HNDIT1106 – Web Development

Chapter3: Connecting to the Internet

Course Content

- Internet services
- Internet connection options
- Internet service providers
- Internet Connection Types

Why do people want to get connected to Internet

- It provides freedom of communications
- Internet is termed by some people as the world of largest democracy with no government. It has no state of head to control it
- The Internet is a rare example of a large democracy with no state of head, no official censors, no bosses, no board of directors. Nobody controls the Internet and in principle, any computer can speak to any other computer, as long as it obeys the technical rules of the TCP/IP protocol.
- This freedom of Internet helped it to move out of its original base in military and research institutions, into elementary and high schools, colleges, public libraries, commercial sectors

Internet Services

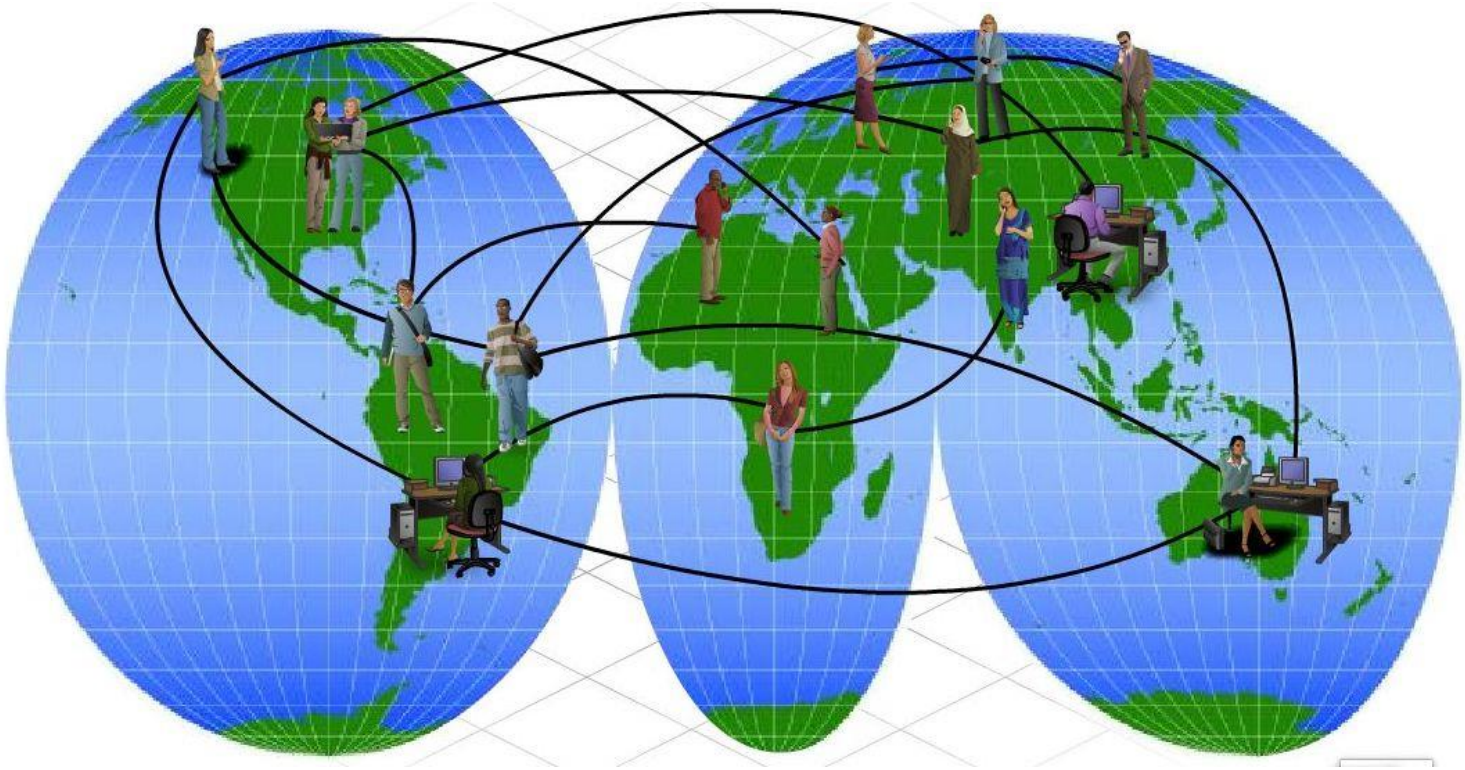
- Internet mail is (e-mail or electronic mail), much faster as compared to normal postal mail.
- One can also send software and certain forms of compressed digital image as an attachment.
- News groups or discussion groups facilitate Internet user to join for various kinds of debate, discussion and new sharing.
- Long-distance computing was an original inspiration for development of ARPANET and does still provide a very useful service on Internet.
- Programmers can maintain accounts on distant, powerful computers, execute programs.
- File transfers service allows Internet users to access remote machines and retrieve programs, data or text.

Internet connection options

- Internet connection options vary by Internet Service Provider and by region.
- Customers should consider some of the following factors before selecting an Internet package:
  - Speed or bandwidth
  - Cost
  - Availability
  - Reliability
  - Convenience
- The type of internet connection will determine how much time is spent for uploading or downloading i.e. internet access speed .
- Different types of internet connections are compared according to their speed, cost and availability.

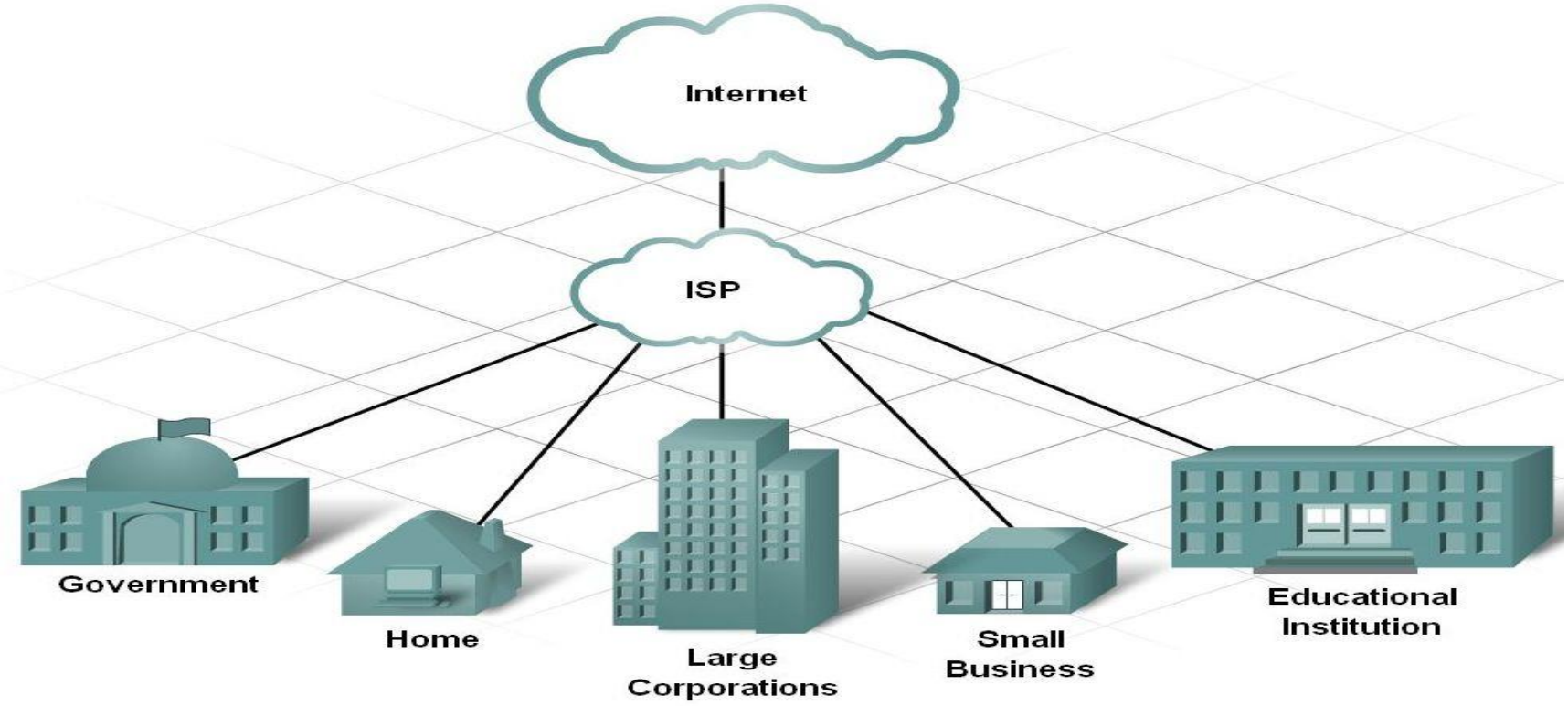
Internet

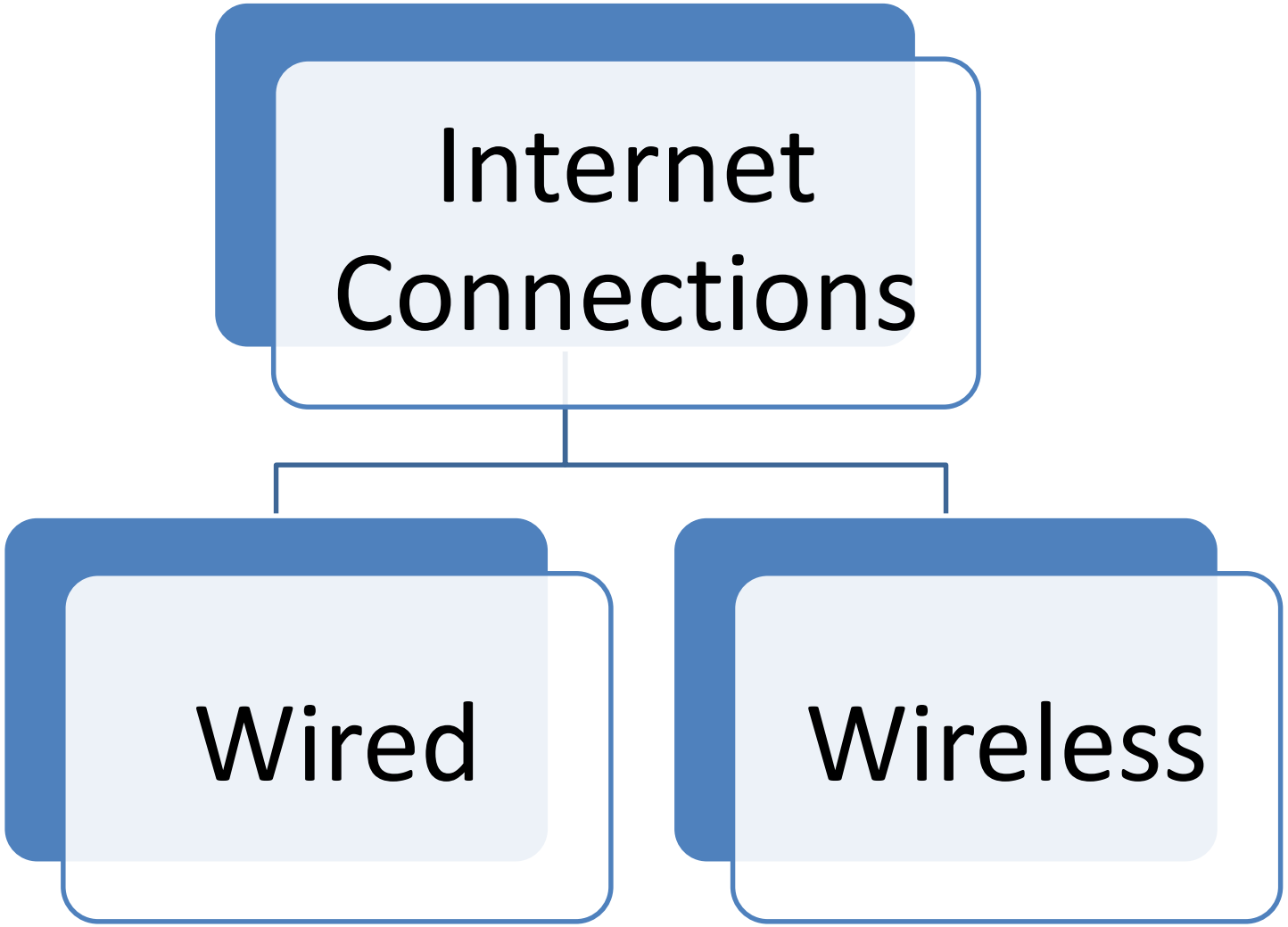
- Users are connected to ISPs
- ISPs are connected to other ISPs



Internet service providers

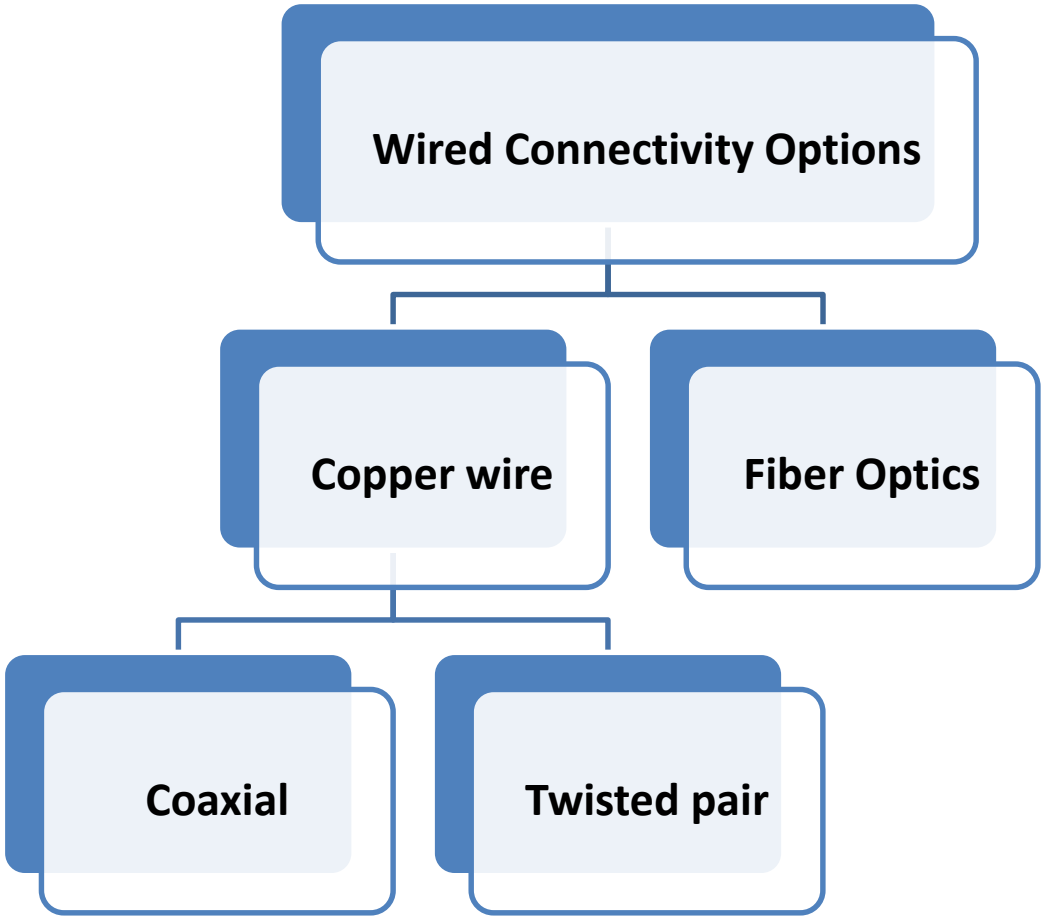
- Internet Service Providers
  - Give users access to internet resources
  - Allow organizations and individuals to publish information on the internet




Internet Connections
Wired
Wireless

Wireless Connectivity options

- Wi-fi
- Bluetooth
- Cellular
- Wi-Max
- Satellite



Internet Connection Types

- Analog or Dial up
- ISDN
- DSL
  - ADSL
  - SDSL
  - VDSL
- CABLE
- WIRELESS
- LEASED LINES
  - T1
  - T3
  - OC3
- SATELLITE

INTERNET Connections

Gateway Access

- Gateway Access is also known as Level-One connection.
- It is the access to the Internet from a network, which is not on the Internet.
- The gateway allows the two different types of networks to "talk" to each other. But the users of the Gateway Internet have limited access to the Internet.
- They might not be able to use all the tools available on Internet. The local Internet Service Provider (ISP) normally defines this limitation.

Wired Internet Connections

Dial-up connections

- Standard phone lines and a modem

  Uses the facilities of the PSTN (Public Switched Telephone Network) to establish a dialed connection to an Internet service provider (ISP) via telephone lines.
- Computer dials a number for your ISP
- All Internet programs use the connection
- Applications might need configured
- A transient connection,

  Because either the user, ISP or phone company terminates the connection.
  - It may suit the purposes of the occasional Internet user without a need for a fast or consistent connection.
- Slow Speed
- Cheap

To access any of dial-up accounts you need the followings;

- Computer
- Modem
- Telephone Connection
- Shell or TCP/IP account from the ISP
- Internet client software such as Internet browser.

Wired Internet Connections…

Broadband connections

- Very fast (faster than dialup)
- This high-speed Internet connection is provided through either cable or telephone companies.
- One of the fastest options available, broadband Internet uses multiple data channels to send large quantities of information.
- The term broadband is shorthand for broad bandwidth.
- Allow the user to stay connected to the Internet at all times; the user need only open a browser window to access the Internet, as there is no log-on process to complete.
- Broadband Internet connections such as DSL and cable are considered high-bandwidth connections.
- Although many DSL connections can be considered broadband, not all broadband connections are DSL.
- Networks share the broadband connection
  - All users access the same connection
  - T or DSL lines common
- Home use increasing due to
  - Lower cost
  - Increased availability

Wired Internet Connections…

ISDN (Integrated Services Digital Network)

- Offers speeds up to 1.5 Mbps
- Uses standard phone lines
- Requires special equipment
- Simultaneous use of phone and data
- An international communications standard for sending voice, video, and data over digital telephone lines or normal telephone wires (copper wires).
- Offers circuit-switched connections (for either voice or data), and packet-switched connections (for data)

Wired Internet Connections…

DSL (Digital Subscriber Line)

- Uses existing 2-wire copper telephone line connected to one's home. So service is delivered at the same time as landline telephone service. Customers can still place calls while surfing the Internet.
- provides digital data transmission over the wires of a local telephone network
- Needs special DSL modem
- Simultaneous use of phone and data

xDSL

- Refers collectively to all types of DSL
- new digital service that uses high-bandwidth to bring voice, video and data to your business.
- two main categories being ADSL and SDSL
- Two other types of xDSL technologies are High-data-rate DSL (HDSL) and Very high DSL (VDSL).

- ADSL (Asynchronous DSL or *Asymmetric DSL*)
  - Different up and download speeds
  - Usually used for residential service, since residential customers don't need to upload much
- SDSL (Synchronous DSL or *Symmetric DSL*)
  - upstream and downstream speeds are equal
  - Usually used for business service

ADSL and SDSL are very affordable and cost-effective services based upon a flat rate and also they are easily and inexpensively installed.

- Variable DSL
  - Speed changes based on traffic

DSL Connections…

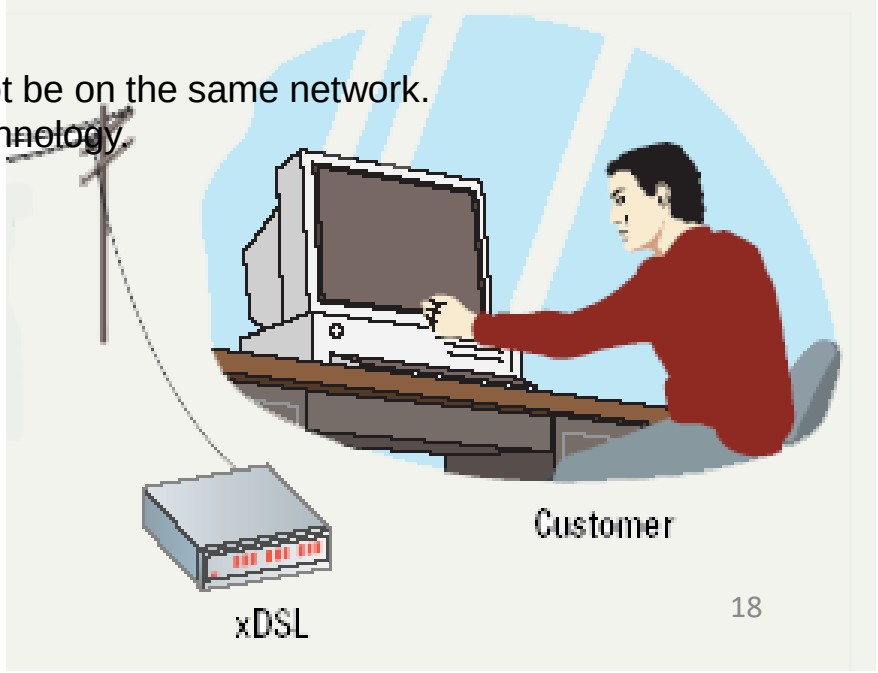
- The data bit rate of consumer DSL services typically ranges from 256 kbit/s to over 100 Mbit/s in the direction to the customer (downstream), depending on
  - DSL technology
  - Line conditions
  - service-level implementation
- In ADSL, the data throughput in the upstream direction, (the direction to the service provider) is lower, hence the designation of asymmetric service.
- In Symmetric Digital Subscriber Line (SDSL) services, the downstream and upstream data rates are equal.

Advantages:

- Security: each subscriber can be configured so that it will not be on the same network.
- Integration: DSL will easily interface with ATM and WAN technology.
- High bandwidth
- Cheap line charges from the phone company.
- Good for “bursty” traffic patterns

Disadvantages:

- Expensive
- . Busy lines
- Distance Dependence
- Slower Uploads



ADSL wired network

ADSL wireless network

Wired Internet Connections…

Cable Internet connection

- A form of broadband access.
- Through use of a cable modem, users can access the Internet over cable TV lines.
- Cable modems can provide extremely fast access to the Internet.
- Uses cable TV wires
- Simultaneous use of TV and data
- Cable modems are primarily used to deliver broadband Internet access in the form of cable.
- They are commonly deployed in Australia, Europe, Asia and Americas.

Wired Internet Connections…

Leased Connection

- Leased connection is also known as direct Internet access or Level Three connection.
- It is the secure, dedicated and most expensive, level of Internet connection.
- With leased connection, your computer is dedicatedly and directly connected to the Internet using high-speed transmission lines.
- It is on-line twenty-four hours a day, seven days a week.
- Leased Internet connections are limited to large corporations and universities who could afford the cost.

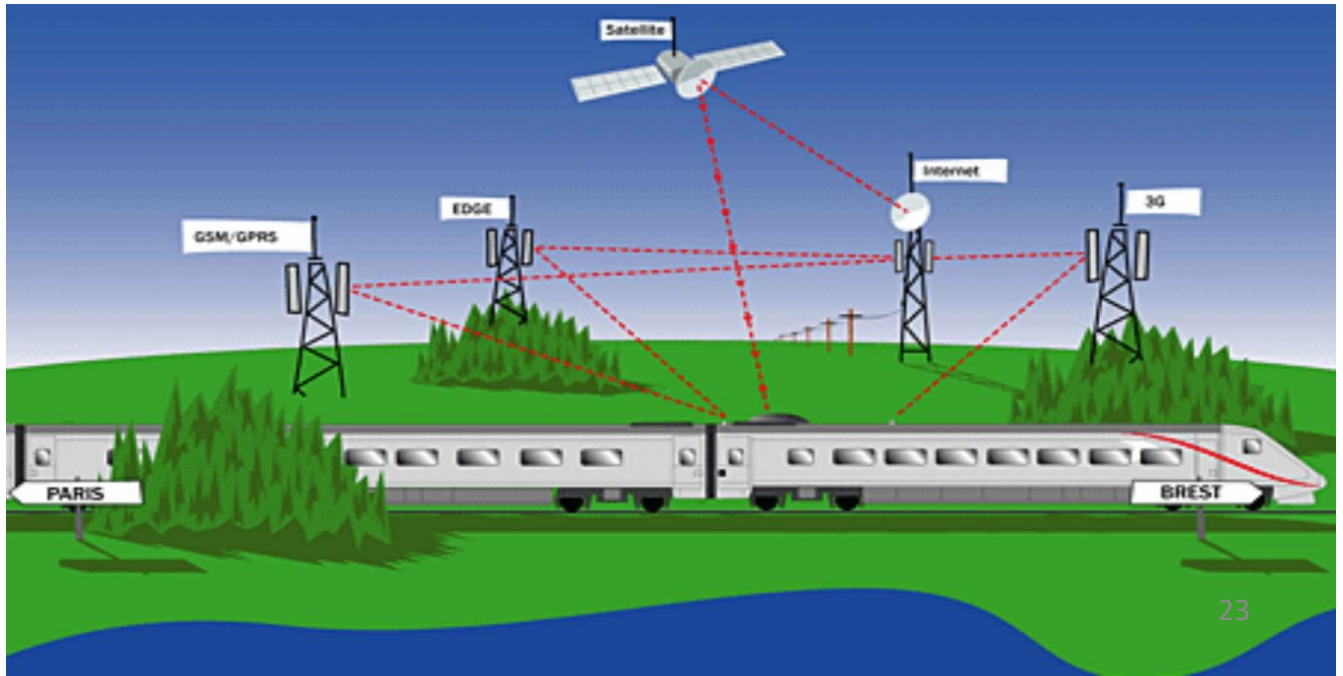
Leased Connection…

- A permanent fiber optic or telephone connection between two points set up by a telecommunications carrier
- Sometimes referred to as a ‘dedicated line’
- Can be used for telephone, data, or Internet services
- Oftentimes businesses will use a leased line to connect to geographically distant offices because it guarantees bandwidth for network traffic.

  e.g. A bank may use a leased line in order to easily transfer financial information from one office to another.
- Do not have telephone numbers because each side of the line is always connected to one another, as opposed to telephone lines which reuse the same lines for numerous conversations through a process called "switching."
- The fee for the connection is a fixed monthly rate. *(The primary factors affecting the monthly fee are distance between end points and the speed of the circuit)*
- provide a guaranteed level of service and speed, offering fast data transfer over a completely secure connection at a price that can be cost effective for very heavy internet users

Wireless Internet Connection

- **Wireless network** refers to any type of computer network that is not connected by cables of any kind.
- Radio frequency bands are used in place of telephone or cable networks.
- One of the greatest advantages of wireless Internet connections is the “always-on” connection that can be accessed from any location that falls within network coverage.



Wireless Internet Connection…

- Wireless WAN (WWAN)
  - Wireless network over a large area
  - Uses radio signals to transfer data
  - Antennas required
  - Subject to atmospheric disturbances

- Wireless MAN (WMAN)
  - A type of wireless network that connects several Wireless LANs
  - WiMAX : A type of Wireless MAN described by the IEEE 802.16 standard.

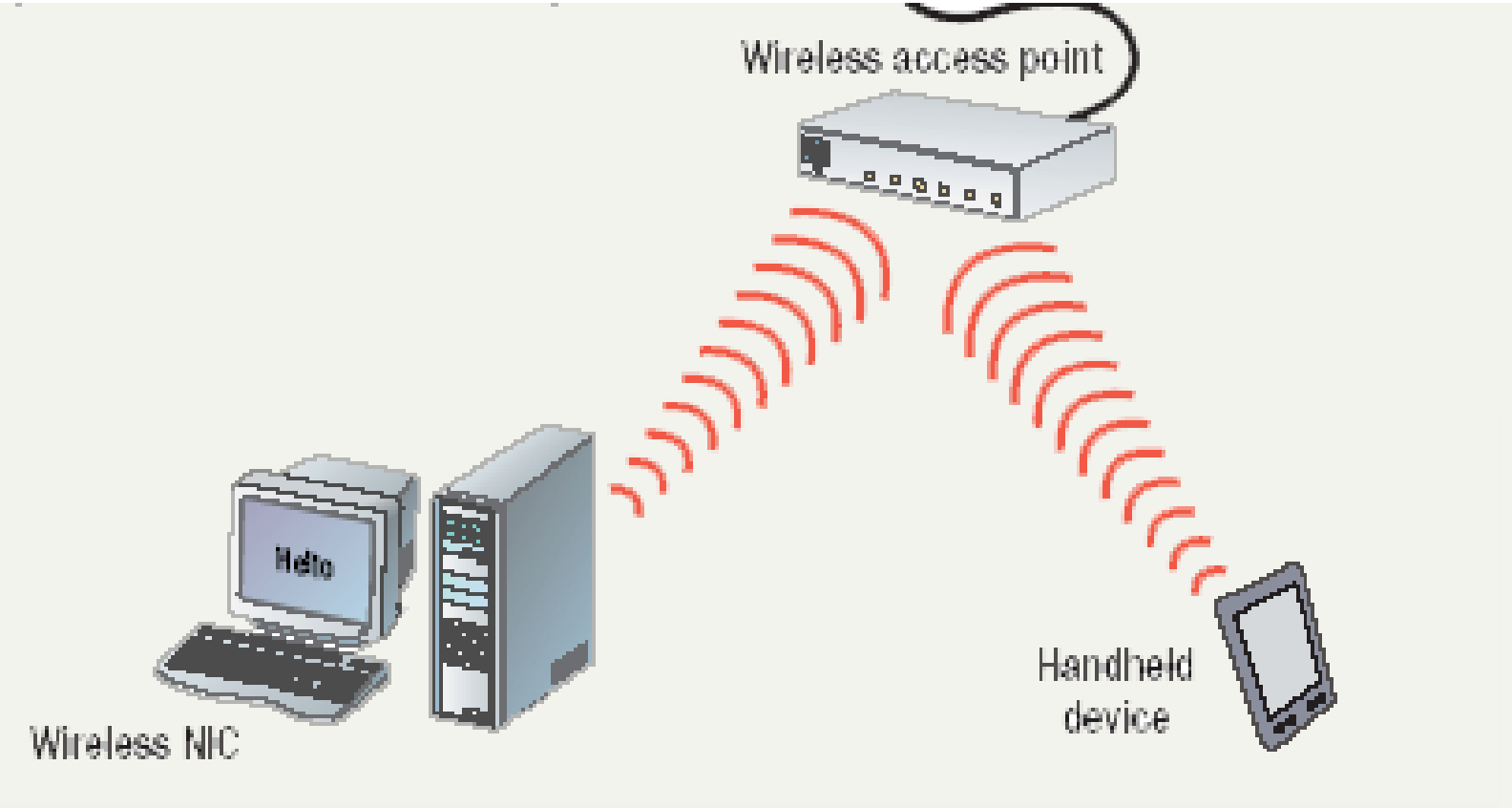
Wireless Internet Connection…

- Wireless LANs (WLAN)
  - Network without wires
  - Connects to a broadband LAN connection
  - WAP are wired directly into the LAN
  - Nodes use wireless
  - Wi-Fi: A term used to describe 802.11 WLANs

- Wi-Fi
  - Wireless Fidelity
  - wireless networking technology that allows computers and other devices to communicate over a wireless signal.
  - Wi-Fi connection only exists between the device and the router.
  - Most routers are connected to a DSL or cable modem, which provides Internet access to all connected devices.

- WiMAX
  - Worldwide Interoperability for Microwave Access
  - A communications technology that uses radio spectrum to transmit tens of megabits per second in bandwidth between digital devices such as laptop computers.
  - Similar to WiFi, WiMAX brings with it the ability to transmit over far greater distances and to handle much more data.

Wireless LAN



Wireless Internet Connection…

Satellite services

- Used in satellite communications of data, voice and video signals, excluding broadcast television.
- Internet access in remote regions
- Needs a VSAT (Very Small Aperture Terminal) at the client
  - A VSAT consists of two parts, a transceiver that is placed outdoors in direct line of sight to the satellite and a device that is placed indoors to interface the transceiver with the end user's communications device, such as a PC.
  - The transceiver receives or sends a signal to a satellite transponder in the sky.
  - The satellite sends and receives signals from a ground station computer that acts as a hub for the system.
  - Each end user is interconnected with the hub station via the satellite, forming a star topology.
  - The hub controls the entire operation of the network.
  - For one end user to communicate with another, each transmission has to first go to the hub station that then retransmits it via the satellite to the other end user's VSAT.
- Suitable for home and office use
- High speed connection. But usually slower than cable and DSL connections.
- Most popular in areas in which cable or DSL connections are unavailable or unreliable.

VSAT (very small aperture terminal)

Advantages

- Costs Insensitive to Distance
- Single Platform service delivery (one-stop-shop)
- Flexibility
- Upgradeable
- Low incremental costs per unit

Disadvantages

- High start-up costs (hubs and basic elements must be in place before the services can be provided)
- Higher than normal risk profiles
- Severe regulatory restrictions imposed by countries that prevent VSAT networks and solutions from reaching critical mass and therefore profitability
- Some service quality limitations such the high signal delays (latency)
- Natural availability limits that cannot be mitigated against
- Lack of skills required in the developing world to design, install and maintain satellite communication systems adequately

Mobile

- Many cell phone and smartphone providers offer voice plans with Internet access. Mobile Internet connections provide good speeds and allow you to access the Internet on the go.

Hotspots

- Hotspots are sites that offer Internet access over a wireless local area network (WLAN) by way of a router that then connects to an Internet service provider.
- Hotspots utilize Wi-Fi technology, which allows electronic devices to connect to the Internet or exchange data wirelessly through radio waves.
- Hotspots can be phone-based or free-standing, commercial or free to the public.

Wireless Internet Connection…

- Wireless security
  - Crucial to protect wireless transmissions
  - Encryption protects transmissions
  - Wireless Encryption Protocol is quite weak
  - Wi-Fi Protected Access is stronger
  - MAC address of trusted computers
  - War driving

ADVANTAGES AND DISADVANTAGES OF POPULAR CONNECTIONS

TYPES	ADVANTAGES	DISADVANTAGES
Analog modem	· Low cost · Availability: able to get internet service almost anywhere in the country · Simplicity	· Slowest type of connection available · Unable to talk on the telephone when using internet
ISDN	· Faster than analog modems · Widely available in most metro areas · Able to talk on the telephone and surf the web simultaneously · Always on connection	· Not dramatically faster than analog service · The access charge is usually per-minute. · Not available everywhere
Cable	• Always on connection • High speed	• Variability of speed • Upstream speed limited

DSL	**· Always on connection** **· High speed** **· Promise of affordability** **· Uses existing lines**	**· Not available everywhere due to the signal limitations based on the distance.**
Leased line	· Available virtually everywhere in the regional serving area · Always on connection	· Too expensive to the individual and small business
Satellite	· Available virtually everywhere in the regional serving area · Always on connection	· Sensitive to the heavy rainy day

Lesson Review

- Compare and contrast wired internet connections and wireless internet connections.

- List advantages and disadvantages of each type of wired and wireless internet connections.