

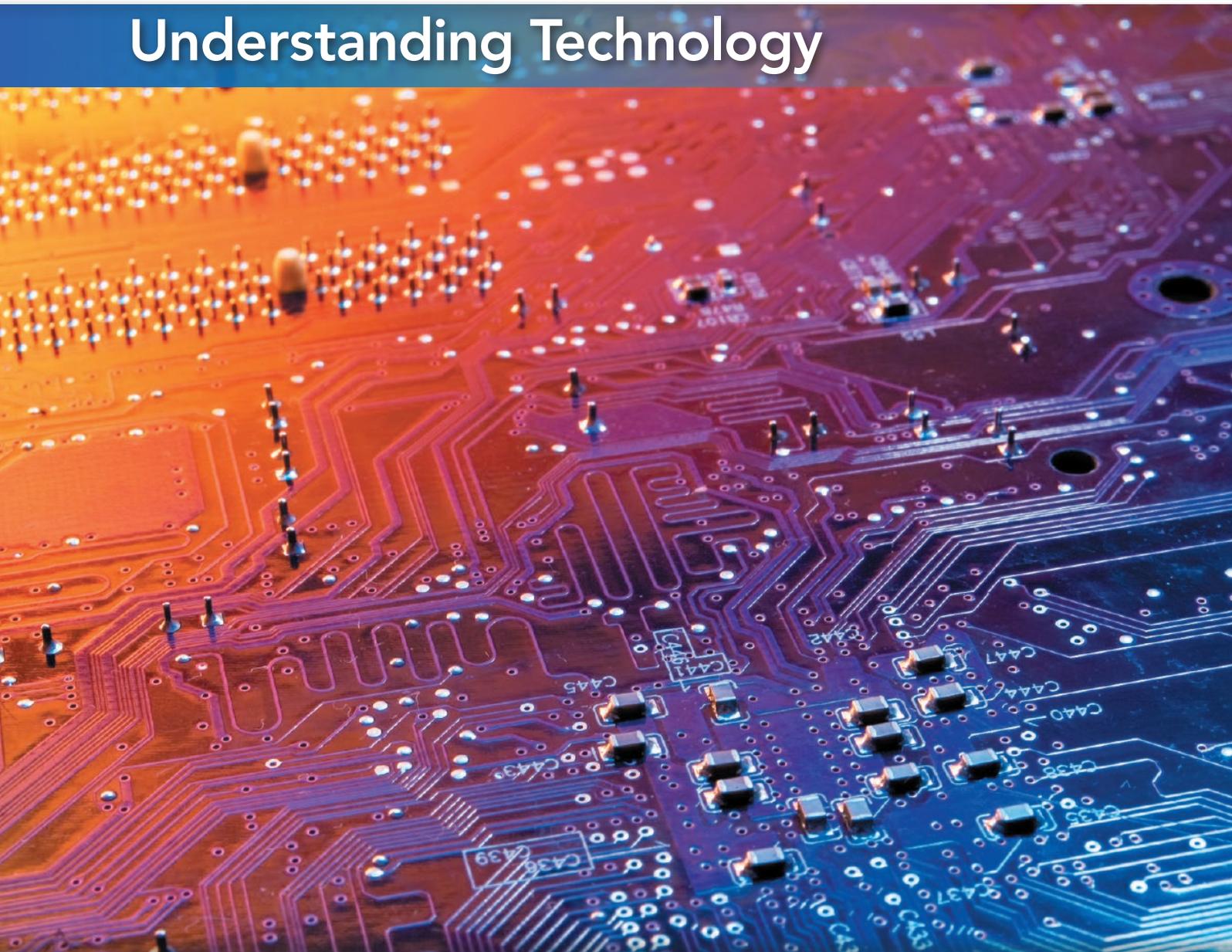
Sampler

 PARADIGM
EDUCATION SOLUTIONS

COMPUTERS

Fifth Edition

Understanding Technology

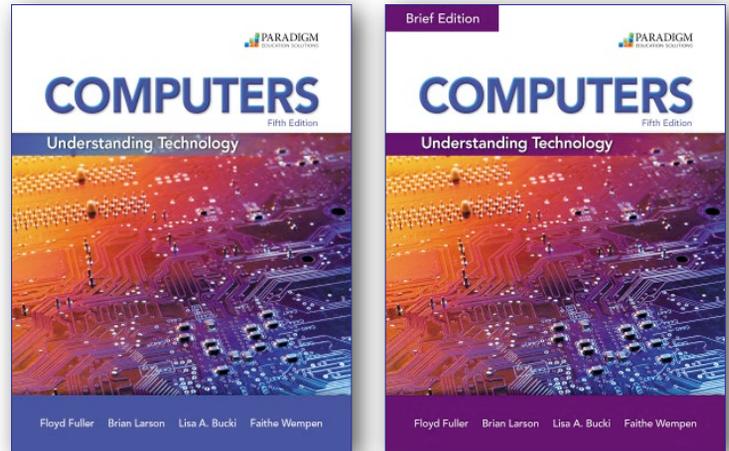


Floyd Fuller Brian Larson Lisa A. Bucki Faithe Wempen

Motivate your Students to Learn Key Computer Concepts

New 5th edition!

Paradigm's all-new *Computers: Understanding Technology* provides comprehensive, up-to-date coverage of computer concepts—including hardware, software, networks, and the Internet, as well as programming, security, and ethics. Available in Comprehensive and Brief versions, the fifth edition is competency-based and objective-driven. It gives you and your students:



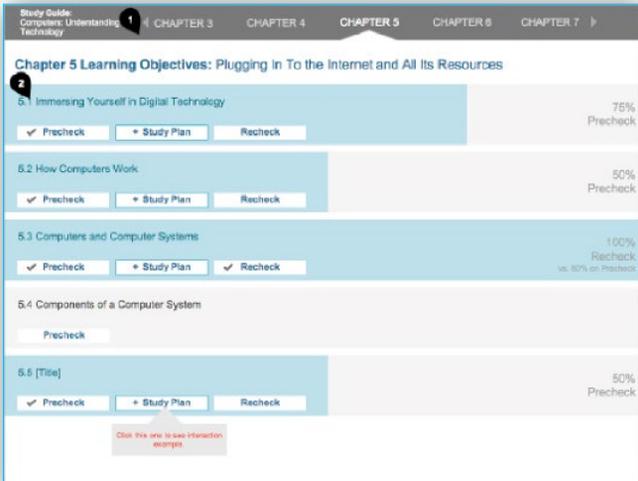
Interactivity. A responsive design that guides students to become active learners.

- Precheck and Recheck quizzes test student competency on each learning objective in the course and helps them track their progress.
- Diverse learning resources like video tutorials and research articles meet the unique learning preferences of individual students.

Flexible content delivery. Choose the method that works best for your class.

SNAP with Integrated eBook

- Students and instructors can access all course resources through a web-based training and assessment system. Key assignments, quizzes, and test results are uploaded into an online gradebook.
- SNAP automatically returns a customized Study Plan for each student, with concept-level feedback and links to the resources that will help the student master the corresponding learning objective.



Learning Objective	Completion Status	Actions
5.1 Immersing Yourself in Digital Technology	75% Precheck	Precheck, Study Plan, Recheck
5.2 How Computers Work	50% Precheck	Precheck, Study Plan, Recheck
5.3 Computers and Computer Systems	100% Recheck vs. 90% at Precheck	Precheck, Study Plan, Recheck
5.4 Components of a Computer System	Precheck	Precheck
5.6 [Title]	50% Precheck	Precheck, Study Plan, Recheck

Study Plan

Multiplatform eBook

- Students can hyperlink to additional content, flash cards, interactive chapter summaries and glossary, and games.
- eBook provides immediate feedback on Precheck and Recheck quizzes, as well as selected end-of-chapter exercises.

Chapter Features

Learning Objectives

- 5.1 Describe the overall types of activities made possible by the Internet.
- 5.2 Explain how to connect to the Internet, including needed hardware and software and different types of connections.
- 5.3 Discuss how the Internet delivers page information to a web browser from the specified IP address or URL as you navigate the web.
- 5.4 Describe the language used to create web pages and the basics of publishing to a website.
- 5.5 Describe how to use basic web browser techniques to view web pages and content.
- 5.6 Use fundamental search techniques to find information on the web.
- 5.7 Discuss diverse uses and services on the Internet, including the emergence of social media and services.
- 5.8 Behave appropriately as a member of the Internet community.

Learning Objectives are numbered and align with major sections of chapter.

Section headings divide a chapter into major sections that align with the learning objectives listed on the chapter opener page.

Precheck tests students' knowledge of each objective prior to studying. It addresses a particular term or concept covered in the section. **Note:** Throughout the book, the green arrow icon  indicates online resources that are available in the eBook and in SNAP.



Precheck 5.1

Check your understanding of the concepts covered by this objective.

Infographics add interesting facts and visual emphasis to reinforce and expand on important and interesting concepts.

Tracking Down Tech features challenge students to get off the computer and out of the study lab, to explore on campus and beyond to learn about technology while completing a scavenger hunt.

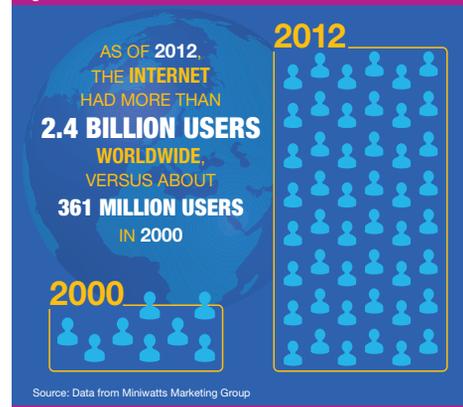
Tracking Down Tech >>>>>>

Observing the Internet in Action

The Internet enables you to interact with people and information sources around the globe. Connecting to the Internet greatly expands what you can do with a computer or mobile device. You can take advantage of what the Internet has to offer nearly any place and any time using

a variety of technologies, which you will learn about in this chapter. Visit <http://CUT5.emcp.net/TrackingDownTech5> to get instructions for a scavenger hunt that will lead you to discover examples of the Internet in action on campus and beyond.

Figure 5.1



Video Activities highlight interesting tech topics, and both expand on and reinforce material covered in the textbook. Each video ends with 5 Checkpoint questions.



Activity 5.1.1

Video
Real-Time Meetings

Practical TECH

Saving Money on Mobile Service

The data plans for mobile phones and other devices can be expensive. You can save money, however, by taking advantage of the options offered by different carriers. For instance, many carriers allow you to share a data plan among multiple devices—perhaps two family phones and a tablet or two sharing one data plan. In such a case, if one user needs a data allowance but doesn't use it much, the users of the devices share the monthly data allowance provided by the plan. At least one wireless carrier (AT&T)

offers a data "day pass"; it lets you use the Internet with your device periodically for a reasonable fee (much less than you would spend for a monthly data plan). Another way to save is to have a small data plan and connect through wireless networks whenever possible. Most smartphones can connect to a home or other wireless network and through these connections avoid using the data allowance.

Practical Tech features provide real-world examples and advice about the best technology or method to use to accomplish tasks or achieve objectives.

Tech Career Explorer features give students a flavor for IT career options and opportunities.

Hands On step-by-step activities give students an opportunity to begin working with tech by completing a task directly related to the concept material they are studying.

Hands On

Get Ready with Airplane Mode

To make sure you will be ready for your next trip, find airplane mode on your mobile device. Follow the steps presented at <http://CUT5.emcp.net/AirplaneModeSetting>.

Recheck test students at the end of each section to check their understanding of the key concepts covered in the section.

Practice Activities engage students in drag-and-drop, hotspot, and other interactions to reinforce and test their knowledge and understanding of key graphics.

Hotspot features focus on wireless technology and its interesting twists, perspectives, and uses related to communications and community-building issues.

Hotspot

Understanding Airplane Mode

Making a call using a mobile phone during a commercial airline flight is prohibited by the Federal Aviation Association (FAA). However, late in 2013, the FAA changed its policy to allow the use of some personal electronic devices (PEDs) during all phases of a flight, including takeoff and landing. Most major airlines offer Wi-Fi service, so now you can use your ebook reader or tablet throughout a flight. (Because of the sizes of notebook computers and certain devices, you must still stow them during takeoff and landing.) As of early 2014, additional rule changes with regard to the use of cell phones were also under consideration. Each carrier also may set its own specific policies for use of personal electronic devices, as well as setting fees (if any) for online wireless services.

There's one catch for using your device in flight—you must put it in airplane mode or otherwise disable cellular service in the device's settings. (Depending on the device

and manufacturer, you may see another name for airplane mode, such as *flight mode*, *offline mode*, or *standalone mode*.) Using airplane mode prevents the device from sending and receiving calls, text messages, and other forms of data. Enabling airplane mode may also turn off additional signaling features that could interfere with the plane's avionics.

While in airplane mode, devices generally consume less power. This means that using airplane mode will help preserve battery life, which can be an advantage on a long flight.



Tech Career Explorer

Checking Out TED

The mission of the nonprofit organization TED (Technology, Entertainment, and Design) is to spread inspired and innovative ideas worldwide. TED's primary means of spreading ideas is through recorded video talks by interesting and thought-provoking people. If you want to learn cutting-edge ideas about technology, personal and global challenges, and more, you can watch free TED Talks on those topics. Go to <http://CUT5.emcp.net/CheckingOutTED> to explore a tech field that might interest you as a career.

Recheck 5.1

Recheck your understanding of the concepts covered by this objective.

Activity 5.2.1

Practice
The Structure of the Internet

Article Activities provide succinct overviews of additional topics that are closely related to the material covered in the textbook.

Activity 5.3.1

Article
Browser Evolution

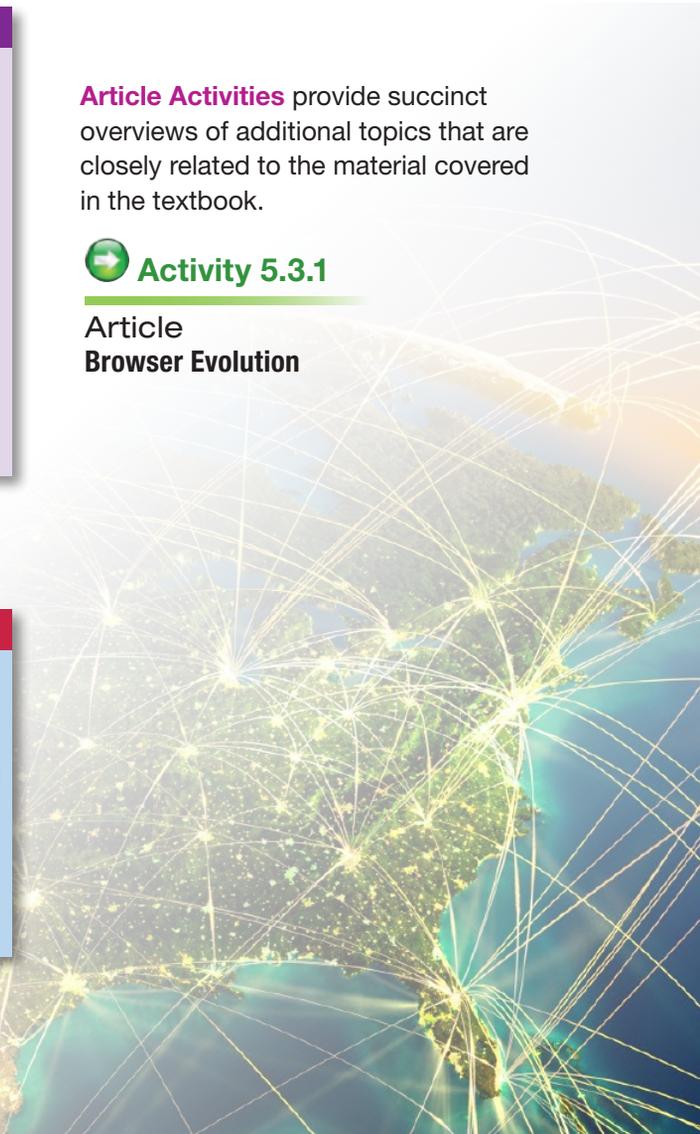
Cutting Edge features showcase hot new technologies.

Cutting Edge

Introducing Web 3.0, the Semantic Web

The term *Web 2.0* was coined in 2004 by Tim O'Reilly at a conference sponsored by the company he founded, O'Reilly Media. At that time, interaction and collaboration were beginning to occur online, most notably through websites such as Facebook and Twitter. Now that Web 2.0 is part of the Internet's "present," experts are increasingly using the term *Web 3.0* (or sometimes *Semantic Web*) to describe the Internet's future. Possibilities for Web 3.0 developments may include machine-generated (rather than human-sourced) information, three-dimensional (3-D) simulations and expanded or enhanced reality (including

the widespread use of sensors), greatly expanded use of high-quality video by computers and other devices, and much more.



Tech Ethics features highlight ethical issues and situations in IT. These provide an ongoing discussion of ethics in the profession.

Links that are boldfaced and blue connect students with relevant information online.

End-of-chapter study aids can be accessed online through provided links and include the following:

- Chapter Summaries
- Study Notes
- Presentations
- Glossary
- Flash Cards
- Games

Most end-of-chapter exercises and assessments have the option to be done through the eBook or SNAP for added interactivity.

Tech Ethics

The Stored Communications Act

Do you know that different legal standards apply to the privacy of your information stored online versus on your local hard disk drive? Law enforcement authorities need a warrant and probable cause to search your home and your local hard drive, but they may need only a subpoena or a court order and prior notice to look at your online storage.

The Stored Communications Act (SCA), which was part of the Electronic Communications Privacy Act of 1986, enacted some privacy protections for electronic data held by a third party (such as your online storage provider), but it only goes so far. The SCA protections for electronic data

are similar to the Fourth Amendment protections against unreasonable search and seizure. Legal precedents establishing the limits of this protection are still evolving, and it has even been suggested that the SCA is unconstitutional because it permits a lower standard of privacy than the Fourth Amendment would normally provide.

For a summary of recent legal decisions about this issue, see <http://CUT5.emcp.net/SCA>. As more people move toward cloud storage and cloud-based applications, this issue will become increasingly relevant.

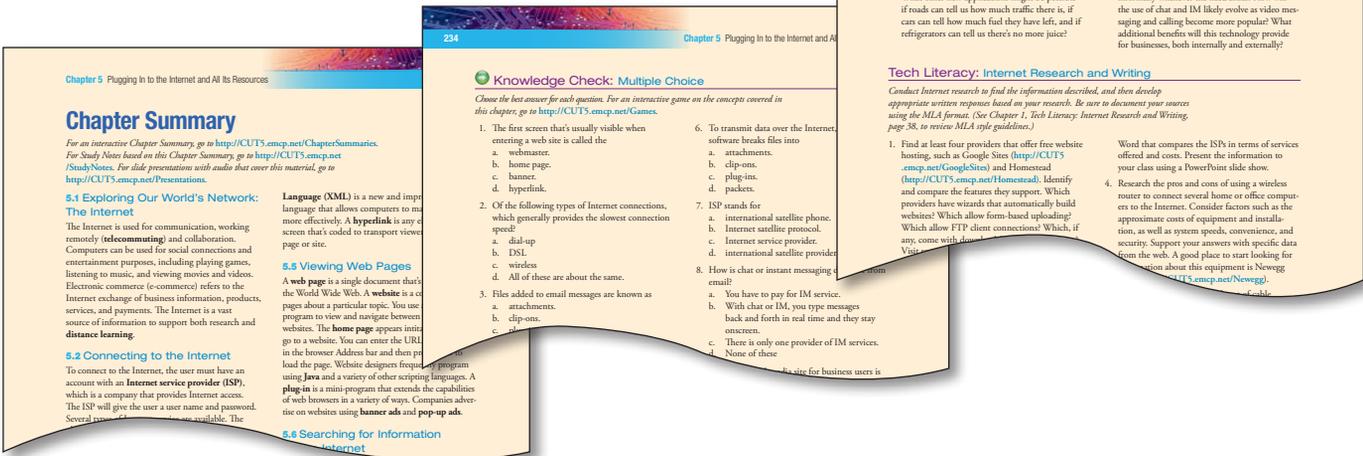


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7. Taking Advantage of the Cloud: Teamwork, Apps, and Storage
8. Maintaining and Managing Your Devices
9. Understanding Your Role as a Digital Citizen: Security, Privacy, and Ethics
10. Leveraging Technology in Business
11. Using Programming Concepts and Languages
12. Changing Everything with Big Data
13. Glimpsing the Future of Computing

Plugging In to the Internet and All Its Resources

Chapter Goal

To learn how the Internet works and how you can use it properly to perform a variety of life-enhancing activities

For a list of the bold blue links that are used in this book, go to <http://CUT5.emcp.net/Links>. Click a link in that list for quick access to the corresponding web content.

Learning Objectives

- 5.1** Describe the overall types of activities made possible by the Internet.
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- 5.8** Behave appropriately as a member of the Internet community.

social networking services, video messaging, and more. Also, users are no longer tethered to the computer to use the Internet to communicate. Smartphones and other portable devices can enable you to communicate using various applications (apps) over a wireless connection to the Internet or a mobile network. In the case of a mobile (cellular) network, a device such as a tablet would have to be mobile capable and the user would have to have a mobile data plan for the device. Many restaurants and cafes, including popular chains such as Starbucks and McDonald's, offer free wireless service. Having this service lets users connect to the Internet with a laptop or other portable, mobile-capable device.

Telecommuting and Collaboration

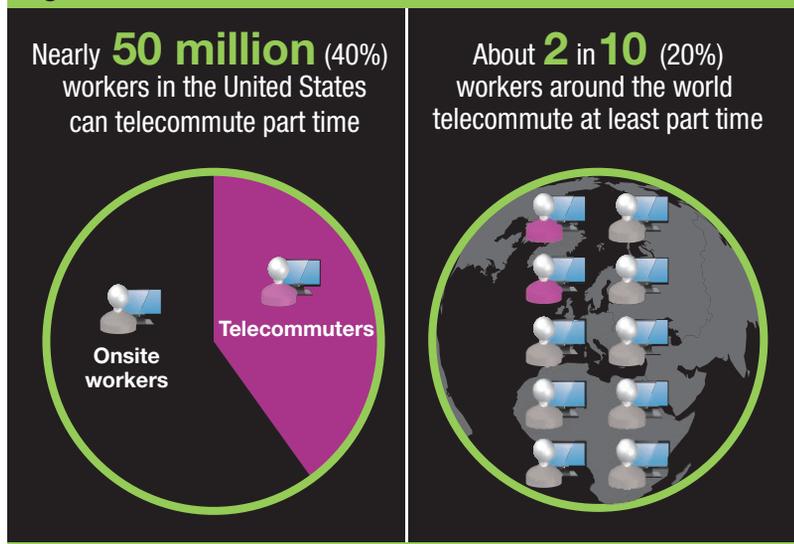
Millions of workers now perform their work activities at home using a computer and Internet connection (see Figure 5.2). This activity is known as **telecommuting** (also called *teleworking*). Some employers have discovered that allowing employees to telecommute offers important advantages—for example, increased worker productivity, savings on travel costs to and from the workplace, and an opportunity to employ individuals who are highly productive but have physical limitations.

Several types of telecommuting arrangements are possible. In some cases, the employer provides the employee with a computer and pays for some or all of the employee's cell phone and Internet service. In other cases, the employee supplies his or her own computer equipment and pays for necessary phone and Internet service plans. Generally, the employer identifies much of the software the employee will use, such as a particular email program or online (over the Internet) collaborative platform (which you will learn about in Chapter 7). Many telecommuting employees sign in to the company's email system and

Activity 5.1.1

Video Real-Time Meetings

Figure 5.2



Practical TECH

Saving Money on Mobile Service

The data plans for mobile phones and other devices can be expensive. You can save money, however, by taking advantage of the options offered by different carriers. For instance, many carriers allow you to share a data plan among multiple devices—perhaps two family phones and a tablet or two sharing one data plan. In such a case, if one user needs a data allowance but doesn't use it much, the users of the devices share the monthly data allowance provided by the plan. At least one wireless carrier (AT&T)

offers a data "day pass"; it lets you use the Internet with your device periodically for a reasonable fee (much less than you would spend for a monthly data plan). Another way to save is to have a small data plan and connect through wireless networks whenever possible. Most smartphones can connect to a home or other wireless network and through these connections avoid using the data allowance.

also sign in to file and project sharing systems hosted by the employer. Telecommuting employees might also participate in online video calls or meetings using forms of digital communication that are personal, immediate, and interactive.

Of course, the same tools that enable telecommuting also facilitate collaboration among employees working at multiple sites. Employees can work online with team members, as well as outside vendors and contractors, in other cities and countries.

Entertainment and Social Connections

Internet users of all ages take advantage of computers for entertainment purposes. A computer with the right components and accessories can imitate almost any entertainment device. You can play games, listen to music, and even watch movies and TV programs on your computer. You can also message or chat with friends, participate in online social platforms and services (such as online dating sites), place carryout orders or make dinner reservations, and connect socially with others in just about any way imaginable.

Today's dedicated gaming consoles have internal hardware similar to a personal computer (PC) and attach to a TV for display. For gaming, most of these consoles connect to the Internet. Mobile phones, tablets, and other portable devices (such as the iPod Touch) can also be used for online gaming and other forms of entertainment. To play online, the user must have a cellular or wireless Internet connection for the device.

An enormous number of both paid and free games are available online, including traditional games such as backgammon, checkers, and bridge. Users must buy software to play some games—for example, EVE Online and World of Warcraft. But most (if not all) games can be purchased online and then downloaded or played online.

Playing games with other users online (sometimes called *social gaming*) is just one way to make social connections using the Internet. Options for social media and other online social activities are expanding at a fast pace. Consumers spend a lot of money on online gaming. According to one research firm, worldwide revenue from social media, including income from social gaming, is growing rapidly (see Figure 5.3).

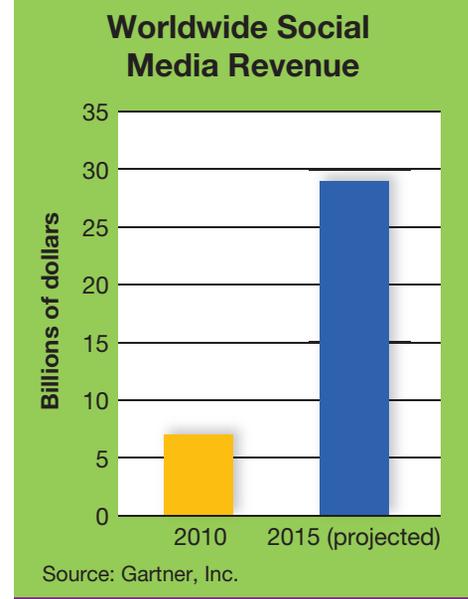
Electronic Commerce

Electronic commerce (e-commerce) involves exchanging business information, products, services, and payments online. E-commerce is commonly divided into two categories defined by the target audience: business to consumer (B2C) and business to business (B2B).

Online shopping makes up most of B2C e-commerce. The top retail category is clothing, followed by books, music, videos, auction items, toys, and computer hardware. Each year, retail e-commerce sales continue to grow. By the second quarter of 2013, sales had reached \$64.765 billion, or 5.8 percent of all US commerce, according to estimates from the US Department of Commerce.

Many retailers post online catalogs that potential buyers can look through. The buyer can select items of interest and add them to a “shopping cart.” This virtual shopping cart functions just like a real shopping cart, allowing the buyer to put items in the cart and remove them later, as desired. When the buyer finishes shopping,

Figure 5.3



Revenue from social media has grown rapidly worldwide—a trend that's expected to continue.

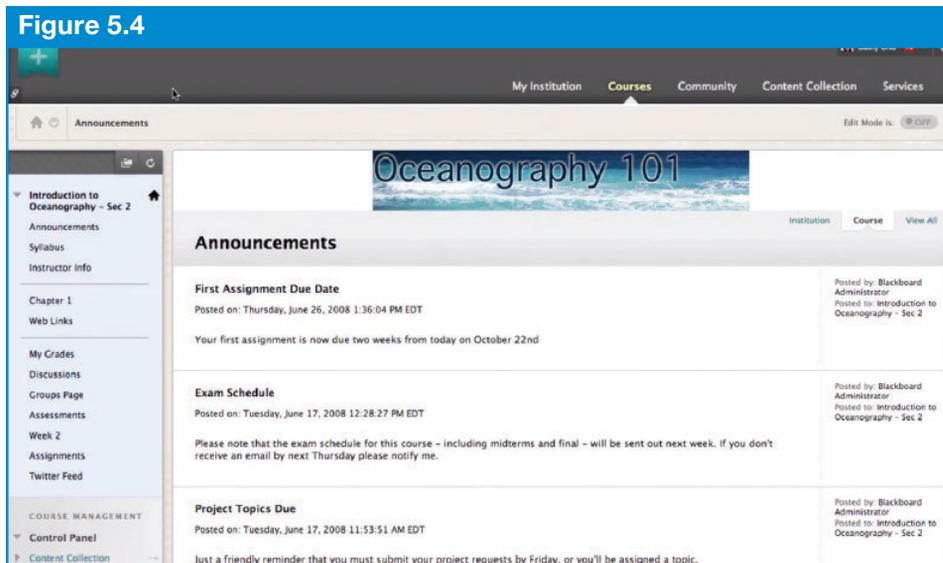
Distance Learning

Many colleges and universities offer online courses and study programs in a form of education referred to as **distance learning**. Distance learning involves the electronic transfer of information, course materials, and testing materials between schools and students. A college or university typically delivers distance learning courses (also called *online courses*) to students using a type of online computing platform called a **learning management system (LMS)**.

Ready-made LMS platforms are available and provide a range of features. Typical features include pages that provide information about the course, communication tools such as online chat and email, online posting and grading of tests, and learning resources that support course content. The top two LMSs—WebCT and Blackboard—merged in 2006. The LMS has continued under the Blackboard name and includes the best of both original platforms. With Blackboard (see Figure 5.4), instructors can provide their own course content or use Blackboard-ready content developed by textbook publishers. Other LMSs are Moodle and Desire2Learn.

Distance learning has become increasingly popular with students of all ages. It's especially popular with people whose interests aren't met by the course offerings of a standard or nearby college or university. Distance learning is also an attractive option

Figure 5.4



Blackboard provides numerous tools for online course delivery, including an announcements feature (shown here) and the ability to post content for both instructors and students.

Practical TECH

Free Online Learning Opportunities

You don't have to be working toward a degree to try online learning. Numerous online courseware sites have partnered with colleges, universities, and organizations such as museums to offer free online courses. One leading site, Coursera, offers more than 600 online courses from 100-plus partners. Another site, TED-Ed (<http://CUT5.emcp.net/TED-Ed>), offers more than 450 free courses. Some of these courses are based on TED Talks, which are

available at the website TED (<http://CUT5.emcp.net/TED>). The number of free online courses continues to expand and includes offerings from Wikiversity, Udacity, and the OpenCourseWare Consortium, among others. See the section "Distance Learning Platforms" on page 226 to learn even more about these courses, including massive open online courses (MOOCs).

for students whose schedules or careers make it difficult to attend regular classes. Some business schools have distance learning programs and other options for individuals who want to earn a degree while working full time. For example, Duke University's Fuqua School of Business offers blended or hybrid courses in the master's in business administration (MBA) program. Blended or hybrid courses include both distance learning and onsite (at the school) study, providing students with the opportunity to earn a degree on a more flexible schedule while pursuing a career. The Duke MBA program provides online courses with weekend onsite study. Four-year colleges and universities, as well as many community colleges, offer distance learning courses as a low-cost, high-convenience way to get an education.



Recheck 5.1

Recheck your understanding of the concepts covered by this objective.



Precheck 5.2

Check your understanding of the concepts covered by this objective.

5.2 Connecting to the Internet

Billions of people throughout the world can connect to the Internet. Within each country, high-capacity networks operated by large telecommunications companies form the backbone of the Internet. Other organizations, including ISPs, purchase bandwidth from these high-capacity network providers, each of which is also known as a **network service provider (NSP)**. An **Internet service provider (ISP)** is an organization that provides user access to the Internet, usually charging a subscription fee. An ISP may share data with other ISPs and networks through **Internet exchange points (IXPs)**, as well as provide Internet connections to customers through a **point of presence (POP)**. High-volume, fiber-optic transmission lines form the Internet backbone and move data between the various connection points on what are known as *trunk lines*. In the United States, trunk lines are usually high-speed digital data transmission lines called *tier 1 (T1)* and *tier 3 (T3) lines*. A typical single T3 line to a location can operate from 28 to nearly 30 times faster than a single T1 line. Parts of the Internet backbone use even faster fiber-optic transmission lines called *optical carrier (OC) lines*, and the OC-48 lines in use by some regional ISPs transmit data at up to 2488.32 megabits per second.

Some businesses and organizations need so much Internet bandwidth that they can justify paying the high cost of having a T1 or T3 connection from a provider. However, most residential and small business users typically connect using some type of broadband connection, such as digital subscriber line (DSL), cable connection, or satellite Internet. If none of these technologies is available, a traditional telephone landline can provide the necessary connection.

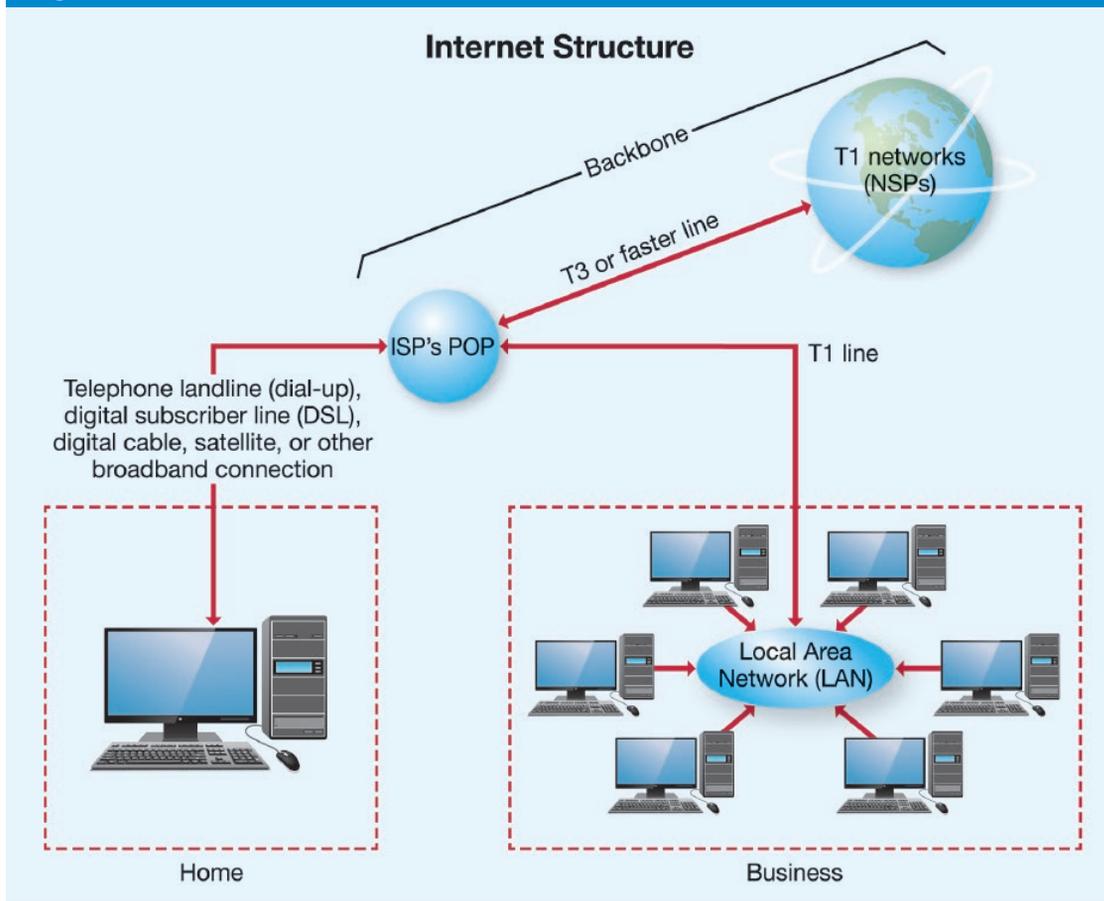
Hands On

Setting Up a New Internet Connection in Your Operating System

No matter what type of broadband connection you have, once you have received the connecting hardware, called a *modem*, you will need to set up an Internet connection in your computer's operating system. If your ISP sends out an installation technician, he or she will usually set up the connection for you. This service is typical with satellite ISPs, for example. But if you purchase a modem independently or one is shipped from your ISP and you prefer

not to use the installation software, you will need to set up the connection yourself. Go to <http://CUT5.emcp.net/InternetConnectionSetup> for guidelines on connecting a broadband modem directly to a Mac OS X or Windows 8.1 operating system. (Setting up a wireless network and connecting the broadband modem to it is covered in Chapter 6.)

Figure 5.5



The structure of the Internet makes it possible for large volumes of data to be delivered to home and business users.

Figure 5.5 illustrates the overall structure of the Internet, from the backbone to the connection provided to a user's home or business. Chapter 6 will provide more information about setting up a network.

Hardware and Software Requirements

The following equipment and software are required to connect to the Internet:

- A computer with an internal wireless or wired network adapter or wireless/wired network card or USB adapter; a tablet device; or a smartphone
- A modem compatible with your connection type (DSL, cable, and so on)
- An account with an Internet service provider (ISP) or value-added network (VAN), including any locally installed equipment required, such as a cable connection or an Internet satellite dish
- Wireless and/or wired network equipment, if you want to share the Internet connection among multiple devices
- A web browser

As defined earlier, an ISP is a company that provides Internet access. Having access usually requires paying a fee but is sometimes free. (Firms that provide free access usually require subscribers to view advertisements when viewing web pages.) A **value-added network (VAN)** is a large ISP that provides specialized service or content, such as

Activity 5.2.1

Practice The Structure of the Internet

reports from the Reuters news service or access to a legal database. Nonetheless, all ISPs and online services can reach the same email users and websites.

The best-known ISPs offer service at a national level. But in the United States, some ISPs offer service only within a particular region based on the limits of the physical network. For example, a landline phone company might offer only dial-up or DSL Internet service in the states that it serves. Large ISPs provide local telephone numbers in several cities so that customers who travel outside their local areas can make dial-up connections without paying for long-distance calls. Today, most people access the Internet via wireless connections when traveling.

Types of Internet Connections

Users can get online using several types of Internet connections: dial-up, digital cable, DSL, wireless, fiber-optic, and satellite. All of these connection types except dial-up are considered broadband, or high-speed, connections. In 2013, nearly 70 percent of Americans over age 18 had DSL, digital cable, or satellite service, according to the Pew Research Center's Internet and American Life Project.

Table 5.1 compares the connection speeds used to **download** (receive) and **upload** (send) information. Internet transfer speeds are measured according to how many bits of data are transferred per second. Each **Kbps (kilobit per second)** represents 1,000 bits per second, and each **Mbps (megabit per second)** represents 1,000,000 bits per second.

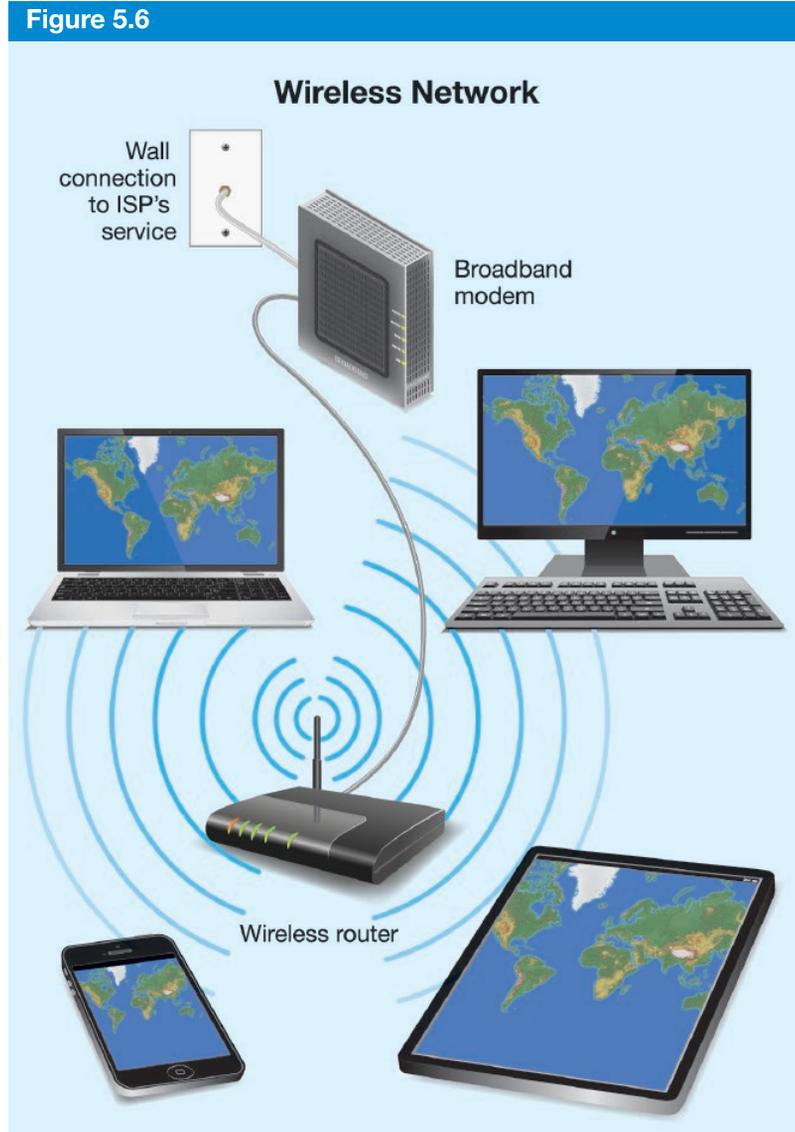
Table 5.1 Comparison of Internet Connection Speeds

	Connection Hardware	Download Speed*	Upload Speed*
	Dial-up access with 56 Kbps modem	40–50 Kbps	28 Kbps
	Cable	Up to 105 Mbps	400–600 Kbps
	DSL	Up to 6 Mbps	Up to 768 Kbps
	Wireless and mobile	Varies widely	Varies widely
	Fiber-optic cable	Up to 1,000 Mbps	Up to 500 Mbps
	Satellite	Up to 15 Mbps	Up to 2 Mbps

* Download speed measures how quickly one computer can receive a file from another. In most cases, download speed is more important than upload speed. Upload speed measures how quickly a file can be sent from one computer to another.

Connection speeds vary depending on the type of plan purchased from the ISP; more expensive plans generally provide faster download speeds. Of course, having a fast download speed allows data to arrive and display more quickly on your computer and device. Having a fast download speed is also needed to perform activities such as viewing online videos and making calls over the Internet; both require high speeds to operate effectively.

Most of the connection types discussed in this section can be shared among several devices by connecting the modem to a local area network (LAN). For example, most users today share a connection at home by setting up a wireless LAN using a wireless router, which connects to a broadband modem, which then connects to the ISP service through a cable. Having a wireless setup makes it possible to connect computers and accessories (such as printers) to the network without wires. It also makes it possible for all of the connected computers and other devices (such as tablets and smartphones) to access the Internet connection. Figure 5.6 illustrates how a wireless Internet connection operates.



Having a wireless network enables numerous devices to access a single Internet connection.

Dial-up **Dial-up access** allows connecting to the Internet over a standard land-based telephone line by using a computer and a modem to dial into an ISP. Dial-up access is a feature typically included with the software provided by the ISP. After installing the software, the user can add a shortcut icon on his or her computer desktop; double-clicking on that icon will launch the connection.

Dial-up access is relatively inexpensive because of the slow connection speeds it provides, as noted earlier. To get faster connection speeds, most US Internet users have upgraded to a **broadband connection**, or high-speed, Internet connection. Broadband connection speeds are better suited to online activities such as viewing videos. In some rural areas, power companies offer a form of Internet service called *broadband over powerline (BPL)*. BPL delivers Internet access over powerlines, similar to services that deliver access over phone lines.

Cable The same coaxial cable that provides cable TV service to a home or business can also provide Internet access. Cable TV companies such as Comcast and Time

Warner Cable provide a special modem and software for broadband. Having this type of connection allows simultaneous TV viewing and Internet usage. This service is available only in areas in which the provider has installed cable, however, which rules out many rural locations. In addition, with this type of service, the connection speed slows down as more subscribers sign up in a neighborhood or location. Comcast calls its service XFINITY Internet. Time Warner Cable offers several different Internet plans with names such as Ultimate and Extreme.

Digital Subscriber Line **Digital subscriber line (DSL) Internet service** is a form of broadband that's delivered over standard telephone lines. It's as fast as service using a cable modem and provides simultaneous web access and telephone use, but it has limited availability. DSL service is usually available only to users within three miles of the telephone carrier's digital subscriber line access multiplexer (DSLAM). A digital subscriber line is dedicated to one household and isn't shared with neighbors.

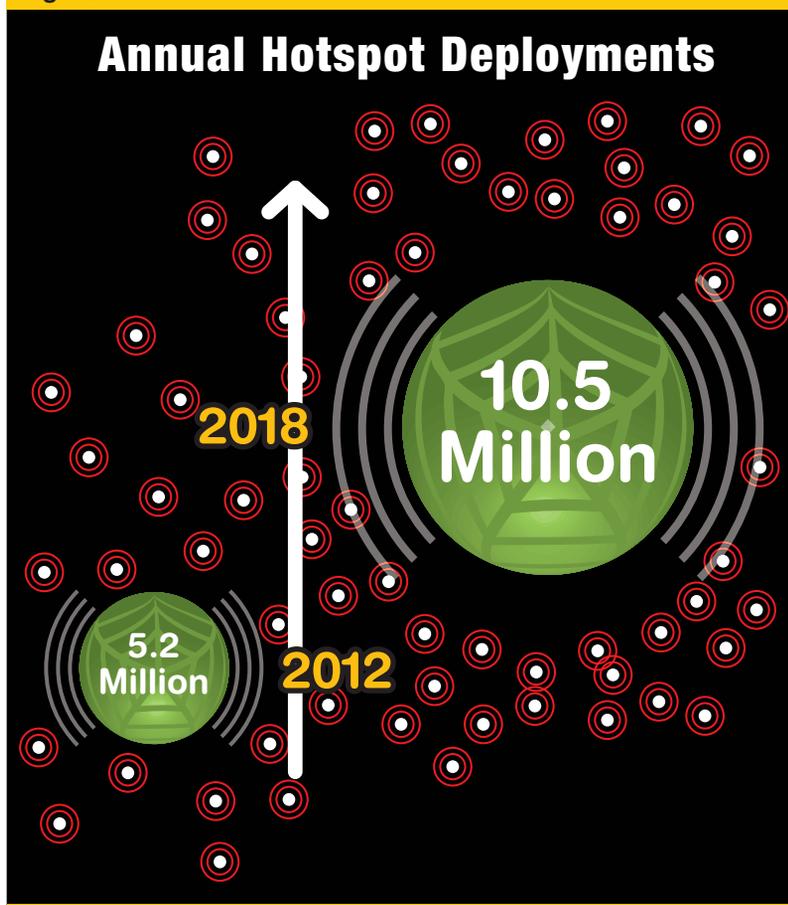
You can buy DSL service in a bundle with phone service from your phone company, or you can buy a naked DSL service, a connection without the accompanying phone service. Like dial-up, DSL has become less and less popular in the United States as consumers have shifted to faster broadband technologies.

Wireless One fast-growing segment of Internet service involves wireless broadband connections. Millions of wireless access points, or **Wi-Fi hotspots**, have sprung up worldwide, and the number is expected to continue to grow (see Figure 5.7). Using these hotspots, you can access the Internet in public places and even aboard airplanes using a computer (equipped with a wireless network card) or mobile device (such as a tablet or smartphone).

Just like you can create a wireless network at home, the owner of a coffee shop or other public location can create a Wi-Fi hotspot by sharing a broadband Internet connection through a wireless network. In some cases, the owner may protect the password for the wireless network so that only authorized customers can use it. In many other cases, though, using a Wi-Fi hotspot is free for customers and designated users. Some wireless service providers and private operators also charge a fee to provide access to their hotspots.

Wireless connections to the Internet can be slower than wired connections. Even so, they provide a great deal of flexibility and portability, because you aren't required to plug into a connection in a wall.

Figure 5.7



In 2013, the Wireless Broadband Alliance predicted that the number of wireless hotspots worldwide would double within five years.

To guarantee that you will have access to hotspots while traveling, check the services offered by your mobile phone provider. Some providers offer access to a network of hotspots, either bundled as part of a plan or as an add-on service. Some providers also let you purchase short-term, prepaid access to enable your devices to connect to Wi-Fi hotspots. For example, AT&T offers prepaid DataConnect Pass plans in more than 100 countries, as well as global plans and both daily and weekly plans. AT&T also offers On the Spot one-time access, which lets you buy a session at one of its more than 30,000 hotspots for several dollars or less, depending on the location and session time. You can purchase this access even if you aren't an AT&T customer.

Wireless ISPs (also known as *Wi-Fi ISPs*) provide another form of wireless Internet access—one not many people know about. A Wi-Fi ISP uses directional antennas to direct wireless radio signals from one location to another within a particular area. Directing these signals creates a large hotspot, in effect, which provides continuous service within that area. Some cities have experimented with building this type of network to offer free wireless Internet access to the people that live and work in the area. Small wireless ISPs have also emerged in rural areas to offer a choice of services to customers who may not have access to other types of broadband. Service may be poor, however, in areas with lots of hills or trees.

Fiber Optic To make up for declining business in landline telephone service, large telecommunications providers in the United States and other countries are offering other services. Specifically, these telecom companies are delivering digital phone, TV, and Internet service to homes using fiber-optic cable. Verizon calls its service FiOS, and AT&T calls its service U-verse.

Hands On

Get Ready with Airplane Mode

To make sure you will be ready for your next trip, find airplane mode on your mobile device. Follow the steps presented at <http://CUT5.emcp.net/AirplaneModeSetting>.

Activity 5.2.2

Video Wireless Access Point

Hotspot

Understanding Airplane Mode

Making a call using a mobile phone during a commercial airline flight is prohibited by the Federal Aviation Association (FAA). However, late in 2013, the FAA changed its policy to allow the use of some personal electronic devices (PEDs) during all phases of a flight, including takeoff and landing. Most major airlines offer Wi-Fi service, so now you can use your ebook reader or tablet throughout a flight. (Because of the sizes of notebook computers and certain devices, you must still stow them during takeoff and landing.) As of early 2014, additional rule changes with regard to the use of cell phones were also under consideration. Each carrier also may set its own specific policies for use of personal electronic devices, as well as setting fees (if any) for online wireless services.

There's one catch for using your device in flight—you must put it in airplane mode or otherwise disable cellular service in the device's settings. (Depending on the device

and manufacturer, you may see another name for airplane mode, such as *flight mode*, *offline mode*, or *standalone mode*.) Using airplane mode prevents the device from sending and receiving calls, text messages, and other forms of data. Enabling airplane mode may also turn off additional signaling features that could interfere with the plane's avionics.

While in airplane mode, devices generally consume less power. This means that using airplane mode will help preserve battery life, which can be an advantage on a long flight.



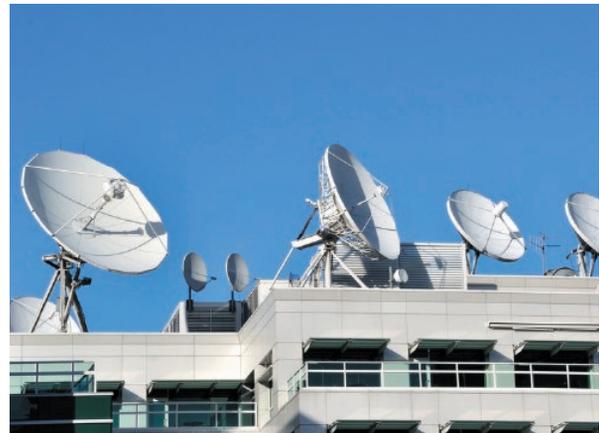
A fiber-optic cable bundles many strands of thin glass or plastic cable within an external sheath. In terms of service, fiber optics offers the advantages of freedom from electromagnetic interference and reduced signal loss; it also provides the greatest bandwidths over the longest distances. (Network bandwidth is discussed in more detail in Chapter 6.) A fiber-optic connection not only offers the speediest Internet downloads, but it can also carry digital TV and phone (voice) signals. This means that fiber optics allows the bundling of Internet, TV, and phone services. As of late 2013, Verizon's FiOS plan also included a free wireless router.

The biggest limitation of fiber optics is availability. Fiber-optic lines are expensive to install, so major providers have been slow to roll out this type of Internet service. The competition for providing fiber-optic cable is growing, however. Well-funded companies that haven't previously provided Internet or other content delivery services see the potential of fiber optics and are getting into the business. For example, Google Fiber has launched a digital Internet and TV service in three US cities (Austin, Texas; Kansas City, Kansas; and Provo, Utah), with more cities to follow. Google Fiber's unique hardware eliminates the need to have a separate modem and Wi-Fi router. (Wireless network routing capability is built into Google's Network Box, and Google's TV Box can connect wirelessly to the signal from the Network Box.)

Another great feature included with many fiber-optic TV bundles and some cable and satellite TV providers allows playing live TV or streaming other shows to a mobile device. After installing a free app on the device and entering the user name and password for the Internet account, you can watch content wherever a wireless connection is available.

Satellite Like having satellite TV, having a satellite Internet connection involves installing a dish at the service location. For a basic plan, the dish might be as small as a satellite TV dish, but for a plan with high download speeds, a somewhat larger dish will probably be required. Advances in the technology have reduced the sizes of satellite dishes over time, however.

Installing a satellite Internet dish requires hiring a trained technician. The technician will know how to point the dish in the precise southern direction and angle



Satellite Internet dishes vary in size and capacity. Newer and smaller dishes offer improved technology.

Practical TECH

Shopping for an ISP

When shopping for an ISP, consider more than just what type of connection is available in your area. With the exception of dial-up access, ISPs offer most types of connections through a variety of service plans based on download speeds, number of email addresses, and other features. Some plans even bundle services by combining cable TV or telephone with Internet for a single monthly fee.

You can find out what providers serve your area, what types of connections are available, and how much different plans cost by doing some research. Go to the library to use

its Internet-connected computers or take your notebook or tablet to a place with free wireless service. To learn about service options, go to an ISP's website and look for a link or button for setting up a new service. You will likely have to enter your phone number or address to see whether service is provided in your area, as well as what plans and features the ISP offers and what they cost. If telephone or cable service is already available at your location, it's likely that your existing carrier offers Internet service too. If that's the case, then start with that ISP's website.

needed to communicate with the satellite carrying the service. The satellite ISP might lease space on the satellite or own the satellite outright. For example, leading satellite ISP HughesNet was purchased by EchoStar in late 2011, and in 2012, EchoStar launched its own EchoStar 17 satellite to provide more capacity to HughesNet. Other well-known home and small business satellite ISPs are Exede (owned by ViaSat) and WildBlue (offered through Exede).

A satellite dish must be installed where there's a clear line of sight to the satellite. At some locations, this requires installing the dish away from the building, whether a home or office, and mounting it on a metal pole. Coaxial cable runs from the dish to the building and connects to a satellite Internet modem. (The cable is buried if the dish is installed away from the building.) The modem is then connected to the wired or wireless network router to provide a broadband connection.

Downloading data can be quick via satellite, but uploading is slower. (This is also true for most other types of broadband connections.) Some satellite ISPs allow bundling of TV, Internet calling, and other services. The costs of satellite plans are also similar to those of other types of broadband services. Costs will vary depending not only on downloading speed but also on the amount of data downloaded. Because satellite capacity is limited, satellite ISPs charge users more for downloading large amounts of data (similar to the data plan for a mobile device). For example, a plan might limit you to downloading 15 gigabytes (GB) of data per month, which might not be enough if you stream a lot of video. Satellite ISPs usually offer ways to get around data limitations. For example, you might be able to purchase additional data allowances as needed or to download more data during low-traffic periods (such as 2 a.m. to 7 a.m.). Satellite Internet service has long been offered in rural areas with no other forms of broadband connection available, a great advantage.

Mobile Hotspots If you need to connect to the Internet frequently while on the go and don't want to constantly look for Wi-Fi hotspots, you can bring your own hotspot with you. Major carriers such as Verizon offer mobile hotspot devices. To use the device, you have to purchase a mobile data plan for it. You tell the device to connect with the mobile network, and once it's connected, it wirelessly shares the Internet connection. The number of users or devices that can connect at any time varies depending on the device and provider. (See the section "Using a Cell Phone as a Hotspot," in Chapter 6 on page 274, for instructions on setting up your phone as a hotspot.)

If you need only a single connection while on the go, you may be able to use your smartphone as a hotspot—a setup called **tethering**. Many models of smartphones are equipped to act as mobile modems. To use this function, you must pay for a monthly hotspot data plan. Once you have activated the proper plan, you can turn on the hotspot feature by changing a setting on your phone. The phone will display a request for a sign-in password to make the connection. The wireless networking hardware on your computer or tablet should discover the new wireless network (the phone hotspot). When it does, you will select that connection and enter the password to sign on. Your computer or tablet will then be connected to the Internet using your mobile phone provider's network. Any data that you download will be charged against your data plan.



A hotspot device enables multiple devices and users to connect to the Internet wirelessly from any location. A mobile data plan is required and service is provided by the mobile network.



Recheck 5.2

Recheck your understanding of the concepts covered by this objective.

5.3 Navigating the Internet

Once you have connected your computer or tablet to the Internet, you can start **surfing**, or navigating between pages and locations on the web using the browser. To navigate the web effectively, you should also know about Internet Protocol (IP) addresses and uniform resource locators (URLs) and how they are used to identify and locate resources on the Internet.

Web Browsers

A **web browser** or browser program displays web pages on the screen of a computer or mobile device. The Microsoft Windows operating system comes with the browser Internet Explorer built in (see Figure 5.8). The Apple OS X and iOS operating systems come with the browser Safari built in. Google's Chrome browser works on Android and Chrome OS devices. Google also offers versions of Chrome that you can install and use instead of the default browsers on the Windows and OS X operating systems. A number of other browsers are also available for computers and other devices, such as Mozilla's popular Firefox browser and Opera Software's Opera browser.

As a feature of the Internet, website content must be built and accessed using consistent technology. Because of this, most browsers have similar features, including the following:

- The ability to interpret and display HTML code (the language of web pages).
- Support for compiled programming languages (such as Java) and scripting languages (such as Perl, PHP, and Ruby). The programs or scripts written in these languages extend the web browser's capabilities—for example, adding the ability to stream video. In some cases, an additional software component—either a plug-in or a runtime environment—must be installed within the browser to enable it to run the mini-programs or scripts.
- An easy-to-use interface that allows navigating backward and forward, tracking favorite websites, and more. You will learn more about these features later in the chapter.

Precheck 5.3

Check your understanding of the concepts covered by this objective.

Activity 5.3.1

Article Browser Evolution

Figure 5.8



Use a browser such as Internet Explorer 11 to display a web page.

IP Addresses and URLs

Web browsers locate specific material on the Internet using an **Internet Protocol (IP) address**. An IP address works like an Internet phone number. Every device connected to the web can be located using its IP address.

Currently, the vast majority of IP addresses follow the **IPv4** format and use a four-group series of numbers separated by periods, such as 207.171.181.16. Using the IPv4 format, only 4.3 billion addresses can be created, and some of these addresses must be reserved for special purposes on the web. Because of the recent explosion in the number of devices connecting to the Internet, a new IP format has been developed, **IPv6**. An IPv6 address uses eight groups of four **hexadecimal digits** (that is, numbers with a base of 16), and the groups are separated by colons (:), as in 2001:0db8:85a3:0000:0000:8a2e:0370:7334. (The IPv6 format can be abbreviated or stated in other ways. For example, you could remove the leading zeros within each group between colons, so that :0000: becomes just :0: or :0370: is just :370:.) Each IPv6 address is also called a **128-bit address**, which means it allows for 2^{128} addresses. That is:

340 undecillion, or
340,000,000,000,000,000,000,000,000,000,000,000,000,000,000, or
340 billion billion billion billion.

IPv6 is slowly replacing IPv4; the two protocols aren't compatible.

Because remembering IP addresses would be difficult, every website host has a corresponding web address called a **uniform resource locator (URL)**. URLs generally use descriptive names rather than numbers, so they are easier to remember. For example, to go to the home page of Amazon, you type the URL `http://www.amazon.com`, not the IP address. A system called **Domain Name Service** maps the URL to the host's underlying IP address.

The Path of a URL

A URL consists of an address that indicates where the information can be found on the Internet. It contains several parts that are separated by slashes (/), a colon (:), and dots (.). The first part of a URL identifies the communications protocol to be used. One protocol is Hypertext Transfer Protocol (HTTP); it's designated by `http://` (as in the Amazon URL mentioned previously). The other protocol is Hypertext Transfer Protocol Secure (HTTPS); it's designated by `https://` and indicates a secure connection.

Immediately after the protocol is the overall **domain name**, divided into various parts. First may come format information, such as `www` for World Wide Web pages. Following the format information is the **second-level domain**, which identifies the person, organization, server, or topic (such as Amazon) responsible for the web page. The **domain suffix**, or *top-level domain (TLD)*, comes next (`.com` in the Amazon example). After that, there may be additional folder path information (with folder names separated by slashes), as well as the name of a specific web page file or object. To go directly to a specific folder or file, you must type the full path and file name portions of the URL. Figure 5.9 illustrates the various parts of a URL.

Activity 5.3.2

Video URL Structure

Figure 5.9



The domain suffix or TLD identifies the type of organization or the country of origin. In the Amazon example, the domain suffix *.com* stands for *commercial organization*. A web-based enterprise is often referred to as a **dot-com company**, because the company's domain name ends with *.com*. Table 5.2 lists other domain suffixes in common use.

In 1998, the US Department of Commerce created the Internet Corporation for Assigned Names and Numbers (ICANN) and assigned it the task of expanding the list of existing domain suffixes. In late 2000, ICANN completed this task and approved a number of new suffixes (see Table 5.3). These suffixes serve very specific purposes and may be reapproved for use on a limited basis. You may not see them used a lot for national organizations, but you may see local organizations using them.

Some URLs also include a two-letter country abbreviation. Table 5.4 lists the country abbreviations.

Table 5.2 Common Domain Suffixes Used in URLs

Domain Suffix	Type of Institution or Organization	Example
.com	commercial organization	Ford, Intel
.edu	educational institution	Harvard University, Washington University
.gov	government agency	NASA, IRS
.int	international treaty organization, Internet database	NATO
.mil	military agency	US Navy
.net	administrative site for the Internet or ISPs	EarthLink
.org	nonprofit or private organization or society	Red Cross

Table 5.3 New Domain Suffixes

Domain Suffix	Type of Institution or Organization
.aero	airline groups
.biz	business groups
.coop	business cooperatives
.info	general use
.museum	museums
.name	personal websites
.pro	professionals

Table 5.4 Country Abbreviations Used in URLs

af	Afghanistan	fr	France	nz	New Zealand	ch	Switzerland
au	Australia	de	Germany	no	Norway	tw	Taiwan
at	Austria	il	Israel	pl	Poland	uk	United Kingdom
be	Belgium	it	Italy	pt	Portugal	us	United States
br	Brazil	jp	Japan	ru	Russia	yu	Yugoslavia
ca	Canada	kr	Korea	za	South Africa	zw	Zimbabwe
dk	Denmark	mx	Mexico	es	Spain		
fi	Finland	nl	Netherlands	se	Sweden		

Typing a URL into a browser and pressing Enter or Return sends a request to the Internet (see Figure 5.10). Routers identify the request and forward it to the appropriate web server. The web server uses the URL to determine which page, file, or object is being requested. Upon finding the item, the server sends it back to the originating computer using the HTTP or HTTPS protocol, so the browser can display the delivered page on the screen of the computer.

Figure 5.10

Connecting to the Internet

STEP 1

Using a computer or mobile device with Internet access, type the URL for the website you want to visit or click on a link to that site



Your computer or mobile device

STEP 5

The server at the receiving destination receives the URL request and sends the requested web page or document to your computer or mobile device. Your web browser receives the web page or document and displays it on the screen of your computer or mobile device



Requested web page or document displays on the screen of your computer or mobile device

STEP 2

Your computer or mobile device uses web browser software, and your ISP's web server uses server software. Using the web browser software, your computer sends the request to your ISP's server



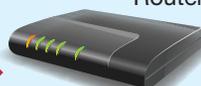
Your ISP's web server

Destination web server

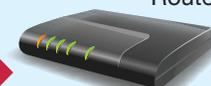
STEP 3
Your ISP's server sends the request over the Internet



Router



Router



Router

STEP 4

Routers along the Internet examine the request to determine the server to which it should be sent

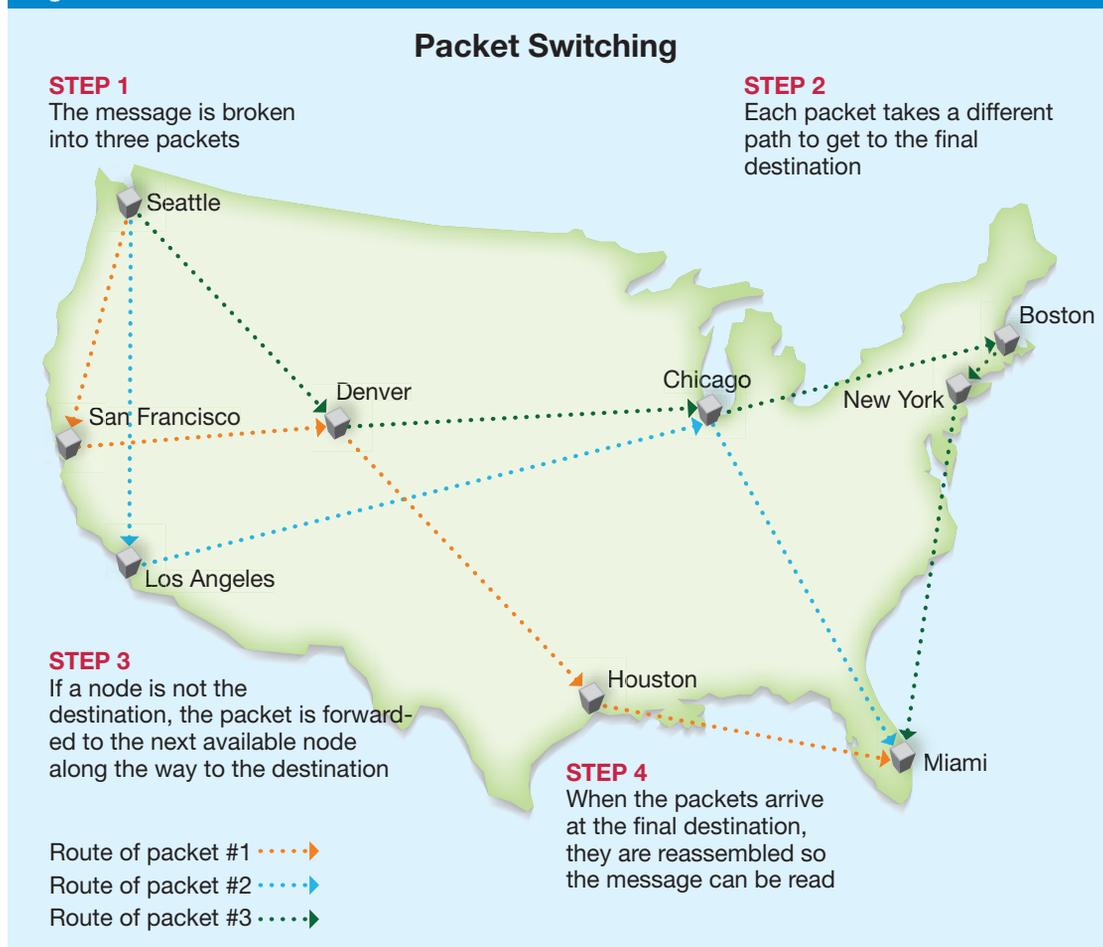
Packets

A file isn't sent over the Internet as a single file. Instead, messaging software breaks the file into units called **packets** and then sends the packets over separate paths to a final Internet destination. The packets are reassembled when they reach that destination. What paths individual packets take depends on which routers are available. This process of breaking a message into packets, directing the packets over available routers to their final Internet destination, and then reassembling them is called **packet switching**.

Figure 5.11 shows the journey of an Internet message sent from a computer in Seattle and received on a computer in Miami. The message is broken into three packets, and each packet follows a different route to the final destination. If a packet arrives at a node (that is, a router or other communications switching equipment) that is not the final destination, the network passes it along to the next node. At the destination, the computer receives the packets and reassembles the file. If any packet is missing, the receiving computer requests that it be sent again. This re-requesting of information explains why web pages sometimes appear incomplete and some portions take longer than others to fully load.

The idea of dividing files into packets originated during the Cold War (1945–1991). During that era, the Internet was thought of as a system for maintaining communication among the military and other government agencies in the event of a

Figure 5.11



Messages sent over the Internet are broken into separate units called packets. The packets are directed by routers and reassembled when they arrive at the final destination.

nuclear war. To prevent breakdowns, the system was designed to keep working even if part of it was destroyed or not functioning. A packet sent from New York to Los Angeles, for example, might attempt to travel through Denver or Dallas. But if both of those systems are busy or unavailable, the packet could go up to Toronto and then on to Los Angeles. This design feature, called **dynamic routing**, is part of what makes the Internet work well even with a heavy load of traffic.

IPv6 enables routers to handle packets more efficiently than IPv4. Because of this and many other differences between the two protocols, the Internet will have to operate using the two protocols as side-by-side networks until IPv6 has been fully implemented. Special translation gateways and some other translation technologies enable limited traffic to flow between the IPv4 and IPv6 networks.

Recheck 5.3

Recheck your understanding of the concepts covered by this objective.

5.4 Understanding Web Page Markup Languages

Text files created with a word-processing program follow a particular file format that the program can display. Similarly, web page files follow a particular format that a web browser can display. Web page files are different, however, because special software isn't needed to create them. You can use practically any word-processing program that you want. However, to describe the content for a web page so that the browser can display it, you must use a specific language.

Precheck 5.4

Check your understanding of the concepts covered by this objective.

HTML and CSS

Hypertext Markup Language (HTML) has long been used to create web pages. HTML is a tagging or **markup language**, which includes a set of specifications that describe elements that appear on a page—for example, headings, paragraphs, backgrounds, and lists. Like other programming languages, HTML has evolved over time to include new features and specifications; the current standard is HTML5.

Along with HTML, you can use **cascading style sheets (CSS)** to make the design for a web page or site more consistent and easier to update. You can use CSS, a separate formatting language, along with HTML to make the design for a page or site more consistent and easier to update. Most modern websites also have functions that have been added using various scripting languages. (Chapter 11 will cover web development in more detail, because creating a complex website requires significant programming skills.)

HTML gives web developers a lot of freedom in determining the appearance and design of web pages. Within an HTML file, tags are inserted to define various page elements, such as the language type, body, headings, paragraph text, and so on. A **tag** is

Practical TECH

Is Your Computer System IPv6 Ready?

Most new computer systems are set up to use the IPv6 protocol, so users don't have to do anything to start browsing to sites using IPv6. To see what your computer's IPv4 and IPv6 addresses are and to test your computer's IPv6 readiness, you can use a test site such as <http://CUT5.emcp.net/test-ipv6>. For some older computers,

it's possible to add the IPv6 protocol for the Internet connection being used. If you encounter this rare situation and have trouble browsing to specific websites, search the web for instructions about adding the IPv6 protocol to your computer's operating system. Making this change might solve the problem.

enclosed in angle brackets, and tags must be used in pairs: an opening tag and a closing tag. (The closing tag includes a forward slash.) As shown in Figure 5.12, the opening tag `<html>` should appear at the top of the document (below the `<!doctype>` tag). The closing tag `</html>` should appear at the bottom of the document to indicate that all of the text in the document is HTML code. The tags `<body>` and `</body>` indicate what should appear in the main browser window, `<title>` and `</title>` define the page title, and so on.

A web page also typically functions as a **hypertext document**, presenting information that's been enhanced with **hyperlinks** (also called *web links*) to other websites and pages. The user clicks a link to access additional information on another web page. Links most commonly appear as underlined text, but they can also take the forms of buttons, linked photos or drawings, navigation bars or menus, and so on.

XML

Whereas HTML defines the format of a web page, **Extensible Markup Language (XML)** organizes and standardizes the structure of data so computers can communicate with each other directly. XML is more flexible than HTML, because it's really a **metalanguage**, a language for describing other languages. XML allows developers to design custom languages that work with limitless types of documents and file formats.

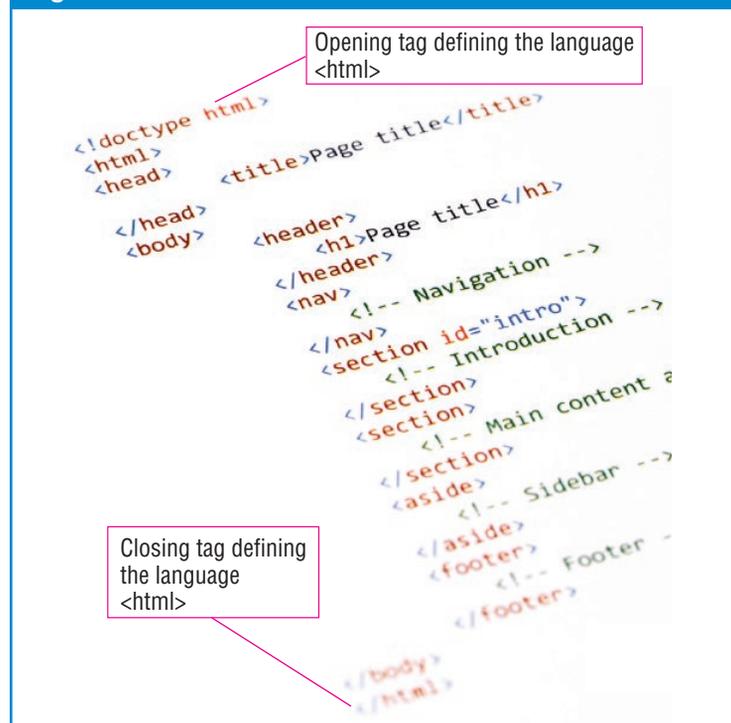
Web developers frequently use XML to manipulate and present information for large online databases. Many commonly used applications, such as Microsoft Excel and Access, can now import and export XML data. This compatibility makes XML the ideal tool for facilitating data sharing between the web and other platforms.

Website Publishing Basics

You can create a simple website with just a little knowledge of HTML. (As noted earlier, Chapter 11 will provide more information about the scripting languages used for web programming.) Many ISPs include storage for a basic website and supply a predetermined URL based on the information in your account name. You can upload your web page to that location, often using a method called *File Transfer Protocol (FTP)*, and have your site ready to go. (You will learn more about FTP later in this chapter.) However, if you want to have your own domain name, the process requires a few more steps:

1. **Obtain your domain name.** You can check to see if a particular domain name (for example, `www.mydomainname.com`) is available by using name registration services such as GoDaddy (at <http://CUT5.emcp.net/GoDaddy>) and Network Solutions (at <http://CUT5.emcp.net/NetworkSolutions>). If the name you want

Figure 5.12



HTML tags are enclosed within angle brackets (`<` `>`) and used in pairs. An opening tag and closing tag define the text between them as a particular type of element for the web browser to display.



Activity 5.4.1

Article
Using XML to Share
Information



Activity 5.4.2

Video
Creating a Simple
Web Page

is available, you can register it by paying a fee. Registration services also enable you to renew your domain name, and in some cases, they allow you to bid on names already owned by others.

2. **Obtain hosting.** The Internet hosting service operates the web servers that will store your website's content and deliver it to the web. The monthly or annual fee you pay will vary depending on the level of hosting services you need; you can usually get started for a low monthly cost. (Of course, a large organization might have its own servers to self-host the website.) GoDaddy and Network Solutions are among the many national hosting companies; you might also find local hosting companies that you can work with.
3. **Create your site content.** You can create your own HTML and other content from scratch, or you can use fee-based or free online tools such as Google Web Designer, Joomla, and Drupal. (Keep in mind, however, that the features you build in may require a higher level of web hosting to support them.) If you include graphics files, use the file formats JPEG (Joint Photographic Experts Group), PNG (Portable Network Graphics), and GIF (Graphics Interchange Format). These files are smaller and preferred because they download more quickly. Similarly, for any video or audio you include, use an appropriately compressed file type, such as MP4 for video and MP3 for audio.
4. **Upload your content if needed.** Some hosting services include built-in tools for transferring files using FTP or another method. In other cases, you will need FTP software to complete the transfer.

Also keep in mind two more points. First, most hosting services require the home page for a website to have a specific file name (such as `index.htm`). Following this practice ensures that when a user navigates to your domain name (URL), the correct page will display. Second, some users take advantage of popular blogging websites (such as WordPress.com and Blogger) to get content creation tools and hosting services in one package. A URL may also be included in that package (although typically, the URL will include the name of the blogging website). WordPress will let you use your custom domain URL if you pay a small additional annual upgrade fee.

5.5 Viewing Web Pages

A **web page** is a single document that's viewable on the World Wide Web. A **website** consists of one or more web pages devoted to a particular topic, organization, person, or the like, and generally stored on a single domain. When you navigate to a website, the first page displayed is usually the site's home page. Like the table of contents in a book, the **home page** provides an overview of the information and features provided by the website.

This section covers some of the basic actions for using a web browser program to view, find, and mark online information.

Tech Career Explorer

Trying Out HTML

If you are considering a career as a web programmer, check out <http://CUT5.emcp.net/TryingHTML> to explore a full range of hands-on tutorials for working with HTML, CSS, and more.

Recheck 5.4

Recheck your understanding of the concepts covered by this objective.

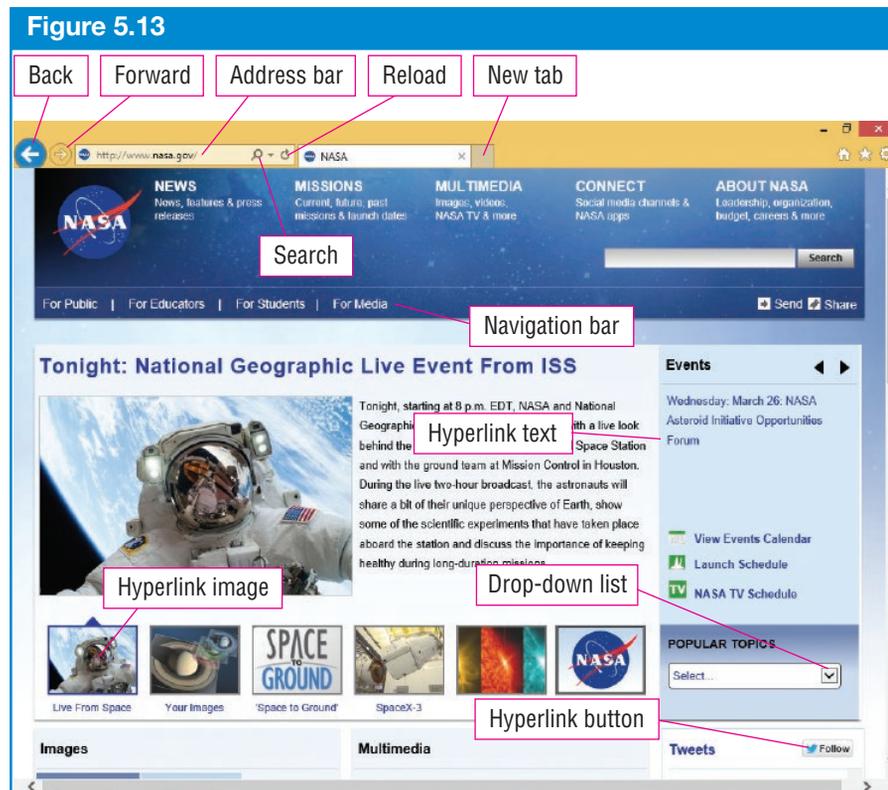
Precheck 5.5

Check your understanding of the concepts covered by this objective.

Hands On

Taking a Spin Online

Chances are, you have spent some time online and know how to browse. If not, follow the steps at <http://CUT5.emcp.net/Browsing> to try browsing now.



Activity 5.5.1

Practice Web Browsing Features

Use these tools to browse the web.

Basic Browsing Actions

Various web browsers look a little different and offer some varying features. Even so, the basic browsing actions work the same no matter which browser you are using. Look at Figure 5.13 to see where to find the bars, buttons, and links used to perform these actions:

- **Go to a URL.** Select any address in the Address bar, type a new URL, and then press Enter or Return.
- **Go back, go forward, and reload.** Click the Back button to return to the previous page and click the Forward button to return to the previous page. Click the Reload button to reload a page that didn't display properly. While a page is reloading, the Reload button changes into the Stop button. Click this button to stop the reloading (which you may want to do if it's taking too long, for example).
- **Add a new page tab.** Click the New tab button, type the URL for the new web page, and then press Enter or Return.
- **Browse by following a hyperlink.** Click the hyperlinked text, image, or button in the body of the page, on the navigation bar, at a drop-down list, or elsewhere on the page.

Audio, Video, and Animation Elements

As the web grows more sophisticated, multimedia elements such as video and sound are being incorporated into web pages both to grasp viewers' attention and to expand the range of activities a web page can perform. Various applets and scripts make adding the elements possible, as do plug-ins such as Apple QuickTime, Adobe Acrobat Reader, Macromedia Shockwave, and Macromedia Flash Player.

Activity 5.5.2

Article Plug-ins, Applets, ActiveX Controls, and Scripting Languages

Java Applets and Scripts Java is a programming language that website designers frequently use to produce interactive web applications. It was created for use on the Internet and is similar to the C and C++ programming languages. Applets are small Java programs that web browsers run. (*Applet* is the term for a miniature program.) Like macros, Java applets provide the ability to program online games and highly interactive interfaces.

Other scripting languages, such as JavaScript and Ajax, enable web developers to add web page functions, such as user login tools, shopping carts, dynamically loading content (such as articles that update periodically), and more. (Numerous scripting languages are available, including Perl, PHP, and Ruby; they will be discussed again in Chapter 11.)

Cookies A **cookie** is a very small file that a website places on a user's hard drive when he or she visits the site. Often, these files are harmless and even helpful. For example, one type of cookie may be used to verify whether you are currently logged in to your subscription account on a site such as an online newspaper. Sometimes, however, websites use cookies to track the surfing habits of users without their knowledge. One website might place a file on your computer that indicates what sites you have visited and then allow related sites to read this information and track your actions. You can adjust the security settings on your browser to warn you when cookie files are being accessed or to prevent their operation altogether.

Plug-Ins Sometimes, a website will ask for approval to add a plug-in to your web browser. A **plug-in** is a mini-program that extends the capabilities of web browsers in a variety of ways, usually by improving graphic, sound, and video elements. A missing plug-in often causes viewing errors on a web page, such as a message that a video can't play because the appropriate plug-in hasn't been installed.

Most plug-ins don't carry hidden or destructive features that can cause problems. However, as a general rule, it's a good idea to perform a web search and verify that a plug-in is safe and legitimate before giving permission to load it onto your computer. If you think the website recommending the plug-in download is trustworthy, click the Refresh button on the browser. Doing so will reload the page and redisplay the prompt to install the plug-in. Follow the prompts to install the plug-in for your browser.

One widely known plug-in is Shockwave, by Macromedia. Sites that use Shockwave normally take longer to load but offer higher-resolution graphics, superior interaction, and streaming audio. Macromedia Flash Player and Apple QuickTime are two other popular plug-ins that let users experience animation, audio, and video.

Ads

Advertising on a company's or individual's website produces income. For some companies and individuals, this ad revenue supplements the primary revenue stream. For example, the giant online retailer Amazon not only promotes the products it sells, but it also sells ad space to companies that want to feature their products or services on Amazon's prime web "real estate." For other websites, income from ads provides the majority of their revenue. A social media site such as Facebook, a news media site such as CNN.com,

Tech Career Explorer

IT for Space Travelers

NASA's research and exploration efforts require the skillsets of many people in addition to astronauts. If you are excited about being part of NASA's research and contributions to humankind but aren't sure how your skills and interests might fit in, go to <http://CUT5.emcp.net/SpaceTravelers> and learn about job opportunities that involve an information technology (IT) role at NASA.

and an individual blogger's website may all rely heavily on ad-generated revenue.

Website advertisers typically pay for the advertising on a per-click basis, but other payment models are followed as well. A website may also present ads in many different formats, including ad banners and pop-up windows. Users should be aware that some less-than-legitimate content can masquerade as ads, including blind links and hijackers.

Banners A **banner ad** invites the viewer to click it to display a new page or site selling a product or service. Banners were originally rectangles that appeared across the tops and bottoms of web pages, but today, they can take any shape and appear in any location on a page. Many banners include bright colors, animation, and video to attract attention, as shown in Figure 5.14.

Banners can provide helpful information to people interested in the product being advertised. Also, banners often provide special pricing when the user clicks the banner to go to the linked product site.

Pop-Ups An online ad may also appear as a **pop-up ad**, as shown in Figure 5.15. Named for its tendency to appear unexpectedly in the middle or along the side of the screen, a pop-up ad (or *pop-up*) typically hides a main part of the web page. When the window pops up, that part of the page may also darken or flicker.

On most devices, you can click a Close (X) button in the pop-up to remove it from the screen. However, some pop-ups are extremely persistent—reappearing immediately after you close them or even lacking a Close button or any other means for shutting them. On a Windows computer, you might be able to close a pop-up window that doesn't have a Close button by pressing the keyboard shortcut Alt + F4. Most web browser software includes **pop-up blocker** features that you can activate to avoid this sort of nuisance. (Chapter 9 will explain more about web privacy and security, including pop-up blocking.)

Blind Links A link sometimes misrepresents its true destination, taking you to an unexpected page when you click on it. For example, a link such as [Next Page](#) might actually take you to an advertising web page. Called a **blind link**, this type of deceptive device appears only on websites that aren't trustworthy, such as some free-host sites. Free-host websites don't charge a fee for hosting web pages. However, they do require that the pages display banners and other forms of advertising chosen by the companies that host the pages.

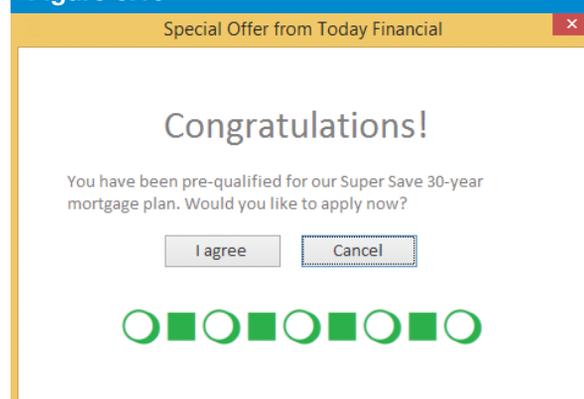
Hijackers Web hijackers can disrupt your browsing experience and expose you to unwelcome ads. A **hijacker** is usually an extension or plug-in that's installed with your web browser. It functions by taking you to pages you didn't select—generally, pages filled with advertisements.

Figure 5.14



Websites sell advertising space in the form of banner ads. Many users prefer to avoid ad-heavy websites.

Figure 5.15



A pop-up ad covers part of the web page and prompts the user to buy a product or subscribe to information.

Hijackers typically install on your computer without your awareness and sometimes attempt to make you pay a fee to remove them. You can often get rid of hijackers by working with the security settings in your web browser and by deleting or uninstalling web browser extensions. In extreme cases, you may need to reinstall your computer's operating system.

A new form of hijacker replaces ads that the publisher sold with ads from the company that created the hijacker. Each time a user clicks one of these ads on the publisher's website, the hijacker company—not the publisher—receives revenue.

Web Page Traps Some websites can change your browser's settings permanently or attempt to prevent viewers from leaving by continually popping up more windows and disabling the Back button. To avoid this so-called **web page trap**, change your web browser's settings to increase the level of security. Having higher security settings may cause the browser to prompt you whenever it comes across suspicious behavior, as shown in Figure 5.16. Unfortunately, having higher security settings may cause the browser to prompt you constantly, even when you are visiting legitimate websites.

If you fall into one of these traps and are using Windows, press the key sequence Control + Alt + Delete to open the Task Manager. (Depending on your Windows version, you may have to press this sequence twice.) From the Task Manager, you can choose to reboot the computer or close the web browser.

Figure 5.16



Internet Explorer blocked this website from displaying content with security certificate errors.

Show content

x

This warning indicates a problem with the site's online security certificate, which verifies the site's authenticity to users. The certificate might have expired, for example.

Cutting Edge

Introducing Web 3.0, the Semantic Web

The term *Web 2.0* was coined in 2004 by Tim O'Reilly at a conference sponsored by the company he founded, O'Reilly Media. At that time, interaction and collaboration were beginning to occur online, most notably through websites such as Facebook and Twitter. Now that Web 2.0 is part of the Internet's "present," experts are increasingly using the term *Web 3.0* (or sometimes *Semantic Web*) to describe the Internet's future. Possibilities for Web 3.0 developments may include machine-generated (rather than human-sourced) information, three-dimensional (3-D) simulations and expanded or enhanced reality (including

the widespread use of sensors), greatly expanded use of high-quality video by computers and other devices, and much more.

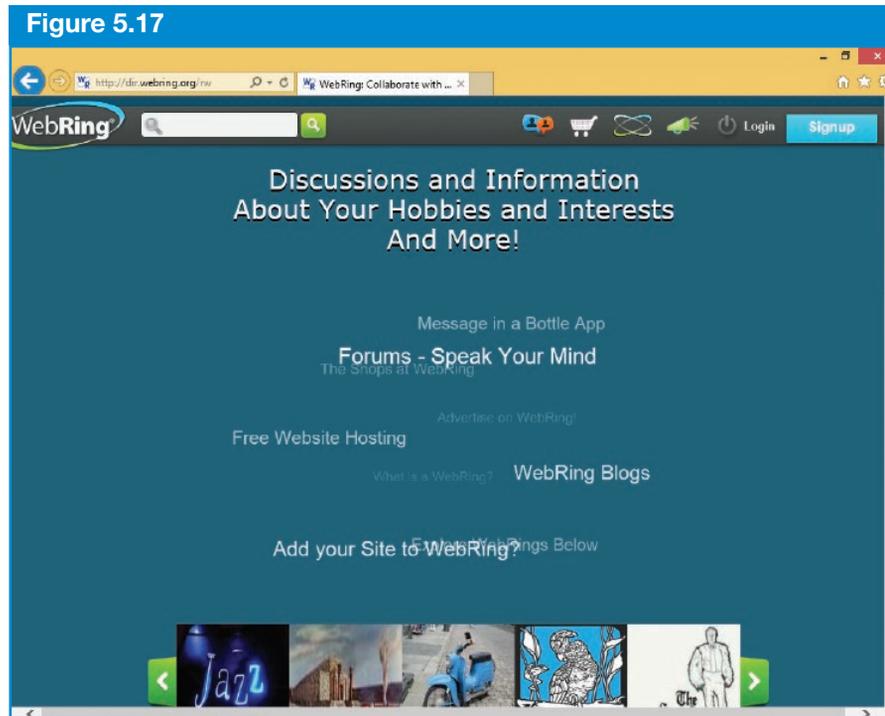


Hotspot



Wireless, USA

The move to go wireless could spread nationwide. In early 2013, the Federal Communications Commission (FCC) proposed a plan to create a free wireless network covering all of the United States. The network would use some of the wireless spectrum currently used for TV broadcasting. Having such a network would make it possible for all types of devices to remain connected to the Internet at all times and at no cost to users—a reason that some companies support the proposal. Of course, companies that currently provide fee-based ISP services have expressed concerns about the proposal.



The WebRing home page has listings for hundreds of different WebRings organized around different topics.

WebRings

One relatively safe way to move from site to site on the Internet is by using a **WebRing** (see Figure 5.17). Each site on a WebRing maintains links to the next site and the previous site, forming a ring (hence, the name). WebRings link sites devoted to a similar theme or topic. Sites dedicated to hobbies or special interests typically include this navigation feature.

WebRings are usually moderated by people who want to help others find websites they would probably not find on their own. Taking advantage of WebRings is an excellent way for hobbyists to find like-minded individuals who share their passion for falconry, old cars, nineteenth-century tea sets, or hundreds of other hobbies. WebRing.org, shown in Figure 5.17, can help you find a WebRing in one of dozens of topic areas. You can search for a topic to find a list of matching WebRings. For example, if you search for waterfall, the matching rings include the Waterfalls WebRing, as well as rings on travel photography and more.

Recheck 5.5

Recheck your understanding of the concepts covered by this objective.

5.6 Searching for Information on the Internet

More than 90 percent of adult Internet users search the Internet to tap into the global library of limitless data that's available on practically any topic. Some experts now estimate that the web holds more than 1 trillion pages of information. Finding anything among so much information requires the proper tools and techniques.

Users can search for and retrieve information from web pages by using a search engine in a web browser. A **search engine** is essentially a website or service you use to locate information. You type search criteria or **keywords** in the site's search text box or in your browser's address or location bar. The leading search engines include Google, Yahoo!, and Bing.

Precheck 5.6

Check your understanding of the concepts covered by this objective.

Suppose you want to find information about the Battle of Vicksburg for a history class report. You will begin by typing the search criteria—in this case, the words *Battle of Vicksburg*—in the search text box and then pressing Enter or clicking the Search button. Doing so will cause a list of hyperlinked articles to appear in the browser. Clicking on an article's title will make the article display and allow you to read it. Most search tools provide a basic search page that contains a search text box with a search command button beside or below it (see Figure 5.18).

Search Engine Choices

The search engine that was set up as the default when you installed your web browser may not be the one you prefer to use. However, every web browser program enables you to change the default search engine. In addition, most browsers enable you to add another search engine of your choice.

Not all search engines offer the same features, and some search engines perform certain types of searches better than others. Search results differ depending on the search algorithm (step-by-step search method) and software tools used to generate the results. Search results also may differ depending on the number of web pages an engine indexes (catalogs) and on the methods it makes available for refining a search. Also consider that some search engines accept fees for placing websites at the top of search results lists. This means that the first few websites in a results list are likely to have paid for that premier position and may not contain the information that's most relevant for you.

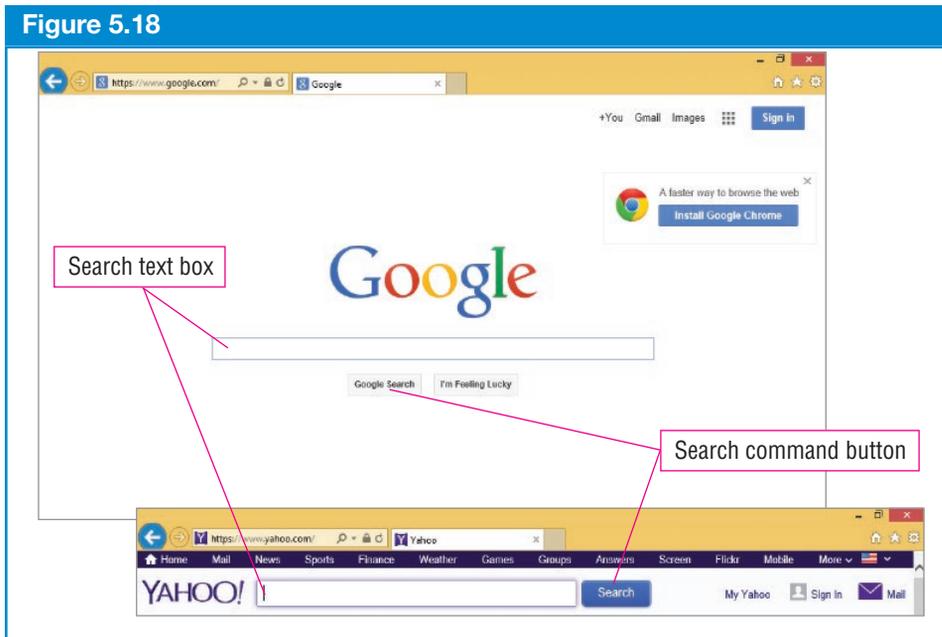
In addition to working with a single search engine, you can use a metasearch engine. A metasearch engine sends your search request to multiple search engines at once, and may also search other libraries and directories or paid-placement services. Metasearch engines include Search.com, Dogpile, and Excite.com.

Hands On

Adding a Search Engine to Your Browser

The process for adding a search engine to your browser depends on the browser. You can try methods like the ones described at <http://CUT5.emcp.net/AddingSearchEngine>.

Figure 5.18



Google and Yahoo! are two frequently used search engines. Both provide a basic search page with a search text box and a search command button.

Default Search Engine

When you have added multiple search engines in your browser, you can change the default to a specific search engine at any time. For example, you might prefer to use Google for most searches but switch to the Wikipedia Visual Search engine when you are looking for content with images for reference. Most browsers enable you to switch between search engines easily, but keep in mind that the new search engine you choose will remain the active or default engine until you choose another one.

Advanced Search Techniques

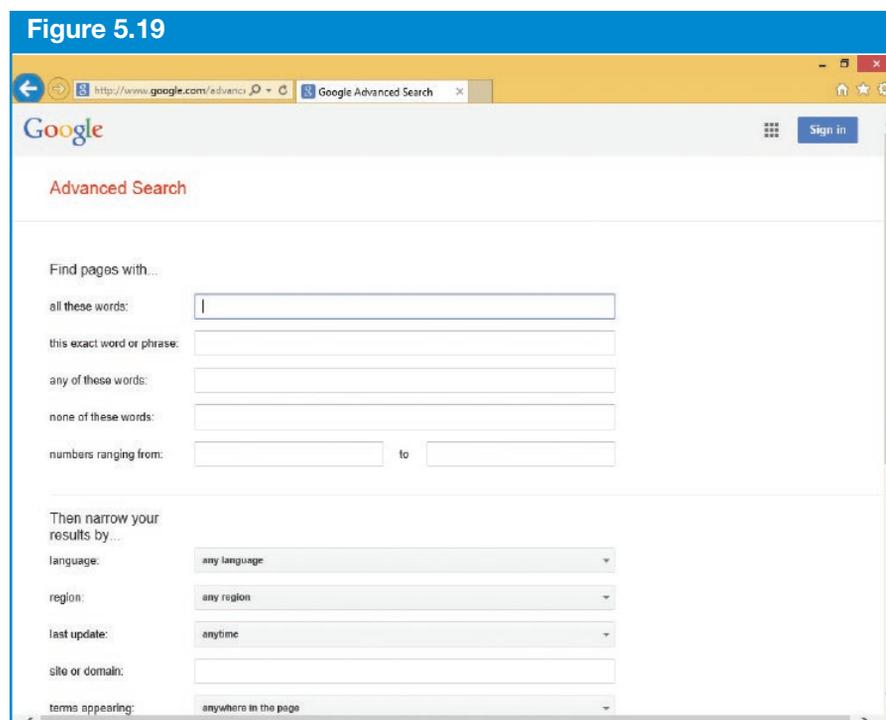
To get the most targeted results from any Internet search, you must enter the right keyword or keywords in the search engine's search text box. Using too many keywords will produce hundreds or even thousands of search results, which you will need to wade through to find what you are looking for. Using vague, obsolete, or incorrectly spelled terms will further reduce the chances of conducting a successful search. Think carefully about what combinations of words most likely appear in the material you need. Some search engines, such as Google, let you work with an advanced search page that prompts you to enter details about the information you want, as shown in Figure 5.19.

The first and often overlooked method for getting more accurate search results involves using quotation marks. If you enter the phrase *four score and seven years ago*, you will get different results than if you enclose the phrase in quotation marks, for example *"four score and seven years ago"*. For a well-known phrase such as this, the results might be similar due to the advanced intelligence of the algorithms used by

Hands On

Choosing the Active or Default Search Engine in Your Browser

The method for changing the current search engine depends on your browser, but you can try techniques such as those described at <http://CUT5.emcp.net/ChoosingDefaultSearchEngine>.



The Google Advanced Search page prompts users to provide details that will return more specific information.

today's search engines. However, for a less common phrase or a special item such as a name, enclosing the phrase or name in quotation marks will produce more targeted results.

Other advanced searching methods use a logic statement containing one or more **search operators** to refine searches. Three common search operators are AND, OR, and NOT:

- AND (or the plus sign, +) connects search terms and returns search results that contain references to all of the terms used. For example, asking the search engine to search for *dogs AND cats* (or *dogs + cats*) will return only sites containing references to both dogs and cats.
- OR returns results that contain references to any of the search terms. Asking the search engine to search for *dogs OR cats* will return sites that have references to either dogs or cats or both. OR is usually the default logic option on a search engine.
- NOT is used to exclude a keyword in a search. Searching for *dogs NOT cats* will produce only sites that refer to dogs but don't mention cats.

You can use search operators along with phrases contained in quotation marks to conduct even more detailed searches.

Bookmarking and Favorites

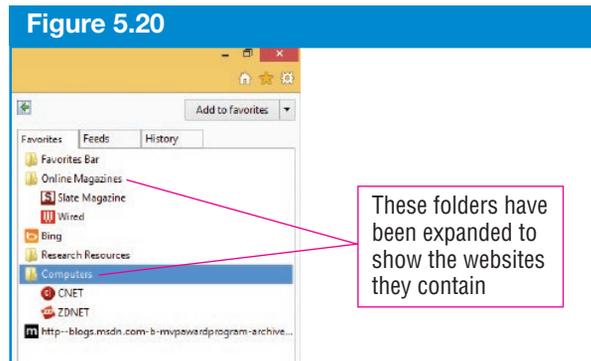
If you frequently use the web for research, you can mark and organize web pages to make it easier to find them again later. Some web browsers (such as Chrome) call a marked page a **bookmark**, while others (such as Internet Explorer) call it a *favorite*.

Once you have navigated to the page to mark, choose the button or command for marking favorites in your browser; this happens to be a star icon in the upper-right corner of both Chrome and Internet Explorer. If needed, click the Add or Add to Favorites button, edit the name to use for the site, choose or create the folder to store the bookmark in, and then click Add or Done. Using folders enables you to organize the sites you visit by subject matter or type, as shown in the Online Magazines and Computers folders that are expanded in Figure 5.20. To use a bookmark or favorite, simply display the list or pane that holds them in your browser, expand a folder if needed, and click the bookmarked web location to visit.

Hands On

Reinforcing Your Browsing and Search Skills

Complete the tasks at <http://CUT5.emcp.net/BrowsingAndSearching> to reinforce your Internet browsing and search skills.



 **Recheck 5.6**
Recheck your understanding of the concepts covered by this objective.

 **Precheck 5.7**
Check your understanding of the concepts covered by this objective.

5.7 Using Other Internet Resources and Services

The Internet originated as a platform for communication and information sharing. As its infrastructure and underlying programming technologies have evolved, the Internet has become a platform for many activities beyond communication and research. This section provides a detailed look at the broad variety of applications and activities that you can take advantage of when online.

Communicating with electronic devices might sound cold and impersonal, but in reality, the Internet continues to evolve as a primary channel for staying in touch

with others. Less than a dozen years ago, you could use the Internet to communicate in only a handful of ways, but now, new digital platforms for connecting and sharing with others online emerge almost daily.

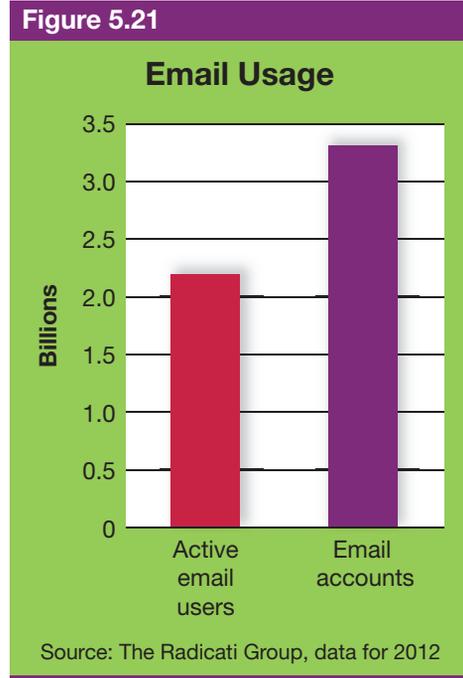
Electronic Mail

Electronic mail (email) remains one of the top activities performed on the Internet. In fact, nearly 90 percent of adults have sent or read email and over 3 billion people had email accounts in 2012 (see Figure 5.21). You can use email to create, send, receive, save, and forward messages in electronic form. Email is a fast, convenient, and inexpensive way to communicate.

A typical Internet account includes at least one email address, and some ISPs allow you to create multiple email addresses per account. Other web-based email services (such as Gmail, Yahoo! Mail, and Outlook.com) allow you to set up an email address independent of a particular ISP. Gmail, Yahoo!, and Outlook.com accounts are free, but paying a small monthly fee will typically let you upgrade your account with features such as additional storage space.

You also can choose to work with and manage email in two different ways, depending on your ISP's capabilities and your own preferences. One way is to use an email application that's installed on your computer, such as Microsoft Outlook 2013 or Mozilla Thunderbird (a free alternative). Both Windows 8.1 and Mac OS X include built-in applications for reading and sending email. After installing the software (if necessary), you set up your email account information so the software can connect with your ISP to send and receive messages. Email applications typically download all messages to your computer or device. However, you can choose to have messages stored online, as well, so that you can access them from other computers or devices.

The other way to work with and manage email is to use **webmail**. This method has become more common as users have increasingly wanted to access email via a smartphone or tablet in addition to a computer. With webmail, you use your web browser to navigate to your email account on your ISP's website. Depending on your service, you may have to navigate to a particular URL (such as *webmail.earthlink.net*) to access your ISP's sign-in page. After you sign in with your account information, you can send, receive, and



Practical TECH

Mail on Mobile

If you use a tablet or smartphone for email, you can probably download an email app to make the process simpler than logging on through the device's web browser. For example, you can download apps for Gmail and Yahoo! Mail. To find apps specific to other email providers, search the app store for your device type.

For some other types of accounts, such as Outlook.com, you enter the email account information in the device's settings and use the device's mail app to work with your email. Windows Phone, iOS, and Android devices all have built-in mail apps.

view messages online. Some ISPs even offer a separate URL for signing in with a mobile device, such as *m.webmail.earthlink.net* (see Figure 5.22).

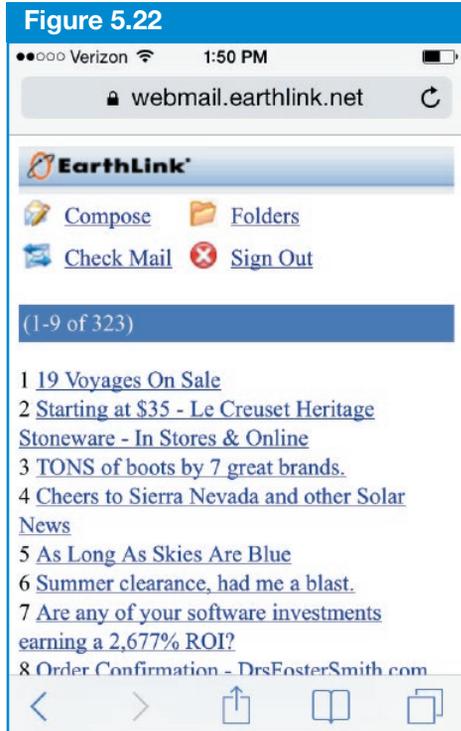
Even though Gmail, Outlook.com, and Yahoo! Mail are all webmail services, they also enable you to access your email for free through an email application such as Outlook. For Gmail and Yahoo!, the process for connecting to your email application typically means making sure that the POP email protocol is enabled in your online account settings and then setting up the account information in your email program. (Table 6.2 in Chapter 6 covers communications protocols such as POP.)

Figure 5.23 shows common features of both email applications and web-based email as they appear in Gmail. These features allow you to perform the following actions:

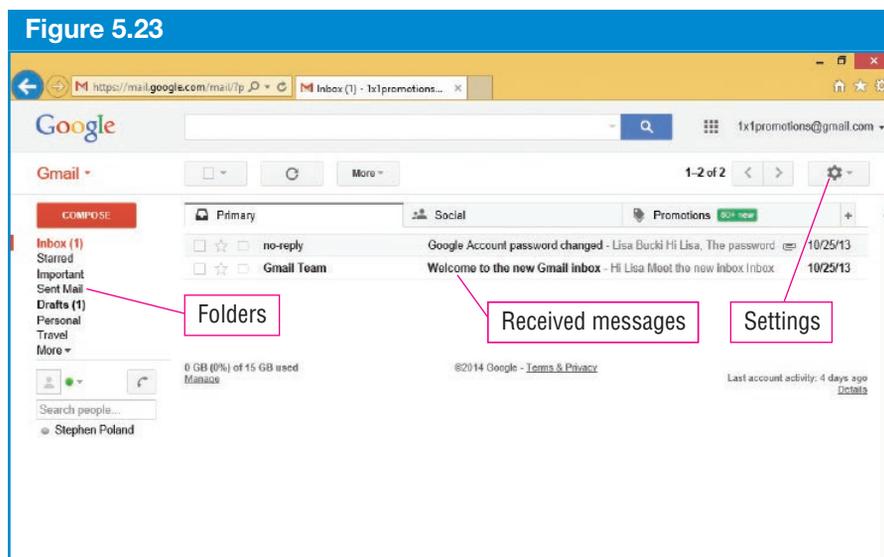
- Organize messages in folders.
- Assign priorities to the messages you create.
- Sort the messages in a folder.
- Change settings.
- Mark messages as “Read” or “Unread.”
- Print messages and save attachments.

Whether you are using an email application or webmail, the process for sending an email message generally works the same. You click the command or button for composing a new message, provide the recipient’s email address, type a subject in the *Subject* text box, type a message, and then click the Send button. In addition to sending messages that contain text, you can attach various types of files to email messages, including reports, spreadsheets, photos, and video files. Recipients can then open the attached files to view or save them.

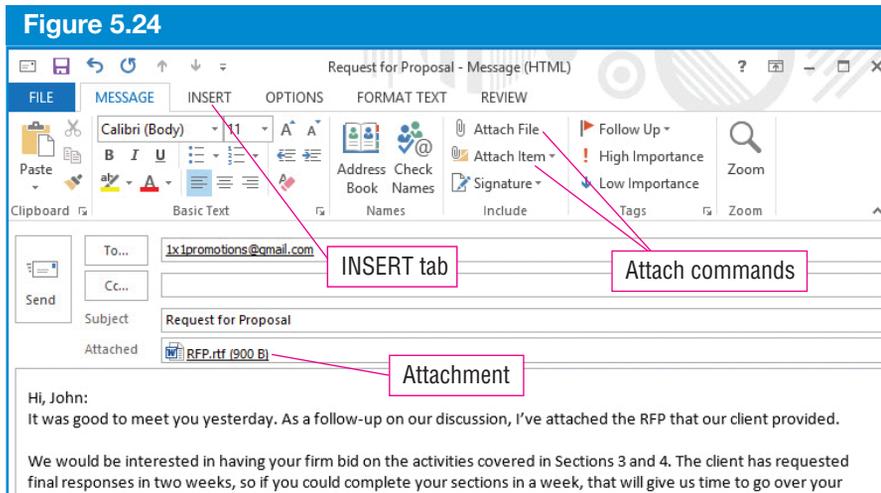
In most email programs and webmail systems, you insert an attachment by clicking an Attach button (which often has a paper clip icon). Some email programs allow you to insert other types of information in a message as well. For example, if you click the



You can view webmail using your mobile device browser.



Google’s Gmail is a free email service that includes many valuable features.



In the Outlook message window, click the Attach File button to select a file to send with a message or use the options available on the INSERT tab to include other types of content.

INSERT tab in an Outlook message window (see Figure 5.24), you will find options for inserting or attaching a calendar item, virtual business card, table, and more.

You may want to compress or “zip” large file attachments or multiple files. A **compressed file** or **zipped file** is smaller than the original file, which means it takes less time to send and download (copy from the host’s computer to the recipient’s computer). The recipient can then open or “unzip” the received file to view its contents.

Be aware that because malicious software can be hidden within certain types of files, some ISPs and IT departments block certain types of file attachments—including zipped files, image files, and executable files. It’s a good idea to check with the recipient before sending a very large file or a file in a special format. If sending and receiving such files causes problems, you can use the FTP method (covered later in this chapter) to transfer the information.

Also be aware that most ISPs enable you have some control over spam, or unwanted junk emails. You can often change the overall level of spam filtering in your account settings or within your email program and block specific senders. You also can mark messages as spam, so that messages from that sender will automatically be directed to a Spam or Junk folder (also called the **spam trap**) in the future. The only drawback to this screening feature is that legitimate messages sometimes end up in the spam trap. Be sure to check this folder routinely for messages you might want.

Social Media, Sharing, and Networking

One new genre of web services enables people to create personal online spaces and interact socially. **Social networking services**—such as Facebook, Twitter, Pinterest, LinkedIn, and Reddit—have become popular, boasting hundreds of millions of users. These free sites give anyone the opportunity to open an account and share content.

For example, Facebook users can personalize their Timelines with profile information, photos, music and video, and status updates. Animal rescue groups use their Facebook pages to raise funds and place animals in adoptive homes.

Twitter operates differently, allowing people to share 140-character messages called *tweets* with anyone who cares to follow and read their messages. Celebrities and journalists use their Twitter accounts to connect with millions of fans and followers. Twitter recently purchased Vine (Vine.co, which is different from the Vine.com retail site), a mobile social video app for sharing six-second videos from a mobile device.

Activity 5.7.1

Article Internet Social Networks

Some sites bring together content from a variety of sources, either organizing it by tags or letting contributors rank or vote on its value. When tagging, the publisher or users apply a tag or keyword to identify a particular type of content.

New types of social media sites emerge nearly daily to address nearly any interest. Table 5.5 lists a variety of popular and emerging services of various types. To use some social media services, such as Instagram, you have to download an app for your mobile device. Other services simply work within your web browser.

Chat and Instant Messaging

Using **chat** and **instant messaging (IM)**, users can engage in real-time dialog, or live, instantaneous online conversations, with one or more participants. Chat and IM used to be thought of as two different services, with chats taking place in special online locations called *chat rooms* and IM usually taking place between two people in a back-and-forth dialog, like a typed phone conversation. Many users now call IM interactions *chats*; for example, some sales and help websites give you the option of initiating a chat (IM) session with a customer service representative.

ICQ (“I seek you”) offers web-based chat room environments, where users can discuss a variety of topics, such as climate change and stocks. IM used to require having a specific application, such as Windows Messenger or AOL Instant Messenger. However, most IM services have been moved to a web-based platform or rolled into another service, such as Skype. Internet Relay Chat (IRC) is a form of instant messaging (even though it includes the word *chat* in its name) that requires specific software, such as mIRC (<http://CUT5.emcp.net/mIRC>). In addition, Google has been testing an IM app called *Google Talk*.

Table 5.5 Popular Social Media Services Beyond Facebook and Twitter

Service	Description
	Pinterest lets you pin or bookmark items from around the web on a virtual corkboard or scrapbook; you can also follow other users' boards.
	Instagram lets you capture photos from your mobile device, apply fun filters, and then share the photos at other social sites, such as Facebook, Twitter, and Tumblr.
	Some social sites aggregate (or collect) a particular type of content and allow users to follow and interact. Tumblr aggregates more than 150 million blogs, and Reddit acts as a social news service.
	
	LinkedIn is a professional social network, on which users can create an online résumé, search for jobs, and share information about business topics.
	Some social sites let you share and distribute content you have created. Digital artists and others can share and sell their creations on deviantART. Using digital photocentric services such as Flickr, you can upload and share images, have printed items made, and distribute images for a fee or under Creative Commons licensing.
	
	Google+ falls somewhere between Facebook and LinkedIn in terms of the services it provides. Like Facebook, Google+ allow you to share information with circles of users, view other posts in an ongoing feed, and join special interest groups called <i>communities</i> . Like LinkedIn, Google+ tends to be professional in tone, and it lets users create and attend online events called <i>Hangouts</i> .

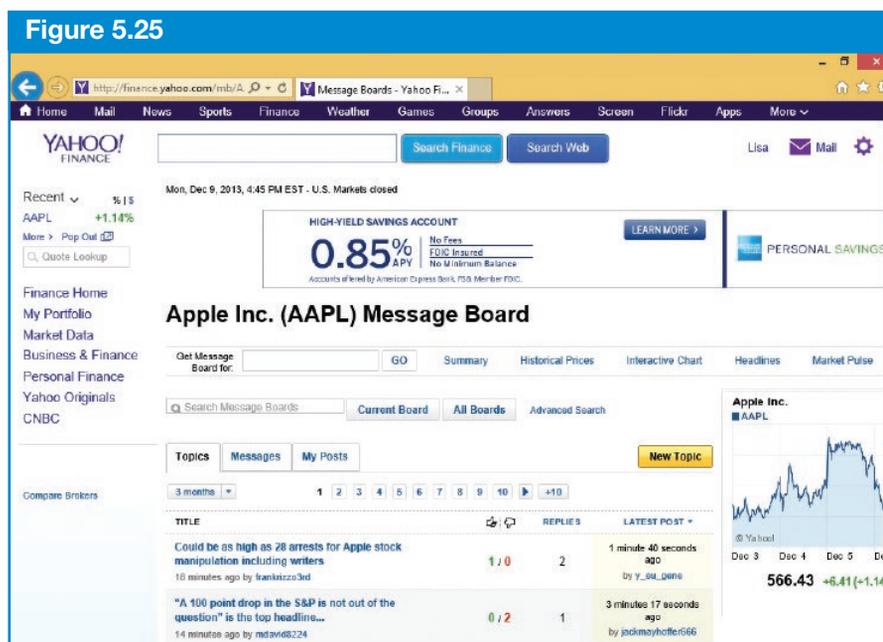
Most online and social services provide some form of chat or messaging. For example, Gmail enables you to chat with your online contacts, and Facebook enables you to exchange **private messages (PMs)**, which are visible only to you and others invited to the conversation. With these types of social services, you can initiate a chat or message when you see one of your contacts or friends online. Type a comment and then press Enter or click Send to send it to the other person, who can respond to you in the same way. The messages remain visible in the message area as you continue the typed conversation, much like text messaging using a smartphone.

The corporate world is increasingly implementing forms of chat as a business communications tool. For instance, many shopping and customer service websites offer users the option of having an interactive conversation with a customer service representative via a chat or message window. Employees accustomed to instant messaging in their personal lives also find it convenient to communicate with coworkers and clients using this medium.

Message Boards

A **message board**—often called a *discussion forum* or simply a *forum*—presents an electronically stored list of messages that anyone with access to the board can read and respond to. Like a classroom or dormitory bulletin board, a message board allows users to post messages, read existing messages, and delete messages.

Similar to chat rooms, most message boards center on particular topics. Yahoo! Finance provides a message board for almost every stock so that investors can discuss a company's performance and stock price (see Figure 5.25). InvestorVillage is a stand-alone website that also offers a variety of boards about specific stocks and general investing topics. In the InvestorVillage message boards, you can read and respond to posts and typically assign ratings to comments by others. Because the messages remain in a message board (unless deleted by a moderator), you can typically search a board to find information posted by a particular user or information about a particular keyword. This searchability feature makes many message boards useful bodies of information that users can access for future reference or research.



Users go to message boards, like this one from Yahoo! Finance, to read and post messages about topics of interest.

Blogs

A **blog** is a frequently updated journal or log that contains chronological entries of personal thoughts and web links posted on a web page. (It was originally called a *weblog*—a combination of the words *web* and *log*.) The content and style of blogs vary as widely as the people who maintain them (who are called *bloggers*). In general, though, blogs serve as personal diaries or guides to others with similar interests. Collectively, the world of blogs is known as the **blogosphere**. Users can start and publish blogs at websites such as Blogger and WordPress.com.

Many corporate websites now include one or more blogs to communicate with employees, customers, and partners. Bloggers add a personal, informal tone to company communications and provide information that's more timely and relevant than the content traditionally provided in a glossy marketing brochure.

News and Weather

Many users are turning away from print and TV sources of news and weather and relying instead on mobile and standard web versions of their favorite information sources. For example, CNN, ABC News, and other national networks offer free news online, 24/7. Some print-based publications, such as the newspapers owned by the Gannett company, attract readers by offering limited online articles to individuals who don't subscribe to the print edition and unlimited online articles to print subscribers. Other publications, such as the *New York Times* and the *Wall St. Journal*, offer digital (online-only) subscriptions.

Other more topical information sites are offshoots of popular subscription TV channels, such as ESPN and The Weather Channel. Some sites have more video content than other news sources and may offer localized content as well. For example, at many weather news sites, such as Intellicast.com, you can get local forecast information by entering your zip code. So you can read and access vital information while on the go, most news and weather sites (and many of the informational sites covered in the next section) enable you to download mobile apps.

Business, Career, and Finance

While plenty of entertainment can be found on the web, plenty of business resources are available as well. If you are looking for business news or strategy information, you can consult online editions of such popular magazines as *Fast Company*, *Businessweek*, *Entrepreneur*, and *Forbes*. You can also consult web-only business news sources, such as *Business Insider*. You will find content covering a variety of business segments and niches in specialty online publications such as *Wired*, and you will find informative publications and newsletters at the website of the trade or professional association for the industry you work in.

Most news and business sites offer a “Career” or “Job Postings” section, and some sites are dedicated to helping people find jobs (or employees for businesses that are hiring). The top job search sites include Indeed, Monster, CareerBuilder, GlassDoor,

Tech Ethics

Keeping Clean in Company Communications

Electronic communications in the workplace often involve legal privacy issues. Companies generally keep backups of communication in the event of a data loss, but some industries require that all forms of digital communication be archived for legal reasons. For example, the financial industry requires that all email and instant message content be kept for several years. Doing so is necessary to ensure it will be available as evidence in the event of an investigation by the Securities and Exchange Commission or another legal body.

Employees should keep the content of email and instant messages in the workplace professional and courteous, because their employers will have digital records of who said what and when.

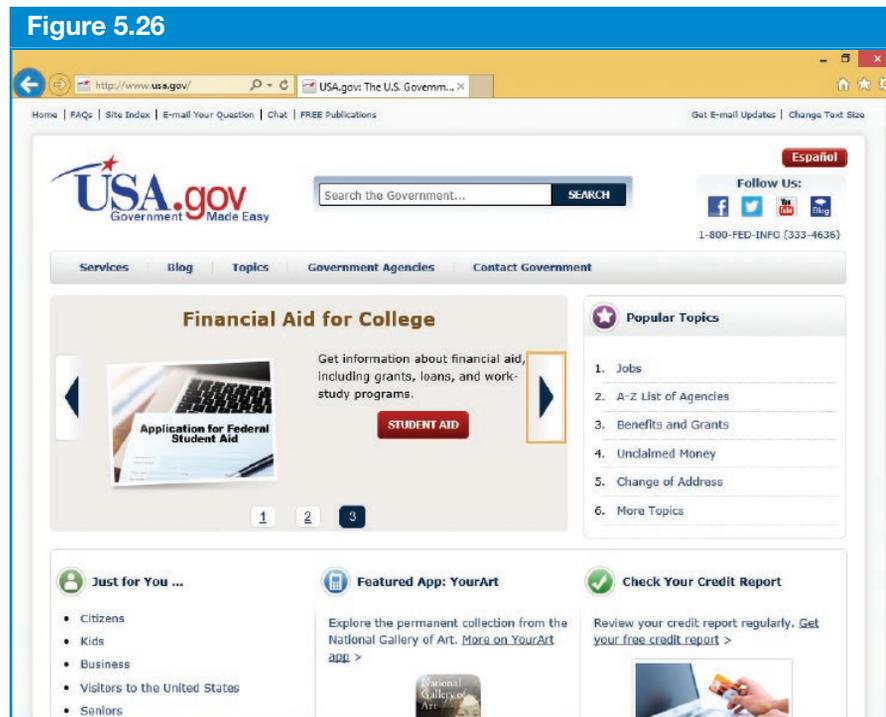
and Simplyhired. Some job search sites are specific to professions, such as Dice for IT professionals, and job-hunters can also connect with target companies through LinkedIn. There are even sites to help people find freelance work, such as Elance and Guru.com. Most of these sites enable you to post your résumé, so it's available to all potential employers, and provide career statistics and help with career development.

If you are interested in news specific to the stock market, the Internet has what you need. Many major players—including Google, Yahoo!, Bloomberg, and Marketwatch—provide daily stock market and company news, along with stock quotes, charting, and more. Some sites also allow you to track a portfolio of stocks, and most provide information on topics such as personal finance and commodities.

Government and Portals

Any website with the domain .gov is a government website. Many .gov websites are operated by federal agencies. For example, you can go to the top of the US government by visiting WhiteHouse.gov. Other .gov websites are operated by governments at the state, county, and local or municipal levels. These sites not only offer information about government departments and services, but they also publish important announcements, including those required by public meeting laws.

A special type of website called a **portal** acts as a gateway for accessing a variety of information. A portal serves as a “launching pad” for users to navigate categorized web pages within the same website or across multiple websites. The US government's USA.gov website (<http://CUT5.emcp.net/USA.gov>) is an example of a portal (see Figure 5.26). The majority of the material on the USA.gov site is located on the USA.gov servers, but links also take users to individual federal, state, and local government agency websites. The home page for USA.gov provides an overview of the information contained within the site.



The official website of the US government, USA.gov, is a portal that provides access to information about all aspects of the federal government. The USA.gov home page provides links to information on millions of government web pages.

FTP and Online Collaboration

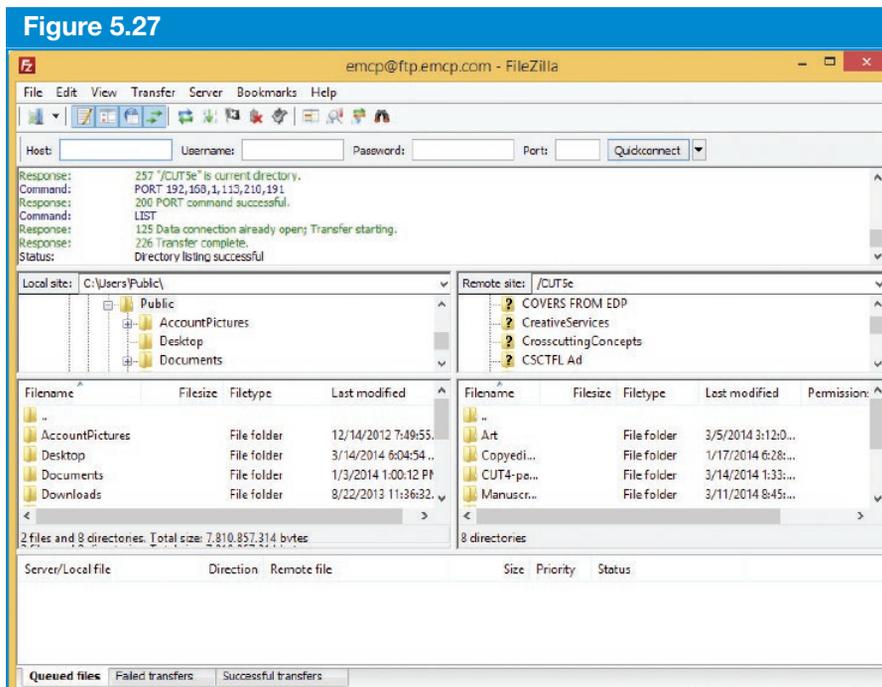
As mentioned earlier in the chapter, **File Transfer Protocol (FTP)** enables users to transfer files to and from remote computers. FTP was the original method used for transferring files on the Internet, and it remains an option for transmitting files that can't be emailed because of their large size or because they are blocked by the recipient's system.

Although most web browsers can be used to connect with an FTP server, heavy FTP users usually prefer to use some type of FTP client software, such as the free program FileZilla (shown in Figure 5.27). Most FTP servers are secure, so a user name and password are needed to sign on, but some site operators allow users to log on anonymously.

Typically, you can download files from the FTP site to your computer and upload files from your computer to the FTP site. FTP allows any kind of file to be transferred. For example, a student can download lecture outlines that an instructor has made available on a school's FTP site, or an engineer can download and view blueprints that an architect has placed on the firm's FTP site. And of course, telecommuting employees and contract workers can submit completed projects and documents via FTP and download resource documents.

While FTP used to be the main way to transfer documents for telecommuting and other forms of remote work, more modern online workspaces have evolved over the years. Online workspaces have developed both in conjunction with web-based email services and as standalone services implemented by corporations and other organizations. For example, when you have an Outlook.com account, you also have an online storage area known as your *OneDrive*. You can upload, download, and even share documents from your OneDrive with other users. Corporate-level collaborative platforms include SharePoint, which allows online file sharing and real-time file collaboration. (You will learn more about using online sharing and collaboration features in Chapter 7.)

Figure 5.27



The authors of this textbook used FileZilla to upload all of the manuscript and image files to the publisher's FTP site.

Peer-to-Peer File Sharing

Peer-to-peer (P2P) file sharing has caused a lot of controversy on the Internet. P2P enables users to download material directly from other users' hard drives, rather than from files located on web servers. Napster, the famous pioneer of peer-to-peer file sharing, operated by maintaining a list of files made available for sharing by subscribers to the system. For example, someone would let Napster know that he had 50 music files on his hard disk that he would be willing to share. Other users could then use Napster to locate these files and request that they be sent to their computers. Newer P2P systems remove the central server entirely and allow user computers with the fastest connections to provide the search function and keep track of which computers have shared a file. P2P is a powerful idea that allows every computer to function as both a server and a client.

Napster was launched in 1999, and in less than a year, it had more than 20 million users. At its peak, Napster had more than 70 million users worldwide and was being used to download music files by almost 70 percent of US college students. Unfortunately, many of the files being shared in this way were copyrighted material. Napster was forced to shut down in 2001 after two court injunctions ordered it to stop doing business. After filing for bankruptcy and being acquired by Roxio, Inc., Napster was relaunched as a music download service in 2003 and eventually was incorporated into Rhapsody, one of many services chasing market leader iTunes.

Today's P2P technologies allow sharing any types of files, including games, movies, and software programs. Since Napster, the biggest file sharing technology has been BitTorrent. Industry research firms estimate that BitTorrent usage accounts for 35 percent of all Internet traffic. Although some individuals use BitTorrent to illegally find and download copyrighted files, others use the software to share their own files, which is legal. Also, software and media companies such as TimeWarner are interested in the distribution technology as another sales channel.

Using P2P technology to harness the individual contents of millions of computers around the world represents a vast opportunity for communications. However, with additional access come additional security risks.

Voice over Internet Protocol (VoIP)

Through an application of **Internet telephony** (digital communications using different IP standards) technology called **Voice over Internet Protocol (VoIP)**, two or more people with good-quality connections can use the Internet to make telephone-style audio and video calls around the world. The process digitizes the voices and videos, breaking them down into packets that can be transmitted anywhere, just like any other form of digital data.

VoIP can be used in three different ways: from device to device, via Internet-ready phones, and via an analog telephone adapter (ATA). Through popular device-to-device services, such as Skype, the user at each end of the connection downloads and installs software that uses the sound features in the computer, mobile device, or Skype-ready TV. Adding video requires having a webcam. The software enables the users to connect through a "call" over the Internet. Then, it translates the words spoken

Tech Career Explorer

Telecommuting Techs

Telecommuting has its own set of challenges, including being self-motivated, avoiding distractions, dealing with interruptions, and maintaining effective communication. If you like these kinds of challenges and you like IT, you might be interested in exploring how to combine the two. Go to <http://CUT5.emcp.net/TelecommutingTechs> for a brief introduction to various types of IT jobs and the skills and responsibilities involved in them.

into the microphone by the sender into sounds that are heard through speakers by the recipient, with video transmitting simultaneously.

Two-camera models of the iPhone, iPad, and iPod Touch, as well as some recent MacBook models, have the ability to make FaceTime audio and video calls over a Wi-Fi network. These devices all come loaded with the FaceTime software.

Having a Gmail account enables you to use a feature called *Google Voice* to call telephones of other Gmail account holders. These individuals can make free calls within the United States and Canada.

Although less common now than in the past, Internet-ready phones provide another option for users. This type of phone plugs directly into an Internet connection and performs the same translation without separate software. An ATA device takes the analog signal from a traditional phone and converts it into digital data that can be transmitted over the Internet.

Using VoIP service eliminates the need to have long-distance telephone service, which sometimes involves paying extra charges. To take advantage of this savings, some users eliminate traditional telephone lines from their homes and make all calls using VoIP service along with a mobile phone. Vonage pioneered VoIP service, but many high-speed ISPs now offer VoIP calling plans, including TimeWarner Cable, SBC Communications, and HughesNet. In late 2012, Juniper Research estimated that mobile VoIP usage would reach one billion users (or one in seven mobile subscribers) by 2017.

Audio, Video, and Podcasts

To watch a video or listen to a song stored on the Internet, users previously had to download the file to a computer and use a dedicated application to open it or download the file to a digital media player, such as an iPod.

Now, you can either download the file or stream it online.



You can make audio and video calls over the web using your computer or mobile device.

Cutting Edge

Accelerating Innovation

The development of advanced, high-speed Internet applications and technologies is being facilitated by the Internet2 research platform. Internet2 is a consortium of more than 200 universities that are working in partnership with industry and government. It enables large US research universities to collaborate and share huge amounts of complex scientific information at amazing speeds. The goal is to someday transfer these capabilities to the broader Internet community.

Internet2 provides a testing ground for universities to work together and develop advanced Internet technologies, such as telemedicine, digital libraries, and virtual

laboratories. An example of this collaboration is the Informedia Digital Video Library (IDVL) project. IDVL uses a combination of speech recognition, image understanding, and natural language processing technology to automatically transcribe, partition, and index video segments. Doing so enables intelligent searching and navigation, along with selective retrieval of information.

Internet2 has partnered with Level 3 Communications to launch the Internet2 Network backbone, which is capable of supporting speeds of more than 100 gigabits per second (Gbps). To learn more about Internet2, visit the Internet2 website at <http://CUT5.emcp.net/Internet2>.

Downloading The most popular music download service, Apple's iTunes, works with a variety of devices, including Windows-based computers. Most music download websites charge a per-track or per-album download fee. You "own" the music but can only sync or copy it to a limited number of devices.

For some time, the most widely used music file format for downloads was Moving Pictures Expert Group Layer III (**MP3 format**). The MP3 compression format reduces the size of CD-quality sound files by a factor of 10 to 14. It reduces file sizes by removing recorded sounds that the human ear can't perceive. The MP3 format creates files that are much smaller and easier to download.

Compression and file size are an issue of some controversy for audio fanatics. iTunes files use the **Advanced Audio Coding (AAC format)**, which is thought to provide higher audio quality with comparable compression. Windows has another format: **Windows Media Audio (WMA format)**. Other enthusiasts prefer the **Free Lossless Audio Codec (FLAC format)**. This open source method provides efficient, **lossless compression**, which means none of the original sound information is eliminated.

iTunes and Windows Media Player, as well as other digital music management programs, enable you to **rip** (copy) songs from a CD and choose the file format and compression level you prefer. Once you have downloaded or ripped a music file to your computer's hard disk, you can transfer the song to a portable digital music player or smartphone for mobile playback.

You can view downloaded video files using an application such as Microsoft Windows Media Player. Many formats are used for digital movies, such as **MPEG (Moving Picture Experts Group) format** and the newer **MP4 format** and **WMV (Windows Media Video) format**. Because video files are very large, downloading movies or long clips takes a long time unless you have a high-speed Internet connection.

Some online audio and video files are called *podcasts*. In some ways, a **podcast** is like a typical downloadable audio or video file (or even a PDF or ebook file), but it's different in the sense that each download is often part of an ongoing series. Podcasts may be offered as daily or weekly episodes or as parts of a larger, comprehensive broadcast. Although most users typically listen to podcasts on portable devices, you can also play them back on a computer using applicable software for the podcast file format.

Streaming An alternative to downloading a song or video from the Internet is a technique called *streaming*. **Streaming** sends a continuous stream of data to the receiving computer's web browser, which plays the audio or video. Old data is erased as new data arrives, which means no complete copy of the material downloads. Streaming protects the owners of copyrighted materials to some degree, because it eliminates the possibility of copying and sharing.

The entertainment and rich media (streaming and interactive media) that are offered on the web have become increasingly full of features and easier to use. Sites such as YouTube and Pandora have become the Internet standard in video and music streaming.

YouTube enables people to upload, view, share, and comment about videos. The videos range from political commentaries to music videos to product reviews, plus some clips of random silliness. YouTube streams many videos at low resolutions to speed download and viewing time, but some are high-definition (HD) quality. YouTube is free to users, because the service is supported by advertising.

Pandora is a free, ad-supported online radio service that personalizes the songs it plays for listeners. It selects songs for you by analyzing what songs you have listened to previously. Apple launched a similar service called *iTunes Radio* in 2013, offering more than 250 stations of music.



Using a portable music player is a convenient way to listen to songs downloaded from the Internet.

Other services offer fee-based video and music streaming or offer some free content along with the option to pay for additional content. For example, the Rhapsody music streaming service allows you to play music and share it on a limited number of devices or to stream it through an Internet-connected “smart” TV. Hulu offers some free online TV episodes and other content (such as documentaries), but it also lets you upgrade to Hulu Plus’s more advanced content for a fee. And of course, the monthly subscription service Netflix enables you to stream TV and movie content to a variety of devices. Google Play also enables you to purchase movies and music.

It’s also possible to view TV shows, music videos, movies, and other types of videos from a variety of websites. Many news networks and newspapers offer video on their websites. You can click on a story and then view a short video newscast that gives you all of the details.

Downloading versus Streaming So which is better: downloading or streaming audio and video content? The answer depends on your preferences. If you like to control the cost on a case-by-case basis and “own” the content, then you should rip or download and purchase your media. But if you love to sample new music and movies, you will prefer the variety available through streaming subscription services.

Purchasing media allows you more control over access to the content. Every online service has usage agreements with particular artists and content providers. If any of those agreements changes, the service may have to remove certain songs and videos from its catalog. Should that happen, subscribers would no longer have access to that content.

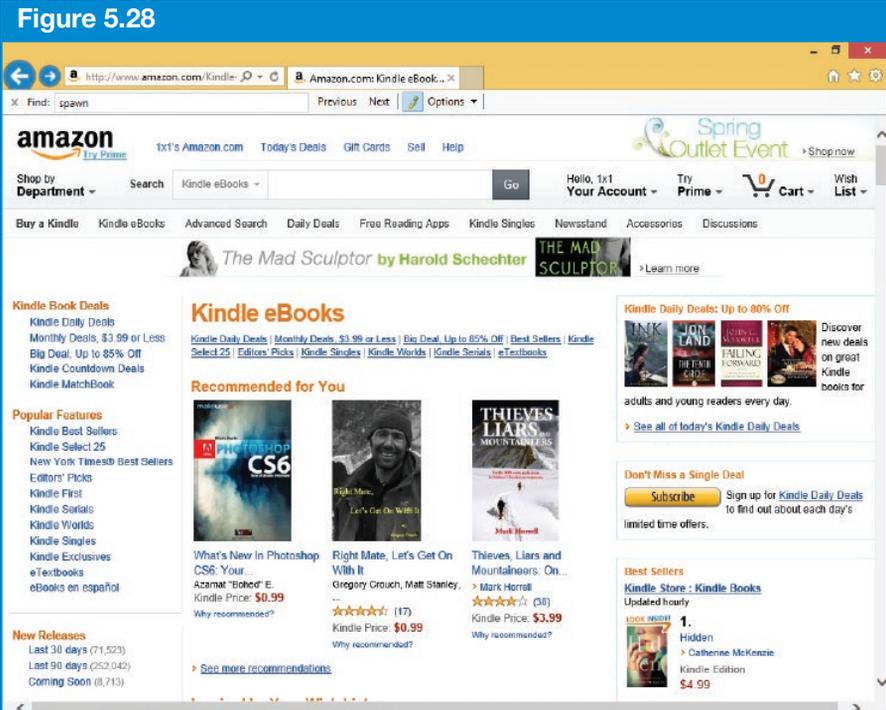
Audio Books and EBooks

Online books represent the latest “battleground” in terms of competition among digital entertainment services. Audible.com and other services provide downloadable audio books that users can play on digital music players. Amazon’s Kindle reader spawned the first large group of **ebook** consumers. Amazon’s Kindle eBooks store (shown in Figure 5.28) is the leading ebook retailer, holding a significant share of

Activity 5.7.2

Article Streaming Media

Figure 5.28



The screenshot shows the Amazon Kindle eBooks store homepage. At the top, there's a navigation bar with 'Shop by Department', 'Search', and 'Kindle eBooks'. Below that, there are promotional banners for 'The Mad Sculptor' by Harold Schechter and 'Spring Outlet Event'. The main content area is divided into several sections: 'Kindle Book Deals' with links to 'Kindle Daily Deals', 'Monthly Deals', and 'Big Deal'; 'Recommended for You' featuring books like 'What's New in Photoshop CS6', 'Right Mate, Let's Get On With It', and 'Thieves, Liars and Mountaineers'; 'Kindle Daily Deals: Up to 80% Off' with a 'Subscribe' button; and 'Best Sellers' in the Kindle Store.

Ebooks are available for sale from the Kindle store and other digital booksellers.

the market. Even if you don't have a Kindle, you can download a free Kindle app for another device and then purchase ebooks and read them using the app. You can also buy downloadable ebooks at Apple's iBooks store, the Barnes and Noble NOOK Press store, and the Google Play service, along with a number of other smaller competitors.

While publishing hard copies of a book can be expensive, publishing a digital book is much less costly. With the right software and expertise, virtually anyone can publish an ebook. You can learn the ins and outs of the different file formats required by various ebook retailers, or you can produce and promote your ebook using a service such as BookBaby. These services produce and promote your ebook for a flat fee and, in some cases, a commission on royalties received from the digital retailer. Although ebooks typically sell for less than print books, ebook publishing can offer a great money-making opportunity for individuals and independent publishers.

iBooks Author from Apple enables creation of a new generation of ebooks. Using this free app, you can create interactive iBooks for iPad and Mac OS X. iBooks makes it possible to include not only videos but also galleries, interactive diagrams, 3-D objects, and more.

Health and Science

The web now also teems with medical information. Your personal medical providers and local medical facilities all likely have websites with basic information about location, hours, contact numbers, and service offerings. Some sites also offer health news and information that you might find useful, such as details about upcoming wellness programs. National health resources are also online, such as WebMD and MayoClinic.org. Sites such as these provide both current medical news and information about specific diseases and conditions, treatments, and medications.

If you are scientifically minded, you might enjoy exploring the range of resources available on the web. You can check out the online versions of popular publications, such as *Science* (Sciencemag.org), *Science Daily* (ScienceDaily.com), and *Popular Science* (Popsci.com). You can also check out the science offerings of media outlets such as Discovery Channel and National Geographic. At their websites, you can search to find serious scientific research and publications or fun science in the form of home science experiments.

Online Reference Tools

If you are a writer or researcher, you may feel overwhelmed by the huge number and variety of resources on the web. To make your search more efficient, use one of the reference tools available online, such as Refdesk.com. Refdesk.com, which calls itself the "Fact Checker for the Internet," serves as a dashboard to other core resources for researchers. It includes direct connections to all of the most popular search sites. In

Hotspot

Replacing TV with Telephone?

In late 2012, InMobi (a mobile ad company) surveyed individuals about smartphone watching versus TV watching. According to the survey, the average person spends more minutes a day watching his or her smartphone than watching TV. At least 77 percent of users reported using their phones for online entertainment, including video and music.

Be aware that streaming media uses a lot of data. Know the data limit on your phone plan, and watch the amount of data you are using. You can reduce the amount of data you use through your phone service by connecting to a wireless network whenever possible.

addition, it provides thought provokers such as “Fact of the Day,” “Word of the Day,” and “This Day in History”; links to news and weather sites; games and other diversions; translation tools; links to online encyclopedias and more specific information sources; and writer’s resources, such as online dictionaries, quotations, and style and writing guides.

Other reference sites address specific subject matter or provide specific types of help. For example, About.com and HowStuffWorks offer instructions and information about a lot of tasks and topics. By searching, you can find sites offering useful information about everything from cleaning to legal advice. Of course, the websites of many schools and universities offer reference information about their programs. A search might turn up school-approved writing guidelines or research results of a study performed conducted by a particular department.

Wikipedia represents another valuable reference resource: a wiki. A **wiki** works like an online encyclopedia, but it allows anyone to contribute information. Users can post new articles about subjects, or they can edit or contribute to existing articles, add “Notes” or “See also” entries, or respond to questions or disputed information in an article. The idea behind a wiki is that having many users’ contributions will improve the quality of the information in the article. Another popular wiki, wikiHow, is devoted to teaching users how to do anything. You also may see user-created “Help” and “How-to” wikis for open source software.

One potential drawback about using wikis applies to many online reference resources: Make sure the resource is credible and has a good reputation. In other words, know your sources.

Gaming and Gambling

Online gaming and gambling have grown into popular Internet pastimes for many people. Users can play by themselves or compete with other players, often in very real online worlds. For example, **virtual reality (VR)** involves a computer simulation of an imagined but convincing environment or set of surroundings. Games enhance the VR effect by enabling each player to select a virtual body, called an **avatar**, which serves as his or her point of view in the game world.

Millions of players pay monthly fees to play World of Warcraft, the most popular online game in the world. Many users also spend significant time gaming on mobile devices; in fact, apps for games are some of the most frequently downloaded mobile apps. Users also enjoy gaming through other platforms, such as Facebook.

Online casinos are a unique and controversial form of entertainment. Users can log on and gamble online in a virtual casino. Although online casinos are prohibited by law in many areas, they are difficult to police because they may be located in any part of the world. The experience may seem like playing a game, but any losses are real and will be billed to the user’s credit card.

Distance Learning Platforms

As discussed earlier in this chapter, online or distance learning platforms serve the needs of degree-seeking and non-degree-seeking learners around the world. These platforms have developed in response to the rising costs of advanced education and the ongoing need for skills development and training. Some universities provide fee-based online learning services, such as online or hybrid (part online, part on campus) courses. MBA programs are offered online by a number of major business schools.



Activity 5.7.3

Article

Earning a Degree Online

As noted earlier, you can also take advantage of free online courses from websites such as Coursera. A **massive open online course (MOOC)** provides free and open access and frequently offers the best content from top schools and partners. MOOCs typically include online video lectures with accompanying project assignments and tests. Many provide a completion certificate when a student passes a final exam, which can be used as an employment credential. In addition to Coursera, other MOOC providers include Udacity and edX, whose partners include the Massachusetts Institute of Technology (MIT), Harvard University, and the University of California, Berkeley.



Some universities have adopted MOOCs to offer online degree programs. Using this successful technology has allowed schools to offer low-cost educational opportunities to a broader range of students than they can normally serve. While these programs aren't free, they are offered at a reduced cost. Students therefore have the chance to earn a college degree online for a reduced cost, compared with an on-campus degree. In 2013, the Georgia Institute of Technology (Georgia Tech) became the first top-ranked university to offer an online master's degree program. The cost of earning the degree online was less than one-fourth what it would cost students to earn the degree on campus. Twice as many students enrolled in the online program than in the standard program.

Research about the success of distance learning programs is ongoing. However, even the early data suggest that students stay more motivated when taking online courses than regular courses. Offerings for distance learning and online degree will most likely continue to expand in the next decade.

Web Demonstrations, Presentations, and Meetings

Not only educators are using the web as a platform for information delivery. In addition, businesses and organizations are using the web increasingly to share information and provide education. For example, many companies create media-rich and interactive product demos to show potential buyers product features and options.

Microsoft's PowerPoint 2013 presentation graphics program enables you to share a presentation online with users that you invite. A tool will prompt you to invite the users and then lead you through starting the online presentation. So, while you are holding a conference call, for example, your colleagues can view the presentation you have prepared as you walk them through it, slide by slide, over the phone.

Other online meeting services offer a more robust experience, including audio and video (of both participants and information), whiteboard-style brainstorming, and more. Team members around the country or the world can participate in live meetings via computer or mobile device. These services go beyond what can be done with PowerPoint and similar one-way presentation programs, because they allow all of the participants to interact with the online content. The leaders in these services include WebEx and GoToMeeting.

Sometimes, organizations use online meeting services to host a webinar, or web-based seminar. Conducting a webinar allows communicating directly with customers and others. A service such as AnyMeeting allows users to conduct online webinars and meetings with up to 200 participants. (Chapter 7 discusses other forms of online collaboration and teamwork.)



Recheck 5.7

Recheck your understanding of the concepts covered by this objective.



5.8 Respecting the Internet Community

Internet users around the world form a community, and like members of any community, they exhibit the entire range of behaviors possible—from considerate and creative to insulting and damaging. Unfortunately, the anonymous nature of Internet interaction tends to bring out the worst in some people. The fear of embarrassment or shame that sometimes governs behavior in face-to-face encounters fades away when people interact on the Internet. This means that some individuals act very differently than they would if they were in a public forum. These individuals ruin the Internet experience for others but experience few consequences themselves.

Guidelines for good net behavior have been developed to encourage people to be considerate and productive. Providing moderated environments is another way to manage inappropriate behavior. In addition, a number of technical and legal issues influence the direction and development of the Internet. Companies and individuals insist that standard protocols and increased transmission bandwidths be provided, consumers worry about the privacy and security of Internet communications and transactions, and copyright holders want stronger protection for their intellectual property.

Netiquette

Netiquette (*net* and *etiquette*) is a collection of guidelines that define good net behavior. Netiquette is based on the idea that people should treat others as they would like others to treat them.

Some points of netiquette address problem behaviors such as **flaming**, which is the Internet equivalent of insulting someone face to face. By taking advantage of the anonymity that's offered online, some people are as rude as possible, to the point that they drive others away. So-called flame wars are instances of flaming that are traded back and forth, often among multiple parties.

Other points of netiquette deal with Internet conventions that users should learn to avoid offending others unintentionally. For example, new email users commonly type messages in all capital letters without realizing that, by convention, using all caps is equivalent to shouting. Without meaning to, these email writers may make people

Precheck 5.8

Check your understanding of the concepts covered by this objective.

Practical TECH

The Internet Is Forever

The fact that Facebook and Twitter feeds seem to scroll off and SnapChat Snaps seem to disappear immediately may tempt you to act out or reveal too much information online. You should remember, though, that the servers hosting your data may archive it for a long time, and other users may capture and keep your material. For example, it's possible for a recipient to make a screenshot of a SnapChat Snap and post it on another service, such as Facebook or Twitter. In short, don't put anything online that you wouldn't want a future employer or anyone else to see. If you must post "selfies," avoid photos that show you nude, behaving badly, and so on.



uncomfortable or even angry. Knowing the common rules of netiquette listed in Figure 5.29 can help you avoid this and other unintentional offenses.

Having some specific suggestions for composing and sending email and other types of digital messages (including text messages and posts to social media) may help you better understand netiquette. Because composing and sending email is so quick and easy, you should be careful to avoid mistakes that you might regret later. Keep in mind these important points when writing and sending email messages and making posts:

- In most cases, an email message can't be retrieved after it's been sent.
- A permanent copy of any email message probably exists somewhere on the Internet.
- Others can easily forward or copy your email messages and posts.

For these reasons, it's a good idea to avoid sending or posting any message that you have written in anger or haste. Save the message and then look at it again later, after you have cooled down. If you still feel the message should be sent or posted, you will still have that option. However, in most cases, you will realize that you would have regretted sending or posting the original message.

Moderated Environments

Many people who want to avoid the seedy side of the Internet interact with others in moderated environments. Many chat rooms, message boards, and mailing lists have a **moderator**, an individual with the power to filter messages and ban people who break the rules. Rule violations can range from making insults to not staying on topic. A moderator running a chat room on travel, for example, might warn or ban people for discussing their favorite movies at length. Usually, a moderator has complete power over the situation and can discipline people any way he or she sees fit. If a moderator is too harsh, however, people might switch to another group.

Net Neutrality

A common principle among networks is that of *network neutrality*, often shortened to **net neutrality**. Net neutrality is a doctrine or code of fairness that states that all Internet traffic will be treated with equal priority. In other words, one packet won't be favored or ignored over another, no matter who the sender or receiver might be.

Figure 5.29

Core Rules of Netiquette

- ➔ **Rule 1**
Remember the human
- ➔ **Rule 2**
Adhere to the same standards of behavior online that you follow in real life
- ➔ **Rule 3**
Know where you are in cyberspace
- ➔ **Rule 4**
Respect other people's time and bandwidth
- ➔ **Rule 5**
Make yourself look good online
- ➔ **Rule 6**
Share expert knowledge
- ➔ **Rule 7**
Help keep flame wars under control
- ➔ **Rule 8**
Respect other people's privacy
- ➔ **Rule 9**
Don't abuse your power
- ➔ **Rule 10**
Be forgiving of other people's mistakes

Source: Adapted from *Netiquette*, by Virginia Shea (Albion Books, 1994)

Following this policy has several benefits. One key benefit is that the system's job of transmitting data is simplified. No data is more important than other data; it's all the same in value. This means that the system simply passes on whatever data it gets to the intended destination without judging the content. The policy of net neutrality also provides for greater innovation. When a new website is put up on the web, it's treated by the internal structure of the Internet with the same respect as the most popular site on the planet. By "leveling the playing field" in this way, the policy allows new sites to grow rapidly. As of July 2014, the FCC was considering changing net neutrality rules to allow ISPs to charge large websites a premium for faster service.

Privacy Issues

Privacy is a major concern for many Internet users, particularly with email communications and e-commerce transactions. Most users know that email messages can be intercepted and read by others. In the workplace, employees' email messages may be read by their supervisors, and current law gives employers the right to do that. Monitoring employees' email is becoming more common as businesses discover that their workers are spending time surfing the web for personal reasons, instead of doing their work. (For more on employee monitoring, security, and similar privacy topics, see Chapter 9.)

Copyright Infringement

Many of the materials found on the web are copyrighted, and copying and using them without permission is illegal. Most websites include a copyright notice that states general guidelines for how the site's content may be used (see Figure 5.30 for an example). Nevertheless, users frequently ignore copyright laws, and some violators end up in court, such as those who used P2P services to obtain copyrighted music files.

Because most copyright laws were written with printed materials in mind, the US Congress passed a law in 1998 that addressed the major issues related to protecting digital content on the Internet (which can include text, videos, music, and many other file formats). The **Digital Millennium Copyright Act of 1998 (DMCA)** generally prohibits people from disabling software encryption programs and other safeguards that copyright holders have put in place to control access to their works. Entertainment companies have tried to protect their movies on DVDs by including security codes, but hackers have already developed programs capable of cracking them. A key provision of the Digital Millennium Copyright Act makes the use and distribution of security-cracking codes illegal, and the penalty involves civil damages ranging from \$200 to \$2,500. Repeat offenders face criminal penalties of up to \$1 million in fines and 10 years in jail.

Figure 5.30

© 2013 The New York Times Company | Site Map | Privacy | Your Ad Choices | Advertise | Terms of Sale | Terms of Service | Work With Us | RSS | Help | Contact Us | Site Feedback

The copyright notice on the *New York Times* home page reminds visitors that the content of the site is copyrighted.

Recheck 5.8

Recheck your understanding of the concepts covered by this objective.

Chapter Summary

For an interactive Chapter Summary, go to <http://CUT5.emcp.net/ChapterSummaries>.

For Study Notes based on this Chapter Summary, go to <http://CUT5.emcp.net/StudyNotes>.

For slide presentations with audio that cover this material, go to <http://CUT5.emcp.net/Presentations>.

5.1 Exploring Our World's Network: The Internet

The Internet is used for communication, working remotely (**telecommuting**) and collaboration. Computers can be used for social connections and entertainment purposes, including playing games, listening to music, and viewing movies and videos. Electronic commerce (e-commerce) refers to the Internet exchange of business information, products, services, and payments. The Internet is a vast source of information to support both research and **distance learning**.

5.2 Connecting to the Internet

To connect to the Internet, the user must have an account with an **Internet service provider (ISP)**, which is a company that provides Internet access. The ISP will give the user a user name and password. Several types of Internet service are available. The older type of **dial-up access** is being replaced by **broadband connections**; they include cable, **digital subscriber line (DSL)**, wireless, and satellite connections. Many users can share an Internet connection over a local area network (LAN), which is often wireless, or from a wireless **Wi-Fi hotspot**.

5.3 Navigating the Internet

Surfing the Internet means gaining access to and moving about the web using a browser. **Web browsers** locate material on the Internet using **Internet Protocol (IP) addresses**. Every IP also has a corresponding web address called a **uniform resource locator (URL)**, which is a path name that describes where the material can be found. The Internet breaks files into many pieces of data called **packets** and sends them out over separate routes in a process called **packet switching**.

5.4 Understanding Web Page Markup Languages

Web pages are usually created using **Hypertext Markup Language (HTML)**. **Extensible Markup**

Language (XML) is a new and improved web language that allows computers to manage data more effectively. A **hyperlink** is any element on the screen that's coded to transport viewers to another page or site.

5.5 Viewing Web Pages

A **web page** is a single document that's viewable on the World Wide Web. A **website** is a collection of web pages about a particular topic. You use a web browser program to view and navigate between web pages and websites. The **home page** appears initially when you go to a website. You can enter the URL for a page in the browser Address bar and then press Enter to load the page. Website designers frequently program using **Java** and a variety of other scripting languages. A **plug-in** is a mini-program that extends the capabilities of web browsers in a variety of ways. Companies advertise on websites using **banner ads** and **pop-up ads**.

5.6 Searching for Information on the Internet

Search engines help you look for information using **keywords** (search terms). Advanced searching requires the use of logic statements known as **search operators**; using these operators will refine searches and improve results.

5.7 Using Other Internet Resources and Services

Most ISP accounts provide free email, but users also have the option of choosing a web-based service such as Gmail, Yahoo! Mail, or Outlook.com. Another option is to use **webmail**, rather than email software, to access email with a variety of devices, including mobile devices. Dozens of new **social networking services** enable users to connect and interact online for social and professional purposes. Users can also set up **blogs** to write articles about various topics and share them online. **Voice over Internet Protocol (VoIP)** technology provides free video and voice calling service over the Internet, rather than

the telephone network. Tiny video cameras called *webcams* allow video to be included in the calls. Rather than download a piece of music or a video, users can access it using **streaming**. Streaming online entertainment to a variety of devices represents a fast-growing use of the Internet. Similarly, many users are purchasing and downloading **ebooks**, which can be read on computers, mobile devices, and even special readers such as Kindles. Users also enjoy a variety of gaming and gambling opportunities on the web. Students can take advantage of **massive open online courses (MOOCs)** to learn new skills or even get college degrees. Online presentation and meeting services improve businesses' productivity through webinars.

5.8 Respecting the Internet Community

Guidelines for good online behavior, called **netiquette**, have been developed to encourage people to interact politely and productively. **Flaming** is one of the most frequently encountered examples of rude Internet behavior. Providing a **moderator** is another way of managing inappropriate behavior. Other concerns for Internet use include net neutrality, privacy, and copyright infringement. **Net neutrality** is the policy that all Internet traffic will be treated with equal priority. Privacy is a concern particularly with email communications and e-commerce transactions. Copyright infringement occurs frequently on the Internet. The **Digital Millennium Copyright Act of 1998 (DMCA)** generally prohibits people from breaking software encryption and other safeguards.

Key Terms

Numbers indicate the pages where terms are first cited with their full definition in the chapter. An alphabetized list of key terms with definitions is included in the end-of-book glossary. For an interactive Glossary with Image Bank, go to <http://CUT5.emcp.net/Glossary>.

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Chapter Exercises

Complete the following exercises to assess your understanding of the material covered in this chapter.

Terms Check: Matching

Match each term with its definition. For interactive Flash Cards of key terms and their definitions, go to <http://CUT5.empc.net/FlashCards>.

- | | |
|---------------|--------------------|
| a. packet | f. e-commerce |
| b. HTML | g. browser |
| c. netiquette | h. banner |
| d. spam | i. zip file |
| e. keyword | j. dynamic routing |
- ___ 1. A common type of compressed data file.
 - ___ 2. A term used to find information using a search engine.
 - ___ 3. Business conducted using the Internet.
 - ___ 4. Unwanted messages sent in large numbers and often repeatedly over the Internet.
 - ___ 5. A program that allows users to retrieve information on the World Wide Web.
 - ___ 6. Small, rectangular advertisements used to promote products and services on web pages.
 - ___ 7. The method used to send packets by a variety of different routes to their final destination.
 - ___ 8. The code of guidelines for appropriate behavior for Internet users.
 - ___ 9. The programming language long used to create web pages.
 - ___ 10. A small amount of data sent across the Internet.

Knowledge Check: Multiple Choice

Choose the best answer for each question. For an interactive game on the concepts covered in this chapter, go to <http://CUT5.emcp.net/Games>.

- The first screen that's usually visible when entering a web site is called the
 - webmaster.
 - home page.
 - banner.
 - hyperlink.
- Of the following types of Internet connections, which generally provides the slowest connection speed?
 - dial-up
 - DSL
 - wireless
 - All of these are about the same.
- Files added to email messages are known as
 - attachments.
 - clip-ons.
 - plug-ins.
 - packets.
- When you use your smartphone to connect to the Internet, you are using it as a(n)
 - dial-up modem.
 - roaming modem.
 - cable modem.
 - hotspot.
- HTML stands for
 - High-Tech Marketing Language.
 - High-Tech Markup Language.
 - Hypertext Markup Language.
 - Hypertext Marketing Language.
- To transmit data over the Internet, messaging software breaks files into
 - attachments.
 - clip-ons.
 - plug-ins.
 - packets.
- ISP stands for
 - international satellite phone.
 - Internet satellite protocol.
 - Internet service provider.
 - international satellite provider.
- How is chat or instant messaging different from email?
 - You have to pay for IM service.
 - With chat or IM, you type messages back and forth in real time and they stay onscreen.
 - There is only one provider of IM services.
 - None of these
- A leading social media site for business users is
 - LinkedIn.
 - Facebook.
 - Instagram.
 - Pinterest
- FTP enables you to
 - organize emails in folders.
 - chat on Facebook and save the conversation.
 - send and receive files that can't be sent via email.
 - program a website with styles.

Key Principles: Completion

Complete each statement with the appropriate word or phrase.

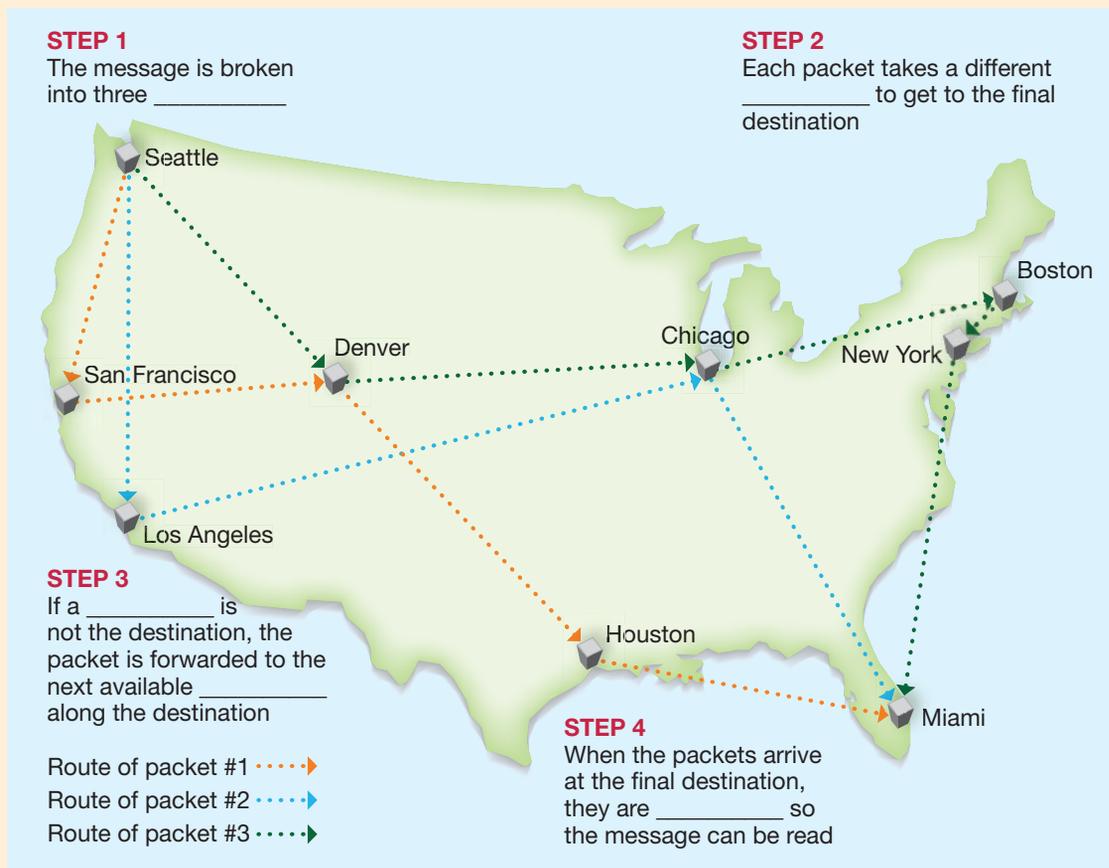
- The graphic persona of a player in a virtual reality game is called a(n) _____.
- A small file stored on a web surfer's hard drive that might be used to track his or her behavior is called a(n) _____.
- The part of a URL that comes last and identifies the type of organization is called the _____.
- Another way of accessing email via the web is _____.
- A four-group series of numbers separated by periods represents a(n) _____.
- An advertisement that appears within a rectangular portion of a web page is called a(n) _____.

7. Unwanted email messages that are transmitted over the Internet are called _____.
8. The design feature that describes how packets are moved around the Internet by the best available route is called _____.
9. The user's approval is often requested on a website before a _____ is downloaded and installed to provide additional functionality.
10. _____ sites, such as Facebook, enable you to interact with other users online.

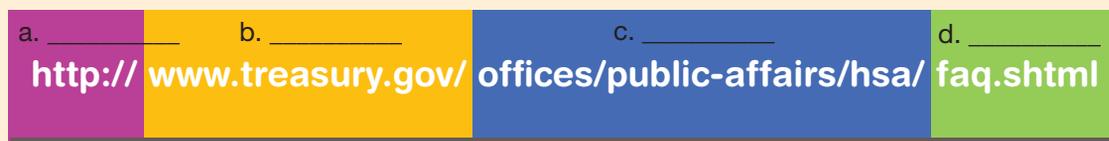
 **Tech Illustrated: Figure Labeling**

Fill in the blanks with the correct labels.

1. Packet switching



2. URL structure



Tech to Come: Brainstorming New Uses

In groups or individually, contemplate the following questions and develop as many answers as you can.

1. Smartphones, household appliances, vending machines, road systems, and buildings are just a few of the things that can be connected to the Internet for control and monitoring purposes. How will developing new uses for the Internet change its nature and how we think about it? What other new applications might be possible if roads can tell us how much traffic there is, if cars can tell how much fuel they have left, and if refrigerators can tell us there's no more juice?
2. Chat and instant messaging (IM) technology have grown from forms of social media to tools for business communication. Financial services and retail websites offer customers live "chat" with customer service representatives, and colleagues within organizations can chat to meet informally whenever the need arises. How will the use of chat and IM likely evolve as video messaging and calling become more popular? What additional benefits will this technology provide for businesses, both internally and externally?

Tech Literacy: Internet Research and Writing

Conduct Internet research to find the information described, and then develop appropriate written responses based on your research. Be sure to document your sources using the MLA format. (See Chapter 1, Tech Literacy: Internet Research and Writing, page 38, to review MLA style guidelines.)

1. Find at least four providers that offer free website hosting, such as Google Sites (<http://CUT5.emcp.net/GoogleSites>) and Homestead (<http://CUT5.emcp.net/Homestead>). Identify and compare the features they support. Which providers have wizards that automatically build websites? Which allow form-based uploading? Which allow FTP client connections? Which, if any, come with downloadable web page editors? Visit some sites developed using these free hosts. Do they load quickly? Do they have an excessive number of advertisements? Write a report comparing and contrasting these free host providers, and identify the one you think is the best.
2. Join LinkedIn and develop a profile that presents your résumé to the world. Keep in mind that your profile should impress potential employers. Invite your instructor to view your profile.
3. Find out what ISPs are available in your area. Which one would best meet your needs? If you don't have access to a computer at home, assume that you are researching this information for your school. For each ISP, identify the services, speeds, and other account features it offers. Also find out information about the costs of the services. Then create a chart in Excel or Word that compares the ISPs in terms of services offered and costs. Present the information to your class using a PowerPoint slide show.
4. Research the pros and cons of using a wireless router to connect several home or office computers to the Internet. Consider factors such as the approximate costs of equipment and installation, as well as system speeds, convenience, and security. Support your answers with specific data from the web. A good place to start looking for information about this equipment is Newegg.com (<http://CUT5.emcp.net/Newegg>).
5. Research the availability and cost of cable Internet, DSL, and other broadband services in your area. Could any or all of these services be provided to your home today? How much would it cost to install the service? How much faster and more reliable would it be? When comparing the costs, include the cost of a second phone line for a dial-up system; the faster systems have the advantage of not tying up the phone.
6. Find a web page that uses Flash animation. Game advertisements from companies such as Disney, Sony, and Microsoft tend to use Flash animation frequently. At the web page, were you asked you to download a plug-in? Are the

resulting graphics superior? How much longer does it take to load a page with Shockwave graphics compared with a page with simple

HTML? (Be sure to mention the type of Internet connection you are using.)

Tech Issues: Team Problem-Solving

In groups, develop possible solutions to the issues presented.

1. Should federal and state governments invest heavily in providing high-speed Internet connections to schools and libraries? Why or why not? If the government pays for Internet service, should it have a say in how schools and libraries use the Internet? After the technology has been perfected, should high schools and colleges require students to use electronic versions of textbooks downloaded from the Internet? What would be the advantages and disadvantages of requiring this?
2. Many people use the web to operate their own businesses or to telecommute. If you were to consider working from home, what advantages and disadvantages would you consider? Would more risk be involved? More freedom? Less work or more work? What would be your greatest concern? Support your answers by conducting web research on this topic.
3. Experts claim that the “shelf life” of knowledge is only two to three years in many fields, including areas as diverse as medicine, technology, engineering, and history. How can distance learning and web-based tools help address this issue? Given this problem, should college diplomas be stamped with an “expiration date”? Why or why not?

Tech Timeline: Predicting Next Steps

Listed below is a timeline of some of the major events in the history of cybercrime. As you review the list, think of what major events might occur next, in terms of both hacker actions and the government’s response. Use your predictions to complete the timeline through the year 2020.

- | | | | |
|-------------|---|-------------|--|
| 1984 | The press learns of several high-profile incidences of criminals breaking security systems and uses the term <i>hacker</i> to describe these criminals. | 2000 | In March, a 13-year-old hacker breaks into a government security system that tracks US Air Force planes worldwide, damaging a “secret” system. |
| 1986 | The Electronic Communications Privacy Act and the Computer Fraud and Abuse Act both pass Congress. | 2001 | A cyberwar flares up between Chinese and American hackers after a US Navy plane collides with a Chinese fighter aircraft, killing the Chinese pilot. Each group of hackers attacks thousands of sites in the other nation. |
| 1988 | Robert Morris, a college student, releases a worm that brings much of the Internet to a halt. | 2002 | The Federal Bureau of Investigation (FBI) arrests three men who gained unauthorized access to credit reports and caused consumer losses of more than \$2.7 million. |
| 1990 | On January 15, AT&T’s long-distance telephone switching system crashes, disrupting 70 million phone calls. | 2003 | The Department of Justice, FBI, and Federal Trade Commission conduct a major cybercrime sweep called <i>Operation E-Con</i> that results in 130 arrests and \$17 million in property seizures related to Internet auction scams, bogus investments, credit card fraud, and identity theft. |
| 1990 | In May, Operation Sundevil commences. Sundevil was the code name for the government’s sweeping effort to crack down on cybercrime. | | |
| 2000 | In January hackers shut down Yahoo.com, Amazon.com, CNN.com, and eBay.com, among others, for one hour. | | |

- 2004** The fastest-growing Internet scam is now “phishing,” in which criminals pretend to represent a legitimate web site or institution and request updates to individuals’ financial records.
- 2005** Hackers favor the use of keystroke-logging technologies to steal sensitive information.
- 2005** Hackers crack Microsoft’s antipiracy system within 24 hours after its launch.
- 2006** Jeanson James Ancheta pleads guilty to four felony charges for creating and selling so-called botnets: thousands of computers infected with malicious code and turned into zombie computers to commit crimes.
- 2009** An 18-year-old hacker going by the name GMZ cracks a Twitter staffer’s password and gains access to high-profile celebrity Twitter accounts.
- 2010** The Stuxnet worm is deployed to disable equipment at Iran’s nuclear facilities.
- 2013** In July, US Army soldier Chelsea Manning is convicted of violating the Espionage Act by releasing digital copies of classified documents to the public.
- 2013** In August, US National Security Agency contractor Edward Snowden flees the United States after copying and releasing classified documents and is granted asylum in Russia.

Ethical Dilemmas: Group Discussion and Debate

As a class or within an assigned group, discuss the following ethical dilemma.

The appeal of message boards is often the anonymity that the medium provides. In minutes, you can create a user name, log on to a board, and discuss the board topic with other a group of strangers—all without revealing your true identity. But what consequences would you face if the message board operator shared your account information with,

say, your family, employer, or law enforcement authorities? What prevents the board operator from doing this? Would you have any recourse against the operator? Does thinking about this dilemma change your view on what you would and would not say on a message board?

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