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Study of Network Topology and basic arrangements and types of network topologies.

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Abstract : Network topology refers to the physical or logical layout of a network. It defines the way different nodes are placed and interconnected with each other. Alternately, network topology may describe how the data is transferred between these nodes. Network topology is the arrangement of various network elements used in data transmission and formation of interconnections like nodes and links with each other. This linking of various elements is known as network topology.

Network topology is of two types:

- Physical topology
- Logical topology

Physical topology is the mapping out of the various interconnections that are visible and which is the physical design of that network. Logical topography is the mind mapping of such intercommunication diagrams that you make while identifying a network. It shows how the data flows within a functioning network. A good example is the local area network. A local area network, or LAN, works as having many connections with various devices in a given network. Such that when a map is drawn out of the interconnections, a geometrical shape is formed. This is the physical topography of that network. On the other hand, the understanding of the flow of data and its transmission forms the logical topography.

1. So basically network topology is the layout of various connected devices. This layout may be in the form of a circle but that doesn't means that it is a ring topology. The shape of the connection is based on the fact that how the data is being transmitted and how are the devices linked. Network topology is the arrangement of the electrical devices and cable wired that ensures how the devices are arranged. Logical topology is the shape of the data flow regardless of the shape of the physical data arrangement. It depends on how

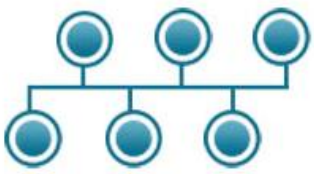
the transmission is taking place and how the electrical signals are flowing. Hence the term signal topology and logical topology are used interchangeably. Now it is worth noting that the physical topology and the logical topology can be different. It doesn't matters that if the physical topology is that of the bus shape then the logical topology will be the same as well but can be different as it depends on the flow of data and not the physical arrangement of the data. Below mentioned are the few basic arrangements and types of network topologies.

2. Point to point
3. Bus
4. Star
5. Ring or circular
6. Mesh
7. Tree
8. Hybrid
9. Daisy chain

Point to point:

This is the simplest and the earliest type of topology that links two end points. This has been used by the telephonic systems and is the oldest type of network topology. A simple example of such a topology is how main frames and mini computers are connected to terminals. There can be one terminal or various terminals but that one terminal server will have a point to point topological access to each of its subscriber.

Bus Topology: All the devices/nodes are connected sequentially to the same backbone or transmission line. This is a simple, low-cost topology, but its single point of failure presents a risk.



Bus

Star Topology: All the nodes in the network are connected to a central device like a hub or switch via cables. Failure of individual nodes or cables does not necessarily create downtime in the network but the failure of a central device can. This topology is the most preferred and popular model.

Star

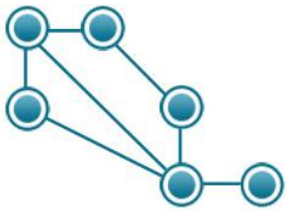
Ring Topology: All network devices are connected sequentially to a backbone as in bus topology except that the backbone ends at the starting node, forming a ring. Ring topology shares many of bus topology's disadvantages so its use is limited to networks that demand high throughput.

Ring

Tree Topology: A root node is connected to two or more sub-level nodes, which themselves are connected hierarchically to sub-level nodes. Physically, the tree topology is similar to bus and star topologies; the network backbone may have a bus topology, while the low-level nodes connect using star topology.

Tree

Mesh Topology: The topology in each node is directly connected to some o r all the other nodes present in the network. This redundancy makes the network highly fault tolerant but the escalated costs may limit this topology to highly critical networks.



Mesh

Hybrid: A hybrid network topology is the kind of arranging work stations in such a way that it doesn't resembles any of the basic network topologies like the star, bus or ring, etc. Rather it amalgamates the two types of topologies to create a new one. For example, the star ring network or a star bus network. A star ring network uses multiple networks arranged in star topologies that are then connected together using a multistation access unit as a centralized hub.

Daisy chain:

A daisy chain network topology allows the workstation to be connected in such a way that the data which has to be sent is transmitted in a sequence. It makes it easy for adding more connections and station in the topology as daisy chaining and causes the data flow to be transmitted in such a way that all the signals are transmitted station to station one after the other in a sequence that causes them to end up in their desired destination. A daisy chain topology can be arranged in two ways:

- ***A linear topology:*** The linear topology allows the station to send and receive the data in a two way fashion. This was difficult to build as all the stations required two receivers and two transmitters.

- ***Ring topology:*** It is formed by all the computers connected by each other through their ends. This ensures that all the data is transmitted by the computers one after the other and if there is a pathway break then the data is transmitted in the reverse fashion ensuring that the signals are received at their desired destination.

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