Computer Networks

Computer Network

- When computers are connected and communicated through a guided or an unguided media then it is called computer network.
- There are three different types of network
- LAN
- WAN
- MAN

LAN

- A local area network (LAN) is a computer network within a small geographical area such as a home, school, computer laboratory, office building or group of buildings.

- A LAN is generally constructed within one KM range.

- The scope of the LAN is small, typically a single building or a cluster of building

- LAN is owned by the same organization that owns the attached devices.

- Network management responsibility for a local network falls solely on the user.

- Traditionally, LANs make use of a broadcast network approach rather than a switching approach.
- With a broadcast communication network, there are no intermediate switching nodes.
- At each station, there is a transmitter/receiver that communicates over a medium shared by other stations.
- A transmission from any one station is broadcast to and received by all other stations.

Wide Area Network

- Wide-area networks have been traditionally been considered to be those that cover a large geographical area.

- A WAN connects different smaller networks, including local area networks (LANs) and metro area networks (MANs).

- A WAN consists of a number of interconnected switching nodes.

- A transmission from any one device is routed through these internal nodes to the specified destination device

- These nodes are not concerned with the content of the data; rather, their purpose is to provide a switching facility that will move the data from node to node until they reach their destination.

Metropolitan Area Network(MAN)

- Metropolitan area Network is similar to local area network (LAN) but spans an entire city or campus.

- MAN is formed by connecting multiple LANs. MAN is smaller than WAN.

- MAN is extremely efficient and provides fast communication via high speed carriers such as fiber optic cable

Transmission Mode

- In **simplex mode** data flows in one direction only.
- For example radio and TV transmission.
- In **half duplex** mode there is only one communication channel.
- However both devices can be either a transmitter or a receiver.
- While one device is transmitting other will be in receiving mode, and vice versa.
- In **full-duplex** connection data flows in both direction simultaneously.
- Each end can transmit and receive data at same time.
- Number of communication channels in full-duplex can either be one or two

Parallel And Serial Connection

- In n bit parallel communication channel, n bits are simultaneously transmitted over separate n communication lines.

- In serial connection one bit can be transmitted over the transmission channel at a time.

- Since most processors process data in parallel, device that sends data must convert parallel data to serial form before sending to receiver.

- Similarly on receiving the serial data, the receiver must convert it into parallel data so that it can be processed further.

Synchronous & Asynchronous Transmission

- In **synchronous transmission** the sender and receiver are synchronized with each other using a clock.

- In this case, characters or bytes are grouped together to form a data block.

- Then header and trailers are added to form a frame.

- The header contains useful information that needed by receiving device to synchronize its clock with sender's clock.

- In asynchronous transmission the sender transmits data character by character to receiver at any point of time.

- To alert the receiver to the arrival of a new group, therefore, an extra bit is added to the beginning of each byte.

- This bit, usually a 0, is called the start bit. To let the receiver know that the byte is finished, 1 or more additional bits are appended to the end of the byte.

- These bits, usually 1s, are called stop bits.

- It does not call for synchronization between the sending and receiving devices