Network Criteria

Performance	Reliability	Security
• Number of users •Type of transmission_medium • Hardware & Software	•Frequency of failure •Recovery time •Catastrophe	• Unauthorized access • Viruses

A Compute network should ensure

- ✓ **reliability** of the data communication process
- ✓ **security** of the data
- ✓ **performance** by achieving higher throughput and smaller delay times

Transmission Speed

Narrow band Channel	Voice band channel	Broadband Channel
• Bandwidth less than 3000 hertz. • Transmission rate between 5 and 30 character per second. • Too slow to be used for modern data communication (suitable for news service).	Bandwidth of about 3000 hertz. Transmission rate up to about 960 characters per second. (telephone lines, video displaying terminal, slow printers) .	Bandwidth greater than 3000 hertz. Transmission rate up to several million characters per second. Coaxial microwave, Optical Fiber cable.Used for high speed, high volume data transmission.

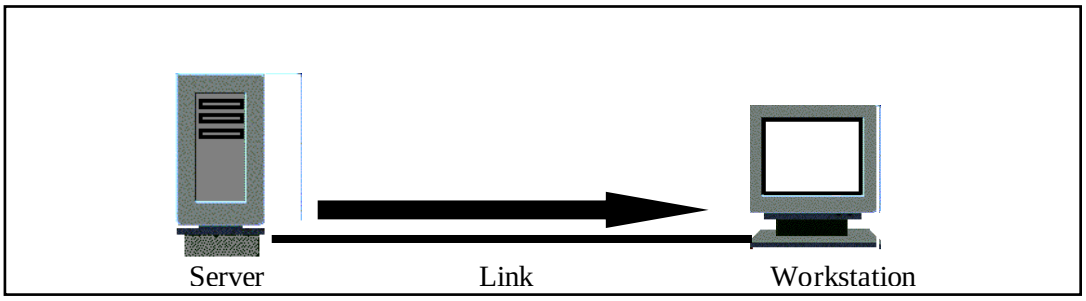
1.5 Transmission Modes

The term transmission mode is used to define the direction of signal flow between two linked devices. There are three types of transmission modes:

- ❖ ***Simplex.***
- ❖ ***Half duplex.***
- ❖ ***Full duplex***

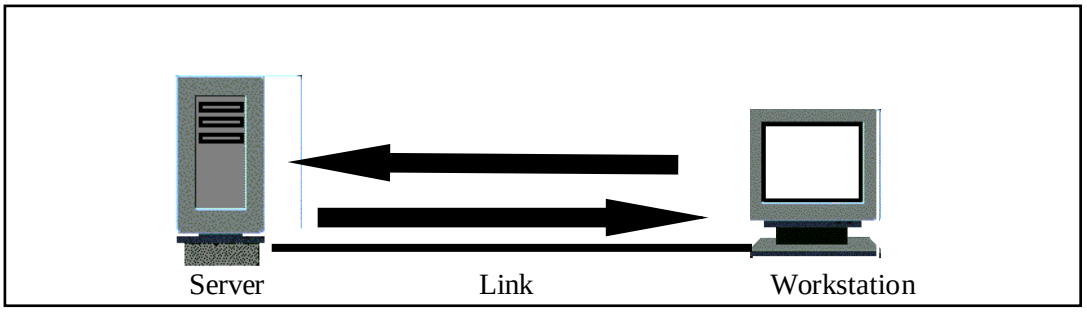
Simplex

- In, simplex mode, the communication is **unidirectional** only one of the two stations on a link can transmit the other can only receive (see Figure below).
- Keyboards and traditional monitors are both examples of simplex devices. The keyboard can only introduce input; the monitor can only accept output.



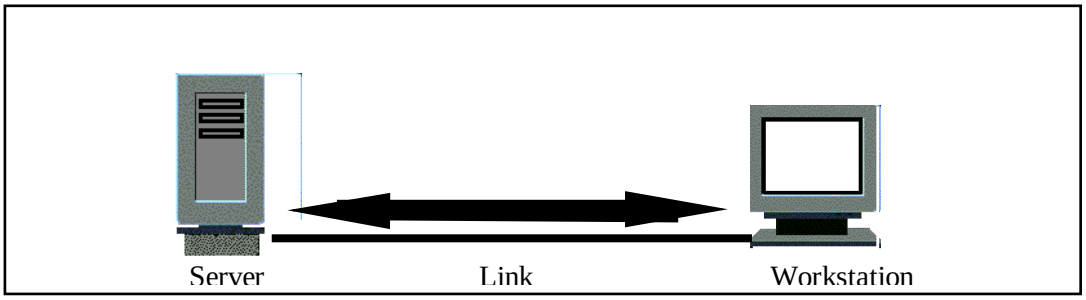
Half-Duplex

- In half-duplex mode, each station can ***both transmit and receive, but not at the same time*** When one device is sending, the other can only receive, and vice versa (see Figure below).
- In a half-duplex transmission, the entire capacity of a channel is taken over by whichever of the two devices is transmitting at the time. Walkie-talkies are half-duplex systems.



Full-Duplex

- In full-duplex mode (also called duplex), ***both stations can transmit and receive simultaneously*** (see Figure below).
- In full-duplex mode, signals going in either direction share the Capacity of the link.
- This sharing can occur in two ways: either the link must contain two physically separate transmission paths, one for sending and the other for receiving. Or, the capacity of the channel is divided between signals traveling in opposite directions.



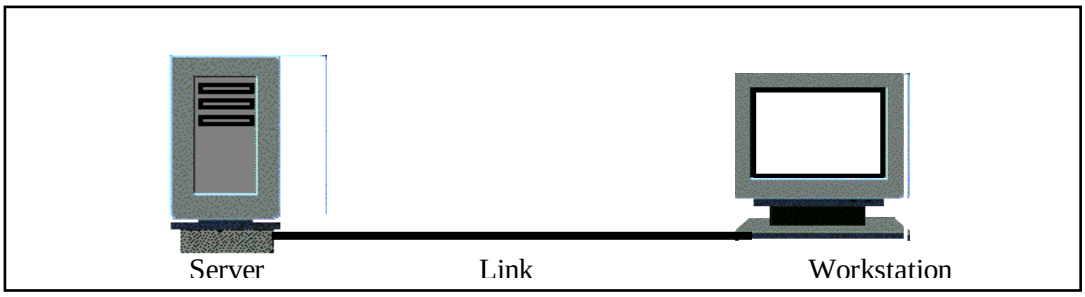
1.6 LINE CONFIGURATION

Line configuration ***refers to the way two or more communication devices attach to a link***. A ***link*** is the physical communication pathway that transfers data from one device to another. Line configuration ***defines the attachment of communication devices to a link***.

Point-to-Point

A point-to point line configuration provides a **dedicated link** between two devices. The entire capacity of the channel is reserved for transmission between those two devices.

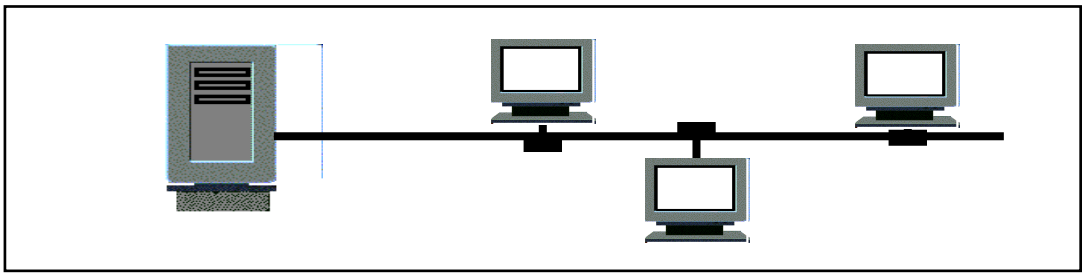
Most point-to-point line configurations use an actual length of wire or cable to connect the two ends but other options, such as microwave or satellite links are also possible (see Figure below



Multipoint

A multipoint (also called multidrop) line configuration is one in which more than two specific devices **share a single link** (see Figure below).

In a multipoint environment the capacity of the channel is ***shared,*** either spatially or temporally. If several devices can use the link simultaneously, it is a spatially shared line configuration. If users must take turns, it is a time shared line configuration.



1.7 TOPOLOGY

The term topology ***refers to the way a network is laid out, either physically or logically***. Two or more devices connect to a link; two or more links form a topology. The topology of a network is the ***geometric representation of the relationship of all the links (nodes) to each other.***

There are five basic topologies possible:

- **Physical topologies**

Physical topology is the mapping of the nodes of a network and the physical connections between them, cables.

- **Logical topologies**

Logical topology is the way that the signals act on the network media, or the way that the data passes through the network from one device to the next without regard to the physical interconnection of the devices.