Chapter 3: Computer Networks and the World Wide Web

Learning Objectives

1. Computer Networks and the Internet

2. Searching the Web

3. Beyond browsing

4. E-mail services

Computer Networks and the Internet

- Computer network

    - A collection of hardware and other devices that are connected together

    - Users can share hardware, software, and data

    - Users can communicate with each other

- Network servers

    - Manage resources on a network

Computer Networks and the Internet

- Computer networks exist in many sizes and types

    - Home networks

    - School and small business networks

    - Large corporate

    - Public wireless networks

    - The Internet

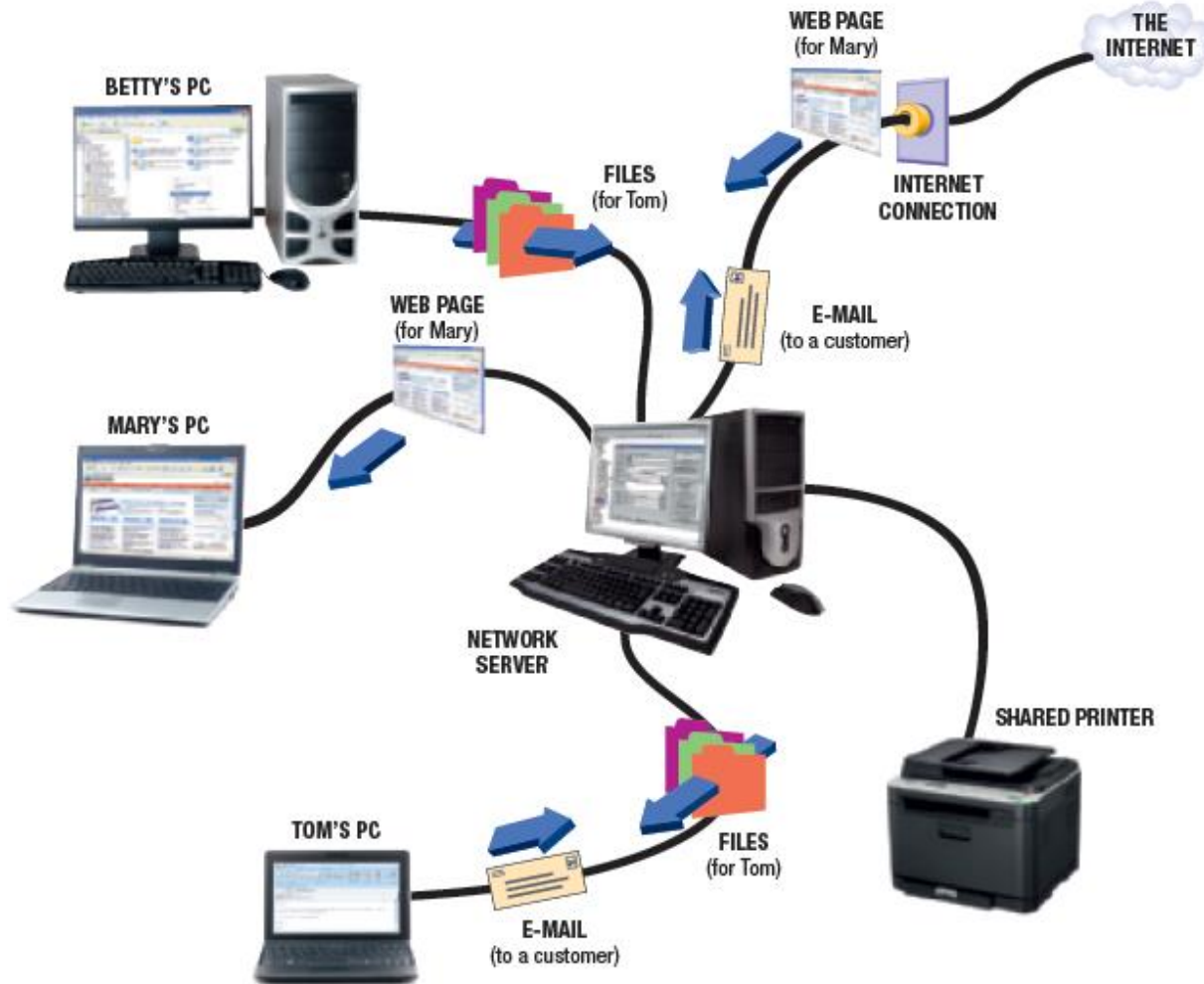# Computer Networks and the Internet

FIGURE 1-20
Example of a computer network.

What are the Internet and the World Wide Web?

- Internet
  - The largest and most well-known computer network in the world
  - Individuals connect to the Internet using an Internet service provider (ISP)
- World Wide Web
  - One resource (a vast collection of Web pages) available through the Internet
  - Web sites contain Web pages stored on Web servers
  - Web pages viewed using a Web browser (Internet Explorer, Chrome, Safari, Firefox, Opera, etc.)
  - A wide variety of information is available through the Web

What are the Internet and the World Wide Web

ACCESSING PRODUCT INFORMATION

LOOKING UP REFERENCE INFORMATION

READING NEWS

SHOPPING

ACCESSING SOCIAL NETWORKS

WATCHING TV SHOWS AND MOVIES

FIGURE 1-21
Some common Web activities.

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Accessing a Network or the Internet

- Need a modem or network adapter to connect
- Some networks require a username and password
- Internet connections can be:
  - Direct (always-on) connections
  - Dial-up connections
- Internet addresses are used to access resources on the Internet
  - IP (Internet Protocol) address
    - Numeric address that identifies computers (207.46.197.32)

Accessing a Network or the Internet

– IP addresses and domain names

  • Text-based address that identifies computers (microsoft.com)

– Uniform resource locators (URLs)

  • Identify Web pages (http://twitter.com/jobs/index.html)

– E-mail addresses

  • Identifies people for e-mail exchange (jsmith@cengage.com)

IP Addresses and Domain Names

- IP addresses are numeric and unique
- Domain names
  - Correspond to IP addresses
  - Top-level domains (TLDs) identifies type of organization or its location
  - Custom TLDs may soon be allowed

ORIGINAL TLDS	INTENDED USE
.com	Commercial businesses
.edu	Educational institutions
.gov	Government organizations
.int	International treaty organizations
.mil	Military organizations
.net	Network providers and ISPs
.org	Noncommercial organizations

NEWER TLDS	INTENDED USE
.aero	Aviation industry
.biz	Businesses
.fr	French businesses
.info	Resource sites
.jobs	Employment sites
.mobi	Sites optimized for mobile devices
.name	Individuals
.pro	Licensed professionals
.uk	United Kingdom businesses

FIGURE 1-22
Sample top-level domains (TLDs).

Uniform Resource Locators (URLs)

- Uniform Resource Locators (URLs)
  - Uniquely identifies a Web page
    - Protocol or standard being used
    - Identification of the Web server
    - Names of folders in which the Web page file is stored
    - Web page's filename

Uniform Resource Locators (URLs)

- Protocols:
  - Hypertext Transfer Protocol (http://) is typically used to display Web pages (https:// is used for secure Web pages)

  - File Transfer Protocol (ftp://) is often used for file exchange

Web page URLs usually begin with the standard protocol identifier http://.

This part of the URL identifies the Web server hosting the Web page.

Next comes the folder(s) in which the Web page is stored, if necessary.

This is the Web page document that is to be retrieved and displayed.

http:// twitter.com / jobs / index.html

Natalia Siveina/Shutterstock.com; prism68/Shutterstock.com; Courtesy of Twitter

E-mail Addresses

- E-mail addresses consist of:
  - Username
    - A person's identifying name for a particular domain
  - The @ symbol
  - Domain name for the computer that will be handling the person's e-mail (mail server)
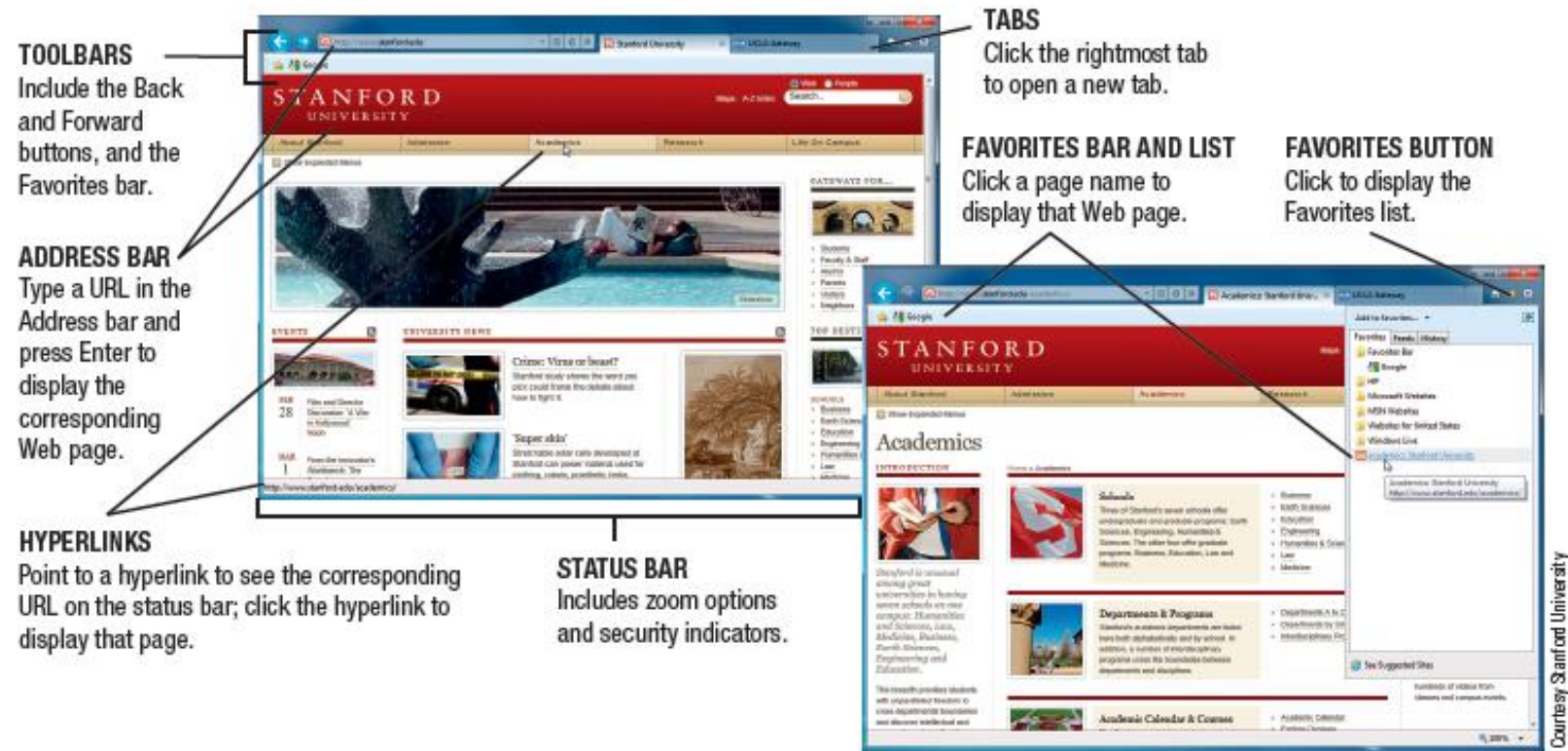- Pronouncing Internet addresses

TYPE OF ADDRESS	SAMPLE ADDRESS	PRONUNCIATION
Domain name	berkeley.edu	berkeley dot e d u
URL	microsoft.com/windows/ie/default.asp	microsoft dot com slash windows slash i e slash default dot a s p
E-mail address	president@whitehouse.gov	president at white house dot gov

Surfing the Web

- Web browser
  - Used to display Web pages
- Browser starting page or home page
  - The first page displayed when the browser is opened
- To navigate to a Web page, you can:
  - Type a URL in the Address bar
  - Click a hyperlink –graphics or text linked to other Web pages
  - Select a Favorite/Bookmark or page from the History list

Surfing the Web

TOOLBARS
Include the Back and Forward buttons, and the Favorites bar.

ADDRESS BAR
Type a URL in the Address bar and press Enter to display the corresponding Web page.

HYPERLINKS
Point to a hyperlink to see the corresponding URL on the status bar; click the hyperlink to display that page.

TABS
Click the rightmost tab to open a new tab.

FAVORITES BAR AND LIST
Click a page name to display that Web page.

FAVORITES BUTTON
Click to display the Favorites list.

STATUS BAR
Includes zoom options and security indicators.

FIGURE 1-25
Surfing the Web with Internet Explorer. URLs, hyperlinks, and favorites can be used to display Web pages.

Courtesy Stanford University

Searching the Web

- Search site:

- Web page that helps you find Web pages containing the information you are seeking

  – Typically search using keywords

- Reference Sites

  – Look up addresses, telephone numbers, ZIP codes, maps, etc.

FIGURE 1-26
The Google search site displayed in the Chrome browser.

OTHER SEARCHES
Use these options to search for images, news, video, products for sale, and more.

KEYWORD SEARCHES
Since the Web option is selected, type keywords here and press Enter to see a list of Web pages matching your search criteria.

ADVANCED SEARCHES
Click to display a fill-in form to perform a more specific search.

Searching the Web

- Search Sites
  - Web sites specifically designed to help users search for Web pages that match specified keywords or selected categories
    - Typically use a search engine in conjunction with a database containing information about Web pages to locate appropriate Web pages
    - Many search sites available (Google, Bing, Yahoo, Ask.com, etc)
    - Real-time search engines are emerging
      - Search the Web live rather than relying on a database, i.e., MyLiveSearch

Searching the Web

- Keyword Search
  - Keywords are typed in a search box to locate information on the Internet
  - Matching Web pages are called hits
  - Clicking on a Web page name displays that page
- Directory Search
  - Categories are selected to locate information on the Internet
- Search Site Tools
  - Search for music files, image files, newsgroups, news articles, maps, people, telephone numbers, videos
  - Google is one of the most versatile search sites

Searching the Web

FUNCTION	EXPLANATION
Calculator	Enter a mathematical expression or a conversion to see the result.
Currency converter	Enter an amount and currency type to see the corresponding value.
Dictionary	Enter the term *define* followed by a term to view definitions for that term from online sources.
Earthquakes	Enter the term *earthquake* to see recent earthquake activity around the world.
Flight information	Enter an airline and a flight number to see status information.
Movie showtimes	Enter the term *movie* followed by a ZIP code to view movies showing in that area.
Number search	Enter a UPS, FedEx, or USPS tracking number; an area code; or a UPC code to view the associated information.
Sports scores	Enter a team name or league name to see scores and schedules.
Sunrise/sunset	Enter the term *sunrise* or *sunset* followed by a city name to see the time of the sunrise or sunset in that city.
Stock quotes	Enter one or more stock ticker symbols to retrieve stock quotes.
Street maps	Enter an address to find a map to that location.
Time	Enter the term *time* followed by a city name to see the current time in that city.
Weather	Enter the term *weather* followed by a city name or ZIP code to view the weather for that location.
Yellow pages	Enter a type of business and city name or ZIP code to view businesses in that local area.

EXAMPLES:

10 miles in feet [Search]

10 miles = 52 800 feet

time paris [Search]

10:10pm Wednesday (CEST)
Time in Paris, France

weather san francisco [Search]

Weather for San Francisco, CA
68°F
Mostly Cloudy
Wind: NW at 1 mph
Humidity: 76%

Wed 65°F | 50°F   Thu 68°F | 52°F   Fri 70°F | 52°F

FIGURE 3-13
Google search tools.

Google screenshot © Google Inc. and used with permission. © 2013 Cengage Learning

Searching the Web

- Search Strategies
  - Using Phrases
    - Phrase searching is typing more than one keyword in a keyword search

SEARCH PHRASE USED	SEARCH SITE	NUMBER OF PAGES FOUND	TITLE OF FIRST TWO NONSPONSORED PAGES FOUND*
dogs	Google	371,000,000	Dog Breeds, Breed Information and Picture Dogs – Wikipedia, the free encyclopedia
	Bing	109,000,000	Dog – Wikipedia, the free encyclopedia Dogs & Puppies – Next Day pets
hand signals	Google	6,380,000	Hand Signals Bicycle Safety – Hand Signals
	Bing	26,800,000	Hand Signals – Wikipedia, the free encyclopedia Hand Signals
dog hand signals	Google	667,000	How to Teach a Dog Hand Signals	eHow.com Dog Hand Signals – How To Information	eHow.com
	Bing	20,900,000	How to Teach a Dog Hand Signals	eHow.com DDEAF Training Hand Signs
"dog hand signals"	Google	17,400	How to Teach a Dog Hand Signals	eHow.com Dog Hand Signals – How To Information	eHow.com
	Bing	28,100,100	How to Teach a Dog Hand Signals	eHow.com DDEAF Training Hand Signs

* Highlighted entries indicate Web pages about dog hand signals.

FIGURE 3-14
Examples of phrase searching. Using different search phrases and different search sites can dramatically change the search results.

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Searching the Web

- Using Boolean Operators
  - Use AND, OR, and NOT to further refine a search
  - Check the search site being used to see what operators can be used on the site
- Using Multiple Search Sites
  - Different search sites can return different results
- Using Appropriate Keywords, Synonyms, Variant Word Forms, and Wildcards
  - Synonyms are different words that mean the same thing
  - Variant word forms are variations of your keywords, alternate spellings, etc.
  - Wildcards, such as *, can be used to search for keyword patterns

Searching the Web

– Using Field Searches

- Field searches are searches limited to a particular characteristic, such as page title, page text, URL, top level domain or Web site

FIGURE 8-15

Field searching.
Field searches limit search results to just those pages that match specific field criteria, in addition to any specified search criteria.

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FIELD TYPE	EXAMPLE	EXPLANATION
Title	title: "tax tips"	Searches for Web pages containing the words "tax tips" in the page title.
Text	text: "tax tips"	Searches for Web pages containing "tax tips" in the text of the page.
Site	forms site:irs.gov	Searches for Web pages associated with the keyword "forms" that are located only on the irs.gov Web site.
Domain	tax tips site:*.gov	Searches for Web pages associated with the keywords "tax tips" that are located on government Web sites (they can have anything for the first part of the domain name, but must have a .gov TLD).

Searching the Web

- Evaluating Search Results
  - Does the title and listed description sound appropriate for the information you are seeking?
  - Is the URL from an appropriate company or organization?
  - You should also evaluate:
    - The author
    - The source
      - Determine if reliable or biased
    - The date
      - Many online articles are years old
  - Verify online information with a second source

Searching the Web

- Citing Internet Resources
  - To avoid plagiarism, proper citation procedures should be used for all Internet content used in a paper, book, or on a Web site
  - Citation should include
    - Author
    - Date of publication
    - Article or Web page title
    - "Retrieved" statement listing the date the article was retrieved form the Internet and the URL used

Searching the Web

TYPE OF RESOURCE	CITATION EXAMPLE
Web page article (magazine)	Dvorak, John. (2011, March 23). Government Wants to Control App Market. *PC Magazine*. Retrieved February 14, 2012, from http://www.pcmag.com/article2/0,2817,2382500,00.asp
Web page article (journal)	Hader, Richard. (2011, March). Forging Forward: Future of Nursing Special. *Nursing Management*, 42 no. 3. Retrieved June 21, 2012, from http://journals.lww.com/nursingmanagement/Fulltext/2011/03000/Forging_forward__Future_of_Nursing_special.9.aspx
Web page article (not appearing in a periodical)	Liebowitz, Matt. (2011, March 23). Fraud Attack Targets Google, Skype, and Yahoo. MSNBC. Retrieved May 15, 2012, from http://www.msnbc.msn.com/id/42238340/ns/technology_and_science-security/
Web page content (not an article)	*Browse the Web Safely.* (n.d.) Retrieved April 11, 2012 from http://us.norton.com/security_response/browsewebsafely.jsp
E-mail (cited in text, not reference list)	Maria Rodriquez. (personal communication, March 28, 2012)

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FIGURE 3-16

Citing Web sources. It is important to properly credit your Web sources. These examples follow the American Psychological Association (APA) citation guidelines.

Beyond Browsing

- Other Types of Online Communications
  - Instant Messaging (IM) and Text Messaging
    - Instant Messaging
      - Exchanging real-time messages
      - Typically real-time--presence technology
      - Often can be used for a variety of other tasks such as starting a voice or video call, playing games, sending files and photos, etc.
    - Text Messaging
      - Used by mobile phone users
      - Short Message Service (SMS) also used
      - Beginning to replace e-mail for personal communication

Beyond Browsing

– Twittering and Social Networking Updates

- Often referred to as microblogging
- Users post short updates called tweets
- Used in both business and personal lives
- Other types of status updates are available via some social networking sites

FIGURE 3-18

Twitter. Allows individuals to post tweets via computer, mobile phone, or Xbox (as shown here).

Courtesy Microsoft Corporation

Beyond Browsing

- Message Boards
  - For asking questions of, making comments to, or initiating discussions with a large group of people
  - Participants post and read messages
- Voice over Internet Protocol (VoIP)
  - Making telephone calls over the Internet
  - Computer to computer
    - Skype, IM, etc.
  - More permanent VoIP setups replace landline phones
  - Relatively inexpensive—as little as $25 per month
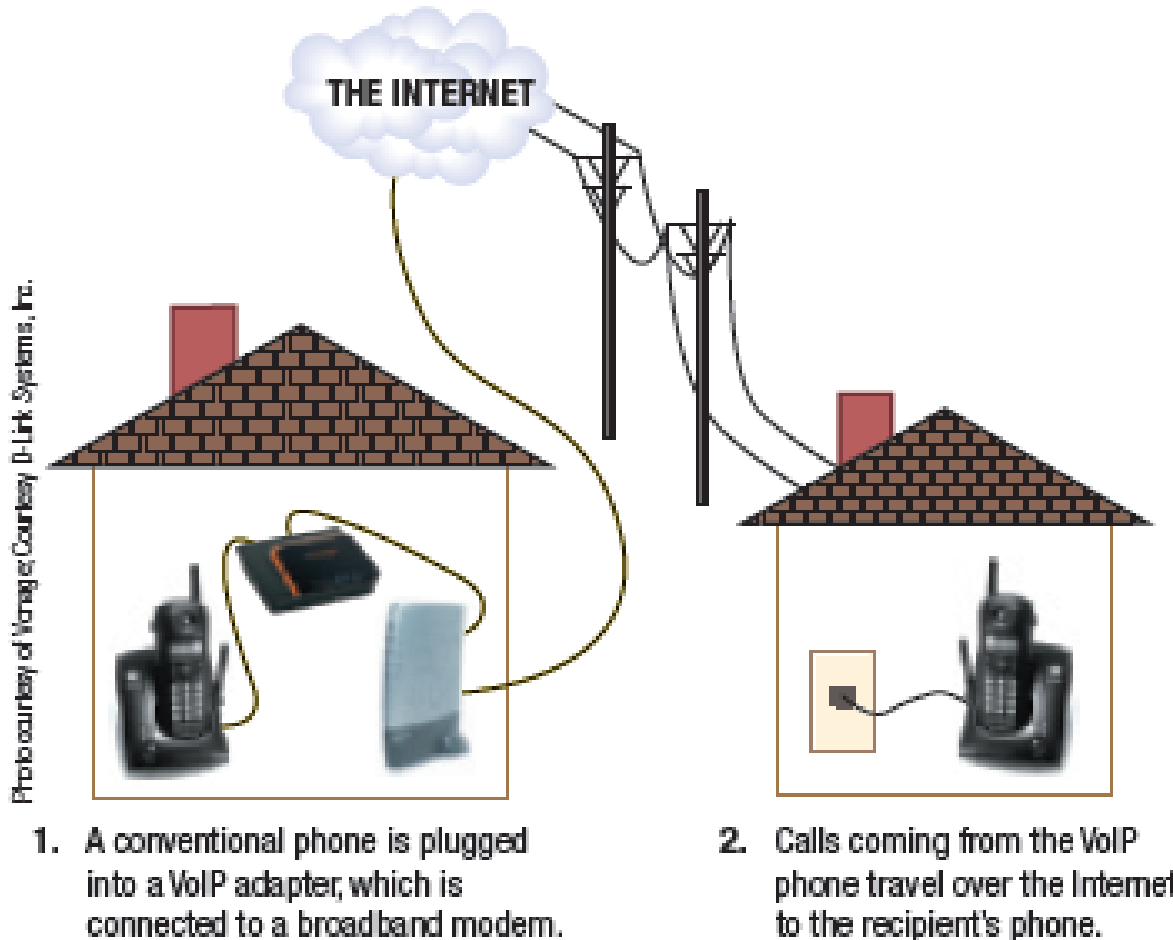 - Does not work when Internet connection or power is out

Beyond Browsing

Photo courtesy of Vonage Courtesy D-Link Systems, Inc.

THE INTERNET

FIGURE 3-19
Voice over IP (VoIP).
Permanent VoIP setups allow telephone calls to be placed via a broadband Internet connection using a conventional telephone.

1. A conventional phone is plugged into a VoIP adapter, which is connected to a broadband modem.

2. Calls coming from the VoIP phone travel over the Internet to the recipient's phone.

Beyond Browsing

- Web Conferences and Webinars
  - Web Conference
    - Face-to-face meeting (videoconferencing) taking place via the Internet
    - Typically takes place using a personal computer or mobile phone
    - Used by individuals and businesses
    - Can be set up using any online communications program that supports video phone calls
    - Business Web conferences with multiple participants might use Web Conferencing software or services

Beyond Browsing

FIGURE 3-20
Web conferencing. Allows individuals to talk with and see each other in real time.

Courtesy of Microsoft

Beyond Browsing

- – Webinar
  - A seminar presented via the Web
  - Typically more one-way communication than a Web conference
- – Webcast
  - A completely one-way presentation
- Social Networking
  - – Social Networking Site
    - A site that enables a community of individuals to communicate and share information

Beyond Browsing

- MySpace, Facebook, etc. allow people to post information about themselves
- YouTube and Flickr enable video and photo sharing
- Meetup connects people in specific geographic areas
- Used by schools for classmates to meet and share
- Used in politics and business
- Used by families

– For security and safety reasons, users should be careful not to reveal too much about themselves

– Sites are increasingly monitored by colleges and employers
  - Carefully check what is posted and remove anything that might be potentially embarrassing
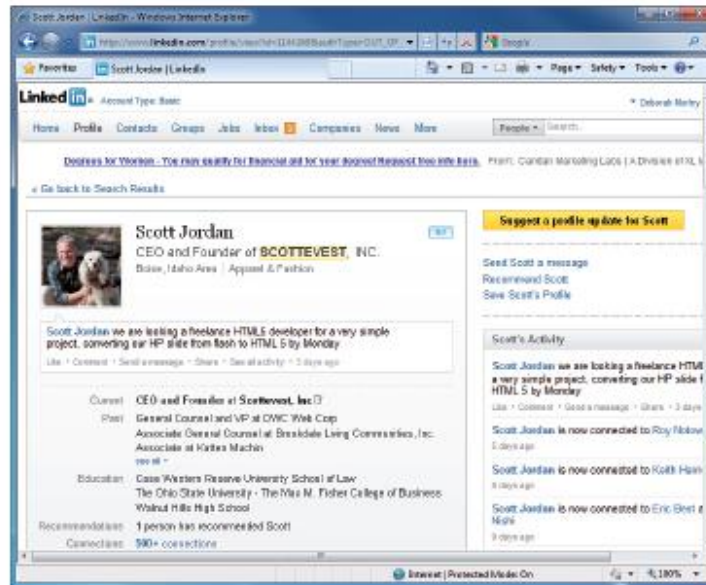
Beyond Browsing

PERSONAL PROFILING SITES
Allow individuals to post information about themselves, view status information about their friends, exchange messages, and so forth.

BUSINESS NETWORKING SITES
Help businesspeople find business contacts, potential new employees and clients, dinner and traveling partners during business trips, and so forth.

⚠ **FIGURE 3-21**
Social networking sites. A variety of social networking sites are available to meet different needs.
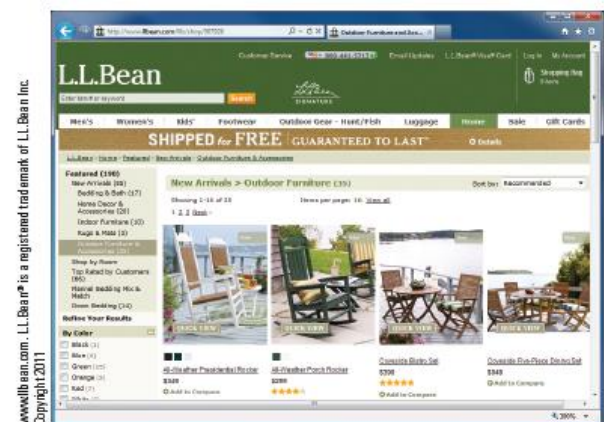
Beyond Browsing

- Online Shopping and Investing
  - E-commerce
    - Online financial transactions
  - Precautions
    - Be sure all e-commerce activities are performed via a secure Web server (https://)
    - Use a credit card or online payment service whenever possible

Beyond Browsing

- Online Shopping and Auctions
  - Online Shopping
  - Buying products or services online—both physical and downloadable items
  - Typically paid via credit card or online payment service such as PayPal

FIGURE 3-22
Online shopping.
Allows you to purchase goods and services online.

Beyond Browsing

- Online Auctions
  - Bids are placed for items, and the highest bidder purchases the item
  - Sellers list items (such as via eBay)
  - Can bid until auction closes
  - Winning bidder arranges payments and delivery with seller
  - Seller pays auction fees
- Online Banking and Online Investing
  - Online Banking
    - Performing banking activities via the Web--(transfer funds, check balances, pay bills, etc.)

Beyond Browsing

FIGURE 3-23

Mobile banking. Many banks allow online banking via text message or mobile app.

Beyond Browsing

- Online Investing
  - Buying and selling stocks, bonds, mutual funds and other types of investments via the Web
  - Lower transaction fees
  - Ability to buy and/or sell quickly
  - Typical online services include the ability to order sales and purchases; access performance histories, corporate news, and set up online portfolios

Beyond Browsing

- Online Entertainment
  - Online Music
    - Music played or obtained via the Web
    - Online radio stations
      - Listen to music live
    - Online music subscription service
      - Used to purchase and download music singles and albums in digital format legally, i.e., iTunes
    - Number of online music users predicted to reach 178 million by 2015

Beyond Browsing

– Online TV, Videos, and Movies
- Online videos
  – Videos watched or downloaded via the Web
- Online TV
  – Live or recorded TV shows available via the Web
- Online movies
  – Feature films available via the Web
- Video-on-demand (VoD)
  – The process of downloading movies and television shows, on demand, via the Web
- Internet Protocol Television (IPTV)
  – Delivery of content via Internet directly to your TV

Beyond Browsing

FIGURE 3-24
Online TV and movies.

Courtesy MobiTV

Courtesy CastTV

MOBILE TV
Both live and recorded TV shows can be delivered directly to a mobile phone.

ONLINE TV AND MOVIES
TV shows and movies can be watched online for free via a variety of Web sites.

Beyond Browsing and E-Mail

– Online Gaming

- Playing games via the Web

- Web-based games, online multiplayer games, etc.

- Quite often associated with Internet addiction

  – The inability to stop using the Internet or to prevent extensive use of the Internet from interfering with other aspect's of one's life

Beyond Browsing

- Online News, Reference, and Information
  - News and Reference Information
    - News
      - Available through Web sites belonging to news organizations, television networks, newspapers, magazines, etc.
      - Usually updated on a continual basis
      - Growing trend is to abandon print subscriptions and provide Web-only service--mainly due to cost
      - News archives are often available (sometimes requires a fee)

Beyond Browsing

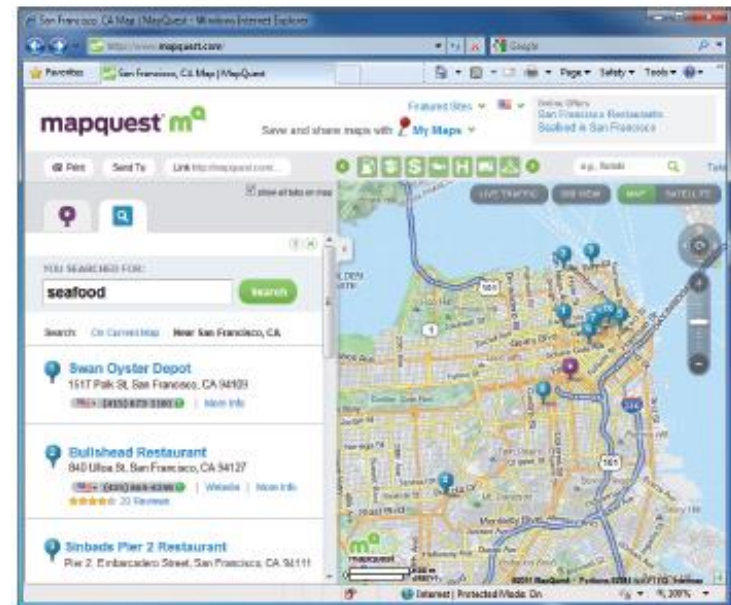**FIGURE 3-25**

Online news and reference Web sites.

NEWS SITES
News organizations typically update their sites several times per day to provide access to the most current news and information.

Beyond Browsing

- Reference Sites
  - Provide access to specific types of useful information
  - Phone and address directories, weather, maps, home values, encyclopedias, dictionaries, etc.

FIGURE 3-25
Online news and reference Web sites.

REFERENCE SITES
Reference Web sites provide access to specific types of useful information, such as the maps and driving directions available via this Web site.

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Beyond Browsing

- – Portal Pages, RSS Feeds, and Podcasts
  - • Portal Web page
    - – Designed to be selected as a browser's home page, typically can be customized
    - – Often contains news, calendars, e-mail, search capabilities, and other tools
    - – Usually personalized
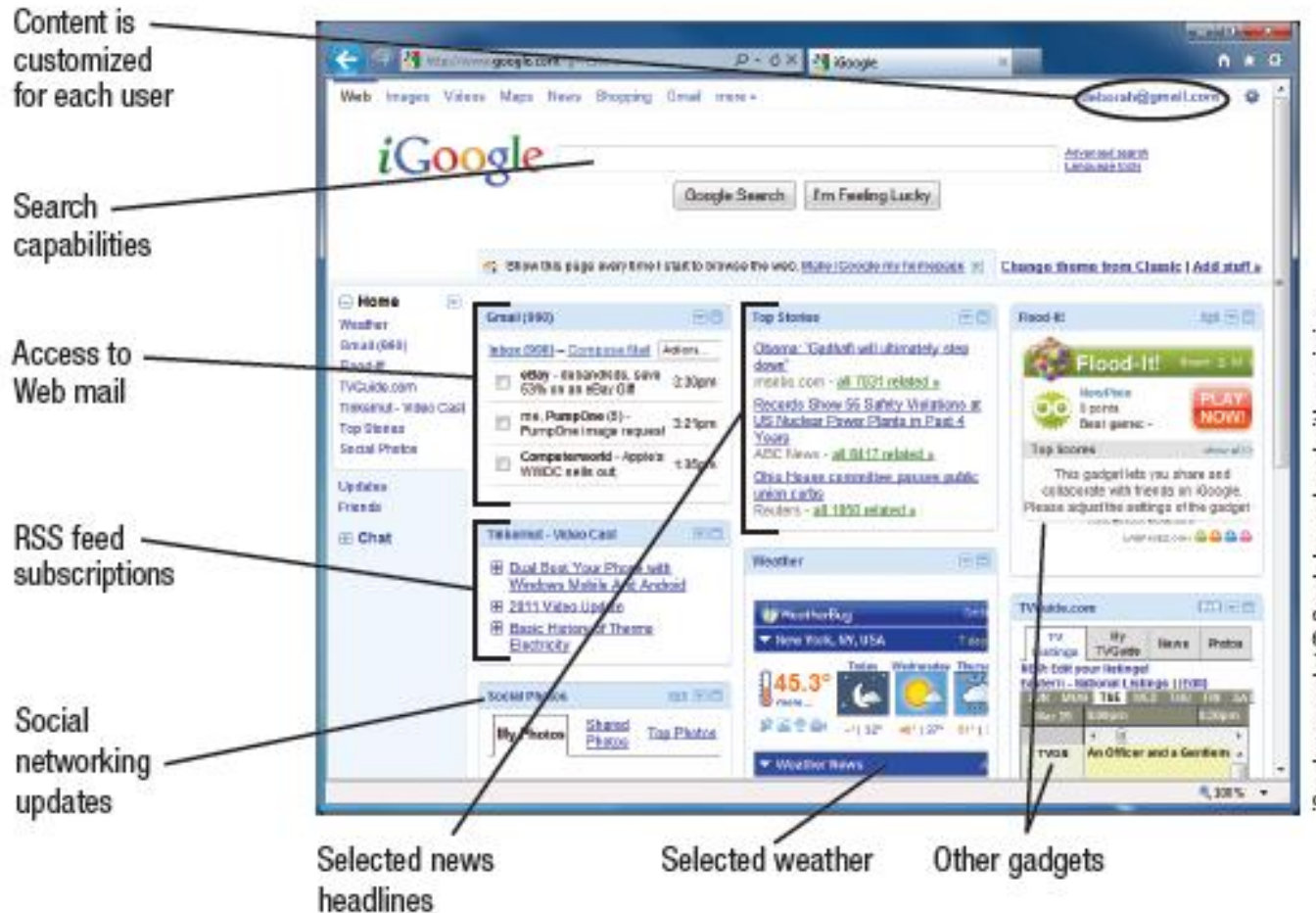   - – Popular portals include iGoogle, My Yahoo!, My MSN, and AOL.com

Beyond Browsing

Content is customized for each user

Search capabilities

Access to Web mail

RSS feed subscriptions

Social networking updates

Selected news headlines

Selected weather

Other gadgets

FIGURE 3-26
Portal pages. Portal pages can contain a wide variety of customized news and information.

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Beyond Browsing

- RSS (Really Simple Syndication) Feeds
  - News tool that delivers selected Web content to subscribers as the content is published to a Web site
  - Individuals subscribe to an RSS feed and new content is delivered to them as it becomes available
- Podcasts
  - Recorded audio or video file that can be played or downloaded via the Web
  - Prepared by individuals and businesses
  - Used to share knowledge, express opinions, share original poems, songs, or short stories
  - Typically uploaded to the Web on a regular basis

Beyond Browsing

- Product, Corporate, Government, and Other Information
  - Vast amount of product and government information available online
    - Product specifications
    - Instruction manuals
    - Tax forms
    - Government publications
    - Legislative bills
  - Wide variety of information from non-profit organizations, conservation groups, political parties, etc., also available

Beyond Browsing

Beyond Browsing

- Online Education and Writing
  - Using the Internet to facilitate learning
  - Rapidly growing application
  - Web-Based Training (WBT)
    - Any instruction delivered on an individual basis via the Web
      - Corporate training, tutorials, distance learning, etc.
  - Distance Learning
    - Students take classes from a location which is different from the one where the delivery of instruction takes place.

Beyond Browsing

- Advantages
  - Self-paced instruction
  - Flexible location
  - Up-to-date material
  - Immediate feedback
  - Customized content
- Disadvantages
  - Technology requirements and problems
  - Anonymity
  - Lack of face-to-face contact

Beyond Browsing

FIGURE 3-28

Web-based learning. The Understanding Computers in a Changing Society CourseMate Web site provides a variety of Web-based learning opportunities for readers of this textbook.

Beyond Browsing

– Online Testing
- Taking tests via the Internet
  – Available for both objective and performance-based exams
  – Typically are graded automatically
  – Security is an issue
  – Authorized testing centers
  – Secure testing systems

FIGURE 3-29
Secure online testing.

1. The device authenticates the individual via a fingerprint scan before the exam can begin.

2. The device captures real-time audio and video during the exam.

3. The computer is locked down during the exam so it can only be used for authorized activities.

Courtesy Software Secure, Inc.

Beyond Browsing

– Blogs, Wikis, and Other Types of Online Writing
  • Blogs
    – A Web page that contains short, frequently updated entries in chronological order, typically by just one individual
  • Wikis
    – A collaborative Web page that is designed to be edited and republished by a variety of individuals
    – Wikipedia is largest
    – Carefully evaluate content, as irresponsible individuals can enter erroneous information
  • E-portfolios
    – A collection of an individual's work accessible via the Web

Beyond Browsing

FIGURE 3-30

Blogs. Allow individuals to post entries to an online personal journal.

FIGURE 3-31

Wikis. Wikis, such as the Wikipedia collaborative online encyclopedia shown here, can be edited by any authorized individual.

E-Mail

- Electronic mail (e-mail)

  – Electronic messages exchanged between computers on a network

  – One of the most widely used Internet applications

  – Can be conventional e-mail program, Web-based, or mobile-based

Conventional	Web-based
Microsoft Outlook	Gmail
Microsoft Mail	Windows Live Mail

E-Mail

– Can contain photos, attached files, etc.

– Mobile e-mail may require a fee

– Other types of mobile communications

- Short Message Service (SMS)
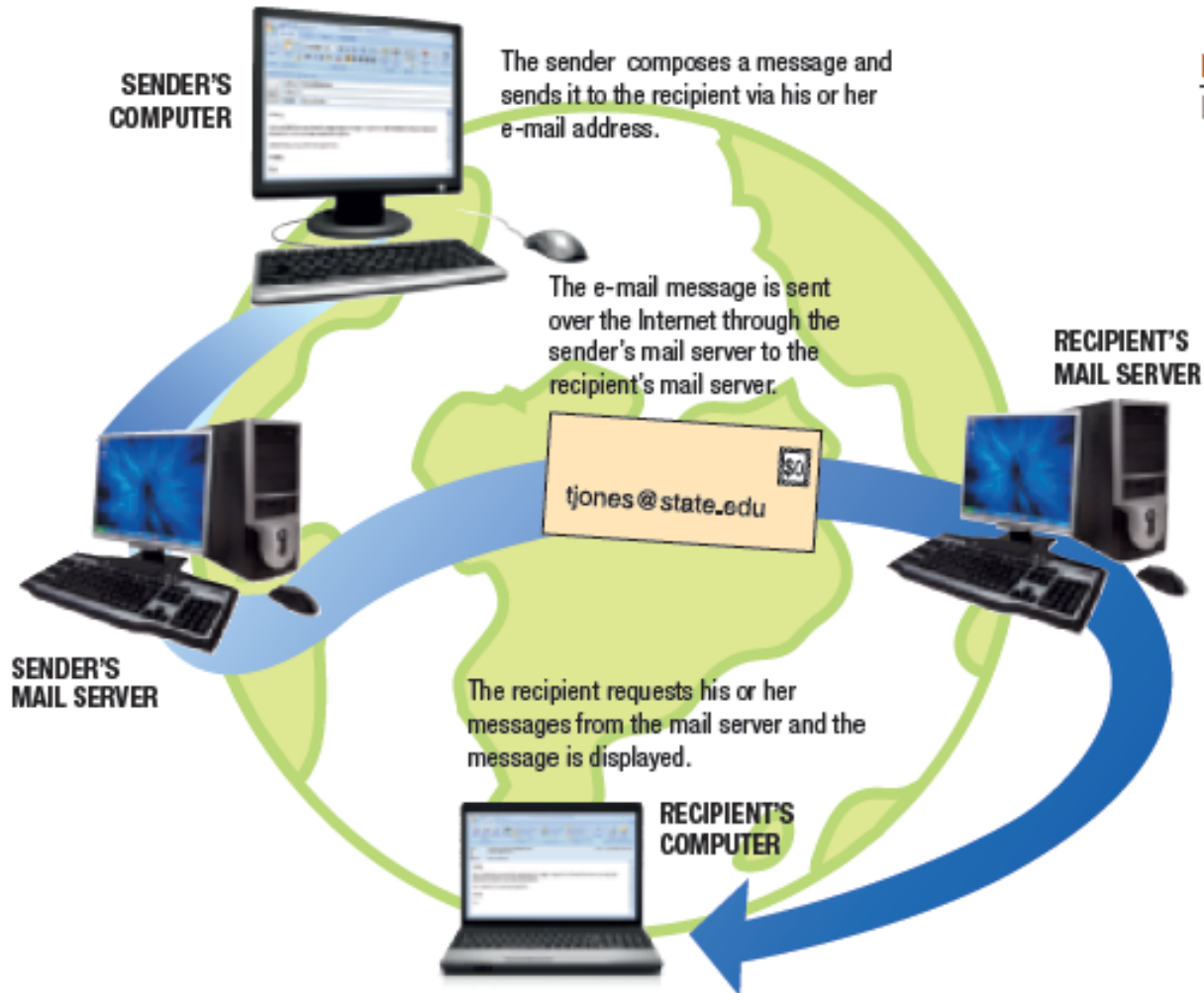
- Multimedia Message Service (MMS)

E-Mail

FIGURE 1-27
How e-mail works.

SENDER'S COMPUTER

The sender composes a message and sends it to the recipient via his or her e-mail address.

The e-mail message is sent over the Internet through the sender's mail server to the recipient's mail server.

RECIPIENT'S MAIL SERVER

tjones@state.edu

SENDER'S MAIL SERVER

The recipient requests his or her messages from the mail server and the message is displayed.

RECIPIENT'S COMPUTER

Summary

- What is a Computer Network

- Effective Searching of the Web

- Beyond Browsing and Email