure 6.3
Configuring Navigator to recognize Microsoft Word as a helper application.



When you click on **OK**, you will be returned to the **Helpers** screen where you can identify the file extensions associated with the application program (*doc* and *wrd*) and the name and location of the application program (*c:\winword\winword.exe*). When you click on **OK** again, your new application will be added to the list of helper applications, as in the screen below:

Figure 6.4
Adding Microsoft
Word to the
Navigator helper
applications.



Another method for displaying documents you've already created on your electronic commerce site, while maintaining their original format and layout, is to use a page definition language (PDL) to capture layout and format data. Special software can be used to create and display PDL documents. Three popular types of PDL software are Novell, Inc.'s *Envoy* (<http://wpp.novell.com/busapps/wwin/tocen10w.htm>), Common Ground Software's *Common Ground* (<http://www.commonground.com/productinfo/productinfohtml/digipapr.html>), and Adobe's Portable Document Format (<http://www.adobe.com/Solutions/>).

Of the three PDLs listed above, Adobe's Portable Document Format (PDF) is the most common exchange format; in fact, the IRS makes tax forms and instructions, as well as other documents, available for free download using Adobe PDF. To read PDF files, your clients will need to have Adobe readers available on their computers. Luckily, Adobe readers, such as *Acrobat* and the new *Amber* plug-in for Netscape *Navigator*, are available for free on

the Internet. PDF is a universal electronic format, so users of any platform can view and print PDF files.

Converting Pre-Existing Documents

Depending on the forms in which your organization's documents exist, making pre-existing content available on your electronic commerce site may be easier than you think. Crucial data may be brought into your electronic commerce site immediately by simply copying documents into simple text files (ASCII) and then framing the documents with a few easy-to-learn HTML tags. Brochures and other promotional documents can be scanned and presented as solid blocks in a graphic (not a feasible solution if disk space is limited, however). Eventually, you may want to convert most of your commerce site documents to HTML files so that you can build in hyperlinks and make full use of the power of Web-enhanced commerce.

Pre-existing documents that are available in electronic form can also be converted to HTML documents through any of a variety of automatic conversion tools. For example, word-processed documents created in both *Microsoft Word* or *Word Perfect* can be converted to HTML through simple-to-use add-on modules. Although these tools can convert most word-processed features into comparable HTML effects, you should still expect to spend some time touching up these documents to refine the HTML tags. *HTML Transit* is a more sophisticated conversion program that will automatically take a set of source files in *Word*, convert them to HTML, extract all the graphics and store them as GIFs (a common image format for Web display), build a hyperlinked table of contents and index, and even add navigation buttons at the top and bottom of each page.

There are also a variety of tools available for converting other types of documents, such as spreadsheets with important statistical data, into HTML. Microsoft's *Accounting Analysis Pac (AAP)* for Microsoft *Excel* works with packages like *PeachTree*, *Simply Accounting*, *ACCPAC*, and *M*A*S 90*. It provides a series of functions to import data, to produce standard financial reports, and to perform what-if analyses (including the effect of selling assets, adding or paying back loans, changing pricing or product mix, and buying or leasing decisions). Once *AAP* brings the data into *Excel*, Microsoft's free HTML wizard add-on for *Excel (Internet Assistant for Excel)* creates an HTML representation of the data. The wizard leads the user through defining the ranges that will become a table, choosing whether to preserve formatting, and defining header and footer areas for titles and internal documentation; the wizard then saves the HTML file either separately or in an existing document. *AAP*'s primary competitor is *F9* from Synex Systems. *F9* is more expensive than *AAP*, but works with *Lotus 1-2-3*, Corel's *Quattro Pro*, and Microsoft *Excel*. *F9* is also available in versions that integrate with most high-end accounting software packages.

Before investing valuable time into rebuilding key documents, contact the support staff for the software in which you have created them. You may find that a conversion module is available that can make your move to HTML simple and painless.

Building HTML Documents

When you become accustomed to using HTML documents, you will soon recognize the many types of information that will be useful on your electronic commerce site. As your appreciation for the power of the WWW as an information distribution and

commerce tool develops, you will soon want to develop new content for your electronic commerce site.

When writing those new HTML documents, you may take any of three basic approaches:

1. Use a word processor with an HTML conversion add-on.
2. Use a simple text editor and type in HTML tags.
3. Use an HTML editor.

When using a word processor with an add-on, simply create the document as you would any word-processed document, defining formatting and layout issues as you compose using your word processor's formatting tools. Then, use the add-on utility to save the document as an HTML file. Typically, the add-on tool will interpret your formatting decisions as the HTML equivalents that have been defined in the software (in some software, you can pair specific HTML tags with word-processing codes). As I mentioned above, always expect to refine these documents, since, more often than not, unless you have customized it, the add-on's interpretation may not match your intentions. Some of these add-ons offer a WYSIWYG mode (what you see is what you get) that shows an approximation of the HTML display as you work. But remember, since many browsers display features differently, these documents may still need to be refined after you have tested them in several browsers.

You may also use any simple text editor or word processor as long as you can save your work in ASCII text format. (Word-processor file formats, such as the *.doc* format in Microsoft *Word*, save hidden characters that may interfere with the way a Web document displays.) Using a word processor allows you the benefit of using the word processing features (like spell check) to refine the document content. After this refining process, you can

type in the necessary HTML tags and save the document as an HTM or HTML document (depending on the number of letters you are permitted to have in an extension in the software you are using).

Many people prefer to use special HTML editors, such as *HTMLeD* or *HoTMetaL*. Using an HTML editor works much like using a word processor, but HTML editors also offer tools that automatically insert HTML tags. These editors also supply the benefit of limiting tags that are presented as possible choices to only those that will plausibly work in the place indicated by the author's cursor. For new content developers, this can be a useful feature.

Although Web pages often seem sophisticated and complex, HTML is surprisingly easy to learn and implement. When looking at an HTML document outside a Web browser, the page appears as simple text with letters and words displayed inside greater-than and less-than brackets (< >). Everything that is inside brackets is an HTML tag and is left out of the display when the document is opened in a Web browser. Tags define and control specific areas of a document, so, in most cases, there is a "start tag" and an "end tag" (distinguished by a forward slash). A few HTML tags do not require end tags, such as , the tag that indicates an item in a list. Since the next tag indicates a new list item, it also "ends" the previous tag. Typical HTML tags are common words, abbreviations, or notations, and their functions are usually easy to guess. For example, the HTML tag that indicates a group of words that will be represented in the title bar of a browser is, predictably, <TITLE>. (Note: HTML tags are case-insensitive. That is, <title> is not treated any differently from its capitalized equivalent <TITLE> when interpreted by a Web browser.) When using some tags, you can give more specific directions by using

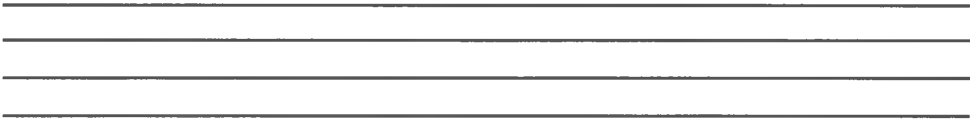
“attributes,” which define special features, such as the size of graphics or the type of border to use in a table.

All HTML documents have two basic parts—a head and a body. The head of the document is reserved for giving the document a title, and indicating any unusual parameters a browser may be using (such as Netscape-compliant special features). The body of an HTML document includes the text (and graphics) that are the meat of the document’s content. The entire document is enclosed in tags that identify it as HTML, and so, all HTML files have at least these basic tags:

- <HTML>** Identifies the document as HTML.
- <HEAD>** Identifies information about the document.
- <TITLE>** Identifies the document title.
- </TITLE>** Marks the end of the title.
- </HEAD>** Marks the end of information about the document.
- <BODY>** Identifies the main content of the document.
- </BODY>** Marks the end of the document’s content.
- </HTML>** Marks the end of the HTML document.

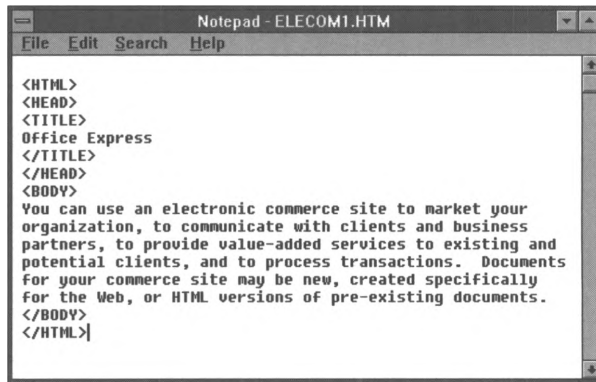
As we noted earlier, to display an electronic document immediately, you could simply save the file as text and copy the text into the document between the body tags of this basic frame. Although not pretty or integrated, the text will be available through a Web interface.

The simplest way to understand how HTML tags work in relation to Web documents is to look at the HTML instructions that appear in the document’s source file, like the one displayed below. This document illustrates how HTML tags surrounding three distinct items of text define the placement and appearance of the document when it is displayed in a Web browser. First,



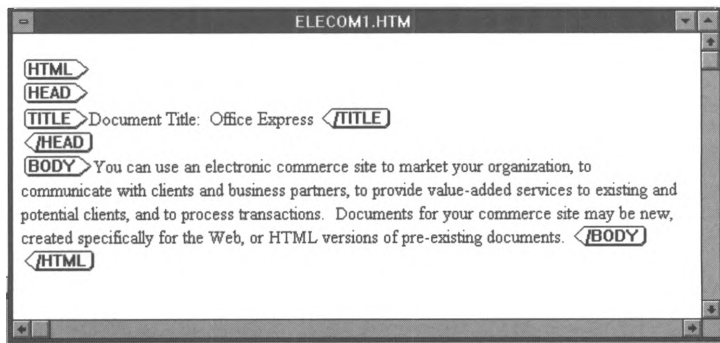
look at the source file created by typing the HTML tags and the text of the document in *Notepad*:

Figure 6.5
Creating an HTML source file using Notepad.



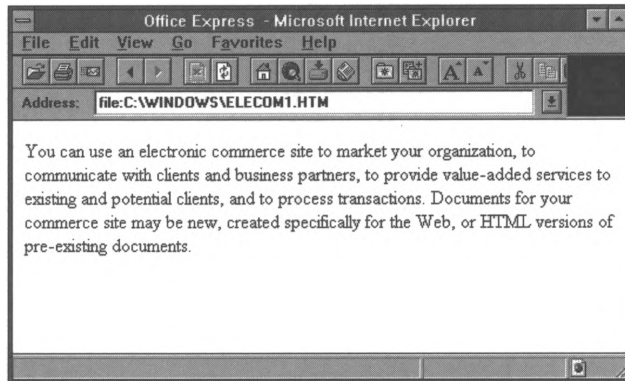
The same source document created with the simple HTML editor *HoTMetaL*, looks like this:

Figure 6.6
Creating an HTML source file using HoTMetaL.



Now compare the source files to the figure below that shows how this document appears when interpreted by the Microsoft *Internet Explorer* Web browser.

Figure 6.7
*HTML source file
displayed in
Internet Explorer.*



The tag sequence `<HTML></HTML>` tells the browser that all the text within the tags is to be treated as an HTML document. The tag sequence `<HEAD></HEAD>` in combination with the tag sequence `<BODY></BODY>` distinguish the two main parts of an HTML document—information about the document (head) and the document itself (body). The tag sequence `<TITLE></TITLE>` tells the browser to display the text between the tags in the top bar of the browser window. The actual body of the document is the text. (The end of the body text is marked by the second `</BODY >` tag.) Notice that the browser is displaying a file at a local computer (the function is **file:**) instead of a file from a remote site like those URLs you see when browsing the WWW (**http://**). One of the conveniences of developing content for a Web page is that developers can create documents, save them in a local directory, and view them through Web browser software before making them available to others by uploading them to a Web server.

The content of those Web pages, that is, the body of the documents, can be arranged and formatted in various ways. In this chapter, we will limit our discussion to these basic document features:

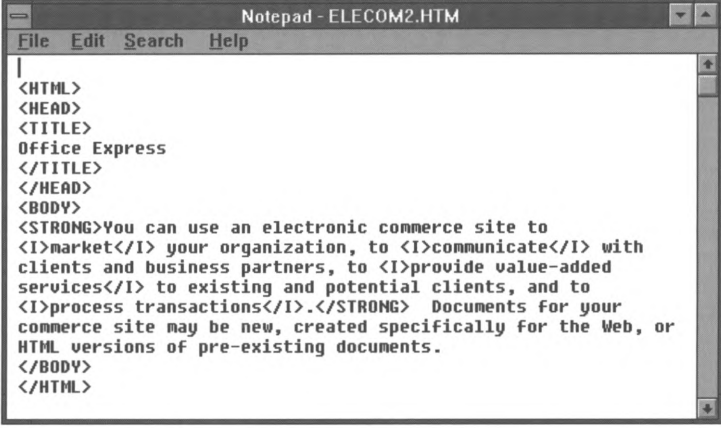
- Appearance of text
- Content divisions
- Lists
- Hyperlinks
- Images
- Feedback mechanisms

Appearance of Text

Text can be represented in many ways in an HTML document. The most common text effects are italics and bolding. Creating either of these effects in an HTML document is simply a matter of inserting the appropriate tags in a text document that is framed by the HTML document codes we described above. Text can be formatted using either style tags that assign specific style attributes to the text, or content tags that attempt to adjust style based on the way the text is intended to be read. For example, if you want to emphasize text in relation to other text in a document, you might choose the content tag pair ``. Most browsers will interpret these tags by italicizing the word(s) between the tags. On the other hand, style tags are more straightforward; if you want to italicize a group of words in a document, simply place the style tags for italics `<I></I>` around the word(s) you wish to be italicized. Similarly, to represent text in bold-face lettering, you could use the content tag `` which tells the browser to represent the text more strongly in relation to other text on the page, a direction that most browsers interpret as bolding. Or you could use the style tags ``.

An interesting capability of HTML tags, which can be used to enhance these features, is tag nesting. By using HTML tags inside other tags, you can create multiple effects, for instance, in the HTML document below, the `<I></I>` tag pair is nested inside the `` tag pair:

Figure 6.8
Nesting HTML
tags in Notepad.



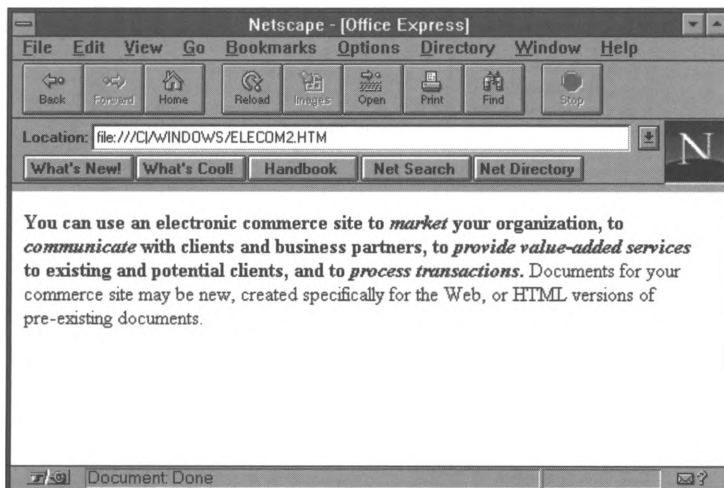
```

Notepad - ELECOM2.HTM
File Edit Search Help
|
<HTML>
<HEAD>
<TITLE>
Office Express
</TITLE>
</HEAD>
<BODY>
<STRONG>You can use an electronic commerce site to
<I>market</I> your organization, to <I>communicate</I> with
clients and business partners, to <I>provide value-added
services</I> to existing and potential clients, and to
<I>process transactions</I>.</STRONG> Documents for your
commerce site may be new, created specifically for the Web, or
HTML versions of pre-existing documents.
</BODY>
</HTML>

```

The Web browser interprets these nested tags by bolding everything between the ``/`` tags, including the text between the `<I>`/`</I>` tags, which tell the browser to add the additional italicized treatment to the bolded words. The resulting Web display looks like this:

Figure 6.9
Nested tags
displayed in
Navigator.



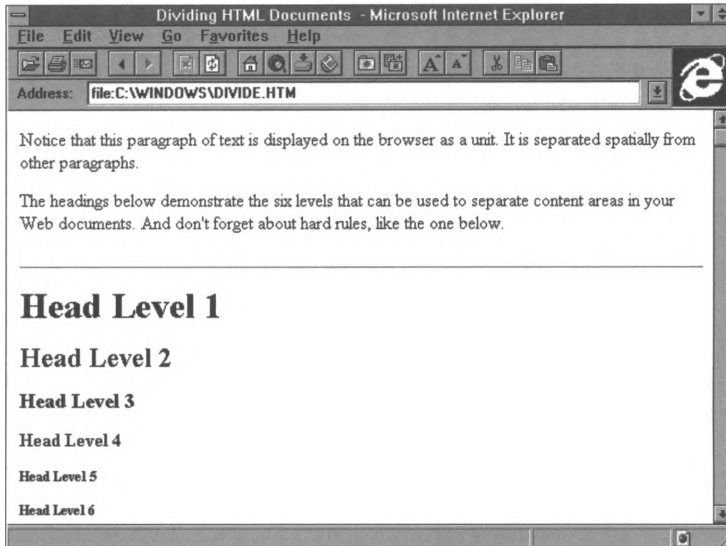


Content Divisions

In addition to adding special style features to your text, you will be creating larger divisions to help users understand the way documents are organized. The most common tool for organizing text is a paragraph. To represent a group of text as a paragraph, set apart spatially in relation to the rest of the body text, use the tag **<P>**. You may also need to break lines of text, and since Web browsers do not read hard returns in word-processed documents, these breaks must be artificially created using the tag **
. Sometimes you may want even stronger visual breaks, in which case you might choose to use a device called a "horizontal" or "hard rule." A horizontal rule is simply a straight horizontal line that extends across a Web page. Using the tag **<HR> inserts a horizontal rule wherever you have placed the tag in your document. (The tags above are among the tags mentioned earlier that do not require end tags.)

Another common method of organizing text is through separating sections of the body with descriptive headings. Headings are typically distinguished from the body text by appearing bolded and in a different type size. Most Web browsers acknowledge six levels of headings that are indicated in HTML documents with the following paired tags: **<H1></H1>**, **<H2></H2>**, **<H3></H3>**, **<H4></H4>**, **<H5></H5>**, **<H6></H6>**. Look at the browser display below to see how *Internet Explorer* interprets some of these features.

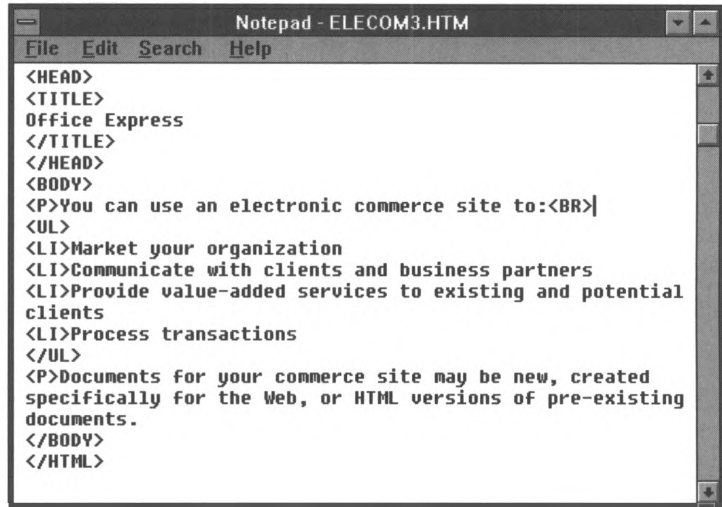
Figure 6.10
*Content dividers
displayed in
Internet Explorer.*



Lists

A list is one of the simplest and most common organizational effects you might want to create in an HTML document. Lists can be either ordered (numbered) or unordered (bulleted). For example, let's use a list in the simple Web document we've already created. The HTML source document would look like this in *Notepad*:

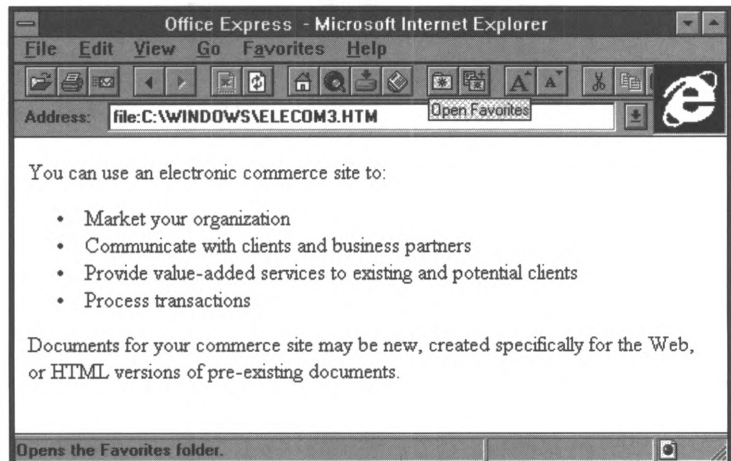
Figure 6.11
HTML source file
for an unordered
list.



```
Notepad - ELECOM3.HTM
File Edit Search Help
<HEAD>
<TITLE>
Office Express
</TITLE>
</HEAD>
<BODY>
<P>You can use an electronic commerce site to:<BR>
<UL>
<LI>Market your organization
<LI>Communicate with clients and business partners
<LI>Provide value-added services to existing and potential
clients
<LI>Process transactions
</UL>
<P>Documents for your commerce site may be new, created
specifically for the Web, or HTML versions of pre-existing
documents.
</BODY>
</HTML>
```

The corresponding display on the browser would look like this:

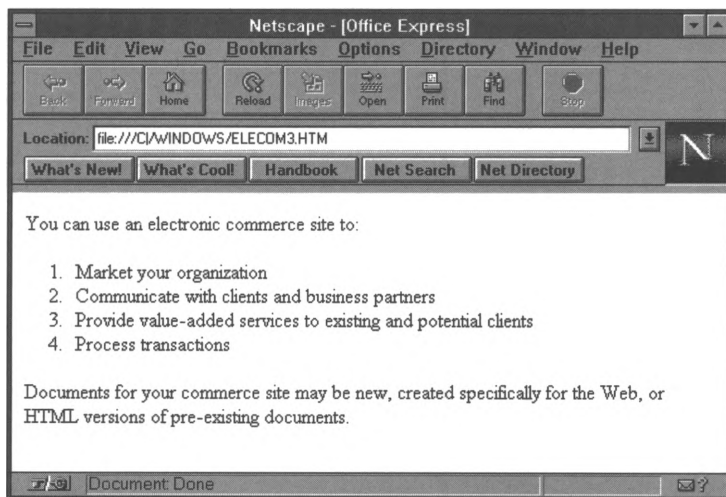
Figure 6.12
An unordered list
displayed in
Internet Explorer.



In this document, the HTML unordered list tag sequence `` tells the browser to treat all the text within the tags as an unordered (bulleted) list. Each item in the list is indicated by the list item tag ``. Notice that the `` tag does not require a partner since the next `` tag automatically indicates

the next item in the list (although some HTML editors will automatically insert the unnecessary HTML partner tag ``). To create a list that uses numbers rather than bullets, the ordered list tag sequence `` replaces `` and the corresponding Web page looks like this:

Figure 6.13
An ordered list
displayed in
Navigator.

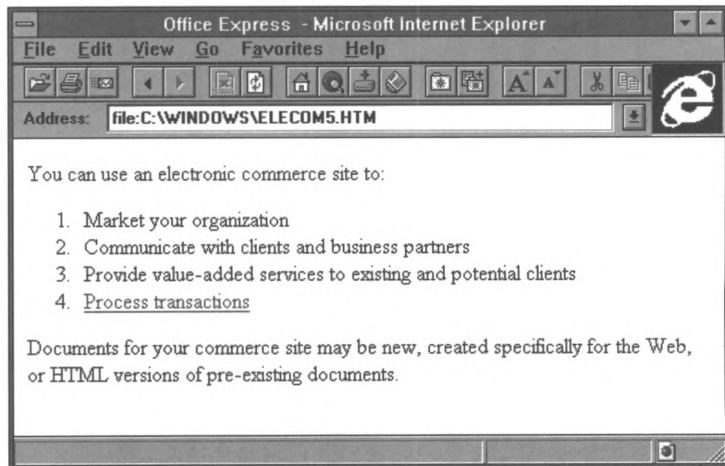


Hyperlinks

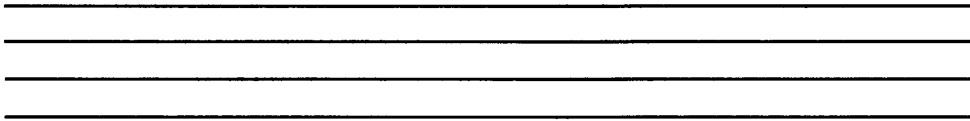
The feature that has come to characterize Web pages, and the primary reason Web sites are so easy to use, is hyperlinks. Hyperlinks give users the ability to retrieve and display different resources simply by clicking on an associated word or phrase in an HTML document. To create a hyperlink to a document, you only need to know its location, called its URL (see Chapter Three, "Understanding Electronic Commerce," for more information about URLs). In general, the address that corresponds to a URL will be something like `http://address/directory/filename.html`. To create a hyperlink, you simply "anchor" the URL of the document to which you intend to link, to the related word or phrase in the original HTML document. As you have probably guessed, anchoring your document to another document is simply a matter

of typing in the appropriate HTML tags. The tag pair for creating anchors is `<A>`. Placed around the word or group of words that you intend to act as the launching point, these tags will tell the browser to display the text inside as blue and/or underlined words. To anchor to a document, you must also include a reference to the URL in your tag, using the notation HREF and an equal sign (=), followed by the URL of the target page in quotation marks. So, for instance, to create a hyperlink from our sample page to a page that describes the transactions supported by the site's hardware and software, we might type `` before the trigger words "Process transactions" followed by the end tag `` in our source document. The resulting Web display would look like this:

Figure 6.14
A hyperlink displayed in Internet Explorer.



URLs that link to documents on the same server and in the same directory can be written in a shorthand version called "relative URLs." For instance, to link from the transaction document to pages that describe credit card payments, the HTML source tags for the transactions document may include a tag sequence that looks like this:



`trigger words`

The Web browser will automatically fill in the missing portions of the URL using respective parts from the base document's URL—in this case **http://address/documents/**.

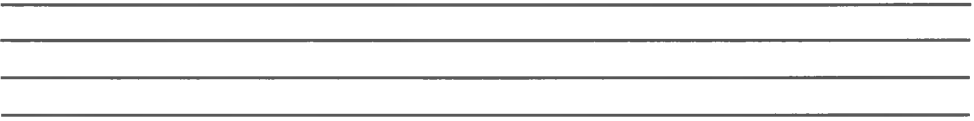
Images

Another effect you can add to your electronic commerce Web pages is images, or graphics. Common graphics include

- icons (graphics with pictures that represent their functions, such as a picture of a house that links back to a home page or a picture of a printer that activates a print command).
- bullets (enhanced bullets which replace simple bullets, often various shapes and colors, such as blue diamonds or gold balls).
- buttons (graphics which appear as 3-D onscreen buttons with particular functions sometimes indicated by symbols or words, such as backward pointing arrows which retrieve previously viewed documents).
- bars (lines that run horizontally across a Web page, often in various colors or patterns, such as rainbows and chains).

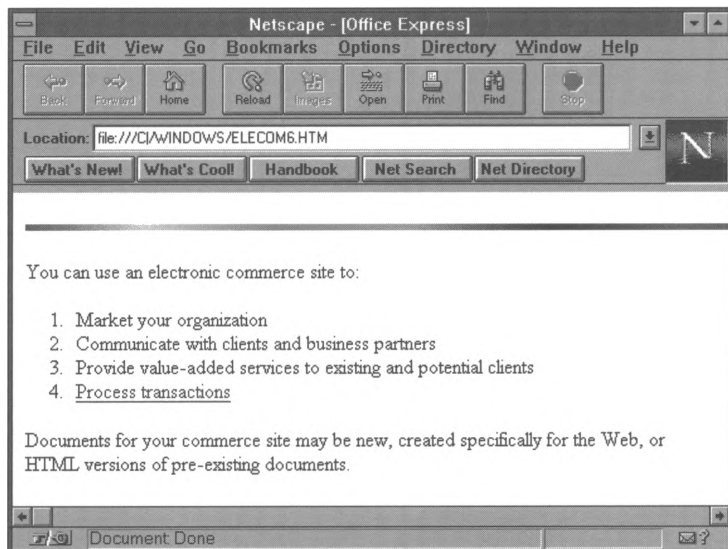
In addition to these simple graphics, which help users navigate through a Web page, you can also use other images, such as company logos, to customize your site and create corporate and brand recognition.

To add an image, use the tag **** with a reference to the source (SRC) or location of the graphic file, as in ****. In this HTML sequence the Web browser is directed to look for the image in a special



subdirectory of the Web server reserved for graphics. When the browser displays the HTML file, it will look for the referenced graphic and display it in the place marked by the tag. The Web display that results, if we insert this code at the top of our sample document's body, looks like this:

Figure 6.15
Rainbow bar
displayed in
Navigator.



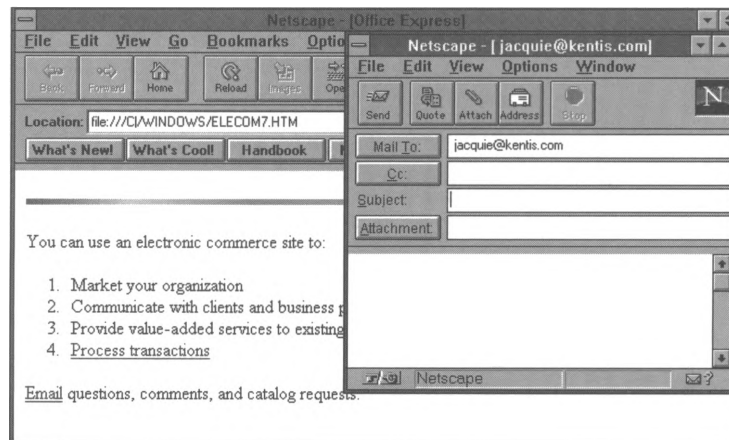
Feedback Mechanisms

One of the features that makes HTML documents unique is their ability to provide interactive tools for users. A common method of interaction on Web pages is the use of an automatic email device. By including an automatic email device for feedback, you can encourage visitors to your electronic commerce site to send you comments, suggestions, and requests for information. To use this "mailto" device, anchor the piece of text that will serve as the trigger (such as the word "email") to an HTML "mailto" command. The necessary HTML tag looks something like this:

trigger word

The corresponding Web page displays the trigger words in blue and, when the user clicks on this link, the user's email program launches automatically and inserts the address included in the anchor, as in the *Navigator* sample below:

Figure 6.16
Automatic email
displayed in
Navigator.



You already know how to “anchor” text within the body of your HTML document and how to add graphics to your Web site by using the tags `` and ``, respectively. If you combine these two functions, you can “anchor” graphics to give them the same navigating power as hypertext links. For example, rather than having users click on the word “Email,” to activate the automatic “mailto” function, you could use a graphic of a mailbox to accomplish the same effect.

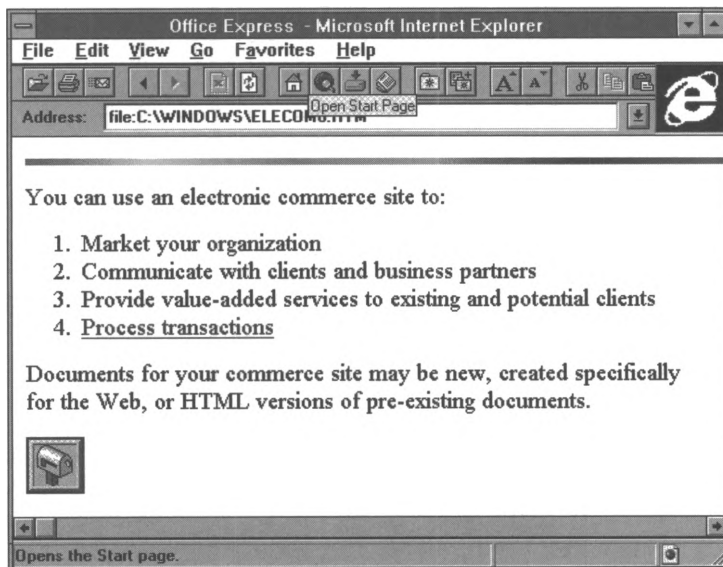
The principles for creating an anchored graphic are the same as those used to anchor text; simply enclose the image in the anchor tags. To create this hyperlink in our sample page, we must first find a suitable graphic. If you have a communications or art department in your organization, you may solicit help from a staff member to create an original graphic. If you do not have staff members who can create these graphics for you, use your Web browser to visit and browse any of the vast number of online sites from which Web graphics are available for free downloading.

When you have selected a graphic, your HTML string may look something like this:

```
<A HREF="mailto: email address">  
<IMG SRC="http://address/images/mail.gif"></A>
```

where **images** is a subdirectory of the Web server where graphics are stored, and **mail.gif** is the name of the mailbox graphic. As you can see in the Web display below, users may now click on the graphic of the mailbox to automatically launch their email programs and send mail to a predetermined address.

Figure 6.17
*Hyperlinked
graphic in
Internet Explorer.*



As you begin to design HTML documents of your own, you will find many useful resources online (see "Electronic Commerce Resources"), but the list at the end of this chapter, "Basic HTML Tags," will help you get started.

General HTML Design Guidelines

In earlier sections of this chapter, we have discussed various ways to develop content for your electronic commerce site. You will also need to consider several more general content issues before you compose documents for your organization, such as

- Establishing a corporate voice.
- Making use of non-linear documents.
- Controlling document size.
- Using graphics.

Corporate Voice

As we discussed earlier, HTML documents offer a unique way to give clients, customers, and business partners, access to important documents. The ease-of-use and open systems power of Web documents can, however, tempt content developers to forget that, like other corporate documents, electronic commerce sites must conform to the same voice and style conventions that characterize other organizational publications. In addition to providing a consistent and professional feel, establishing and enforcing guidelines for corporate voice will enhance the usability of your commerce site and reduce the learning curve faced by users. When planning your site, consult with marketing personnel to develop writing guidelines for content developers. You may wish to create a style guidelines page to which content developers can refer with sample documents, writing guidelines, and document templates.

Create Non-Linear Documents

Hyperlinks have revolutionized the ways that we read documents. Traditionally, users read documents from top to

bottom, from beginning to end. The job of the writer was to attempt to present the material in the order that would fit the needs of the largest group of readers. But hyperlinks allow for a non-linear reading experience in which readers can stop at any point and select a more focused topic by clicking on related words that have been anchored to other documents. The author of hyperlinked documents does not need to guess what order will best suit the needs of readers, since readers can select their own method for studying the materials available on the electronic commerce site. Be certain that the documents you and others create for your electronic commerce site make use of this intuitive research strategy.

Control Document Size

Breaking a large document into smaller hyperlinked documents can also contribute to more efficient Web sites. As you remember from Chapter Three, "Understanding Electronic Commerce," information can be transmitted across a network more quickly and with less errors when large documents are broken into smaller units. Similarly, smaller documents require less packets and less download time for users. Remember, if a document takes too long to download, users are likely to simply click to another site which offers faster navigation.

Using Graphics

Graphics at Web sites can add a lot of interest to a page. Carefully selected systems of icons can even facilitate fast and easy navigation through your electronic commerce site. Offering, for example, an easy-to-identify button that always opens the site's home page or an order form can be a useful and time-saving feature for your users. Just as with letterhead or company logos, the graphics used on your commerce site should help to develop a consistent organizational image. You might even

consider including a set of coordinated navigation graphics that can be made available for all content developers to use when they are designing documents for your site.

When planning your site, you must also consider the lengthy download times that are often required for sophisticated graphics. We have all experienced the initial thrill of watching a new colorful graphic display on our screens. But after one or two visits to a site, we are more likely to turn off the browser's image-download feature to avoid the long wait for a graphic we've already seen. You may choose to offer any number of graphic displays at your commerce site (see Chapter Seven, "Enhancing Your Commerce Site"), but make these decisions carefully. When deciding whether or not to use a particular graphic, examine what the graphic adds to the site and how long that value will last. If the graphic is only a flashy picture that does not contribute to the corporate voice, assist in navigation, or develop the value of the Web page content, you should probably eliminate the graphic from your electronic commerce site.

Today's business environment is increasingly competitive. Moving into the online marketplace can make an enormous difference in an organization's business processes, marketing reach, and corporate image. Even if you use only the HTML features described in this chapter, you can make a respectable presence on the WWW. However, to keep the continuing interest of users, you will probably use more sophisticated HTML features to enhance your site and improve the interface between your organization and your users. In the next chapter, you will learn how to build on the documents we've created in this chapter to make use of other exciting HTML features that are used on many Web commerce sites today.

Basic HTML Tags

Tags for the document frame:

<code><BODY></BODY></code>	.....	Marks the beginning and end of the document body.
<code><HEAD></HEAD></code>	.....	Marks the beginning and end of a document head.
<code><HTML></HTML></code>	.....	Marks the beginning and end of a hypertext document.
<code><TITLE></TITLE></code>	.....	Marks the beginning and end of a document title.

Tags for special treatments of text:

<code></code>	Represents the enclosed text as bold-faced type.
<code><BIG></BIG></code>	.....	Represents the enclosed text in a bigger type.
<code><BLOCKQUOTE></BLOCKQUOTE></code>	.....	Treats the enclosed text as a block quote.
<code><CENTER></CENTER></code>	.....	Centers the enclosed text.
<code></code>	Emphasizes the enclosed text by italicizing.
<code><I></I></code>	.....	Represents the enclosed text as italicized type.
<code><PRE></PRE></code>	.....	Represents enclosed text in its original preformatted style, including line breaks and spacing.
<code><STRIKE></STRIKE></code>	.....	Displays the enclosed text with a line struck through horizontally.
<code></code>	Represents the enclosed text as bold-faced type.
<code><TT></TT></code>	.....	Represents the enclosed text as teletype.

Tags for major document divisions:

<code>
</code>	Breaks the text and starts a new line.
<code><Hn></Hn></code>	.....	Treats enclosed text as a level <i>n</i> heading. (Numbers and treatments vary from 1-6.)
<code><HR></code>	.....	Inserts a hard or horizontal rule in the document.
<code><P></P></code>	.....	Marks the beginning and end of a paragraph.

Tags for lists:

<code><DD></DD></code>	.....	Marks a definition in a definition list.
<code><DL></DL></code>	.....	Marks the beginning and end of a definition list.
<code><DT></DT></code>	.....	Marks a term in a definition list.
<code></code>	Precedes an item in a list.
<code></code>	Marks the beginning and end of an ordered (numbered) list.
<code></code>	Marks the beginning and end of an unordered (bulleted) list.

Tags for links, images, and interaction:

<code></code>	Links to a Web document stored at the enclosed URL.
<code></code>	Inserts an image stored at the enclosed URL.
<code></code>	Launches an email program and inserts an address.



Chapter Seven

Enhancing Your Commerce Site

In Chapter Six, “Developing Content for Your Commerce Site,” you learned the basic steps for creating HTML documents for a simple commerce site. In this chapter, we will take you beyond the basics and show you how to customize your commerce site to fit your company’s needs and attitudes.

Since many of the elements that we will show you in this chapter are extensions of basic HTML 2.0 standards, some browsers will be incapable of displaying the effects. These nonstandard extensions, while not supported by all browsers, are quickly becoming de facto standards because so many people are using them. As we illustrated earlier in screenshots from *Navigator* and *Mosaic*, most browsers can read HTML tags that conform to HTML 2.0 standards, but even these documents may be displayed with slight variations by different browsers. So imagine the display variations with advanced HTML tags that don’t conform to HTML 2.0 standards! The bottom line is: you must know your organization’s equipment limitations and the limitations your customers and clients are likely to have in order to decide which of the enhancements described in this chapter will be most useful on your commerce site.

In this chapter we will explore the following advanced HTML features:

- Backgrounds
- Image maps
- Searchable data
- Audio
- Tables

- Forms
- Frames
- JavaScript

Beyond Publishing

The World Wide Web was designed to use HTTP (Hyper Text Transfer Protocol) to publish but not to process information. In order to interact meaningfully with Web databases—to perform searches, or to manipulate information in other ways—HTTP relies on programs called gateway scripts. There are three main types of programs that allow HTTP to interact with gateway scripts. These programs will be most helpful for gathering, processing, and distributing information on your electronic commerce site. These are (1) Common Gateway Interface (CGI), (2) Server-Side Includes (SSI), and (3) vendor-specific Application Programming Interfaces (API).

CGI is platform-independent programming, supported by all HTTP servers, that enables HTTP to accept processing requests from browsers, pass this information to gateway scripts for processing, and return readable results to the users. CGI scripts can be written in any programming language supported by a Web server. CGI is the preferred programming technique for most developers, because CGI is reasonably secure. And, since it is independent of the Web server, CGI is less likely to “crash” a server than server-side programming.

However, for developers familiar with HTML, but who have little programming experience, Server-Side Includes (SSI) are easier to use than CGI. The coding for SSI is very similar to using the tag `<!--comment here-->` to make notes for your own use inside an

HTML document. Comments can be added anywhere within your HTML file and do not appear in the final document. Similarly, if you want to run the SSI program that displays the current date on your home page, you can simply type the following code in your HTML document:

```
<!--#echo="DATE_LOCAL"-->
```

Although the simplicity of SSI seems to make it the programming language of choice, there is one rather large catch that makes SSI less accepted—security risks. Whenever you run a program that interacts with your server, you open your system to hackers who may be able to use the program to gain access to your system. SSI is the least secure programming language, and, therefore, many Web designers shy away from using it. Consider the risks as well as the benefits when deciding whether or not to incorporate SSI programming on your site.

Competition between developers of Web server software has led to the development of vendor specific APIs. For example, the Netscape Server API (NSAPI) offers tools for extending the capabilities of the *Netscape Server*, while the Internet Server API (ISAPI) allows users to customize Microsoft's *Internet Information Server*. In both cases, these types of programming offer faster response times than CGI scripts and are more secure than SSI.

Advanced Graphics

As we discussed in Chapter Six, "Developing Content for Your Commerce Site," graphics are a great way to add dynamic effects to your commerce site and carry over corporate image through careful use of your organization's logo. But graphics are more

than ornamentation. Since they require more space and processing time from your server, only graphics which play a valuable role in the site's usability are truly practical. In this chapter, we will demonstrate how to use advanced graphic features to enhance user enjoyment and how to add navigating power to your graphics.

Backgrounds

As you have surfed the WWW, you've probably noticed that the default background color on most Web pages is gray. You can distinguish your site from the Web "crowd" by adjusting the background color that will appear on your electronic commerce site by

1. Using the BGCOLOR attribute inside the <BODY> tag.
2. Tiling a graphic throughout the page.
3. Combining methods 1 and 2.

BGCOLOR

The first way to distinguish your Web site's background is to change the default gray color to a background that matches the tone you are trying to set for your site. In order to change the background color, you must change the BGCOLOR attribute within the <BODY> tag. (Remember, attributes are options available within a tag that give that particular tag more flexibility.) The tricky part of changing the background color is that you must know the hexadecimal red-green-blue format code for the color that you wish use as your background. For example, a few colors and their associated codes are listed below:

White	FFFFFF	Black	000000	Blue	0000FF
Cyan	00FFFF	Green	00FF00	Yellow	FFFF00
Gold	FFD700	Beige	F5F5DC	Tan	D2B48C
Brown	A52A2A	Purple	A020F0	Red	FF0000
Maroon	B03060	Violet	EE82EE	Plum	DDA0DD

(A large list of sites where color information can be found is http://www.yahoo.com/Computers_and_Internet/World_Wide_Web/Page_Design_and_Layout/Color_Information/.) Once you know the code, simply include it in the opening body tag as in

```
<BODY BGCOLOR="FFD700">
```

which creates a gold background for the Web display of the HTML document.

Tiling a Graphic

Another way to change the appearance of your background is to tile a small graphic throughout your page. This can be done with black and white, grayscale, or color graphics. However, be careful to use small graphics for this effect, since a large graphic will take a long time to load, slowing the performance of your site. Using a graphic as a background is virtually the same as adding color using the codes we described above. Simply use the BACKGROUND attribute in your **<BODY>** tag. Using a graphic for your background is actually simpler than changing the color of your background, because you don't need to find any codes. Instead, you reference the image in the same way that you would if you were placing a graphic on the page:

```
<BODY BACKGROUND="http://address/images/image.gif">
```

Colors and Graphics

The final way to adjust the appearance of your commerce site's background is to combine the colors and graphics. For example, if you want to add a graphic, but are concerned about loading times, you can use a grayscale graphic (smaller than a color graphic) with a background color. The HTML tag with this combined attribute would look like this:

```
<BODY BGCOLOR="FFFFFF" BACKGROUND=  
"http://address/images/image.gif">
```

Image Maps

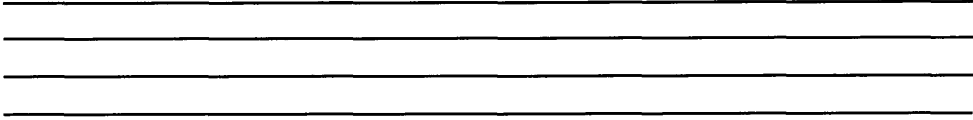
Image maps are increasingly popular tools for linking Web pages and enhancing navigation between related documents. Image maps, also called clickable image maps, are graphics that are divided into distinct regions. Each of these regions is linked to a specific location, either an area on a page or another Web page. Clicking on a specific region of the image map retrieves the associated page. An image map can be a good way to simplify your site and provide a sense of continuity for users. For example, an organization could use several small graphics as a menu of selections that retrieve increasingly more specific documents (such as an online catalog or a guestbook). Converting these separate graphics into a single image-map graphic allows users to directly access specific areas from one central graphic that suggests an overall plan for the organization of documents at your site.

Although they may seem complicated, image maps are quite simple. They consist of three main parts:

1. An image in GIF format.
2. A map file based on the image.
3. An image map program.

Choosing an Image

Of course, every image map begins with an image. As we noted earlier, the common file format for graphics on the Web is GIF (Graphics Interchange Format), and you can acquire graphics in GIF format at various Web sites or create your own image using



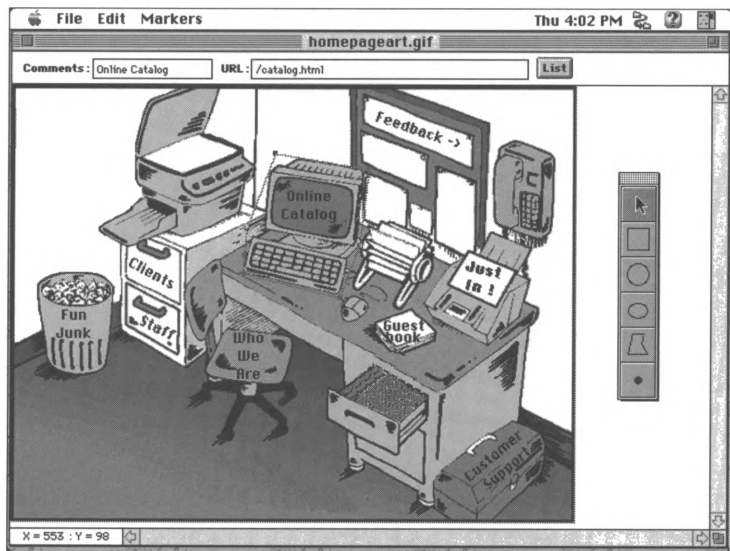
any of the many available image-creation and editing programs, such as *Adobe Photoshop*.

Creating a Map File

The map file assigns specified regions of your graphic to the URLs of the Web documents to which you want the image to link. You will need a special image-mapping program to complete this step, and, as you might imagine, various image-mapping tools are available on the Internet—many for free. To design an image map with *WebMap for Macintosh*, for example, open the graphic in *WebMap*. First you will want to set a default link that will be activated if a user clicks on an area of the image map that is not assigned a particular URL. (For example, a typical default URL might link to background information on your organization.)

Now you're ready to begin assigning specific URLs to defined areas of your graphic (called "hot spots"). Defining hot spots is simple with *WebMap's* floating palette (see Figure 7.1). The floating palette allows you to choose and define hot spots by clicking one of the shapes on the palette and then using your mouse to define the size and location of the shape on your image. For example, to define an irregular hot spot in the example below, so that when users click on the computer they are transferred to an Online Catalog, click on the irregular shape on the floating palette and then click at one corner of the hot spot, dragging each side across the graphic until the entire hot spot is defined. After the hot spots are defined, assign links to the hot spots.

Figure 7.1
Using WebMap
to define a hot
spot on an image
map.



After you have defined all of the hot spots and assigned each a URL, it's time to save the file (use the **Save** command under the **File** menu). Although this file is not the map-definition file you will upload to your server, you can use this special *WebMap* file for later editing. To make the map-definition file, use the **Export as Text** option in the **File** menu. In the menu that opens, choose a location to store the map-definition file and give this file the same name as your graphic, replacing the *.gif* or *.jpg* extension with *.map*.

Referencing Your Image Map and Program

To make your image map work with your commerce site, you must construct references in your Web document's HTML file that point to your new map when a user clicks on the image displayed at your site. In addition, your server must have an appropriate software utility (a gateway script) to handle the image map. Many servers come with some software utility, typically located in a *cgi-bin/imagemap* directory, and most ISPs store basic scripting programs for subscribers to use on their sites.

Check with your Internet Service Provider or read your server documentation to determine how to create and program an image map on your system.

For example, if you created a *homepageart.map* file and used the image *homepageart.gif* for the map, including the following line of HTML would link the image to the map file you created and the program (stored in the server's cgi-bin) that will make the map work:

```
<A HREF="http://servername/cgi-bin/imagemap/  
homepageart.map"> <IMG SRC="/homepageart.gif"  
ISMAP></A>
```

Finally, upload the graphic, the associated image map, and the HTML document with the necessary referencing codes, and you will be ready to try out your image map. (See "Electronic Commerce Resources" for other programs with which you can create image maps.)

Searchable Data

As you know, one of the biggest advantages of a commerce site over other forms of information distribution is that very large amounts of data can be updated and made available to customers quite easily. And that information can be made electronically searchable with a few simple codes and programs. For example, in our sample commerce site, we may offer an Online Catalog as a searchable database.

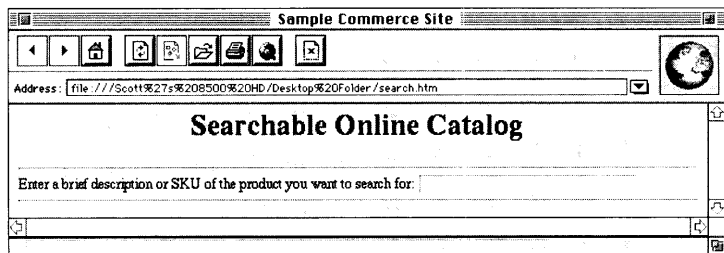
The two tags needed to make your HTML data searchable are the **<ISINDEX>** and the **<BASE>** tags. The **<ISINDEX>** tag tells the browser that the data on the page is searchable and lets the users know this too by providing a prompt statement that reads, "This is a searchable index. Enter search keywords," followed by an

input box where users can type their search words. If you want to customize the prompt statement, use the attribute PROMPT inside the `<ISINDEX>` tag followed by your customized statement, as in

```
<ISINDEX PROMPT="Enter a brief description or SKU of the product you want to search for:">
```

The corresponding Web page display is shown below:

Figure 7.2
A customized search prompt on a searchable Web page.



The other very important tag needed, the one that actually makes the data searchable, is the `<BASE>` tag. This tag points the browser to the location of the data that will be searched and the corresponding search program, as in `<BASE HREF="http://servername/cgi-bin/directory-query">`. Like image maps, searchable documents require some type of support from the server to work, because the way that the server interprets and processes the query is not defined by the HTML tags. Talk to your ISP or read your server documentation to learn how your server will process the query before creating the complete `<BASE>` statement.

Audio

Another great advantage of publishing your organization's documents on a Web is that you can incorporate sound and pictures to enhance documents like the Online Catalog described

above. Keep in mind, however, that these multimedia tools tend to use a lot of system space and require special client software for your customers to be able to use them. Use these features carefully and develop clear guidelines for your content developers to follow when they are deciding whether or not to incorporate multimedia features in your commerce site.

One type of multimedia enhancement available to developers is audio. Many browsers treat audio files as separate documents that are downloaded and displayed by helper applications (such as Real Audio). Others, such as *Internet Explorer* and *Navigator* offer built-in or plug-in applications that extend the capabilities of the browsers to manipulate audio files.

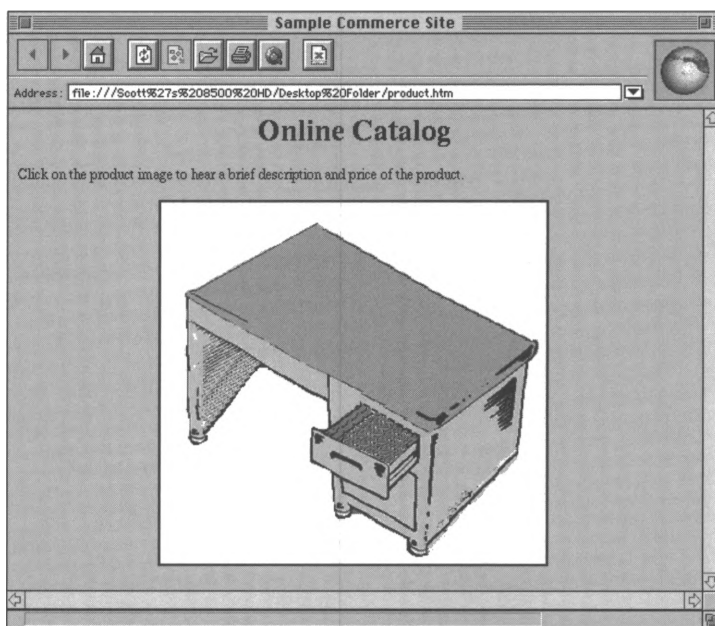
Currently, sound can be used in two ways: (1) as background music or (2) as descriptive narration. The use of background music is currently only supported by Microsoft's *Internet Explorer*, and depends on the tag **<BGSOUND>**. This tag triggers the download and playback of an audio file as soon as the host HTML document is downloaded. More typically, Web developers use sound to explain an idea or example, to enhance online training for audio learners, or to offer excerpts of speeches and presentations. To use an audio file in this way, you must first create the file with one of the many available audio programs. (See "Electronic Commerce Resources" for a listing of multimedia software sites). Then, create a link from your Web document to the sound file. As you do with any external file, you must reference the file using the **<A>** tags.

You can enhance your audio link with a hyperlinked graphic, by "anchoring" your audio file to a graphic on your Web page. For example, rather than having users "click" on the words "Product Description," to read a description of the product, you could use a graphic of that product (like the desk graphic below) to link to



an audio file that describes the product, maybe even in your voice!

Figure 7.3
*A graphic
hyperlinked
to an audio file.*



To create this audio hyperlink in our sample page, create your audio file and then find a suitable graphic. If you have a communications or art department in your organization, you may solicit help from a staff member to create an original graphic. If you do not have staff members who can create these graphics for you, use your Web browser to visit and browse any of the vast number of online sites from which Web graphics are available for free downloading. When you have selected a graphic, your HTML string may look something like this:

```
<A HREF="http://address/product.au">  
<IMG SRC="http://address/images/desk.gif"></A>
```

where **product.au** is the associated audio file that gives a brief audio description of the pictured product, *images* is a subdirectory of the Web server where graphics are stored, and **desk.gif** is the name of the desk graphic. (Remember, images used on your Web site will be in either GIF or JPEG formats.)

Tables

Tables are advanced Web publishing devices that display data in rows and columns. It is quite simple to create a table in which to display large amounts of information in an easy-to-read, appealing way. When dealing with tables, there are several functions that can enhance the appearance, some of which are supported by a limited number of browsers. In this discussion, we will describe only those properties supported by a majority of browsers.

Tables consist of four main tag sequences. The **<TABLE>** **</TABLE>** tags tell the browser to format the text within the tags as a table. You would also define the table's alignment, border, and width, inside the opening tag, if you choose. The tags **<TR>****</TR>** are nested inside the **<TABLE>** tags and surround all the text and tags that will be used in that row. As we've seen, browsers often interpret tags differently (or ignore tags completely!) and **<TR>****</TR>** is a good example of this discrepancy. The default alignment of the text varies from browser to browser, and so, the default alignment of the rows of your table will vary as well. If you feel that your table looks better justified a particular way, you can change the default value within each row by using the "ALIGN=*left, right, or center*" attribute in the **<TR>****</TR>** tag pair. Inside the **<TR>****</TR>** tags, the tag sequences **<TH>****</TH>** and **<TD>****</TD>** are nested to define headers and data within a table. Although only a few browsers, such as *Navigator* and *Mosaic*, support the tag **<TH>**, using it will display headers in bold text in some browsers.

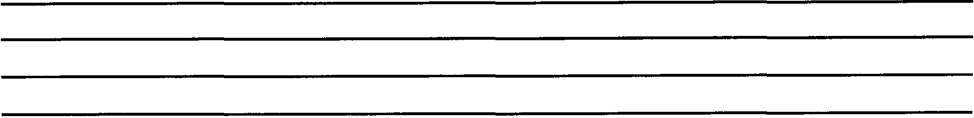
Browsers that do not support this tag simply display the included text as regular information in the table. (Remember the `` tags from Chapter Six? You can create the same effect using this tag pair around the text you want to display as bold.) The `<TD></TD>` tags operate in the same way to display the text as information within a cell in your table. The data will be displayed in the order you present it, from left to right in your rows.

Forms

One of the greatest benefits of a commerce site is that it allows customers to order products and services right over the Internet, while acting as an information-gathering resource for your organization. You could, for example, construct an online order form for customers to fill out that allows them to place orders for one or more items to be shipped directly to them and billed accordingly. Like the other HTML effects we've described, a form is created by surrounding text with special tags that tell the browser what functions to perform. The tags `<FORM></FORM>` indicate to the browser that the inside text and tags are to be treated as a form.

In addition to the tags, to make a form function, you must also define particular attributes. Forms require two attributes: an ACTION attribute and a METHOD attribute. The ACTION attribute tells the browser the URL of the program that receives and processes that data and is provided by simply typing `"ACTION='URL'"` inside the `<FORM>` tags. The METHOD attribute sets the method by which the browser sends the data to the server for processing, either GET or POST. If the data is sent using the POST method, the browser uses two steps:

1. The browser contacts the server specified in the action attribute.



2. The browser sends the data to the server in a separate transmission.

On the other hand, if the data is sent using the GET method, these two steps are completed as one, appending the data to the action URL, separated by a question mark character (?). Although now, most servers can receive data by either method, be certain to check with your ISP or refer to server documentation before building your forms. To select the method you will use, type "METHOD=POST" or "METHOD=GET" inside the **<FORM>** tag.

As you've probably guessed, you need more than just the HTML shell tags described above to make the application work. The next tag in your form does not have an ending tag but only the beginning tag **<INPUT>**, because all of the information is within the tag itself. The **<INPUT>** tag can work in two very different ways. If used alone, **<INPUT>** creates the fill-in boxes where users type text. Typically, users require some type of prompt to know what to type into a fill-in box, so you can use the formatting tags you learned in Chapter Six to develop text that walks the user through the form, or type simple prompts followed by **<INPUT>** tags, as in:

Name: <INPUT>

If you have more than one fill-in box, you may want to use other divider tags to improve the presentation of your form. For example, to present several fill-in boxes in neat rows and columns, you would use the table tags described above to create a table within a form (see Figure 7.4).

One of the main attributes used within the **<INPUT>** tag is the **HIDDEN** attribute. As the name suggests, the information within this tag is not displayed by the browser at all, but rather, it is used

by the program that is running on the server to determine what to do with the information, once it has been processed. In our example (Figure 7.4), you see that the input information is used to tell the program that it is to mail the information to the address in the VALUE field once it has processed the information in the form.

Another of the attributes used within the `<INPUT>` tag is the SIZE attribute. This attribute allows you to set the size by indicating the number of characters that each box should be able to accommodate. In addition, you use the `<INPUT>` tag and the attribute `TYPE=SUBMIT` to make a button with the words "Submit Query" on it. Clicking on the button sends the information that has just been filled in to the URL designated in the ACTION attribute. To adjust the notation on the button, simply use another attribute; in the `<INPUT>` tag type `VALUE="whatever text you want to appear on the button."`

But even these tags aren't enough to make a useful form. Forms require special software programs running on the server to process the information collected in the form and to perform other necessary functions, such as clearing the form. Fortunately, server vendors and ISPs usually supply sample forms applications with their servers. Talk to your ISP representative or look for a directory named ***cgi-src*** and you will probably find a number of examples you can copy and modify for your own forms.

The HTML source document for a fill-in form that collects ordering information from customers might look like this:

Figure 7.4
*HTML source file
 for a Web fill-in
 form.*

```

regform.htm
<HTML><HEAD>
<TITLE>Sample Commerce Site</TITLE></HEAD>
<BODY>
<CENTER>
<H1>Online Catalog Order Form</H1></CENTER>
<P>Below is a list of the products that you wish to order. To remove an item,
enter a quantity of zero.</P>
<FORM ACTION="http://servername/cgi-bin/order" METHOD="POST">
<INPUT TYPE="HIDDEN" NAME="Mailto" VALUE="who@where.com">
<TABLE>
<TR>
<TD>Qty</TD>
<TD>SKU</TD>
<TD>Description</TD>
<TD>Price per Unit</TD>
<TD>Total Price</TD></TR>
<TR>
<TD><INPUT SIZE="2"></TD>
<TD><INPUT SIZE="5"></TD>
<TD><INPUT NAME=""></TD>
<TD><INPUT SIZE="10"></TD>
<TD><INPUT SIZE="10"></TD></TR>
<TR>
<TD><INPUT SIZE="2"></TD>
<TD><INPUT SIZE="5"></TD>
<TD><INPUT NAME=""></TD>
<TD><INPUT SIZE="10"></TD>
<TD><INPUT SIZE="10"></TD></TR>
<TR>
<TD><INPUT SIZE="2"></TD>
<TD><INPUT SIZE="5"></TD>
<TD><INPUT NAME=""></TD>
<TD><INPUT SIZE="10"></TD>
<TD><INPUT SIZE="10"></TD></TR>
<TR>
<TD></TD>
<TD></TD>
<TD></TD>
<TD ALIGN="RIGHT">Total Price: </TD>
<TD><INPUT TYPE="TEXT" SIZE="10" VALUE="799.97"></TD></TR></TABLE>
<CENTER>
<P><INPUT TYPE="SUBMIT" VALUE="Continue Browsing"><INPUT
TYPE="RESET" VALUE="Clear Form"> **<INPUT TYPE="SUBMIT" VALUE="Place
Order">**</P></CENTER></FORM></BODY></HTML>
  
```

The corresponding Web display of the sample Online Catalog order form (with items selected by a customer), looks like this:

Figure 7.5
Web fill-in form
displayed in
Explorer.

Sample Commerce Site

Address: file:///Scott%27s%208500%20HD/Desktop%20Folder/regform.htm

Online Catalog Order Form

Below is a list of the products that you wish to order. To remove an item, enter a quantity of zero.

Qty	SKU	Description	Price per Unit	Total Price
1	A023	Cherry Office Desk	599.99	599.99
2	C145	3-Shelf Bookshelf	99.99	199.98
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
Total Price:				799.97

As you can see from the above example, a very simple form can be of great way to construct an online order form. Sometimes, however, a more complex form may be needed to gather the necessary information. Some of the more valuable tags that extend the information gathering ability of a form include:

```
<SELECT></SELECT>
<OPTION>
<TEXTAREA></TEXTAREA>
<INPUT TYPE="radio">
```

The `<OPTION>` and `<SELECT></SELECT>` tags go together to form, as the tags imply, a list of options from which a user can select (such as a group of payment methods supported by the commerce server). The `<TEXTAREA></TEXTAREA>` tags create a block of space that may be filled in with more than one line of text—great for soliciting comments from users! To adjust the size of the text area that is created on the screen, use the `ROWS` and `COLS` attributes to specify the number of rows and characters per row, respectively. Another very useful feature is the radio button attribute of the `<INPUT>` tag. This feature allows you to provide a list from which the user may check only one of the selections.



A radio button attribute may be checked as a default in the HTML source code to save the user time when filling out your form. The following source code demonstrates these tags and attributes:

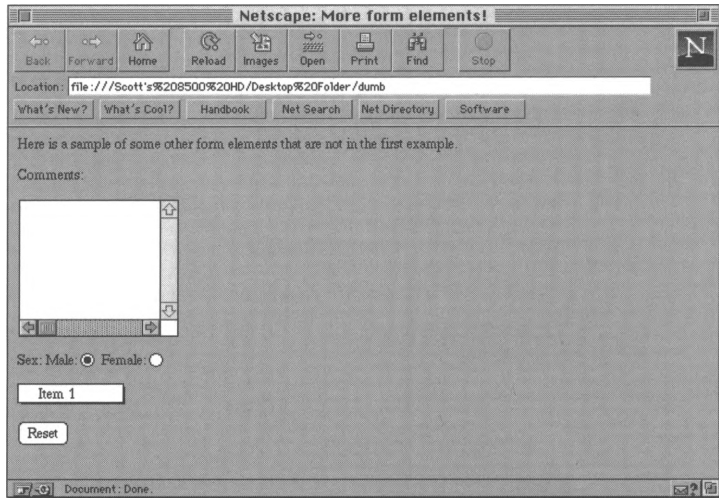
Figure 7.6
Source code for more Web form elements.

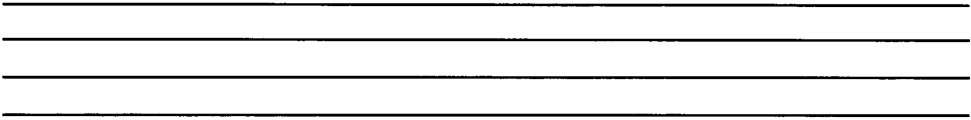
```

form elements
<HTML>
<HEAD>
<TITLE>More form elements!</TITLE></HEAD>
<BODY>
<P>Here is a sample of some other form elements that are not in the first example.
<FORM>
<P>Comments:<p>
<TEXTAREA ROWS="7" COLS="35"></TEXTAREA>
<P>Sex: Male:<INPUT TYPE="RADIO" CHECKED> Female:<INPUT TYPE="RADIO">
<P>
<SELECT SIZE="1">
<OPTION>ITEM1
<OPTION>ITEM2
<OPTION>ITEM3
<OPTION>now</SELECT>
<P><INPUT TYPE="RESET"></FORM></BODY></HTML>
    
```

And the Web display would look like this:

Figure 7.7
More Web form elements displayed in Navigator.





Frames

Frames extend the capabilities of a browser by breaking the main display window into separate smaller windows, each simultaneously displaying a different document. To use frames, you need the tags `<FRAMESET></FRAMESET>` in which you define the number and sizes of the frames. Typically these sizes are determined by pixels or screen space percentages, followed by an asterisk (*), which tells the browser to size columns or rows to whatever space is left over. Next, use the `<FRAME SRC="URL">` inside the `<FRAMESET></FRAMESET>` tags to direct the browser to the documents that will be displayed in the frames.

Because these tags are not recognized by all browsers, you should also use the `<NOFRAMES></NOFRAMES>` tags to supply an alternate navigation method for users who do not have frames capabilities. Browsers that are not frames compatible will read the tags and text inside these tags—something like

```
<BODY>This document can only be viewed with a frames-  
capable browser. <A HREF="framealt.html"> Use this link </A>  
to view the first HTML document in this set.</BODY>
```

Another good way to give alternate displays for those browsers that are not frames-enabled is to include the source code for one of the HTML pages in the frames display inside the `<NOFRAMES></NOFRAMES>` tags (as in the example below).

For example, we can combine the searching page, the product description page, and the order form page so that the customer may input a product, see it come up in a different window on the same page and add it to his order form in yet another window on the same page. To create the Web page described above, you would create the following source code:

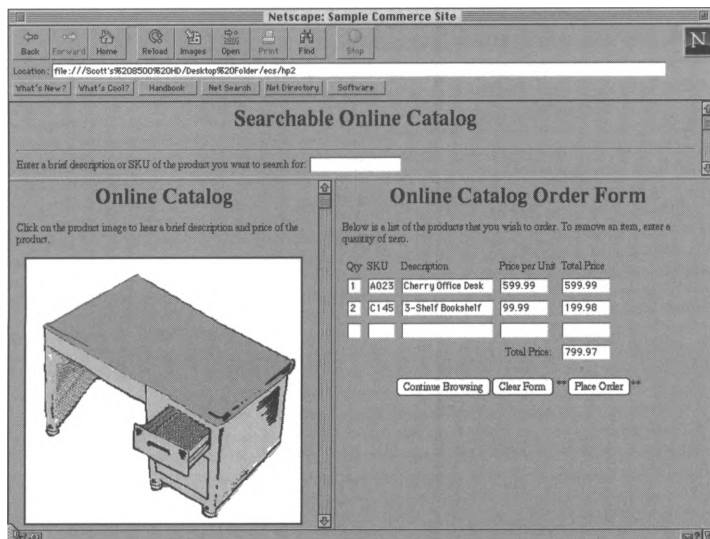
Figure 7.8
HTML source file
for a Web page
using frames.

```

hp2
<HTML>
<HEAD>
<TITLE>Sample Commerce Site</TITLE></HEAD>
<FRAMESET ROWS="18%,82%" COLS="46%,54%">
<FRAME SRC="/search.htm">
<FRAME SRC="/product.htm">
<FRAME SRC="/regform.htm">
<NOFRAMES>
<BODY>
<CENTER>
<H1>Searchable Online Catalog</H1></CENTER>
<ISINDEX
PROMPT="Enter a brief description or SKU of the product you want to search for: "
ACTION="http://servername/cgi-bin/catalog"></BODY></NOFRAMES></FRAMESET></HTML>
    
```

The corresponding Web page would look like this:

Figure 7.9
Frames displayed
in Navigator.



Client-Side Programming

With the booming interest in Internet technologies, new concepts to make the Web even more dynamic have begun to emerge,

including client-side programming languages. As you saw earlier in this chapter, one of the drawbacks of programming such as SSI or CGI is that the programs open server security risks and put additional processing demands on your Web server. Client-side programming, on the other hand, is written into HTML files and runs on the client software instead of the server.

JavaScript

One of the newest and most exciting client-side programming tools is JavaScript, a simplified version of Java, a programming language created by Sun Microsystems. JavaScript is an object-oriented, platform-independent, event-driven scripting language that is responsible for many of the exciting effects you see on the Internet—scrolling marquis, functioning clock faces, various simple animation effects, and much more. What this means to commerce site developers is that you now have a scaled-down programming language that allows you to create pages that can respond to user's selections or actions, making your commerce site even more dynamic. Let's look at each aspect of JavaScript to give you a better understanding of what it does.

First, JavaScript is a scripting language, which means that you can create mini-applications to complete specialized tasks using JavaScript. These mini-applications aren't compiled like regular programs, but rather, they are interpreted line by line while the application is running and are incorporated into embedded HTML tags in Web documents to make the programming easy for Web designers to use.

JavaScript is object-oriented, which means that JavaScript deals with a program as a collection of individual parts (objects) that complete different tasks rather than as a sequence of statements that perform a specific task. This is very helpful because the language has a number of objects already built in. For example,

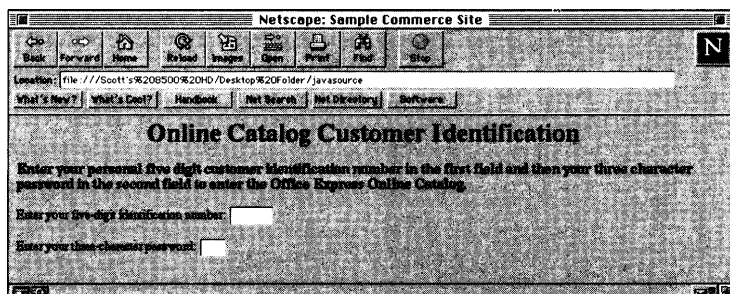
JavaScript already has a “date” object built in so that you don’t have to build one.

JavaScript is also platform-independent, which means that JavaScript is not bound by the particular computer platform being used (*Macintosh*, *Windows*, or *Unix*). Therefore, you may create the JavaScript application on a *Macintosh* computer and *Windows* and *Unix* users will still be able to see and perform the same functions as those using *Macintosh* machines.

Finally, JavaScript is event-driven, which means that JavaScript can respond to any number of things that the user does. Whenever the user clicks a button, drags the mouse, loads a page, or even unloads a page, this is considered an event by the application. The JavaScript program can be written to offer alternative responses to various “events,” allowing a great deal of flexibility to the Web page’s level of interactivity.

For example, you can create a simple program to verify certain basic information typically input by users on a Web page. This allows the computer to let the user know if they have accidentally misinput the information before it takes the time to process the information. If, for instance, your organization uses customer identification numbers and passwords, you might have a form on your commerce site in which customers input this information before a transaction begins, such as the form below:

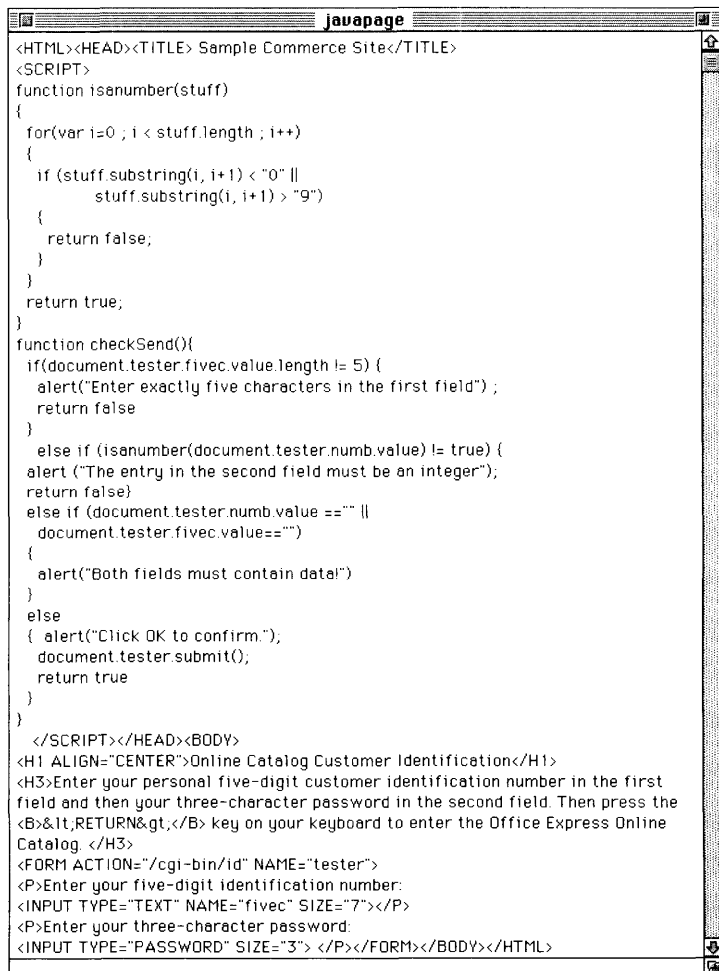
Figure 7.10
Sample
identification
page using
JavaScript.



The screenshot shows a Netscape browser window titled "Netscape: Sample Commerce Site". The address bar contains the file path: "file:///Scott's%206500%20HD/Desktop%20Folder/javasource". Below the address bar are several menu items: "What's New?", "What's Cool?", "Handbook", "Net Search", "Net Directory", and "Software". The main content area features a heading "Online Catalog Customer Identification" and a paragraph of instructions: "Enter your personal five digit customer identification number in the first field and then your three character password in the second field to enter the Office Express Online Catalog." Below this are two input fields: "Enter your five-digit identification number:" followed by a text box, and "Enter your three-character password:" followed by a text box.

In a typical transaction, the customer would input this information, complete the order form, and send all the information to the server for processing, at which point the server might find that the user's password does not match the ID number. The server would then send an error message to the user and request that they complete the information again. The JavaScript program below would work behind this input form and verify the information before the customer proceeds further in the ordering process. The source code that makes this process possible is shown below between the `<SCRIPT></SCRIPT>` tags that indicate to the browser that this is a JavaScript program:

Figure 7.11
Source code for
sample
identification
page using
JavaScript.



```

<HTML><HEAD><TITLE> Sample Commerce Site</TITLE>
<SCRIPT>
function isnumber(stuff)
{
  for(var i=0 ; i < stuff.length ; i++)
  {
    if (stuff.substr(i, i+1) < "0" ||
        stuff.substr(i, i+1) > "9")
    {
      return false;
    }
  }
  return true;
}
function checkSend(){
  if(document.tester.fivec.value.length != 5) {
    alert("Enter exactly five characters in the first field");
    return false
  }
  else if (isnumber(document.tester.numb.value) != true) {
    alert ("The entry in the second field must be an integer");
    return false;
  }
  else if (document.tester.numb.value == "" ||
    document.tester.fivec.value=="")
  {
    alert("Both fields must contain data!")
  }
  else
  { alert("Click OK to confirm.");
    document.tester.submit();
    return true
  }
}
</SCRIPT></HEAD><BODY>
<H1 ALIGN="CENTER">Online Catalog Customer Identification</H1>
<H3>Enter your personal five-digit customer identification number in the first
field and then your three-character password in the second field. Then press the
<B>&lt;RETURN>&gt;</B> key on your keyboard to enter the Office Express Online
Catalog. </H3>
<FORM ACTION="/cgi-bin/id" NAME="tester">
<P>Enter your five-digit identification number:
<INPUT TYPE="TEXT" NAME="fivec" SIZE="7"></P>
<P>Enter your three-character password:
<INPUT TYPE="PASSWORD" SIZE="3"> </P></FORM></BODY></HTML>

```

As with server-side programming, you can find various JavaScript applets online or in print publications. Or, if you plan to include a lot of programming on your site, you may consider hiring a programmer or training a staff member to take on this role. Whichever method you choose, using these ever-developing programming innovations can offer you various opportunities for developing your commerce site's usefulness.

As you can see, there are numerous ways to enhance your Web site and move beyond the simple content development that we described in Chapter Six. The level of complexity that you decide to implement will depend on your server capabilities, your staff members' training, and your organization's needs. As you study the next chapter, "Planning Your Electronic Commerce Site," be sure to consider the type of content you will be creating and the level of sophistication that the documents require, as well as the hardware, software, and staff that you will need to create and maintain a site that uses these enhanced design effects.

Advanced HTML Tags

Tags for advanced graphics:

- `<IMG SRC=` Anchors a graphic to a specific URL.
`"URL of graphic">`
- `<IMG SRC=` Anchors a graphic to a Web map file.
`"URL of map GIF" ISMAP">`
- `<BODY BGCOLOR="color code">` Creates a colored background in a Web page.

Tags for searchable data:

- `<ISINDEX>` Tells the browser that the page is searchable and displays an input box.
- `<BASE HREF="URL">` Identifies the location of the search program and data.

Tags for tables:

- `<TABLE></TABLE>` Marks the beginning and end of a table.
- `<TR></TR>` Marks the beginning and end of a row in a table.
- `<TH></TH>` Displays the enclosed text as a bolded table head.
- `<TD></TD>` Displays the enclosed text as information inside a row cell.

Tags for forms:

- `<FORM></FORM>` Marks the beginning and end of a form.
- `<INPUT>` Creates a fill-in box for user input.
- `<INPUT TYPE="SUBMIT">` Creates an onscreen button that reads "Submit Query."
- `<SELECT></SELECT>` Marks the beginning and end of a selection.
- `<OPTION>` Designates items in a selection.
- `<TEXTAREA></TEXTAREA>` Creates an area on screen in which text can be typed.

Tags for frames:

- `<FRAMESET></FRAMESET>` Marks the beginning and end of a frame display and allows for definition of frame sizes.
- `<FRAMESRC="URL">` Identifies the location of the document that will be displayed in a frame.
- `<NOFRAMES></NOFRAMES>` Displays the enclosed text to browsers that do not read



Chapter Eight

Planning Your Electronic Commerce Site

Information technology projects, such as the implementation of an electronic commerce site, can require considerable investments of time and money. Careful planning at the start of, as well as during, a project can help to assure that your site will accomplish its goals on schedule and within your planned budget. You may be tempted to get started without considering where the project will lead; however, decisions made in haste may need to be reversed later, may prove too costly for your organization, or may lead to discouraging results that leave management and staff members doubting the value of your electronic commerce project.

To avoid these disappointments, use a well-defined planning methodology. A methodology is a proven set of steps and tasks that system developers follow to build quality systems quickly, at low costs, and with minimal risk. Any methodology sets goals, defines targets, establishes schedules, and estimates costs for the entire life cycle of a project. If your company has its own pre-established methodology, or you have successfully used some method to implement information technology projects in the past, then select the method that best suits your organization's needs. The exact methodology that you choose is unimportant as long as it is appropriate to the size, type, and scope of the electronic commerce site you plan to develop. Whichever method you choose, you can be prepared to adapt your methodology to the

particular challenges of implementing an electronic commerce site by studying this chapter. Key topics include

- Analyzing needs
- Assessing costs and benefits
- Planning
- Development
- Implementation

Project Management

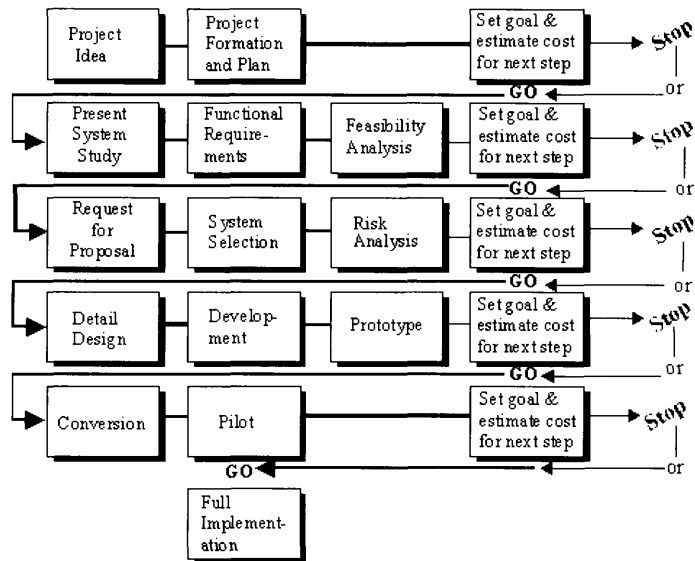
According to the Project Management Institute (<http://www.pmi.com>), project management is “the application of knowledge, skills, tools, and techniques to project activities in order to meet or exceed stakeholder needs and expectations from a project.” In other words, project management is planning the steps necessary to produce the outcome that the owner, or the board of directors, of an organization desires. Managing a project requires that the manager or group of managers organize and outline, plan and predict, direct and develop, every facet of the project implementation. This process is usually done by breaking the implementation into smaller facets. These smaller facets will be discussed in this chapter. Briefly, when you manage an electronic commerce project, you will be responsible for planning how the site will fit into the existing business structure, how the site itself will be constructed, how long it will take for the site to be completed, how much the site will cost, how you will allocate and reallocate your human resources, and how you will analyze the benefits of the site. Generally speaking, these smaller concerns are called project phases, and, collectively, the whole implementation is called the project life cycle. The necessity of life cycle planning is clear—since the plan looks beyond the initial costs and benefits to the full cycle of potential costs and benefits over the life of a project, it offers a more

accurate assessment of the impact of a new technology system on an organization's business goals. While organizing and overseeing all of these phases may sound like a daunting undertaking, as long as you carefully monitor each phase of the project and follow the life cycle plan, you should have a successful electronic commerce site up and running in no time!

Life Cycle Planning

Life cycle project management is simply a process of practical problem solving applied to all aspects of any information technology project. The methodology assumes that your organization is facing a problem that must be solved or has identified a new market that it would like to branch into. Life cycle project management then estimates the costs and feasibility of developing a solution to the problem; for example, could we market and sell these gadgets cheaper on the Internet? It also analyzes the ongoing benefits and costs of maintaining the system and supporting the staff as they undertake the new tasks made necessary by the system. The steps involved in the process of implementing your electronic commerce site may follow the sample process illustrated below:

Figure 8.1
A model of a life cycle project management flowchart.



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On the other hand, your project plan may include some but not all of the steps illustrated in the chart above. Whatever level of detail you decide to include, a solid, well-defined plan will help bring your goals into focus and lead you to a successful implementation.

Whether you decide to use the life cycle methodology or some other methodology, your electronic commerce site implementation plan should be a written document that clearly defines the goals of your project and outlines the methods you plan to use to achieve them. It will describe what the site will achieve, how it will be implemented, who will be involved in the process, why it is being done, and some kind of timeline for implementation. When developing your plan, it is important to

establish realistic goals and a sound method for attaining them. Your plan should include at least the following parts:

1. Needs analysis
2. Cost/benefits analysis
3. Planning
4. Development
5. Full implementation
6. System support and adjustments

Needs Analysis

The only reason to be considering an electronic commerce site for your organization is that you have identified some problem an electronic commerce site can solve or some need an electronic commerce site can meet. Perhaps you are reading this guide because you have already concluded that electronic commerce can help your organization, or a client's organization, meet the challenges of today's business environment. Whatever process has brought you to this point, it is important to stop before continuing and consider your organization's problems and needs.

To identify the needs of your organization, spend some time finding answers to the questions below. You might even circulate a questionnaire to solicit staff feedback on the most pressing issues they are facing. In the online documents describing their Framework methodology, the US Department of Defense lists a number of questions for which any team involved in managing technology change should know answers before they begin any technology change process. We have adapted that list of questions on the following page to act as a checklist for your own technology change initiatives.

Technology Change Questionnaire

*(Adapted from the US DOD Framework methodology documents at
<http://www.dtic.dla.mil/c3i/bprcd/3003.html>.)*

1. Will the potential process improvement change the way data and information is collected, entered into systems, filed, and referenced?
2. Will the system require new processes for data entry, tracking material and documents?
3. Will the implementation require new or different processing algorithms such as if-then-else rule-based systems, fuzzy logic, or object-oriented procedures?
4. Will the technology make use of emerging document managing systems that provide sophisticated techniques for capturing and producing integrated text, data, and image information? Will electronically generated forms replace standard print forms?
5. Will the implementation provide paperless procedures to replace paper-intensive business procedures? Will data be encoded using magnetic strips, bar codes, smart cards, or optical devices?
6. Will the electronic commerce site depend on integrated text, data, voice, graphic, and imaging systems for any part of the design?
7. Will the technology require relational databases, repository systems, re-use libraries, or sophisticated keyword-in-context retrieval systems?
8. Will the new system incorporate distributed computing principles such as wide-area data communications, satellite communications links, video teleconferencing, email, or remote access to databases?
9. Will the technology use work flow or work group computing techniques to support empowered cross-functional work teams?

-
-
-
-
10. Will the system also support networked software such as groupware, computer-aided drafting and design software, meeting or conference facilitating software?
 11. How will the system incorporate sophisticated security, access, and accountability algorithms to monitor or control business-related decision making?
 12. Will the system require graphic user interface software, customized computers or interface equipment, or built-in measuring or monitoring devices?
 13. Will the new technology come with a self-learning system with a built-in menu, help, hypertext, and other learning aids?

Armed with answers to these questions, sit down and assess the strengths and weaknesses of new technology implementation in your organization. Whether your organization is large or small, you will quickly see the efficiency gaps that an electronic commerce site might help you solve.

Cost/Benefits Analysis

Now that you have considered the needs that your organization is facing, consider the various solutions that can help you improve the flow of commerce, information, and business-critical activities. Perform in-depth feasibility studies and cost/benefits analyses for several likely systems. You may use the “Cost Estimate Worksheet” on the following page to gather useful data for developing this section of your plan.

Cost/benefits analyses are determined by comparing various alternative methods for achieving the desired results. As mentioned earlier, all of the alternatives for improving processes and empowering employees to complete more diverse tasks may ultimately have a higher cost than continuing to perform tasks in existing systems and at current levels of performance. Therefore, to accurately assess the benefits of an electronic commerce site, you must compare the costs of electronic commerce functionality with similar functionality offered through other methods. This portion of your plan should consider each alternative’s overall performance and factors such as

- Compatibility with existing hardware and software.
- Adaptability to changing business needs.
- Impact on staff and organization.
- Reliability of the system.
- Ease of use.
- Maintenance.

For each alternative, prepare detailed cost estimates that include tangible factors as well as other intangible factors. For instance, benefits may be technological (offering increased interconnections between vendors, staff, and customers), cost savings (the reduced costs of electronically marketing company products), performance (a staff that responds more quickly to clients because they have access to clients online via email), and quality (reduction in data-entry errors and faster customer support). The purpose of this type of cost/benefits analysis is to compare the technical, personnel, functional, and cost aspects of the various methods available for achieving your organizational goals. The resulting section of your project planning document will describe how the alternatives deliver (or fail to deliver) the results you expect.

Cost Estimate Worksheet

<i>Item</i>	<i>Initial Costs</i>	<i>Continuing Costs</i>
TCP/IP Stack		
Installation/Licensing	_____	_____
Support	_____	_____
Platform Upgrades		
Hard Drive	_____	_____
Operating System	_____	_____
Memory	_____	_____
Browser		
Evaluation	_____	_____
Installation/Licensing	_____	_____
Training	_____	_____
Web Server or ISP		
Evaluation	_____	_____
Installation/Licensing	_____	_____
Support	_____	_____
Document Creation Software		
Evaluation	_____	_____
Installation/Licensing	_____	_____
Support	_____	_____
Training	_____	_____
Graphics Editors		
Evaluation	_____	_____
Installation/Licensing	_____	_____
Support	_____	_____
Training	_____	_____
Transaction Support Software		
Evaluation	_____	_____
Installation/Licensing	_____	_____
Support	_____	_____
Maintenance		
Content Upkeep	_____	_____
System Upkeep	_____	_____
Administration and Support		
Helpdesk	_____	_____
Acceptable-Use Committee	_____	_____

Planning

Before drafting the description of the electronic commerce site project for your organization, you should take sufficient steps to educate yourself on the technology and applications as they are being used by other organizations. Look for other organizations that are completing tasks that are comparable to tasks completed in your own organization and use them as examples to supplement your plan (especially if you must seek management approval for your plan). When assessing the value of an electronic commerce site to an organization's business growth goals, a well designed program or site used by a competing organization might truly be worth a thousand words! If time and resources allow, you might even design a small manageable electronic commerce site as a pilot project that will demonstrate your plans to management and staff.

After completing this preliminary research step, align the goals of your organization with the possibilities of the project. For every problem you identified in your organization, assess the solutions offered by an electronic commerce site. Be as specific as possible at this stage of the planning, perhaps using a chart to visually assign solutions to outstanding organizational problems and to describe the specifics of your electronic commerce site life cycle plan. Include at least the following items in your planning document:

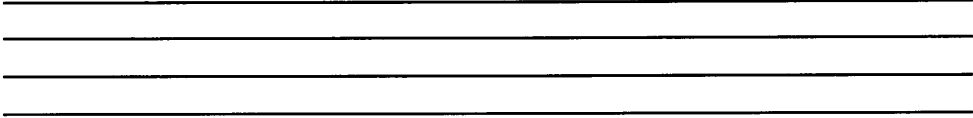
- Current process benchmark figures
- Objectives and expected results
- System requirements
- Software and hardware
- Security controls
- Expected performance and response times
- System documentation
- Backup and recovery procedures

- Methods for evaluating results
- Team members

Development

After having progressed this far in the process, it will be very tempting to leap ahead with your electronic commerce implementation project—tempting but unwise. In fact, you may want to begin to develop your electronic commerce site by focusing on a small manageable pilot project first. Then you can build on that pilot project as the electronic commerce site and its offerings develop. This kind of approach is natural and reasonable for an electronic commerce project, since the systems that support electronic commerce are scaleable—capable of growing easily with your organization.

When you evaluated the technology processes and commerce problems in your organization, you probably noticed many likely areas for an electronic commerce pilot project. An obvious choice might be to market and sell a new product or category of products online. For instance, if your clothing company is going to be coming out with a new line of purple velvet clothing—such as the line of “Purple Passion” skirts in the opening Netwear example—you may want to begin to market that line of clothes both online and through conventional marketing channels. Another choice for a pilot project may be to begin offering online support or purchasing power for an already existing product. For example, if your sewing machine manufacturing company is anticipating opening an electronic commerce site to sell all of their manufactured sewing machines, knitting machines, and automatic weaving looms, you could begin with a pilot project that offers online support for those businesses and individuals who bought the Knit-Purl AAA3 machine, and you could offer these machines for purchase at the site. Whatever pilot project



you select, you must be certain that the scope is well defined and the results are measurable.

After selecting a manageable and measurable pilot project, plan the documents that will be necessary. In general, there are two types of documents that you may have on your electronic commerce site: (1) indexing documents and (2) content documents. Indexing documents are documents that consist wholly of links to other documents. Their primary purpose is to direct users to useful resources, to act as a table of contents for the other electronic commerce documents. Content documents, on the other hand, are the catalogs, forms, and text that are at the heart of every organization's business commerce processes.

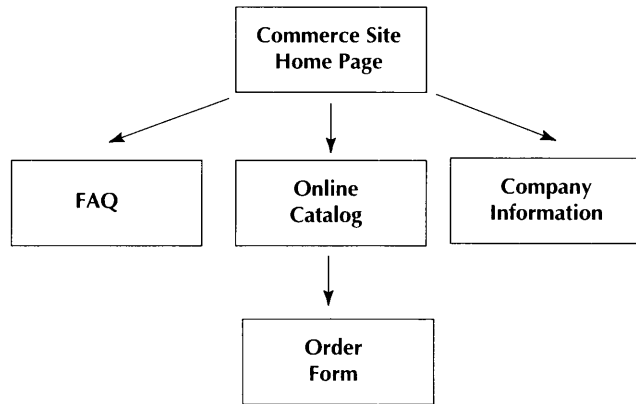
Next you will need to create the documents that will be necessary for the pilot project. If your pilot is a site that markets an already existing company product, for example, there may be several related pages that will need to be written and formatted with HTML tags. From the electronic commerce site home page, which is an indexing page, you might offer links to

1. An online help site or a FAQ (Frequently Asked Questions) document.
2. A product catalog page.
3. A purchasing order page.
4. A company information page that lists the email addresses of online support people and company officials.

You might develop a flow chart like the one illustrated below to help you visualize the connections between documents:

Figure 8.2
*Sample flowchart
for an electronic
commerce pilot
project site.*

Commerce Site Flowchart



Working with the staff and your ISP, make the pilot project documents available to the company's own staff on the Internet. Invite staff members to visit the pilot project test site and provide feedback. Be certain to follow up with staff members who visit the site and ask questions or provide comments and suggestions.

Use the feedback from this test phase to finalize the technical design of the site, revise the performance model, and prepare system documentation. If the pilot project indicates problems you had not anticipated, then revise the project plan to offer solutions. Reassess the cost-benefits analysis you completed to make any necessary adjustments in your conclusions based on the real-life test run of your electronic commerce life cycle plan. Meet again with your team members to refine your development plan and then get ready for the real fun—implementing your full-scale electronic commerce site.

Full Implementation

Full implementation of your electronic commerce site is not as imposing as it sounds, if you have followed the guidelines above

to prepare for the project. In fact, this is the easy part, especially after you have implemented a pilot project on which you can build your expanded electronic commerce site. Focus your efforts on

- Developing a FAQ (Frequently Asked Questions) database.
- Developing Web style guidelines.
- Bringing content online.

Developing a FAQ (Frequently Asked Questions) Database

There are a number of reasons for developing a document that includes the most frequently asked questions that the support staff in your organization receive and the answers that they normally give. Perhaps the most important consideration is productivity. Obviously, an electronic commerce site will enable customers to obtain individualized support through email when they have questions or problems. However, it wouldn't be very productive to pay one staff person, or many staff members, to sit and answer the same question day in and day out via email. If, for example, the support staff receives twenty-five queries every hour as to whether the new line of "Purple Passion" velvet clothing can be washed by hand or how the clothes should be washed, cost effectivity would increase if the customer who wanted this information could just retrieve an HTML document that outlined the basic cleaning instructions for velvet clothing. The FAQ, in this case, would save the staff member many hours of repetitious email response time.

The questions and answers that you choose to provide on your company FAQ will depend on your organization's objectives and the questions that your support staff are typically asked. It is a good idea to discuss these issues with management and the staff in advance and then develop a list of the most frequently asked

questions and the answers normally given. The questions and the answers should be written in standard, grammatically correct versions of whatever language or languages your electronic commerce site will support. Remember, your FAQ will, in many cases, free your live customer support people to accomplish other tasks; it will become the representative “voice” for your organization to your active customers and clients. The questions, and the answers given, should be polite and respectful, and they should encourage the customers to feel free to call the live support crew if they experience technical difficulties that they cannot overcome. Of course, no company would want to publish a FAQ and answer like the following:

Q. How shall I clean my new “Purple Passion” skirt?

A. As any idiot or small child knows, velvet and water just do not mix. KEEP THE VELVET AWAY FROM THE WASHING MACHINE AND DEFINITELY KEEP IT OUT OF THE SINK! Spend the extra few dollars, tightwad, and take your fine, new, soft, supple, “Purple Passion” skirt to the drycleaner.

You get the picture.

You will need to develop, announce, and enforce standards for online writing and presentation that the entire support and writing staff will follow.

You will also need to provide some type of training for staff members who will manage the electronic commerce site, for they may be handling support questions about the organization’s products and services, and also questions about the organization’s online capabilities. For staff members, plan to offer some introductory training (consult with HR personnel if

possible). Many members of your staff will have already used Web browsers and so training them to use the interface will require only a limited time investment. After all, they only need to point and click—no cryptic command line codes or complicated screen interfaces. For the sake of the customers and the company image, be certain staff members understand that all correspondence and Web pages must contribute to the professional presentation of the organization's staff and resources. Finally, be certain that staff members are informed of security risks and precautions they can take to protect the customer and the company from interference by hackers trying to access sensitive information. (See Chapter Ten, "Security and Your Electronic Commerce Site" for more information about security issues.)

Whatever the scope of your clients and whatever their needs, your electronic commerce site places the organization on the technology cutting-edge, promising improved service and efficiency. Do not let this opportunity to enhance your organization's reputation go unexploited.

Developing Web Style Guidelines

Your electronic commerce documents should conform to both organization style initiatives and more general guidelines that have come to characterize well-constructed Web pages. As you begin to delegate responsibility for developing documents for your electronic commerce site, it is a good idea to have a clear policy to guide your authors. Your electronic commerce document style guidelines will depend in large part on the style that has been used in other organizational documents.

In addition, these style guidelines must consider system issues. Defining guidelines for the number and size of graphics will allow you to control download times. Insisting on use of

templates saves time for developers who can simply dump their content into HTML frames making the content available quickly and without costing unnecessary human resource hours. When making decisions about your guidelines, consult with your Web Master and management, and look to the examples of other organizations that are often posting their own guidelines online.

For an example, study BC Hydro's Web design guidelines, developed by Steve Whan, BC Hydro's Corporate Web Master (steve.whan@bchydro.bc.ca) and reproduced below, in order to get a feel for how the document should be phrased and the types of issues that should be addressed:

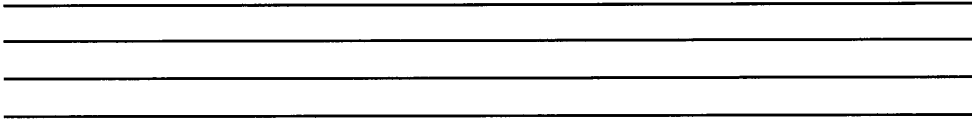


The following content guidelines will apply to all Web content providers and Web-based application developers. These guidelines will allow for efficient use of our network resources so that everyone can take advantage of these services. In addition, using a standard template and following the approved Style Guide will ensure that users will view consistently designed Web pages.

Data Constraints

Users connect to the Enterprise Data Network at BC Hydro which runs at a minimum of 14.4K bits per second. While network bandwidth can be upgraded to meet demand, there are upper limits. Many sites cannot be upgraded beyond 56Kbps due to site locations. Large files of data moving through this network will negatively impact all users (every application from email through to mainframe access shares the same pipe). Because of this, there will initially be a number of data constraints placed on content providers and application developers.

The design goal at this time is for the user to be reading the page within 10 seconds using a 14.4K line, therefore:



- *No audio or video clips unless they are loaded directly from the local workstation.*
- *Client-side image maps should be used instead of server-side image maps (and only if there is a business justification for using a map in the first place).*
- *Graphics and images should be set-up as a thumbnail sketch in the source (max. 2000 bytes) with a link to the larger file (max. 30k bytes). The size of the larger image should be specified so that the user can decide to view it or not.*
- *The maximum recommended number of thumbnails or icons is seven per page. The total page size including thumbnails and icons should not exceed 30K.*
- *Any image or graphic element must have a business purpose for being in the document (e.g. a flow chart or process diagram). Graphics used to add colour or additional design elements to a page are not acceptable because they will directly impact network performance.*
- *Textual information in documents should be limited to 7K (equals about six pages on the screen) in order to speed loading and minimize the impact on the network. Whenever possible, pages and documents should be broken up into chapters or sections accessible from a menu or index screen.*
- *Images from the /images sub-directory should be used for logos, buttons etc. instead of creating personal versions. This will take advantage of images stored in the browser's cache.*
- *Information more than 6 months old will be considered "stale" and the owner will be contacted to verify the validity of the application or information.*

- *Information that is found to be out of date or inaccurate will be removed from access until it is updated. "No information is better than wrong information." The content provider is responsible for guaranteeing the currency and accuracy of the information.*

Standard Template

1. *The first Web page will contain the following information in the <ADDRESS> area:*
 - *primary contact/owner (phone number & a 'mailto:' if they have email and department/SBU name)*
 - *date last revised or updated (full date format should be used e.g. May 12, 1996)*
 - *a standard link back to the InfoPage home page*
2. *The approved Style Guide is the one created by Rick Levine of Sun Microsystems, Inc. (<http://www.sun.com/styleguide/>). Content providers and application developers should use this as their basis for design decisions until a BC Hydro Style Guide is available.*
3. *All Web pages should have the same look and feel wherever possible, so sample templates and style guide files will be available online.*

Use the worksheet on the following page to help you develop Style Guidelines for your Web site.

Web Style Guidelines Worksheet

Answer the questions below to outline style guidelines for your electronic commerce site.

What type of equipment will your customers be using?

14.4 modem or higher?

Browsers with advanced HTML capabilities (frames, tables, forms, etc.)?

Audio or video add-ons?

What is your design goal?

Pages that load in 15 seconds or less using a 14.4 modem?

Pages that are viewable in most browsers (i.e., pages that do not use sophisticated HTML features)?

Pages that illustrate your technological expertise (i.e., pages that make use of many sophisticated HTML and programming features)?

What constraints will you place on content developers to insure that your design goal is met?

Will you allow audio and video clips?

Will you use client-side image maps, server-side image maps, or no image maps at all?

Will you use full-size graphics or thumbnail graphics that users can view by choice?

Will you allow graphics that do not serve an obvious business purpose?

Will you limit the size of graphics used at your site? If so, how large can a graphic be?

Will you limit document size at your site? If so, how large can a document be?

How will you control the accuracy and currency of documents?

Will documents be dated?

Will someone review documents periodically to ensure that all material is current and accurate?

Is outdated information better than no information at your site? Or should outdated information be removed from the site?

How will you control consistency at your site?

Will you supply templates for document developers?

Will you supply an images directory with buttons, logos, and other graphics that will be used throughout the site?

Bringing Content Online

Next identify the documents that need to be created and placed online immediately and set team members to work producing them. Although much of the information that you will use initially will consist of pre-existing content, such as the owner's manual for the Knit-Purl AAA3 knitting machine, you should also map out the whole electronic commerce site as you envision it. This will most likely take the form of an extensive flow chart or electronic commerce site map. Like the small flowchart we used to illustrate the pilot project, the electronic commerce site map should trace the relationships between documents.

Remember: electronic commerce sites are wonderfully scaleable and so you can plan to begin with a small initial investment that can easily be built upon. Do not feel pressured to get everything up and running immediately. Begin with one product or product line and then expand to others. Begin with one document and then branch off to other related documents. Whatever your strategy, electronic commerce sites are flexible and easy to expand, so take your time, examine your steps carefully, and stick with your plan.

System Support and Adjustments

Even after the electronic commerce site has been fully implemented, you are not yet through with your planning. Next you must assess and measure the site's successes and failures. This includes continuously monitoring, maintaining, and modifying the system to ensure it performs as expected, and continues to meet the customers' and staff's ever-changing needs. Continuous monitoring will also help you to identify and prevent potential problems, pinpoint where maintenance costs can be minimized, and determine when modifications are needed. Keep careful records of both user satisfaction and system performance

to help you effectively support and modify your electronic commerce site.

User Satisfaction

To successfully monitor your electronic commerce site, you must establish a system of feedback with the site's users. Implement an electronic feedback function ("mailto") on the site to allow users to easily send email to you as they test the system. When problems occur they can contact you through this convenient automatic email function. User feedback is the most crucial information you have, because, no matter how technologically smooth it may be, the electronic commerce site is a failure if it is not actively and consistently used by your customers.

System Performance

Use the feedback from end users and logging and auditing software to work with the Web Master to eliminate your site's deficiencies. Measure the actual system results against the expected benefits you projected in your project plan and refine the system when necessary. Document the system changes you implement to simplify the process of maintenance and upkeep and be certain to revise user documentation and online help to alert users to any adjustments that affect their electronic commerce interface.

Finally, implement the backup and recovery strategies you outlined in your plan to protect the system against failure and continue to meet with the project team to assess performance, to review possible adjustments, and to plan for continuing training.

8.24 PLANNING YOUR ELECTRONIC COMMERCE SITE



Chapter Nine

Marketing Your Electronic Commerce Site

After you've developed your documents and planned your commerce site project, you can assume that users will flock to your site, right? Well, maybe. But there are steps you will need to take to make it happen. Just like all other business ventures, the success of your commerce site depends on how well you've prepared your staff, existing customers, and potential new customers to take advantage of the benefits of your products and services. To make this transition, you should market your site both internally and externally, to the staff members who will manage it and to clients and customers who will use it. In addition, you might be able to reduce your overhead even further by convincing your business and trading partners to exchange information and orders with you electronically. In this chapter, we will discuss the following aspects of marketing your electronic commerce site:

- Selling the site to the staff
- Selling the site to existing customers and clients
- Attracting new customers and clients to the site
- Selling the site to business partners

Selling the Site to the Staff

A Double-Duty Marketing Plan

When implementing an electronic commerce site, you will need to revise your organization's marketing plan to incorporate this new advertising, customer service, and ordering channel. This step is necessary for planning how to introduce your site to existing customers and how to attract new customers to your site. But the marketing plan can also serve another purpose: when you distribute the new, revised marketing plan to employees, it can serve to pique their interest and challenge them to learn the technology involved in electronic commerce. If you haven't worked on a marketing plan in some time, or need general advice about how to approach and develop one, one good place to start is the US Small Business Administration online site, where you can find all the SBA publications, including a template and instructions for developing a marketing plan from the ground up (<http://www.sbaonline.sba.gov>). For the purposes of this chapter, we'll assume that you have a marketing plan in place that can be revised to include particular concerns related to electronic commerce sites. You can involve your key marketing, customer service, and MIS personnel in researching and developing the additional needed portions of the marketing as a way to keep them involved and invested in the project's success.

Getting the Right People on the Electronic Commerce Site Team

First, you should develop and write a description of the site. This will be necessary for both your marketing plan and your employee orientation programs. Be sure to include a list of the benefits of the site and how it will increase profits to your business. You should emphasize the special features that make an electronic commerce site right for your company or department.

Perhaps your company will be able to sell 100,000 more “Purple Passion” velvet skirts every month with this commerce site, or maybe you will be able to reduce printing costs by \$10,000 annually by providing an online version of your catalog. These features can help to convince your staff that an electronic commerce site is the “only way to go.”

Next, you will need to identify who in your organization will be involved in the development, implementation, and maintenance of your commerce site. You can probably expect that many of your employees have had some experience on the Internet. You can also expect that many of them will volunteer to work with you on this project in order to broaden that experience and to gain new insights into this technology. When making the choices about who will be included in this project, don’t be reluctant to ask candidates what types of Internet experience they have and where they got this experience. Some employees will be project team members by virtue of the positions they already hold in your organization. For instance, it would be foolish to implement an electronic commerce site without the input of your marketing manager or the person responsible for the ordering process.

Motivating Employees

Motivation is another factor to consider when putting the team together. Motivation is based on what an employee gets from performing the job. You should remember that while salary is important to performance, it’s not everything. The best employees are those who enjoy what they do. While you might offer some kind of a bonus remuneration for being part of the implementation team, you should remember that your task in screening the candidates is to find people who will want and like to do the job for which they are being chosen. Some employees may come to the project with the skills they need to participate, like HTML coding or graphic design. You may need to consider special training for others; for instance, your customer service

representative might need to learn basic email and Web browser skills to retrieve customer inquiries or walk a customer through the online ordering process.

The role of the leader and the manager in this implementation process should not be overlooked. In their recent book, *The Leadership Challenge*, authors James Kouzes and Barry Posner maintain that “leaders treat people in a way that leads to extraordinary achievements.” They point to surveys revealing that when workers are asked to describe the difference between leaders and managers, most respond that “leaders bring out the best in us. They get us to achieve even more than we originally believed possible ourselves.” Examining your own attitudes toward electronic commerce and your reasons for wanting to implement a site might provide helpful perspective. Do you really think the site will be best for the company, or are you just jumping on the “We Need Technology Now” bandwagon? Are you taking the job security of your workers into account, or are you just looking at bottom line profitability margins? Have you made decisions and created positions that will allow your staff members time to learn the new technology and transfer their job positions and seniority, or are you just trying to get this site implemented as quickly as possible so that you can complete your department’s task list in this year’s tactical plan?

Your employees, of course, may feel threatened by the new technology. The CSC Index indicates that the employees of companies that are involved in BPR usually have two main fears: that the technology will endanger their jobs and that the years of experience that they have accumulated will count for nothing in the company hierarchy (<http://www.netlib.com/bpr1.html>). Chu and his associates advise that, in order to overcome employee apprehensions, “managers must constantly communicate their plans and expectations.” One way you can ensure that your

employees are not threatened by the electronic commerce implementation project is by providing them with an orientation program. Well-developed orientation programs convince employees they are important to the project. Those positive feelings translate into team productivity and profitability.

Frank S. Taylor IV of TriNet Services, Inc., claims in his paper "Business and the Internet" (<http://trinet.com/tonc/inetbusiness.html>) that:



Using the Internet is good for the employees too. Some candidates for hire will ask if a company has Internet access before they will consider the job. The Internet has become an invaluable tool in the workplace. A number of experts from all types of fields are connected to the Internet, and many are outspoken and willing to help others with problems in their field. Getting answers to questions quickly can save lots of time and money. Furthermore, communication with peers can greatly enhance the level of expertise one gains while on the job. The Internet makes this communication easier every day.

The information that you finally present to your staff should answer these questions:

- How many other firms are implementing electronic commerce sites?
- How will the skills acquired by your staff in developing and implementing an electronic commerce site translate into future job productivity and profitability?
- How will the electronic commerce site make your staff and your company more efficient?
- How will an electronic commerce site make your staff's jobs easier?

Training Employees

Once you've formed the team and oriented the team members to the project guidelines and timelines, you can then develop an effective training program. Thomas Gilbert, in *Human Competence: Engineering Worthy Performance*, recommends the following five steps for a successful training program.

1. Motivate and familiarize. Acquiring a new skill requires time, effort, and energy, and at first, the new behavior seems uncomfortable and unnatural. The first step is to make the trainee feel that the new skill is important. Begin training by pointing out the necessity of the new skill.
2. Make sure employees have the basic skills required to learn the new skills. You already should have found out what basic computer or Internet knowledge and skills they are bringing to the team. Maybe they need a refresher course on *Windows* basics or Internet navigation skills.
3. Teach the specific skills of the standard task. The staff who will be developing the Web commerce site should know HTML and any other programming tools that will produce the pages of the site. For instance, they might need to learn Adobe *Photoshop* to provide the graphics for the Web pages, or become familiar with Java or Perl to create search programs or special routines within the pages. There is a wide variety of technical books available on all subjects related to electronic commerce, and you can obtain computer-assisted or instructor-led training on many of these topics.

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4. Teach master skills and challenge your employees to new goals. Once your employees learn to accomplish routine tasks, they will want to progress to more complex tasks or they might become bored. Encourage your site development and maintenance personnel to suggest ways to enhance the commerce site that will both increase customer service and stretch their current skill levels.
 5. Arrange for your employees to apply the new skills on the job immediately after the completion of training. The most effective way is to send them back to the workplace to apply the skill in a real life situation. As soon as the programmers learn Macromedia's *Shockwave*, for instance, have them incorporate some sort of animated video option into the electronic commerce site.

Selling the Site to Existing Customers and Clients

Once again, you will need to re-visit your marketing plan to understand how best to educate your current customers about your new electronic commerce site. In your plan, you have probably outlined the features and benefits on which your current marketing strategies hinge. Therefore, your first task will be to assess whether or not the electronic commerce site modifies these features or adds others. When reviewing the plan, ask yourself the following questions:

- Does our electronic commerce site add unique features or benefits to our products or services?
- Are our competitors using electronic commerce?
- Are we able to reduce our fees or prices via the use of electronic commerce?

- How will this site affect our level of customer service?
- Is our target market enlarged or changed by the electronic commerce site?

The answer to the last question above is probably a resounding “yes.” Simply by virtue of registering a domain name on the Internet and launching a site, you have enlarged your potential market to an international audience of millions of Internet users. Even if the focus of your overall marketing strategy remains local or regional, you should consider this very large potential market when choosing advertising vehicles or developing service procedures. For instance, does your shipping department know how to ship an order from Mississippi to Australia, and is it easy for visitors to your online site to determine the extra charges for this shipping?

In addition, you should consider your existing customers when planning the pages and screens of your electronic commerce site. Customers who have been in a business relationship with your organization for years will recognize and appreciate your efforts to enhance service to them. The Business and Computer Bookstore is located in Willow Grove, Pennsylvania, near Philadelphia. They also have an electronic commerce site located at <http://www.bcb.com>. For local and existing customers who visit the store, they have included directions and a street map for finding the store on the Web site, and instructions on how to place a special order. National, international, and online customers will find online ordering and account set-up procedures. Both types of customers can take advantage of the downloadable catalogs, available in both ASCII and ZIP-compressed formats.

Figure 9.1
*The Business and
 Computer Book
 Store's home
 page.*



In contrast, the Sportsworld Mall, which exists only as an online entity, has no need to service a group of existing customers who have previously interacted with the company via traditional channels. Therefore, they open their commerce site simply with instructions on how to find various products:

Figure 9.2
*The Sportsworld
 Inc. electronic
 mall.*



You should be sure to include your electronic commerce site address in all of your traditional marketing materials. The organization letterhead should be revamped to include the email address of the firm, perhaps even individual staff members, and also the WWW address of the electronic commerce site. The business cards of the employees should undergo a similar facelift to include email and WWW addresses. Including your company's World Wide Web electronic commerce address and your email address in traditional marketing materials marks the company as progressive, as a company that is moving with the times. Making your address widely known in the "real" or familiar world of letters, radio, and TV is a good way to open your online site to many who may not have the time or desire to spend hours surfing around online for good sites.

Print ad campaigns, press releases, and commercials for television and radio should also include information about the new commerce site. Any ad in a magazine or a newspaper should have the WWW address displayed in a prominent, or at least readable, position. TV ads should have the address displayed at the bottom of the screen in a readable font. Finally, any advertisement on the radio will need to include some announcement of this address—preferably more than once. Your domain address should be simple enough that others can remember it after having heard it on the radio. For example, potential customers would probably be able to retain an announcement such as "please visit our Web site at <http://www.netwear.com>." However, asking them to "visit our electronic commerce site at <http://www.acbiu97/newdesign/velvet/mia.html>" will probably not encourage or invite many visitors.

Attracting New Customers and Clients to the Site

Once you have launched your new electronic commerce site, tested it thoroughly, oriented your employees to it, modified your business processes to accommodate this new ordering channel, and introduced the site to your existing clients or customers, the real fun begins! Now is the time to market your site to potential new customers and to pursue the growth and increased revenue that led you to develop the site to begin with. In this section, we'll review some concepts of market research and the Internet user profile, look at sources of online marketing advice, outline how to make sure that your site gets exposure in Internet areas such as Usenet, and describe how to publicize your site with search engines and registration services.

Market Research

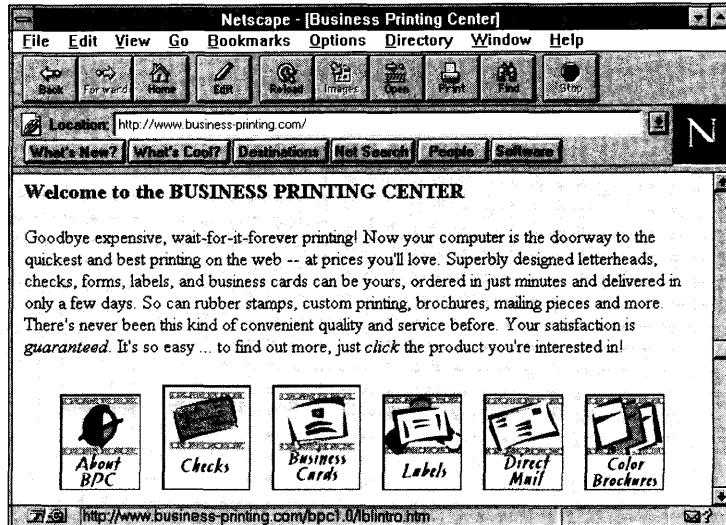
Researching the market is perhaps the easiest way to assess it. Market research does not have to be costly, nor does it have to be a complex process. It can be as simple and as easy as surveying a cross-section of your clients or customers (focus group) to get their opinions about the product or service you will be offering through your commerce site. Your focus should be on gathering enough information to determine who your potential customers are—their needs, wants and expectations; if there is a demand for your product or service; who your competitors are, and how well they are doing. You can form this focus group from among your own staff. Have the employees from the company visit the pilot project test site and review the services and products offered there. Have them test the links and read the information. Give them a list of competitors' sites to evaluate. Encourage them to email their comments back your electronic commerce site administrator, and be sure that the site administrator answers the email that the focus group generates. Follow up on the suggestions and incorporate any likely strategies into the site.

Your market research should answer questions such as

- Who are your customers and potential customers?
- What kind of people are they?
- Will they trust the technology? How can you help them trust the technology?
- Can and will they buy the product or service you're offering?
- Are you offering the kinds of goods or services they want?
- Are your prices consistent with what the buyers view as the products' values?
- What do customers think of your site?
- Who are your competitors?
- How does your site compare with the competition?
- Do you offer the services necessary to support your clients once they buy your product? Are the service prices in line with the service prices of the competition?
- What else should the electronic commerce site offer in the future—in terms of services, products, links, and information?

Remember that, while market research may appear to be a tedious, time-consuming process, it is necessary if you want to be successful. You can think of market research as simply a method of finding out what catches customers' attention by observing their actions and drawing conclusions from what you see. For instance, the Business Printing Center's electronic commerce site opens with the phrase, "Goodbye expensive, wait-for-it-forever printing!" We can tell from this pitch that this site is targeting a particular type of online customer—the one who feels that the other conventional and online sources of business forms and letterhead are too slow or too expensive. By finding out exactly what your potential customers want and need, you can create a similarly targeted marketing strategy.

Figure 9.3
The Business
Printing Center
commerce site.

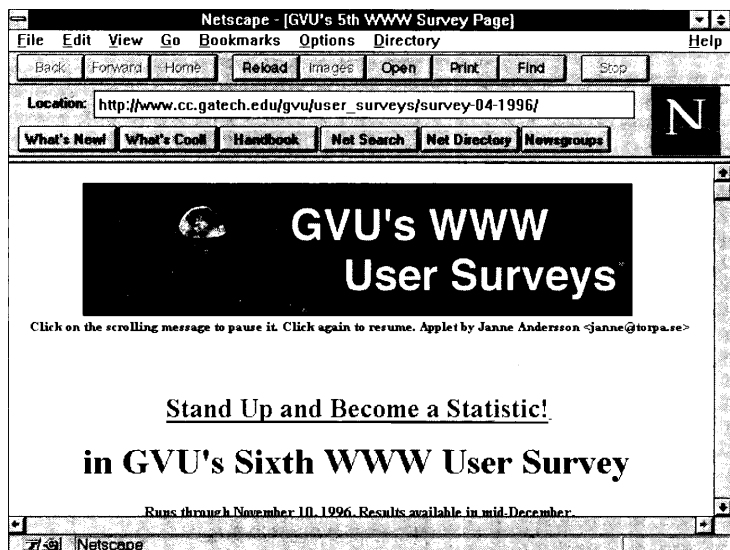


Who is Online?

You should gear your electronic commerce site to the clientele that is out there surfing the Net. This past year has seen a huge increase in Internet users, and these users are your potential customers. One survey estimates that 13.5 million people are online; another estimates that 75 million people have access to the Internet. Who is doing the surfing? Do you imagine that technology geeks and nerdy academic types are the only people online? Think again. A survey developed by the Irish research firm Nua (<http://www.nua.ie:80/Choice/Surveys/SurveyPix/Profession.html>) indicates that, contrary to popular beliefs about them, Internet users are not predominantly students or in technology-related fields, but are in professional or managerial occupations (42%). According to the new user survey from Georgia Tech's Graphic, Visualization, and Usability Center, the average age of a typical Internet user is 33, down from last year's 35 years old, due to an increase in European users who are typically younger than their US counterparts. The location of Web users is overwhelmingly in the US (73.4%), but European

(10.8%), and Canadian and Mexican (8.4%) users have significantly increased in the last year and are expected to continue to do so (http://www.cc.gatech.edu:80/gvu/user_surveys/survey-04-1996).

Figure 9.4
The Gvu WWW
User Surveys
site.



The latest Gvu Survey indicates that the most significant statistical change in Internet usage to occur this year is in the sex of the typical Web user. The Hermes project (<http://www-personal.umich.edu:80/~sgupta/hermes/survey4/>), which analyzed the Gvu data, states, "clearly, a major shift in Web usage is under way." While last year only 15.5% of the users were female, this year the figure has grown to 31.5%. Other studies report smaller percentages of female users, with *Survey.net* (<http://www.survey.net:80/inet1r.html>) reporting the total percentage of female Internet users at 26.1% and I/PRO (<http://www.ipro.com/>) reporting 27% female users on the Web; however, both are substantial increases from the 15.5% figure of last year.

According to Nua, the majority of Internet users average five to twenty online hours per week (<http://www.nua.ie:80/Choice/Surveys/SurveyPix/Usage.html>), and they are searching the Net for information—information on products/services, on companies/organizations, or for other more general information. Hence, providing information, such as a FAQ or general news announcements related to your business field, is a sure way to get your company's electronic commerce site recognized and visited.

General Internet Presence Issues

As you begin making plans to market your electronic commerce site on the World Wide Web, you will want to keep in mind that, just as conducting commerce on the Internet is different from conducting traditional forms of commerce, so is marketing on the Web different from traditional forms of marketing. It is important to know the difference and to use appropriate marketing techniques while on the Internet.

Mass media advertising works by bombarding a large, passive audience with brief messages and images. Examples of this kind of broadcast marketing are mass mailings or television commercials which are "broadcast" without regard for the real needs or values of the audience members. If the broadcast marketer gets lucky, someone in that vast unidentified audience is actually interested in the product or, more likely, is attracted to the image used to represent the product.

Internet marketing, on the other hand, offers as much information as possible to an audience that reacts to advertising through instant electronic messaging. To attract clients, you must create a site with both information and interactivity. For example, a site like Netwear, Inc. would attract clients not only by providing a photographic and text description of the "Purple Passion" skirt. Netwear's site would have to include some kind of information

about the company and about the products it sells. The site administrators might also want to provide information about the designers of the clothing, updates about future projects, and instructions for the care of velvet. A history of velvet and the meanings that each color of velvet had in the codes of European royalty in the Middle Ages could also be provided at Netwear's site. Netwear would also want to be interactive, and the best form of interactivity is some type of "mailto" function. Netwear would do well to provide an email box for specific questions about the material used, about whether the sizes run large or small, about care instructions, and about further plans for designing and manufacturing purple velvet clothing.

Unlike traditional marketing media where brevity is emphasized, in the online world, length is a positive quality. The Internet community is a reading culture, and the more information you can provide, the more appealing and trustworthy your site will appear to your clients and peers. In fact, one way to increase the likelihood of repeat visits is to provide so much information that one visit is not enough to read all that you have to offer. Hypertext links change the way virtual readers approach lengthy texts—don't limit users through a strictly linear WWW site (one that must be read from beginning to end). Provide easy access to all the materials at your site through links that allow users to go directly to the information most useful to their needs. For instance, your electronic commerce site devoted to marketing your line of velvet clothes could also contain a FAQ dedicated to the most-often-submitted support questions about the clothes you sell, the prices you charge, the manufacturers that supply your raw materials, the labor force you employ, and the future product lines you envision. Your site should also offer free new, exciting, or interesting information, such as the result that the new export laws in England will have on the price of velvet or how the strike

by the loom operators in the Bangladesh factories will affect the upcoming designs in the fashion worlds of Paris and Milan.

Many Internet users believe online business is risky. You can decrease that perception of risk by making use of the sense of community that results from instant electronic feedback. Join the “virtual community” of Internet users by becoming a contributing member and establishing a presence that is respectful of the community rules. Become the “local” advisor who offers free, accurate information and services to the community at large. Joining the community is how you prove your trustworthiness in the online world and separate yourself from the “broadcast” marketers. If, for instance, your company manufactures velvet clothing (like Netwear, Inc.) you would probably want to join newsgroups related to the fashion industry and to the latest designs and designers emerging from New York, Paris, Milan, and Tokyo. You would want to follow discussions of fashion and contribute frequently to those discussions. During these discussions you could not, of course, advertise your company. However, the signature line you use when you sign your discussion messages should definitely include your company’s name and WWW address. Those members of the discussion group who are impressed with your expertise will visit your site for more information.

The quality of information at your site is the single greatest determinant of your commitment to the community and your site’s long-term success as a marketing vehicle. Don’t try to transfer broadcast marketing tools, like brochures or business cards, to the Internet—doing so will mark you as an outsider rather than a member of the community. Successful online marketing demands that you transform your marketing tools into rich sources of online information, an investment in time and resources that will establish you as a member committed to the

growth and welfare of the community at large. According to Jill Ellsworth and Matthew Ellsworth, authors of *Marketing on the Internet*, a successful marketing Web site has these four qualities: (1) it incites user curiosity, (2) it changes frequently, (3) it provides an indispensable tool, and (4) it offers a unique event or resource.

You should always keep in mind the distinction between the public and the commercial areas of the Internet. If you keep this distinction in mind, you can avoid participating in inappropriate commercial activity in public Internet areas. Public areas are the newsgroups, mailing lists, and document repositories of sites open to the public. In general, commercial solicitation and marketing activities are prohibited in public areas. Commercial areas are sites established by for-profit entities specifically for commercial activity. You can conduct marketing in these areas only.

For instance, posting a message listing your business products, contact information, and prices or hourly fees is not permitted on, say, a Usenet newsgroup. Doing so is marketing in a public area. Posting any such message to many newsgroups is “spamming” and is in very poor taste. In fact, the process is prohibited by many Internet service providers (who will cancel your account if you do so). However, posting such an advertisement in the Classified Advertisements section of a commercial online service such as CompuServe is entirely appropriate. You may also send email messages to someone in a newsgroup or mailing list who specifically requests information.

Savvy users of the Internet realize the great benefit to be gained by establishing a presence as an expert in particular newsgroups or mailing lists. While this is not strictly considered marketing activity, it is certainly one way to promote your expertise and reputation. For instance, if you have an electronic commerce site

devoted to the sale of clothing made out of velvet, you can gain the respect and trust of the “Lovers of Velvet” newsgroup users by consistently answering questions posed: How do I care for my velvet? How can I get chocolate pudding out of my velvet without hurting the material? Who are the most widely known and respected manufacturers of velvet in the United States? What are the tariffs involved in importing velvet from England? From India? How many colors does velvet come in? If you provide reliable and clear information and explanations, you’ll probably find that other newsgroup subscribers occasionally contact you via private email to inquire about your services or to request the address of your own commerce site. At this point, you are free to negotiate with this potential client and do any self-promotion you wish.

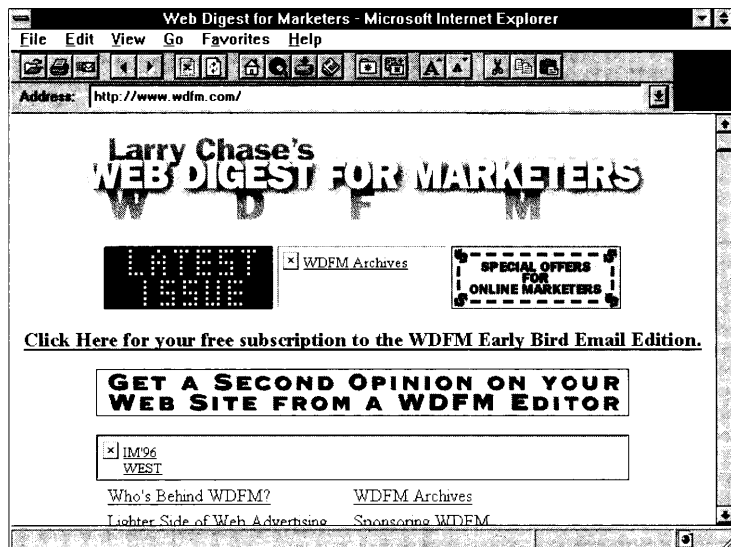
Finally, remember that one of the qualities of a community experience is interactivity. Traditional marketing is characterized by its unidirectional approach to information—information comes out, but it doesn’t go back. When marketing online, however, you must include methods for your community members to “talk” to you. Remember, one of the ways community members learn to trust one another is by asking questions, receiving answers, and participating in community improvement. Design your site to allow that sense of interactivity and shared experience. Online clients will expect to be able to tell you what they like about your site, what additional needs you could meet, and how you can improve your service to them. They will also voice their opinions on the various topics that you post at your site. Expect, for instance, that if you post an announcement about the strike in the Bangladesh factories that you will receive mail from the fashion debutante who is concerned that she will not be able to buy her “Wonder Winter White” velvet suit in time for the gala Christmas events **and** from the chairperson of a socialist party dedicated to the uplift of the worker, condemning you for buying velvet from a

manufacturing center with conditions so deplorable that the loom workers must strike in order to get the right to have a ten-minute lunch break. The wonder of the Internet is that everyone with a computer and a modem can access it and that everyone can voice opinions.

Marketing Advice Online

Many online sites exist to help Web-based marketers. Larry Chase's *Web Digest for Marketers* is a free, bi-weekly publication available both in email format and at its own Web site (<http://www.wdfm.com>).

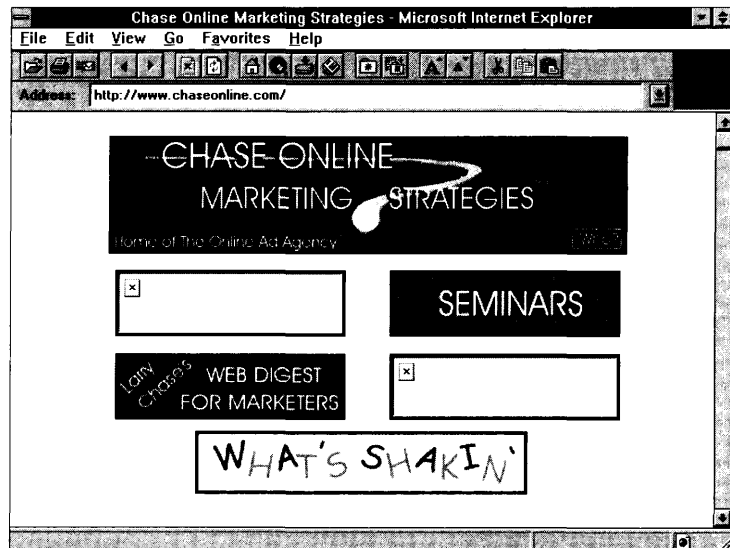
Figure 9.5
Larry Chase's
Web Digest for
Marketers.



Each issue reviews a group of 30 Web sites, both new and established, in a broad range of categories. Reviewers comment on each site's quality from a marketing perspective, noting those techniques that are effective and those that are not. You can use these reviews to locate high-quality sites in particular areas of interest, but, perhaps more importantly, you can learn from others' experiences when building your own electronic

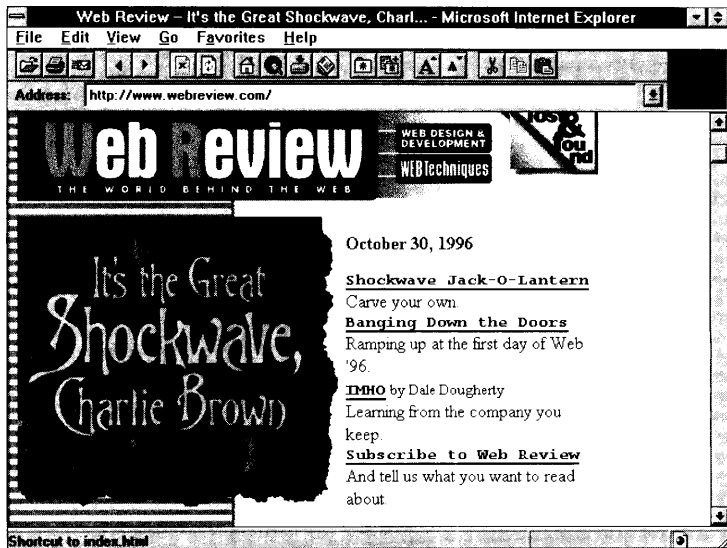
commerce site. Use this publication to learn what Web professionals have to say about topics such as image maps, readable text design, “loss leader” free offers, and customer databases. Be sure to visit *Chase Online Marketing Strategies*, the site of the parent company and publisher of *Web Digest for Marketers*, for even more information on Web-based marketing (<http://www.chaseonline.com>).

Figure 9.6
Chase Online Marketing Strategies site.



Another electronic publication designed especially for Web professionals, including marketers, is *Web Review* (<http://www.webreview.com>). Co-developed by Songline Studios, Inc., and Miller Freeman, Inc., the project describes itself as a “synergy of content. It is an alliance of resources online, in print, and in person, from *Web Review* e-zine, *Web Techniques* magazine, and Web Design & Development Conferences (Web ‘96).” *Web Review*’s publisher, Dale Dougherty, was the co-founder of leading Internet publisher O’Reilly & Associates and a developer of Global Network Navigator (GNN).

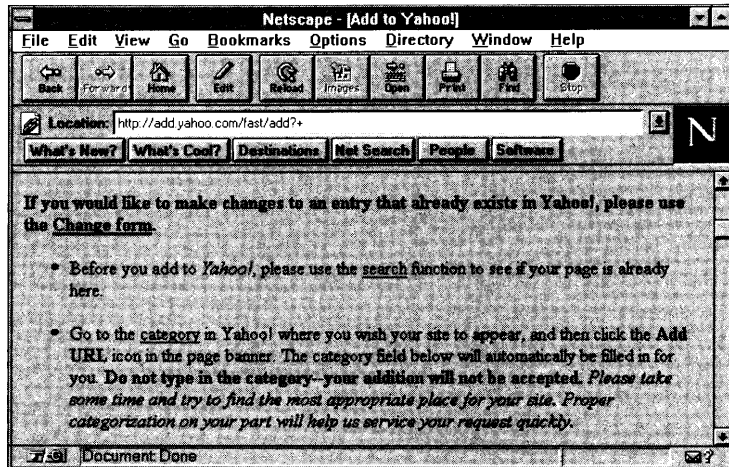
Figure 9.7
The Web Review
e-zine.



Registering and Promoting Your Web Site

In addition to providing interactivity and valuable information content on your site, you will need to make sure that your electronic commerce site is listed, registered, and well-described in the various search engines and directories that potential clients and customers will use to find you on the World Wide Web. Each search service has its own procedure for registering a site, but most have links on their initial screens with instructions for adding a site. For instance, from the *Yahoo* opening Web page (<http://www.yahoo.com>), you can click on the link "How to Include Your Site" to find the step-by-step instructions for registering your site with *Yahoo*, as illustrated below:

Figure 9.8
*Registering a site
 with Yahoo.*



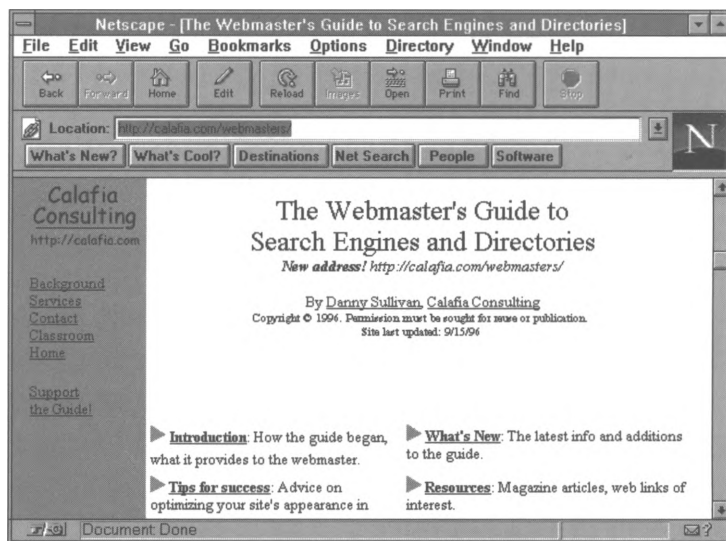
Some, but certainly not all, of the major, comprehensive, search sites are listed below. You can use this list to start your registration process, adding others as you find them.

- Alta Vista (<http://altavista.digital.com>)
- Excite NetSearch (<http://www.excite.com>)
- HotBot (<http://www.hotbot.com>)
- InfoSeek Guide (<http://guide.infoseek.com>)
- Lycos (<http://www.lycos.com>)
- Magellan (<http://www.mckinley.com>)
- MetaCrawler (<http://www.metacrawler.com>)
- OpenText (<http://www.opentext.com>)
- WebCrawler (<http://www.webcrawler.com>)
- Yahoo (<http://www.yahoo.com>)

Because different directories and search databases include and index information in different formats, you would be wise to spend a little time researching how the various search engines work and how you can best position your organization within a particular search service. For an excellent overview of these topics, visit *The Webmaster's Guide to Search Engines and Directories*, a free, online publication available at <http://calafia.com/webmasters/>. This document includes

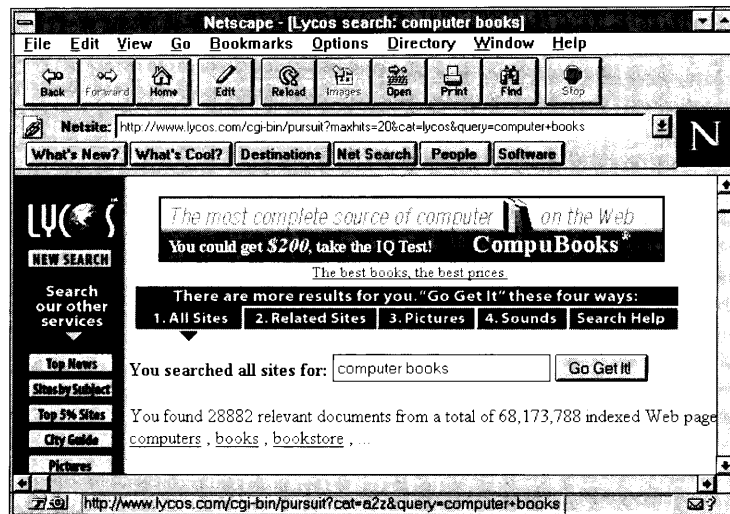
information in categories such as advice on optimizing your site's appearance in search engine listings; a guide to major search engine features, from the Webmaster's perspective; and how search engines work.

Figure 9.9
The Webmaster's
Guide to Search
Engines and
Directories.



When visiting the various search sites, pay attention to the paid advertisements that appear on both the query form page and the results pages. Your organization may wish to consider purchasing advertising space on one of these search sites—each ad includes both the graphic and a live link to the site being advertised. Some search engines can even tailor the results screen to include an advertisement for a company that sells products or services related to the topic on which the user is searching. For instance, a *Lycos* search on the topic “computer books” returned the following results screen, with an ad and hot link to the *CompuBooks* electronic commerce site at the top:

Figure 9.10
Results screen
and advertising
banner on Lycos.



Another option to consider when marketing your Web site is to obtain professional help. There are hundreds, perhaps thousands, of “Web presence services,” many of whom offer various registration and promotion services. The services and fees of these firms run the gamut—from the entry-level package offered by *!Register-It!* (<http://www.register-it.com/>), which auto-lists your Web site with 100 search engines and directories for \$39.00, to the very individualized service provided by The Ward Group, Inc., which can include writing press releases, obtaining editorial reviews of your site, and advising you on site content, in addition to listing your site with various directories and search engines (<http://www.netpost.com/>). To find a listing of such firms, visit your favorite search engine and search on the terms “Web promotion” or “Web services.” A nicely-organized list is provided by *Yahoo* (<http://www.yahoo.com>); you can find it by following the links through *Yahoo*’s nested subject categories as follows: Business and Economy—Companies—Internet Services—Web Presence Providers—Announcement Services.

Selling the Site to Business Partners

Most electronic commerce sites are geared toward customers—the end-users of a product or service. But another potential benefit of your electronic commerce site is that you can automate interactions with various business and trading partners, including suppliers and wholesalers. A velvet clothing retailer, to use our opening example, would want to initiate an electronic commerce site in order to sell the company's velvet clothing online, of course. But the opening of the retailer's site also provides the opportunity for essential information exchange to begin taking place between the retail company and its clothing manufacturers. Our example company, Netwear, Inc., can establish an electronic channel to reorder from the manufacturing company when the stock of "Purple Passion" skirts gets dangerously low. Furthermore, the manufacturing company doesn't have to maintain a huge warehouse to store outrageous amounts of velvet for use at some "later date." Its electronic transaction system allows its computers to contact its velvet supplier to send more velvet when supplies run low. This system has obvious benefits—no long-term warehousing, fewer staff members devoted to monitoring inventory and filling out order forms, less paper wasted on forms and invoices.

The method that most organizations use for the business-to-business exchange of computer transactions is called Electronic Data Interchange, or EDI (see the appendix, "Electronic Data Interchange"). In EDI, processes that traditionally would be carried out in several steps, involving paper tracking and data entry at each end, can be completed directly between computers. A manufacturer can automatically submit purchase orders for needed parts when the parts supply falls to a pre-determined level. The supplier can plan in advance to fill the manufacturer's

orders, according to the automatically submitted orders, and can even order its own materials via the same procedure. In this way, the chain a product follows, from raw materials to parts to assembly, can be managed with the newest just-in-time business techniques. EDI differs from the larger category of electronic commerce, in that EDI data is transmitted in standardized formats established by national and international regulatory groups. However, most electronic commerce software developed by large, established software vendors can also accommodate EDI-formatted transactions between businesses.

Frank S. Taylor IV credits the Internet and electronic commerce with providing incredible benefits to companies online. In his white paper "Business and the Internet" (<http://trinet.com/tonc/inetbusiness.html>), Taylor states,

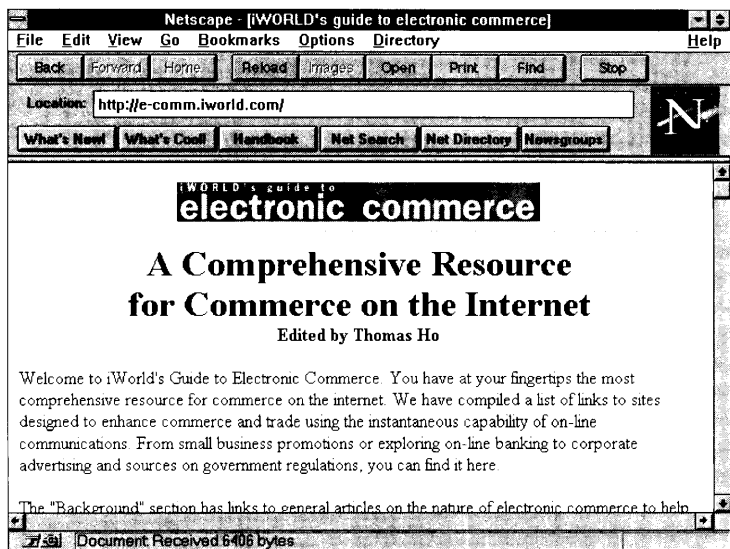


Companies using the Internet are finding they can gain instant international market exposure, provide 24-hour support to their world-wide customers at lower costs than traditional methods, offer up-to-the-minute advertising, provide the latest product information or catalogues, and can even provide customers with the ability to take orders without a phone call. Furthermore, companies can use the Internet to collaborate with other companies (large and small) to work together more effectively. Transmitting information over the Internet is much faster in most cases than sending by fax or by traditional delivery services. Documents and data can be easily transferred saving countless hours and delivery costs.

A complete history of electronic commerce, an overview of the types of electronic commerce, solutions to common electronic commerce problems, listings of information resources, and a listing of favorite electronic commerce sites and the criteria used to judge those sites can be found at *iWorld's Guide to Electronic*

Commerce at [http://e-comm. iworld.com/](http://e-comm.iworld.com/), edited by Thomas Ho. This site is an invaluable source of information for those just beginning to plan their electronic commerce sites or for those businesspeople just getting started on the Internet.

Figure 9.11
iWorld's Guide to Electronic Commerce.



Use the worksheets on the following pages to consider current marketing activities and new marketing activities that will be included in your Web Marketing Plan.



Chapter Ten

Security and Your Electronic Commerce Site

If you have traveled the Internet, you have seen the great resources and opportunities the Internet offers to businesses. Global connectivity provides telecommunications savings and allows even small organizations to have global reach. Online customer support and feedback allow organizations to respond immediately to customer problems and orders. The opportunities are limitless, but along with these opportunities come new hazards. This chapter surveys general information about the security of Internet connections that will help you prepare to answer security questions when building your electronic commerce site. Topics covered in this chapter include

- Virus protection
- Password access
- Backup systems
- Encryption
- Firewalls
- Security policies

How Much Security Do You Need?

Although there is no such thing as a truly secure network, some networks are more secure than others. Every organization must

decide on the level of risk that is acceptable when connecting a server to a network like the Internet and make plans for securing the server accordingly. This chapter can help you decide what level of risk is acceptable and what precautions you can take to reduce the possibility of security transgressions on your electronic commerce site. The relationship between security and convenience must be carefully examined when making these decisions. For example, some systems may have a high level of security that uses firewalls and various levels of password restrictions, but a system that uses many levels of security is also likely to be difficult for staff and customers to access. How many passwords should you expect your customers to remember? How often are they willing to change those passwords? How do security measures impact on staff productivity? When you are deciding what level of security to enforce on your commerce site, remember, these access questions are just as important as the data you are protecting.

When a computer is connected to a network, suddenly many users are allowed access to data and permitted to perform operations without ever touching the computers that process the operations or house the data—a great convenience, of course, but also a potential security risk. The Trusted Computing Standards Evaluation Criteria, established by the US Department of Defense, defines various levels of security that can be assigned to computer systems. The levels are represented by letters ranging from A to D. Within each level, numbers are used to subdivide the level, as in D1, which would indicate a system with no security at all, where anyone sitting at a keyboard has complete access to anything on the system. At the other end of the range is an unplugged computer locked in a vault which is obviously an A1 (secure, but not terribly useful). C-level systems are more typical. For instance a C1 system would include login routines, passwords, and some method of assigning file ownership.

Although at first it may seem that we would all want to get as close to A-level security as possible, a delicate balance is at stake. A secure system is a waste if it is so difficult to access that no one uses it. So, in selecting the level of security that you use on your electronic commerce site, you must take into consideration the fact that legitimate users must go through the same time-consuming steps that you are setting up to protect your site from hackers and exclude nonlegitimate users.

To help you decide what level of compromise will be acceptable in your system, first take stock of what truly needs to be protected. Software and even hardware can be replaced, but what you cannot afford to lose (through accident or intent) is data. You can replace software and hardware fairly simply, but you cannot buy a copy of data that your organization has been building for months or even years, nor can you afford for personal information entrusted to you by clients to get into the hands of hackers or scam artists. Devote your time and resources to protecting that data, your most valuable asset.

General Internal Security

Although media coverage of system hackers might lead us to believe otherwise, the most common computer security breaches are, in fact, internal. No matter how stringently your system may be protected from the outside world, a virus introduced accidentally by an employee can wreak havoc on an organization's data. No matter how many firewalls may be in place between your server and the world at large, a disgruntled employee armed with a few passwords can delete, alter, steal, or otherwise sabotage significant company data. When developing your security procedures, consider your internal risks and plan for

- Virus protection.
- Password access.
- Backup systems.

Viruses

Down-time and other costs that result from the damage caused by computer viruses are significant financial concerns. Obviously careful preventative measures are necessary, but the panic and paranoia that often result at the mere mention of the term “computer virus” can be avoided by staying well informed about viruses and virus protection, and by educating your staff on the various ways that viruses spread. They may be surprised to learn that most viruses are spread through diskettes, not through the Internet or other outside intrusions.

If you are leasing Web space from an Internet Service Provider for your electronic commerce site, then your task is much simpler. Because the ISP must insure that the server stays up and running, the ISP will run continual virus-checking programs that will prevent you (and other subscribers) from uploading files that contain viruses to the server where your commerce site resides. On the other hand, if you are running an internal server, it is up to you to safeguard your files from virus infection. This is especially important if you provide files for clients, customers, and business partners to download. Infecting a client’s computer with a virus will not earn you points in the world of electronic commerce.

The first step towards protecting your commerce site from computer viruses (and computer-virus panic) is answering these two important questions: (1) What is a virus? (2) How does a virus work? A computer virus is simply a program designed to reproduce and spread within a computer system or network without revealing its presence. A computer virus attaches to files

or to boot sectors of hard or floppy disks. Once in a computer system, the virus replicates itself; in fact, some viruses do nothing else. Even so, there is no such thing as a truly harmless virus since, at the very least, viruses expand, taking up hard-drive space and slowing the performance of your system.

Viruses are typically classified by the way they “infect” a computer’s system. For example, a virus that infects executable programs residing on a computer (such as .exe files) are referred to as “program viruses.” Viruses that infect the boot sector or partition tables in a computer or disk are referred to as “boot viruses.” Viruses that are capable of infecting both are referred to as “multipartite viruses.” Because a virus is simply computer code, once it enters a computer system, it can spread by being transmitted along with any legitimate software that is running on the computer or floppy disk.

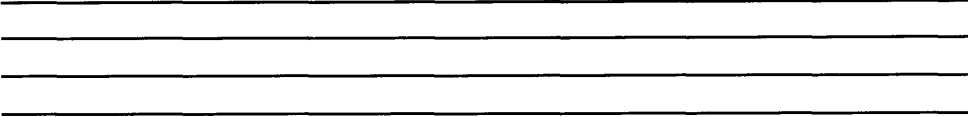
A typical virus program consists of four main parts: the replication instructions, the protection instructions, the trigger, and the payload. The replication instructions are simply the parts of the program that allow the virus to copy itself. The protection instructions are the parts of the program that protect the virus from being detected. (Protection may include encryption or “stealth” techniques that interfere with virus-detection software.) The trigger is the part of the program that controls when the virus is triggered into activity. A virus may remain inactive on a computer for a long time before the trigger activates it. For example, a virus may remain inactive until the computer has been turned on a specific number of times or until the computer’s clock indicates a certain day or time (such as the infamous Michelangelo virus that is triggered on March 6). The payload is that part of the program that is executed when the trigger is activated. Sometimes triggers are simply messages that indicate

that the PC has been infected, but others are more damaging, such as the deletion of files.

Once a system is infected by a virus, many types and levels of damage can result. Some levels may be considered negligible, as in the cases of viruses that do nothing more than replicate or viruses that alter or delete files that can be easily reloaded when the viruses are removed. Other viruses may destroy all the files on a computer's hard drive, and, although this sounds like an overwhelming loss, if backups have been made regularly, even this level of damage can be easily corrected by removing the virus and reloading programs and data from the backups. More difficult to recover from are viruses which slowly corrupt data over a long period of time without ever revealing their presence in the system. In cases such as this, backups are corrupted as well, and data must be rebuilt from scratch. Perhaps the most dangerous types of viruses are those designed to do nothing except discover and report crucial system information, such as the password of the Web Administrator. If one of these "discovery" viruses is successful, unlimited damage to the system and its data is possible.

Although these descriptions are chilling to those of us who depend heavily on our computers, there are simple ways to protect your commerce site from these viruses and ways to recognize when certain types of viruses are residing on your system. Some of the symptoms of a computer infected by a virus include

- Unexpected changes in the sizes of programs.
- Longer load times for programs.
- Slower system operation.
- Unusual error messages.
- Reduced memory or disk space.



- Unusual screen activity.
- Incorrect changes in file dates and time information.
- Unexpected writes to a drive.

Recognizing the symptoms of a computer-virus infection will permit you and your staff to clean your system and limit the damage. However, virus prevention is more effective than virus treatment. The best solution to the problem of computer viruses is to follow a logical virus-prevention procedure that includes at least the eight steps described below:

1. Back up all your work and system-configuration files regularly.
2. Install and use reputable anti-virus software.
3. Update your anti-virus software regularly to prevent new viruses and virus variants.
4. Always scan floppy disks and CD-ROMs for viruses.
5. Do not boot your PC from a floppy disk unless you are sure the disk is free of viruses.
6. Whenever possible, use the write-protect tab when using floppy disks to prevent viruses from copying themselves.
7. When downloading from the Internet, scan files for viruses before running them.
8. Use only licensed copies of software obtained from reputable sources.

Passwords

When loading files to a server, users must supply at least a user name or login ID and a password. When configuring your server software, you probably identified the levels of users who would be interacting with your server and what level of security clearance they would need. The login ID appears onscreen when it is typed and is assumed to be common knowledge. In fact, other users on the system will use this ID to identify users on

the system, as in email addresses. The password, on the other hand, does not appear when it is typed. It should not be common knowledge and should be regularly changed. When both of these pieces of information are provided to the system, they are compared to information stored in a special password file (*passwd*) on the server. The login routine looks through the password file to ensure that the user's information matches the expected information stored in the file. (Passwords are encrypted in the *passwd* file.) Unauthorized users would need to match a login name to a password in order to gain access to your server and the files stored there.

Passwords are the oldest line of computer defense. Although they have been used for almost 30 years, passwords are still misunderstood and misused. Employees who think nothing of using a key to get into their offices bridle when asked to enter passwords to use the company computer system and may not understand the dangers posed by a system left unprotected. When educating your staff on the necessity of these precautions, remind them that, although in the early days of mainframe computing physical access to the computer console could be controlled and a system would be limited to 30 to 100 users, today a computer that is fully connected to the Internet has millions of potential users, not all of them legitimate.

Some common password problems are easy to avoid. The most common password security problems are "Joes." Joes are account passwords that are variations of the name of the account's owner. One consulting company theorized that there is at least one "Joe" account on every system, and found at least one such account on every client's system that they tested. This problem most often results when users are assigned default passwords, such as their last names, when the accounts are created and then don't change them to more secure passwords.

To avoid this problem, accounts should never be given default passwords that are easily guessed, and users should be informed how to change their passwords and advised to do so the first time they use their account to login to the system.

Another password problem occurs when accounts have no password or some commonly known default password. Some application programs that need access to shared information will create an account for the program at installation and set the password to some common default. Even some operating systems set up guest or demo accounts with no password when they are installed. To prevent problems like these, always make sure that you understand the installation of system software and its effect on the password files. If the software requires shared accounts, be certain that you change the password to something other than the default so every purchaser of the software doesn't have access to the account on your machine.

Some users of your system may have accounts on many machines within the company or elsewhere. These users will often use the same password for each account they hold. Using the same password for different systems is secure only when

- The two systems are logically equivalent, like two servers in the same company.
- The two systems are run by the same information system center with the same security measures.

If the systems are run by different organizations, have different security levels, or have different operating systems, users should have a unique password for each system. Let's say that you have an account with an Internet Service Provider and also on a commercial database system. If someone cracks your password for your ISP and they discover that you have an account on the

database server, the cracked password will be the first thing they try when they attempt to gain access to your other account.

To help your staff educate themselves on password security, you might want to distribute the Password Security Checklist on the following page.

Password Security Checklist

1. Is your password shorter than eight characters?
Increasing the length of your password from six to eight characters makes a cracker check many more possibilities.
2. Is your password "letmein," "password," "hello," or some other clever response to the password prompt? These are commonly known and are the first checked by cracker programs.
3. Is your password your login name in any form? Is it your license plate number, telephone number, street name, or the make of car you drive? Information like this is easy to discover, and so it makes an insecure password.
4. Is your password all digits (like "12345678"), or a repeated character (like "aaaaaaaa")? Is it a repeated sequence of digits, or a keyboard pattern (like "12341234" or "asdfasdf")? Passwords like these significantly decrease the length of time needed to crack a password.
5. Is your password in ANY dictionary? Crackers first check words in online dictionaries, both in English and some foreign languages.
6. Is your password a word in a dictionary modified by prepending or appending a digit? Passwords like "house1" are not secure; cracker programs check appended and prepended digits as a matter of course.
7. Is your password a word constructed by rotating or reversing one of the above classes? For example, Frank may think that "knarf" (his name backwards) or "rankf" (his name with the first character moved to the end) is more secure than his name, but this is not true.
8. Is your password an example taken from a printed source? (Including this document!)

If you answered “no” to all of the questions above, your password is probably secure. If it is not, consider the following suggestions:

- If the system distinguishes between upper- and lower-case letters in a password, mix the case of letters in your password. “TomCaT” is more secure than “tomcat” or “TOMCAT.”
- Use non-alphabetic characters INSIDE the password. “Tom3CaT” is more secure than “TomCaT” or “TomCaT3.”
- Choose a line or two from a favorite song or poem and use the first letters of each word. For example, “To be or not to be; that is the question” becomes “2Bon2bit?”.
- Choose two short words and concatenate them together with a punctuation character between them. For example: “dog+rain,” “book!mug,” “kid?goat.”
- Choose an adjective, a noun, a verb, and an adverb. This will make a (possibly nonsense) sentence that you can remember. Now use the first two letters of each word for your password. For example: “Orange Cars Fly Silently” becomes “OrCaFlSi.”

You often find warnings about not writing down your passwords. Keeping them online in a file is certainly not advised, nor is writing them on Post-It notes and sticking the notes to your monitor or to the underside of your keyboard, but keeping a note in your purse or wallet containing your password is OK (unless strictly forbidden by your site security). After all, how often is your purse or wallet stolen? It is better to have a secure password that you must write down to remember for the first couple of weeks than it is to have a password that is so easy to remember that anyone could crack it.

Finally, be certain to check your *passwd* file regularly for inconsistencies or breaches, such as entries that do not have passwords. Without a password entered in the system, anyone could use the commonly known ID to enter the system without being prompted for a password.

Backups

Backup policies are a crucial part of the security of your electronic commerce site. In the event of a system compromise, a well-designed and implemented backup policy can make the difference between a major disaster and a minor glitch in operations. Backups protect against many security mishaps: users can destroy data by mistake; the system staff can make mistakes that wind up in lost programs or data; hardware and software can fail, destroying data. Even ISPs sometimes fall victim to hackers or virus variants not yet recognized by virus checking software. Backups will also protect from effects of some security breaks. The *passwd* file and other programs that control login and user identification are targets of system attackers. Multi-user systems also contain user authorization files that detail what actions each user is allowed on the system. An attacker would try to alter these files to permit unauthorized access to important systems. Audit and accounting files can be altered by attackers to cover their tracks. Schedules should be set up so that backups are completed often enough to protect against data loss.

Your electronic commerce site should also have a “pristine backup” of all of the executable files, documents, and directories: a backup made when all executable files and directories are known to be secure, such as before the complete site is implemented when there has been no chance of corruption. In the event of a break-in, the system executables and your

commerce documents and files can be restored from this backup to guarantee security of the system programs.

When security is very important, programs and files can be reinstalled periodically. Copies of the executable programs are kept offline and copied to disk to replace existing copies. Sensitive data should also be backed up regularly. Most large database systems provide transaction logging that will recreate damaged databases, but daily backups guarantee that only a single day's work is lost in the event of a system crash.

Web Security

Whether you use an ISP or an internal server, in order for your commerce site to work, you must provide some means for the user to interact with your site and send information with reasonable assurance that the information will remain secure.

There are two main types of risks you must prepare for you and your customers begin performing important transactions on the Web:

1. Transmissions must be secure from eavesdropping and tampering.
2. Transmissions must be authentic. If you are using the Web for business transactions, you need to be sure that an eavesdropper cannot imitate a client or staff member to make a fraudulent purchase or enter the system. You must also be sure a "man in the middle" cannot imitate your server.

In the sections that follow, we will describe some of the methods used to safeguard against these types of security threats.

Encryption

To protect the contents of Internet messages, you can use a message security technique called encryption. The encryption schemes used make recording and attempting to decode the messages too expensive (in terms of computing time) to be worthwhile. To assure that your messages can be validated to prove that they came from the sender and have not been altered, you use a technique called authentication. Fortunately, there is software that can handle these functions for you. And some of the least expensive software has proven to be the most effective.

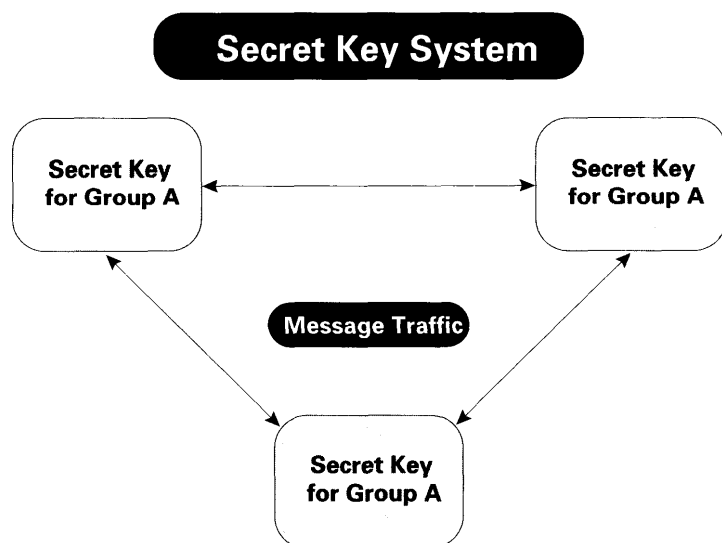
One term that is important to understand when discussing Internet security is keys. Keys are the computer programs that encode and decode messages. Keys are widely used in many types of computer programs. For instance, your word processing software might have a function that uses a password key to lock and unlock your documents. (In fact, one way to secure word processing files transmitted over the Internet is to use the program's password protection.) File compression utilities use various compression and decompression keys to make files more compact for storage. The keys used to encrypt messages are a special type; they must be complex algorithms that are very difficult, almost impossible, to decipher and compromise.

One method of securing messages is called the secret key system. In this system, two or more Internet users each have copies of the same program or secret key. This secret key program encodes and decodes messages sent between these correspondents. Each correspondent that exchanges messages in this group is given a copy of the secret key program. While this system is a good way to keep messages secure, it also has disadvantages. To use the secret key system, you must know the persons with whom you

wish to exchange email messages and provide them with the secret key before sending any email. In addition, the private key must be distributed through a secure channel (not the Internet), because if the private key is intercepted, the security of all messages sent among members of the group will be compromised.

An example of the secret key system is Kerberos, developed by the Massachusetts Institute of Technology (MIT). In this system, there is a designated Internet site called the Kerberos server that generates keys whenever a group of users wishes to send messages. Kerberos requires that users rely upon the security of the Kerberos system, so that keys are not generated that would allow unauthorized parties to intercept messages that were intended to be secure. Another secret key system is called DES. Parties that wish to share encoded messages use a common DES numerical string (DES key) along with the DES program to encode and decode messages.

Figure 10.1
Secret key encryption.



Public key systems, on the other hand, were designed so that users would not need to access other sites to generate keys and so users could distribute keys through unsecured channels. To do this, keys were broken into two parts, private keys and public keys. Users distribute their public keys to anyone who wishes to send a secure message. Public keys may also be used by anyone to authenticate the signature of the public key's owner and they can be used to verify that a message has not been altered. Public keys are posted at key distribution centers so that anyone can get access to anyone else's public key.

One of the best known public key systems is a computer program known as PGP. PGP stands for "Pretty Good Privacy." PGP uses a formula to create a numerical string (key) from two prime numbers using the RSA, Inc., public-key cryptosystem invented in 1977 by Ron Rivest, Adi Shamir, and Leonard Adleman. This numerical string or key is used by the PGP program to encode messages. To decode the message, one must know the two original prime numbers. For 15 years, numerous mathematicians have unsuccessfully vied for the bragging rights and cash rewards offered by RSA, Inc., to anyone who invents a method to discover the prime numbers from a key generated by PGP. Their lack of success has proven PGP to be a secure method of sending encoded messages.

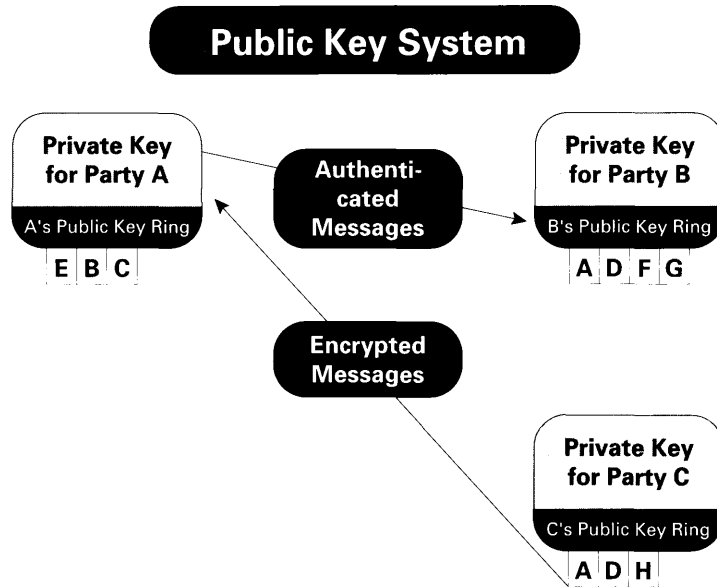
With the PGP system, User A (let's suppose it's a bank) creates a public key and distributes it to all its customers. It posts this key in a public place where anyone who wishes to send a secure message to the bank can find it. User B (a bank customer) puts the bank's public key onto its PGP key ring. When User B wishes to have funds transferred, it uses PGP and the bank's public key to encrypt a message and send it to the bank. The only party that can decode messages to the bank is the bank, because it is the

only party that knows the two prime numbers that make up its private key.

PGP public keys can also be used to authenticate signatures and ensure message integrity. The bank may wish to send its customers a message changing a deposit procedure. The bank can use PGP to create an elaborate digital signature (numerical string) that contains not only the bank's signature but also a message digest. The customer can process the bank's message and signature with PGP and the bank's public key and verify that the message was from the bank and that it was not altered before reaching the customer. The receiver can also use certificates to authenticate messages. Certificates are digital documents that attest to the binding of a public key to a particular individual or organization. They allow the receiver to authenticate that the public key they receive does, in fact, belong to a given individual or organization, and not to a criminal posing as an organization. In its simplest form, a certificate contains a public key and a name, but it may also contain an expiration date, a serial number, and the name of the certifying authority. Most importantly, it contains the digital signature of the certificate issuer.

PGP is available for non-commercial use by using Telnet to go to the **net-dist.mit.edu** site. Log-in as **getpgp**, answer the questions, and then use FTP to go to the **net-dist.mit.edu** site and follow the directions to obtain the PGP software. These complicated procedures to get PGP from MIT are required by law because PGP cannot be exported outside the United States and Canada. PGP for commercial use is available from Via-Crypt at (800) 536-2664.

Figure 10.2
Public key
encryption.



Unfortunately, PGP is much slower encoding and decoding than a secret key system like DES. Some businesspersons use a combination of secret key and public key techniques to save time when sending large files. They might encode a large file, such as a customer database or proprietary technical report, with DES, using a randomly selected DES key. The DES key is then encrypted with the receiving party's PGP public key. The encrypted file, along with the encrypted DES key, is digitally signed with the sending party's PGP private key, forming what is known as a digitally secure envelope. The recipient authenticates the message with the other party's public key, decrypts the DES key with its own PGP private key (the two random prime numbers), and then decrypts the DES-encoded file with DES software. This procedure probably seems very complicated, and it is, but you may resort to it after becoming frustrated with the slowness of PGP when encrypting large files.

When using an internal server, you should monitor the security of your server installation and configuration, as well as the security

of traffic between your server and connecting clients. The basic protocol for data exchange between WWW servers and clients is HTTP, short for HyperText Transport Protocol. HTTP specifies the syntax of documents called pages, allows for links between pages, and also defines the specification for page addresses called “universal resource locators” or URLs. Although quite flexible, this protocol doesn’t include any security guarantees.

To use the Internet and the World Wide Web for secure business transactions, clients must be able to authenticate the server to which they connect, servers need to verify that the clients connecting are who they say they are, and messages exchanged must be protected from alteration or corruption. Messages also must be irrefutably verifiable: if you send a message, the recipient should be able to verify that the message they receive is from you and could only have come from you.

SHTTP and SSL

Currently there are two security schemes in place for WWW transactions. The first is called the Secure HyperText Transport Protocol, or SHTTP for short. Servers and clients that adhere to this protocol encrypt all traffic in their conversations. Authentication is provided at three levels: clients can identify servers (and vice versa), message integrity is guaranteed, and communications are sent with a secure digital signature. This digital signature is unforgeable and asserts that the message was written or otherwise authorized by the signator. The recipient, or any third party, can verify the origin and integrity of the message content. SHTTP configurations use a secure, password-based client identification scheme, and the software can be configured as a proxy application.

SSL (Secure Sockets Layer) is a simple, seamless way to conduct a secure credit card transaction over the Internet. When as SSL-

enabled browser, such as Netscape's *Navigator* and Microsoft's *Internet Explorer*, connects to an SSL-enabled commerce server, the SSL protocol negotiates encryption keys and authenticates the server. The SSL transmission consists of two main phases: server authentication and client authentication. In the first phase, the server, in response to a client's request, sends its certificate and its encryption preferences. The client software then generates a master key, which it encrypts with the server's public key, and transmits the encrypted master key to the server. The server uses the master key to authenticate itself to the client by returning a message encrypted with the master key. Subsequent data is encrypted with keys derived from this master key. In the second phase (optional), the server sends a challenge to the client and the client authenticates itself to the server by returning the client's digital signature and its public-key certificate. (To view the *SSL Protocol Internet Draft*, visit <ftp://ietf.cnri.reston.va.us/internet-drafts/draft-freier-ssl-version3-01.txt>.)

Customers and clients using SSL-enabled browsers know when they are sending secured information by the special security icons that appear on the browser screen. In Netscape *Navigator*, a solid key appears in the lower left corner (as opposed to the broken key that is in the corner when a Web site is not secure), and in Microsoft's *Internet Explorer* a gold padlock appears in the bottom right corner when a connection is secure.

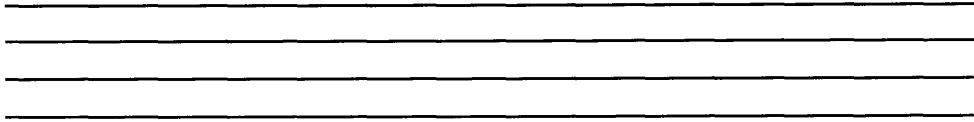
Figure 10.3
SSL secure site icons for Navigator and Internet Explorer.



Firewalls

When apartment complexes are built, brick walls are constructed between them to prevent fires that start in one complex from spreading to another complex. These walls are referred to as firewalls. Computer firewalls have a similar purpose—to separate computer systems and screen potential threats from the outside. A firewall is a combination of hardware and software used to isolate your electronic commerce site from harm from the outside. A firewall enhances security by funneling any possible attack through a smaller gap where detection and prevention is more possible. Like physical firewalls, network firewalls can never be 100% effective, but they will improve the security of your connection if designed, installed, and used correctly. If you are setting up your commerce site on an internal server, you will need to decide on the type of firewall system that will meet your needs. And, even if you are leasing server space from an ISP, if security is important to you, talk with your ISP about the firewall system that will be used to protect your site.

Firewalls are used for two basic security reasons: (1) to prevent unauthorized users from accessing your server, and (2) to prevent export of or damage to proprietary data on your server. When designing a firewall solution for your commerce site, ease of use may conflict with security precautions. You can choose from one of two approaches when designing your firewall: either activities that are not expressly forbidden will be permitted, or activities that are not expressly permitted will be prohibited. It is important that you decide which path to take before installing a firewall. There are different ways to configure firewalls, and each has its strengths and weaknesses, which we will describe below.

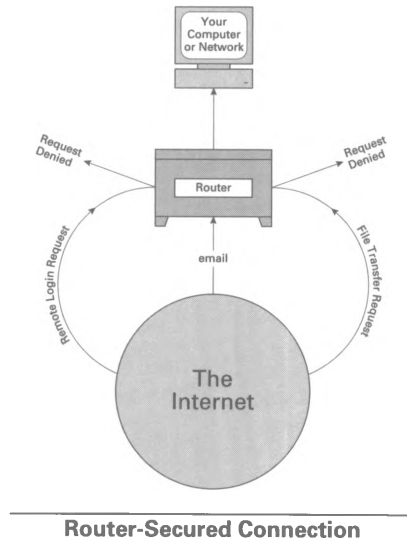


Screening Router

The screening router is a piece of hardware that is programmed to allow only certain traffic to pass from one side to the other. Routers can be programmed, for example, to allow electronic mail connections to pass over a particular port to your server, and from your server to the Internet, but to disallow FTP connections. Routers are effective, but not all routers support all types of traffic screening, and they may be difficult to program. To their benefit, if you have an internal network, they do make your network physically independent from the Internet. Some firewalls consist only of a screening router.

Routers allow direct communication between multiple hosts on your network and multiple hosts on the Internet. This means that the possible zone of security concern increases with the number of hosts on your private network and the number of services allowed to cross through the router. Damage control and security is difficult; each host on your network must be monitored. It is also hard to trace destruction of a router-based firewall. The administrative password of the router can be compromised, the router may be misconfigured, or hardware or operator error may leave the router in *pass-through* mode, allowing unrestricted access to your net from any host on the Internet. So, although a screening router can add to the security of your site, it must be installed and administered correctly.

Figure 10.4
Screening router
firewall.



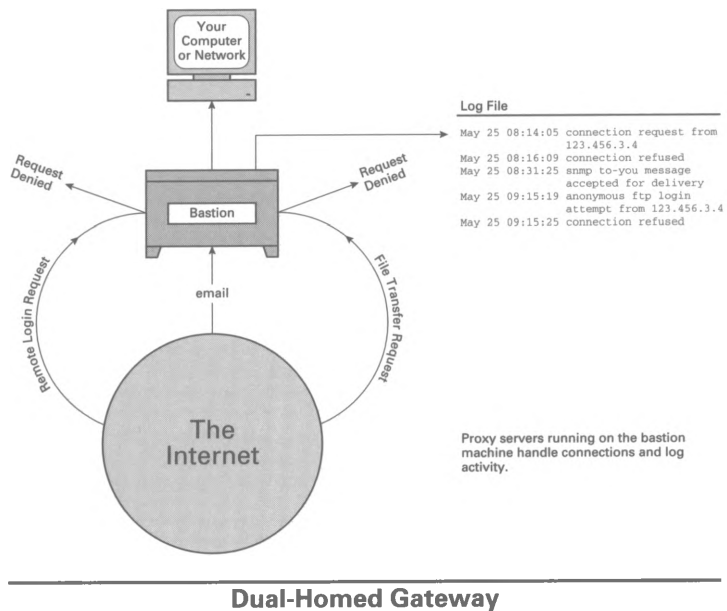
Bastion Host/Dual-Homed Gateway

The bastion host or dual-homed gateway firewall configuration designates one computer on your private network as the “bastion host.” This machine is, in effect, both on the Internet and on your local network, but it is configured so that no traffic can pass through it directly. Any machine on the Internet can send traffic to your bastion host, and any other machine on your local network can send traffic to your bastion host, but no host outside can directly send traffic to any machine on your private net, including your server.

Services are provided by proxy servers running on the bastion host. These proxy servers supply a benefit that routers cannot provide by adding the capacity to log activity. These proxies limit services to those explicitly provided. The zone of security concern is then limited to the bastion host alone; no other host on your network has access to the outside world.

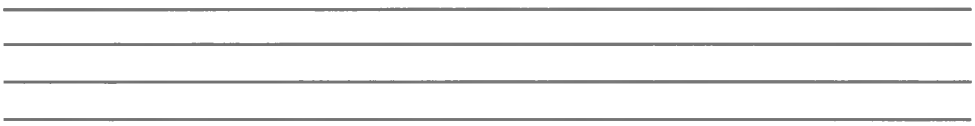
User accounts on the bastion should be discouraged. If a user account is granted and is protected by a weak password, an attacker could gain access through the account, increasing the zone of concern to include the entire private network. Failure of the bastion host firewall may result in severe consequences. The attacker might reconfigure the bastion service proxies or somehow modify them, allowing free access to your private network. The bastion host and the service proxies need to be carefully installed and monitored to maintain security.

Figure 10.5
*Bastion
host/dual-homed
gateway firewall.*



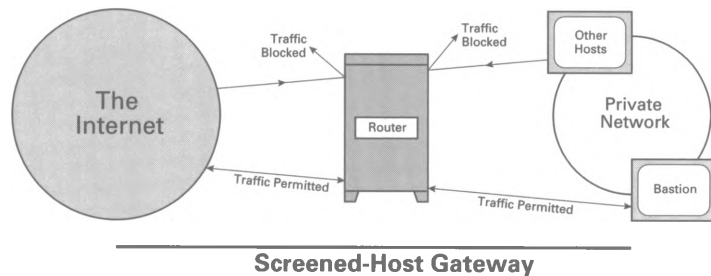
Screened Host Gateway

This firewall configuration includes both a screening router and a bastion host. The bastion host is on your private network, while the router makes the bastion the only host available from the Internet. The router can even be programmed to block traffic to or from certain ports on the bastion host to limit available services by source, destination, or service type.



Screened host gateways are very secure and fairly easy to implement. Since the bastion host is on the private network, user connectivity is very good, but the zone of security concern is still limited to only the bastion and the router.

Figure 10.6
Screened-host gateway firewall.

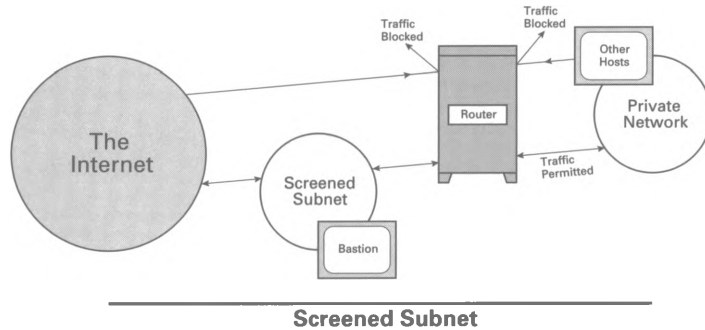


Screened Subnet

In this firewall type, a small, isolated subnet is created between your private network and the Internet. Hosts on the Internet can access hosts on the isolated subnet, as can hosts on your private network, but no traffic can cross the isolated subnet. This configuration can even allow user accounts on the bastions on the isolated subnet for interactive Internet sessions without compromising the private network.

Although firewalls of this type are more complex, they are also more flexible and more difficult to compromise. An attacker must reconfigure the bastion host, the screening router, and also a host on the private network without being detected.

Figure 10.7
Screened subnet
firewall.



Designing a Security Policy

The security policy is a high-level planning document for securing your commerce site. The authors of *Practical Unix Security* define security by saying that a computer system is secure “if you can depend on it and its software to behave as you expect it to” (O’Reilly & Assoc., 1991). Users of a computer system should be able to trust the system not only to protect their information, but also to make it available when needed. A well-planned security policy can help you achieve this dependability. Typical security policies address at least the following issues:

1. What assets are you trying to protect?
2. From whom/what are you trying to protect these assets?
3. What is the likelihood of a threat?
4. What cost-effective measures can be taken to protect the assets?
5. What should happen if an asset is attacked?
6. What on-going reviews should be in place to keep protection up-to-date?

Keep in mind that the security policy is a general game plan rather than a list of specific solutions to anticipated problems. If you are designing security policy and sentences like “smart cards and dial-back modems will be used on all systems” creep in, you know that you are involved in too much detail. In this case, you can wind up getting more security than you need in some areas and end up spending more money than is necessary.

Just as the kitchen in a small roadside hot dog stand is much less complex than the kitchen in a large luxury hotel, a person running a small organization maintaining an electronic commerce site on an ISP’s server will have much simpler answers to these questions than would a Fortune 500 company supporting numerous networked computers and multiple internal servers.

One of the main reasons to take the time to develop a detailed plan is cost efficiency. It would make little sense to spend thirty thousand dollars on a firewall system and an alarmed computer room to protect a personal computer that would cost two thousand dollars to replace. The overall goal of the security policy is to put measures in place that are the most cost-efficient and least inconvenient while still protecting the value of the commerce site to the organization.

Other issues should also be considered as part of the overall security policy. Since security involves the restriction of improper use of the computer system, the security policy should define what the company considers to be “proper use.” The security policy must also conform to existing policies, rules, and laws both inside and outside the organization. For instance, a security policy cannot deem it permissible to distribute copyrighted materials because that distribution is prohibited by US and international law. Finally, the security policy needs to consider the system in a global context if it is going to be part of the

Internet community. Each site needs to be aware of its responsibility for the security of the entire network.

What Are the Threats?

Once you have established proper use guidelines, it is time to consider what the possible risks to your assets could be.

Unauthorized Access

Unauthorized access can be as simple as use of an account owned by another user to access a system. John may leave his desk for lunch and leave himself logged in to the commerce server. Richard, who walks by the office and notices that the computer is on, uses John's terminal to retrieve administrative information to which John has access but from which Richard is barred. Susan might remember to log herself out each time she leaves her desk, but keeps her password on a Post-It note stuck to her monitor. This type of unauthorized access is much more common than invasion by an outside hacker, though much less exciting and newsworthy.

Theft of Information

Any information stored online is open to the threat of theft. A password file might be stolen to run a cracking program against the file at another computer. Research data could save a rival company years of investment in R&D. A customer's credit card number could be used for rampant unauthorized purchasing. A new project or product proposal could be worth millions to a competitor. Any information that could be valuable to someone other than the owner of the information should be considered.

Denial of Service

As anyone who uses a computer knows, it doesn't take long for the computer to become an indispensable tool. If the computer becomes unavailable, it is often impossible to get any work done. If your server becomes unavailable to your customers, they will

need to make their purchases some other way—maybe at a competitor’s site. Denial of service can come in many forms. A malicious or incorrect program could bring a server to a standstill. A virus can infect a computer system and slow or halt it completely. The security policy should determine which services are provided by the system to its users and try to predict the effect on the organization if these services are disrupted.

Don’t forget that electricity is the power behind the whole system. If you find that a certain file server is essential to operations and needs to be available twenty-four hours a day, seven days a week, you might consider an uninterruptable power supply (UPS) for that server.

What Happens When Security is Violated?

If a break-in occurs, will the intruder’s processes be immediately terminated, or will the intruder be allowed to continue unhampered while the system administrators trace the intruder’s identity? These two strategies are called “protect and proceed” and “pursue and prosecute.” Each strategy has its benefits and drawbacks. If the intrusion is immediately eliminated and the security hole that allowed it repaired, the system can be repaired and restored to normal operation more quickly. On the other hand, law enforcement agencies and prosecutors are urging more prosecutions of intruders, even though they cannot offer protection to a site reporting an incident if users initiate lawsuits alleging damage to their systems and data.

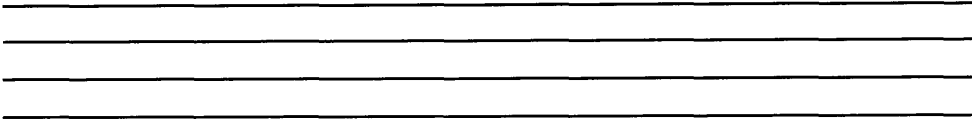
RFC 1244 recommends the following checklist to help you decide between the two different approaches. Only organizations that can answer “yes” to each of the questions below should consider the “pursue and prosecute” response to an intruder:

-
-
-
-
1. Are the system assets well protected so that continued activity by the intruder will do no irreparable damage? Clearly, if there is a risk of losing some irreplaceable data or program or having a system damaged or destroyed, then the intrusion should be stopped immediately rather than being allowed to proceed.
 2. Are good backups of all system software and data available that can replace any files damaged by the intruder? If there is a risk that the intrusion could damage or corrupt data that is essential to site operations and the data could not be replaced from backups, the intrusion should not be allowed to continue. Say an intruder is detected attempting to access the data on orders received in the last week. If the file has not been backed up recently, the intruder should be stopped immediately; they could alter the file and you would have no way of getting the original contents back.
 3. Is protection against future break-ins worth more to the site than risk to the assets from the current intrusion? Your site has had a couple of incidents in the last month or so, and you plan to continue to do business on the Internet. It would be worth it in the long run to identify and prosecute the intruder now so that you could proceed with some guarantee that the attacks would stop.
 4. Is the attack one that occurs frequently? Every Monday morning, you find that someone has attempted to access your system all weekend.
 5. Is the site a natural attraction to intruders? Sites like large financial and defense institutions or research systems at universities seem to attract a large number of attempted break-ins.
 6. Is the site willing to take the financial (or other) risk involved with letting the intrusion continue?

7. Can the intruder's access to the system be controlled?
8. Are monitoring tools in place to gather information necessary to catch the intruder?
9. Is the system staff sufficiently knowledgeable about the operating system and utilities to make pursuit worthwhile? Can they outsmart the intruder?
10. Is management willing to prosecute when the intruder is identified? This is often not the case; the publicity could damage a company more than any damage caused by the break-in.
11. Is there is sufficient legal knowledge about what type of information is needed for a successful prosecution?
12. Has your organization established contact with knowledgeable law enforcement agencies?
13. Is someone at the site who knows the relevant legal issues?
14. Is the organization prepared for possible legal action from customers and clients if there is damage caused by the intruder?

The "protect and proceed" philosophy strives to patch the hole that allowed the intrusion without attempting to identify and prosecute the offender. You would want to protect and proceed if any of the following were true:

1. System assets are not well protected. It would be better to stop the intruder immediately, try and figure out the hole that was exploited to admit them, patch it, and go on from there.
2. Continued access by the intruder could lead to great financial risk. Industrial espionage is getting more and more prevalent as companies become connected. If there is a chance that an intruder could cause the site to lose large sums of money, drop them in their tracks, and lock them out in the future.



3. The company is unwilling to prosecute intruders. It is often the case that prosecution and the publicity attached would do more damage to an organization's reputation than the security breach itself.

These and other issues that you should address when developing a security policy for your electronic commerce site are summarized in the Security Policy Checklist at the end of this chapter. You may wish to photocopy and distribute this document to guide discussions of security at your organization's electronic commerce site.

CERT: Online Help With Security Issues

In 1988, the Defense Advanced Research Projects Agency organized the Computer Emergency Response Team (CERT) at Carnegie-Melon University in Pittsburgh. The original mission of CERT was to facilitate community responses to Internet security breaches, though they have expanded to be a repository for current security information as well.

Services provided by CERT include

- A 24-hour technical line for assistance in responding to security breaches.
- A repository of free, downloadable technical documents on security.
- Product vulnerability assistance to help identify and repair security holes in available software.
- Seminars on security.
- Free software security tools.

One of the most important services provided are the periodic CERT advisories. These advisories are posted to the FTP archive and also mailed out to people on their mailing list. The advisories contain detailed patches or solution strategies for security holes discovered in commercial products. To obtain these advisories, you can monitor the Usenet newsgroup **comp.security.announce** or access the archive through the CERT FTP server **info.cert.org** in the **/pub/cert_advisories** directory. Other archives are also maintained at the CERT FTP site. A list of frequently asked questions is available in the **/pub/cert_faq** directory. The **/pub/tech_tips** directory contains information on packet filtering, FTP configurations, and other topics of interest to those technically inclined.

CERT will assist sites in recovering from security incidents. They maintain a 24-hour hotline at (412) 268-7090 and have been handling between eight and fourteen incidents per day over the last year. CERT also recommends monitoring certain Usenet newsgroups and participation in mailing lists. The newsgroups include

- **comp.security.announce** (CERT advisories).
- **alt.security** (a wide-ranging discussion of security issues).
- **comp.virus** (information on virus detection and prevention).

Security Policy Checklist

The following list of questions can serve as a starting point for discussion of security policy at your electronic commerce site:

I. List Your Assets

- A. What computers/file servers will be used?
- B. What software programs (database managers, word processors, spreadsheets, operating systems, transaction software) are essential to system operations?
- C. What essential data files are stored online?

II. Threat Analysis

- A. Protect Against Unauthorized Access
 1. Is physical access to the server controlled?
 2. Are multiple users allowed to access the server's administrative files?
 - a. Are all user accounts to be secured by passwords?
 - b. Is system auditing to be used?
 - c. Will there be some mechanism for access control in the file system?
- B. Protect Against Theft of Information
 1. What information will users be allowed to access?
What sanctions will be imposed if users access information beyond that which they have permission to access?
 2. Will sensitive information be transmitted online?
What measures will be taken to protect sensitive information?
- C. Protect Against Denial of Service
 1. Will systems be protected against loss of power?
 2. Will someone be on call to restore interrupted service?
 3. Will essential software be backed up?

III. Other Policy Issues

- A. Who is authorized to use the system?
 - 1. Are all users allowed access to all parts of the system? Which files or devices are to be restricted?
 - 2. Are anonymous guest accounts to be allowed?
- B. Acceptable Use
 - 1. Will users be allowed to share accounts?
 - 2. What rights do file protections imply? Will users have the right to access all information to which they have physical access?
 - 3. Who can install software? Can software be uploaded or downloaded by users? Who is responsible for copyright legality?
 - 4. What sanctions should be imposed upon users who violate acceptable use policy?
- C. Responsibilities and Rights of Users
 - 1. What will be considered "excessive use" of system resources?
 - 2. User passwords
 - a. Will password aging be used? How often will users be required to change passwords?
 - b. Will there be requirements on user password selection? Will passwords be checked proactively (as users change them) or reactively (on occasion with cracker programs)?
 - 3. Will staff members be responsible for backing up their own information or will the system provide backup services?
- D. Who will be responsible for keeping up-to-date on security issues?
- E. How much will be budgeted for security?

IV. Reaction to Incidents

- A. What procedures should be followed if/when policy is violated by local users?
- B. What procedures should be followed if/when an intrusion is discovered?
 - 1. Who will be responsible for dealing with the intrusion?
 - 2. What (if any) information will be made public concerning the incident? What agencies should be contacted (if any)?
 - 3. Will the site take a “pursue and prosecute” stand against intruders, or “protect and proceed?”
 - 4. Is the site protected from legal action arising from clients, customers, or business partners who have problems after an intrusion?

10.38 SECURITY AND YOUR ELECTRONIC COMMERCE SITE



Appendix:

Electronic Data Interchange

For the past two years, the AICPA's Technology Division has ranked Electronic Data Interchange (EDI) as the most important technology affecting the accounting profession. This year, it ranks second only to image processing as a profession-changing influence. Among the books recently published on the subject, several have been written by accountants or accounting firms. So, what's all the fuss about?

In this appendix we will

- Describe why EDI is important and what roles CPAs are likely to have in EDI projects.
- Define basic EDI terminology.
- Outline some of the standards being used to implement EDI systems.

At the end of the appendix, we think that you'll be convinced that EDI is here to stay, and that it might even offer some interesting opportunities for financial professionals serving on system project teams and assisting clients.

What is EDI?

Although EDI texts are sprinkled with complex-sounding data translation schemes and systems development methodologies, the basic concept is surprisingly simple. The three words, electronic data interchange, really say it all. EDI is a way for computers to exchange information—electronically. The millions of companies

in the world store information in millions of formats, so sending information “as is” between computers is impossible unless the computers use a shared, standard format for the exchange. And that is exactly what EDI does.

EDI is a collection of data format and transmission standards that governs how information will be transmitted between separate organizations, for instance, between a manufacturer and a parts supplier conducting purchase transactions for component parts. Processes that traditionally would be carried out in several steps, involving paper tracking and data entry at each end, can be completed directly between computers. A manufacturer can automatically submit purchase orders for needed parts when the parts supply falls to a pre-determined level. The supplier can plan in advance to fill the manufacturer’s orders, according to the automatically submitted orders, and can even order its own materials via EDI. In this way, the chain a product follows, from raw materials to parts to assembly, can be managed with the newest just-in-time business techniques. And, the chain can even extend to distributors and retailers, whose systems can automatically order products when inventory reaches a threshold level.

As you can imagine, implementing an EDI system requires a significant systems development effort. These projects follow a life-cycle similar to other computer projects: planning, development and programming, testing, migration, and implementation. In each of these project phases, accounting professionals can contribute important consulting services and skills, like serving as representatives of the future users of the EDI system on the project team and designing the internal controls that become so crucial in a system of this type. EDI systems, by their nature, are based on information and transactions traditionally located in the business systems of the enterprise, like

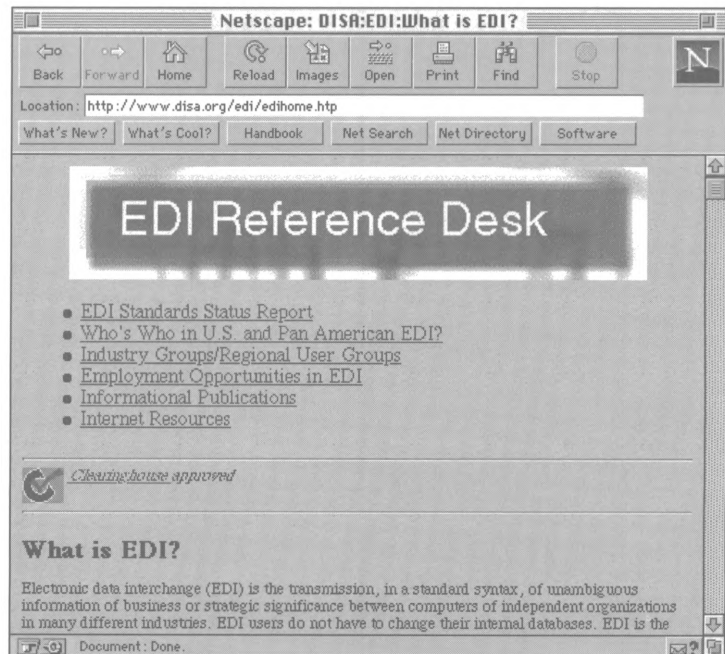
accounts payable, accounts receivable, and inventory management. Accounting professionals are often the managers responsible for the operation of these business systems, and they play an important role in translating the efficiencies offered by EDI back into the organization in the form of savings. A wise accountant won't leave the development of core EDI systems up to the information systems group—staying involved in highly visible projects is a good career move.

In the consulting arena, CPAs can offer clients important guidance when deciding whether or not to implement EDI. Cost-benefit analyses and current system assessments are important pieces of any computer systems decision, and EDI is no exception. Many companies turn to outside business and systems consultants to assist with these steps. When a firm has decided to implement EDI, there are still many decisions to be made: internal development or outsourcing; the scope and schedule of the project; and how testing and system audits will be accomplished. These are all services a CPA familiar with EDI systems can offer to a wide range of businesses.

Although EDI began in the transportation industry, where the efficient sharing of schedule, shipment, and tracking information is intrinsically necessary, the technology has now spread to many other industry segments. The Data Interchange Standards Association, Inc.'s, EDI information Web page (<http://www.disa.org/edi/edihome.htm>) provides a clear basic description of EDI and states, "many industries, including shipping, retail and grocery, apparel manufacturing and textiles, warehousing, aerospace, chemicals, construction, automotive, electrical, electronics, utilities, finance, health care, petroleum, metals, and paper endorse EDI standards." This list will only continue to grow as the cost savings and process improvements gained through implementation of EDI technology influence enterprises to

develop EDI systems to keep up with competitors and strategic business partners.

Figure A.1
The Data Interchange Standards Association, Inc.'s EDI Reference Desk.



One of the biggest potential channels through which to route EDI transactions is (you guessed it!) the Internet. Two companies wishing to exchange information electronically must establish some form of inter-computer communication between their two sites. In the past, EDI systems have operated over private bulletin board systems (BBSs), dedicated telecommunications lines, and various forms of private networks. However, the Internet is the biggest, most-used network in the world, and it makes sense that companies would begin to explore how they can take advantage of the Internet's built-in advantages, like the number of various Internet service providers available and the inherent network redundancies of the Internet's web-like structure. In addition, the Internet's broad public-user base now makes it a prime channel

through which to develop consumer-based transaction systems. Thus, the fields of EDI and electronic commerce have become intimately linked. Selling products in a retail venue is one of the biggest transaction-based processes in business, and we are beginning to see innovative companies provide goods and services over the Internet via EDI-based systems. You might want to check out the Internet sites listed below which contain good background information on EDI, its historical development, and current trends in EDI systems.

IETF-EDI Working Group FAQ

<http://www.va.gov/publ/standard/edifaq/index.htm>

Federal EDI

<http://snad.ncsl.nist.gov/dartg/edi/fededi.html>

EDI Help Desk

<http://www.wwa.com/unidex/edi/>

EDI Terminology

If the AICPA is correct, you'll probably be approached to consult with an EDI project team in your organization or to help a client evaluate whether or not to build an EDI system in the near future. When that happens, you'll have a running start if you know what some of the most common EDI terms mean and how they are used.

While they might seem cryptic and mysterious at first, you'll see that they refer to things you already know about—facts and figures, transactions, and shared procedures. EDI is inherently a very methodical process. One of the major benefits of EDI is that companies from around the world can exchange information

quickly and cost-effectively if they adhere to a set of agreed-upon standards and a common vocabulary.

ASC X12

The term ASC X12 refers to two related entities. In 1979, the American National Standards Institute (ANSI) chartered the Accredited Standards Committee called X12 to oversee and establish standards for the exchange of business information. In this context, ASC X12 refers to the committee responsible for these standards. However, there are now many subcommittees of ASC X12 that develop standards and present them for the approval of the general ASC X12 committee membership. Thus, the EDI standards themselves are now referred to as a group as ASC X12 standards. The ASC X12 standards for electronic data interchange are now accepted by most businesses in the US, the US Federal government, and the Canadian government.

EDIFACT

EDIFACT is an acronym for the United Nations' rules for Electronic Data Interchange For Administration, Commerce, and Transport. These rules are internationally accepted standards, directories, and guidelines for EDI. There are six regional EDIFACT boards that oversee the administration of EDIFACT rules in geographical areas; the board for North and South America is called the Pan-American EDIFACT Board (PAEB). The ASC X12 committee described above is currently working on coordinating the ASC X12 standards with these more global EDIFACT guidelines.

Data Element, Segment, and Transaction Set

A data element is a single fact or figure—the basic building block of the exchange of information. For instance, the price of one unit of a particular product would be a data element. A group of

related data elements arranged one after another is called a segment. A unit price together with a number of items ordered and an extended price would represent a segment of related data elements. Segments are strung together to form transaction sets. The electronic equivalent of a printed exchange of information, the EDI transaction set will include all data elements and related exchange information that are required for transmission of one transaction between EDI partners. One example of a transaction set would be the information required to transmit an electronic purchase order.

Mapping and Translation

Mapping is a process used in building EDI systems that determines which data elements in a company's computer system correspond to the standard data elements used in the ASC X12 or EDIFACT guidelines. Developers working on EDI mapping might ask, "Which specific field in our company database represents the unit price of a product? Does this field always correspond to the unit price, or is the unit price sometimes computed from two other fields?" Once the mapping is complete, developers need to consider how the two computer systems will communicate the EDI transactions. Translation is the process used to communicate information from one computer system to another system made by a different manufacturer or running different software. An EDI project team will typically begin by deciding which standards the system will follow, and ASC X12 or EDIFACT are the most common choices. Then, team members might consider exactly which data elements, segments, and transaction sets will be included in the EDI system. This step will involve deciding which paper processes the company wishes to automate and perhaps coordinating system development with a proposed manufacturer, supplier, or trading partner. For instance, a project team might decide to automate the purchase-order process between their own parts company and the manufacturer that

assembles the parts into a finished product. Once team members know which outside company the EDI system will communicate with, they will begin the process of mapping their own company's data and deciding how translation between the two systems will be handled.

EDI Standards and Guidelines

Once you become familiar with basic EDI concepts and terms, you can easily make your way through the guidelines and standards documents so important in developing and implementing EDI systems. First, let's outline three types of documents that deal with EDI and the kinds of information they contain. Then, we'll take a closer look at the ASC X12 set of standards that form the core of many EDI systems.

Documents about EDI can be divided into three categories:

1. General reference books and information
2. Specific agency or industry guidelines
3. Standards

The general references usually contain information about why companies should use EDI and how to organize an EDI project. Earlier we listed several sources of online documents in this category: the *IETF-EDI Working Group FAQ* (<http://www.va.gov/publ/standard/edifaq/index.htm>); the Data Interchange Standards Association's *EDI Reference Desk* (<http://www.disa.org/edi/edihome.htm>); and the Unidex *EDI Help Desk* (<http://www.wwa.com/unidex/edi/>). In addition, there is a wide range of books and periodicals available on the subject of EDI; you can find listings of print publications at the online sites listed above or browse a

selection at most libraries or bookstores. These reference documents will help you see the EDI “big picture” and understand how other companies have implemented EDI systems. They can help you orient yourself and gain background information, but they do not contain mandatory criteria or regulatory guidelines for EDI systems.

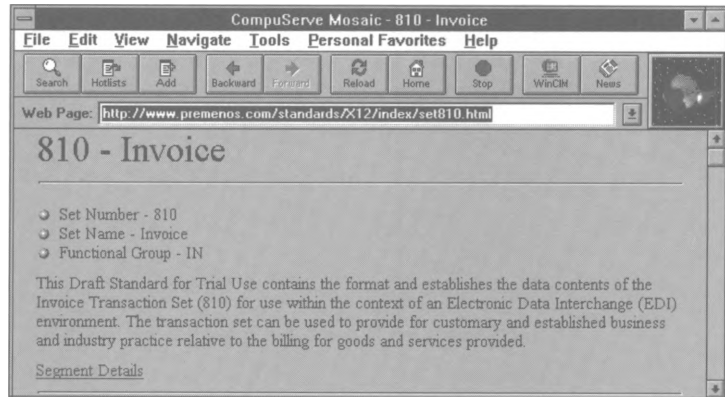
The second category of EDI documents, specific agency or industry guidelines, are published by groups that administer systems development in a particular area. For instance, the US Federal government is understandably urging large Federal contractors to build EDI systems to interface with Federal agencies. The US Department of Commerce National Institute of Standards and Technology has published an architecture document describing the conventions used in Federal procurement systems. Available at the Federal EDI site (<http://snad.ncsl.nist.gov/dartg/edi/fededi.html>), this architecture document governs all electronic transactions between Federal suppliers and the government. Naturally, it is important and necessary for contractors wishing to do business with the government to follow the stipulations of this document. In contrast to the general reference documents described above, it is crucial to locate and follow any agency or industry guidelines that have authority over an EDI system you may be building.

The most important, and most specific, types of EDI documents are those in the third category, standards. Various organizations have established EDI standards for US and worldwide use, but the ones you will run into again and again are the Accredited Standards Committee X12 standards, called ASC X12 as a set. This group of very detailed, technical standards governs exactly how EDI files are built. Although companies wishing to exchange information electronically might use widely different information systems, the basic assumption of EDI is that they will create and exchange computer files that contain data in a standard form. The

ASC X12 standards define this form, and any business entity wishing to do business via EDI must use them.

One nicely organized online version of the ASC X12 set of standards is provided by Premenos, a company specializing in EDI translation software (<http://www.premenos.com>). At this site, the standards are listed all together on one page as links. When following a link for, say, Standard 810, which defines the format of invoices in EDI transactions, the next page you will see is a general description of the transaction set described by the standard, as below:

Figure A.2
*Invoice standards
at the Premenos
site.*



If you follow the "Segment Details" link, you will find a list of all data segments included in invoice transaction sets. (Remember that transaction sets are made up of related data segments, which are, in turn, made up of individual data elements, like unit price or order quantity). You can see from the information in the screen below that this level of detail already includes a good deal of technical information that might be used by a systems analyst or programmer to develop an EDI system. For instance, the letters in the "Seg" column indicate how the segment will be labeled in the electronic file, and the numbers in the "Max" column indicate

how many distinct segments with that label can appear in any given transaction set.

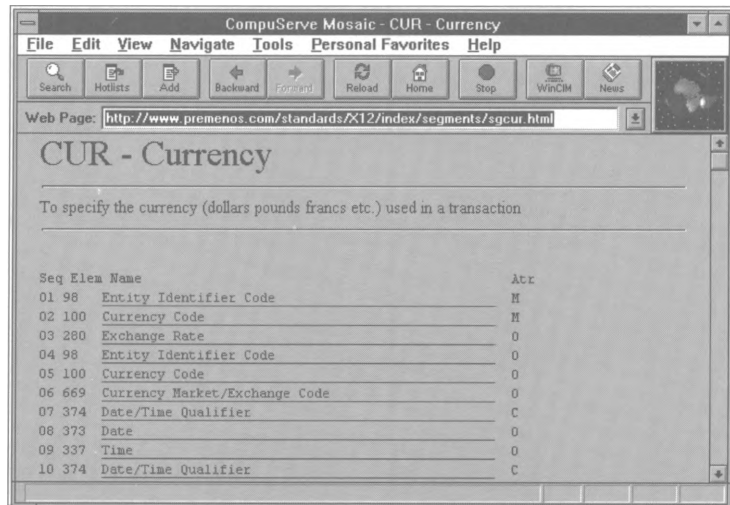
Figure A.3
Invoice segments at the Premenos site.

Pos	Seg Name	Req	Max	Loop
TABLE 1				
010	ST <u>Transaction Set Header</u>	M	1	
020	BIG <u>Beginning Segment for Invoice</u>	M	1	
030	NTE <u>Note/Special Instruction</u>	F	100	
040	CUR <u>Currency</u>	0	1	
050	REF <u>Reference Numbers</u>	0	12	
060	PER <u>Administrative Communications Contact</u>	0	3	
	LOOP ID-N1			1
				Loop Repeat-200
070	N1 <u>Name</u>	0	1	1
080	N2 <u>Additional Name Information</u>	0	2	1
090	N3 <u>Address Information</u>	0	2	1
100	N4 <u>Geographic Location</u>	0	1	1

Similarly, you could follow the link for any data segment from this screen to an even more detailed description of how the data elements comprising the segment should be formatted, as with the “Currency” segment below:

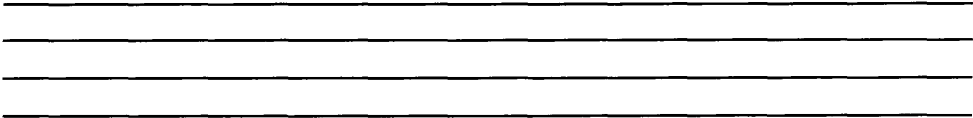


Figure A.4
*Formatting data
 elements.*



A CPA would probably not be involved at this technical level of an EDI project unless supervising an information systems group. However, a clear understanding of the ASC X12 standards is necessary for CPAs to provide solid consulting services to clients and to build auditing and control processes in support of EDI systems. In addition, performing a quality assurance review of an EDI system would require referring to the standards upon which the system is built, as would any trouble-shooting.

When approaching an EDI project, whether for a small business client or a huge multinational corporation, it makes sense to approach your planning in terms of these three document categories. First, are there any general references or guidelines that could assist you in understanding what companies of a particular industry, country, or size are doing with EDI? Next, can you locate any guidelines developed by specific agencies or industry groups with authority over the company's area of business? And, lastly, what are the specific EDI standards that



your system must follow to create and receive electronic transactions? If you have these three bases covered, you are probably ready to get to work!

A.14 ELECTRONIC DATA INTERCHANGE



Electronic Commerce Resources

Auditing and Security

CERT

Computer Emergency Response Team's server with articles about security concerns, tools for evaluating security, and an archive of alerts about break-in attempts.

<ftp://cert.sei.smu.edu/pub>

COAST

Purdue University's multiple-project effort in computer security research contains an online catalog of computer security resources.

<http://www.cs.purdue.edu/coast>



Computer Security Resource Clearinghouse

Maintains security awareness and training information, publications, conferences, software tools, as well as security alerts and prevention measures.

<ftp://csrc.ncsl.nist.gov>

<gopher://csrc.ncsl.nist.gov>

<http://csrc.ncsl.nist.gov/>

Computers and Information Resources (CIRT) Home Page

This site provides links to resources about ethics and security. The site was established by Dr. David Grisham, Security Administrator for the University of New Mexico.

<http://www.unm.edu:80/~dave/secpage.html>

<ftp://ftp.unm.edu>

Firewalls mailing list

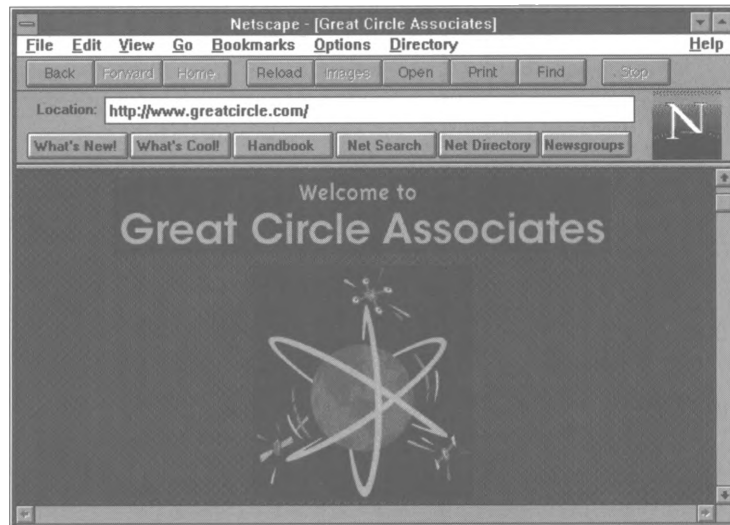
Listserve focused on the subject of firewalls and Internet security.

Subscribe through email to majordomo@greatcircle.com with message: subscribe firewalls-digest

Great Circle Associates

A firm that specializes in training about and consulting on Internet security firewall systems.

<http://www.greatcircle.com/>



"A Guide to Understanding Audit in Trusted Systems"

This useful resource for auditors is presented by the National Computer Security Center and offers guidelines for Internet security audits.

<http://bilbo.isu.edu/security/isl/audit.html>

Information Security Discussion List

A non-moderated Internet discussion list for information security and auditing professionals in government, industry, and academic institutions.

Subscribe through email to listserv@etsuadmn.etsu.edu with message: SUB INFSEC-S yourname

International Cryptography Pages

This site in Finland details international sources for software and information on cryptography, concentrating on software and information outside the US.

<http://www.cs.hut.fi/crypto>

NCSA Tutorials

From this page, you can access a number of security-related tutorials on topics such as "Access Control and User Authentication" and "Setting Up a Secure Server."

<http://hoohoo.ncsa.uiuc.edu/>

RSA Labs FAQ Home Page

This site is the launching page for the RSA searchable FAQ database that offers useful answers to various security questions, such as "What are Certificates?" and "What is SSL?"

<http://www.rsa.com/rsalabs/newfaq/>

SSL Protocol Internet Draft

This site offers the highly technical Internet Draft describing the various features and implementation standards for Secure Sockets Layer security protocols.

[ftp://ietf.cnri.reston.va.us/internet-drafts/
draft-freier-ssl-version3-01.txt](ftp://ietf.cnri.reston.va.us/internet-drafts/draft-freier-ssl-version3-01.txt)

"Tools to Detect System and Process Activities"

This site, maintained by the Center for Scientific Computing in Finland, lists and describes the various tools that you can use to monitor system and process activities.

<http://www.csc.fi/sbs/metaflops>

Trusted Information Systems, Inc.

Provides security analysis and risk assessments, firewalls, mail encryption, and other tools for network and computer systems security.

<http://www.tis.com>



Business Process Redesign

Business Process Redesign: An Overview

This white paper written by Yogesh Malhotra from the Katz School of Business, University of Pittsburgh, outlines Business Process Redesign—from the myths that say it's a euphemism for downsizing to the benefits it provides in the form of costs control and information management.

<http://www.pitt.edu/~malhotra/bpr.htm>

Business Process Reengineering *Analysis and Recommendations*

William W. Chu, Wan Ching Lin, Van Le, Maureen Weicher, and Dominic Yu from the City University of New York define Business Process Redesign and discuss ways of implementing it in business, give case study examples, and provide a useful bibliography at the end.

<http://www.netlib.com/bpr1.htm>

The Computer Information Centre

Offers online technical, supplier, and consultant information. This site also provides connections to all of the major BPR sites.

<http://www.compinfo.co.uk/tpbpr.htm>

The Electronic College of Process Innovation

Written and maintained by the US Department of Defense, this site outlines a methodology for Business Process Redesign called Process Management. The site offers a step-by-step guide for implementing global changes in an organization.

<http://www.dtic.dla.mil/c3i/bprcd/3003.html>

The Enabling Role of EDI in Business Process Re-Engineering

This white paper by Bob Roberts discusses EDI as an enabling tool that can be used in conjunction with Business Process Redesign, rather than using EDI as just another technology in competition with a company's existing systems.

http://infosys.kingston.ac.uk/isschool/Staff/Papers/Roberts/EDI_BPR.html

The Wider Research Context of Business Process Analysis

Dr. Rod Coombs and Richard Hull have written this paper, published by the Manchester School of Management, UMIST, England. This paper maintains that Business Process Redesign is not clearly defined and that it should be seen as an emergent business paradigm; it also discusses ten major points in the paradigm, including competitiveness, entrepreneurship, supply-chain management, and others.

<http://bprc.warwick.ac.uk/umist1.html>

Electronic Payment Systems

Atomic Software

<http://www.atomic-software.com/>

Checkfree

<http://www.checkfree.com/>

CyberCash

<http://www.cybercash.com/>

Data Transfer Associates, Inc.

<http://www.datatransfer.com/index.html>

Digicash

<http://www.digicash.com/>

First Virtual

<http://www.fv.com/>

MPACT Immedia

<http://www.mpactimmedia.com/>

NetCash

<http://www.netbank.com:80/~netcash/>

Open Market

<http://www.openmarket.com/>

General

BankNet

An online bank that allows you to open an account and purchase products on the Internet.

<http://mkn.co.uk/bank>

Buyer's Guide to Electronic Commerce

A guide that includes a listing and descriptions of products from many companies that deal in electronic commerce and EDI.

<http://www.e-com.com/buyersguide/>

CALS

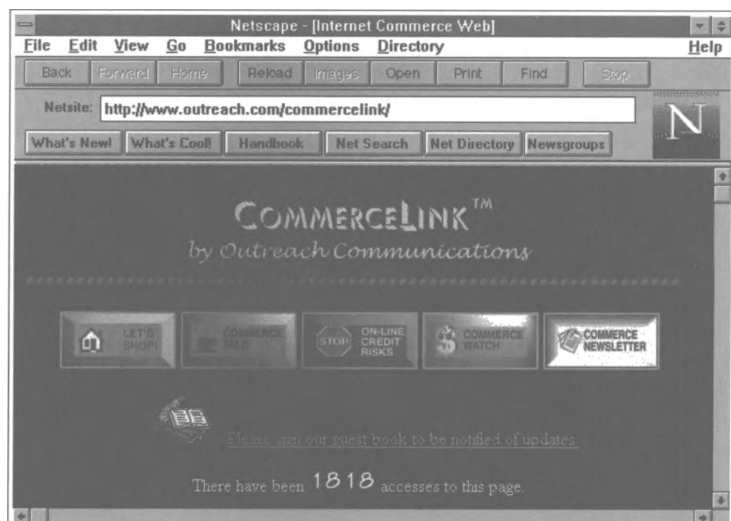
The Commerce at Light Speed Web page includes information on CALS technology and has an extensive search page with links to other electronic commerce-, EDI-, and CALS- related sites.

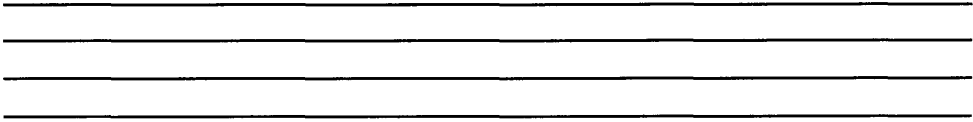
<http://www.cals.com/>

Commercelink

A Web page that offers shopping opportunities on the Web, information on other electronic commerce servers, and a chat room for electronic commerce discussion.

<http://www.outreach.com/commercelink/>





CommerceNet

A consortium of over 150 companies (including leading banks, VANs, ISPs, online services, and companies) that are working together to make the Internet into a global marketplace. The site includes news and a very useful search page.

<http://www.commerce.net/>

EC World

A free online publication covering the fast moving new technological breakthroughs in the world of electronic commerce.

<http://ecworld.utexas.edu/>

EDI World

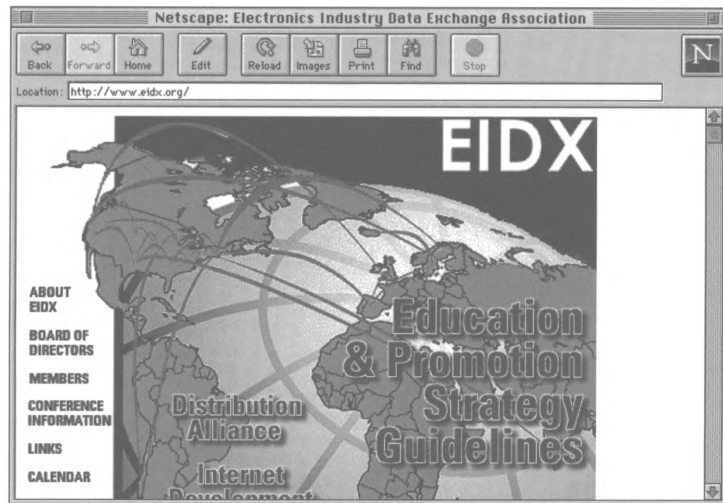
A monthly magazine on electronic commerce.

<http://www.ediworld.com>

EIDX

Electronics Industry Data Exchange Association is a non-profit organization that includes many companies involved in electronic commerce and EDI. The Web page is a forum for electronic commerce issues that includes a long list of links to sites concerning electronic commerce, EDI, and security.

<http://www.eidx.org/>



Electronic Commerce Resource Center for Small Businesses and SME's (Small to Medium Enterprises)

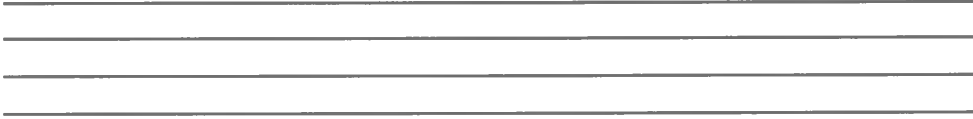
A Web page provided by the George Washington University Center for Advancement of Small Business that includes information ranging from the history of the Internet to the newest technology in EC pertaining to small businesses.

<http://gwis2.circ.gwu.edu/%7Erwill/>

Electronic Commerce World Institute

This site offers information about electronic commerce, EDI, and CALS. It has a virtual exhibition hall of companies involved in electronic commerce and security, a resource center, and a search page.

<http://www.ecworld.org/>



The Emergence of Electronic Commerce on the Internet

This paper by Walt Scacchi of the USC School of Business Administration discusses the implications of the Internet for modern businesses and strategic planners, the opportunity for using the Internet in business, and the research projects that USC is currently running on business and the Internet.

http://www.usc.edu/dept/ATRIUM/Papers/Electronic_Commerce.html

ESD

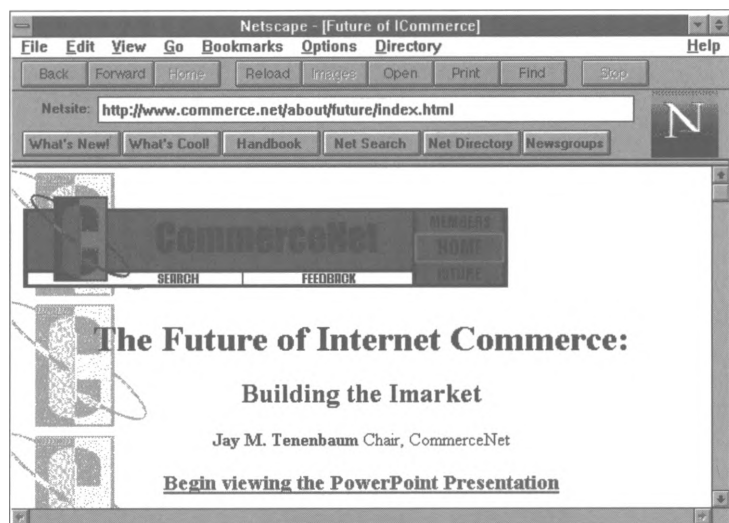
A German company involved in development of hardware used in homebanking and electronic commerce.

<http://www.esd.de/>

The Future of Electronic Commerce: Building the Imarket

This site features a *Powerpoint* slide presentation on the past, present, and future of electronic commerce.

<http://www.commerce.net/about/future/index.html>



IfBG Money and Payment Systems

A collection of links to sites concerning the history of money, digital money, electronic payment systems, corporations and projects concerning electronic payment, and credit card and card services.

<http://www.wiso.gwdg.de/ifbg/geld.html>

Interactive Age

A magazine devoted to the latest Internet and electronic commerce news.

<http://techweb.cmp.com/techweb/ia/current>

Internet Electronic Commerce

This site explains the basics of electronic commerce, connects electronic commerce to Business Process Redesign, describes the benefits of electronic commerce, and finally markets the services of site developers for implementing a commerce site.

<http://www.bja.com/iec.htm>

An Introduction to Electronic Commerce

Published by the BT (British Telecommunications) Electronic Commerce Innovation Centre, this site offers an introduction to electronic commerce and touches on the electronic commerce site in business vision and importance.

<http://www.cf.ac.uk/uwcc/masts/ecic/eleccomm.html>

SBT's Web Series for Internet Commerce

Software Business Technologies offers a line of electronic commerce products and accounting software.

<http://www.sbt.com/sbtlib/pwso.html>

Stefan Brands Home Page

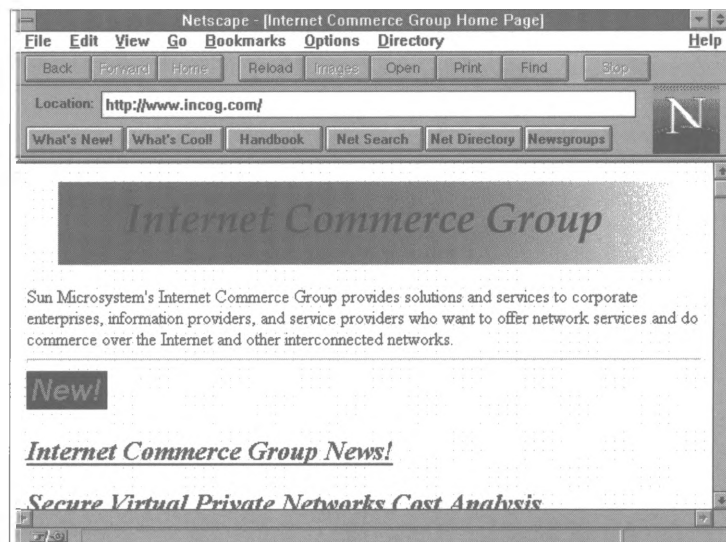
A cryptography consultant discusses the workings of electronic cash and payment. The site includes publications on electronic cash and has a detailed explanation of one electronic cash system.

<http://www.cwi.nl/~brands/index.html>

Sun Microsystem's Internet Commerce Group

Offers services and advice to companies that want to offer network services and do commerce over the Internet. They also offer news and other Internet commerce services links.

<http://www.incog.com/>



Year-X Electronic Commerce Information Center

This site provides news, events, a directory of services and software, and a long list of links.

<http://www.year-x.co.uk/ec/home.htm>

HTML

(see also "Software")

comp.infosystems.www.authoring.html

A Usenet newsgroup devoted to discussions of HTML authoring.

Front Page 1.1

This HTML editor, available from Microsoft, has a wizard that guides you through making your Web page.

<http://www.microsoft.com/intranet/prodinfo.htm>

HTML Transit Authoring Tool

This site advertises software that does template-based production of HTML pages and conversion of documents from different word-processing programs into HTML.

<http://www.process.com/htmltrans/trdata.htm>

Hypertext Mark-Up Language Site in Cern, Switzerland

Provides links to guides on HTML and how to construct World Wide Web pages.

<http://info.cern.ch/hypertext/WWW/MarkUp/MarkUp.html>

Lochnet Reference Guide

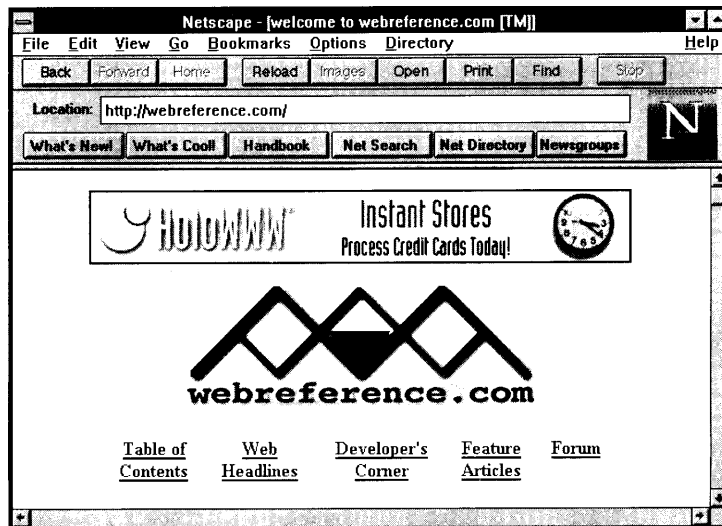
This site provides connections to books and publications that explain HTML.

<http://www.lochnet.com/lochusa/usrefer.htm>

Webmaster Reference Library

Reference guide with links to sources about running a Web site, getting a server running, building Web pages, and HTML.

<http://webreference.com>



Programming

Application Programming Interface (API)

Netscape's API is explained at this site, which also offers programming and design tips.

http://home.netscape.com/newsref/std/server_api.html

CGI Configuration: NCSA HTTPd Tutorial

A basic introduction to CGI and more advanced programming notes and guidelines are offered at this site.

<http://hoohoo.ncsa.uiuc.edu/cgi/>

comp.infosystems.www.authoring.cgi

A Usenet newsgroup devoted to discussions of CGI scripting.

comp.lang.java.programming

A Usenet newsgroup devoted to discussions of Java programming.

comp.lang.perl.modules

A Usenet newsgroup devoted to Perl programming.

Java

This site defines Java and explains its applications.

<http://www.intranet.co.uk/intranet/sidebars/java.html>

The NSAPI Versus the CGI Interface

This site includes an overview of the limitations of CGI and a discussion of the benefits of API programming within the context of a Netscape server.

http://home.netscape.com/newsref/std/nsapi_vs_cgi.html

“SSI, CGI, or API? Choosing the Right Tool for the Job”

This paper by Rob Denny describes these three programming languages and details how to choose the language to best meet your site's needs.

<http://solo.dc3.com/white/extending.html>

Virtual Directory Structure: NCSA HTTPd Tutorial

This site includes a basic introduction to SSI and more advanced programming notes and guidelines.

<http://hoofoo.ncsa.uiuc.edu/docs/tutorials/includes.html>

Software

EDI

Harbinger Corporation

<http://www.harbinger.net/>

MPACT Immedia

<http://www.mpactimmedia.com/>

Sterling Commerce

<http://www.stercomm.com/>

Graphics

Adobe Illustrator

<http://www.adobe.com/prodindex/illustrator/>

Adobe Photoshop

[http://www.adobe.com/prodindex/photoshop/
main.html](http://www.adobe.com/prodindex/photoshop/main.html)

Kai Powertools

<http://the.tech.mit.edu/KPT/KPT.html>

LView Pro

<http://www.lview.com>

Macromedia FreeHand

<http://www.macromedia.com/text/software/>

Map Edit

<http://www.boutell.com/mapedit/>

Map THIS

<http://galadriel.ecaetc.ohio-state.edu/tc/mt/>

Web Map

<http://www.city.net/cnx/software/webmap.html>

HTML Editors and Converters

Access Internet Assistant

<http://www.microsoft.com/msaccess/internet/ia/>

Corel WEB.DESIGNER

<http://techweb.cmp.com/products/techtools/html/corel.html>

Excel Internet Assistant

<http://www.microsoft.com/msexcel/internet/ia/>

HotDog Professional 2.0

<http://techweb.cmp.com/products/techtools/html/hotdog.html>

HoTMetaL Pro 3.0

<http://techweb.cmp.com/products/techtools/html/hotmetal.html>

HTML Transit

<http://www.infoaccess.com/products/transit/httoc.htm>

InContext Spider

<http://techweb.cmp.com/products/techtools/html/spider.html>

Live Markup

<http://www.mediatec.com/mediatech/>

Microsoft FrontPage 1.1

<http://techweb.cmp.com/products/techtools/html/frontpage.html>

Microsoft Internet Assistant

<http://www.microsoft.com/internet/>

Microsoft Schedule+ Internet Assistant

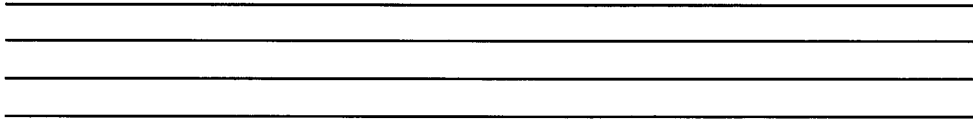
<http://www.microsoft.com/msscheduleplus/internet/ia/>

TILE for Lotus Notes

<http://tile.net/info/>

Web Author for Word

<http://www.qdeck.com/qdeck/products/WebAuthr/>

**WebIt**

<http://futures.wharton.upenn.edu/~attau791/webit.html>

Word Internet Assistant

<http://www.microsoft.com/msword/internet/ia/>

WordPerfect Internet Publisher

<http://wp.novell.com/elecpub/intpub.htm>

WPTOHTML for WordPerfect for DOS

<ftp://oak.oakland.edu/SimTel/msdos/wordperf/wpt60d10.zip>

Link Checkers**InContext WebAnalyzer**

<http://www.incontext.ca/products/analyze.html>

NetCarta WebMapper

<http://www.netcarta.com/prod/>

SiteSweeper

<http://www.sitetech.com/SiteSweeper/Sweeper.htm>

Logging**3Dstats**

<http://www.netstore.de/Supply/3Dstats/>

Analog

<http://www.statslab.cam.ac.uk/~sret1/analog/>

net.Analysis Desktop

<http://www.netgen.com/products/net.Analysis/>

WebTrends

http://www.egsoftware.com/PRODUCTS/WEBTREND/DEF_MAIN.HTM

Multimedia**Fountain**

<http://www.caligari.com/lvltwo/Zcalgari.html>

Internet Wave

<http://www.vocaltec.com>

Real Audio

<http://www.realaudio.com/>

Stream Works

[http://www.xingtech.com/streams/info/
streamwk_gen_info.html](http://www.xingtech.com/streams/info/streamwk_gen_info.html)

True Speech

<http://www.dspg.com>

VDO Live

<http://www.vdolive.com/>

WebFX

<http://www.paperinc.com/>

Wirl

<http://www.vream.com/>

Operating Systems

Apple Macintosh

<http://www.apple.com>

Novell Netware

<http://www.novell.com>

Unix

[http://www.yahoo.com/Computers_and_Internet/
Operating_Systems/Unix/](http://www.yahoo.com/Computers_and_Internet/Operating_Systems/Unix/)

Windows NT

<http://www.microsoft.com/ntserver/>

Search Tools

Excite

<http://www.excite.com/>

Glimpse HTTP

<http://glimpse.cs.arizona.edu:1994/ghttp/>

LiveLink Search

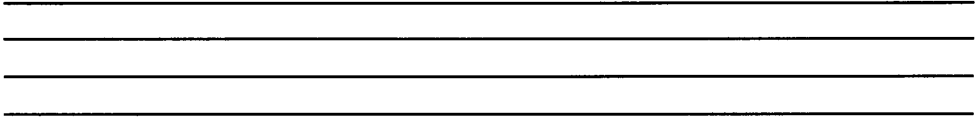
<http://www.opentext.com/livelink/>

Personal Library Software

<http://www.pls.com/>

Verity

<http://www.verity.com/>

**Web Browsers**

Internet Explorer

<http://www.microsoft.com/ie/>

Mariner

<http://www.mariner.ncd.com/>

Mosaic

http://www.spyglass.com/products/mosaic_download.html

Navigator

http://www.netscape.com/mirror/client_download.html

Web Surfer

<http://www.netmanage.com/netmanage.apps/websurfer.html>

Web Server Software

American Internet's SiteBuilder

<http://www.american.com/sitebuilder.htm>

Big Software's Big Business Web Server

<http://www.bigsoftware.com>

InterNotes Web Publisher

<http://www.lotus.com/inotes/>

Lotus Domino

<http://domino.lotus.com>

Microsoft's Internet Information Server

<http://www.microsoft.com/infoserv/>

Netscape's Enterprise Server

http://home.netscape.com/comprod/server_central/

Netscape's FastTrack

http://www.netscape.com/comprod/server_central/product/fast_track/index.html

Novell Netware Web Server

<http://corp.novell.com/market/apr96/mm000253.htm>

Open Market Secure Web Server

<http://www.openmarket.com/servers/>

O'Reilly and Associates' WebSite

<http://website.ora.com/>

Process Software's Purveyor Intraserver

<http://www.process.com/pintnet.htm>

Process Software's Purveyor WebServer

<http://www.process.com/intranets/dynamic.htm>

SuperWeb Server

<http://www.frontiertech.com/products/superweb.htm>

WebStar

<http://www.starnine.com/webstar/>

Website

Concord Systems, Inc.

<http://www.tiac.net/users/stakutis/csi.html>

iCat

<http://www.icat.com/>

Netscape Commerce Products

<http://www.netscape.com/comprod/>



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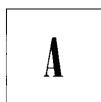
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Glossary



Address Resolution Protocol (see ARP)

Adobe Acrobat

A helper application that reads PDF (Portable Document Format) files, files created by converting printer output into compact files, fonts, and page layouts.

Advanced Research Projects Agency (see ARPA)

American Standard Code for Information Interchange (see ASCII)

anchor

The process used when linking two hypertext documents. To anchor a document, you connect the URL of the document you intend to link to the related word, phrase, or graphic in the original HTML document.

ARP (Address Resolution Protocol)

A method for finding a host's Ethernet address from information contained in its Internet address.

ARPA (Advanced Research Projects Agency)

The decentralized computer network of defense agencies and strategic command posts established by the US government in the 1960s to ensure the nuclear defense system would remain functional under a nuclear attack.

ARPANET

The first packet-switching network, developed by ARPA in 1972.

ASCII (American Standard Code for Information Interchange)

A standard numerical code for characters used so that any computer can read word processed or text-based programs.

ASC X12

(1) The committee commissioned by the Accredited Standards Committee to oversee and establish standards for the exchange of business information. (2) The EDI standards themselves that the committee developed and approved.

attribute

The HTML commands used by some tags that allow the author to make the tags more specific, defining for example, not only the placement of a graphic, but also its height and width.

auditing program

A program that monitors the users coming in and out of a system and the information they are accessing.

authentication

A security measure using the data encryption standard that verifies that a transmission or message was not altered.



bandwidth

The amount of data that one can send through any given communications circuit in one second.

bars

Lines that run horizontally across a Web page, often in various colors and shapes.

beta

Pre-release software programs offered for free to Internet users for testing purposes.

binary counting system

The counting system used by computers that has two as the base and uses the digits 0 and 1.

bit

The smallest unit of data in a computer's binary counting system.

blind signature

The process by which a bank stamps envelopes created by a customer's computer with validation seals and keeps the coins which are transferred inside them. The envelope is transferred back to the customer's computer, which places another coin inside the envelope to send to the vendor. These "blind signatures" protect the privacy of the customers.

BPR (Business Process Redesign)

An organizational effort to analyze and redesign existing business processes in order to streamline those processes used to create, manipulate, transfer, and store business-critical information.

browser plug-ins

Tools used to change, enhance, or extend the capabilities of a browser. Plug-ins are developed to be used within specific browsers and to interpret particular files or file formats (such as Shockwave, Real Audio, Adobe PDF).

bullet

A graphic or typographical feature (such as dots, diamonds, or arrows) that separates items in a list.

Business Process Redesign (see BPR)

buttons

Graphics with particular functions indicated by a symbol or word, such as backward pointing arrows that retrieve previously viewed documents.



cache

To store previously displayed information in the computer memory for quick retrieval. For example, most WWW browsers can cache a number of recently viewed pages so that the user can re-view them without downloading the pages again.

cardfile

A *Windows* accessory program that organizes and manages information such as names, directories, and phone numbers.

client-server technology

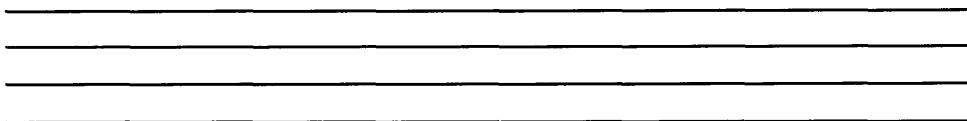
A type of distributed system in which software functions are split between a server computer and a client computer. A client requests information from the server computer, according to set protocols, and the server responds to the request.

Clipper Chip

An encryption system developed by the National Security Agency for export out of the US. This system is based on the idea of "key-escrow" and mandates the US government hold the keys to encryption in "escrow" in case any government agency wishes to view a company's encrypted messages.

conferencing

Meetings, either face-to-face or through telecommunications.

**content documents**

Reports, data, and other text documents on a Web.

conversion software

Programs (such as *HTML Transit*, *Accounting Analysis Pac (AAP)*, *Internet Assistant for Excel*, and *F9*) that translate word-processed documents into HTML form.

CyberCash

A software program that holds credit card information and transfers electronic money via the Internet.

cyberspace

The electronic space through which information flows in computer networks.

**database**

A program that organizes, stores, and retrieves data in response to user requests.

data element

A single fact or figure—the basic building block of the exchange of information.

datagram (see packet)**debug**

Identifying and fixing software malfunctions caused by errors in programming.

desktop-publishing tool

A software package for creating documents that appear to be professionally typeset, but are actually the output of a PC.

DigiCash

A leading company in digital money development that has produced a digital cash system called Ecash.

digital cash systems

Systems that allow micropayments on the Internet.

directory

A listing, somewhat like a table of contents, of the files and groups of files available on a particular server.

DNS (Domain Name System)

The computer system that translates text domain names into IP (numerical) addresses and maintains routing information for Internet transmissions.

Domain Name System (see DNS)

download

To move a file from a remote computer to your local computer.

downward capability

A feature of Internet software that allows it to work with less advanced software that is also running on the Internet.



Ecash

The digital cash system developed by DigiCash. In Ecash, customers open special accounts in banks that support Ecash, and then, with special software, customers and vendors can transfer money from the buyer's account to the vendor's account.

EDI (Electronic Data Interchange)

A way for computers to exchange information electronically using a shared, standard format.

EDIFACT

The United Nations' rules for Electronic Data Interchange for Administration, Commerce, and Transport. These rules are more global than the ASC X12 standards.

electronic commerce

The process of using electronic information technologies to improve business relationships between trading partners.

Electronic Data Interchange (see EDI)**electronic mail (see email)****email (also spelled e-mail)**

A fast, inexpensive, communication method that sends electronic mail messages through a computer network.

encrypt

A process that uses ciphers to alter information before transmitting it over a network, ensuring that the message cannot be read or altered during transmission.

encryption keys

Computer programs to encode and decode messages. For example, in public key encryption systems, the user is given a pair of keys—a public key and a private key. The public key uses a pair of different values to control a related encryption and decryption process. The sender encrypts with the receiver's public key, and the receiver then uses his private key, which is never published, to decode the message.

extension

An enhancement or addition to an existing standard. Extensions are often referred to in the context of proprietary HTML tags.



File Transfer Protocol (see FTP)

firewall

A combination of hardware and software used to isolate a computer or network and protect it from security risk.

First Virtual

A software program that electronically transfers funds from a buyer's credit card to a vendor's bank account without the exchange of credit card information over the Internet.

forms

Web data-entry screens or "fill-in forms" created with HTML tags and supported by some browsers.

frames

A Web-display feature in which the main browser window is divided into smaller window frames, each simultaneously displaying different HTML files.

FTP (File Transfer Protocol)

(1) A client/server program that transfers files between local and remote computers across the Internet using the File Transfer Protocol. (2) A protocol method that defines how to transfer files, such as software programs, graphics, or text files, from one place to another.

**gateway**

A computer system that reformats data so that the data can transfer between networks that are usually incompatible.

GIF (Graphics Interchange Format)

A standard for digitized images defined by *CompuServe* and commonly used on the World Wide Web.

Gopher

A menu-based tool for locating Internet resources that organizes host computer files into categories and sub-categories for quick, intuitive retrieval.

Graphics Interchange Format (see GIF)**groupware (also called Computer Supported Cooperative Work)**

Software tools and technology to support groups of people working together on a project, often at different sites.

**hardware**

The actual machines, such as computers, monitors, modems, and printers, used to run computer programs and complete other tasks.

header

The part of the electronic message that identifies information about the packet including content type, source, destination, function, and expected life span.

helper application

A program launched by a Web browser and used to display non-HTML files retrieved through a Web transmission.

home page

- (1) The opening screen on a World Wide Web site that allows users easy access to files and sources through hypertext links.
- (2) The Web page that opens when you launch a Web browser.

HTML (Hyper Text Mark-up Language)

Tags used to format text, incorporate graphics and sound, and imbed links to other documents at other sites on the World Wide Web. The resulting document is called hypertext.

HTTP (Hypertext Transport Protocol)

The communication protocol that runs between Web clients and servers. HTTP specifies the syntax of World Wide Web pages, allows for links, and also defines the specifications for page addresses (URLs).

hyperlink (see link)

Hyper Text Mark-up Language (see HTML)

Hypertext Transport Protocol (see HTTP)

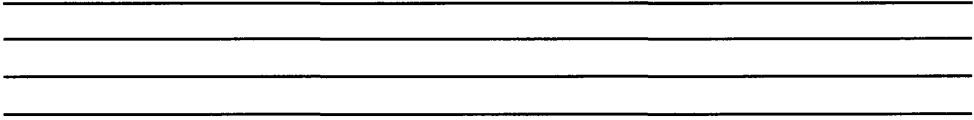


ICMP (Internet Control Message Protocol)

An extension to the Internet Protocol that creates error messages, tests packets, and sends information messages that are related to IP.

icons

Graphics with pictures that represent their functions, such as a picture of a printer that activates a print command.

**IETF (Internet Engineering Task Force)**

The open international community of designers, operators, vendors, and researchers who coordinate the planning and operation of the Internet.

image map

A graphic used for navigation through Web pages in which certain areas are defined to link to specific URLs.

indexing documents

Web documents that consist of links to other documents.

information distribution channel

The route by which information is dispersed.

information superhighway

A term coined by Al Gore for the up-and-coming high-speed global communications network that can carry voice, data, video, and other services around the world.

inline movie

A video application supported only by *Internet Explorer* that launches a video file from a still graphic displayed in a Web page.

interface

The boundary across which two systems communicate.

Internet

The world-wide network of networks that allows file transfers, remote login, electronic mail, news, and other services.

Internet Control Message Protocol (see ICMP)

Internet drafts (see also RFC)

Documents that are circulated throughout the international technical community and upon which the Internet and new Internet protocols are based. These documents are available online through various searchable indexes.

Internet Engineering Task Force (see IETF)

Internet Explorer

A Web browser created by Microsoft.

Internet Protocol (see IP)

Internet server

An Internet host site that offers a service to other computer users, such as mail, file transfer, news, etc.

IP (Internet Protocol) see also TCP/IP

The language or set of protocols that addresses data and delivers it to the correct location.



Joint Photographic Expert Group (see JPEG)

JPEG (Joint Photographic Expert Group)

(1) The original name of the committee that designed the standard image compression algorithm. (2) JPEG is also the name of the code that compresses either full-color or gray-scale digital images of real-world scenes. (3) As a file extension, JPEG is a file that has been compressed using the JPEG method.

**LAN (Local Area Network)**

A network that connects multiple computers across a small area to a server for the purpose of sharing resources, usually in a business office.

laptop

A portable personal computer that is light enough to sit comfortably on one's lap.

link (or hyperlink)

The connection that allows a user to transfer from one hypertext document to another by clicking on the link. Most browsers indicate links through words in blue type or interactive buttons.

Local Area Network (see LAN)**Mailing List**

An online discussion group to which you subscribe to receive messages directly to your email account.

mailto

An HTML tag that launches an email program on the client computer, inserts a predetermined address, and allows the user to send email quickly and easily by clicking on one link.

mainframe

A computer designated for batch rather than interactive use.

mapping

A process used in building EDI systems that determines which data elements in a company's computer system correspond to the standard data elements used in the ASC X12 or EDIFACT guidelines.

MBPS (Mega Bits Per Second)

A transfer rate for units of information.

Mega Bits Per Second (see MBPS)

methodology

An organized way of approaching a problem and implementing a solution.

micro-transactions (or micropayments)

The electronic exchange of very small amounts of money for information or services.

middleware

Software that runs between a client and a server to make communication possible.

MILNET

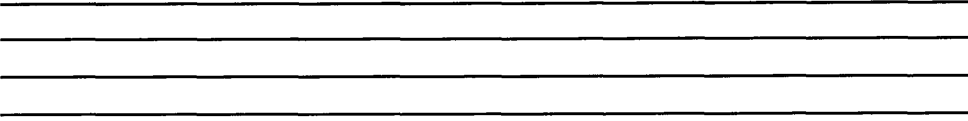
The military network that is part of the Defense Data Network and the Internet. MILNET is managed by the Defense Information Systems Agency.

MIME (Multi-Purpose Internet Mail Extension)

A program used to enhance the abilities of email; the extensions identify the type of content of the message and deliver the message to the correct application program.

modem (modulator-demodulator)

A piece of hardware that connects computers and allows them to communicate with one another by modulating digital data (generated by the source computer) into analog signals that travel through the phone lines to a remote modem. The remote modem then demodulates those analog signals back into digital data that the remote computer can understand.

**modular programming**

A programming method that breaks large software programs into smaller parts, called modules, in order to make development and maintenance simpler by spreading the workload over more than one computer.

modules

Smaller parts of large software programs.

Multi-Purpose Internet Mail Extension (see MIME)**navigation buttons**

Graphics on a Web page (often appearing as 3-D buttons) that provide links to other documents or pages.

Navigator

A World Wide Web client developed by Netscape.

NCP (Network Control Protocol)

The first set of protocols that allowed computers to communicate across platforms and systems.

network

A system of computers connected by telephone wires or other means that allow hardware and software to exchange data.

network administrator

The person responsible for the set up and control of a computer network.

Network Control Protocol (see NCP)**Network Operating Systems (see NOS)**

newsreader

A software program that provides access to Usenet newsgroup postings.

node

A terminal in a computer network.

NOS (Network Operating Systems)

An operating system that includes all the software needed to communicate with other computers over a network.



Online Checks System

A software program that allows merchants to accept and reproduce checks for customers over the phone or by fax.

Open Market

Software that supports electronic payment via a specially designed “payment URL” so that credit card or other sensitive financial data does not have to be exchanged over the Internet.

operating system

A type of software that manages the work done on a computer. The operating system is responsible for scheduling tasks, allotting storage space, and directing interface among computers and the various hardware with which they interact.

**packet**

The basic grouping of Internet data. Any message sent through the Internet is made up of packets that carry necessary information, such as the address. The packets are reconstructed when they reach their destination by TCP/IP protocols.

packet-switching

A communications method by which individual packets are routed between hosts through the most expedient route at that particular time.

Page Definition Language (see PDL)**password**

A string of characters that will allow a user to pass a firewall, enter a protected system, or access restricted data.

PDL (Page Definition Language)

A computer language that captures layout and format data so that previously-created documents can be displayed in their original format on a WWW site.

pilot project

A small project, run like an experiment, upon which you can build a bigger implementation.

platform

The computer operating system and also the standards that run them.

port

A channel in a communications system that is assigned to each application program.

posting

The message sent to a Newsgroup or a Mailing List; or the act of sending that message.

PostScript

A language that defines the appearance of text, graphics, and images on printed or displayed pages for laser printers and on-screen graphics systems.

proprietary software

Software produced by a particular software development company that will not run with software from another development company.

proprietary software provider

The developer or retailer of commercial software.

protocols

A set of rules that determine how computers will communicate. Protocols allow computers from different manufacturers and running different software to (1) agree on what data means and how to use it, (2) share computing applications, and (3) communicate back and forth.



Quicktime

Apple Computer's standard for integrating full-motion video and digitized sound into application programs.



RAND Corporation

America's foremost Cold War think-tank and the creator of the idea for the Internet.

Real Audio

A program that allows users to create and playback audio files.

real-time

Used to describe a system that provides a response with no noticeable time delay—usually microseconds or milliseconds.

remote login

Operating interactively on a computer, as if you were on a terminal attached to that system, even though you are not locally attached.

Request for Comments (see RFC)**resolver**

The computer program that sends queries to “resolve” address requests to DNS servers, which store routing information.

RFC (Request for Comments)

Internet informational documents and standards followed by developers in the Internet community. These standards are called for, developed, implemented, and tested by technical experts acting on their own initiative and reviewed by the Internet at large, not by a formal governing body.

root server

A server that stores information about the addresses housed on other DNS servers.

router

An internetworking device that analyzes network traffic and determines the best route for information (network packets) to travel.

routing

The process of examining the headers on files and moving them to the next site through the most expedient path to the destination address.

routing tables

Lists of instructions that correspond to address commands that are used to move files from a source to a destination.



segment

A group of related data elements arranged one after another.

server

An Internet host site that offers a service to other computer users, such as mail, file transfer, news, etc.

server-side include (see SSI)

service provider

A company that provides Internet service to individual users.

SGML (Standard Generalized Mark-Up Language)

A set of codes used to define components of a document to make them readable across various computer platforms and software programs. HTML, the markup language used to create Web pages on the Internet, is a subset of this standard.

Simple Mail Transport Protocol (see SMTP)

Simple Network Management Protocol (see SNMP)

SLIP/PPP (Serial Line Internet Protocol/Point to Point Protocol)

Two protocols that treat a computer like it has a complete and continuous connection to the Internet, instead of just being connected with a modem and telephone line on an intermittent basis. (Also called dedicated port, dial-up direct, or dedicated dial-up line service.)

SMTP (Simple Mail Transport Protocol)

Communication protocol standards used to exchange mail between Internet hosts.

SNMP (Simple Network Management Protocol)

Communications protocols used to monitor and control network devices.

software

Stored instructions (programs) that translate the information you send to your computer into language and commands that the computer can understand.

spent coin database

The database the bank uses to keep track of the serial numbers of each spent coin in the Ecash digital money system.

SSI (server-side include)

A command that directs the server to run a program, such as the inclusion of the current date on a Web page.

stack (also called suite)

A group of protocols that includes a cluster of related protocols.

Standard Generalized Mark-Up Language (see SGML)

suite (see stack)

Sybase

A database software developer that first used the phrase “client/server” to describe a software product that links databases and applications.

System Administrator (also called sysadmin)

The systems expert in charge of a computer or a network.



T3

A high-end connection that transmits data at extremely high speeds (45 MBPS).

table

A method of arranging data in rows and columns using special HTML tags that are recognized by some browsers.

tag

A formatting command in an HTML document.

tag nesting

The process of placing HTML tags inside other HTML tags in order to create multiple effects, such as text that is both bold and italic.

TCP (Transmission Control Protocol) see also TCP/IP

The shared language or set of protocols that breaks up data files into packets when sent and reassembles the packets in the correct order at the recipient site.

TCP/IP

The shared language or set of protocols that defines how computers on the Internet exchange information. IP addresses data and assures it arrives at the correct location. TCP breaks up data files into packets when sent and reassembles the packets in the correct order at the receiving site.

telecommuting

Working at home and communicating with your fellow workers through the phone lines, typically with computer, modem, and fax.

Telnet

A terminal emulation protocol that allows you to log in to other computer systems and function like a terminal on the Internet.

template

A pattern used as a guide to produce a document to specifications.

terminal

Part of your hardware, a terminal is an electronic device used to enter and receive data in a computer system.

text editor

Any type of program that allows you to create and manipulate text.

topology

The shape of the network cabling system.

transaction set

A group of segments strung together in an EDI system.

translation

The process used to communicate information from one computer system to another system made by a different manufacturer or running different software.

Transmission Control Protocol (see TCP)



UDP (User Datagram Protocol)

A collection of protocols that provide simple datagram transfer services.

Uniform Resource Locator (see URL)

upgrade

A newer or better version of some type of hardware or software.

upload

To move a file from your computer to another computer.

URL (Uniform Resource Locator)

Information used by the World Wide Web browser to determine where an Internet site is and how to connect to it.

Usenet Newsgroups

A collection of thousands of subject-specific bulletin-board type discussion groups on the Internet.

User Datagram Protocol (see UDP)

**virtual reality**

Computer simulations that use 3D graphics and devices (such as a data glove) that allow the user to interact with the simulation.

virus

A program that can “infect” and damage files and programs on your computer.

**W3 (see WWW)****WAN (Wide Area Network)**

A network usually constructed with serial lines, extending over distances greater than one kilometer.

Web browser

Software that reads HTML documents and launches the transfer protocols necessary to use the documents. Browsers can be either text mode (text only) or graphical user interface (incorporates graphics and mouse interaction).

Web document

A document, usually in HTML form, placed on the Web and accessed through a Web browser.

Web Master

The person in charge of creating and maintaining a Web site.

Web page

A block of data stored on a server and written in HTML.

Web server

A host computer on the Internet's World Wide Web or on an intranet that provides information and offers interaction to users connecting with Web browsers (Web client software).

What You See Is What You Get (see WYSIWYG)

word-processing program

A program for creating computer-generated documents that automate input, editing, and formatting tasks.

workstation

A general-purpose computer designed to be used by one person at a time; a workstation usually offers higher graphical performance than a PC, and it gives the user the ability to carry out several tasks at the same time.

World Wide Web (see WWW)

WWW (also called the Web, World Wide Web, or W3)

A hypertext-based system for finding and accessing Internet resources from many different entry points.

WYSIWYG (What You See Is What You Get)

A mode in an application program that allows you to view a document as it will appear as output while you are working on it.



From planning to implementation, **The CPA's Guide to Web Commerce**, published by **Kent Information Services, Inc.**, prepares you to meet the future of commerce on the World Wide Web.

Learn how a Web site can enhance marketing efforts, either as a point of sale or in another marketing function, depending upon the type of product or service offered.

Understand various online payment systems, Web storefront software packages, and servers that can be used in setting up a Web site.

Master the process of planning the Web commerce site and incorporating it into an overall marketing plan that emphasizes the role and responsibilities of the CPA.

Build a Web site using step-by-step instructions that lead readers through Web site construction and how to use HTML.

Chapter Sampler

- Understanding Electronic Commerce - how the process works.
- An Introduction to Electronic Payments - types of payment processing systems and how to implement them on a Web site.
- Developing Content for Your Commerce Site - how to use HTML to design Web pages.
- Security and Your Electronic Commerce Site - how to protect a Web site.

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