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Course Title: CSE 339: Data Communication and Computer Network

Assignment 1: Comparative analysis of different networks topology.

Submitted To,

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Topology:

Computers are connected to a network so that one can communicate with others. Based on the location of the computers within the network, computer network can be divided in the following ways:

* PAN (Personal Area Network)
* LAN (Local Area Network)
* MAN (Metropolitan Area Network)
* WAN (Wide Area Network)

The computers under this Network are connected by different systems. These different systems are called topology. Let us discuss some types of topology here.

Bus Topology:

This topology is also known as line topology. All the computers are connected to a main backbone or a main line in

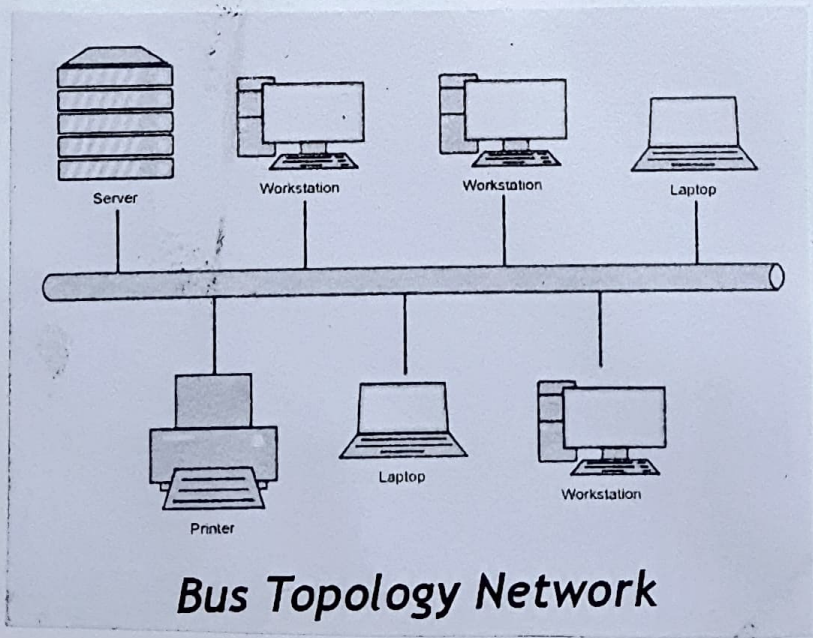
this topology. If a computer wants to contact another computer in bus topology system, the information is shar with all the computers connected to it, but only the desired computer receives the information, and the other computers ignore it. Remember that if the bus or backbone gets damaged, the whole network collapses.

Advantages of Bus Topology:

- Works efficiently for small networks
- Easy and cost-effective to install and add or remove devices.
- Doesn't require as much as cabling alternative topologies.
- If one device fails, other devices are not impacted.

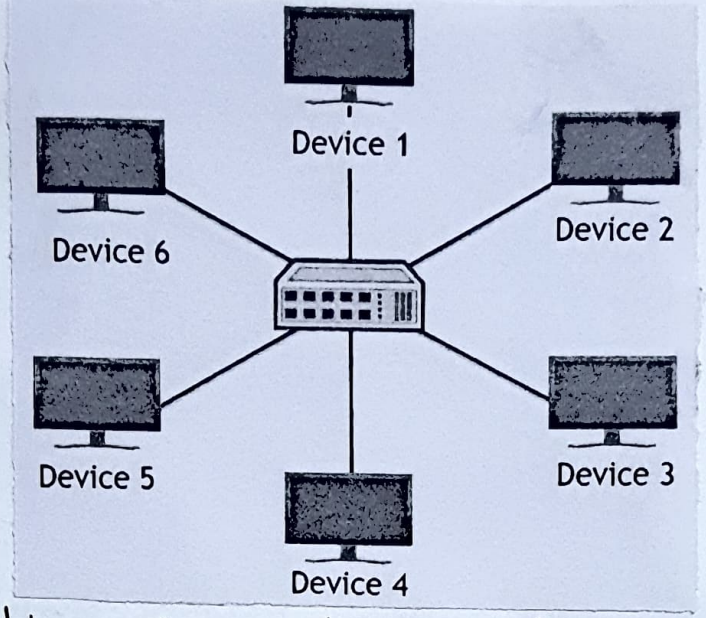
Disadvantages of Bus Topology:

- If the cable is damaged, the entire network will fail or be split.
- Difficult to troubleshoot problems.
- Very slow and not ideal for larger networks.
- Low security due to all devices receiving the same signal from the source.



Bus Topology Network

Star Topology:



If all the computers of a network are connected to a central hub/switch, it is called star topology. It is comparat-ively an easy topology. If anybody wants to create a network fast, he needs to use the star topology. If a computer gets demaged in this topology, the rest of the computers remain active, but if the central hub/switch is damaged, the total network will stop functioning. It is not neeessary for the computers to be arranged in

Stara formation in this topology.

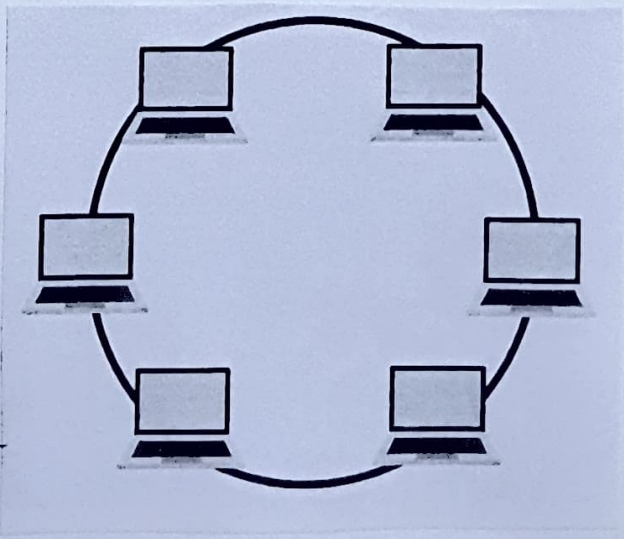
Advantages of star Topology:

- High scalable network.
- Highly efficient.
- Centralized network management.
- Safe to use.

Disadvantages of star Topology:

- High dependency on the central device.
- Expensive.
- Requires additional equipment.

Ring Topology:



This topology is circular in shape. From the image, we can understand that every computer is connected to two more computers. In ring topology, information or data moves from

one computer to another following a particular direction, but keep in mind that in ring topology, the computers need not to be connected in a circular way. They can stay scattered but connection must always remain circular is ring topology. Remember that if any computer gets damaged, the whole network becomes inactive.

Advantages of Ring topology:

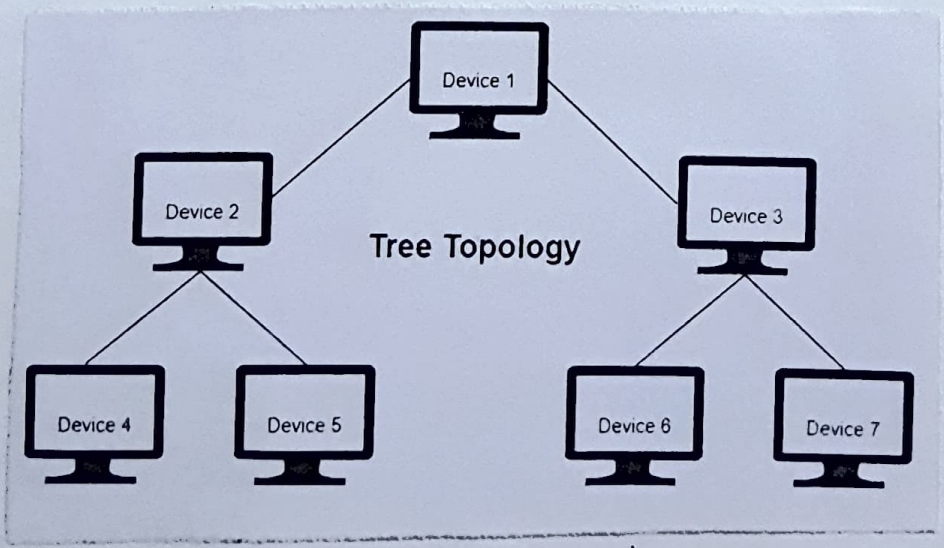
- Easy to identify and isolate single points of failure.
- Better suited for high traffic environments than a bus topology
- A network server is not needed to control network connectivity.

Disadvantages of Ring topology:

- More expensive to implement than bus topology.
- If one device fails, the entire network is impacted.

Tree Topology:

This topology looks like a tree. If you look at the image carefully, you will notice that it really resembles a tree. Just branches grow out from the trunk and multiply rapidly, each computer branches out. The interesting thing here is that numerous star topologies are integrated together to form a tree topology.



Advantages of tree topology:

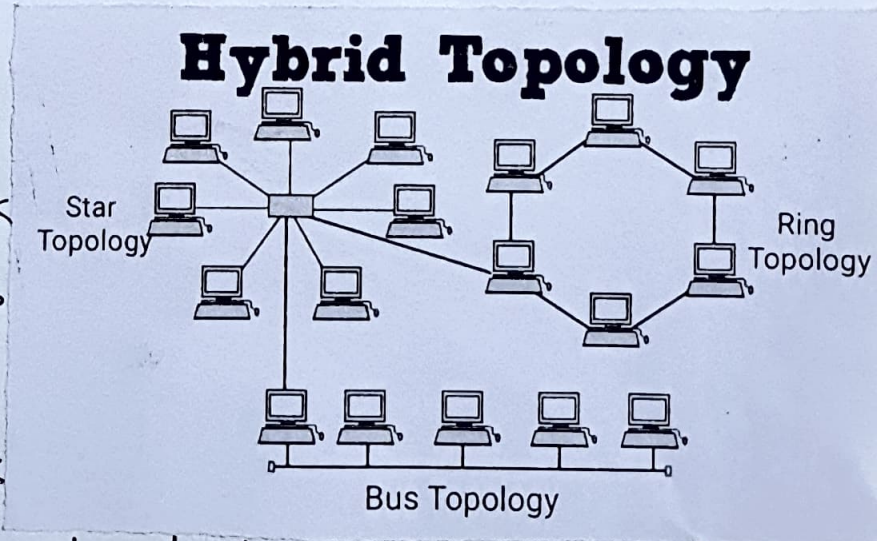
- Tree topology is reliable
- Highly secure

- This topology is the combination of bus and star topology.
- It is used in WAN

Disadvantages of tree topology:

- Requires a large numbe of cables compared to star and ring topology
- Treatment of the topology is pretty complex.

Hybrid Topology:



A Hybrid topology is a type of network topology that uses two or more differing network topologies. These topologies can include a mix of bus topology, mesh topology, ring topology, star topology, and tree topology.

The choice to use a hybrid topology over a standard topology

depends on the needs of a business school, on the users. The number of computers, their location, and desired network performance are all factors in the decision.

Types of Hybrid Topologies:

The two most commonly used types of hybrid topologies are the following:

Star-Ring Hybrid Topology:

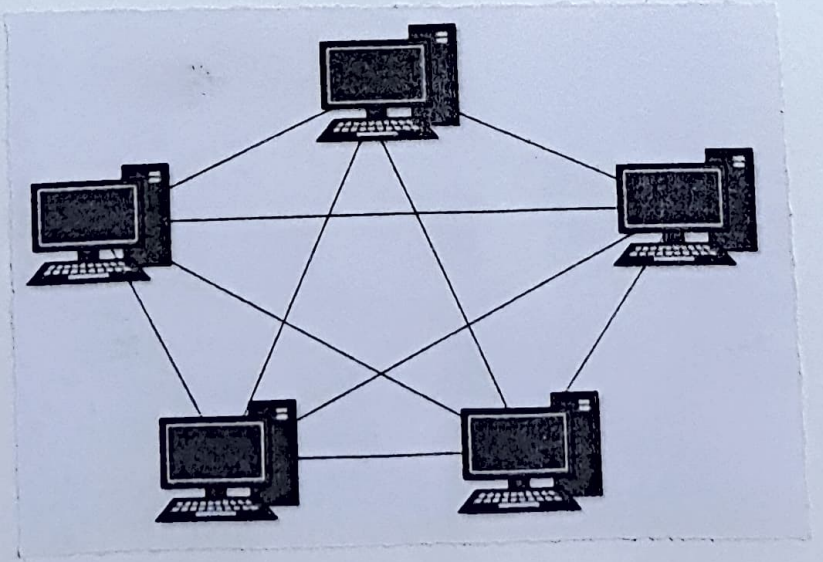
A star-ring hybrid topology is a combination of the star topology and ring topology. Two or more star topologies are connected together through a ring topology.

Star-Bus Hybrid Topology:

A star-bus hybrid topology is a combination of the star topology and bus topology. Two or more star topologies are connected together through a bus topology.

Mesh Topology:

In this system of topology, computers are connected to each other through a number of ways. The computers connected here can not only receive the information but also distribute it among other computers. If all the computers of a network are directly connected to all other computers, it is called a complete mesh. An image of a complete mesh of 6 computers has been represented here.



Advantages of Mesh Topology:

- Easy to add new devices scalability is simple
- No need for central hierarchy.
- It is easy to add.
- Can operate without a complete set of web.

Disadvantages of Mesh Topology:

- Complex structure.
- Difficult to set up initially.
- Costly compared to others.
- More power consumption.
- Maintenance is challenging.