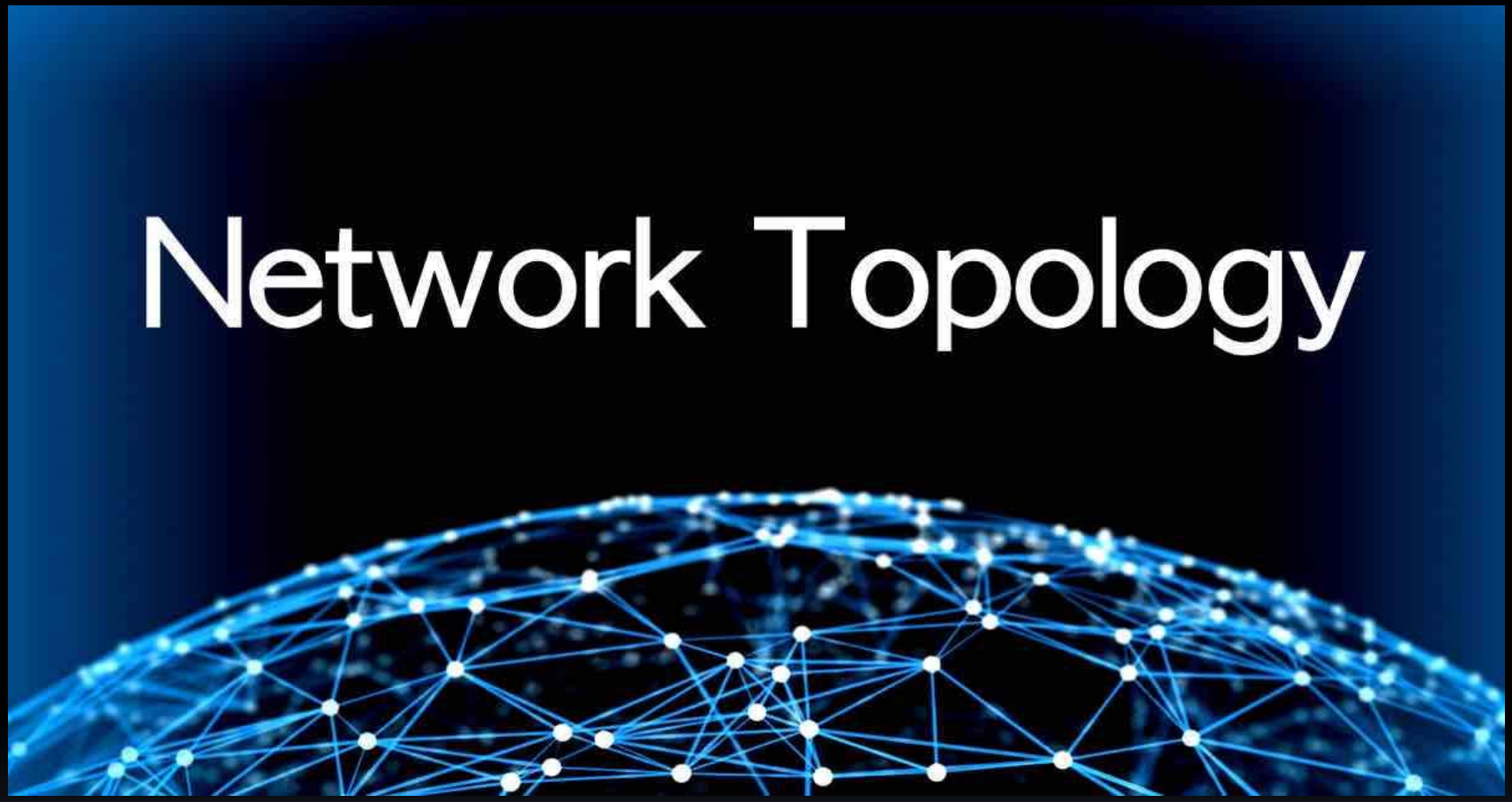
Network Topology



PRESENTED BY:

PROF. **SOMA PRASAD**

Topology

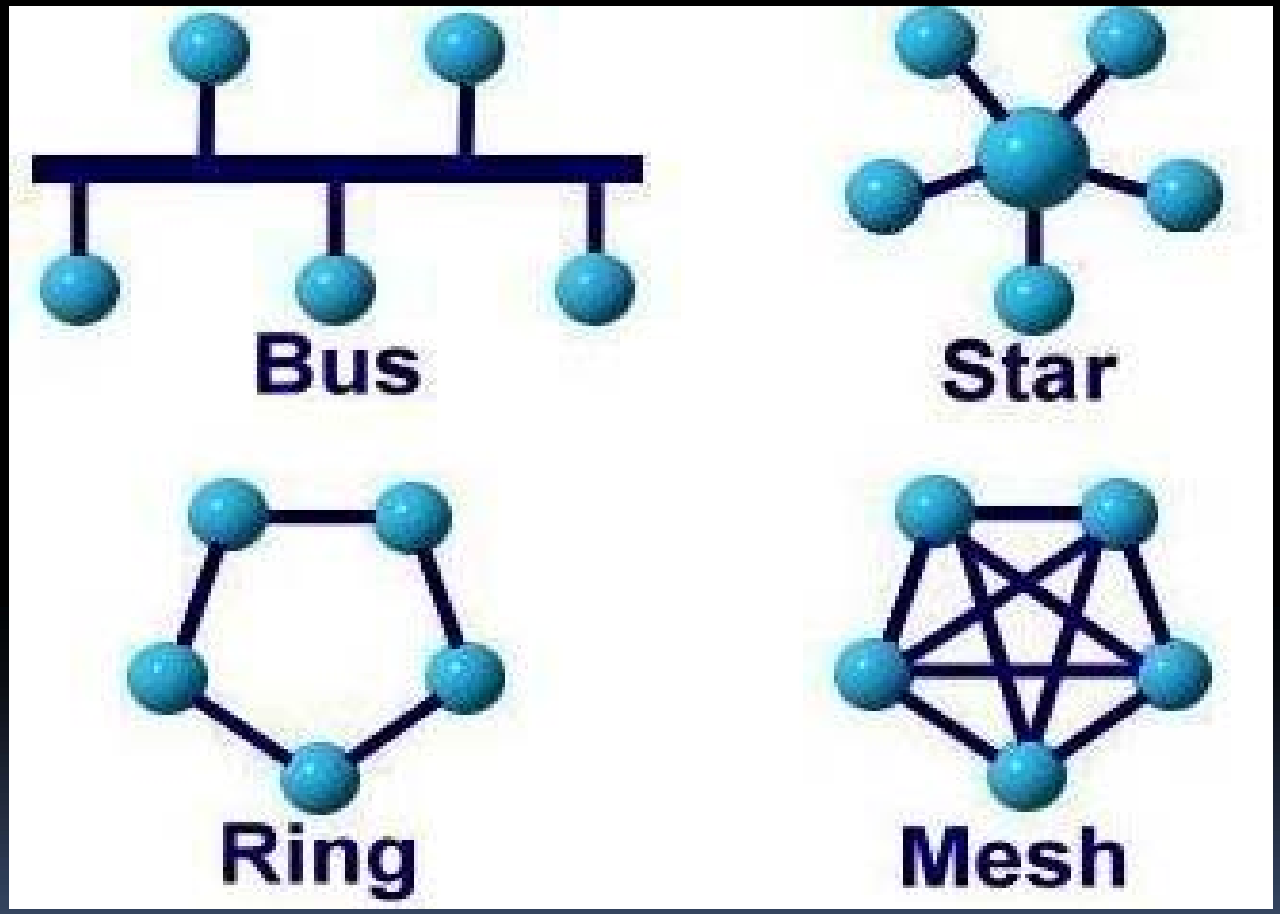
- Topology: Defines how the nodes of a network is connected

- The topology of a network is the geometric representation of the relationship of all the links and linking devices (usually called NODES) to one another.

Categories of Network topologies

- Physical topology : defines how the nodes of the network are physically connected
- Logical topology : how data is transmitted between nodes

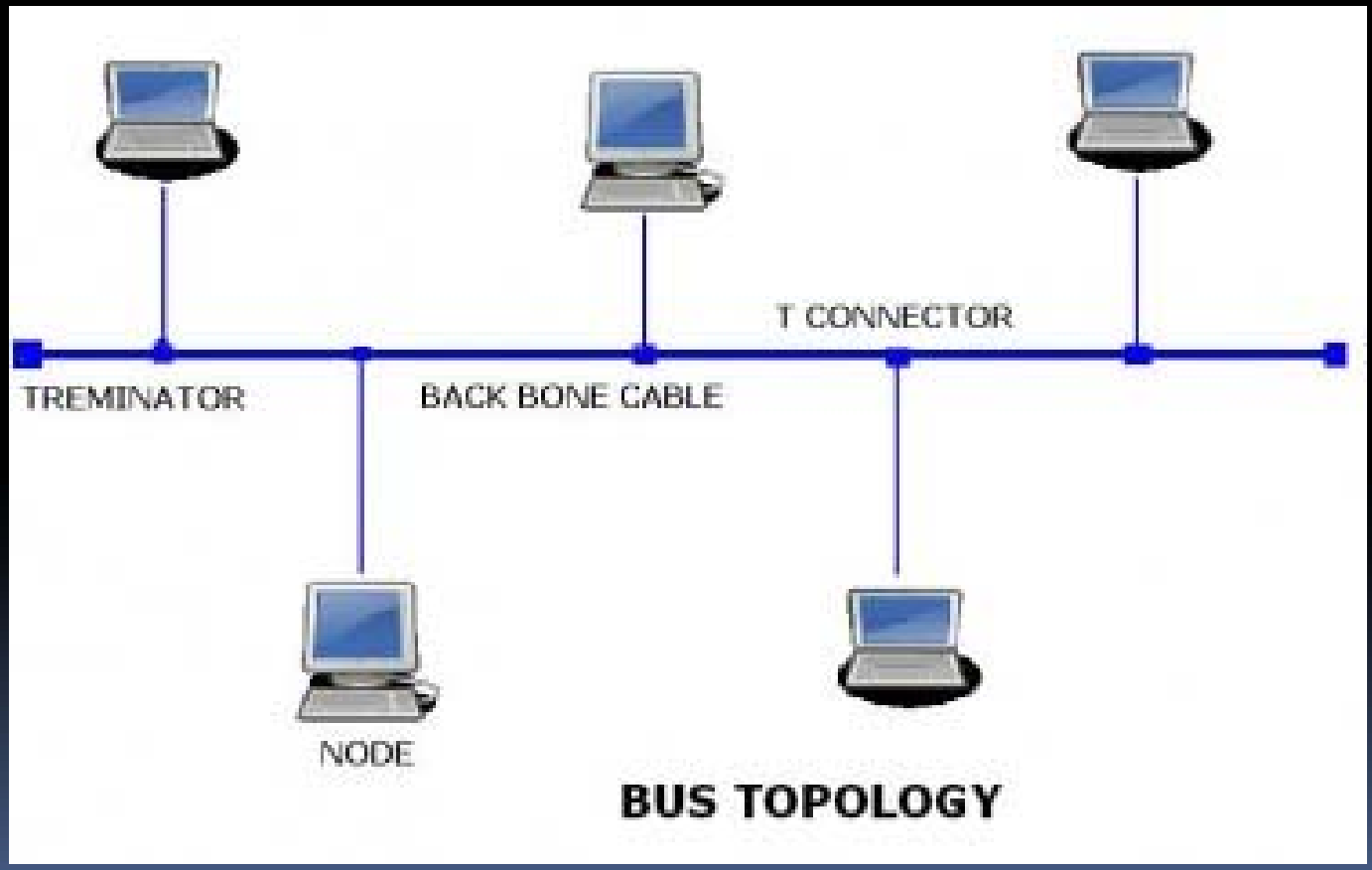
The Physical Topology



Bus Topology

- A bus topology is multi point.
- One long cable acts as a backbone to link all the devices to the backbone by drop lines and taps.
- Drop line: connection between the device and the cable
- Tap : splitter that cut the main link
- This allows only one device to transmit at a time

Bus Topology



Bus Topology

- Advantages:

1. Ease of installation
2. Less cabling
3. Less expensive

- Disadvantages:

1. Difficult reconfiguration and fault isolation
2. Difficult to add new devices
3. Any fault in backbone cable brings down the whole network

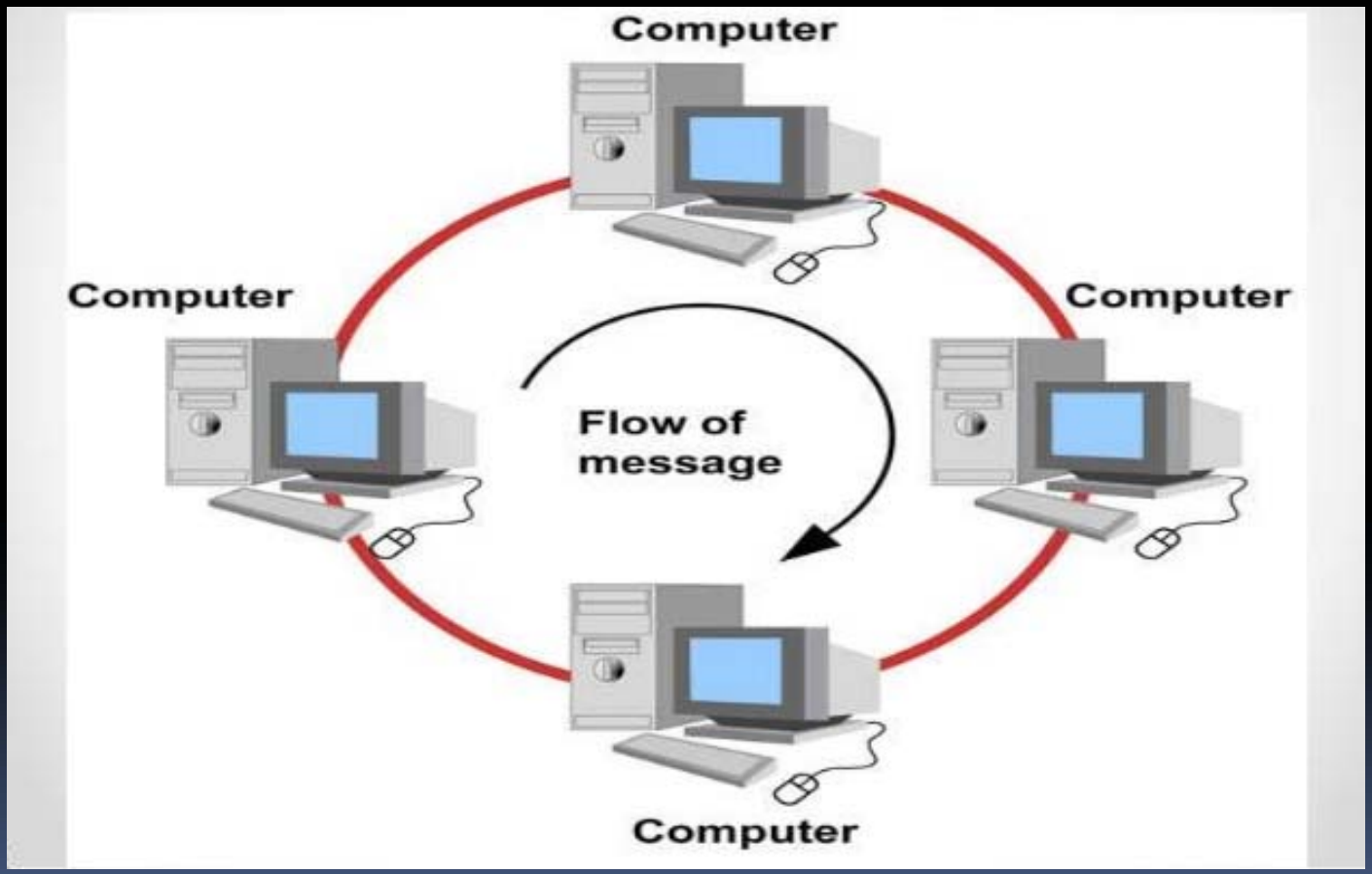
Ring Topology

- Each networked workstation has two connections: one to each of its nearest neighbors
- Data is transmitted unidirectionally around the ring
- Sending and receiving of data takes place by the help of TOKEN

Token Passing

- Token contains a piece of information which along with data is sent by the source computer
- This token then passes to next node, which checks if the signal is intended to it
  - If yes, it receives it and discards the token
  - otherwise passes token along with the data to next node

Ring Topology



Advantages of Ring topology

- Advantages:

1. Less cabling
2. Less expensive
3. Fault isolation is simplified

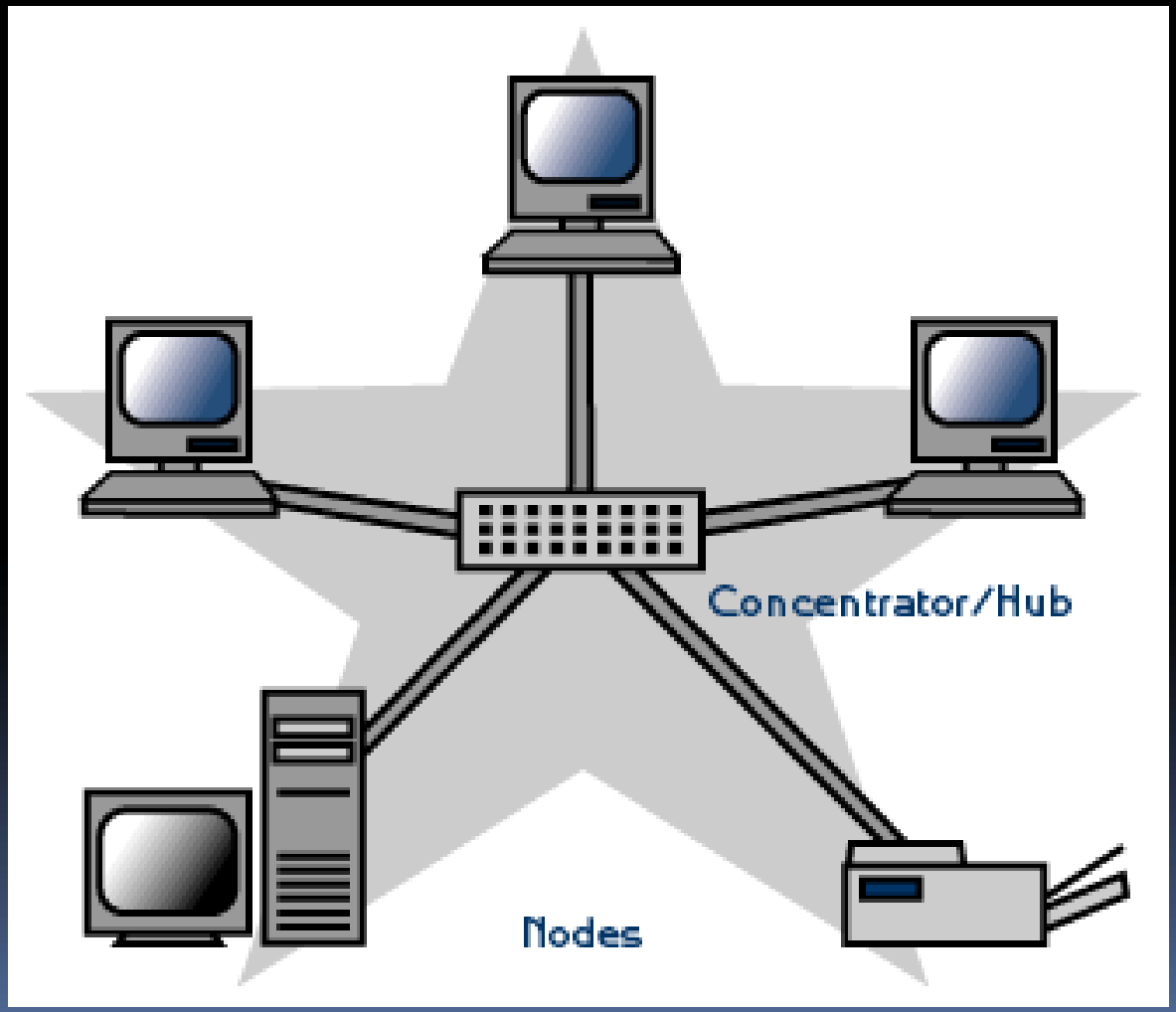
- Disadvantages:

1. Traffic is unidirectional
2. If one node goes down, it takes down the whole network
3. Slow
4. Reconfiguration

Star topology

- Each device has a dedicated point to point link to the central controller called “HUB” or “SWITCH”
- There is no direct traffic between devices
- Transmission occurs only through the central Hub or Switch
- When device 1 wants to send data to device 2, first sends the data to hub which then relays the data to other connected devices.

Star topology



Star topology

- Advantages:

1. Easy to install, reconfigure and wire
2. Robustness: If one link fails, only that link is affected
3. Fast as compared to link and bus
4. Multiple devices can transfer data without collision
5. Eliminates traffic problem
6. Easy to detect faults and to remove parts

Star topology

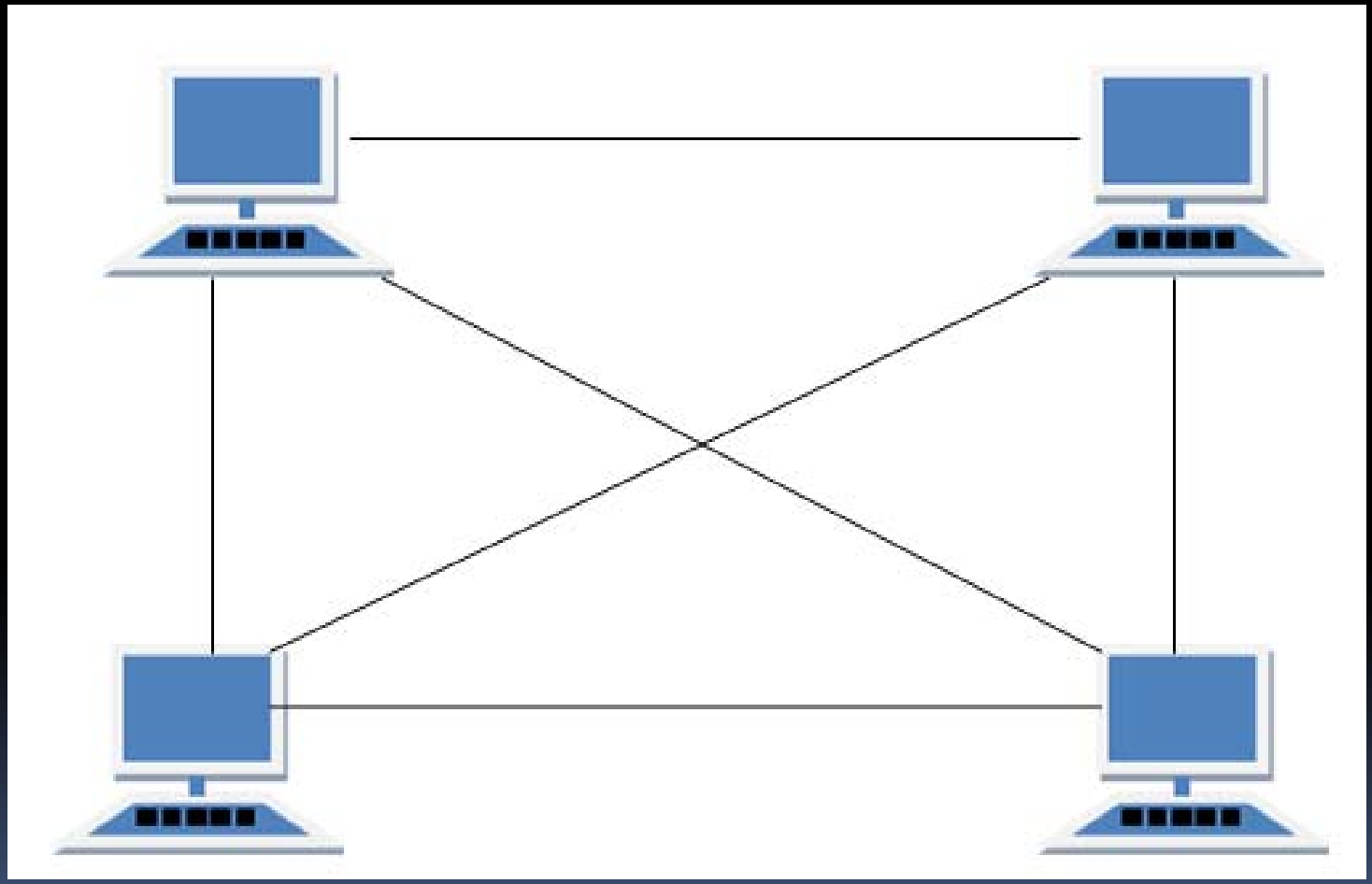
- Disadvantages:

1. If central node (hub or switch) goes down then entire network goes down
2. More cabling is required than bus topology thus expensive than bus.

Mesh topology

- Every device has a point to point link to every other device
- A fully connected mesh can have n(n-1)/2 physical channels to link n devices

Mesh topology



Mesh topology

- Advantages:

1. Each connection can carry its own data load due to dedicated link
2. Eliminates traffic problem
3. Robust: If 1 link becomes unusable, it doesn't affect other systems
4. Privacy or security because of dedicated line
5. Point to point link make fault identification easy

Mesh topology

- Disadvantages:

1. More cables are required than other topologies
2. Installation and reconfiguration is very difficult because each device must be connected to every other device
3. Expensive due to hardware requirements such as cables and I/O ports

Conclusion

- Full mesh topology is theoretically the best since every device is connected to every other device. (thus maximizing speed and security, however it is quite expensive to install)


Thank you!


Any Question ?