

CS 110– Introduction to Computing

Unit 7: The Internet:
Connecting and
Communicating Online

Module Objectives

By the end of the module, you should be able to:

- Discuss the evolution of the Internet
- Describe how to use the web
- Identify techniques for connecting to the Internet
- Explain various online activities and services
- Identify considerations for staying safe online
- Discuss ways to use social networks
- Describe how to conduct and evaluate online searches
- Identify considerations for using online content

The Internet Evolution (1 of 4)

- The **web**, originally known as the **world wide web**, is a service consisting of websites located on computers around the world, connected through the Internet.
- The **internet** is a global collection of millions of computers linked together to share information.
- Each of the networks on the Internet provides resources that add to the abundance of goods, services, and information accessible via the Internet.

Figure 2-1 People around the world use the Internet in daily activities such as viewing media, communicating with others, and accessing information.



The Internet Evolution (2 of 4)

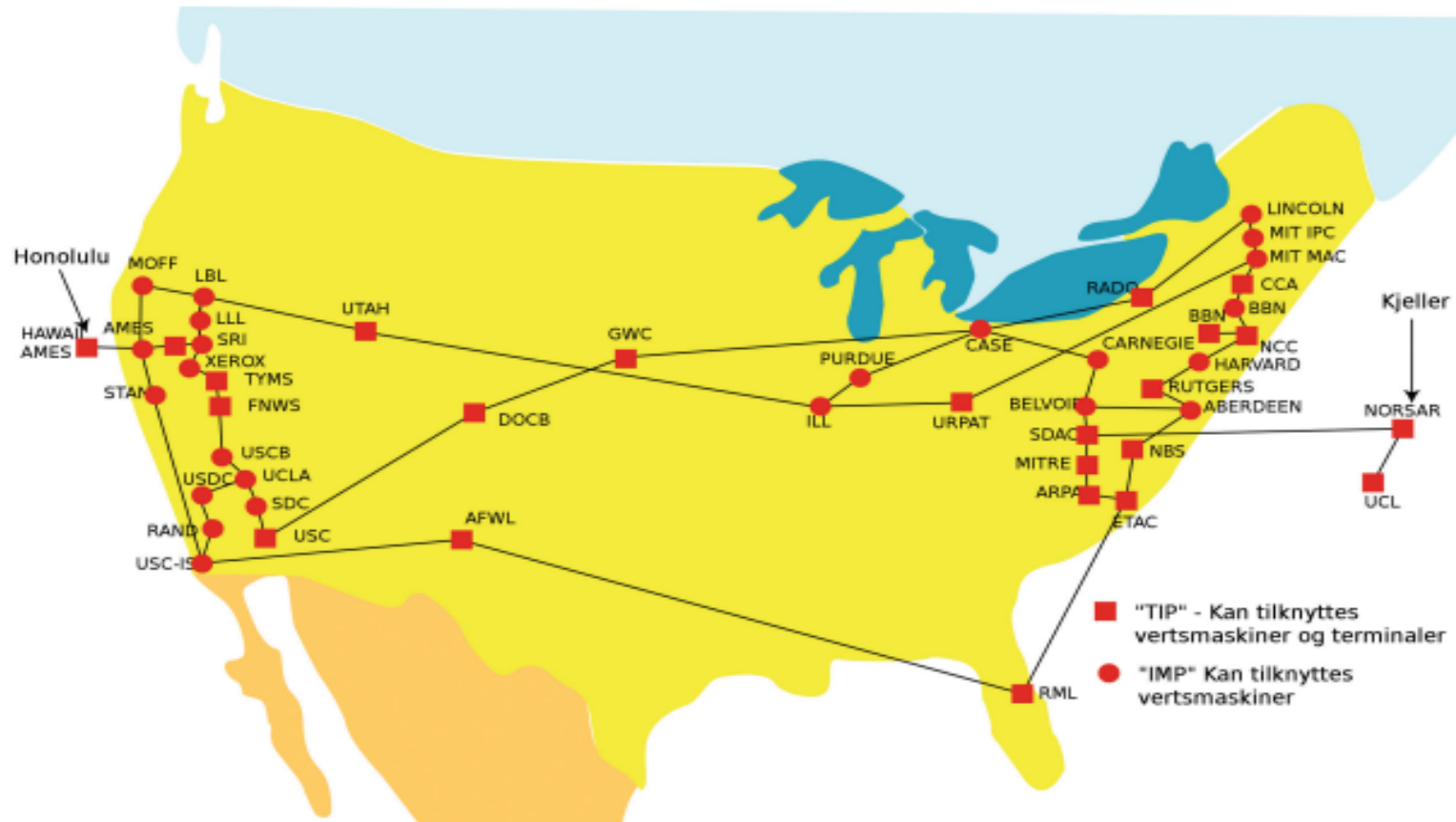
- The Internet has its roots in a networking project started by the Pentagon's Advanced Research Projects Agency (ARPA), an agency of the U.S. Department of Defense. ARPA's goal was to build a network that:
 - (1) enabled scientists in various physical locations to share information
 - (2) can function even if part of the network was disabled or destroyed by a disaster, such as a nuclear attack
- The original ARPANET consisted of four main computers, one each located at the University of California in Los Angeles, the University of California in Santa Barbara, the Stanford Research Institute, and the University of Utah. Each of these computers served as a host on the network.

The Internet Evolution (3 of 4)

- **Bandwidth** is a common term used to describe the capacity of a communications channel.
- **Net neutrality** is the concept that one website has the same value or priority as other websites, resulting in equal, unrestricted access to each site.
- **Internet service provider (ISP)** is a company that sells Internet access who must provide the same level of service to all websites, regardless of content or purpose.

The Internet Evolution (4 of 4)

Figure 2-2 ARPANET network map from 1974.



Using the World Wide Web

(1 of 11)

- A **web page** is a specially formatted document that can contain text, graphics, sound, video, and links to other web pages. The content of most web pages is designed to make them visually appealing and easy to find.
- Web pages are either static or dynamic. When you visit a **static web page**, you see the same content each time.
- With a **dynamic web page**, by contrast, the content of the web page is regenerated each time you display it. Dynamic web pages may contain customized content, such as the current date and time of day, desired stock quotes, weather for a region, or ticket availability for flights.
- **Hyperlinks**, often shortened to links, are words or graphics you can click to display a web page or other resources on the Internet, such as a file.

Using the World Wide Web (2 of 11)

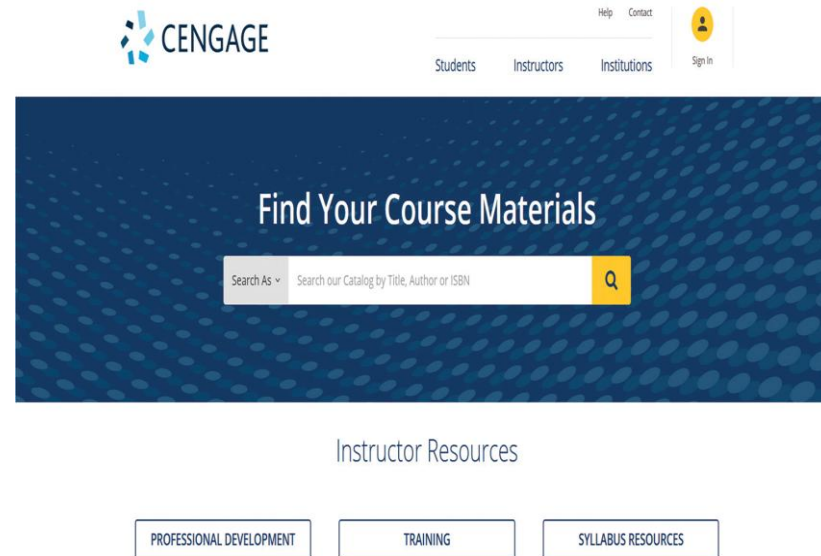


Figure 2-3 Web page

Using the World Wide Web

(3 of 11)

- A collection of related webpages (often shortened to "pages") and associated items, such as documents and photos, stored on a webserver makes up a website.
- A webserver is a computer that delivers requested webpages to your computer or mobile device. The same webserver can store multiple websites.
- **Responsive web design** adapts the layout of the website to fit the screen on which it is being displayed. **HTML (Hypertext Markup Language)** is a set of codes that developers use to specify the headings, paragraphs, images, links, and other content elements that a web page contains.
- HTML is one of the core technologies for developing web pages, along with **CSS (cascading style sheets)**. HTML specifies a web page's layout. CSS is used to specify the content's design and appearance.

Using the World Wide Web (4 of 11)

Figure 2-4 HTML code.







```
<html lang="en">
<head>
  <meta charset="utf-8">
  <meta http-equiv="X-UA-Compatible" content="IE=edge">
  <meta name="viewport" content="width=device-width, initial-scale=1">
  <meta name="description" content="Discovering Computers: Digital Technology, Data, and Devices, 17th Edition, © 2023 Cengage. All Rights Reserved. May not be scanned, copied or duplicated, or posted to a publicly accessible website, in whole or in part."/>
```

Using the World Wide Web

(5 of 11)

Table 2-1 Popular Browsers

	Apple Safari	Preinstalled on Apple computers and devices, Safari has been the default browser for macOS since 2003 and is relatively new to Windows. The browser has built-in sharing with online social networks, fast performance, parental controls, and ease of use.
	Google Chrome	Google's Chrome was first released in 2008. This free browser is available for Windows, macOS, and Linux, and it must be downloaded and installed. Chrome has independent tabbed browsing; if there is a problem in one tab, the other tabs continue to function normally.
	Microsoft Edge	Edge is a Microsoft browser included in the Windows operating system. It is the default browser for Windows on most devices and is not compatible with prior versions of Windows. Features include integration with Cortana and OneDrive, along with annotation and reading.
	Mozilla Firefox	Developed by the Mozilla Corporation for Windows, macOS, and Linux, Firefox is known for its extensive array of plug-ins (discussed later in the module). This free browser was first released in 2004 and must be downloaded and installed. It has enhanced privacy and security features, a spelling checker, tabbed browsing, and a password manager.

Using the World Wide Web

(6 of 11)

- Websites often use **cookies**, which are small text files generated by a web server to store information, such as items you view or purchase on an e-commerce site.
- The browser also keeps track of pages you have viewed in sequence by tracking **breadcrumbs**—the path you followed to display a web page.
- The **navigation bar** in a browser includes buttons, such as Back and Forward, that you can use to revisit web pages along the breadcrumb path.

Using the World Wide Web (7 of 11)

- A browser displays the URL for the current web page in its **address bar**, the part of a browser window that displays the location of the current web page.

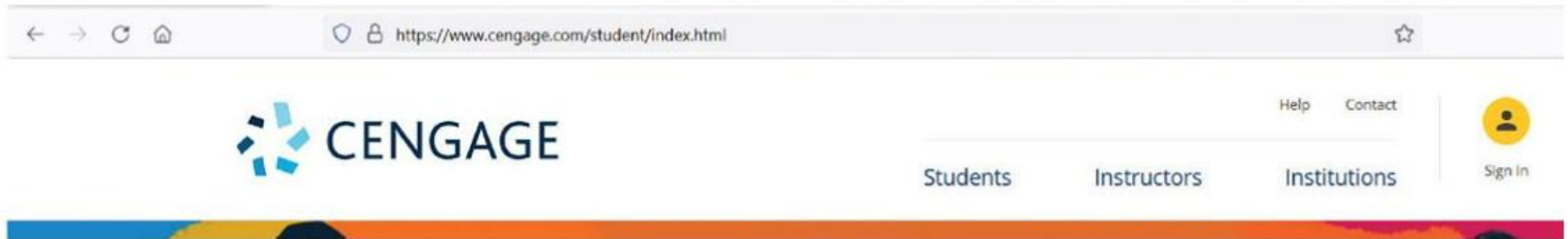
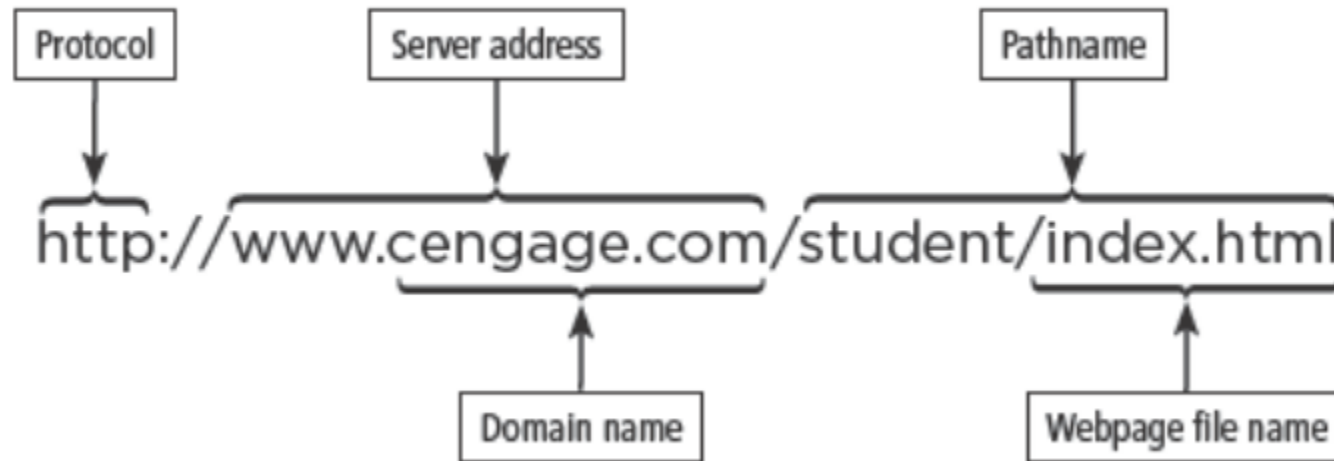


Figure 2-7 URL and pathway display in the address bar.

Using the World Wide Web (8 of 11)

Figure 2-6 Parts of a URL



Using the World Wide Web (9 of 11)

An IP address is a unique number that consists of four sets of numbers from 0 to 255 separated by periods, or dots, as in 69.32.132.255. The Internet uses two IP addressing schemes: IPv4 and IPv6.

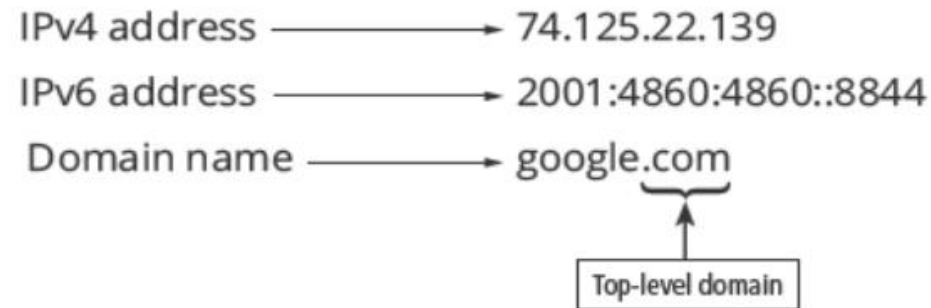


Figure 2-5 The IPv4 and IPv6 addresses, along with the domain name, for Google's website.

Using the World Wide Web (11 of 11)

- The **domain name system** (DNS) is the method that the Internet uses to store domain names and their corresponding IP addresses.
- When you enter a domain name (i.e., google.com) in a browser, a DNS server translates the domain name to its associated IP address so that the request can be routed to the correct computer.
- A **DNS** server is a server on the Internet that usually is associated with an ISP.

How To: Connect to the Internet (1 of 5)

- A **hot spot** is a wireless network device that provides Internet connections to mobile computers and devices.
- A **mobile hot spot** enables you to connect a phone, computer, or other device to the Internet through the cellular network.



Figure 2-8 Verizon mobile hot spot

How To: Connect to the Internet (2 of 5)

- Various types of cellular networks, including 4G and 5G, are available.
- 4G (fourth generation) cellular networks can provide Internet services in most locations where cellular service is offered.
- 5G networks provide higher-speed data transmission, making them more appealing to those requiring access to high-bandwidth content.

How To: Connect to the Internet (3 of 5)

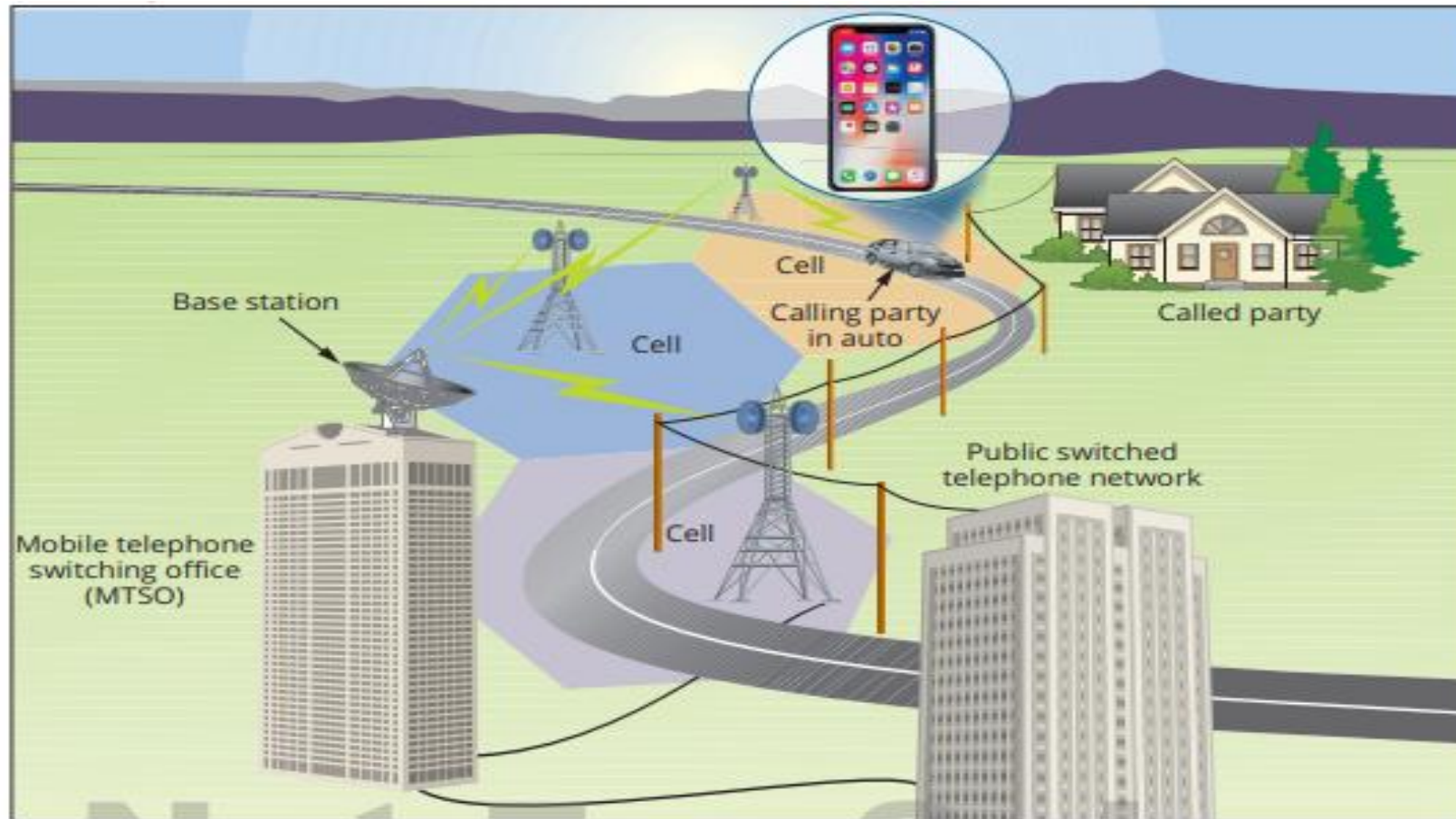


Figure 2-9 How a cellular network might work.

How To: Connect to the Internet (4 of 5)

- **Wireless networks** that are available in public places, such as hotels, restaurants, and coffee shops, are known as **Wi-Fi networks**.
- Mobile hot spot: Many smartphones contain mobile hot spot functionality, although cellular service providers may charge an extra fee to use it, and any data transmitted or received through the hot spot will be added to your overall data usage.



FIGURE 2-10 Available wireless networks

How To Connect to the Internet (5 of 5)

- **Tethering** transforms a smartphone or Internet-capable tablet into a portable communications device that shares its Internet access with other computers and devices wirelessly.



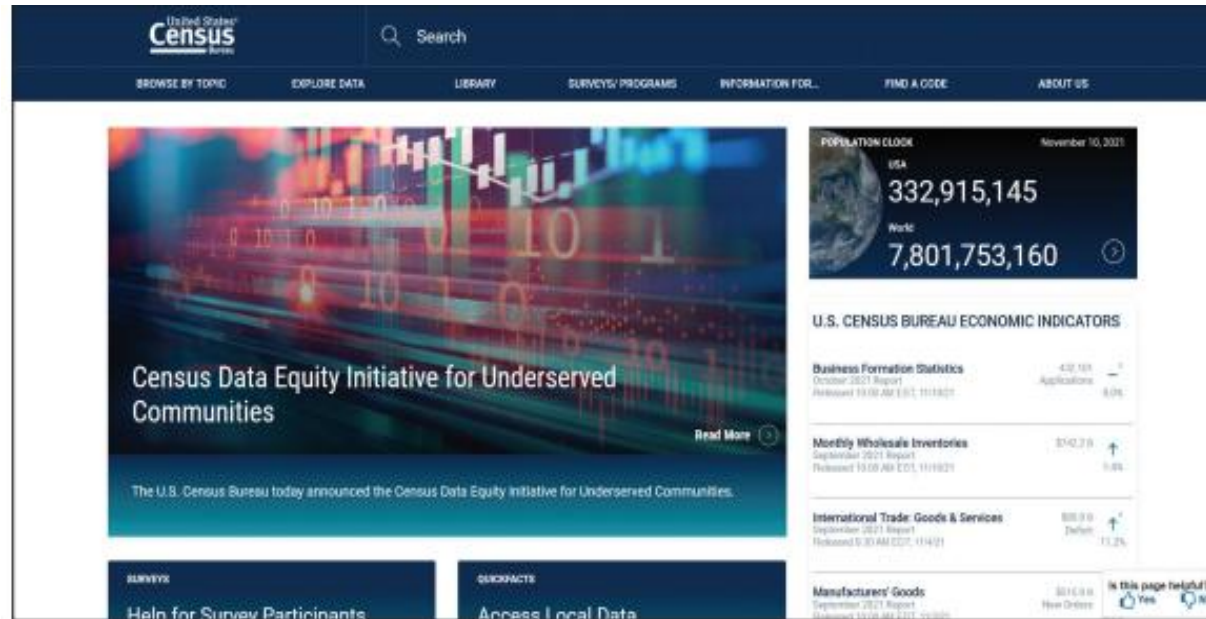
Figure 2-11 Netgear wireless access point

Various Online Activities and Services (1 of 6)

- **Informational and research websites** contain information. Examples include libraries, encyclopedias, dictionaries, directories, guides, and other types of references.
- **Educational websites** offer formal and informal teaching and learning
- **Business websites** aim to increase brand awareness, provides company background or other information, and/or promotes or sells products or services.
- **Government agency websites** provide citizens with information such as census data, or assistance such as forms for filing taxes
- **A blog** is an informal website consisting of time-stamped articles, or posts, in a diary or journal format, usually listed in reverse chronological order.

Various Online Activities and Services (2 of 6)

Figure 2-16: The U.S. Bureau website provides population data.



Various Online Activities and Services (3 of 6)

- **Health and fitness websites** provide up-to-date medical, fitness, nutrition, or exercise information for public access.
- **Science websites** contain information about space exploration, astronomy, physics, earth sciences, microgravity, robotics, and other branches of science.
- **Entertainment websites** offer music, videos, shows, performances, events, sports, games, and more in an interactive and engaging environment.

Various Online Activities and Services (4 of 6)

- **Bookmarking site** is a website that enables members to organize, tag, and share links to media and other online content.
- **A tag** is the descriptive text used to categorize media and invite comments. You can assign tags to web pages, photos, videos, blog posts, email messages, social media messages, and other digital content so that it is easier to locate later.
- **Social media** refers to the many ways individuals and businesses share information and interact using the Internet.

Various Online Activities and Services (5 of 6)

- **Online banking** and online trading enable users to access their financial records from anywhere in the world, provided they have an Internet connection.

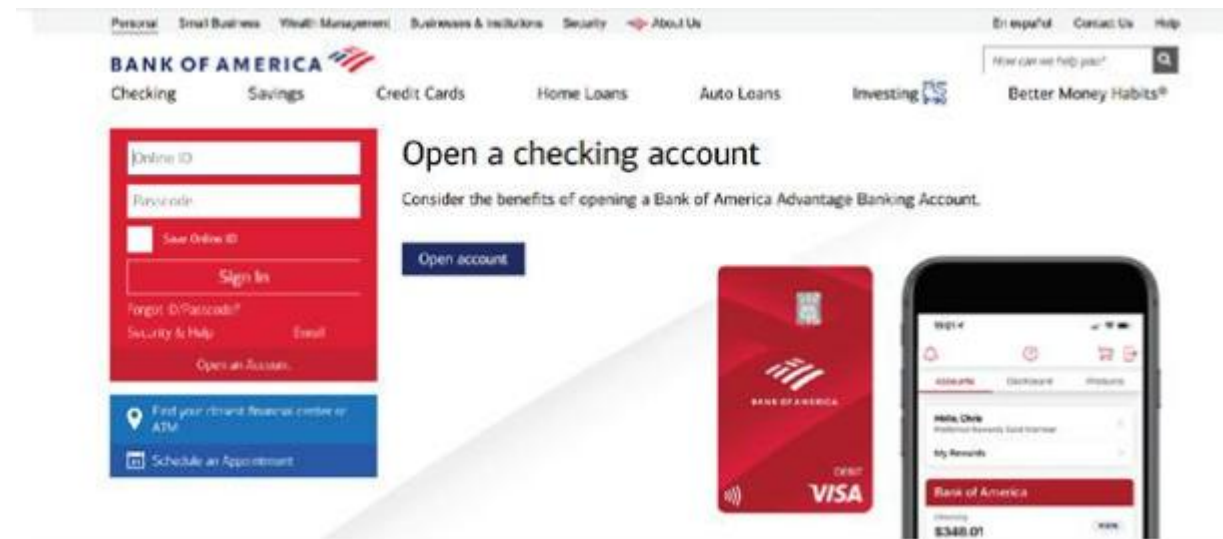


Figure 2-18 You can manage your bank account, make transfers, and more with banking websites, such as Bank of America.

Various Online Activities and Services (6 of 6)

Pros and cons of using web apps.

Pros	Cons
Access web apps from any device with a browser and Internet connection	User must be online to use web apps
Collaborate with others, no matter their location	Files are more vulnerable to security and privacy threats
Store your work on the app's website so you can access it anytime and anywhere	If the web app provider has technical problems, you may be unable to access your work
Save storage space on your device	If the web app provider goes out of business, you can lose your files
Access the latest version of the app without installing updates	Web apps often offer fewer features and may run slower than installed apps

Considerations for Online Safety (1 of 3)

- A secure website uses encryption to safeguard transmitted information.
- **Encryption** is a security method that scrambles or codes data as it is transmitted over a network so that it is not readable until it is decrypted.
- An encrypted website connection displays https instead of http in the URL.
- The “**s**” in https stands for “secure,” so https means **Hypertext Transfer Protocol Secure**.

Considerations for Online Safety (1 of 2)

- Secure websites often use a **digital certificate** to verify a user's identity with a digital key that has been “signed” by a trusted third party.



Figure 2-22 Digital certificates provide security when visiting websites.

Considerations for Online Safety (2 of 3)

Online Safety Tips

- Verify that the website is safe
- Turn off location sharing
- Clear your browsing history
- Never store passwords
- Use a phishing filter
- Enable a pop-up or pop-under blocker
- Use private browsing
- Use a proxy server

Communicating Online (1 of 6)

- **Email** was one of the original services on the Internet, enabling scientists and researchers working on government-sponsored projects to communicate with colleagues at other locations.



Figure 2-24 You can send email to anyone, anywhere in the world.

Communicating Online (2 of 6)

- **Internet messaging services**, which often occur in real time, are communications services that notify you when one or more of your established contacts are online and then allow you to exchange messages or files or join a private chat room with them.

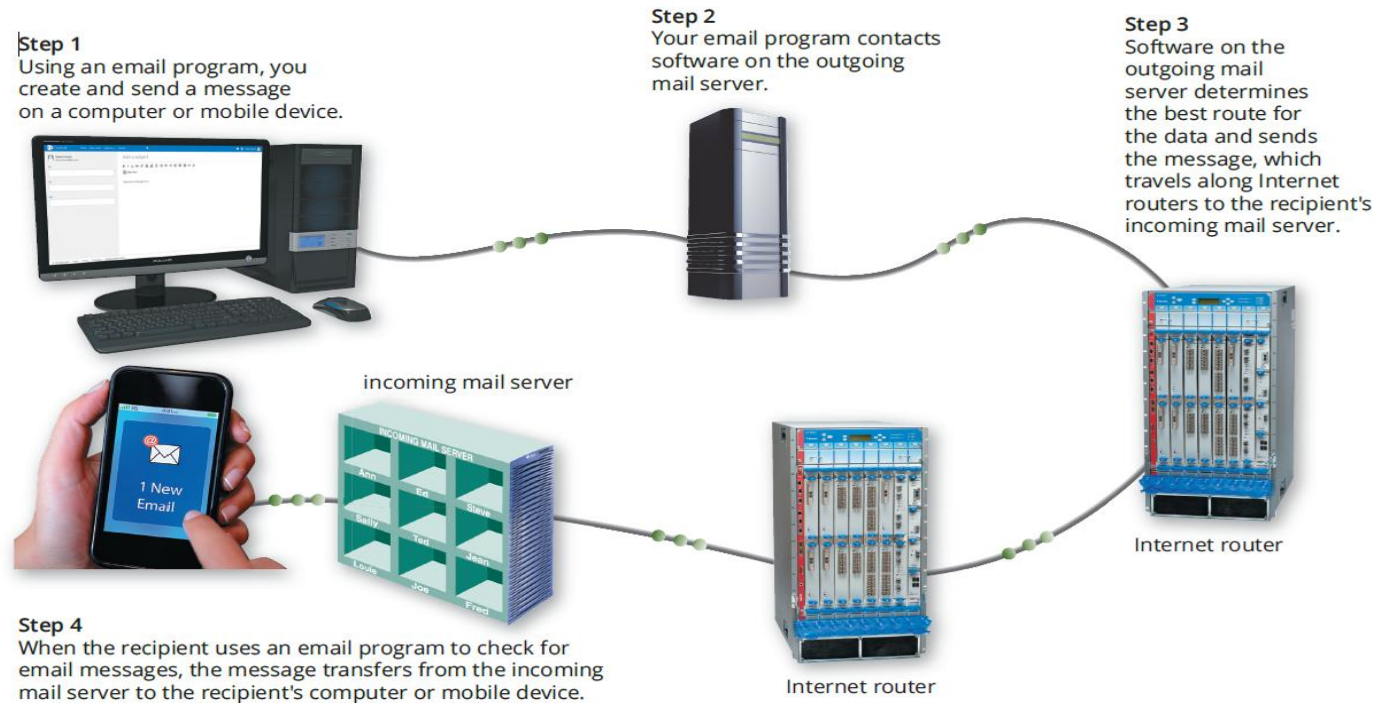


Figure 2-25 How an email message may travel from a sender to a receiver.

Communicating Online (3 of 6)

- Most messaging apps include the following features, which allow for a variety of communication types:
 - Text messaging
 - Multimedia messaging
 - Voice messaging
 - Voice-to-text (also called speech-to-text)
 - Online discussion

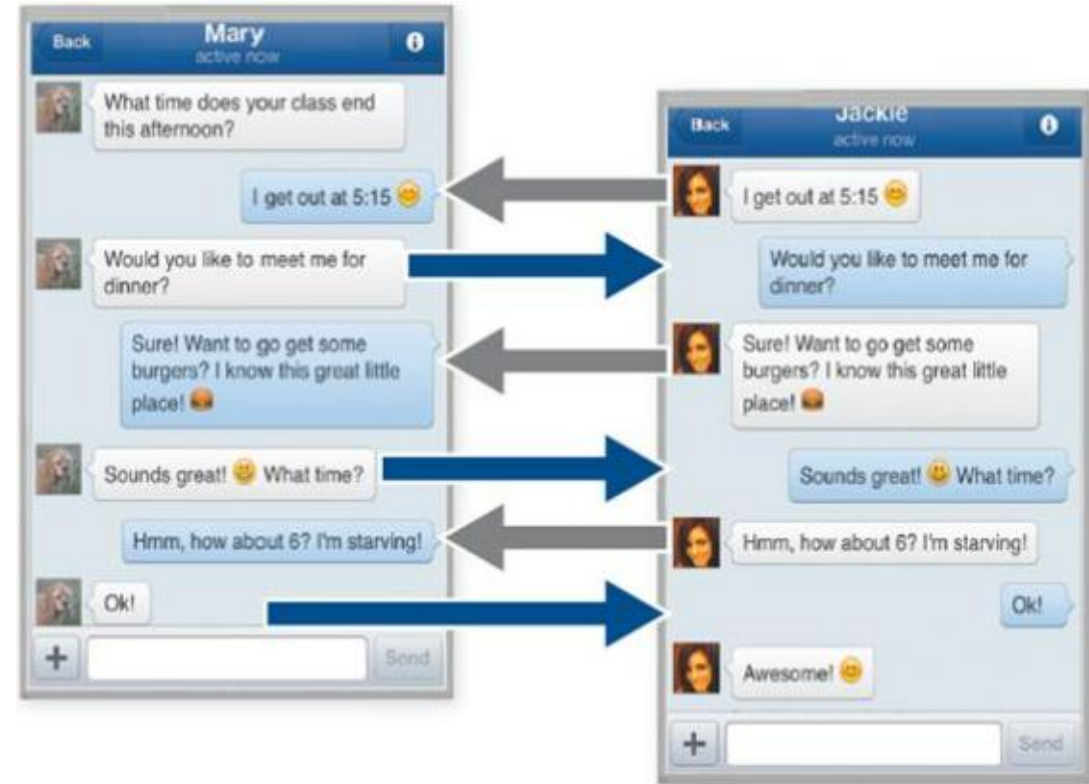


Figure 2-26 Facebook Messenger is an example of messaging app.

Using Social Networks (4 of 6)

Types of social networks.

Type	Lets You	Includes	Examples
Social networking	Share ideas, opinions, photos, videos, websites	Personal and business networking, chat, video chat and videoconferencing, instant messaging, online dating, social memorials	Facebook, LinkedIn, Instagram, Snapchat, Microsoft Skype, Google Hangouts
Blogging and microblogging	Create and update an online journal that you will share with readers	Personal journals, expert advice, information on special areas of Interest	Twitter, Blogger, WordPress, Tumblr, Pinterest
Media sharing and content sharing	View and distribute pictures, videos, and audio files	Photo and video sharing, podcasting, news sites, online learning, distance learning	YouTube, Break, Dailymotion, Flickr, Photobucket, Picasa

Using Social Networks (5 of 6)

Types of social networks. (Continued)

Type	Lets You	Includes	Examples
Collaborative projects	Read, add, and discuss articles about topics of interest	Online encyclopedias, forums, wikis, message boards, and news groups	Wikipedia, WikiAnswers, Wikia
Social curation, bookmarking, and social news	Tag (mark) and search websites; share websites, articles, news stories, and media	Tagging; knowledge management	Delicious, Reddit, Digg
File sharing	Send and receive files from others on an Internet location	Free or paid access to file storage locations on the Internet	Egnyte, ShareFile, Hightail, Dropbox, WeTransfer

Using Social Networks (6 of 6)

- Privacy and Security Risks with Online Social Networks
- Follow the tips to help protect yourself against thieves who are following the network traffic and attempting to invade private facets of your life.
 - Register with caution
 - Manage your profile
 - Choose friends carefully
 - Limit friends
 - Divulge only relevant information
 - Be leery of urgent requests for help

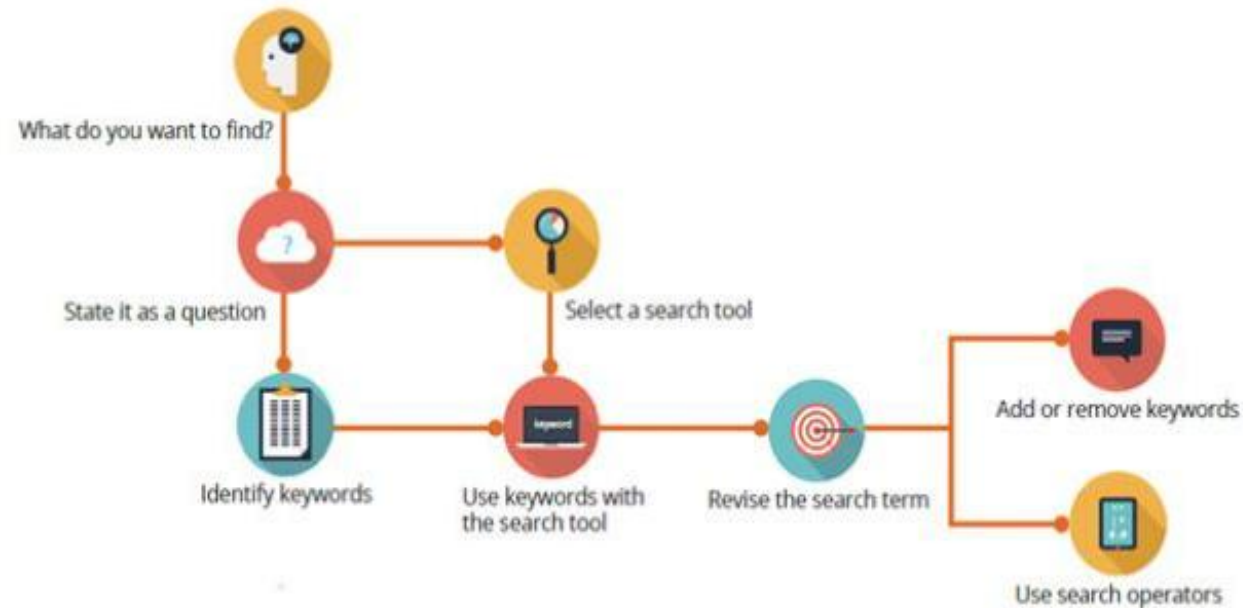


Information Literacy Standards and Web Searches (1 of 3)

- Search engine uses programs called **spiders or crawlers**. A spider or crawler is software that combs the web to find web pages and add new data about them to the database, thereby building an index, or listing of terms and their locations.
- A **query** is a search term entered into a search engine on the web to obtain results.
- A **search tool** finds online information based on criteria you specify or selections you make.
- Another type of **search tool** is a **web directory**, or subject directory, which is an online guide to subjects or websites, usually arranged in alphabetical order.

Information Literacy Standards and Web Searches (2 of 3)

Figure 2-35 Steps in a search strategy



Apply Information Literacy Standards to Web Searches (3 of 3)

You can also refine a web search by using a **search operator**, also called a **Boolean operator**. Search operators are characters, words, or symbols that refine the search.

Below are the common search operators:

Operator	Means	Example
“ ” (quotation marks)	Find web pages with the exact words in the same order	“augmented reality” in business
(vertical bar)	OR	augmented virtual
- (hyphen)	NOT	augmented reality – virtual
*	Wildcard (placeholder for any number of characters)	augment* reality
#..#	Find web pages within a range of numbers	augmented reality 2017..2022

Using Online Content Responsibly and Ethically

(1 of 3)

- On the Internet, anyone can publish anything to a website, a blog, or a social media site, regardless of whether the information is true.
- One way to evaluate a web page is to use the CARS checklist and determine whether the online information is credible, accurate, reasonable, and supportable.
- A **citation** is a formal reference to a source, such as a published work.

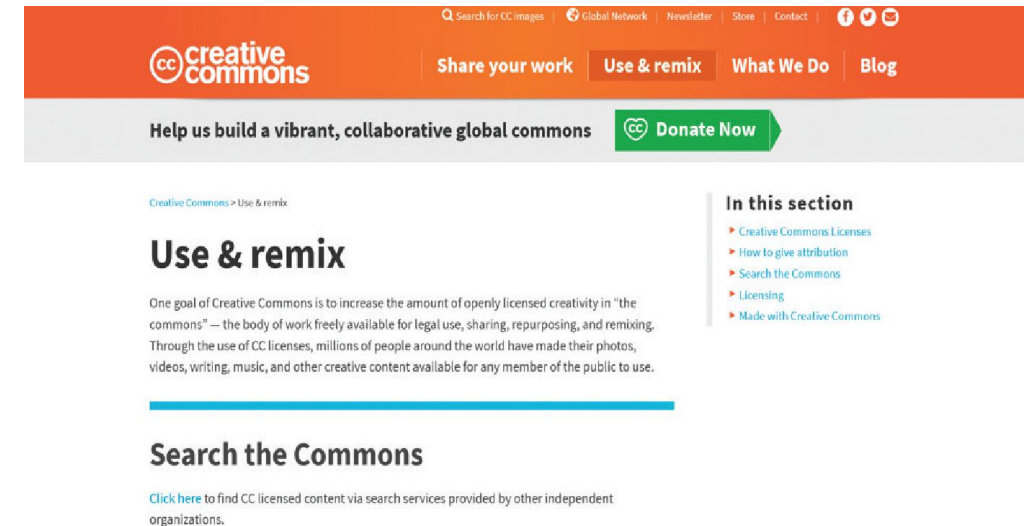
Using Online Content Responsibly and Ethically

(2 of 3)

- If you copy a photo from the Internet and use it in a report, you might be violating the photographer's **intellectual property rights**, which are legal rights protecting those who create works such as photos, art, writing, inventions, and music.
- Some online resources, such as e-books, newspapers, magazines, and journals, are protected by **digital rights management (DRM)**, which is a collection of technologies used by software publishers and trade groups to fight software piracy (theft) and prevent unauthorized copying of digital content; these include authentication, certificates of authenticity, encryption, and digital watermarks.

Using Online Content Responsibly and Ethically (3 of 3)

- **A public domain** means it is not subject to copyright.
- **Creative Commons** is a nonprofit organization that helps content creators keep the copyright to their materials while allowing others to use, copy, or distribute their work.



Ethics and Issues: Using Online Content Responsibly (1 of 2)

- **Ethics** is the set of moral principles that govern people's behavior.
- Ethically and legally, you can use other people's ideas in your research papers and presentations, provided you cite the source for any information that is not common knowledge.
- Some software, such as Microsoft Word, helps you create and manage citations and then produce a bibliography, which is an alphabetical collection of citations.

Ethics and Issues: Using Online Content Responsibly (2 of 2)



Figure 2-37 Citing sources in Microsoft Word