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COMPUTER NETWORKS TOPOLOGIES.

Topology:

The arrangement (structure) of the various elements of a computer network that depicts both physically and logically.

Physical Topology:

The physical way the network is wired (how computers connected to each other.

Logical Topology:

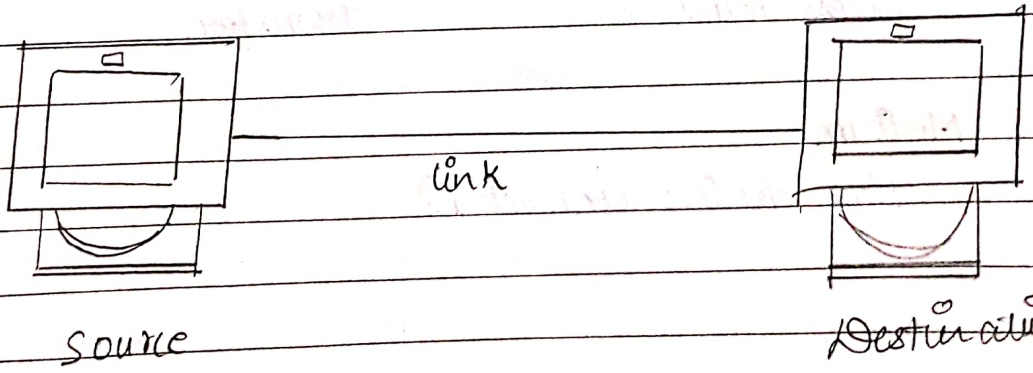
The way messages are sent (how to send a message from machine to another.

BASIC NETWORK TOPOLOGIES:

→ Point-to-point
→ Bus
→ Ring
→ Star
→ Mesh

POINT-TO-POINT TOPOLOGY.

Connection between two machines through a dedicated media link.



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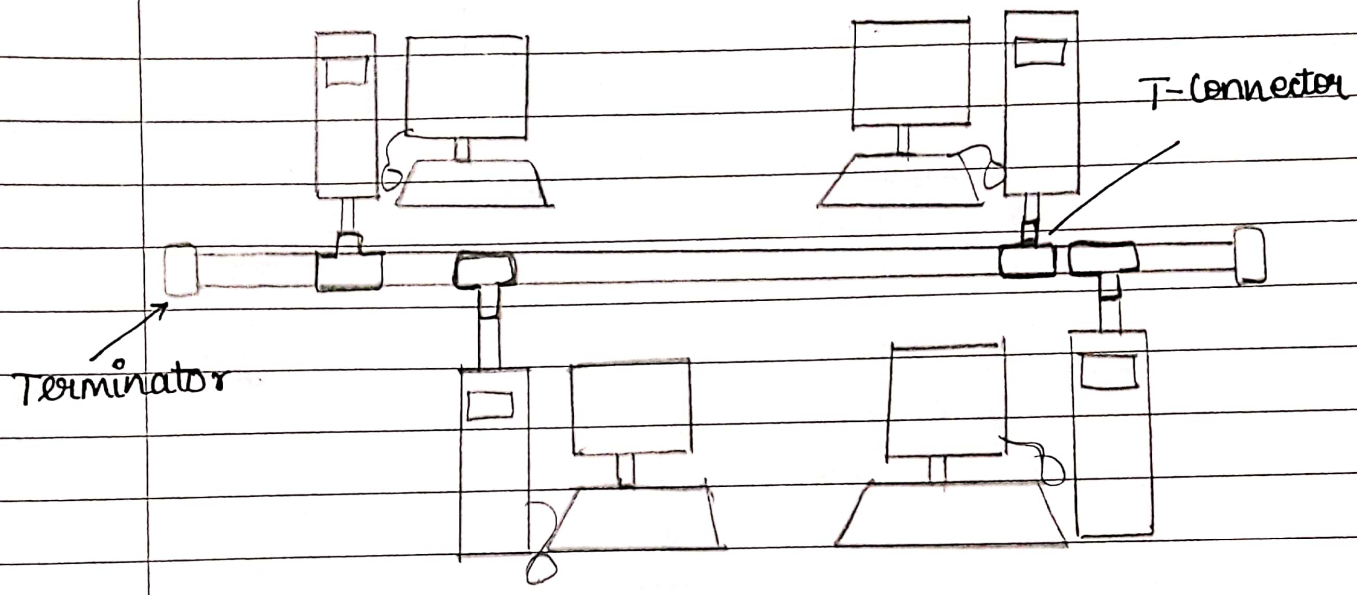
BUS TOPOLOGY

* Single cable functions as a shared communication media bus. (Backbone)
* Computers attach (tap) with an interface connector.
* Terminators at each end of the cable



Advantages

* Simple to design
* Easy to install
* Inexpensive due to using
  - Coaxial cable
  - BNC Connectors

Disadvantages

* Less security (Allows sniffing)
* Slow during high traffic
* Lead to collisions

RING TOPOLO

Cable connects one node to another to form a ring. The ends are attached to each other in the form of a ring. Messages travels through the ring always in the same direction either in clockwise or anticlockwise.

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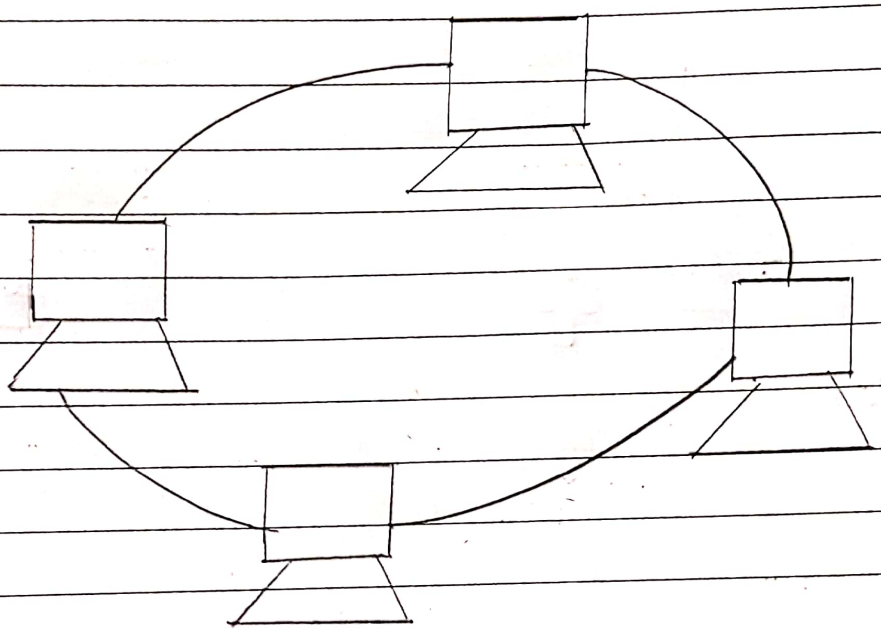
* Data message are transmitted in frames that circulates all the machines.
* Sent frame circulates back to source to acknowledge transmission and set free.



Advantages:
* Simple to design
* Easy to install
* Inexpensive due to using
  - Coaxial cable
  - BNC Connectors

DisAdvantages:
The entire network fails if one machine fails. Expansion or reconfiguration affects operations. Slow for big no. of machines

STAR TOPOLOGY (the most well known and commonly used topology)

* Each station is connected directly to a central device.

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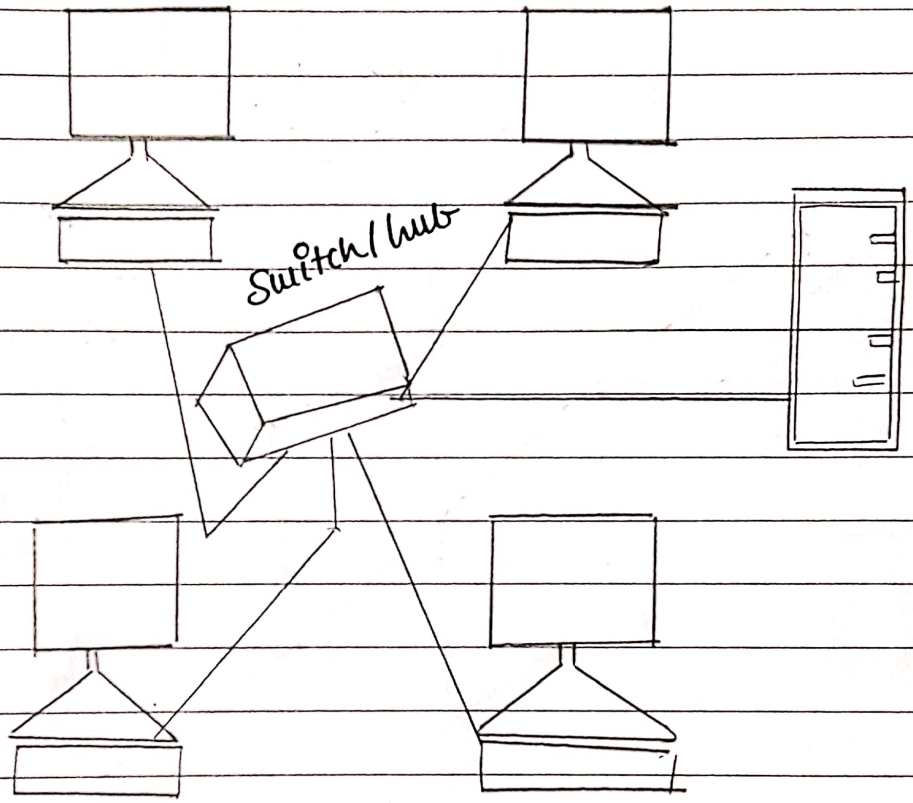
* The connection is like a number of point to point links
* Central device is Hub or Switch
* Switch is more recent technology and more secure device that hub.



Advantages

* Network not affected if one machine fails
* Network expansion and reconfiguration is simple
* Troubleshooting is easy (we can easily identify the failing machine from the switch and we can easily identify where is the problem & where the broken cable exist

Disadvantages

* If the central device fails at the network fails.

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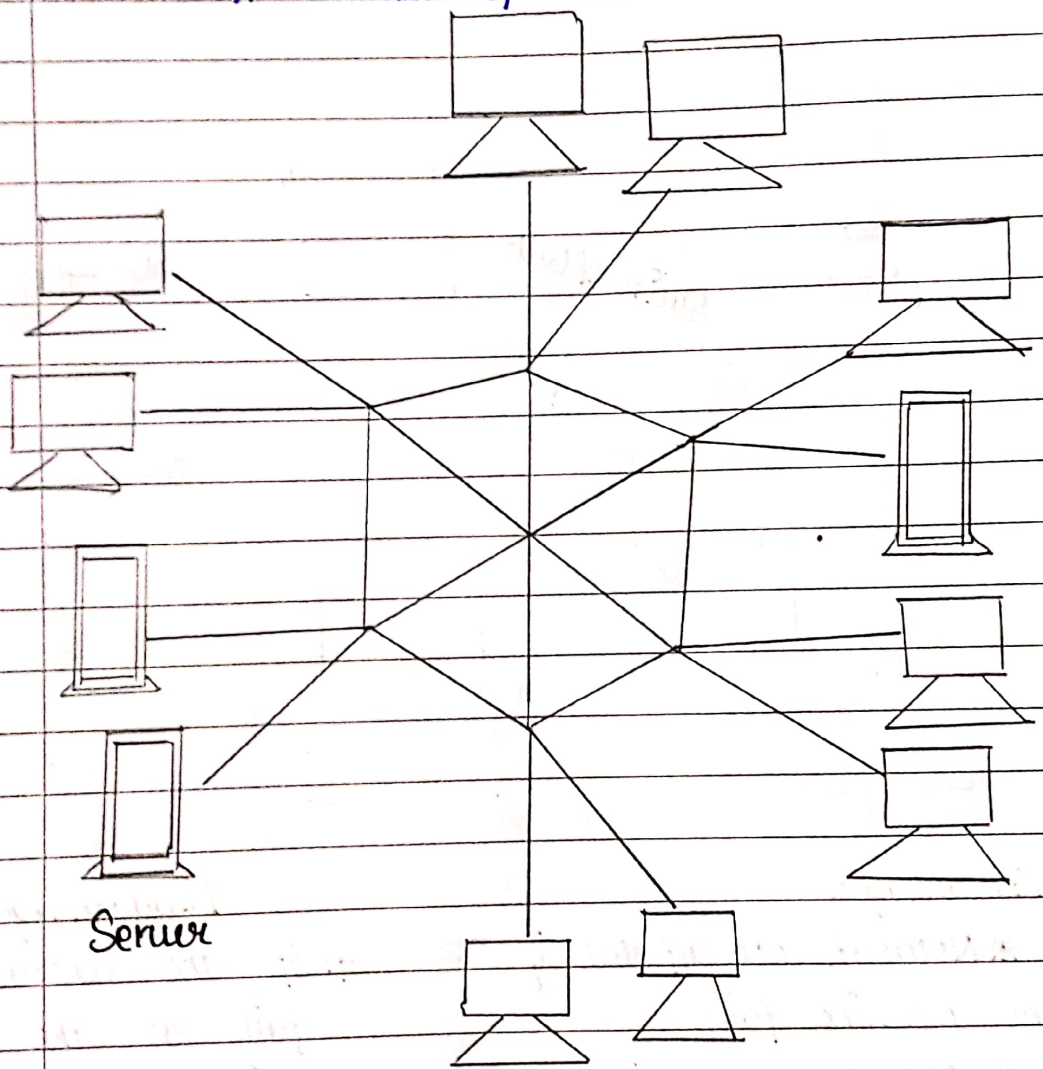
MESH TOPOLOGY:

* Connect all the devices with multiple paths
* Offers redundancy.
* $N = n*(n-1)/2$
  - → N - number of cables
  - → n - number of connected nodes.



Advantages

* Very high fault tolerent
  Very security (high availability)

Disadvantages:

* Expensive due to redundancy.