



# NETWORK TOPOLOGIES

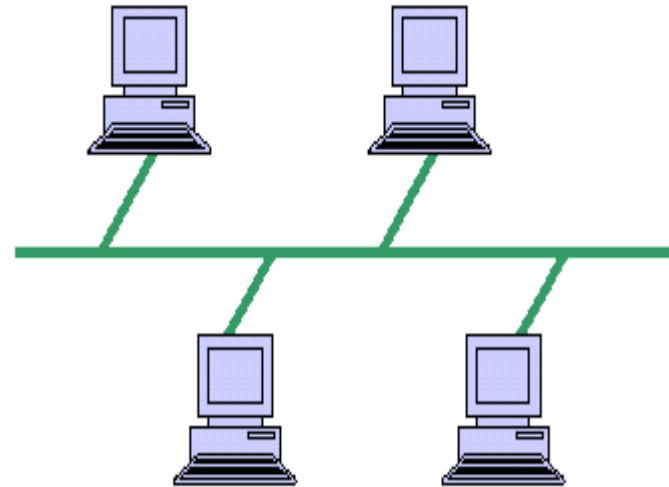


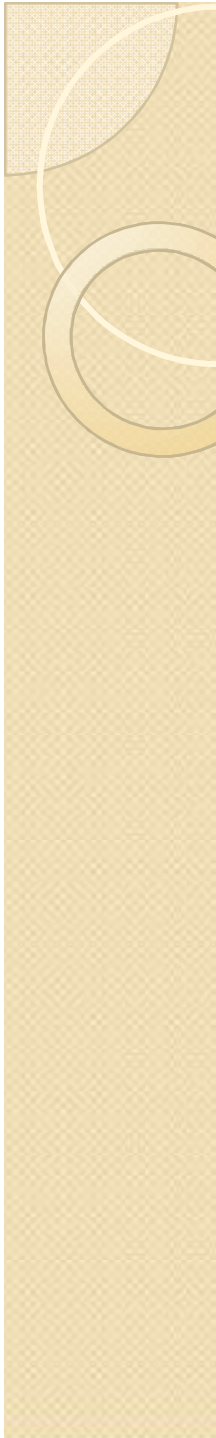
# Topologies

- The physical topology of a network refers to the configuration of cables, computers, and other peripherals
- Star
- Ring
- Bus
- Hybrid
- Tree
- Complete
- Irregular

# BUS Topology

- Each machine is connected to a single cable.
- Each computer or server is connected to the single bus cable through some kind of connector.
- A signal from the source travels in both directions to all machines connected on the bus cable until it finds the address on the network that is the intended recipient.
- If the machine address does not match the intended address for the data, the machine ignores the data.
- Alternatively, if the data does match the machine address, the data is accepted

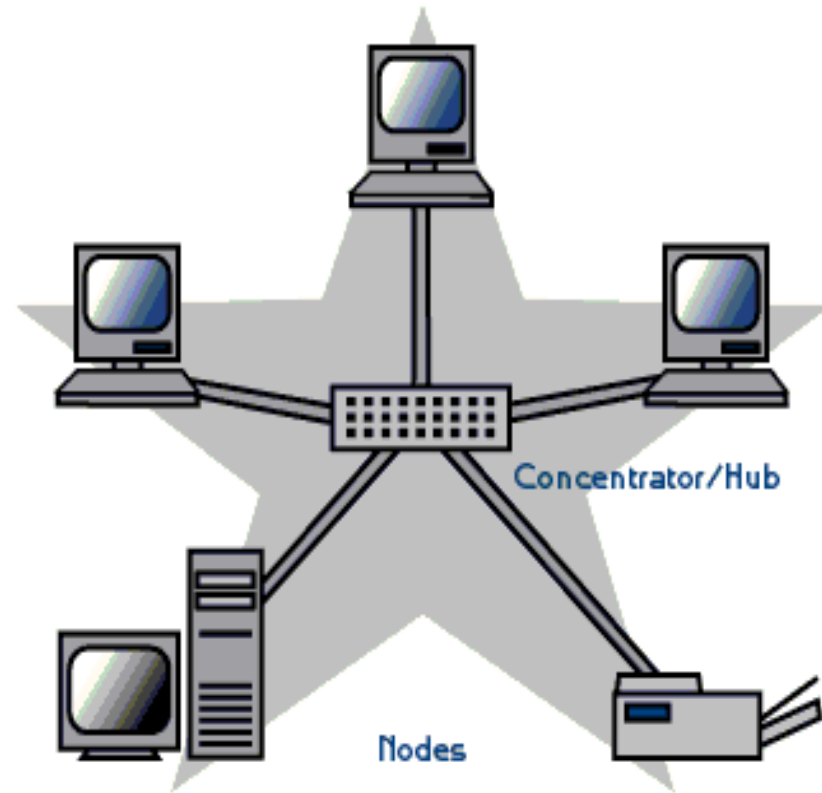


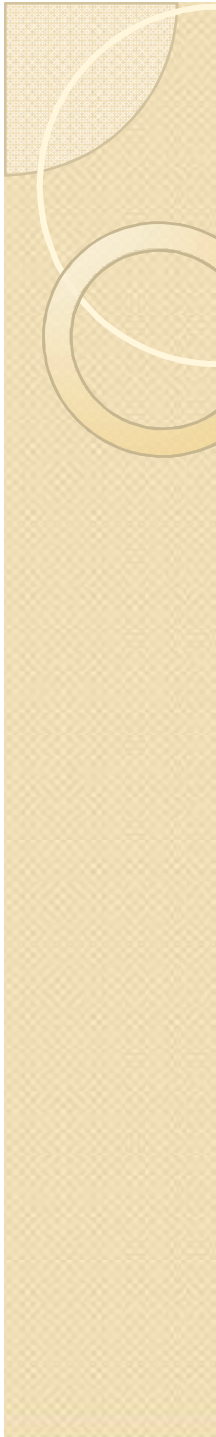


<b>Advantages</b>	<b>Disadvantages</b>
Cheap and easy to implement	Network disruption when computers are added or removed  High cost of managing the network
Require less cable	Single point of failure.  A break in the cable will prevent all systems from accessing the network.
Does not use any specialized network equipment.	Difficult to troubleshoot.

# Star Topology

- Each machine is connected to a central hub or switch.
- It allows each machine on the network to have a point to point connection to the central hub.
- All of the traffic which transverses the network passes through the central hub.
- The hub acts as a signal booster or repeater which in turn allows the signal to travel greater distances.
- Most widely implemented
- Hub is the single point of failure

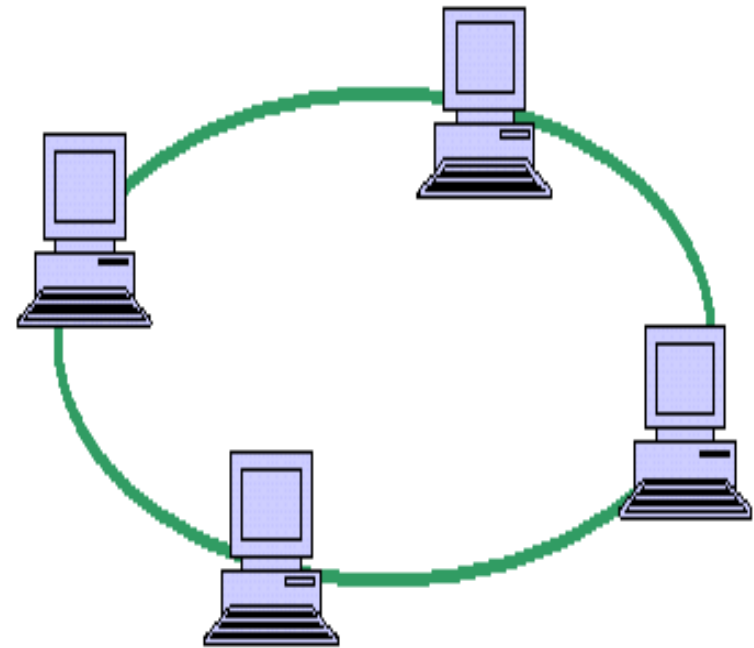


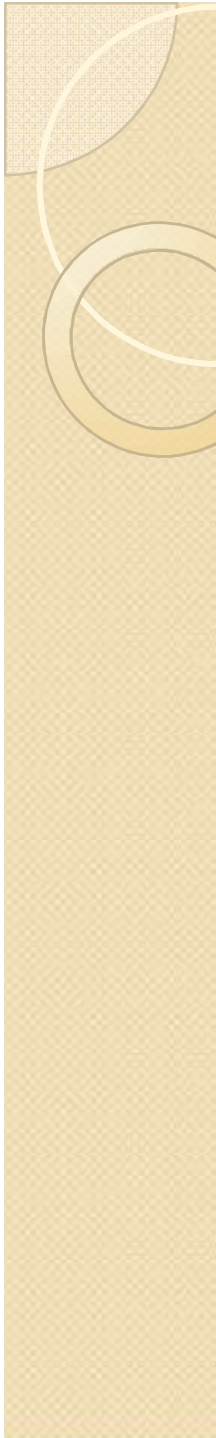


Advantages	Disadvantages
Easily expanded without disruption to the network	Requires more cable
Cable failure affects only a single user	A central connecting device allows for a single point of failure
Easy to troubleshoot and isolate problems.	More expensive than bus topologies because of the cost of the hubs

# Ring Topology

- Each computer is connected to the network in a closed loop or ring
- Each machine or computer has a unique address that is used for identification purposes
- The signal passes through each machine or computer connected to the ring in one direction
- Ring topologies typically utilize a token passing scheme, used to control access to the network
- By utilizing this scheme, only one machine can transmit on the network at a time.





<b>Advantages</b>	<b>Disadvantages</b>
Cable faults are easily located, making troubleshooting easier	Expansion to the network can cause network disruption
Ring networks are moderately easy to install	A single break in the cable can disrupt the entire network.



# Tree

- **Tree:** A collection of busses connected by a branching cable with no closed loops
  - Allows users to create networks using bridges
  - Message from any site can be received by all other sites, until it reaches an end point
  - End point controller absorbs a message if it reaches end point controller without being accepted by a host
  - **Advantage:** Message traffic can still flow through the network even if a single node fails

# Tree ( continued)

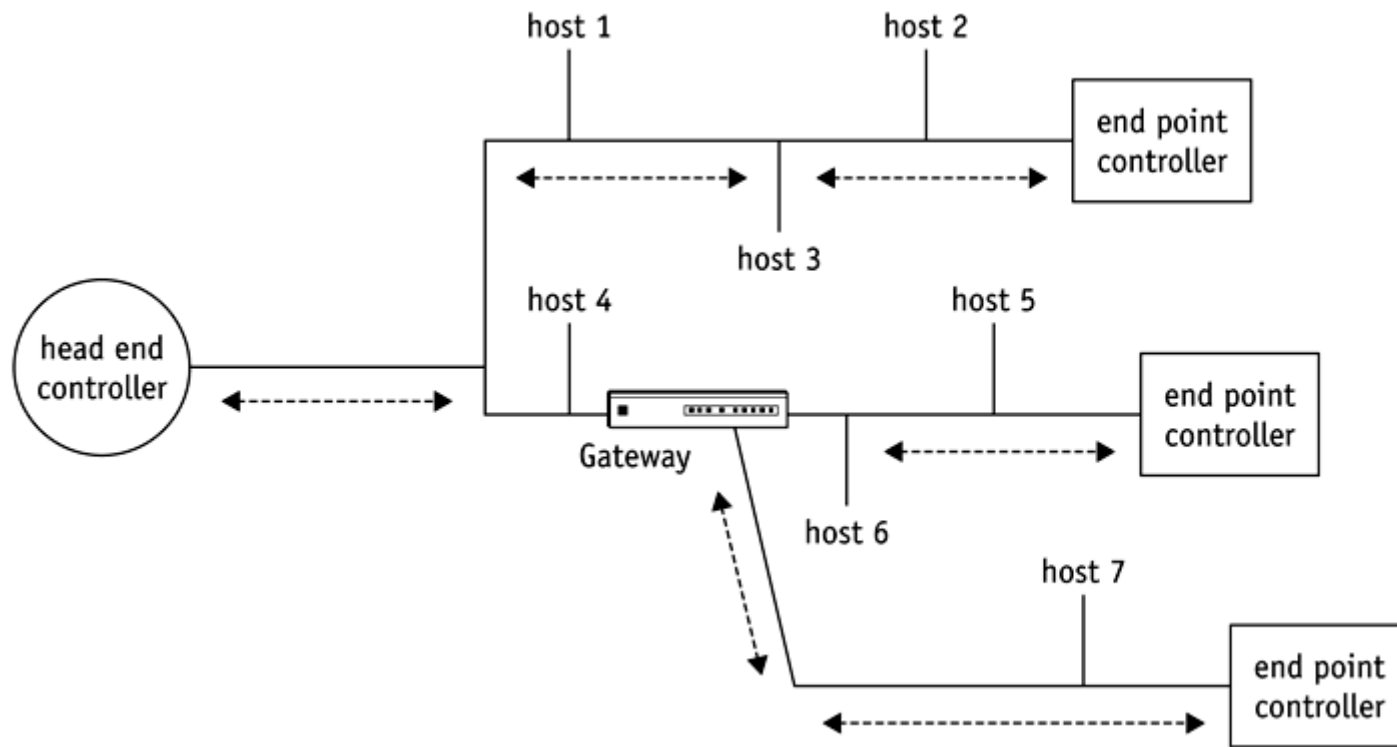


Figure : Tree Topology

# Hybrid

Selects among the strong points of each topology and combines them to meet that system's communications requirements most effectively

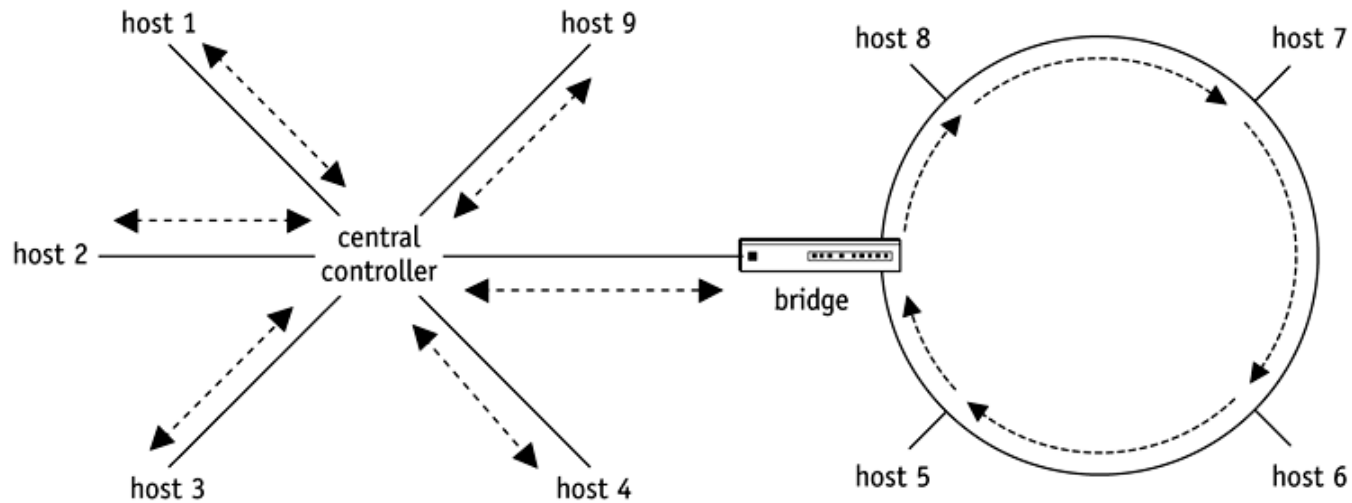


Figure : Hybrid topology combining a star and a ring using a bridge

# Hybrid (continued)

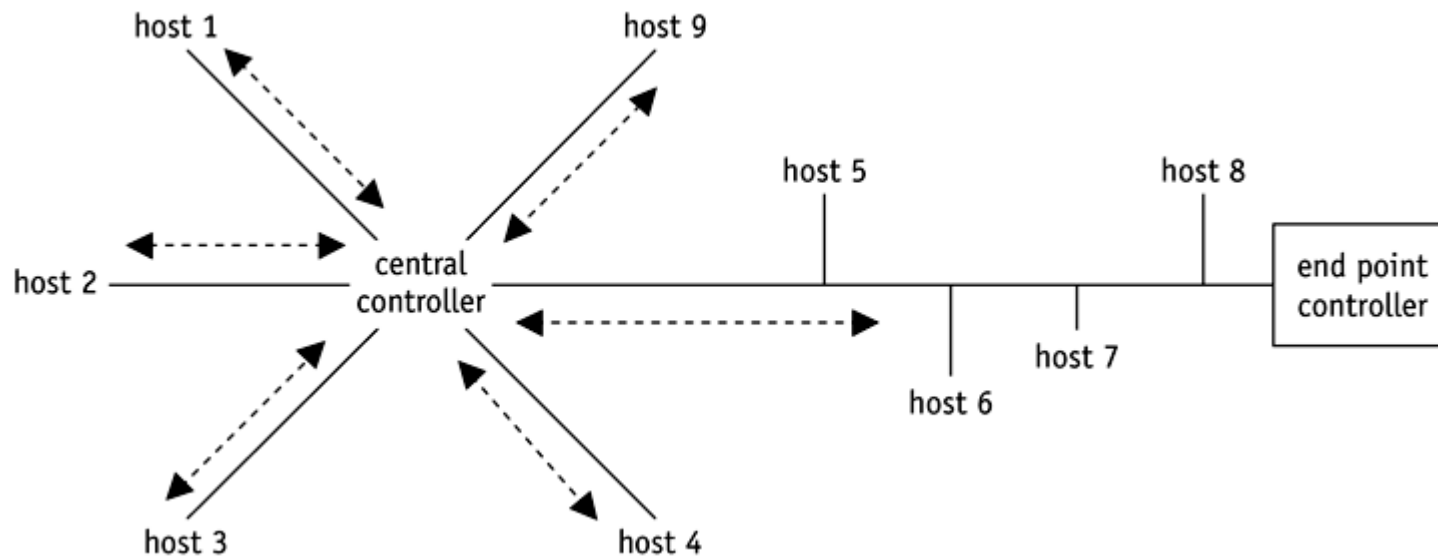
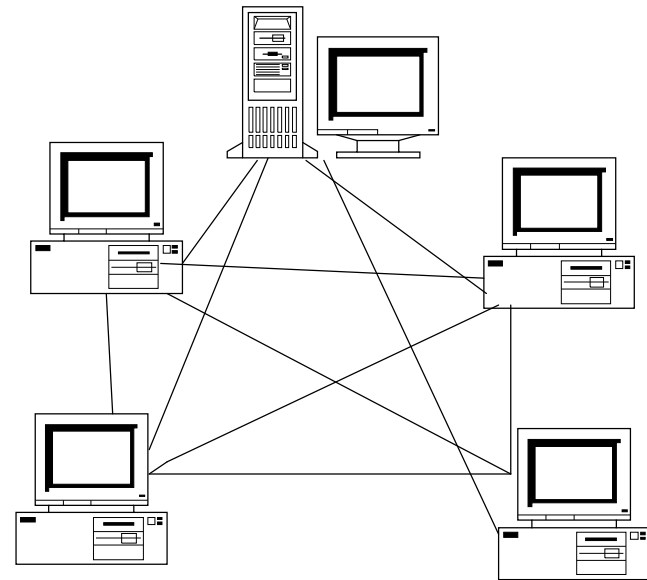


Figure : Hybrid topology combining a star and a bus

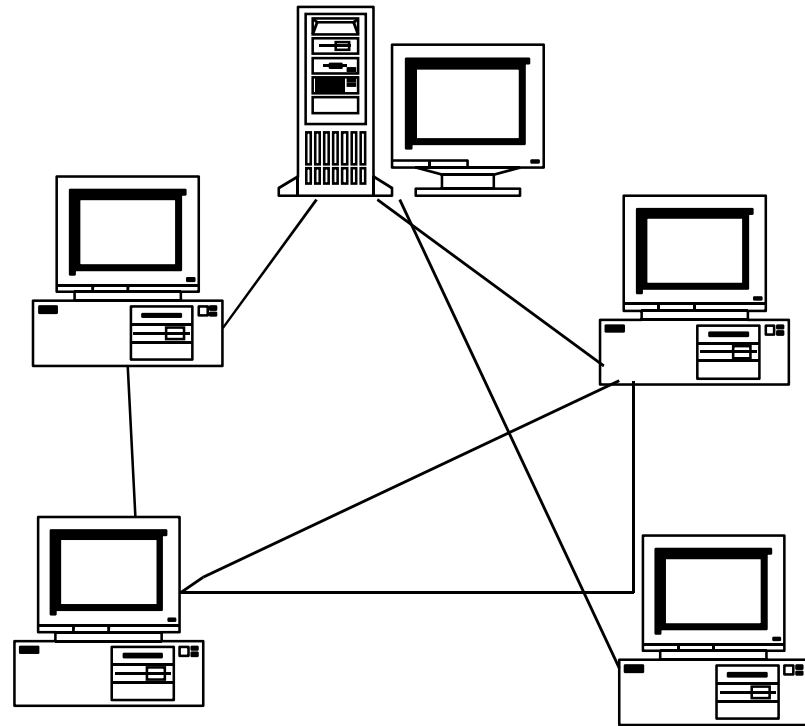
# Fully connected or Complete(Mesh)

- In A mesh network each station is connected directly to every other station in the network.
- It is a viable solution only for smaller networks.
- The huge cabling cost and awkwardness of laying so many direct links make the mesh topology unattractive for LAN's with a large number of stations.
- On the other hand since all stations are directly linked to all other stations on exclusive links, this topology allows simultaneous communications between a number of pairs of stations.



# Irregular network

- An irregular network is similar to the fully connected except that the requirement of connecting every computer to every other is removed.
- The cost and the flexibility to add a new computer is reasonable.
- The effect of failure depends on the exact network topology.





# Application

- **News Groups**
- **Internet Telephony (VoIP)**
- **Video Conferencing**
- **Chat Groups**
- **Instant Messengers**



# Scope of Research

- Improved Network Connection using better Topologies.





# Assignment

1. Why star topology is most commonly used topology?
2. List real life application of Hybrid networks.