Types of Network Connections

1. Point-to-Point Connection:

- Definition: A dedicated link between two devices, where the entire capacity is reserved for transmission between them.

- Example: Changing TV channels using an infrared remote control creates a point-to-point connection.

2. Multipoint Connection:

- Definition: Multiple devices share a single link, either simultaneously (spatially) or by taking turns (temporally).

- Example: Multiple computers connected to the same network cable in a multipoint connection.

Physical Topologies

1. Mesh Topology:

- Structure: Every device is connected to every other device with a dedicated link.

- Advantages: High reliability, privacy, and fault tolerance.

- Disadvantages: Requires a lot of cabling and I/O ports, making it expensive and complex.

- Use Case: Typically used in a backbone network connecting main computers.

2. Star Topology:

- Structure: All devices are connected to a central hub, with point-to-point links.

- Advantages: Easy to install, robust, and simple to manage faults.

- Disadvantages: The entire network depends on the hub. If the hub fails, the network fails.

- Use Case: Common in local-area networks (LANs).

3. Bus Topology:

- Structure: A single backbone cable links all devices in the network.

- Advantages: Easy to install, uses less cabling than mesh or star topologies.

- Disadvantages: Difficult to reconnect or isolate faults. A break in the cable stops all communication.

- Use Case: Early Ethernet LANs often used bus topology.

4. Ring Topology:

- Structure: Devices are connected in a circular fashion, with each device linked to two others.

- Advantages: Easy to install, fault isolation is straightforward.

- Disadvantages: A single break in the ring can disable the entire network unless a dual ring is used.

- Use Case: Was popular in older LANs like IBM's Token Ring.

5. Hybrid Topology:

- Structure: A combination of two or more topologies (e.g., star topology with bus branches).

- Advantages: Flexible and adaptable to different needs.

- Use Case: Often used in complex network environments requiring a mix of topologies.