# NIELIT Gorakhpur

## Chapter 3rd [Networking Concepts]

**Topologies:-** Topology of a network is geometric representation of the relationship of all the links and linking devices to another. There are four basic topology possible: bus, ring, star and mesh.

**Bus Topology:-**The bus topology is designed in such a way that all the stations are connected through a single cable known as a backbone cable. Each node is either connected to the backbone cable by drop cable or directly connected to the backbone cable. When a node wants to send a message over the network, it puts a message over the network. All the stations available in the network will receive the message whether it has been addressed or not. The configuration of a bus topology is quite simpler as compared to other topologies. The backbone cable is considered as a "single lane" through which the message is broadcast to all the stations.

## Advantages of Bus topology:
- Low cost cable
- Familiar technology
- Limited failure
- Moderate data speed
- Easy to expand joining two cables together.

## Disadvantages of Bus topology:
- Cable has a limited length.
- If network traffic is heavy or nodes are more the performance of the network decreases.
- Signal interference
- Reconfiguration difficult
- Attenuation
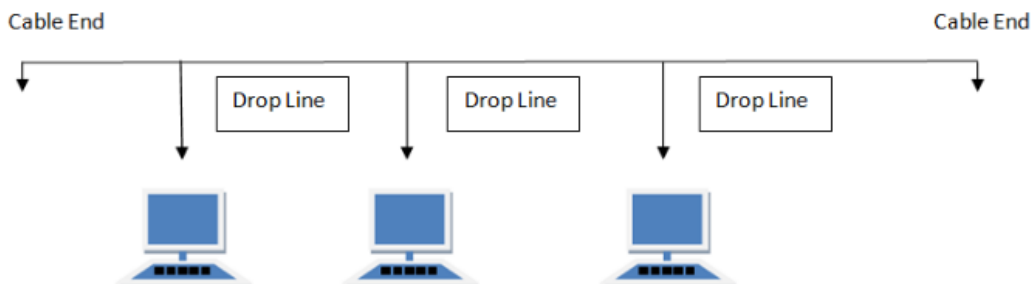


## Ring Topology

Ring topology is like a bus topology, but with connected ends. The node that receives the message from the previous computer will retransmit to the next node. The data flows in one direction, i.e., it is unidirectional. The data flows in a single

loop continuously known as an endless loop. It has no terminated ends, i.e., each node is connected to other node and having no termination point. The data in a ring topology flow in a clockwise direction. The most common access method of the ring topology is token passing.

## Advantages of Ring Topology

➢ Transmitting network is not affected by high traffic or by adding more nodes, as only the nodes having tokens can transmit data.

➢ Cheap to install and expand

➢ It is a more reliable network because the communication system is not dependent on the single host computer.

## Disadvantages of Ring Topology

➢ Troubleshooting is difficult in ring topology.

➢ Adding or deleting the computers disturbs the network activity.

➢ Failure of one computer disturbs the whole network.

➢ Communication delay is directly proportional to the number of nodes. Adding new devices increases the communication delay.

**Star topology:-**Star topology is an arrangement of the network in which every node is connected to the central hub, switch or a central computer. The central computer is known as a server, and the peripheral devices attached to the server are known as clients. Coaxial cable or RJ-45 cables are used to connect the computers. Hubs or Switches are mainly used as connection devices in a physical star topology. Star topology is the most popular topology in network implementation.

## Advantages of Star topology

➢ Efficient troubleshooting
➢ Network control
➢ Limited failure
➢ Familiar technology

- ➢ Easily expandable
- ➢ Cost effective
- ➢ High data speed

## Disadvantages of Star topology

- ➢ If the central hub or switch goes down, then all the connected nodes will not be able to communicate with each other.
- ➢ Sometimes cable routing becomes difficult when a significant amount of routing is required.
- ➢ Performance is based on the hub that is it depends on its capacity



**Mesh technology**:-Mesh technology is an arrangement of the network in which computers are interconnected with each other through various redundant connections. There are multiple paths from one computer to another computer.
It does not contain the switch, hub or any central computer which acts as a central point of communication. The Internet is an example of the mesh topology. Mesh topology is mainly used for WAN implementations where communication failures are a critical concern. Mesh topology is mainly used for wireless networks. Mesh topology can be formed by using the formula: Number of cables = (n*(n-1))/2. Where n is the number of nodes that represents the network.

## Advantages of Mesh topology:

- ➢ ReliableFast
- ➢ Communication
- ➢ Easier Reconfiguration

## Disadvantages of Mesh topology

- ➢ Mesh topology contains a large number of connected devices such as a router and more transmission media than other topologies.
- ➢ Mesh topology networks are very large and very difficult to maintain and manage. If the network is not monitored carefully, then the communication link failure goes undetected.
- ➢ In this topology, redundant connections are high that reduces the efficiency of the network.

# Mesh Topology
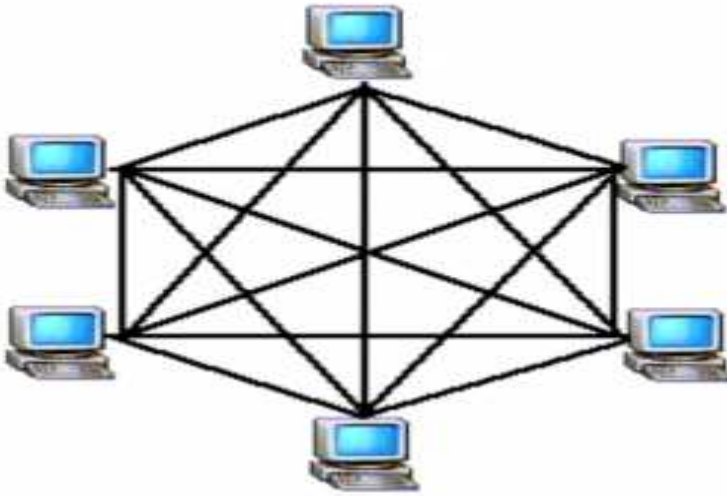


# Assignment:-

1-What is network topology explain?
2-Which network topology is more efficient explain with suitable reasons?