How the Internet Works (cont' d)

- Computers access information from the Internet as follows:
  - You request data from an Internet server
  - The request is divided into packets
  - The packets are routed from your LAN to the Internet backbone
  - The packets are routed from the Internet backbone to the destination server
  - The destination server sends the requested information using the same process

Various Types Of Internet Connections

Internet Connection	Description	Notes
dial-up access	The modem attached to the computer uses a standard telephone line to connect to the Internet	A dial-up connection is slow-speed technology
cable	A cable company that provides TV service also provides Internet connection on the cable, instead of using a phone line	This is a type of broadband service and is faster than a dial-up connection
Digital Subscriber Line (DSL)	A high-speed Internet connection using regular copper telephone lines	DSL offers a higher-speed broadband Internet connection
broadband satellite	A high-speed connection to the Internet via satellite	
3G/4G	High-speed wireless connections for smartphones, tablets and other devices	
Wireless Fidelity (Wi-Fi)	A network uses radio signals to provide Internet connections to wireless computers and devices	Wi-Fi hotspots are located in many public places If your computer is in range of a hotspot, your computer finds the connection automatically, giving you free Internet service
FiOS (Fiber-Optic Service) broadband	The newest type of Internet connection It connects to the Internet using light pulses over a fiber-optic network	The advantage of FiOS is that it can provide higher speeds than traditional copper wire connections such as DSL or cable

Various Types Of Internet Connections

Table 3-1: Common speeds for direct Internet connections

Connection Type	Speed
Fiber-optic cable	Up to 100 gigabits per second (Gbps).
T5 and E5 lines	Currently under development. Will offer speeds of 400.352 Mbps (T5) and 565.148 Mbps (E5)
T3 line	44.736 megabits per second (Mbps). Commonly used by North American ISPs to connect to the Internet backbone. Extremely fast and one of the most costly types of access.
E3 line	34.368 Mbps. European equivalent of T3.
T1 line	1.544 Mbps. Commonly used by North American corporate LANs to connect to ISPs.
E1 line	2.048 Mbps. European equivalent of T1.
Cable modem	512 kilobits per second (Kbps) to 52 Mbps.
xDSL modem	512 Kbps to 32 Mbps.
4G mobile hotspot	Potential for 100 Mbps (moving) and 1 Gbps (stationary). Current speeds are 3 Mbps to 12 Mbps.

Dial-up and Direct Internet Connections

- Dial-up Internet connections:
  - Standard telephone lines and analog modem
  - Integrated Services Digital Network (ISDN) line and an ISDN modem
- Direct Internet connections:
  - High-speed data links, including fiber-optic
  - Wireless connections, including 802.11 standards and satellite
  - T and E carriers, including fractional T and E lines
  - LAN connections
  - Cable modems
  - Digital Subscriber Line (DSL)
  - 4G mobile hotspot

Protocols

A specific set of communication rules is called a **protocol**.

- Because of the many ways computers can communicate with each other, there are many different protocols -- too many for the average person to remember.
- Examples:
  - PPP (Point to Point)
  - TCP/IP
  - HTTP (Hypertext Transfer Protocol)
  - FTP (File Transfer Protocol)