

## e-Business & e-Commerce (on CD)

### Objectives

- To understand how the Internet and World Wide Web are revolutionizing business processes.
- To introduce various business models used on the Web.
- To explore the advantages and disadvantages of creating an online business.
- To examine marketing, payment, security and legal issues that affect e-businesses.

*O Gold! I still prefer thee unto paper, Which makes bank credit look like a bark of vapour!*

Lord Byron

*It is an immutable law in business that words are words, explanations are explanations, promises are promises—but only performance is reality.*

Harold S. Green

*My name is Sherlock Holmes. It is my business to know what other people don't know.*

Sir Arthur Conan Doyle

*When you stop talking, you've lost your customer.*

Estee Lauder



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*Summary • Terminology • Self-Review Exercises • Answers to Self-Review Exercises • Exercises • Works Cited*

## 32.1 Introduction

We have entered the *Age of Knowledge*. The phrases “knowledge is power” and “content is king” are often used in reference to business conducted on the Internet. In the short history of e-business and e-commerce, events have demonstrated that successful e-businesses are those that recognize the needs of their target audiences and match those needs with relevant content. However, the ability to construct such an e-business is not limited to seasoned professionals—many successful online ventures have been started by students on college campuses.

The terms e-business and e-commerce, often used interchangeably, in fact have different meanings. According to Andrew Bartel, vice president and research leader of e-commerce trends at Giga Information Group, Inc., *e-commerce* refers to aspects of online business involving exchanges among customers, business partners and vendors. For example, suppliers interact with manufacturers, customers interact with sales representatives and shipment providers interact with distributors. *E-business* encompasses these elements, but also includes operations that are handled within the business itself. For example, production, development, corporate infrastructure and product management are aspects of e-business not included under the category of e-commerce.<sup>1</sup>

The introduction of e-business and e-commerce has increased the speed and ease with which business can be transacted, resulting in intense competition among online vendors. To remain viable, e-businesses must adjust to evolving technologies, continually integrate new systems and satisfy a wide variety of consumers. If a business fails to do so, its customers do not have far to go to buy from competitors.

Currently, the online medium enables people to pay bills, write and cash checks, trade stocks, take out loans, mortgage their homes and manage assets from the comfort of their homes or offices. In the future, money as we know it could cease to exist, having been replaced by such technologies as smart cards and digital cash. Intelligent programs will handle the financial and logistical aspects of interactions between individuals and corporations on the Internet. People will need only a connection, a computer or handheld wireless device and a digital form of payment to shop online. (Online monetary transactions are discussed in Section 32.5.)

The construction and maintenance of an e-business, especially one that processes a large number of transactions, requires technical, marketing and advertising expertise. Customers want access to products and services on a *24-by-7* basis (24 hours per day, 7 days per week). They also expect reliable, functional, fast and user-friendly services; companies that provide such services have higher success rates. One option for the improvement of e-business processes is *personalization*, which facilitates efficient online shopping and the smooth conduction of e-business transactions. Personalization is achieved by tracking a

consumer's movement through the Internet, combining this data with personal information provided by the consumer and employing the compiled information to customize interactions with Web sites and applications. (Personalization, marketing and customer relationship management are discussed in Section 32.4.)

Although personalization can increase the convenience of Internet navigation, some people consider it to be an invasion of privacy. Similar Internet privacy concerns arise regarding the sale of personal data collected by online organizations. Such information can include customers' names, addresses, purchasing history, credit-card numbers and medical history. We explore Internet privacy and legal issues in Section 32.7.

The conversion of *brick-and-mortar* businesses (businesses that have only a physical presence) into *click-and-mortar* businesses (businesses that have both an online and an offline presence) is occurring worldwide in nearly every industry. Businesses can now operate effectively without offices, because employees can communicate via phone, voice mail, fax, e-mail and the emerging capabilities of the Internet.

## 32.2 E-Business Models

The transition of a business into an e-business provides many benefits. An e-business can offer personalization, effective customer service and streamlined *supply-chain management* (the strategic management of distribution channels and the processes that support them). In this section, we explore the different types of businesses operating on the Internet, as well as introducing the technologies needed to build and run an e-commerce Web site.

Although the term “e-commerce” is relatively new (it was coined in the early 90s), large corporations have been conducting de facto e-commerce for decades by networking their computing systems with those of business partners and clients. For example, the banking industry uses *Electronic Funds Transfer (EFT)* to transfer money between accounts. In addition, many companies employ *Electronic Data Interchange (EDI)*, which facilitates the standardization of such business forms as purchase orders and invoices, allowing companies to share information with customers, vendors and business partners electronically. Until recently, e-commerce was feasible only for large companies. However, by using the Internet and the World Wide Web, even the smallest businesses can use EDI.

**Amazon.com**, eBay™, Yahoo! and other e-commerce sites have assisted in defining industry categories and business models on the Web. Entrepreneurs starting e-businesses and people interested in e-commerce should be aware of the various e-business models currently in use. In the subsections that follow, we review the storefront model, the auction model, dynamic pricing models, the portal model and other Web business models.

### 32.2.1 Storefront Model

The *storefront model* is what many people think of when they hear the word “e-business.” By providing a combination of transaction processing, security, online payment and information storage, the storefront model enables merchants to sell their products online. This model is a basic form of e-commerce in which buyers and sellers interact directly.

To conduct storefront e-commerce, merchants must organize online product catalogs, take orders through their Web sites, accept payments securely, send merchandise to customers and manage customer data (such as customer profiles). They must also market their sites to potential customers through various media.

### 32.2.2 Shopping-Cart Technology

One of the most commonly used e-commerce enablers is the *shopping cart*. This order-processing technology allows customers to accumulate items they wish to buy as they browse an e-business Web site. (See the **Amazon.com** feature.) Support for the shopping cart is provided by a product catalog, which resides on the *merchant server* in the form of a *database*. The merchant server is the data storage and management system employed by the merchant. Often, a network of computers performs all the functions necessary to run a Web site. A database is a section of the merchant server designed to store and report on large amounts of information. For example, a database for an online clothing retailer would typically include such product specifications as item description, size, availability, shipping information, stock level and on-order information. Databases also store customer information, including names, addresses, credit-card data and past purchases. The **Amazon.com** feature contains further information regarding these technologies and their implementations. Additional examples of e-businesses that use shopping-cart technology can be found at **www.kbkids.com**, **www.eddiebauer.com®** and **www.cdnnow.com**.

#### **Amazon.com**

Perhaps the most widely recognized example of an e-business that uses shopping-cart technology is **Amazon.com**.<sup>2</sup> Founded in 1994, the company has grown to become one of the world's largest online retailers. **Amazon.com** offers millions of products to more than 17 million customers in 160 countries.<sup>3</sup> The site also hosts online auctions. Although **Amazon.com** originally served as a mail-order book retailer, its product line has expanded to include music, videos, DVDs, electronic cards, consumer electronics, hardware, tools, beauty items and toys. **Amazon.com**'s catalog is growing constantly, and the site facilitates convenient navigation among millions of products.

**Amazon.com** uses a database on the *server side* (the merchant's computer systems) that offers customers on the *client side* (the customer's computer or handheld device) multiple ways to search for products. This system exemplifies a *client/server application*. The **Amazon.com** database consists of product specifications, availability, shipping information, prices, sales histories, reviews and in-depth product descriptions. In addition to providing customers with details on items for sale, this extensive database enables **Amazon.com** to cross-reference products. For example, a novel can be listed under various categories, including **fiction**, **bestsellers** and **recommended titles**.

**Amazon.com** provides personalized service to returning customers. A database keeps records of users' previous transactions, including items purchased, shipping addresses and credit-card information. Upon returning to the site, customers are greeted by name and presented with lists of titles that are recommended to them on the basis of their previous purchases. This enables the company to offer personalization that would otherwise be handled by sales representatives. **Amazon.com** also uses customer data to search for patterns and trends among its clientele. Such analysis of consumer behavior can assist the company in the improvement of its products and services.

### **Amazon.com (Cont.)**

The purchase process at **Amazon.com** is simple. The company's home page provides various search features and categorical options, allowing users to select the product or type of product they wish to locate. For example, the book *Internet & World Wide Web How to Program, Second Edition*, can be found by using the **Search Box** in the top-left corner of the home page. To purchase an item once it is found, users simply select the **Add to Shopping Cart** option in the top-right corner of the page. The shopping-cart technology processes the information and displays a list of the products in the shopping cart. Users then can change the quantity of each item, remove an item from the shopping cart, check out or continue shopping.

When users are ready to place their orders, they proceed to checkout. First-time visitors are prompted to fill out a personal-identification form in which they provide their names, billing addresses, shipping addresses, shipping preferences and credit-card information. Users are also asked to enter a password that they will use to access account data during future transactions. Once the shipping, billing and password information is confirmed, orders can be placed.

Customers returning to **Amazon.com** can use its *1-Click<sup>SM</sup>* system. This patented system allows consumers to reuse previously entered payment and shipping information, enabling them to place orders with a single click of the mouse. The 1-Click system exemplifies how an intelligently designed database application can improve the efficiency and convenience of business transactions.<sup>4</sup>

When the order process is complete, **Amazon.com** sends a confirmation e-mail to the user. A second e-mail is sent when an order is shipped, and a database monitors the status of all shipments. Users can track the status of their purchases until they leave the **Amazon.com** shipping center by selecting the **Your Account** link at the bottom of the page and entering their passwords. This will bring them to an **Account Maintenance** page. Orders can be cancelled at any time before the product is shipped, which usually occurs within 24 to 48 hours of purchase. **Amazon.com** has regional warehouses from which it can ship a majority of packages overnight without having to use express delivery services.

**Amazon.com** operates on secure servers that protect personal information. Users who feel uncomfortable using their credit cards on the Web can initiate orders through Amazon's Web site by entering the last five digits of their credit-card numbers. To complete such orders, users call Amazon's Customer Service Department and provide the remaining numbers.

### **32.2.3 Auction Model**

The Web offers a wide variety of auction sites, as well as sites that search auction sites to pinpoint the lowest prices on available items. Usually, auction sites act as forums through which Internet users can assume the role of either *seller* or *bidder*. Sellers can post items they wish to sell, the minimum prices they require to sell the items and deadlines to close the auctions. Some sites allow users to provide additional information, such as a photograph or a description of an item's condition. Bidders may search the site for items they are seeking, view the current bidding activity and place bids—usually in designated increments. Some sites auto-

mate the bidding process by allowing bidders to submit the maximum prices they will pay for auction items. On such sites, an electronic system continues bidding for a bidder until the bidder wins the auction or until the auction surpasses the bidder's maximum bid price. (Auction technology is explained in more depth in the eBay feature.)

The *reverse-auction model* allows buyers to set prices that sellers compete to match, or even beat. One example of a reverse-auction site is **priceline.com**, which is a popular site for purchasing airline tickets and making travel reservations. Usually, Priceline can process buyers' bids within one hour. A faster bidding option is available to sellers who are willing to set *reserve prices*. Although a reserve price is the lowest price that a seller will accept, the seller can set a reserve price that is higher than the minimum bid. If no bids meet the reserve price, the auction is unsuccessful. Most sellers who set reserve prices at **priceline.com** receive a series of bids within one hour of their initial posting. However, successful bids on items with reserve prices are binding, meaning that the buyer and seller must commit.

Auction sites usually receive a commission on each sale. When an auction is complete, the seller and winning bidder are notified, and methods of payment and delivery are decided on by the relevant parties. Most auction sites do not involve themselves in payment or delivery.

The auction model also is employed by *business-to-business (B2B)* Web sites. The buyers and the sellers in these auctions are companies. Companies use online auctions to sell excess inventory and to access new, price-sensitive customers. Three examples of B2B auction sites are DoveBid, Inc., (**www.dovebid.com**), WorldCall Exchange (**www.worldcallexchange.com**) and **U-Bid-It.com**.

### ***eBay™ and the Online Auction Model***

Online auctions are a successful method of conducting e-commerce. eBay (**www.ebay.com**) is both the leading online auction Web site and one of the world's most profitable e-businesses (Fig. 32.1).<sup>5</sup> The online auction house's roots lie in a 50-year-old novelty item—Pez® candy dispensers. Pam Omidyar, an avid collector of Pez® dispensers, came up with the idea of trading them over the Internet. In 1995, she and her husband created a company called AuctionWeb. The company, which was renamed eBay, now has as many as 4 million unique auctions in progress at any given time, adding approximately 450,000 new items each day.<sup>6</sup>

People can buy and sell just about anything on eBay. The company collects both a submission fee and a percentage of each sale amount. Submission fees are based on the amount of exposure sellers want their items to receive. For example, an additional fee wins an item a place among the “featured auctions” in a specific product category, whereas an even higher fee is required to be listed on the eBay home page under **Featured Items**. Listings are shown on the home page periodically. Alternatively, sellers can publish their product listings in a boldface font (for an additional charge).

eBay uses a database to manage its auctions. This database evolves dynamically as sellers and buyers enter personal identification and product information. The seller entering a product to be auctioned provides a description of the product, keywords, an initial price, a closing date for the auction and personal information. eBay then uses this data to produce the product profile seen by potential buyers (Fig. 32.2).

## eBay™ and the Online Auction Model (Cont.)



**Fig. 32.1** eBay home page. (These materials have been reproduced by Prentice Hall with the permission of eBay, Inc. COPYRIGHT © EBAY, INC. ALL RIGHTS RESERVED.)

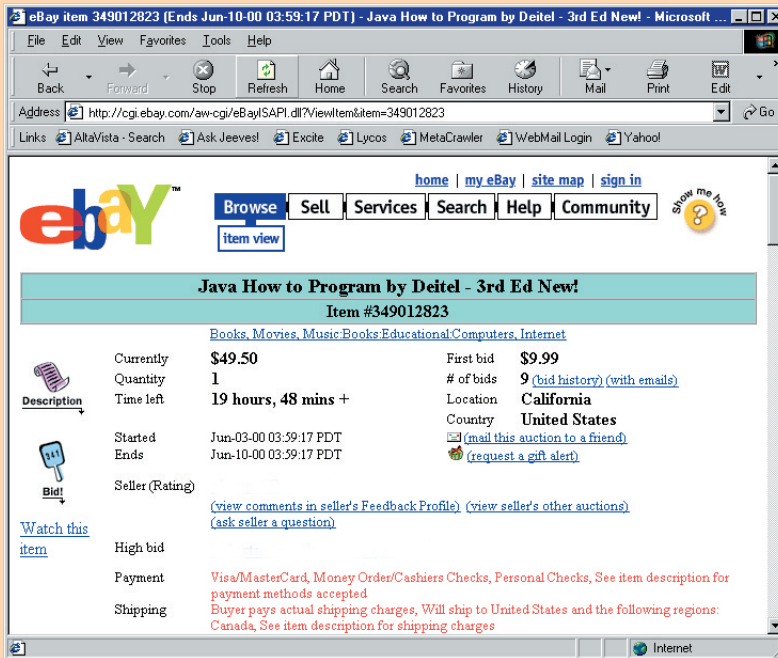
The auction process begins when the seller posts a description of the item for sale and fills in the appropriate registration information. The seller must specify a minimum opening bid. If potential buyers think this price is too high, the item might not receive any bids. In many cases, a reserve price is also set. Sellers often set an opening bid that is lower than the reserve price to generate bidding activity.

If a successful bid is made, the seller and the buyer negotiate the shipping details, warranty and other particulars. eBay serves as a liaison between the parties, providing an interface through which sellers and buyers can conduct business. However, eBay does not maintain a costly physical inventory or deal with shipping, handling or other services that other e-retailers must provide.

eBay's success has had a profound effect on the e-business industry. The company's founders took a limited-access offline business model and, by using the Internet, were able to bring it to the desktops of consumers worldwide. By implementing traditional marketing strategies and keeping the process simple, eBay has created a viable alternative to storefront-style e-commerce.

Other online auction sites include Yahoo! Auctions ([auctions.yahoo.com](http://auctions.yahoo.com)), Amazon Auctions ([www.amazon.com](http://www.amazon.com)), FairMarket, Inc. ([www.fairmarket.com](http://www.fairmarket.com)) and Sotheby's ([www.sothebys.com](http://www.sothebys.com)).

## eBay™ and the Online Auction Model (Cont.)



**Fig. 32.2** Placing a bid on eBay. (These materials have been reproduced by Prentice Hall with the permission of eBay, Inc. COPYRIGHT © EBAY, INC. ALL RIGHTS RESERVED.)

### 32.2.4 Portal Model

Portal sites offer visitors the chance to find almost anything they are looking for in one place. They often provide news, sports and weather information, as well as the ability to search the Web. When most people hear the word “portal,” they think of search engines. *Search engines* are *horizontal portals*, or portals that aggregate information on a broad range of topics. Other portals are more specific, offering a great deal of information pertaining to a single area of interest; such portals are called *vertical portals*.

Online shopping is a popular feature of many major portals. Sites such as **Hotbot.com**, **About.com**<sup>®</sup>, **altavista.com** and **Yahoo.com**<sup>®</sup> provide shopping pages that link users to thousands of sites carrying a variety of products.

Portals that link consumers to online merchants, online shopping malls and auction sites provide several advantages. These portals help users collect information on products and services, thus facilitating comparison shopping. Portals also allow users to browse independently owned storefronts—a capability that some online shopping malls fail to provide. For example, Yahoo! permits users to browse a variety of sites while maintaining the convenience of paying through their Yahoo! account.

### 32.2.5 Name-Your-Price Model

The *name-your-price* business model empowers customers by allowing them to state the price they are willing to pay for products and services. Many e-businesses that offer this service have formed partnerships with leaders of various industries, such as travel, lending and retail. The online business passes each customer's price request to an appropriate industry partner, who decides whether to sell the product or service to the customer at the stated price. A customer whose price is rejected can offer another price. However, if a price is accepted, the customer is obligated to make the purchase.

Many e-businesses use *intelligent agents* (such as *shopping bots*) to enhance their Web sites. Intelligent agents are programs that search, arrange and analyze large amounts of data. Shopping bots can both scour data contained within a single database or search the entire Web to find products and prices.

### 32.2.6 Comparison-Pricing Model

The *comparison-pricing model* allows customers to poll various merchants in search of the lowest price for a desired product or service. Comparison-pricing sites often generate revenue from partnerships with particular merchants. Although such sites can be convenient, users should be careful when employing these services, because they might not be getting the best prices available on the Web. Some services promote the products of merchants with which they have partnerships.

### 32.2.7 Demand-Sensitive Pricing Model

The Web empowers customers to demand better, faster service at cheaper prices by enabling them to shop in large groups and obtain group discounts. The concept behind the demand-sensitive pricing business model is to sell products to groups of people in a single transaction, thus reducing the cost per person. The sale of individual products can be expensive, because the vendor must include retail and overhead costs in the price while still generating a profit. By selling larger quantities to fewer buyers, a business can reduce selling costs, enabling it to offer lower prices while retaining or increasing its profit margins. MobShop<sup>SM</sup> ([www.mobshop.com](http://www.mobshop.com)) sells products for the home, electronics and computers using the demand-sensitive pricing model. Pricing and products vary between MobShop and similar sites. Therefore, customers should visit several such sites before making a purchase.

### 32.2.8 Bartering Model

Another popular e-business model is *bartering*, or the offering of one item in exchange for another. **Itex.com** (formerly **Ubarter.com**<sup>TM</sup>) allows individuals and companies to trade products through its site. At the site, traders make initial offers with the intention of bartering until they reach final agreements with buyers.

The business-to-business Web site iSolve<sup>SM</sup> ([www.isolve.com](http://www.isolve.com)), through which businesses can sell overstocked products and unneeded assets, also allows the sale of items on a barter basis. To conduct transactions at this site, potential customers send their pricing preferences to the merchant, who evaluates the offers. Final agreements often involve a combination of bartering and monetary payment.

### 32.3 Building an e-Business

There are numerous ways to design, develop and maintain an e-business. Some businesses establish online presences using *turnkey solutions*. (See the Yahoo! Store feature.) A turnkey solution is a prepackaged e-business. Another option for e-business development is e-business templates, which outline the business' basic structure, but allow the design to be determined by the owner. Alternatively, larger corporations and businesses with substantial funding can outsource the project to an organization that offers e-business solution packages. Large corporations also can build e-business solutions in-house.

#### **Yahoo! Store**

Online *store-builder* solutions allow merchants to set up online storefronts, complete with catalogs, shopping carts and order-processing capabilities. Although these usually fixed-price options are available to businesses of all sizes, they are ideal for small businesses that cannot afford custom solutions or do not possess secure merchant servers. *Yahoo! Store* is one of the most popular e-commerce store-builder solutions.<sup>7</sup> Yahoo! Store is available at [store.yahoo.com](http://store.yahoo.com).

Yahoo! Store charges monthly fees on the basis of the number of items that users want to sell. Designed to simplify the process of creating an online store, this turnkey solution contains all the features necessary to build a complete e-commerce site.

To set up a demo store, go to [store.yahoo.com](http://store.yahoo.com) and click the **Create a Store** link. Under **I'm a New User**, click on **Sign me up!** Users must enter the addresses and names of their sites. After clicking **Create**, users are presented with the Yahoo! Store Merchant Service Agreement, which must be accepted before a demo store can be built. After the user accepts the agreement, Yahoo! Store provides detailed directions to help merchants set up active online storefronts. The construction of a demo store is free, but orders cannot be processed.

Merchants can change the style of their Web sites by clicking on the **Look** button. Several style templates are available. In addition, the **Random** option can be used to change the colors and fonts. Yahoo! Store automatically sets up the shopping cart and secure order forms so customers can purchase products through new Web stores.

To set up a working storefront where orders can be accepted, users must sign on with Yahoo! Store and set up merchant accounts with banks, enabling the acceptance of credit-card payments. Generally, merchant banks and credit-card companies retain a small percentage of each transaction as their fee. (Online payments are discussed in Section 32.5.)

Yahoo! Store e-commerce sites are hosted on Yahoo! secure servers, which are maintained on a 24-by-7 basis. The site also backs up all the information needed to run a store and provides SSL technology to encrypt credit-card transactions. (We discuss SSL security in Section 32.6.2.)

Yahoo! Store merchants can track sales, analyze customers' paths through the Web to their sites and use the Yahoo! wallet. (E-wallets are discussed in Section 32.5.2.) In addition, Yahoo! lists each store in Yahoo! Shopping, allowing customers to access the store through a link at the Yahoo! Web site.<sup>8</sup>

## 32.4 e-Marketing

Competition is intense in the e-business and e-commerce worlds, and a solid e-marketing strategy can give a company an advantage. In this section, we explore various components of a *marketing campaign*, such as marketing research, advertising, promotions, branding and public relations (PR). We also discuss the importance of search engines and how they can be used to increase Web-site traffic.

### 32.4.1 Branding

A *brand* is typically defined as a name, logo or symbol that identifies a company's products or services. Brands should be unique, recognizable and easy to remember. *Brand equity* includes the value of tangible and intangible items, such as a brand's monetary value over time, customer perceptions and customer loyalty to a company, its products or services.<sup>9</sup> Businesses that already have a solid brand may find it easier to transfer their brand to the Internet, whereas Internet-only businesses must strive to develop a brand that customers trust and value.

### 32.4.2 Marketing Research

Marketing research can help a company develop its *marketing mix*, which includes product or service details and development, effective pricing, promotion and distribution. Traditionally, marketing research has consisted of focus groups, interviews, paper and telephone surveys, questionnaires and *secondary research* (findings based on previously collected data). Research can now be performed over the Internet, giving marketers a new, faster channel through which to find and analyze industry, customer and competitor information. The Internet also provides a relaxed and anonymous setting to hold focus-group discussions and distribute questionnaires.

To target marketing campaigns effectively, it is useful to learn about the *demographics* of Internet, World Wide Web and wireless device users. Demographics are statistics on the human population, including age, sex, marital status and income. Knowledge of customers' personal information can help to reveal their purchase preferences and buying power. Through additional research and analysis, marketers gain information about customers' *psychographics*, which can include family lifestyles, cultural backgrounds and values.<sup>10</sup>

Through *online focus groups*, current or potential consumers can present their opinions about products, services or ideas. This feedback can be useful when making critical decisions concerning the launch of new products, services or campaigns.

### 32.4.3 e-Mail Marketing

E-mail marketing campaigns provide an inexpensive and effective method of targeting potential customers. The marketer should define the *reach of a campaign*, or the span of people the marketer would like to target, including geographic locations and demographic profiles. The marketer should also determine the level of personalization of the campaign. Personalized *direct e-mail* targets consumers by using their names, offering them the right products at the right time and sending special promotions on the basis of their interests. *Internet mailing lists* can help marketers target customers through personalized e-mail. *Opt-in e-mail* is sent to peo-

ple who explicitly choose to receive offers, information and promotions.<sup>11</sup> However, it is important to avoid flooding opt-in customers with promotional e-mail. Excessive correspondence can decrease the effectiveness of an e-mail campaign. Marketers should avoid sending e-mail to people who have not shown interest in specific products or services. *Spamming*—the distribution of mass e-mails to people who have not expressed interest in receiving information from a company—can give a company a poor reputation.

#### 32.4.4 Promotions

*Promotions* can both attract visitors to a site and influence purchasing. Promotions can also be used to increase brand loyalty through reward programs. Frequent-flyer miles, point-based rewards, discounts, sweepstakes, free trials, free shipping and e-coupons are all examples of promotions. Although promotions are an effective way to establish contact with potential customers, it is vital to make sure that customers are becoming loyal to the company, rather than to its promotions or rewards program. In addition, the costs of the program must be monitored carefully.

#### 32.4.5 Consumer Tracking

While generating Web-site traffic is important to an e-business, it is not sufficient to ensure success. Keeping user profiles, recording visits and analyzing promotional and advertising results are helpful when measuring a marketing campaign's effectiveness. By discovering the *target market*—the group of people toward whom it is most profitable to aim a marketing campaign—a company can focus its campaign, increasing the number of visits, responses and purchases. Marketers use *log files* (files that contain data generated by site visits, including each visitor's location, IP address, time of visit and frequency of visits) and *log-file analysis* (the organization and summarization of information contained in log files) to monitor consumer information.

*ID cards* (*tracking devices* that provide Web sites with the numerical addresses of and information regarding consumers' operating systems) record and convey information requested by users. *Cookies*, another type of tracking device, are text files stored by Web sites on individuals' personal computers. Cookies allow a site to track the actions of a visitor. The first time a user visits a Web site, the user's computer might receive a cookie. This cookie then is reactivated each time the computer revisits that site. The information collected is intended to be an anonymous account of log-on times, visit durations, purchases made on the site, the site previously visited and the site visited next. Although the cookie resides on an individual's hard drive, it does not interact with other information stored on the system; furthermore, cookies can be read only by the hosts that place them.

#### 32.4.6 Electronic Advertising

E-business advertising is conducted through such media as television, movies, newspapers and magazines, as well as online and wireless channels. Advertising gives e-businesses the opportunity to establish and strengthen branding. The publication of URLs on all direct mailings, business cards, billboards, print, wireless advertisements and other media also can increase brand awareness, bringing more visitors to a site.

**e-Fact 32.1**

*The amount of money spent on e-business commercials during Super Bowl XXXIV totaled approximately \$135 million.<sup>12</sup>*

While newspapers, magazines, television and films all provide effective advertising channels, the Internet is quickly becoming an important medium through which to market companies, products and services. Online advertising can include the placement of links and banners on other companies' Web sites and the registration of a site with search engines and directories. In addition, businesses can charge other companies for placing their advertisements on its site, providing businesses with additional income.

**e-Fact 32.2**

*By 2003, revenues for online advertising are expected to reach \$13.3 billion, according to Jupiter Research.<sup>13</sup>*

Banner advertisements are similar to billboards seen along the highway, but banners offer the additional feature of interactivity. **Valueclick.com** and **DoubleClick.com** are examples of companies that offer banner-hosting services. Some companies base advertisement charges on the number of times a banner ad is viewed on a page, whereas others charge according to the number of click-throughs generated by the banner ad. However, in both systems, advertisers pay only when a viewer clicks on the banner ad and goes to that Web site.

### 32.4.7 Search Engines

A *search engine* is a program that scans Web sites for desired content, listing relevant sites on the basis of keywords or other search-engine ranking criteria. *Search-engine ranking* is important to bringing new visitors to a site. The method used by a search engine to rank a Web site will determine how "high" a site appears on lists of search results. Businesses can customize and register their sites to improve the sites' positions in search-engine results.

A *meta tag* is an XHTML tag that contains information about a Web page. Although the tag does not change how a Web page is displayed, it can contain a description of the page, keywords and the page's title. Search engines often use meta-tag information when ranking a site.

Some search engines rank sites by sending out a program, called a *spider*, to inspect each site. The spider reads the meta tags, determines the relevance of the Web page's information and keywords and then ranks the site according to that visit's findings. Marketers should examine competitors' sites, analyzing the sites' meta tags and content. It is important to have a site appear in the top results, because often people will not look further. For valuable information about keyword selection, visit **www.keywordcount.com** and **www.websearch.about.com/internet/websearch/insub2-m02.htm**.

### 32.4.8 Affiliate Programs

*Affiliate programs* have become a dominant and unique form of Internet marketing. An affiliate program is a form of partnership in which a company pays *affiliates* (other companies or individuals) on the basis of prespecified actions by visitors who *click-through* from an *affiliate site* to a *merchant site*.

Affiliate programs also can increase Web-site traffic. Affiliates post links on each other's sites in exchange for referral fees, which usually consist of a percentage of each sale or a fixed fee for click-throughs that result in sales. For example, **Befree.com** is a fee-based service that helps users set up affiliate programs. For more information, visit [www.befree.com](http://www.befree.com).

### 32.4.9 Public Relations

*Public relations (PR)* provides customers and employees with the latest information about products, services and such issues as company promotions and consumer reactions. A vital aspect of public relations is communication with customers and employees through press releases, speeches, special events, presentations and e-mail.

*Press releases*, which announce current events and other significant news to the press, can be delivered over the Web. For example, PR Web ([www.prweb.com](http://www.prweb.com)) allows marketers to submit press releases to its site for free. Online press releases sometimes include video clips of news appearances, speeches, commercials and advertisements, all of which can be effective publicity. Visit [www.prnewswire.com](http://www.prnewswire.com) and [www.business-wire.com](http://www.business-wire.com) to view lists of recent press releases, including audio and video news.

*Crisis management*, an aspect of PR, is conducted in response to problems a company is experiencing. When a company is doing poorly, its public-relations department will often issue information regarding the causes, as well as announcing what steps will be implemented to remedy the problem.

### 32.4.10 Customer Relationship Management (CRM)

*Customer relationship management (CRM)* focuses on the provision and maintenance of quality service for customers. Effective CRM involves communicating with customers and delivering products, services, information and solutions in response to customers' problems, wants and needs. Customer satisfaction is key to business success, because it is far less expensive to keep current customers than it is to acquire new ones. Online businesses should give particular attention to CRM, because transactions are often conducted through a series of additional parties, and the establishment of personal relationships with customers requires innovative strategies.

Aspects of CRM are *call handling* (the maintenance of outbound and inbound calls from customers and service representatives), *sales tracking* (the tracking and recording of all sales made) and *transaction support* (support for technology and personnel involved in business transactions). Unique functions of eCRM, the application of CRM to an e-business strategy, include the personalization and customization of customers' experiences and interactions with a Web site, call center or any other forum for customer contact with the e-business. The term iCRM (Internet customer relationship management) can be used interchangeably with eCRM in reference to e-business customer relationship management. Business analysts should review all CRM plan details and data, such as reductions in costs or an influx of customer complaints, to refine the CRM system.



#### e-Fact 32.3

According to the Boston Consulting Group, the cost of acquiring a new online customer is approximately thirty-four dollars, whereas marketing to a current customer through the Internet costs around seven dollars.<sup>14</sup>

## 32.5 Online Payments

Secure electronic funds transfer (EFT) is crucial to e-commerce. Credit-card payments, digital cash and e-wallets, smart cards, micropayments and electronic bill presentment and payment are methods for conducting online transactions. Many companies offer products, software and services that enable monetary transactions on the Web.

### 32.5.1 Credit-Card Payment

Although credit cards are a popular form of online payment, many people resist online credit-card transactions because of security concerns. Customers fear credit-card fraud by merchants and third parties. However, most credit cards, such as the Prodigy Internet<sup>®</sup> Mastercard<sup>®</sup> and American Express, have features that enable secure online and offline payments.

To accept credit-card payments, a merchant must have a *merchant account* with a bank. Traditional merchant accounts accept only *point-of-sale (POS) transactions*, or those that occur when customers present credit cards at stores. However, the growth of e-commerce has resulted in the establishment of specialized Internet merchant accounts that handle online credit-card transactions. These consist of *card-not-present (CNP) transactions*. For example, when users make credit-card purchases through the Internet, they can provide the card numbers and expiration dates, but the merchant does not see the actual cards involved in the transactions. A merchant account can be established through either a bank or a third-party service.<sup>15</sup>

### 32.5.2 Digital Cash and e-Wallets

*Digital cash* is one example of digital currency. It is stored electronically and can be used to make online electronic payments. Digital-cash accounts are similar to traditional bank accounts; consumers deposit money into digital-cash accounts for use in digital transactions. Often, digital cash is used in conjunction with other payment technologies, such as digital wallets. In addition to providing a payment alternative for customers with security concerns regarding online credit-card transactions, digital cash allows people who do not have credit cards to shop online.

To facilitate the credit-card order process, many companies are introducing *electronic wallet services*. *E-wallets* keep track of billing and shipping information so that it can be entered with one click at participating merchants' sites. E-wallets also store e-checks, e-cash and credit-card information for multiple cards.

### 32.5.3 Micropayments

Merchants are required to pay a fee for each credit-card transaction that they process, which becomes costly when customers purchase inexpensive items. Sometimes, the cost of an item is actually lower than the standard transaction fee, causing the merchant to incur losses. *Micropayment* (payments that generally do not exceed \$10) enables ways for nominally priced products and services (such as music, pictures, texts or videos) to be sold profitably over the Web. For instance, a phone bill is essentially an aggregation of micropayments that are charged periodically at set intervals to justify the transaction fee. To offer micropay-

ment processing, some companies have formed strategic partnerships with telephone carriers and utility companies.



#### e-Fact 32.4

According to an ongoing study conducted by Gartner Group, only a small percentage of on-line retailers offer a payment option for items priced under \$10.<sup>16</sup>

### 32.5.4 Smart Cards

Because they contain embedded computer chips, *smart cards* are able to hold more information than can ordinary credit cards with magnetic strips. Smart cards enable the convenient storage of information regarding such topics as health-care, personal identification, retail and banking.

Smart cards are either *contact* or *contactless*. To read and update the information on a contact smart card's computer chip, the card must be placed in a *smart card reader*. By contrast, a contactless smart card contains both a coiled antenna and a computer chip, enabling the card to transmit information. The contactless smart card enables faster information exchange than is possible with a contact card. For example, contactless cards are convenient for transportation services, such as automatic toll payments. A contactless smart card, when placed in a device in a car, will charge a user's account as he or she drives through toll booths.<sup>17</sup>

Smart cards can require users to enter passwords, thus offering a higher level of security than credit cards. Information maintained on smart cards can be designated as "read only" or as "no access." The cards can also be enhanced with additional security features, such as encryption and photo identification.

## 32.6 Security

Modern computer security involves the protection of electronic communications and the maintenance of network security. A successful, secure transaction must meet four fundamental requirements: *Privacy*, *integrity*, *authentication* and *nonrepudiation*. The *privacy issue* is: How do you ensure that the information you transmit over the Internet has not been captured or passed on to a third party without your knowledge? The *integrity issue* is: How do you ensure that the information you send or receive has not been compromised or altered? The *authentication issue* is: How do the sender and recipient of a message verify their identities? The *nonrepudiation issue* is: How do you legally prove that a message was sent or received? In addition to these requirements, network security addresses the issue of *availability*: How do we ensure that the network and the computer systems to which it connects will remain in operation continuously?

The initial explosion of the e-business industry forced businesses and consumers to focus on Internet, network and wireless security. Although this growth has slowed today, security issues still must be addressed. In addition, as new means of conducting business over the Internet (such as wireless transactions) are developed, further challenges to Internet security are created. In the next several sections, we will explore Internet security and the technologies and protocols used to secure e-commerce transactions and communications.

### 32.6.1 Public-Key Cryptography

The channels through which data passes are not secure; therefore, any private information transmitted through these channels must be protected. To secure information, data can be encrypted. *Cryptography* transforms data by using a *cipher*, or *cryptosystem* (a mathematical algorithm for the encryption of messages). An algorithm is a computer science term for “procedure.” A *key* (a string of digits that acts as a password in the cipher) makes the data incomprehensible to all but the sender and intended recipients. Unencrypted data is known as *plain text*, whereas encrypted data is called *ciphertext*. Only the intended recipients should possess the corresponding key to decrypt the ciphertext into plaintext.

Previously, organizations that wished to maintain a secure computing environment used *symmetric cryptography*, also known as *secret-key cryptography*. Secret-key cryptography uses the same secret key to encrypt and decrypt a message. When employing such cryptography, the sender encrypts a message using the secret key, then sends the encrypted message and the symmetric secret key to the intended recipient. However, problems with this method arise because, before two people can communicate securely, they must find a secure way to exchange the secret key. The privacy and integrity of the message could be compromised if the key is intercepted as it is transmitted from sender to recipient over unsecure channels. In addition, since both parties in the transaction use the same key to encipher and decipher a message, it is impossible to authenticate which party created the message.

*Public-key cryptography* is used primarily for authentication, data integrity and secret-key exchange. Public-key cryptography is asymmetric. It uses two inversely related keys: A *public key* and a *private key*. The private key is kept secret by its owner, whereas the public key is openly distributed. If the public key is used to encrypt a message, only the corresponding private key can decrypt it, and vice versa (Fig. 32.3). Each party in a transaction has both a public key and a private key. To transmit a message securely, the sender uses the recipient’s public key to encrypt the message. The recipient then decrypts the message using his or her unique private key. Assuming that the private key has been kept secret, the message cannot be read by anyone other than the intended recipient; through this method, the system ensures the privacy of the message. The defining property of a secure public-key algorithm is that it is computationally infeasible to deduce the private key from the public key; although the two keys are mathematically related, the derivation of one from the other would take enormous amounts of computing power and time. An outside party cannot participate in communication without the correct keys. However, if a third party does obtain the decryption key, the security of the system is compromised. In such a case, the user can simply change the key, instead of changing the entire encryption or decryption algorithm.

*Digital signatures*, the electronic equivalent of written signatures, are used in public-key cryptography to solve authentication and integrity problems. A digital signature authenticates the sender’s identity, and, like a written signature, it is difficult to forge. To create a digital signature, a sender first runs a plaintext message through a *hash function*, which is a mathematical calculation that gives the message a *hash value*. For example, you could take the plaintext message “Buy 100 shares of company X,” run it through a hash function and get a hash value of 42. The hash function could be as simple as adding up all the 1s in a message, although it is usually more complex. The hash value is also known as a *message digest*. The chance that two different messages will have the same message

digest is statistically insignificant. *Collision* occurs when multiple messages have the same hash value. However, it is computationally infeasible to compute a message from its hash value or to find two messages with the same hash value.

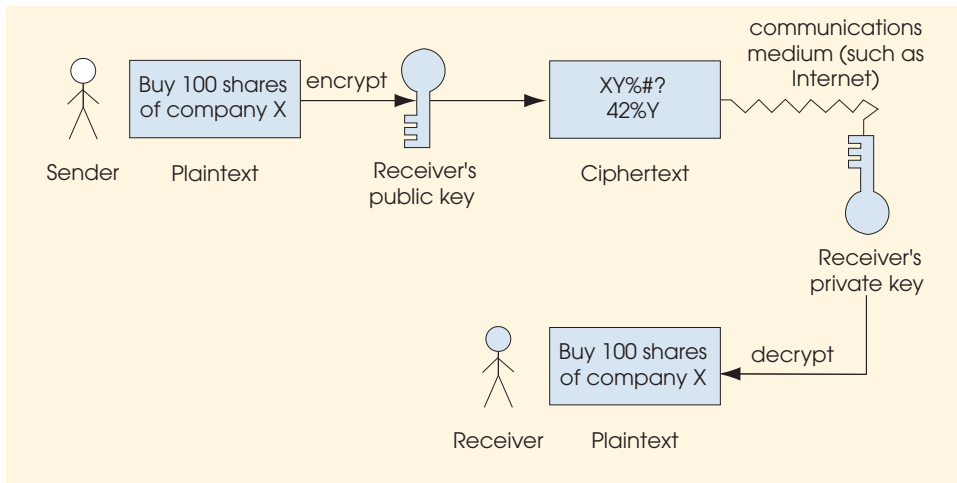
Next, the sender uses a private key to encrypt the message digest. This step creates a digital signature and authenticates the sender, because only the owner of that private key could encrypt the message. The original message, which has been encrypted with the recipient's public key, the digital signature and the hash function, are sent to the recipient. The recipient uses the sender's public key to decipher the original digital signature and reveal the message digest. The recipient then uses his or her own private key to decipher the original message. Finally, the recipient applies the hash function to the original message. If the hash value of the original message matches the message digest included in the signature, *message integrity* is ensured—the message has not been altered in transmission.

One problem with public-key cryptography is that anyone with a set of keys could potentially assume another party's identity. For example, imagine that a customer wants to place an order with an online merchant. How does the customer know that the Web site indeed belongs to that merchant and not to a third party who is masquerading as the merchant to steal credit-card information? *Public Key Infrastructure (PKI)* integrates public-key cryptography with *digital certificates* and *certificate authorities* to authenticate parties in a transaction. *Wireless PKI (WPKI)* is a security protocol specifically for wireless transmissions. Like regular PKI, WPKI authenticates users via digital certificates and encrypts messages using public-key cryptography. The system also ensures nonrepudiation.

Digital certificates are digital documents issued by a *certification authority (CA)*. A digital certificate includes the name of the subject (the company or individual being certified), the subject's public key, a serial number, an expiration date, the signature of the trusted certification authority and any other relevant information. A CA is a financial institution or other trusted third party, such as *VeriSign*. Because the CA assumes responsibility for authentication, it must check information carefully before issuing a digital certificate. Once issued, digital certificates are publicly available and are held by the certification authority in *certificate repositories*. VeriSign, Inc., is a leading certificate authority. (To learn more about VeriSign, visit [www.verisign.com](http://www.verisign.com).)

Many people still consider e-commerce to be insecure. However, transactions using PKI and digital certificates are more secure than point-of-sale credit-card purchases or the exchange of private information over phone lines or through the mail. The key algorithms used in most secure online transactions are nearly impossible to compromise. By some estimates, the key algorithms used in public-key cryptography are so secure that a century would pass before millions of today's computers working in parallel could break the codes.

The most commonly used public-key algorithm is *RSA*, an encryption system developed in 1977 by MIT professors Ron Rivest, Adi Shamir and Leonard Adleman. With the emergence of the Internet and the World Wide Web, these researchers' security work has become even more significant, playing a crucial role in e-commerce transactions. Today, RSA encryption and authentication technologies are used by most Fortune 1000 companies and leading e-businesses. The products are built into hundreds of millions of copies of the most popular Internet applications, including Web browsers, commerce servers and e-mail systems. For more information about RSA, cryptography and security, visit [www.rsasecurity.com](http://www.rsasecurity.com). Other organizations, such as Microsoft, also offer products to ensure security. (See the Microsoft Authenticode feature.)



**Fig. 32.3** Encrypting and decrypting a message using public-key cryptography.

### 32.6.2 Secure Sockets Layer (SSL)

The *Secure Sockets Layer (SSL)* protocol, developed by Netscape Communications, is a non-proprietary protocol commonly used to secure communications between two computers on the Internet and the Web.<sup>18,19</sup> SSL is built into many Web browsers, including Netscape Communicator and Microsoft Internet Explorer, as well as numerous other software products. Although SSL is not designed specifically to secure online transactions, most e-businesses use the technology for this purpose.

#### **Microsoft Authenticode: Authenticating Software**

How can consumers ensure that software ordered online is safe and has not been altered? Are there ways to avoid downloading a computer virus that could wipe out an entire system? Is the source of the software trustworthy? With the emergence of e-commerce, software companies began offering their products online, enabling customers to download software directly to their computers. Security technology is used to ensure that the downloaded software is authentic and has not been altered. *Microsoft Authenticode* is a security feature built into Microsoft Internet Explorer. When combined with VeriSign digital certificates (or *digital IDs*), Authenticode authenticates the publisher of the software and detects whether the software has been modified.

To use Microsoft Authenticode technology, software publishers must obtain digital certificates that are specifically designed for software publishing; such certificates can be obtained through certificate authorities, such as VeriSign. To obtain a certificate, a software publisher provides its public key and identification information. In addition, publishers must sign agreements that they will not distribute harmful software, which gives customers legal recourse if any downloaded software from certified publishers causes harm.

### **Microsoft Authenticode: Authenticating Software (Cont.)**

Microsoft Authenticode uses digital-signature technology to sign software (Section 32.6). The signed software and the publisher's digital certificate provide proof that the software is safe and has not been altered.

When a customer attempts to download a file, a dialog appears on the screen displaying the digital certificate and the name of the certificate authority. Links to the publisher and the certificate authority are provided so that customers can learn more about each party before they agree to download the software. If Microsoft Authenticode determines that the software has been compromised, the transaction is terminated. To learn more about Microsoft Authenticode, visit the following sites: [msdn.microsoft.com/workshop/security/authcode/signfaq.asp](http://msdn.microsoft.com/workshop/security/authcode/signfaq.asp) and [msdn.microsoft.com/workshop/security/authcode/authwp.asp](http://msdn.microsoft.com/workshop/security/authcode/authwp.asp).

In a standard online correspondence, a sender's message is passed to a *socket*, which receives and transmits information from a network. The socket then interprets the message through *Transmission Control Protocol/Internet Protocol (TCP/IP)*. TCP/IP is the standard set of protocols used for communication between computers on the Internet. Most Internet transmissions are sent as sets of individual message pieces, called *packets*. At the sending side, the packets of a message are numbered sequentially, and error-control information is attached to each packet. Each packet might travel a different path because IP routes packets in a manner so as to avoid traffic jams. The destination of a packet is determined by the *IP address* (an assigned address similar to that of a house in a neighborhood and used to identify a computer on a network). At the receiving end, the TCP makes sure that all of the packets have arrived, puts them in sequential order and determines whether the packets have arrived without alteration. If the packets have been modified or any data has been lost, TCP requests retransmission. When all of the data is successfully transmitted, the message is passed to the socket at the recipient's end. The socket translates the message back into a form that can be read by the recipient's application.<sup>20</sup> In a transaction using SSL, the sockets are secured using public-key cryptography.

SSL implements public-key technology, using the RSA algorithm and digital certificates, to authenticate the server in a transaction and to protect private information as it passes from one party to another over the Internet. SSL transactions do not require client authentication; many servers consider valid credit-card numbers to be sufficient for authentication in secure purchases. The security process begins when a client sends a message to a server. The server responds, sending its digital certificate to the client for authentication. Using public-key cryptography to communicate securely, the client and server negotiate *session keys* to continue the transaction. Session keys are symmetric secret keys (explained in Section 32.6.1) that are used for the duration of that transaction. Once the keys are established, the communication proceeds between the client and the server by using the session keys and digital certificates. Encrypted data is passed through TCP/IP, just as regular packets travel over the Internet. However, before sending a message with TCP/IP, the SSL protocol breaks the information into blocks, compresses it and encrypts it. Conversely, after the data reaches the recipient through TCP/IP, the SSL protocol decrypts the packets, then decompresses and assembles the data. These extra processes provide an extra layer of secu-

rity between TCP/IP and applications. SSL is used primarily to secure *point-to-point connections*—transmissions of data from one computer to another. The Transport Layer Security (TLS) protocol, designed by the Internet Engineering Task Force, is both similar to and compatible with SSL. Additional information regarding TLS can be found at [www.ietf.org/rfc/rfc2246.txt](http://www.ietf.org/rfc/rfc2246.txt).

Although SSL protects information as it is passed over the Internet, it does not protect private information, such as credit-card numbers, once the information is stored on the merchant's server. When a merchant receives credit-card information with an order, the information is often decrypted and stored on the merchant's server until the order is placed. If the server is not secure and the data is not encrypted, an unauthorized party can access the information. Hardware devices, such as *peripheral component interconnect (PCI) cards* designed for use in SSL transactions, can be installed on Web servers to process SSL transactions. This reduces the time and power that a server must devote to SSL transaction processing, thus reducing processing time and power, leaving the server free to perform other tasks.<sup>21</sup> For more information about the SSL protocol, explore the Netscape SSL tutorial at [developer.netscape.com/tech/security/ssl/protocol.html](http://developer.netscape.com/tech/security/ssl/protocol.html) and the Netscape Security Center site at [www.netscape.com/security/index.html](http://www.netscape.com/security/index.html).

### 32.6.3 WTLS

*Wireless Transport Layer Security (WTLS)* is the security protocol for the *Wireless Application Protocol (WAP)*. WAP is a standard used for wireless communications on mobile phones and other wireless devices. WTLS secures connections between wireless devices and application servers. It provides wireless technology with data integrity, privacy, authentication and denial-of-service security. WTLS encrypts data sent between a WAP-enabled wireless device and a WAP *gateway*, where messages are transferred from the wireless network to a wired network. At the gateway, data is decrypted from WTLS and subsequently, encrypted into SSL. For a few milliseconds, the data is not encrypted and, therefore, insecure. The brief lapse in security is called the *WAP gap*. Although this flaw causes the system to be insecure, it is extremely difficult to exploit the WAP gap in practice. No one has ever reported an attack on the WAP gap that has successfully caused the compromise of any secure data.

### 32.6.4 IPSec and Virtual Private Networks (VPN)

Organizations are taking advantage of the existing Internet infrastructure to create *Virtual Private Networks (VPNs)*, which link multiple networks, wireless users, customers and other remote users. A VPN is created by establishing a “secure tunnel” between multiple networks. *Internet Protocol Security (IPSec)* is one of the technologies used to secure the “tunnel” through which the data passes.

IPSec uses public-key and symmetric-key cryptography to ensure user authentication, data integrity and confidentiality. An IP packet is encrypted, and sent inside a regular IP packet. The recipient discards the outer IP packet, then decrypts the inner IP packet. For more information about IPSec, visit the *IPSec Developers Forum* at [www.ip-sec.com](http://www.ip-sec.com) and the *IPSec Working Group* of the IETF at [www.ietf.org/html.charters/ipsec-charter.html](http://www.ietf.org/html.charters/ipsec-charter.html).

### 32.6.5 Security Attacks

Recent cyberattacks on e-businesses have made the front-pages of newspapers worldwide. *Denial-of-service attacks (DoS)*, *viruses* and *worms* have cost companies billions of dollars. Typically, a denial-of-service attack occurs when a network or server is flooded with data packets. The influx of data greatly increases the traffic on the network, overwhelming the servers and making it impossible for legitimate users to download information. A *distributed denial-of-service attack* occurs when an unauthorized user gains illegitimate control of a network of computers (usually by installing viruses on the computers) and then uses all the computers simultaneously to attack. These attacks cause networked computers to crash or disconnect from the network, making services unavailable for legitimate users.

Viruses are computer programs—often sent as e-mail attachments or disguised as audio clips, video clips and games—that attach to, or overwrite other programs in efforts to replicate themselves. Viruses can corrupt files or even wipe out a hard drive. The spread of a virus occurs through sharing “infected” files embedded in e-mail attachments, documents or programs. Although worms are similar to viruses, a worm can spread and infect files on its own over a network; worms do not need to be attached to another program to spread. One of the most famous viruses to date is the *ILOVEYOU virus* which hit in May 2000, costing organizations and individuals billions of dollars. Viruses and worms are not limited to computers. In June 2000, a worm named *Timofonica* that was propagated through e-mail quickly made its way into the cell-phone network in Spain, sending prank calls and leaving text messages on subscribers’ phones.<sup>22</sup>

Who is responsible for viruses and denial-of-service attacks? Most often the responsible parties are referred to as *hackers* or *crackers*. Hackers and crackers are usually skilled programmers. According to some, hackers break into systems just for the thrill of it, without causing harm to the compromised systems, whereas crackers have malicious intent. However, regardless of an attack’s consequences, hackers and crackers break the law by accessing or damaging private information and computers. Many vendors offer antivirus utilities that help protect computers against viruses and other threats. For more information on such protection features, visit McAfee at [www.mcafee.com](http://www.mcafee.com) and Symantec at [www.symantec.com](http://www.symantec.com).

### 32.6.6 Network Security

The goal of network security is to allow authorized users access to information and services while preventing unauthorized users from gaining access to, and possibly corrupting, the network. A basic tool used in network security is the *firewall*, which protects a *local area network (LAN)* from intruders outside the network. For example, most companies have internal networks that allow employees to share files and access company information. Each LAN can be connected to the Internet through a gateway, which usually includes a firewall. A firewall acts as a safety barrier for data flowing into and out of the LAN. Firewalls can prohibit all data flow that is not expressly allowed, or they can allow all data flow that is not expressly prohibited. Although network security administrators can choose freely between these options, decisions should weigh the need for security against the need for functionality. Personal firewalls also can be used to protect a single PC.

What happens if a hacker gets inside a firewall? How does a company know whether an intruder has penetrated the firewall? Also, how can a company detect whether unauthorized employees are accessing restricted applications? *Intrusion detection systems* monitor

networks and application *log files* (files containing information on files, including who accessed them and when). If an intruder accesses either the network or an unauthorized application, the system detects the intrusion, halts the session and sets off an alarm to notify the system administrator.

## 32.7 Legal Issues

The Internet has posed significant challenges to the legal structure of the United States. For example, file-sharing technology enables widespread copyright infringement, while Web-site personalization mechanisms threaten consumers' privacy. In this section, we investigate the legal differences between our physical environment, which consists of temporal and geographic boundaries, and *cyberspace*, the realm of digital transmission not limited by geography. We also explore such issues as defamation, copyright and pornography as they relate to the Internet.

### 32.7.1 Privacy

Although an individual's right to privacy is not explicitly guaranteed by the United States Constitution, protection from government intrusion is implicitly guaranteed by the First, Fourth, Ninth and Fourteenth Amendments.<sup>23</sup> The Fourth Amendment provides U.S. citizens with the greatest assurance of privacy, protecting them from illegal search and seizure by the government:

*The right of the people to be secure in their persons, houses, papers, and effects, against unreasonable searches and seizures, shall not be violated, and no Warrant shall issue, but upon probable cause, supported by Oath or affirmation, and particularly describing the place to be searched, and the person or things to be seized.*

Many Internet companies collect personal information from users as they navigate through a site. While privacy advocates argue that such efforts violate individuals' privacy rights, online marketers and advertisers disagree, suggesting that the recording of user behavior and preferences helps online companies to better serve their customers. For example, if a user visits an online travel site and purchases a ticket from Boston to Philadelphia, the travel site might record this transaction. In the future, when a ticket goes on sale for the same flight, the Web site can notify the user.

Online privacy also is impacting companies' relationships with employees. Many businesses are implementing systems that regulate employee efficiency within workplaces. One of the newest surveillance technologies, *keystroke cops*, monitors employee activities on corporate and communications equipment.<sup>24</sup> Keystroke software is loaded onto the hard drive of an employee's computer, or it can be sent to an unsuspecting employee as an e-mail attachment. Once activated, the software registers each keystroke before it appears on the screen. In debates surrounding monitoring technology, a business' right to regulate the use of company time and equipment is pitted against employee's rights to privacy and freedom of speech. Situations can involve employees who neglect responsibilities to write personal e-mails, surf the Web or conduct online tirades against management in chat rooms.

### 32.7.2 Defamation

*Defamation* is the act of injuring another's reputation, honor or good name through false written or oral communication.<sup>25</sup> It is often difficult to win a defamation suit because the

First Amendment strongly protects the freedom of *anonymous speech* (speech by an unknown person or a person whose identity has been withheld).

Defamation consists of *slander* and *libel*. Slander is spoken defamation, whereas libelous statements are written or spoken in a context in which they have longevity and pervasiveness that exceed slander. For example, broadcast statements can be considered libelous, even though it is spoken.

To prove defamation, a *plaintiff* (the person bringing the argument to court) must meet five requirements: (1) The statement must have been published, spoken or broadcast; (2) There must be identification of the individual(s) through name or reasonable association; (3) The statement must, in fact, be defamatory; (4) There must be fault (for public persons, the statement must have been made in *actual malice*, or with the intention of causing harm; for private persons, the statement needs only to have been *negligent*, or published, spoken or broadcast when known to be false); and (5) There must be evidence of injury or *actual loss*.<sup>26</sup>

### 32.7.3 Sexually Explicit Speech

Although pornography is protected under the First Amendment, obscenity is not, and parties can be held legally responsible for obscene statements. As determined in *Miller v. California* (1973), the *Miller Test* identifies the criteria used to distinguish between obscenity and pornography. In the United States, pornography is protected by the First Amendment. To be determined obscene by the Miller Test, material must (1) Appeal to the prurient interest, according to contemporary community standards, and (2) When taken as a whole, lack serious literary, artistic, political or scientific value.<sup>27</sup>

The Internet, with its lack of geographic boundaries, challenges the Miller Test. As we have stated, the Test is dependent on contemporary community standards. In cyberspace, communities exist independently from physical locations. Cyberspace complicates issues of jurisdiction by making it possible, for example, for a person in Tennessee, where the tolerance for pornography is relatively low, to view a site that is hosted in California, where the tolerance is high.

The Internet possesses characteristics similar to those of broadcast media and print media, but problems arise in applying laws developed for those media to the Internet. Broadcasting is considered highly pervasive, and its content is strictly regulated. The Internet resembles broadcasting in its ability to reach a broad audience with little or no warning.<sup>28</sup> By contrast, the regulation of print media focuses on limiting the audience, rather than the content, of the material. Defined as *non-content-related means* (an effort to control the audience rather than the material), print restrictions, for example, allow an adult to purchase and view pornographic material, but limit an adolescent's ability to obtain that material. The Internet can mimic non-content related means by requiring users to provide identification before entering specific sites. Regulation of Web content could require the development of new legislation because of the Internet's unique features.

### 32.7.4 Copyright and Patents

*Copyright*, according to the U.S. Copyright Office, is the protection given to the author of an original piece, including "literary, dramatic, musical, artistic and certain other intellectual works," whether the work has been published or not. For example, copyright protection is provided for literature, music, sculpture and architecture. Copyright protects only the expression or form of an idea, not the idea itself.

Copyright protection provides incentive to the creators of original material by guaranteeing them credit for their work for a given amount of time. Currently, copyright protection is guaranteed for the life of the author plus 70 years. Concerns have been raised regarding the ability of traditional law to protect intellectual-property owners from online copyright infringement because of the ease with which material can be reproduced on the Internet. To complicate the issue further, *digital copies* are perfect duplicates of digital originals, making it difficult to differentiate authorized copies from pirated ones.

Patents, another form of intellectual property, grant the creator sole rights to a new discovery. Given the growth rate of the Internet, some argue that the 20-year duration of patents discourages continuous software development and improvement.

In 1998, the federal regulations governing the distribution of patents increased the scope of patentable discoveries to include “methods of doing business.”<sup>29</sup> To be granted a patent for a method of doing business, one must present an idea that is new and not obvious to a skilled person.<sup>30</sup>

## 32.8 XML and e-Commerce

XHTML (see Chapters 4 and 5) is a markup language used for the publishing of information on the Web. Content developers use a fixed set of XHTML tags to describe the elements of online documents, such as headers, paragraphs, boldface text and italicized text.

*Extensible Markup Language (XML)* is similar to XHTML, but XML does possess some distinguishing differences. XML allows users to create customized tags that are unique to specific applications so that users are not limited to using XHTML’s fixed set of publishing-industry-specific tags. For example, developers can make industry-specific (or even organization-specific) tags to categorize data more effectively within their communities. Some industries have already developed standardized XML tags for online document publication. For example, Mathematical Markup Language (MathML) is a standardized XML-based language for the marking up of mathematical formulas in documents, whereas Chemical Markup Language (CML) is a standardized XML-based language for the marking up of the molecular structure of chemicals.

The ability to customize tags enables business data to be used worldwide. For example, businesses can create XML tags specifically for invoices, electronic funds transfers, purchase orders and other business transactions. However, to be used effectively, an industry’s customized tags must be standardized across that industry.

Once tags are standardized, the browser must be able to recognize them. This is accomplished by building the tags into the browser or by downloading the appropriate plug-ins. The process can be automated, because customized XML tags could actually be used as a command for a browser to download the plug-in for the corresponding set of standardized tags.

The impact of XML on e-commerce is profound. XML gives online merchants a superior method of tracking product information. By using standardized tags for data, bots and search engines are able to find products online more quickly.

Many industries are using XML to improve Electronic Data Interchange (EDI), the transfer of data between computers. The health care industry, for example, uses XML to share patient information (even CAT-scans) among health care applications. This helps doctors access information and make decisions more quickly, which can improve patient care.<sup>31</sup>

The *Health Level Seven (HL7)* organization’s *Application Protocol for Electronic Data Exchange in Healthcare Environments* uses XML. This standard enables health care applica-

tions to exchange data electronically by specifying the layout and order of information. Patient names, addresses and insurance providers are tagged so that such data can be shared electronically among applications. For example, once a patient's identification information is entered, that information can be shared over the hospital's intranet with the labs and the accounting department, eliminating the need to re-enter the same data. HL7 is a non-profit, *American National Standards Institute (ANSI)*—an accredited Standards Developing Organization—that focuses on clinical and administrative data. To locate additional information on HL7, visit their Web site at [www.HL7.org](http://www.HL7.org); the ANSI Web site is [www.ansi.org](http://www.ansi.org).

The *XML Metadata Interchange Format (XMI)* is a standard that combines XML with the *Unified Modeling Language (UML)*. Software developers use UML to design object-oriented systems. XMI allows developers using object technology to tag design data. XMI tags allow developers to exchange design data over the Internet and interact with multiple vendors by using a variety of tools and applications. XMI thus enables people worldwide to collaborate on the designs of object-oriented software systems. For more information about XMI, visit [www-4.ibm.com/software/ad/features/xmi.html](http://www-4.ibm.com/software/ad/features/xmi.html).

Some software companies sell their products over the Web. The *Open Software Description Format (OSD)* is an XML specification that facilitates the distribution of software over the Internet. Using OSD, developers tag the structure of an application and its files. The tags describe each component of the software and its relationship to the other components in the application. The availability of software for download from the Web saves vendors the time, resources and money previously required to create boxed products and ship them to customers.

## 32.9 Internet and World Wide Web Resources

### *Storefront Model*

#### **barnesandnoble.com**

One of the first brick-and-mortar companies to make a large-scale commitment to the Web, Barnes & Noble sells books, e-books, CDs and software on their Web site, using shopping-cart technology.

#### **Moviefone.com**

Moviefone enhances its offline efforts by allowing people to buy advance tickets to movies from its Web site. Visitors can also view movie trailers, read cast interviews and get the latest movie reviews.

### *Auction Model*

#### **eBay.com**

This is the best known and most successful auction site on the Web.

#### **auctiontalk.com**

This site is an auction portal, providing links to other auctions and specific products being auctioned at various sites online.

### *Portal Model*

#### **google.com**

Google is an advanced search engine that ranks search results by the true popularity of the Web site. The more people that follow a link to a particular site, the higher the site will appear in a search.

#### **yahoo.com**

Yahoo! is a portal allowing people to search the Web using a traditional search engine, Yahoo! also offers games, e-business solutions and free e-mail.

### *Name-Your-Price Model*

#### **priceline.com**

The originator and patent holder of the name-your-price model, **Priceline.com** gives customers the ability to name their price for travel arrangements and scores of other products and services.

#### **ticketsnow.com**

Finding low-priced tickets to concerts and the theater is often difficult. This site allows people to bid for a lower price on their tickets.

### *Comparison-Pricing Model*

#### **www.google.com**

**Google.com** uses the comparison pricing model to sell products through its Web site. The site also hosts newsgroups on a broad range of topics.

#### **www.pricewatch.com**

People interested in building a computer or upgrading their current system will find the lowest prices on computer equipment on this price-comparison Web site.

### *Demand-Sensitive Pricing Model*

#### **www.mobshop.com**

Mobshop lowers prices as group buying increases.

#### **www.shop2gether.com**

This site gives visitors a chance to buy products at a lower price by buying with a group.

### *Bartering Model*

#### **www.itex.com**

This site facilitates B2B transactions by allowing members to trade assets through the **itex.com** Web site.

#### **www.allbusiness.com/barter**

This site allows businesses to sell virtually any product in return for Trade dollars. These Trade dollars can be used to purchase other products on the Web site.

### *Free Turnkey Solutions*

#### **www.websiteforfree.com**

The free portion of the site's services include home-page design, the ability to make site corrections and use of the site's educational resources.

#### **www.freemerchant.com**

This site provides a free turnkey solution for building an online store and offers hosting, store-building capabilities and a shopping-cart model at no cost to the user.

### *Credit-Card Payment*

#### **www.cybercash.com**

CyberCash (now owned by Verisign) enables e-merchants to accept credit-card payments online. The company also offers an e-wallet technology and an online bill-paying service.

#### **www.trintech.com**

Trintech offers a secure credit-card payment system that enables simultaneous purchases from multiple stores. This is used in virtual shopping malls.

### *E-Wallets*

**[www.visa.com/pd/ewallet/main.html](http://www.visa.com/pd/ewallet/main.html)**

Visa offers various e-wallets for use with Visa credit cards. These wallets are backed by the specific financial institution that issues the Visa card.

**[www.infogate.com](http://www.infogate.com)**

Infogate's product is a personalized desktop toolbar that offers easy access to news, sports, finance, travel and shopping. It includes an e-wallet feature for use at affiliate Internet stores.

### *Checking Account Payment*

**[www.debit-it.com](http://www.debit-it.com)**

This site allows merchants to draw against the balances in their checking accounts as valid forms of payment over the Internet.

### *Digital Cash*

**[www.ecash.net](http://www.ecash.net)**

eCash offers digital cash services for both online purchases and peer-to-peer payments.

**[www.flooz.com](http://www.flooz.com)**

Flooz is a form of digital cash used as a gift currency. Customers buy Flooz currency with their credit cards and then establish gift accounts. The recipient can then spend the Flooz account at participating stores.

### *Smart Cards*

**[www.visa.com/nt/chip/info.html](http://www.visa.com/nt/chip/info.html)**

This page contains information on a smart card being offered by Visa, which will contain a digital-cash application and e-wallet services.

**[www.americanexpress.com](http://www.americanexpress.com)**

American Express offers the Blue smart card (personal and corporate) and related services through its Web site.

### *Micropayments*

**[www.hut.fi/~jkytojok/micropayments](http://www.hut.fi/~jkytojok/micropayments)**

This is a paper on electronic-payment systems with a focus on micropayments.

**[www.echarge.com](http://www.echarge.com)**

eCharge partners with AT&T to provide micropayment services billed to the user's phone bill.

### *Online Privacy*

**[www.cdt.org](http://www.cdt.org)**

The *Center for Democracy and Technology* has expertise in the legal and technological development of the Web. Its mission is protecting privacy and free speech.

**[www.eff.org](http://www.eff.org)**

The *Electronic Frontier Foundation* is a nonprofit organization concerned with privacy and the freedom of expression in the digital age.

### *Search-Engine Information*

**[www.webdeveloper.com/html/html\\_metatags.html](http://www.webdeveloper.com/html/html_metatags.html)**

The Webdeveloper provides a tutorial on meta tags.

**[www.tiac.net/users/seeker/searchenginesub.html](http://www.tiac.net/users/seeker/searchenginesub.html)**

This site offers direct links to the registration portions of many search engines.

### *General Internet Marketing Information*

**[www.eMarketer.com](http://www.eMarketer.com)**

eMarketer aggregates content on Internet marketing, including news, statistics, profiles and reviews.

**[www.channelseven.com](http://www.channelseven.com)**

Channelseven is a news and information site that helps marketing and advertising professionals keep up-to-date with the Web.

### *Complete CRM Solutions*

**[www.peoplesoft.com](http://www.peoplesoft.com)**

PeopleSoft® created the *Vantive Enterprise* and the *Web-based Vantive eBusiness application suites* to fulfill companies' customer relationship management needs. The modules of the solution can be used separately or together and include *Vantive Quality*, *Vantive Support*, *Vantive Sales*, *Vantive Field Service* and *Vantive HelpDesk*.

**[www.pegasystems.com](http://www.pegasystems.com)**

Pegasystem offers a full range of CRM solutions for service, marketing and sales, using various channels of contact with consumers.

### *Security Resource Sites*

**[www.securitysearch.net](http://www.securitysearch.net)**

This is a comprehensive resource for computer security. The site has thousands of links to products, security companies, tools and more. The site also offers a free weekly newsletter with information about vulnerabilities.

**[theory.lcs.mit.edu/~rivest/crypto-security.html](http://theory.lcs.mit.edu/~rivest/crypto-security.html)**

The Ronald L. Rivest: Cryptography and Security site has an extensive list of links to security resources, including newsgroups, government agencies, FAQs, tutorials and more.

### *Government Sites for Computer Security*

**[www.usdoj.gov/criminal/cybercrime/compcrime.html](http://www.usdoj.gov/criminal/cybercrime/compcrime.html)**

Visit this site for information about the U. S. government's efforts against cybercrime or to read about recently prosecuted cases.

**[cs-www.ncsl.nist.gov](http://cs-www.ncsl.nist.gov)**

The Computer Security Resource Clearing House is a resource for network administrators and others concerned with security. This site has links to incident-reporting centers, information about security standards, events, publications and other resources.

### *Internet Security Vendors*

**[www.rsasecurity.com](http://www.rsasecurity.com)**

RSA is one of the leaders in electronic security. Visit this site for more information about its current products and tools, which are used by companies worldwide.

**[www.ca.com/protection](http://www.ca.com/protection)**

*Computer Associates* is a vendor of Internet security software. It has various software packages to help companies set up a firewall, scan files for viruses and protect against viruses.

### *Public-key Cryptography*

**[www.entrust.com](http://www.entrust.com)**

Entrust produces effective security software products using Public Key Infrastructure (PKI).

**[www.cse.dnd.ca](http://www.cse.dnd.ca)**

The Communication Security Establishment has a short tutorial on Public Key Infrastructure (PKI) that defines PKI, public-key cryptography and digital signatures.

### *Digital Signatures*

**[www.ietf.org/html.charters/xmlsig-charter.html](http://www.ietf.org/html.charters/xmlsig-charter.html)**

The XML Digital Signatures site was created by a group working to develop digital signatures using XML. You can view the group's goals and drafts of their work.

**[www.elock.com](http://www.elock.com)**

E-Lock Technologies is a vendor of digital-signature products used in Public Key Infrastructure. This site has a FAQs list covering cryptography, keys, certificates and signatures.

### *Digital Certificates*

**[www.verisign.com](http://www.verisign.com)**

VeriSign creates digital IDs for individuals, small businesses and large corporations. Check out its Web site for product information, news and downloads.

**[www.silanis.com/](http://www.silanis.com/)**

Silanis Technology is a vendor of digital-certificate software.

### *SSL*

**[www.netscape.com/security/index.html](http://www.netscape.com/security/index.html)**

The Netscape Security Center is an extensive resource for Internet and Web security. You will find news, tutorials, products and services on this site.

**[www.openssl.org](http://www.openssl.org)**

The Open SSL Project provides a free, open source toolkit for SSL.

### *Firewalls*

**[www.interhack.net/pubs/fwfaq](http://www.interhack.net/pubs/fwfaq)**

This site provides a list of FAQs on firewalls.

**[www.thegild.com/firewall](http://www.thegild.com/firewall)**

The *Firewall Product Overview* site has an extensive list of firewall products, with links to each vendor's site.

### *IPSec and VPNs*

**[www.ietf.org/html.charters/ipsec-charter.html](http://www.ietf.org/html.charters/ipsec-charter.html)**

The IPSec Working Group of the Internet Engineering Task Force (IETF) is a resource for technical information related to the IPSec protocol.

**[www.ip-sec.com](http://www.ip-sec.com)**

The IPSec Developers Forum allows vendors and users to test the interoperability of different IPSec products. The site includes technical documents related to the IPSec protocol.

### *Wireless Security*

**www.radicchio.cc**

Radicchio is a nonprofit organization dedicated to the development and promotion of standards and technologies for secure mobile business.

**www.mwif.org**

The Mobile Wireless Internet Forum (MWIF) aims at developing a standard for wireless technology and the mobile Internet. The site provides press releases detailing MWIF advancements.

### **SUMMARY**

- E-commerce involves exchanges among customers, business partners and vendors. E-business is composed of these same elements, but also includes operations that are handled within the business itself.
- The transition from brick-and-mortar businesses to click-and-mortar businesses is happening in all sectors of the economy.
- The banking industry uses Electronic Funds Transfer (EFT) to transfer money between accounts.
- Electronic Data Interchange (EDI) standardizes business forms, such as purchase orders and invoices, so that companies can share information electronically with customers, vendors and business partners.
- The storefront model combines transaction processing, security, online payment and information storage to enable merchants to sell their products online.
- Shopping-cart technology allows customers to accumulate items they wish to buy. A widely recognized example of an e-business that uses shopping-cart technology is **Amazon.com**.
- Auction sites allow users to pinpoint the lowest prices on available items.
- The reverse-auction model allows the buyer to set a price that sellers compete to match or even beat. A reserve price is the lowest price that the seller will accept.
- Portal sites give visitors the chance to find what they are looking for in one place. Search engines are horizontal portals, or portals that aggregate information on a broad range of topics. Vertical portals are more specific, offering information pertaining to a single area of interest.
- The name-your-price business model allows customers to state the price they are willing to pay for products and services.
- Intelligent agents are programs that search and arrange large amounts of data and report answers based on that data.
- The comparison-pricing model allows customers to poll a variety of merchants and find a desired product or service at the lowest price.
- The demand-sensitive-pricing business model follows the idea that the more people who buy a product in a single purchase, the lower the cost per person becomes.
- A popular method of conducting e-business is bartering, or offering one item in exchange for another.
- Some businesses establish an online presence by using a turnkey solution (a pre-packaged e-business). Other options include e-business templates that outline the basic structure, but allow the design to be determined by the owner.
- Components of a marketing campaign include branding, e-mail, marketing research, advertising, promotions and public relations.
- A brand is a name, logo or symbol that helps identify a company's products or services.
- Spamming is mass e-mailing to people who have not expressed interest in receiving such e-mails. Spamming can give a company a poor reputation.

- While generating Web-site traffic is important to the success of an e-business, keeping user profiles, recording visits and analyzing promotional and advertising results are also helpful in measuring a marketing campaign's effectiveness.
- The target market is the group of people toward whom it is most profitable to aim a marketing campaign. Tracking devices, such as ID cards and cookies, are used to monitor consumer behavior.
- A search engine is a program that scans Web sites and lists relevant sites on the basis of keywords or other search-engine ranking criteria. Some search engines rank sites by sending out a program, called a spider, to inspect the site.
- An affiliate program is a form of partnership in which a merchant pays affiliates (other companies or individuals) for specified actions taken by visitors who click-through from an affiliate site to a merchant site.
- Promotions can attract visitors to a site and can influence purchasing.
- Public relations (PR) keeps customers and employees current on the latest information about products, services and internal and external issues, such as company promotions and consumer reactions.
- Customer relationship management (CRM) focuses on providing and maintaining quality service for customers.
- Digital cash is one example of digital currency. It is stored electronically and can be used to make online electronic payments.
- E-wallets keep track of billing and shipping information so that it can be entered with one click at participating merchants' sites.
- Smart cards are able to store more information than ordinary credit cards. Smart cards can require the user to have a password, giving the smart card a security advantage over credit cards.
- There are four fundamental requirements of a successful and secure transaction: privacy, integrity, authentication and nonrepudiation.
- Public-key cryptography uses two inversely related keys: a public key and a private key. The most commonly used public-key algorithm is RSA.
- The Secure Sockets Layer (SSL) protocol is commonly used to secure communication on the Internet and the Web. SSL uses public-key technology and digital certificates to authenticate the server in a transaction and to protect private information as it passes from one party to another over the Internet.
- Defamation is the act of injuring another's reputation, honor or good name through false written or oral communication. Defamation consists of two parts, slander and libel. Slander is spoken defamation, whereas libelous statements are written or spoken in a context in which they have longevity and pervasiveness that exceed slander.
- The Miller Test identifies the criteria used to distinguish between obscenity and pornography.
- Copyright is the protection given to the author of an original piece.
- Extensible Markup Language (XML) allows users to create customized tags unique to specific applications. The ability to customize tags will allow business data to be used worldwide.
- The Open Software Description Format (OSD) is an XML specification that enables the distribution of software over the Internet.

## TERMINOLOGY

24-by-7  
actual loss  
actual malice

affiliate program  
affiliate site  
anonymous speech

asymmetric keys  
authentication  
barter  
bidder  
brand  
brand equity  
brick-and-mortar business  
business-to-business (B2B)  
call handling  
card-not-present (CNP)  
certificate authority  
certificate repositories  
cipher  
click-and-mortar business  
click-through  
client/server application  
collision  
comparison-pricing model  
contact smart card  
contactless smart card  
contemporary community standards  
cookie  
copyright  
cracker  
crisis management  
cryptography  
cryptosystem  
customer relationship management (CRM)  
cyberspace  
database  
decryption key  
defamation  
demand-sensitive pricing  
demographic  
digital cash  
digital certificate  
digital copy  
digital signature  
digital wallet  
direct e-mail  
distributed denial-of-service  
dynamic pricing  
e-business  
e-commerce  
Electronic Data Interchange (EDI)  
Electronic Funds Transfer (EFT)  
electronic wallet  
encipher  
encryption  
firewall  
gateway  
hacker  
hash function  
hash value  
horizontal portal  
ID card  
integrity  
intelligent agent  
Internet mailing list  
intrusion detection system  
IP address  
IPSec (Internet Protocol Security)  
key  
key algorithm  
keystroke cops  
libel  
local area network (LAN)  
log file  
log-file analysis  
marketing mix  
m-business  
m-commerce  
merchant account  
merchant server  
merchant site  
message digest  
message integrity  
meta tag  
Metadata Interchange Format (XMI)  
method of doing business  
micropayment  
Miller Test  
name-your-price model  
negligent  
noncontent-related means  
nonrepudiation  
online focus group  
Open Software Description Format (OSD)  
opt-in  
packet  
patent  
peripheral component interconnection (PCI)  
personalization  
plaintext  
point-of-sale (POS) transaction  
point-to-point connection  
portal  
press release  
privacy  
private key

psychographics	socket
public key	spamming
Public Key Infrastructure (PKI)	spider
public relations	storefront
public-key algorithm	storefront model
public-key cryptography	supply chain management
reach	symmetric cryptography
reliability	symmetric secret key
reserve price	target market
reverse auction	TCP/IP
RSA	transaction support
sales tracking	turnkey solution
search engine	Unified Modeling Language (UML)
secondary research	user profile
secret key	vertical portal
secret-key cryptography	Virtual Private Network (VPN)
secure sockets layer (SSL)	virus
seller	WAP gap
shopping bot	Web bug
shopping cart	wireless application protocol (WAP)
slander	wireless PKI (WPKI)
smart card	wireless transport layer security (WTLS)
smart-card reader	worm

## SELF-REVIEW EXERCISES

- 32.1** State whether each of the following is *true* or *false*. If *false*, explain why.
- To conduct electronic commerce, a company must implement storefront technology.
  - Electronic Data Interchange (EDI) is the system that uses standardized electronic forms to facilitate transactions between businesses and their customers, suppliers and distributors.
  - In public-key technology, the same key is used to both encrypt and decrypt a message.
  - Secure Sockets Layer protects data stored on the merchant server.
  - Secure Electronic Transaction is another name for Secure Sockets Layer.
  - A shopping bot is a shopping cart that allows you to buy items from different stores, all at the same time.
  - XML allows developers to create unique tags to define specialized data.
- 32.2** Fill in the blanks in each of the following statements:
- Customers are able to store products they wish to purchase in a \_\_\_\_\_ while they continue to browse the online catalog.
  - Public-Key Encryption uses two types of keys, the \_\_\_\_\_ and the \_\_\_\_\_.
  - \_\_\_\_\_ learn more about a customer over time.
  - The type of cryptography in which the message sender and recipient both hold an identical key is called \_\_\_\_\_.
  - A customer can store purchase information and multiple credit cards in an electronic purchasing and storage device called a \_\_\_\_\_.

## ANSWERS TO SELF-REVIEW EXERCISES

- 32.1** a) False. Companies have many options when it comes to the design of their e-business. A storefront is a popular method, but it is not the only method. b) True. c) False. Separate, inversely

related public and private keys are used. d) False. Secure Sockets Layer is an Internet security protocol, which secures the transfer of information in electronic communication. It does not protect data stored on a merchant server. e) False. Secure Electronic Transaction is a security protocol designed by Visa and MasterCard as a more secure alternative to Secure Sockets Layer. f) False. A shopping bot can be used to search multiple Web sites for the best available prices and availability. g) True.

**32.2** a) Shopping cart. b) Public key, private key. c) Intelligent agents. d) Secret-key encryption. e) Electronic wallet.

## EXERCISES

**32.3** State whether each of the following is *true* or *false*. If *false*, explain why.

- A search engine pays companies for pre-specified actions taken by visitors who click through from an affiliate site.
- CRM attracts visitors to a site and uses private-key encryption.
- Smart cards can store more information than credit cards.
- RSA is a method of preventing slander and libel on the Web.
- The Open Software Description Format (OSD) allows software to be distributed over the Internet.

**32.4** Fill in the blanks in each of the following statements:

- \_\_\_\_\_ is stored electronically and can be used to make online electronic payments.
- The \_\_\_\_\_ model allows customers to poll a variety of merchants and find a desired product or service at the lowest price.
- The \_\_\_\_\_ model combines transaction processing, security, online payment and information storage to enable merchants to sell their products online.
- There are four fundamental requirements of a successful, secure transaction: \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_ and \_\_\_\_\_.
- The \_\_\_\_\_ identifies the criteria used to distinguish between obscenity and pornography.

**32.5** Define each of the following terms:

- Cryptography.
- Public key.
- SSL
- Auction.
- Personalization.
- E-wallet.
- Shopping bot.
- Intelligent agent.
- Private key.
- XML
- Cookies.

**32.6** Make a spreadsheet containing a column for each of the following business models: store-front model, auction model, name-your-price-model and B2B-exchange model. In each column, list three e-businesses that operate in the corresponding model. Visit the Web site of each of the companies you have selected. Answer the following questions:

- Do the companies operate with more than one of the defined business models (e.g., store-front and auction)? If, so which models do they implement?
- Are the companies Internet-only companies, or click-and-mortar businesses?
- How do the companies generate revenue?

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The notation **<www.domain-name.com>** indicates that the citation is for information found at that Web site.

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