STUDY MATERIAL – 3
TOPIC – NETWORKING

SUBJECT: COMPUTER APPLICATION **CLASS: XII**
F.M.:15 **DATE: 08.07.2020**

Bandwidth

- Bandwidth is the capacity of an ideal communication channel to transmit the maximum amount of data from one point to another over a computer network or internet connection in a given amount of time -- usually, one second.
- The more bandwidth a data connection has, the more data it can send and receive at one time. Bandwidth can be compared to the amount of water that can flow through a water pipe. The bigger the pipe, the more water can flow through it at one time.
- It is measured in Hertz(analogue communication) & as a bit rate expressed in bits per second (bits/s) or multiples of it - kbit/s Mbit/s etc.(digital communication).

Channel Capacity

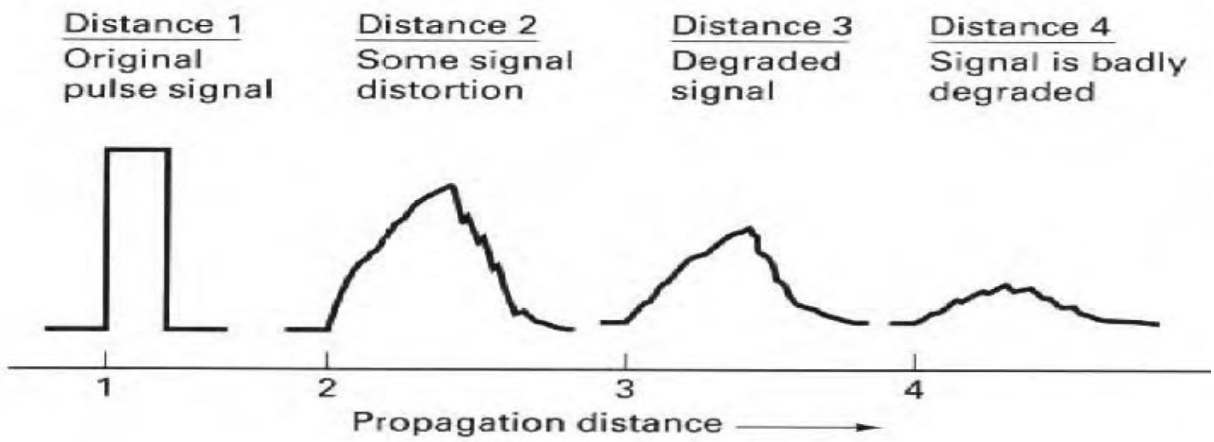
- Channel capacity of a channel indicates the maximum number of bits that can be transmitted through a noisy communication channel per second with minimum error.
- Bandwidth of a channel is measured in ideal condition. But in reality presence of electrical noise distorts the original signal and reduces the data transmission rate of a channel. Under such a case, Channel Capacity gives an upper limit to the number of bits that can be actually transferred without error through a noisy communication channel.
- The channel capacity C of a channel with bandwidth B and signal to noise ratio S/N is given by:

$$C = B \times \log_2(1+S/N)$$

- Channel Capacity is measured by Kbps, Mbps or Gbps.

Signal Distortion & Noise

- During data communication due to several external and internal factors, the signal at the receiving end may not be the same as the transmitted signal. During transmission the signal may get reduced in strength called **signal attenuation**.
- Depending on the physical property of the communication channel, the overall shape of the signal can also change, which is known as **signal distortion.**



- The original transmitted signal also gets mixed with undesirable signals which are collectively known as **electrical noise.**
- Another factor affecting signal transmission is the **signal power**, increasing which increases the strength of the signal. It also reduces the effects of electrical noise on the original signal.
- **Signal-to-noise ratio (abbreviated SNR or S/N)** is a measure that compares the level of a desired signal to the level of background noise.

A large SNR allows signal to be transmitted over longer distance with sufficient degree of accuracy.

Baud Rate

- Baud rate of a channel indicates the signaling speed of the channel, i.e. the number of data symbols that can be transmitted by a channel per second.
- It is measured in symbols per second.
- **Baud rate =** Bit **rate /** the number of bits per **baud**

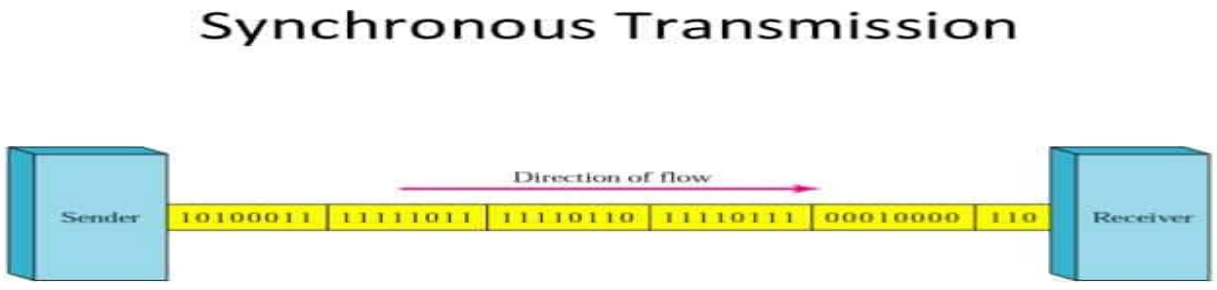
Transmission Modes

When two computers are communicating with each other, the mode of transmission refers to the condition which enables the receiving terminal to determine where one byte ends and where the next byte begins. There are two modes:

- ✓ Synchronous Transmission
- ✓ Asynchronous Transmission

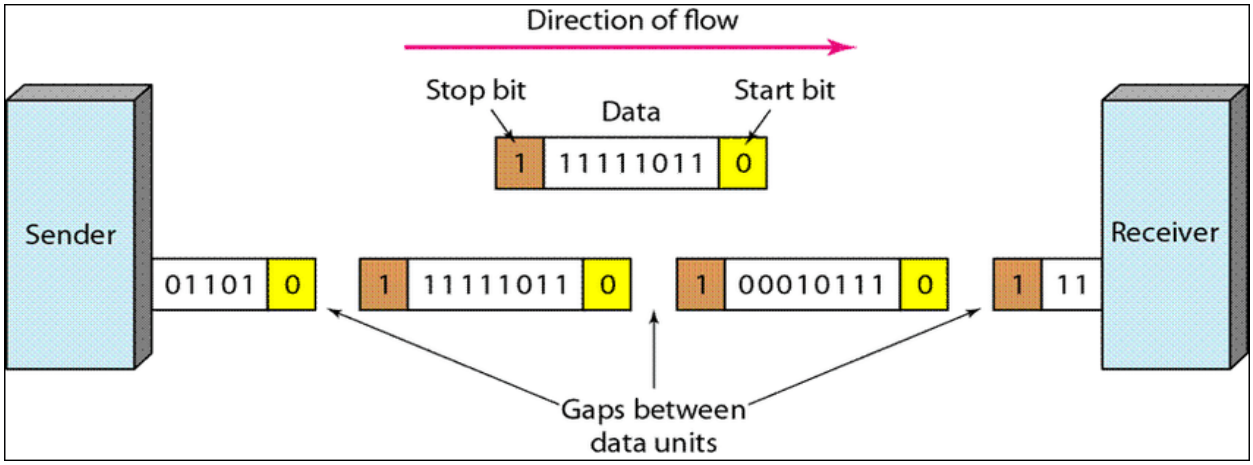
➢ Synchronous Transmission:

Synchronous transmission is a data transfer method which is characterized by a continuous stream of data in the form of signals which are accompanied by regular timing signals which are generated by some external clocking mechanism meant to ensure that both the sender and receiver are synchronized with each other



➢ Asynchronous Transmission:

Asynchronous transmission is the transmission of data in which each character is a self-contained unit with its own start and stop bits and an uneven interval between them. Asynchronous transmission is also referred to as start/stop transmission.



Baseband & Broadband Transmission

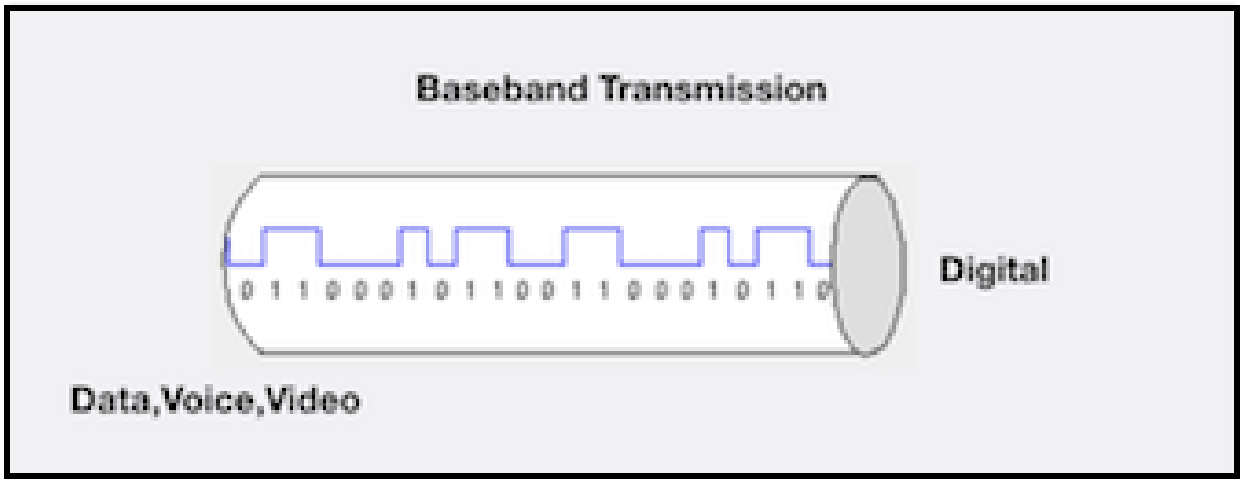
To transfer information over a given medium like a communication cable, two different methods are used with regard to the bandwidth of the channel :

- ✓ Baseband Transmission
- ✓ Broadband Transmission

➢ Baseband Transmission

- ❑ Baseband Transmission is a signalling technology that sends digital signals over a single frequency as discrete electrical pulses. The entire bandwidth of a baseband system carries only one data signal and is generally less than the amount of bandwidth available on a broadband transmission system.

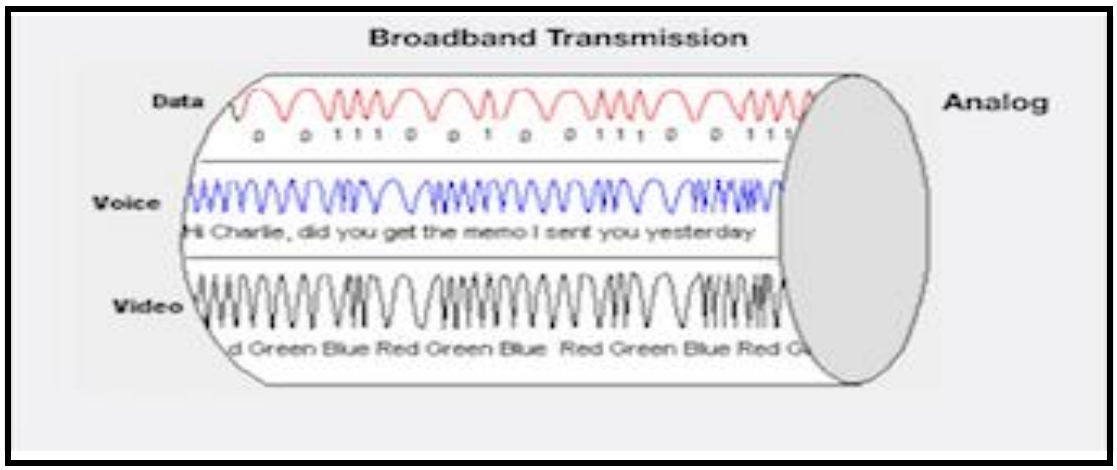
- ❑ This technology is usually used for small networks like LANs.



➢ Broadband Transmission:

- ❑ Broadband Transmission is a signaling technology that sends signals simultaneously over a range of different frequencies as electromagnetic waves. The bandwidth of a broadband system can usually carry multiple, simultaneous data signals.

- ❑ Examples include DSl(digital Subscriber Lines) with rates up to several Mbps over telephone cables.



Servers

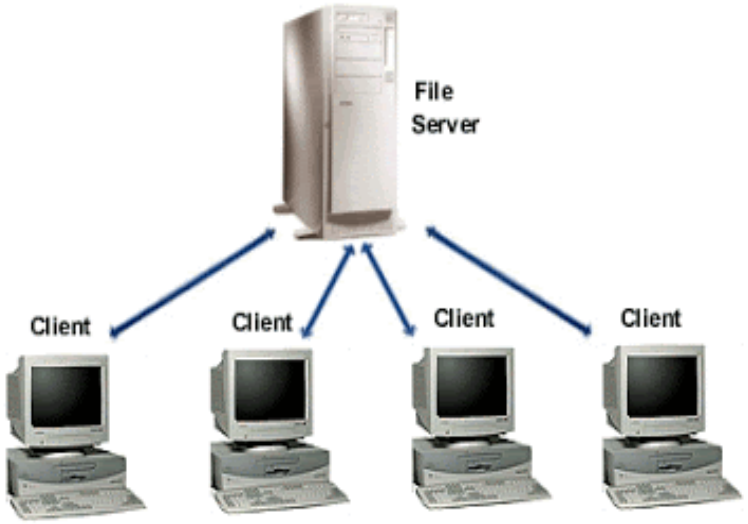
A server is usually a powerful computer, that is dedicated to managing network resources. They are called that because they "serve" another computer, device, or program called "client" to which they provide functionality.

Based on the type of service provided, a network can have THREE basic type of servers:

- ✓ File Servers
- ✓ Print Servers
- ✓ Communication Servers

➢ File Servers:

A file server is a central server in a computer network that provides file systems or at least parts of a file system to connected clients. File servers therefore offer users a central storage place for files on internal data media, which is accessible to all authorized clients.



- ***Types of File Servers:***

- ✓ **Database Servers** – they run softwares like database management programs to carry out various data processing jobs for the client computers.

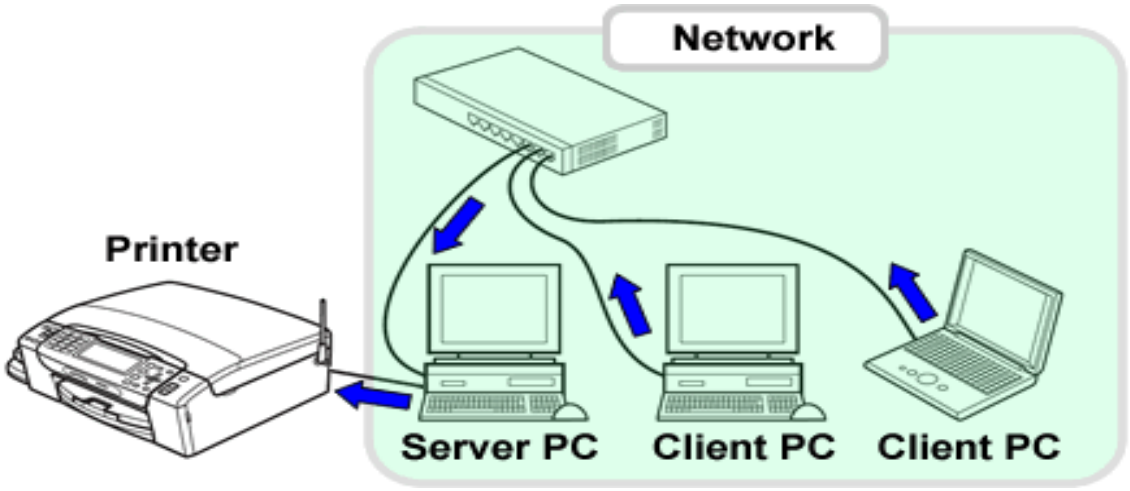
- ✓ **Application Servers** – they stores common application programs that are shared by different client computers.

- ✓ **CD ROM server** – It has multiple optical drives running several optical disks at a time to serve more than one client computer at any given time.

➢ Print Servers:

- A print server is a computer that can process print-related jobs on a network of computers. Print servers are connected to a computer network in order to serve the need for printing jobs in a network that may contain more than one printer.

- A print server accept print jobs sent from different application programs running on different client computers and sends those to the common network printer.

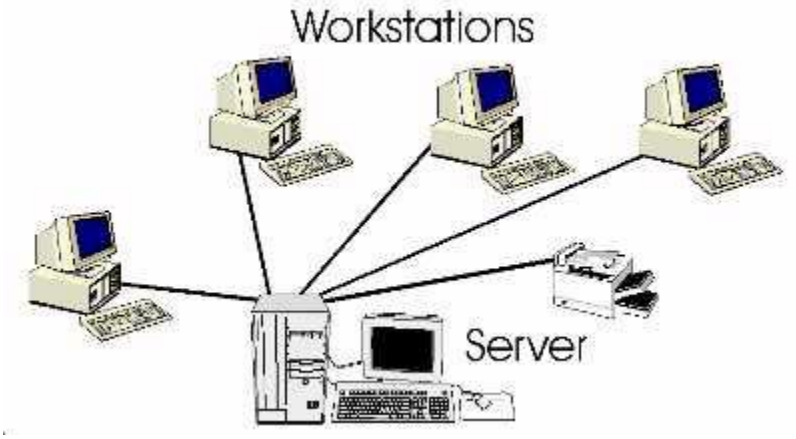


➢ Communication Servers:

- A **communication server** is a dedicated system that provides **communication** services for users on a network who need to transfer files or access information on systems or networks at remote locations over telecommunication links.
- Examples include e-mail servers, DNS servers and proxy servers.

➢ Client or Workstation:

- A personal computer in networking that connects to the server and uses the network services to perform user's tasks is a **client** computer.
- A client can be a dumb terminal which acts only as an input and output interface
- Clients can also be a computer terminal running its own application programs



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