Chapter 2
Fundamentals of the World Wide Web and Internet

Discovering Computers 2012
Your Interactive Guide to the Digital World
Objectives Overview

Discuss the evolution of the Internet

Identify and briefly describe various broadband Internet connections and state differences between broadband Internet connections and dial-up connections

Describe the types of Internet access providers

Describe the purpose of an IP address and its relationship to a domain name

Explain the purpose of a Web browser and identify the components of a Web address

Describe how to use a search engine to search for information on the Web and differentiate between a search engine and a subject directory

See Page 73 for Detailed Objectives

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Objectives Overview

- Describe the types of Web sites
- Explain how Web pages use graphics, animation, audio, video, virtual reality, and plug-ins
- Identify and briefly describe the steps required for Web publishing
- Describe the types of e-commerce
- Explain how e-mail, mailing lists, instant messaging, chat rooms, VoIP, newsgroups and message boards, and FTP work
- Identify the rules of netiquette

See Page 73 for Detailed Objectives
The Internet

- The Internet is a worldwide collection of networks that links millions of businesses, government agencies, educational institutions, and individuals.
Evolution of the Internet

• The Internet originated as ARPANET in September 1969 and had two main goals:

  Allow scientists at different physical locations to share information and work together

  Function even if part of the network were disabled or destroyed by a disaster
Evolution of the Internet

1969
ARPANET becomes functional

1984
ARPANET has more than 1,000 individual computers linked as hosts

1986
NSF connects NSFnet to ARPANET and becomes known as the Internet

1995
NSFNet terminates its network on the Internet and resumes status as research network

1996
Internet2 is founded

Today
More than 550 million hosts connect to the Internet

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Discovering Computers 2012: Chapter 2
Evolution of the Internet

• Each organization is responsible only for maintaining its own network
  – The World Wide Web Consortium (W3C) oversees research and sets guidelines and standards

• Internet2 connects more than 200 universities and 115 companies via a high-speed private network
Evolution of the Internet

- Many home and small business users connect to the Internet via high-speed broadband Internet service.

- Cable Internet service
- DSL
- Fiber to the Premises (FTTP)
- Fixed wireless
- Cellular Radio Network
- Wi-Fi
- Satellite Internet Service
Evolution of the Internet

• An access provider is a business that provides individuals and organizations access to the Internet free or for a fee.
Evolution of the Internet

ISP (Internet service provider)
- Regional ISPs provide Internet access to a specific geographical area
- National ISPs provide Internet access in cities and towns nationwide

Online service provider (OSP)
- Has many members-only features
- Popular OSPs include AOL (America Online) and MSN (Microsoft Network)

Wireless Internet service provider
- Provides wireless Internet access to computers and mobile devices
- May require a wireless modem
Evolution of the Internet

How a Home User’s Data and Information Might Travel the Internet Using a Cable Modem Connection

**Step 1**
You initiate an action to request data or information from the Internet. For example, you request to display a Web page on your computer screen.

**Step 2**
A cable modem transfers the computer’s digital signals to the cable television line in your house.

**Step 3**
Your request (digital signals) travels through cable television lines to a central cable system, which is shared by up to 500 homes in a neighborhood.

**Step 4**
The central cable system sends your request over high-speed fiber-optic lines to the cable operator, who often also is the ISP.

**Step 5**
The ISP routes your request through the Internet backbone to the destination server (in this example, the server that contains the requested Web site).

**Step 6**
The server retrieves the requested Web page and sends it back through the Internet backbone to your computer.
Evolution of the Internet

- An **IP address** is a number that uniquely identifies each computer or device connected to the Internet.

- A **domain name** is the text version of an IP address.
  - Top-level domain (TLD)

- A **DNS server** translates the domain name into its associated IP address.

\[ \text{IP address} \rightarrow 72.14.207.99 \]
\[ \text{Domain name} \rightarrow \text{www.google.com} \]
## Evolution of the Internet

### Examples of Generic Top-Level Domains

<table>
<thead>
<tr>
<th>Generic TLD</th>
<th>Intended Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td>aero</td>
<td>Aviation community members</td>
</tr>
<tr>
<td>biz</td>
<td>Businesses of all sizes</td>
</tr>
<tr>
<td>cat</td>
<td>Catalan cultural community</td>
</tr>
<tr>
<td>com</td>
<td>Commercial organizations, businesses, and companies</td>
</tr>
<tr>
<td>coop</td>
<td>Business cooperatives such as credit unions and rural electric co-ops</td>
</tr>
<tr>
<td>edu</td>
<td>Educational institutions</td>
</tr>
<tr>
<td>gov</td>
<td>Government agencies</td>
</tr>
<tr>
<td>info</td>
<td>Business organizations or individuals providing general information</td>
</tr>
<tr>
<td>jobs</td>
<td>Employment or human resource businesses</td>
</tr>
<tr>
<td>mil</td>
<td>Military organizations</td>
</tr>
<tr>
<td>mobi</td>
<td>Delivery and management of mobile Internet services</td>
</tr>
<tr>
<td>museum</td>
<td>Accredited museums</td>
</tr>
<tr>
<td>name</td>
<td>Individuals or families</td>
</tr>
<tr>
<td>net</td>
<td>Network providers or commercial companies</td>
</tr>
<tr>
<td>org</td>
<td>Nonprofit organizations</td>
</tr>
<tr>
<td>pro</td>
<td>Certified professionals such as doctors, lawyers, and accountants</td>
</tr>
<tr>
<td>tel</td>
<td>Internet communications</td>
</tr>
<tr>
<td>travel</td>
<td>Travel industry</td>
</tr>
</tbody>
</table>
The World Wide Web

- The **World Wide Web**, or **Web**, consists of a worldwide collection of electronic documents (Web pages)
- A **Web site** is a collection of related Web pages and associated items
- A **Web server** is a computer that delivers requested Web pages to your computer
- **Web 2.0** refers to Web sites that provide a means for users to interact
The World Wide Web

- A Web browser, or browser, allows users to access Web pages and Web 2.0 programs

- Internet Explorer
- Firefox
- Opera
- Safari
- Google Chrome
How a Web Browser Displays a Home Page

**Step 1**
Start the Web browser software by clicking the Web browser icon on the taskbar or typing the Web browser name in the search box on the Start menu.

**Step 2**
Behind the scenes, the Web browser looks up its home page setting. For illustration purposes only, the screen on the right shows the home page setting is msn.com.

**Step 3**
The Web browser communicates with a server maintained by your Internet access provider. The server translates the domain name of the home page to an IP address and then sends the IP address to your computer.

**Step 4**
The Web browser uses the IP address to contact the Web server associated with the home page and then requests the home page from the server. The Web server sends the home page to the Web browser, which formats the page for display on your screen.

207.68.172.234
The World Wide Web

• A **home page** is the first page that a Web site displays

• Web pages provide **links** to other related Web pages
  – Surfing the Web

• **Downloading** is the process of receiving information

• Some Web pages are designed specifically for microbrowsers
The World Wide Web

- A Web page has a unique address called a **URL or Web address**

![Diagram of URL components: protocol, domain name, path, Web page name. An example URL: http://www.nps.gov/grsm/planyourvisit/wildlifeviewing.htm]
Tabbed browsing allows you to open and view multiple Web pages in a single Web browser window.
The World Wide Web

- Two types of search tools are search engines and subject directories

**Search engine**
- Finds information related to a specific topic

**Subject directory**
- Classifies Web pages in an organized set of categories
### Widely Used Search Tools

<table>
<thead>
<tr>
<th>Search Tool</th>
<th>Web Address</th>
<th>Search Engine</th>
<th>Subject Directory</th>
</tr>
</thead>
<tbody>
<tr>
<td>A9</td>
<td>a9.com</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>AlltheWeb</td>
<td>alltheweb.com</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>AltaVista</td>
<td>altavista.com</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>AOL Search</td>
<td>search.aol.com</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Ask</td>
<td>ask.com</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Bing</td>
<td>bing.com</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Cuil (pronounced cool)</td>
<td>cuil.com</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Dogpile</td>
<td>dogpile.com</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Excite</td>
<td>excite.com</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Gigablast</td>
<td>gigablast.com</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Google</td>
<td>google.com</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Lycos</td>
<td>lycos.com</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>MSN</td>
<td>msn.com</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Open Directory Project</td>
<td>dmoz.org</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>WebCrawler</td>
<td>webcrawler.com</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Yahoo!</td>
<td>yahoo.com</td>
<td>X</td>
<td>X</td>
</tr>
</tbody>
</table>
The World Wide Web

- A search engine is helpful in locating items such as:

  - Images
  - Videos
  - Audio
  - Publications
  - Maps
  - People or Businesses
  - Blogs
The World Wide Web

How to Use a Search Engine

Step 1
Type the search engine's Web address (in this case, google.com) in the Address bar in the Web browser.

Step 2
Press the ENTER key. When the Google home page is displayed, type: Aspen Colorado. Add, resort, and then point to the Google Search button.

Step 3
Click the Google Search button. When the results of the search are displayed, scroll through the links and read the descriptions. Point to the Aspen Snowmass link.

Step 4
Click the Aspen Snowmass link to display a Web page with a description and links to skiing in Aspen.
Some Web browsers contain an Instant Search box to eliminate the steps of displaying the search engine’s Web page prior to entering the search text.
• Search operators can help to refine your search

<table>
<thead>
<tr>
<th>Operator</th>
<th>Description</th>
<th>Examples</th>
<th>Explanation</th>
</tr>
</thead>
</table>
| Space or + | Display hits that include specific words. | art + music  
4art music | Results have both words art and music — in any order. |
| OR | Display hits that include only one word from a list. | dog OR puppy  
dog OR puppy OR canine | Results have either the word dog or puppy.  
Results have the word dog or puppy or canine. |
| () | Combine hits that include specific words with those that include only one word from a list. | Kalamazoo Michigan  
(pizza OR subs) | Results have both words Kalamazoo Michigan and either the word, pizza, or the word, subs. |
| - | Exclude a word from the search results. | automobile  
-convertible | Results include automobile but do not include convertible. |
| " " " | Search for an exact phrase in a certain order. | “19th century literature” | Results have the exact phrase, 19th century literature. |
| * | Substitute characters in place of the asterisk. | writer* | Results include any word that begins with writer (e.g., writer, writers, writer’s). |
The World Wide Web

- There are thirteen types of Web sites

- Portal
- News
- Informational
- Business/Marketing
- Blog
- Wiki
- Online Social Network
- Educational
The World Wide Web

Entertainment

Advocacy

Web Application

Content Aggregator

Personal

Discovering Computers 2012: Chapter 2
Video: Tell Your Stories via Vlog

CLICK TO START

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The World Wide Web

- Information presented on the Web must be evaluated for accuracy
- No one oversees the content of Web pages

<table>
<thead>
<tr>
<th>Criteria for Evaluating a Web Site’s Content</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Evaluation Criteria</strong></td>
</tr>
<tr>
<td>Affiliation</td>
</tr>
<tr>
<td>Audience</td>
</tr>
<tr>
<td>Authority</td>
</tr>
<tr>
<td>Content</td>
</tr>
<tr>
<td>Currency</td>
</tr>
<tr>
<td>Design</td>
</tr>
<tr>
<td>Objectivity</td>
</tr>
</tbody>
</table>
The World Wide Web

- **Multimedia** refers to any application that combines text with:

  - Graphics
  - Animation
  - Audio
  - Video
  - Virtual Reality
The World Wide Web

- A **graphic** is a digital representation of nontext information.
- Graphic formats include BMP, GIF, JPEG, PNG, and TIFF.
The World Wide Web

- A thumbnail is a small version of a larger graphic
The World Wide Web

- **Animation** is the appearance of motion created by displaying a series of still images in sequence.
The World Wide Web

- **Audio** includes music, speech, or any other sound
  - Compressed to reduce file size
- You listen to audio on your computer using a **player**
- **Streaming** is the process of transferring data in a continuous and even flow

### Audio Web File Formats

<table>
<thead>
<tr>
<th>Format</th>
<th>Description</th>
<th>Format</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>AAC</td>
<td>Advanced Audio Coding</td>
<td>WAV</td>
<td>Windows waveform</td>
</tr>
<tr>
<td>AIFF</td>
<td>Audio Interchange File Format</td>
<td>WMA</td>
<td>Windows Media Audio (part of Windows Media framework)</td>
</tr>
<tr>
<td>ASF</td>
<td>Advanced Streaming (or Systems) Format (part of Windows Media framework)</td>
<td>RA</td>
<td>RealAudio sound file (supported by RealPlayer)</td>
</tr>
<tr>
<td>MP3</td>
<td>Moving Pictures Experts Group Audio Layer 3 (MPEG-3)</td>
<td>QT</td>
<td>QuickTime audio, video, or 3-D animation</td>
</tr>
<tr>
<td>Ogg</td>
<td>Free, unpatented audio and video format</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
How to Purchase and Download Music Using iTunes

Step 1
Display the iTunes program on the screen. Search for, select, and pay for the music you want to purchase from the iTunes Music Store, which is integrated in the iTunes program.

Step 2
Download the music from the iTunes Music Store server to your computer's hard disk.

Step 3a
Listen to the music from your computer's hard disk.

Step 3b
Download music from your computer's hard disk to a portable media player. Listen to the music through earbuds attached to the portable media player.
The World Wide Web

- **Video** consists of images displayed in motion
The World Wide Web

- **Virtual reality (VR)** is the use of computers to simulate a real or imagined environment that appears as a three-dimensional space.
The World Wide Web

- A **plug-in** is a program that extends the capability of a Web browser

<table>
<thead>
<tr>
<th>Popular Plug-Ins</th>
<th>Description</th>
<th>Web Address</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Acrobat Reader</strong></td>
<td>View, navigate, and print Portable Document Format (PDF) files — documents formatted to look just as they look in print</td>
<td>adobe.com</td>
</tr>
<tr>
<td><strong>Flash Player</strong></td>
<td>View dazzling graphics and animation, hear outstanding sound and music, display Web pages across an entire screen</td>
<td>adobe.com</td>
</tr>
<tr>
<td><strong>Java</strong></td>
<td>Enable Web browser to run programs written in Java, which add interactivity to Web pages</td>
<td>java.com</td>
</tr>
<tr>
<td><strong>QuickTime</strong></td>
<td>View animation, music, audio, video, and VR panoramas and objects directly on a Web page</td>
<td>apple.com</td>
</tr>
<tr>
<td><strong>RealPlayer</strong></td>
<td>Listen to live and on-demand near-CD-quality audio and news cast-quality video, stream audio and video content for faster viewing, play MP3 files, create music CDs</td>
<td>real.com</td>
</tr>
<tr>
<td><strong>Shockwave Player</strong></td>
<td>Experience dynamic interactive multimedia, 3-D graphics, and streaming audio</td>
<td>adobe.com</td>
</tr>
<tr>
<td><strong>Silverlight</strong></td>
<td>Experience high-definition video, high-resolution interactive multimedia, and streaming audio and video</td>
<td>microsoft.com</td>
</tr>
<tr>
<td><strong>Windows Media Player</strong></td>
<td>Listen to live and on-demand audio, play or edit WMA and MP3 files, burn CDs, and watch DVD movies</td>
<td>microsoft.com</td>
</tr>
</tbody>
</table>
The World Wide Web

- **Web publishing** is the development and maintenance of Web pages

- Plan a Web site
- Analyze and design a Web site
- Create a Web site
- Deploy a Web site
- Maintain a Web site
E-Commerce

- **E-commerce** is a business transaction that occurs over an electronic network
  - M-commerce identifies e-commerce that takes place using mobile devices
E-Commerce

E-commerce

Business-to-consumer (B2C)

Business-to-business (B2B)

Consumer-to-consumer (C2C)
E-Commerce

An Example of E-Retail

Step 1
The customer displays the e-retailer’s electronic storefront.

Step 2
The customer collects purchases in an electronic shopping cart.

Step 3
The customer enters payment information on a secure Web site. The e-retailer sends financial information to a bank.

Step 4
The bank performs security checks and sends authorization back to the e-retailer.

Step 5
The e-retailer’s Web server sends confirmation to the customer, processes the order, and then sends it to the fulfillment center.

Step 6
The fulfillment center packages the order, prepares it for shipment, and then sends a report to the server where records are updated.

Step 7
While the order travels to the customer, shipping information is posted on the Web.

Step 8
The order is delivered to the customer, who may be required to sign a handheld computer or document to acknowledge receipt.

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Figure 2-25

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Other Internet Services

- **E-mail** is the transmission of messages and files via a computer network.
- An **e-mail program** allows you to create, send, receive, forward, store, print, and delete e-mail messages.
Other Internet Services

How an E-Mail Message May Travel from a Sender to a Receiver

**Step 1**
Using an e-mail program, you create and send a message.

**Step 2**
Your e-mail program contacts software on your service provider’s outgoing mail server.

**Step 3**
Software on the outgoing mail server determines the best route for the data and sends the message, which travels along Internet routers to the recipient’s incoming mail server.

**Step 4**
When the recipient uses an e-mail program to check for e-mail messages, the message transfers from the incoming mail server to the recipient’s computer.

Figure 2-27
Other Internet Services

- A **mailing list** is a group of e-mail names and addresses given a single name
  - **Subscribing** adds your e-mail name and address
  - **Unsubscribing** removes your name
Other Internet Services

• **Instant messaging (IM)** is a **real-time** Internet communications service
Other Internet Services

• A **chat** is a real-time typed conversation that takes place on a computer

• A **chat room** is a location on an Internet server that permits users to chat with each other
Other Internet Services

- **VoIP** (Voice over IP) enables users to speak to other users over the Internet
  - Also called Internet telephony
Other Internet Services

• A **newsgroup** is an online area in which users have written discussions about a particular subject
  – Typically requires a newsreader
• A **message board** is a Web-based type of discussion group
Other Internet Services

- **FTP** (File Transfer Protocol) is an Internet standard that permits file **uploading** and downloading with other computers on the Internet.
- Many operating systems include FTP capabilities.
- An FTP server is a computer that allows users to upload and/or download files using FTP.
Netiquette

• **Netiquette** is the code of acceptable Internet behavior

**NETIQUETTE — Golden Rule: Treat others as you would like them to treat you.**

1. In e-mail, chat rooms, and newsgroups:
   - Keep messages brief. Use proper grammar, spelling, and punctuation.
   - Be careful when using sarcasm and humor, as it might be misinterpreted.
   - Be polite. Avoid offensive language.
   - Read the message before you send it.
   - Use meaningful subject lines.
   - Avoid sending or posting *flames*, which are abusive or insulting messages. Do not participate in *flame wars*, which are exchanges of flames.
   - Avoid sending spam, which is the Internet’s version of junk mail. Spam is an unsolicited e-mail message or newsgroup posting sent to many recipients or newsgroups at once.
   - Do not use all capital letters, which is the equivalent of SHOUTING!
   - Use *emoticons* to express emotion. Popular emoticons include
     - :) Smile
     - :) Indifference
     - :o Surprised
     - :( Frown
     - \ Undecided
   - Use abbreviations and acronyms for phrases:
     - *btw* by the way
     - *imho* in my humble opinion
     - *fyi* for your information
     - *ttfn* ta ta for now
     - *fwiw* for what it’s worth
     - *tyvm* thank you very much
   - Clearly identify a *spoiler*, which is a message that reveals a solution to a game or ending to a movie or program.

2. Read the FAQ (frequently asked questions), if one exists. Many newsgroups and Web pages have an FAQ.
3. Do not assume material is accurate or up-to-date. Be forgiving of other’s mistakes.
4. Never read someone’s private e-mail.
Summary

History and structure of the Internet

World Wide Web

Browsing, navigating, searching, Web publishing, and e-commerce

Other Internet services: e-mail, instant messaging, chat rooms, VoIP, newsgroups and message boards, and FTP

Rules of netiquette
Chapter 2
Fundamentals of the World Wide Web and Internet

Discovering Computers 2012
Your Interactive Guide to the Digital World

Chapter 2 Complete