Chapter-14

Communication and Network Concepts

Computer Network- A Computer Network is a collection of two or more computers which are connected together to share information and resources.

Advantages of Networking-

a) Resource Sharing
b) Increased Reliability
c) Reduced Cost
d) Fast Communication

Disadvantages of Networking-

a) System becomes Complex
b) If central server fails whole system becomes unstable.

Evolution of Networking-

1) ARPANET- The Advanced Research Projects Agency Network (ARPANET) was established in year 1969. This was the world's first network whose goal was to connect computers at different universities and US Defence. ARPANET was developed under the direction of US Advanced Research Projects Agency (ARPA)
2) NSFnet- The National Science Foundation created this network in mid 80's to promote advanced research which was more capable than ARPANET.
3) INTERNET- Internet is a network of the interlinked computers worldwide, which is accessible to the general public. It is also known as Interconnection Network. Internet is known as Netwok of Networks which enable user to do file transfer, sharing of documents and websites on World Wide Web

   Working of Internet-

   a) Message is firstly divided into packets.
   b) These packets are assigned serial numbers.
   c) Packets are transferred from source to destination address.
   d) At Destination address those packets are reassembled.

4) Interspace- Interspace is a Client/Server software program that allows multiple users to communicate online with real time audio video and text in dynamic 3 D environment. Interspace provides the most advanced form of communication available on the Internet today and is a vision of what Internet will become tomorrow.

Switching Techniques- Switching techniques are used for transmitting data across networks.

1) Circuit Switching- In this methodology two network nodes establish a dedicated communication channel (circuit) , then the message is transmitted through the channels. The advantage of

circuit switching is guaranteed delivery. It guarantees the full bandwidth of channel and remains connected for the duration of communication session.

2) Packet Switching- In packet based networks the message gets broken into small data packets. These packets are sent out from the computer and they travel around the network seeking out the most efficient route to travel as circuits become available.
3) Message Switching- In this technique no physical path is established between source and destination in advance. It is also known as Store and Forward technique. During message routing every intermediate switch in the network stores the whole message.

Communication- Communication is the exchange of data between two devices using some form of transmission media. Data is transferred from one place to another in the form of signal.

Channel- A communication channel is a medium that is used in the transmission of message from one point to another.

Three types of channel

1. Simplex Channel- The flow of data is always in one direction. eg- Radio, Television
2. Half Duplex Channel- Data can flow in both directions but not at same time. Eg- Walkie Talkie
3. Full Duplex Channel- Data can flow in both directions simultaneously. Eg- Mobile phone

Baud Rate- It is the unit of measurement for the information carrying capacity of a channel. It measures number of symbols or line changes every second. It's measuring unit is Baud.

Bandwidth- It is the frequency range of a channel measured as difference between highest and lowest frequencies the channel supports. For digital devices, the bandwidth is usually expressed in bits per second(bps) or bytes per second. For analog devices, the bandwidth is expressed in cycles per second, or Hertz (Hz).

KiloHertz- 10^3 Hz

Megahertz- 10^6Hz

Bits per Second-This is an expression of the number of data bits per second.

bps- Bits Per Second. Bps-Bytes Per Second

1 Kbps- Kilobit per second is equals to 1000 bits per second.

1 Mbps- 1000 Kbps or 1 million bps

1 Gbps- 1000 Mbps or 1 million Kbps or 1 billion bps

1 Tbps- 1000 Gbps or 1 million Mbps or 1 billion Kbps or 1 trillion bps.

Data Transfer Rate- It is the amount of digital data that is moved from one place to another in a given time usually in a second. It is measured in bps , Bps or Baud.