Deapartment of Computer Applications

Network Topologies

B.Com.(CA) III Year

By

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Objective

- The main objective of this presentation is to understand the topology, that is structure of the network of how all the computers are interconnected with each other.
- To understand the Pros and Cons of Each Topology.
- To understand the applications of the each and every topological structure.

Network Topology

- A network is two or more computers which are connected together so that they can communicate with each other.

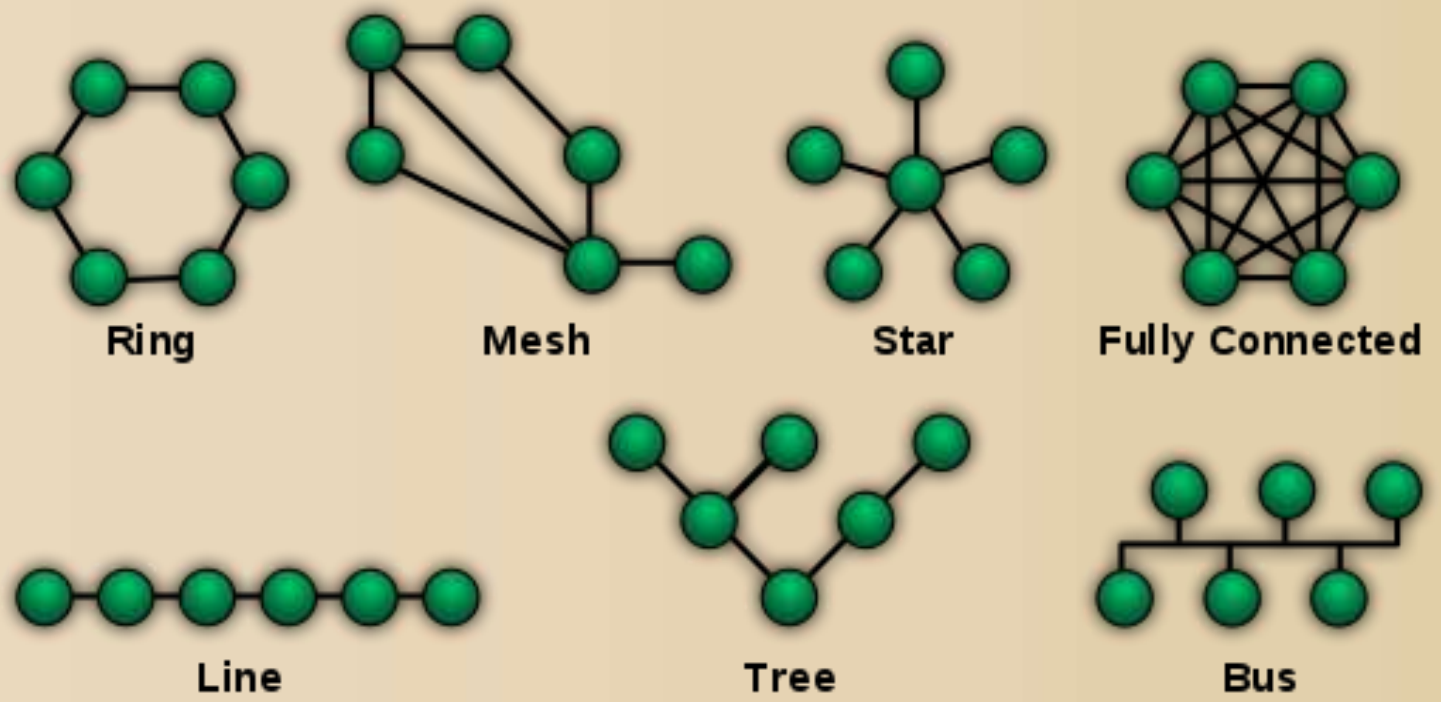
Network Topology

- Topology is the Layout of connected devices on a network.
- Network Topology is the arrangement of the elements of a communication network.
- Topology can be Physical Topology or Logical Topology.
- The Physical topology of a network refers to the actual layout of the computer cables and other network devices.
- The logical Topology of a network refers to the way in which the network appears to the devices that use it.

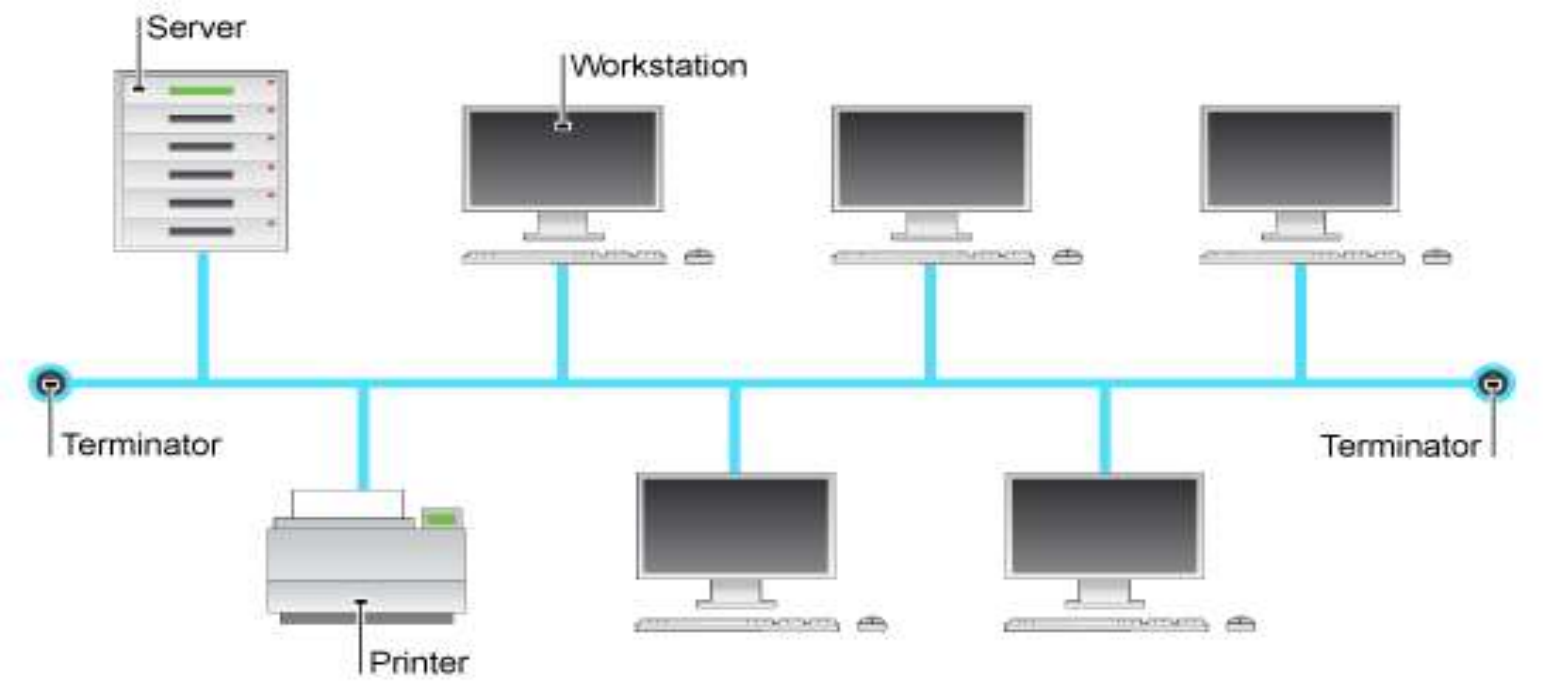
Types of Topology

- Bus Topology
- Ring Topology
- Star Topology
- Mesh Topology
- Tree Topology
- Hybrid Topology

Types of Topologies



BUS TOPOLOGY



BUS TOPOLOGY

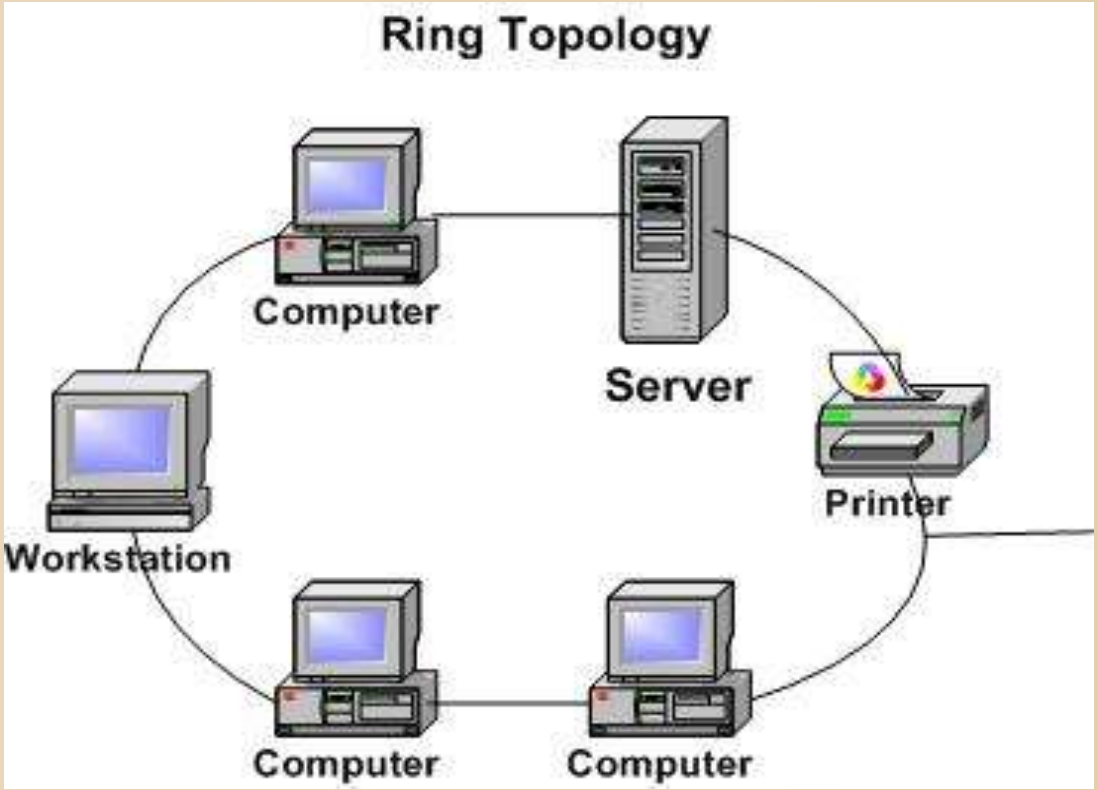
- Bus topology is the simplest of network topologies.
- All the nodes are connected by a single cable (bus).
- A bus topology consists of a main run of cable with a terminator at each end. All nodes are then connected to the linear cable.
- Bus Topology is popular on LAN s (Local Area Network) as they are inexpensive and easy to install.

BUS TOPOLOGY

- **Advantages**
- It is cheap, easy to handle and implement.
- Requires less cable
- It is best suited for small networks.

- **Disadvantages**
- There is a limit on the cable length, which limits the number of nodes connected to the bus.
- This topology is not suitable for large networks with heavy traffic.

RING TOPOLOGY



RING TOPOLOGY

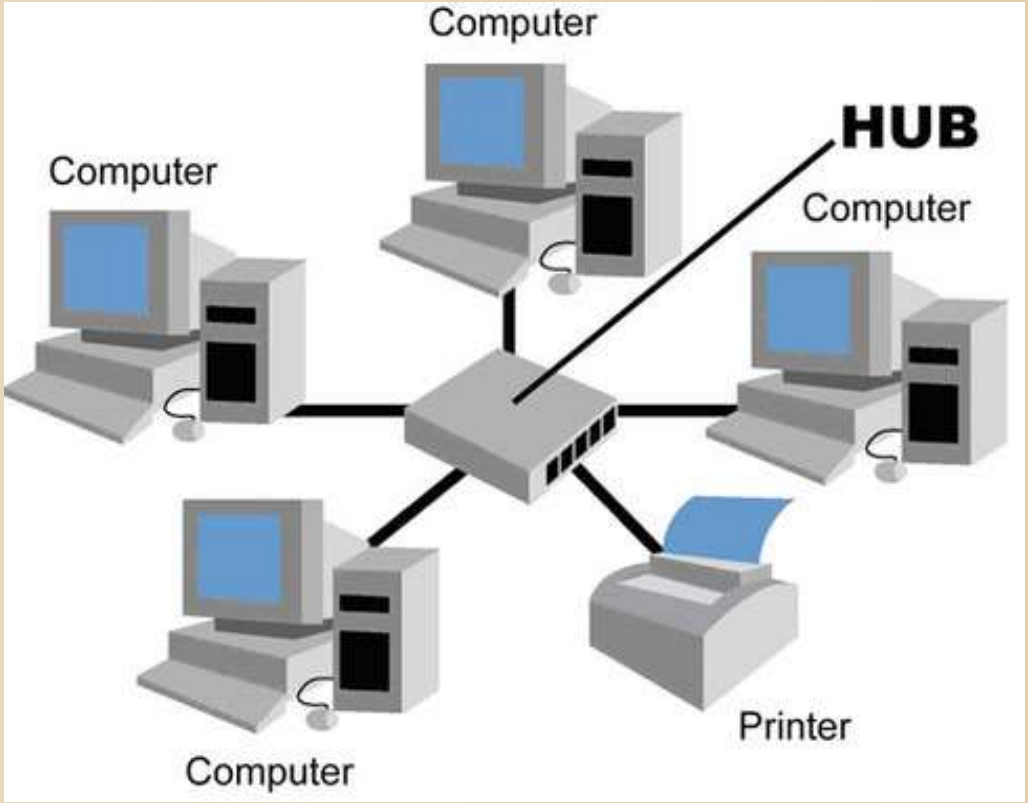
- In a Ring Topology each computer is connected to another computer which forms a ring like structure.
- In a Ring Topology every device has excatly two neighbours for communication purpose.
- When a terminal has to send data, it transmits it to the neighbouring node which transmits it to the next one and so on....
- All messages travel through a ring in the same direction.
- A failure in any cable or device breaks the loop and can take down the entire network.

RING TOPOLOGY

- Advantages
- This network is easier to manage than a Bus Network.
- Good communication over long distances.
- Handles high volume of traffic.

- Disadvantages
- The failure of a single node of the network can cause the entire network to fail.
- The movement or changes made to network nodes affects the performance of the entire network.

STAR TOPOLOGY



STAR TOPOLOGY

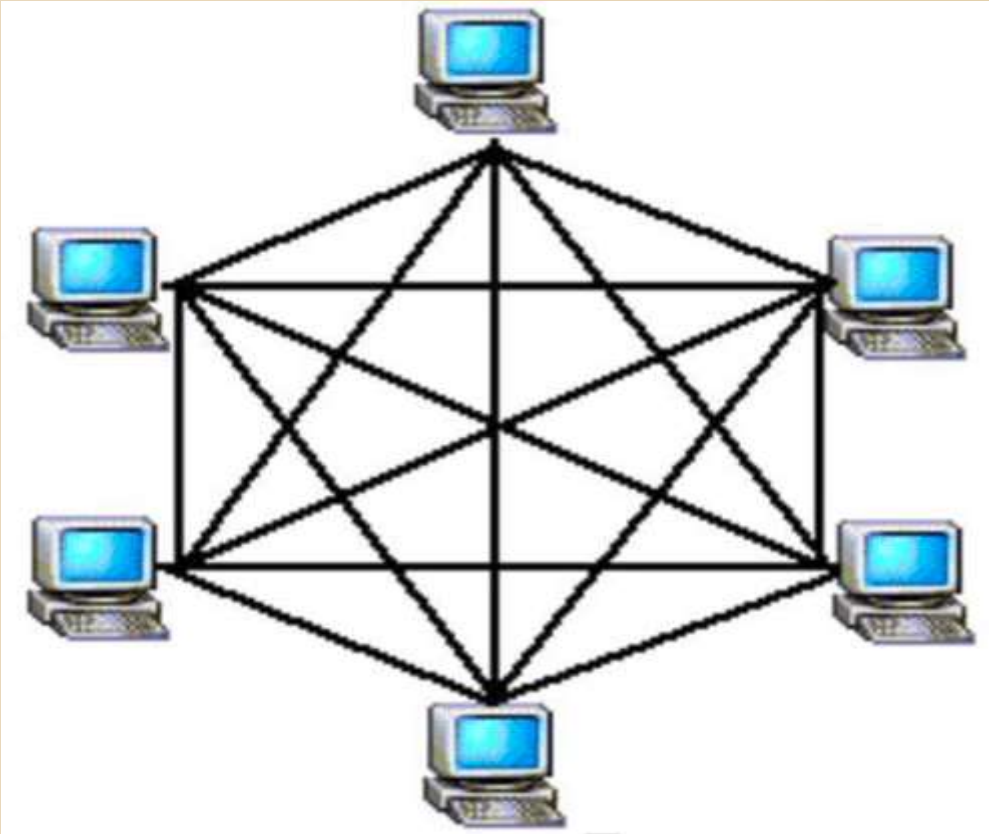
- In Star Topology all nodes are the computers are connected to a centralized hub through a cable.
- The hub is also called as Switch or Concentrator.
- Every node has a dedicated connection to the hub.
- Centralized hub acts as a repeater.
- The Hub takes a signal that comes from any node and passes to all the other nodes in the network.
- The Star Topology reduces the chance of network failure by connecting all the systems to a central node.

STAR TOPOLOGY

- Advantages
- Failure of one node does not affect the network.
- Easier to expand than a Bus or Ring topology.
- Easy to locate problems in cables and nodes.

- Disadvantages
- Requires more cable length than a linear topology.
- If the hub or concentrator fails, nodes attached are disabled.
- More expensive because of the cost of the concentrators.

MESH TOPOLOGY



MESH TOPOLOGY

- Mesh Topology is a point-to-point connection to other nodes or devices. All the network nodes are connected to each other.
- In this topology, each node is connected to every other node in the network.
- Implementing the mesh topology is expensive and difficult.
- In this type of network, each node may send message to destination through multiple paths.
- While the data is travelling on the Mesh Network it is automatically configured to reach the destination by taking the shortest route which means the least number of hops.

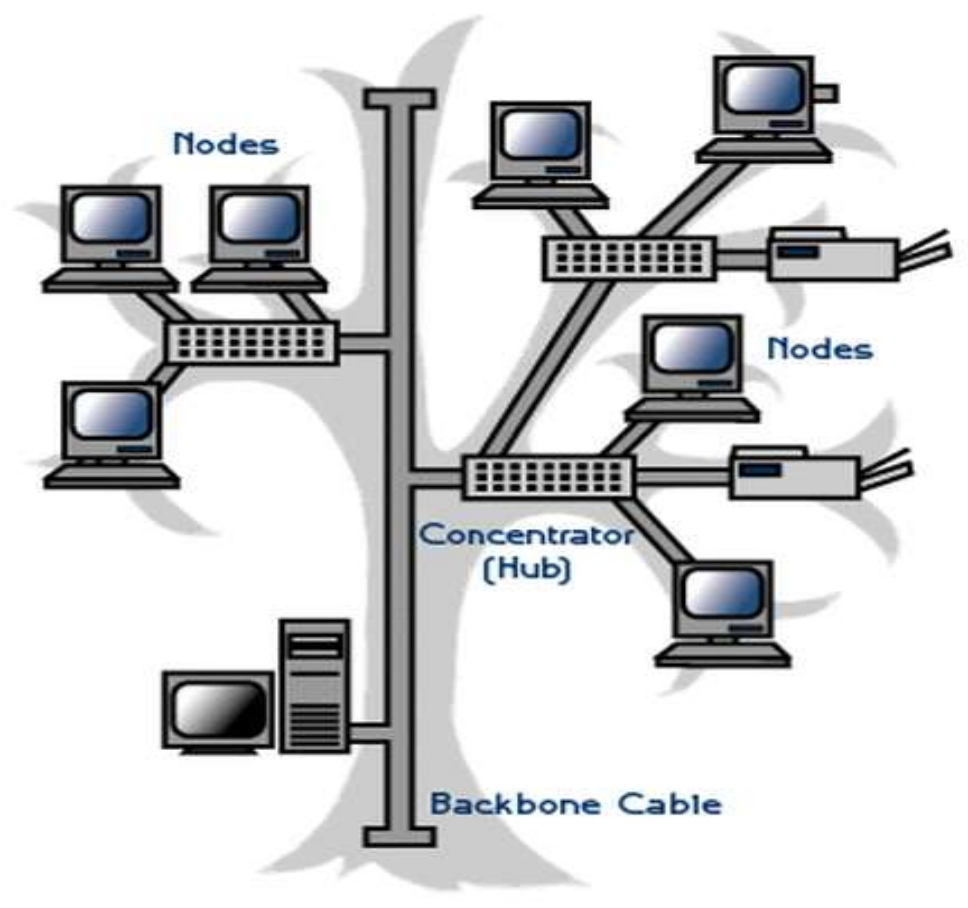
MESH TOPOLOGY

- Advantages

- No traffic problem as there are dedicated links.
- • It has multiple links, so if one route is blocked then other routes can be used for data communication.
- • Point to point links make fault identification easy.

- Disadvantages
- There is mesh of wiring which can be difficult to manage.
- Installation is complex as each node is connected to every node.
- Cabling cost is high.

TREE TOPOLOGY



TREE TOPOLOGY

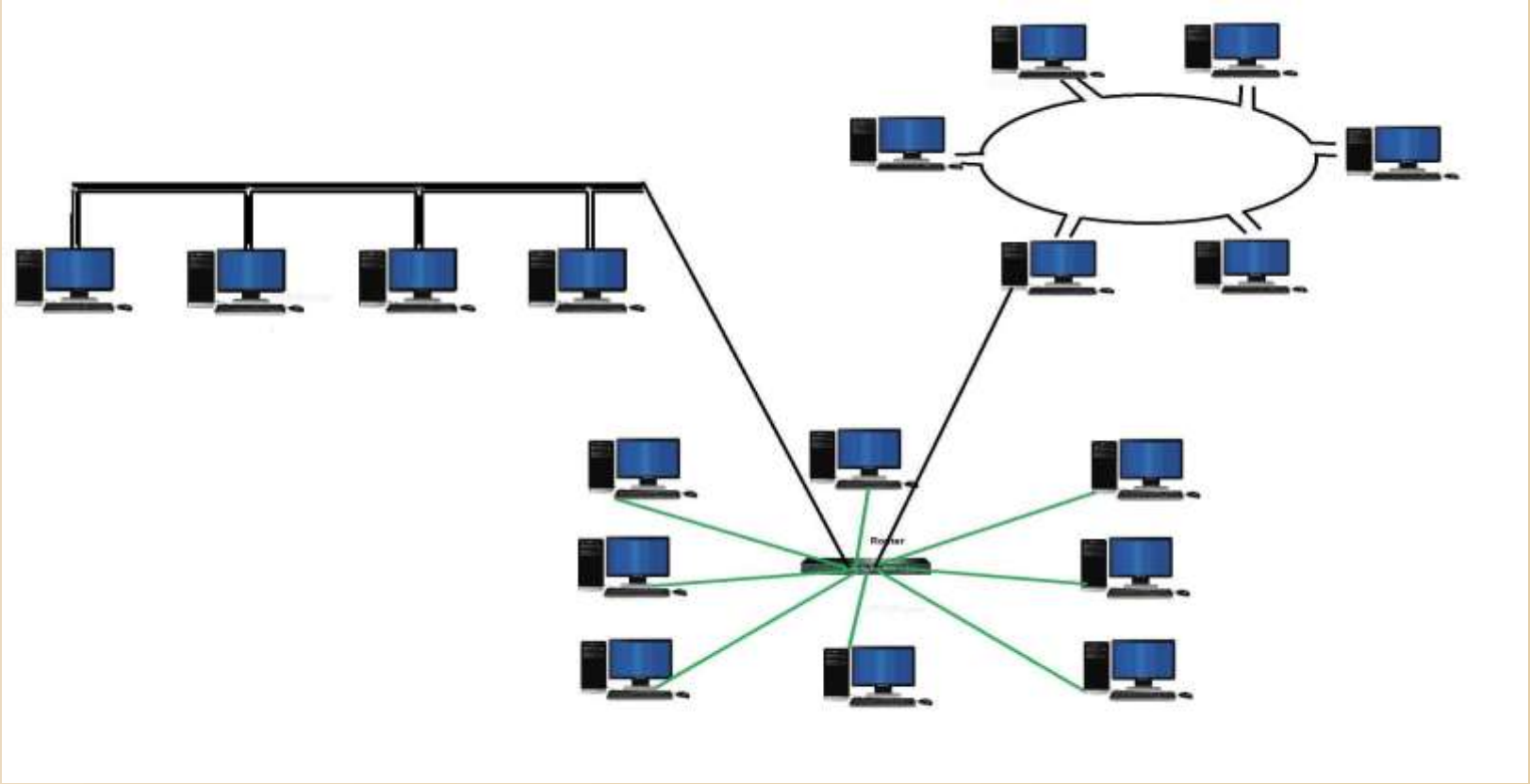
- A tree topology (hierarchical topology) can be viewed as a collection of star networks arranged in a hierarchy.
- This tree has individual peripheral nodes which are required to transmit to and receive from one other only and are not required to act as repeaters or regenerators.
- The tree topology arranges links and nodes into distinct hierarchies in order to allow greater control and easier troubleshooting.
- This is particularly helpful for colleges, universities and schools so that each of the connect to the big network in some way.

TREE TOPOLOGY

- Advantages
- Point-to-point wiring for individual segments.
- Supported by several hardware and software vendors.
- All the computers have access to the larger and their immediate networks.

- Disadvantages
- Overall length of each segment is limited by the type of cabling used.
- If the backbone line breaks, the entire segment goes down.
- More difficult to configure and wire than other topologies.

HYBRID TOPOLOGY



HYBRID TOPOLOGY

- A combination of any two or more network topologies.
- A hybrid topology always accrues when two different basic network topologies are connected.
- It is a mixture of above mentioned topologies. Usually, a central computer is attached with sub-controllers which in turn participate in a variety of topologies.

HYBRID TOPOLOGY

- Advantages
- It is extremely flexible.
- It is very reliable.

- Disadvantages
- The Implementation of Hybrid Topology is very expensive.

CONCLUSION

- Considerations When Choosing a Topology,
- Cost: A linear bus network may be the least expensive way to install a network; you do not have to purchase concentrators.
- Length of cable needed: The linear bus network uses shorter lengths of cable.
- Future growth: With a star topology, expanding a network is easily done by adding another concentrator.
- Cable type: The most common cable in schools is unshielded twisted pair, which is most often used with star topologies.

References

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THANK YOU