

# The Internet & the World Wide Web

## Exploring Cyberspace

- ◆ Connecting to the Internet
- ◆ How Does the Internet work?
- ◆ The World Wide Web
- ◆ Email & Other Ways of Communicating over the Net
- ◆ Telephony, Multimedia, Webcasting, Blogs, E-Commerce
- ◆ Snooping, Spoofing, Phishing, Pharming, Cookies, & Spyware

## Connecting to the Internet

- ◆ Internet History
  - ◆ **Began with 1969's ARPANET for US Dept. of Defense**
  - ◆ **ARPANET was intended to prevent loss of USA's critical documents from nuclear attack on either coast**
- ◆ To connect to Internet you need
  - ◆ An access device (computer)
  - ◆ A means of connection (phone line, cable hookup, or wireless)
  - ◆ An Internet Service Provider (ISP)

## Connecting to the Internet

Definition: ***Bandwidth*** is an expression of how much data – text, voice, video and so on – can be sent through a communications channel in a given amount of time.

Definition: ***Baseband*** is a slow type of connection that allows only one signal to be transmitted at a time.

Definition: ***Broadband*** is a high speed connection that allows several signals to be transmitted at once.

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## Connecting to the Internet

### ◆ Data Transmission Speeds

- ◆ Originally measured in bits per second (bps)
- ◆ 8 bits are needed to send one character, such as **A** or **a**
- ◆ Currently measured in kilobits per second (Kbps)
- ◆ *Kilo-* stands for a thousand
- ◆ A 28.8 Kbps modem sends 28,800 bits per second
- ◆ How many characters per second would that be?  

$$28,800 / 8 = 3600 \text{ characters per second}$$
- ◆ Mbps connections send 1 million bits per second
- ◆ Gbps connections send 1 billion bits per second

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## Connecting to the Internet

- ◆ Modems
  - ◆ Can be either internal or external to your PC
  - ◆ Dial-Up- 28.8 Kbps- VERY SLOW
  - ◆ Need call waiting turned off; either manually or in Windows
- ◆ High-speed phone lines
  - ◆ ISDN line
  - ◆ DSL line
- ◆ Cable Modems
- ◆ Satellite
- ◆ Wi-Fi & 3G

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## Connecting to the Internet

- ◆ Modems
- ◆ High-speed phone lines
  - ◆ ISDN line
    - ◆ Integrated Services Digital Network
    - ◆ Allows voice, video, & data transmission over copper phone lines
    - ◆ Can transmit 64 to 128 Kbps
  - ◆ DSL line
    - ◆ Uses regular phone lines, DSL modem
    - ◆ Receives data at 1.5-9 Mbps; sends at 128Kbps – 1.5 Mbps
    - ◆ Is always on
- ◆ Cable Modems
- ◆ Satellite
- ◆ Wi-Fi & 3G

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## Connecting to the Internet

- ◆ Modems
- ◆ High-speed phone lines
  - ◆ ISDN line
  - ◆ DSL line
- ◆ Cable Modems
- ◆ Satellite
- ◆ Wi-Fi & 3G
  - ◆ Wi-Fi
    - ◆ Name for a set of wireless standards set by IEEE
    - ◆ Typically used with laptops that have Wi-Fi hardware
  - ◆ **3G**
    - ◆ **High-speed wireless that does not need access points**
    - ◆ **Uses cell phone network**

## Connecting to the Internet

- ◆ Internet Access Providers
  - ◆ Internet Service Providers (ISP)
    - ◆ Local, regional, or national organization that provides internet access
    - ◆ Examples: AT&T Worldnet, EarthLink
  - ◆ Commercial Online Service
    - ◆ A members-only company that provides specialized content and internet access
    - ◆ Examples: AOL, MSN
  - ◆ Wireless Internet Service Providers

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## Connecting to the Internet

- ◆ Internet Access Providers
- ◆ Commercial Online Service
- ◆ Wireless Internet Service Providers
  - ◆ Internet Access for laptops, notebooks, smartphones, PDA users
  - ◆ These devices contain wireless modems
  - ◆ Examples: AT&T Wireless, Verizon Wireless, Earthlink Net Zero

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## How Does the Internet Work?

- ◆ The Internet consists of thousands of smaller networks
- ◆ These link educational, commercial, nonprofit, and military organizations
- ◆ Most are Client/Server networks
  - ◆ Client: a computer requesting data or services
  - ◆ Server: a central computer supplying data or services requested of it

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## How Does the Internet Work?

- ◆ Point of Presence (POP)
  - ◆ A local access point to the internet
  - ◆ A local gateway to the ISP's network
- ◆ Network Access Point (NAP)
  - ◆ A routing computer at a point on the internet where several connections come together
  - ◆ Owned by Network Service Providers (NAP)
  - ◆ Four major NAPs established in 1993 when the internet was privatized
  - ◆ Source of much internet congestion →→ PNAPS

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## How Does the Internet Work?

- ◆ Private/Peer NAPs (PNAP)
  - ◆ Established in late 1990s
  - ◆ Provide more backbone access locations than the original 4 NAPs in Chicago, Washington D.C., New Jersey and San Francisco
  - ◆ >100 in U.S.A. at present
  - ◆ Facilitate more efficient routing since there are more backbone access locations

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## How Does the Internet Work?

- ◆ **Internet Backbone**
  - ◆ High-capacity, high-speed data transmission lines
  - ◆ Use the newest technology
  - ◆ Providers include AT&T, Cable & Wireless, Sprint, Teleglobe, UUNET
- ◆ **Internet 2**
  - ◆ Cooperative university/business research project
  - ◆ New standards for large-scale higher-speed data transmission
  - ◆ Requires state-of-the-art infrastructure

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## How Does the Internet Work?

- ◆ **Protocols**
  - ◆ **The set of rules a computer follows to electronically transmit data.**
  - ◆ **TCP/IP is the Internet protocol**
    - ◆ Developed in 1978
    - ◆ Used for all internet transactions
- ◆ **Packets**
  - ◆ Fixed-length blocks of data for transmission
  - ◆ Data transmissions are broken up into packets

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## How Does the Internet Work?

### ◆ IP Addresses

- ◆ Every device connected to the internet has an address
- ◆ Each IP address uniquely identifies that device
- ◆ The address is four sets of 3-digit numbers separated by periods
  - ◆ Example: 95.160.10.240
  - ◆ Each number is between 0 and 255
  - ◆ **Static IP addresses don't change**
  - ◆ **Dynamic IP addresses do change**
  - ◆ Since addresses are limited, and most PCs are not connected a lot of the time, dynamic addresses are common

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## The World Wide Web

### ◆ Browsers

- ◆ **Software for web-surfing**
- ◆ **Examples: Internet Explorer, Mozilla FireFox, Opera, Safari, Google Chrome**

### ◆ Website

- ◆ The location on a particular computer that has a unique address
- ◆ Example: [www.asu.edu](http://www.asu.edu), [www.amazon.com](http://www.amazon.com)
- ◆ **The source of the website could be anywhere** – not necessarily at company headquarters

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## The World Wide Web

### ◆ Web Page

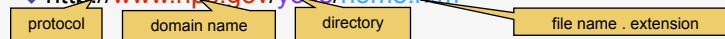
- ◆ A web page is typically an .html, htm, shtml file
- ◆ Contains code that describes how the browser should interpret the images and text
- ◆ Home page
  - ◆ The main entry point for the website
  - ◆ Contains links to other pages on the website

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## The World Wide Web

### ◆ Uniform Resource Locator (URL)

- ◆ A character string that points to a specific piece of information anywhere on the web
- ◆ A website's unique address
- ◆ It consists of
  - ◆ The web protocol, http
  - ◆ The domain name of the web server
  - ◆ The directory or folder on that server
  - ◆ The file within the directory, including optional extension
- ◆ <http://www.nps.gov/yose/home.htm>



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## The World Wide Web

- ◆ Domain names
  - ◆ Must be unique
  - ◆ Identify the website, and the type of site it is
    - ◆ [www.whitehouse.gov](http://www.whitehouse.gov) is NOT the same as [www.whitehouse.org](http://www.whitehouse.org)
    - ◆ .gov means government
    - ◆ .org means professional or nonprofit organization

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## The World Wide Web

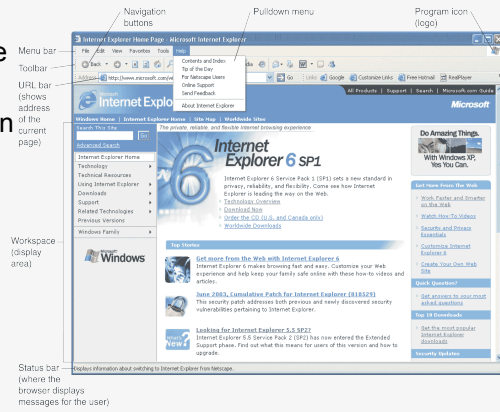
- ◆ **HTTP (hypertext transfer protocol)**
  - ◆ The internet protocol used to access the World Wide Web
- ◆ **HTTPS**
  - ◆ The secure version of HTTP
- ◆ **Hypertext Markup Language (HTML)**
  - ◆ The language used in writing and publishing web pages
  - ◆ The set of tags used to specify document structure, formatting, and links to other documents on the web
- ◆ **Hypertext links connect one web document to another**

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# The World Wide Web

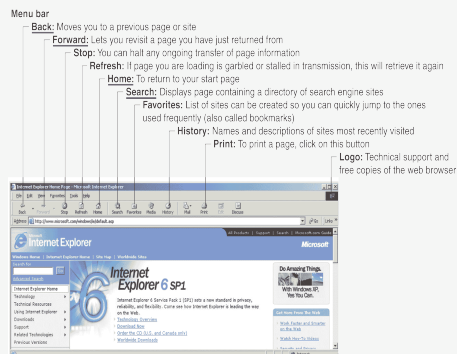
## ◆ Web Browsers

- ◆ Your tool for using the Internet
- ◆ Comes preinstalled on most PCs
- ◆ 5 basic elements
  - ◆ Menu bar
  - ◆ Toolbar
  - ◆ URL bar
  - ◆ Workspace
  - ◆ Status bar



# The World Wide Web

- ◆ Home Page
  - ◆ The page you see when you open your web browser
  - ◆ You can change the Home Page on your browser
- ◆ Back, Forward, Home & Search
  - ◆ Use the menu bar icons to move from one page to another



## The World Wide Web

### ◆ Navigation

#### ◆ History Lists

- ◆ A list of websites you visited since you opened up your browser for this session
- ◆ Allows you to easily return to a particular site

#### ◆ Bookmarks

- ◆ Allows you to store the URL from a site on your PC so you can find it again in another browser session
- ◆ To save the URL for a site, click on "Bookmark" in Internet Explorer or Mozilla Firefox
- ◆ Or just type in the URL of the page you want to visit

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## The World Wide Web

### ◆ Web portals

- ◆ A gateway website that offers a broad array of resources and services, online shopping malls, email support, community forums, stock quotes, travel info, and links to other categories.
- ◆ Examples: Yahoo, AOL, Microsoft Network (MSN), Lycos, or Google
- ◆ Most require you to log in, so you can
  - ◆ Check the home page for general information
  - ◆ Use the subject guide to find a topic you want
  - ◆ Use a keyword to search for a topic

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## The World Wide Web

- ◆ Search Services
  - ◆ Organizations that maintain databases accessible through websites to help you find information on the internet
  - ◆ Examples: portals like Yahoo Search and MSN, and Google, Ask Jeeves, and Gigablast
  - ◆ **Databases are compiled using software programs called spiders**
    - ◆ Spiders crawl through the World Wide Web
    - ◆ Follow links from one page to another
    - ◆ Index the words on that site

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## The World Wide Web

- ◆ 4 web search tools
  - ◆ Keyword Indexes
    - ◆ Type one or more search keywords, and you see web pages "hits" that contain those words
    - ◆ For phrases with two or more words, put phrase in quotes
    - ◆ Examples are Google, Gigablast, HotBot, MSN Search, Teoma
  - ◆ Subject Directories
    - ◆ Search by selecting lists of categories or topics
    - ◆ Example sites are Beaucoup, Galaxy, LookSmart, MSN Directory, Netscape, Open Directory Project, Yahoo
  - ◆ Metasearch Engines
  - ◆ Specialized Search Engines

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## The World Wide Web

- ◆ Should you trust information you find online?
- ◆ There is no central authority that verifies all internet sites
- ◆ Wikipedia?
- ◆ Guidelines to evaluate Web Resources
  - ◆ Does the information appear on a professional site maintained by a professional organization?
  - ◆ Does the website authority appear to be legitimate?
  - ◆ Is the website objective, complete, and current?

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## Email & Other Ways of Communicating over the Net

- ◆ **Email Program**
  - ◆ **Enables you to send email by running email software on your computer that interacts with an email server at your ISP**
  - ◆ Incoming mail is stored on the server in an electronic mailbox
  - ◆ Upon access, mail is sent to your client's inbox
  - ◆ Examples: Microsoft's Outlook Express, Microsoft Entourage, Apple Mail

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## Email & Other Ways of Communicating over the Net

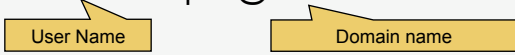
### ◆ Web-based Email

- ◆ You send and receive messages by interacting via a browser with a website
- ◆ Advantage: You can easily send and receive messages while traveling
- ◆ Examples: Yahoo! Mail, Hotmail, Gmail

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## Email & Other Ways of Communicating over the Net

### ◆ Using email

1. Get an email address, following the format
2. Nicholas.lindquist@asu.edu  
The diagram shows the email address 'Nicholas.lindquist@asu.edu' with two yellow callout boxes. The first box, labeled 'User Name', points to 'Nicholas.lindquist'. The second box, labeled 'Domain name', points to '@asu.edu'.

User Name                      Domain name
3. Type addresses carefully, including capitalization, underscores, and periods
4. Use the reply command to avoid addressing mistakes
5. Use the address-book feature to store email addresses
6. Sort your email into folders or use filters

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## Email & Other Ways of Communicating over the Net

### ◆ Email Attachments

- ◆ A copy of a file or document that you send attached to an email to one or more people
- ◆ Be careful about opening attachments
  - ◆ Many viruses hide in them
  - ◆ Know who is sending it to you before you open it
- ◆ The recipient must have compatible software to open the attachment. If they don't have Excel, they probably can't read the spreadsheet you sent them.

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## Email & Other Ways of Communicating over the Net

### ◆ Instant Messaging

- ◆ Any user on a given email system can send a message and have it pop up instantly on the screen of anyone logged into that system
- ◆ Examples: AOL Instant Messenger, MSN Messenger, ICQ, Gmail Chat client, Yahoo Messenger
- ◆ Not all IM systems interoperate
- ◆ To get it, you:
  - ◆ download the software
  - ◆ connect to the internet
  - ◆ register with the service

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## Email & Other Ways of Communicating over the Net

### ◆ FTP – File Transfer Protocol

#### ◆ A software standard for transferring files between computers with different Operating Systems

- ◆ Microsoft Windows → Linux
- ◆ Unix → Macintosh OS, and so forth
- ◆ You can transfer files from an FTP site on the Internet to your PC
- ◆ Know your FTP site!
  - ◆ If the FTP site is offering copyrighted material such as music and movies for free, you are breaking US law if you download files!
  - ◆ You may also get a virus or spyware on your PC from them

## Email & Other Ways of Communicating over the Net

### ◆ Real-Time Chat (RTC)

- ◆ Participants have a typed discussion while online at the same time
- ◆ IM is one-on-one, but RTC has a list of participants

### ◆ Netiquette – appropriate online behavior

- ◆ Before you ask a question, consult the FAQ
- ◆ Avoid flaming
- ◆ Don't SHOUT – use all capital letters
- ◆ Be careful with jokes
- ◆ Don't send huge file attachments unless requested

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## Telephony, Multimedia, Webcasting, Blogs, E-Commerce

- ◆ Internet Telephony
  - ◆ Uses the internet to make phone calls
  - ◆ Long-distance calls are either very inexpensive or free
    - ◆ **VoIP- Voice over Internet Protocol**
  - ◆ Currently inferior in quality to normal phone connections
  - ◆ Also allows videoconferencing

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## Telephony, Multimedia, Webcasting, Blogs, E-Commerce

- ◆ Multimedia on the Web
  - ◆ Allows you to get images, sound, video, and animation
  - ◆ **May require a plug-in, player, or viewer**
    - ◆ A program that adds a specific feature to a browser so it can view certain files
    - ◆ Example: Adobe Acrobat Reader, Flash Player, Flip4Mac, QuickTime
  - ◆ Multimedia Applets
    - ◆ Small programs that can be quickly downloaded and run by most browsers
    - ◆ Java is the most common Applet language
    - ◆ Microsoft's Visual Studio creates ActiveX and com objects

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## Telephony, Multimedia, Webcasting, Blogs, E-Commerce

- ◆ Multimedia on the Web
  - ◆ Animation
    - ◆ The rapid sequencing of still images to create the appearance of motion
    - ◆ Used in video games and web images that seem to move
  - ◆ Video
    - ◆ **Streaming video is process of transferring data in a continuous flow so you can begin viewing a file before it is all completely sent. Nothing downloaded.**
  - ◆ Audio may be transmitted either:
    - ◆ Downloaded completely before the file can be played, or
    - ◆ Downloaded as streaming audio

## Telephony, Multimedia, Webcasting, Blogs, E-Commerce

- ◆ RSS newsreaders (Really Simple Syndication)
  - ◆ Programs that scour the web and pull together “feeds” from several websites to one place
- ◆ Blog
  - ◆ Short for web log, a diary-style web page
  - ◆ Have become popular, both privately and in politics

## Telephony, Multimedia, Webcasting, Blogs, E-Commerce

- ◆ E-Commerce
  - ◆ Conducting business activities online
  - ◆ B2B Commerce is business-to-business e-commerce
  - ◆ Online Finance now involves online banking, stock trading online, and e-money such as PayPal
  - ◆ Online auctions link buyers with sellers
    - ◆ eBay is the most well-known example of person-to-person auctions
    - ◆ Priceline is an auction site for airline tickets and other items

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## Snooping, Spoofing, Phishing, Pharming, Cookies, & Spyware

- ◆ The internet was founded as a collaborative tool based on trust
- ◆ Not everyone on the Internet is honest- be suspicious of EVERYONE
- ◆ **Snooping**
  - ◆ **Email is not private**
    - ◆ Corporate management has the right to view employees' email
    - ◆ Email that travels over the internet may be captured and monitored and read by someone else
    - ◆ Not all ISPs protect their customers' privacy

## Snooping, Spoofing, Phishing, Pharming, Cookies, & Spyware

- ◆ Spam: Electronic Junk Mail
  - ◆ Unsolicited email that takes up your time and may carry viruses or spyware
  - ◆ Delete it without opening the message
  - ◆ Never reply to a spam message
  - ◆ When you sign up for something, don't give your email address (or use a "Dummy" email address!)
  - ◆ Use spam filters

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## Snooping, Spoofing, Phishing, Pharming, Cookies, & Spyware

- ◆ Spoofing
  - ◆ Using fake email sender names so the message appears to be from a different source, so you will trust it.
  - ◆ If you don't know the sender, don't open it.
- ◆ Phishing
  - ◆ Using trusted institutional names to elicit confidential information
  - ◆ Some common schemes look like they are from your bank or from eBay and ask you to "update" your account.
  - ◆ Don't do it – the legitimate company already knows your account information!
  - ◆ If you want to update your information, CALL the number in the phone book, not the number in the email!

## Snooping, Spoofing, Phishing, Pharming, Cookies, & Spyware

### ◆ Pharming

- ◆ Redirecting you to an imposter web page.
- ◆ Thieves implant malicious software on your PC
- ◆ Redirects you to an imposter web page even when you type the correct URL!
- ◆ To foil it, type the **URL with https first (for http secure)**  
<https://www.microsoft.com> Use this one with https, not  
<http://www.microsoft.com> Since it has http, it could be spoofed

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## Snooping, Spoofing, Phishing, Pharming, Cookies, & Spyware

### ◆ Cookies

- ◆ **Little text files left on your hard disk by some websites you visit**
- ◆ Can include your log-in name, password, and browser preferences
- ◆ Can be convenient
- ◆ But they can be used to gather information about you and your browsing habits

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## Snooping, Spoofing, Phishing, Pharming, Cookies, & Spyware

### ◆ Spyware

- ◆ Applications that download without your knowledge
- ◆ They hide on your PC and capture information about what is on the PC and what you are doing
- ◆ That information is then transmitted to the spyware master's website on the internet
- ◆ Information may be used against you to steal your identity, get credit cards in your name, or for other crimes

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## Snooping, Spoofing, Phishing, Pharming, Cookies, & Spyware

### ◆ Spyware (continued)

- ◆ To prevent spyware, you must install and use "Antispyware software" at all times
- ◆ Examples: Ad Aware, AntiSpyware, Spybot Search & Destroy, Pest Patrol, SpyCatcher, Yahoo toolbar with Anti-Spy
- ◆ **Be careful about free and illegal downloads since they are a source of spyware**
- ◆ Don't say "I agree" when you are downloading something – read the fine print
- ◆ **Beware of unsolicited downloads**

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