Network Hardware

Types of Computer Networks

- Network hardware discuss technical issues involved in network design.

- The networks are examined under following categories:

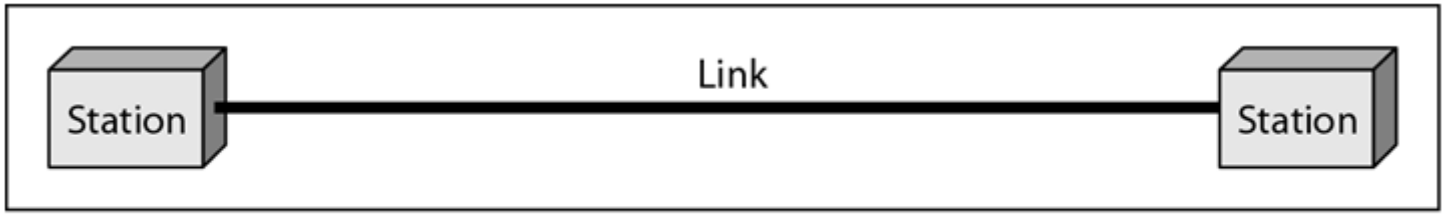
    - Transmission Technology
    - Scale
    - Network Topology

1. Transmission Technology

- There are two types of transmission technology that are in widespread use:
  - Point-to-point Networks
  - Broadcast Networks

1.1 Point-to-point Networks

- Point-to-point networks consist of many connections between individual pairs of machines.
- A message packet may have to visit one or more intermediate machines before reaching its intended target.
- Routing algorithms play an important role.

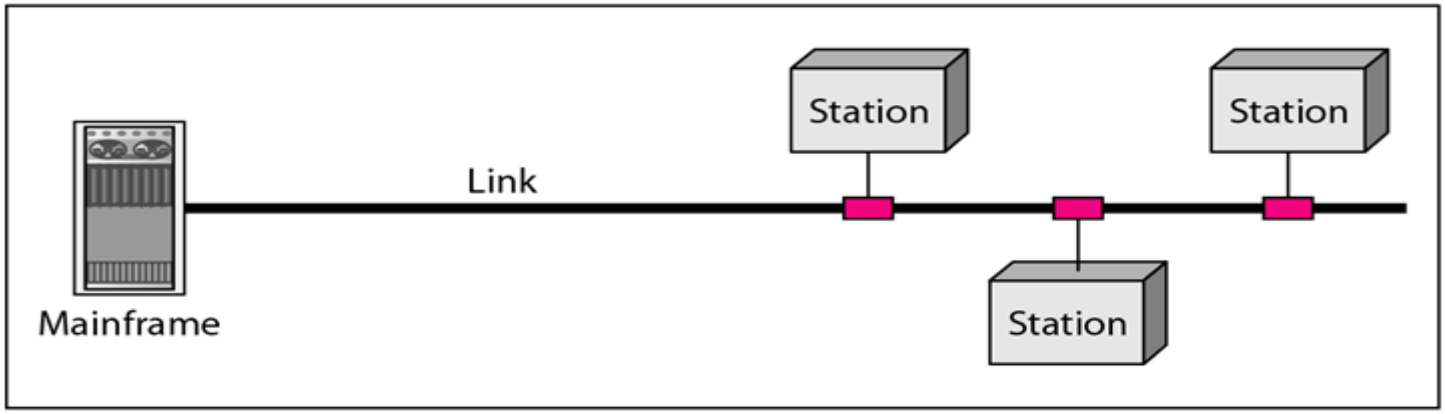


a. Point-to-point

1.2 Broadcast Networks

- The communication channel is shared by all the machines on the network.

- Packets sent by any machine are received by all the others.



b. Multipoint

2. Scale

- On the basis of geographical area covered, network can be divided into the following categories:

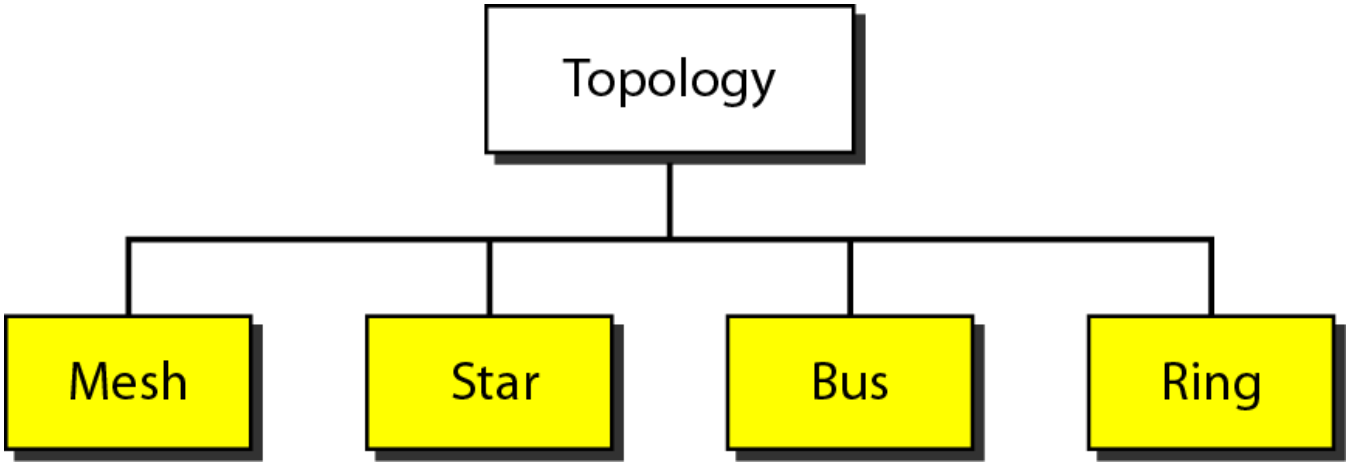
Interprocessor distance	Processors located in same	Example
1 m	Square meter	Personal area network
10 m	Room	Local area network
100 m	Building	
1 km	Campus	
10 km	City	Metropolitan area network
100 km	Country	Wide area network
1000 km	Continent	
10,000 km	Planet	The Internet

- **Personal Area Network (PAN):** A PAN is a network that is used for communicating among computers and computer devices (including telephones) in close proximity of around a few meters within a room.
- **Local Area Network (LAN):** A LAN is a privately owned network that operates within and nearby a single building like a home, office or factory. LAN's can be either wired or wireless.
- **Metropolitan Area Network (MAN):** A metropolitan area network (MAN) is a large computer network that usually spans a city or a large campus. A MAN is optimized for a larger geographical area than a LAN, ranging from several blocks of buildings to entire cities.
- **Wide Area Network (WAN):** WAN covers a large geographic area such as country, continent or even whole of the world. The world's most popular WAN is the Internet.

3. Network Topology

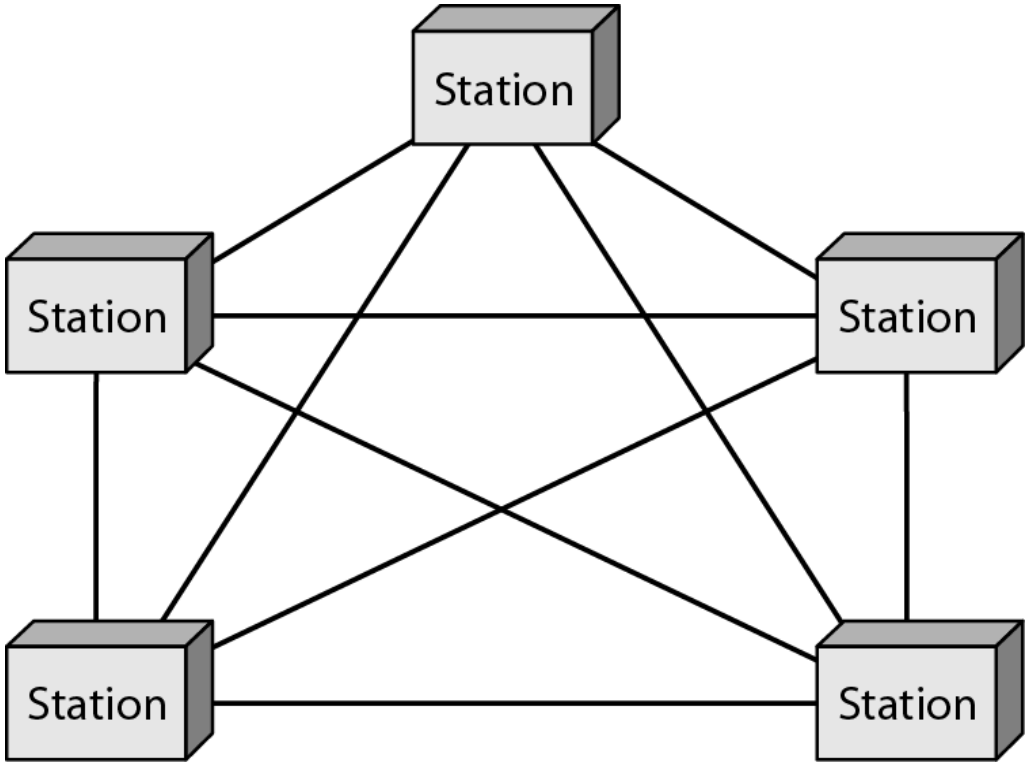
- The topology of a network is the geometric representation of the relationship of all the links and linking devices (usually called nodes) to one another.

- There are four basic topologies possible: mesh, star, bus, and ring.



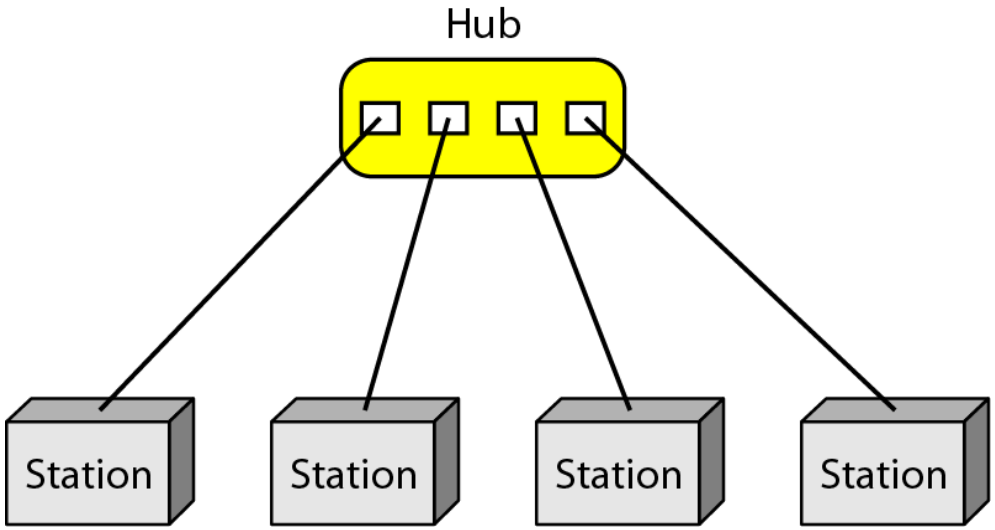
3.1 Mesh Topology

- Here every device has a point to point link to every other device.
- Node 1 must be connected with n-1 nodes.



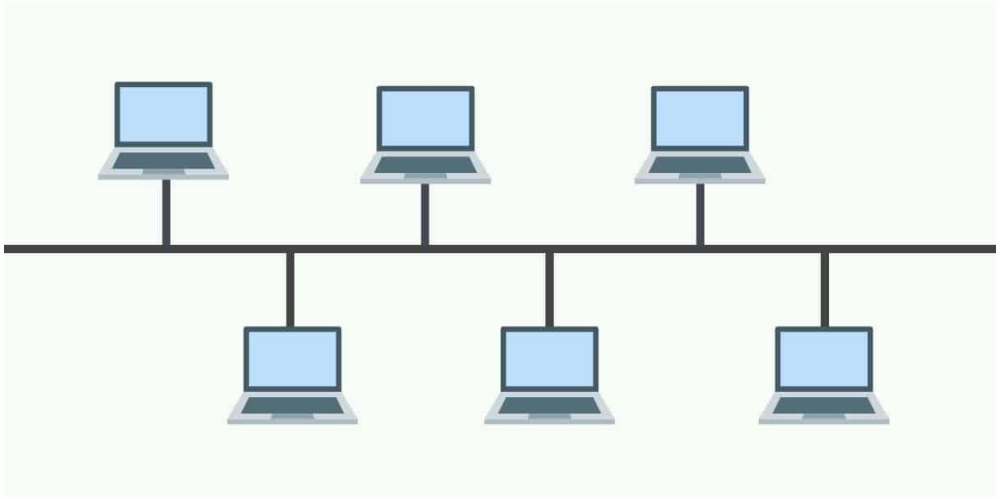
3.2 Star Topology

- Here each device has a dedicated point-to-point link to the central controller called "Hub"(Act as a Exchange).
- There is no direct traffic between devices.
- The transmission are occurred only through the central "hub".
- When device 1 wants to send data to device 2; First sends the data to hub. Which then relays the data to the other connected device.



3.3 Bus Topology

- A bus topology is multipoint.
- Here one long cable act as a backbone to link all the devices are connected to the backbone.
- This allows only one device to transmit at a time.



3.4 Ring Topology

- Here each device has a dedicated connection with two devices on either side.
- The signal is passed in one direction from device to device until it reaches the destination and each device have repeater.
- When one device received signals instead of intended another device, its repeater then regenerates the data and passes them along.

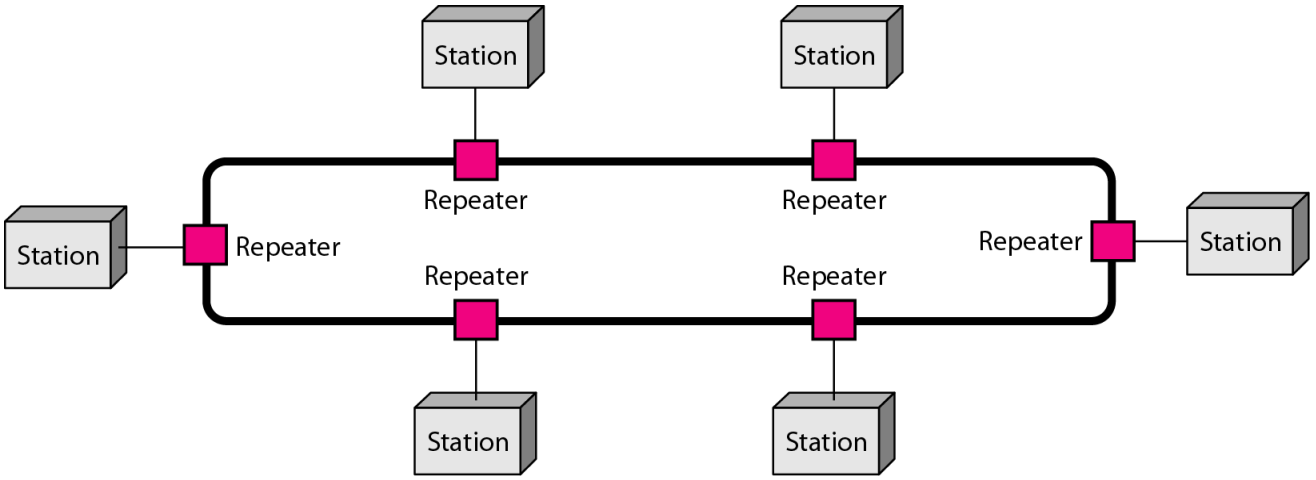


Figure: ***A hybrid topology: a star backbone with three bus networks***

A network can be hybrid. For example, we can have a main star topology with each branch connecting several stations in a bus topology.