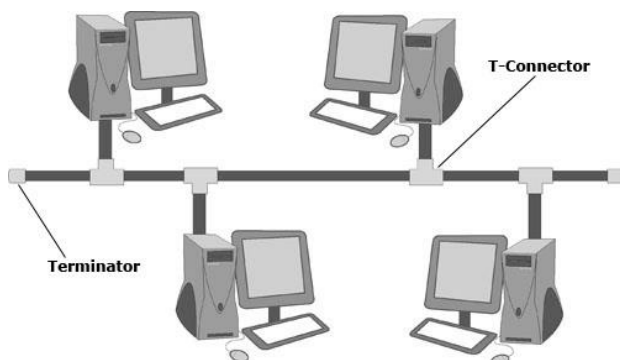


## Network Topology

**Topology** – Physical arrangement of network is termed as topology. Following are the types of network topologies.

### Bus Topology

- ✓ Bus topology uses a common bus called as backbone to connect all devices with terminators at both the ends.
- ✓ This backbone acts as a communication channel to all the nodes which is connected to it with an interface connector.
- ✓ As the message passes from station, the station checks the address of the message. If it is found then node receives the message, if not it is passed to the next node.



### Advantages

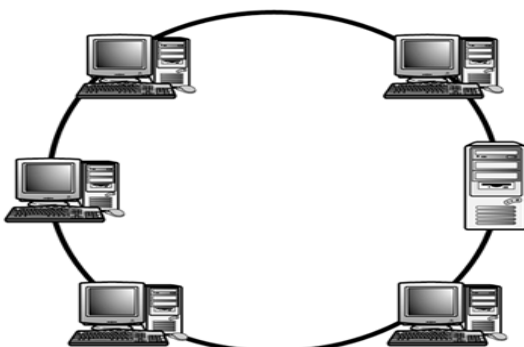
1. Connecting a node is very easy.
2. Cable length required is less hence it is less expensive.
3. Extending a bus/backbone is easy by connecting another cable by a connector.

### Disadvantages

1. Failure of backbone leads to the failure of whole network.
2. Heavy traffic can slow down a bus.

### Ring Topology

- ✓ In Ring Topology all the computers are connected in the form of ring without any terminated ends.
- ✓ All messages travel in a ring in one direction only until it reaches its destination.



### Advantages

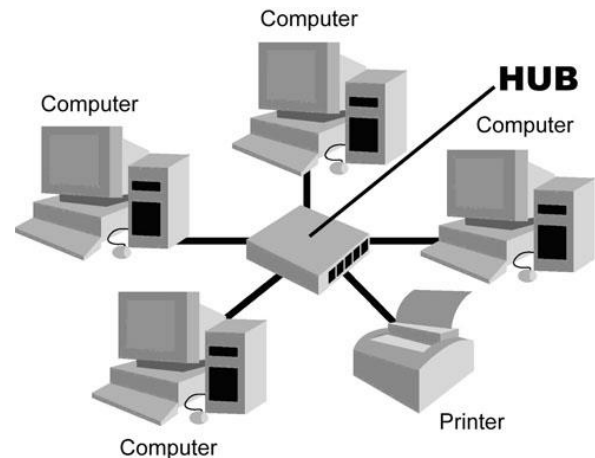
1. Ring topology is easy to install and reconfigure.
2. Every computer is given equal access to ring.

### Disadvantages

1. Failure of cable or any node leads to the failure of whole network.
2. Maximum ring length and number of nodes are limited.

### Star Topology

- ✓ In Star Topology computers are not connected directly to each other.
- ✓ Computers are connected through a central connector known as Hub.



### Advantages

1. It is easy to install.
2. Failure of any node doesn't affect the entire network.
3. Fault detection and removal of faulty parts is easier.

### Disadvantages

1. Cable length required is more as compared to Ring and Bus Topology.
2. Failure of Hub leads to the collapse of entire network.
3. Cost of Hub makes the network expensive.

### Mesh Topology

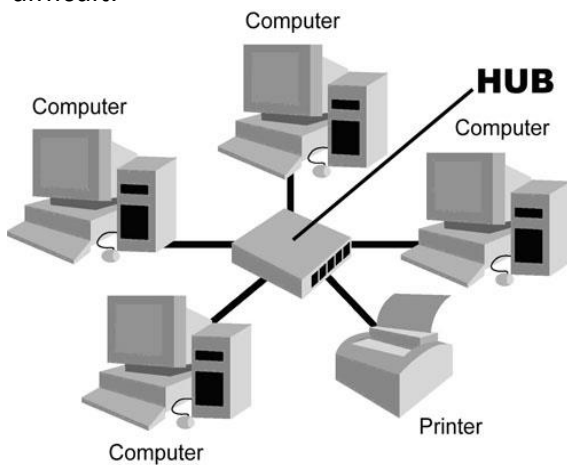
- ✓ In Mesh Topology each computer is connected to all other computers directly.
- ✓ Message sent on Mesh Network can take of several paths from source to destination.

### Advantages

1. Use of large number of links eliminates network congestion.
2. Failure of any node doesn't affect the entire network.

Disadvantages

1. Cable length required is very large which increases cost of network.
2. As every node is connected to other, installation and reconfiguration is very difficult.

**Network Devices**

**Hub** – A Hub is a small box that connects individual devices on a network so that they can communicate with each other. It provides a centralized connection to all the connected devices.

There are two types of Hub 1. Active & 2. Passive

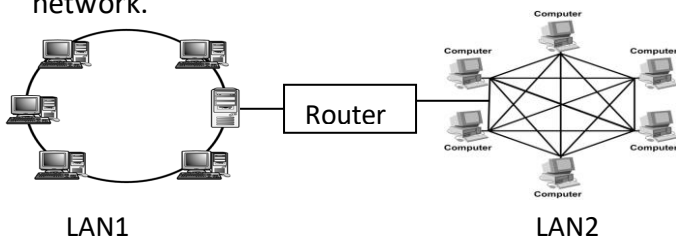
**Active Hub** – It consist of some electronic circuit which can regenerate the weak signal.

**Passive Hub** – It just split and transmit signal. It does not contain any type of electronic circuit.



**Router** – A Router is a device which connects two or more interconnected LAN's.

Routers use algorithm to determine most efficient part for sending data to any given network.



**Modem** - Modem word is derived from the two words 'Modulator & Demodulator'.

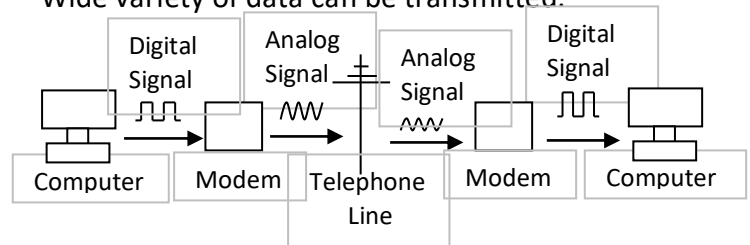
2. Modem converts analog signal to digital and digital signal to analog.

3. Computer always works on digital signal where as telephone lines uses analog signal.

4. It is used to transmit data through telephone lines.

**Asynchronous Modem** doesn't use clock for transmission. It uses bit synchronization. It is used to transmit character data.

**Synchronous Modem** use clock for transmission. Wide variety of data can be transmitted.

**Repeater**

As the signal travels through a medium some part of that signal get weak. Repeater does not filter the signal, it just regenerate a signal.

Repeater is a network device that is used to regenerate the weak signal.

Length of the network can be increased with the help of repeater.

**Access Methods****Contention**

Computers are competing for the use of transmission medium called as contention. Only one computer is allowed to transmit at one time. When two or more computers want to transmit then collision occurs which breaks down the entire system.

Carrier sensing mechanism is used to solve problem of collision. In this method, if network is busy then computer waits till the network is free.

**Polling**

In case of polling bases system a master device is used which see whether computers are ready to transmit or receive data.

Polling system causes a fair amount of network traffic.

**Token Passing**

In case of token passing system a token is given to computer which wants to send or receive data. Computer waits until it receives a token. Token passing is better than contention under the following conditions

1. When network is carrying time critical data. It provides more predictable delivery; hence it is called as deterministic.

2. When some stations should have higher priority.
3. When network experiences heavy utilization.

**Demand Priority**

1. This is contention based access method.
2. In this method nodes are connected to hub and they are connected to other hub.
3. Contention occurs at hub. Therefore priority is assigned to data.