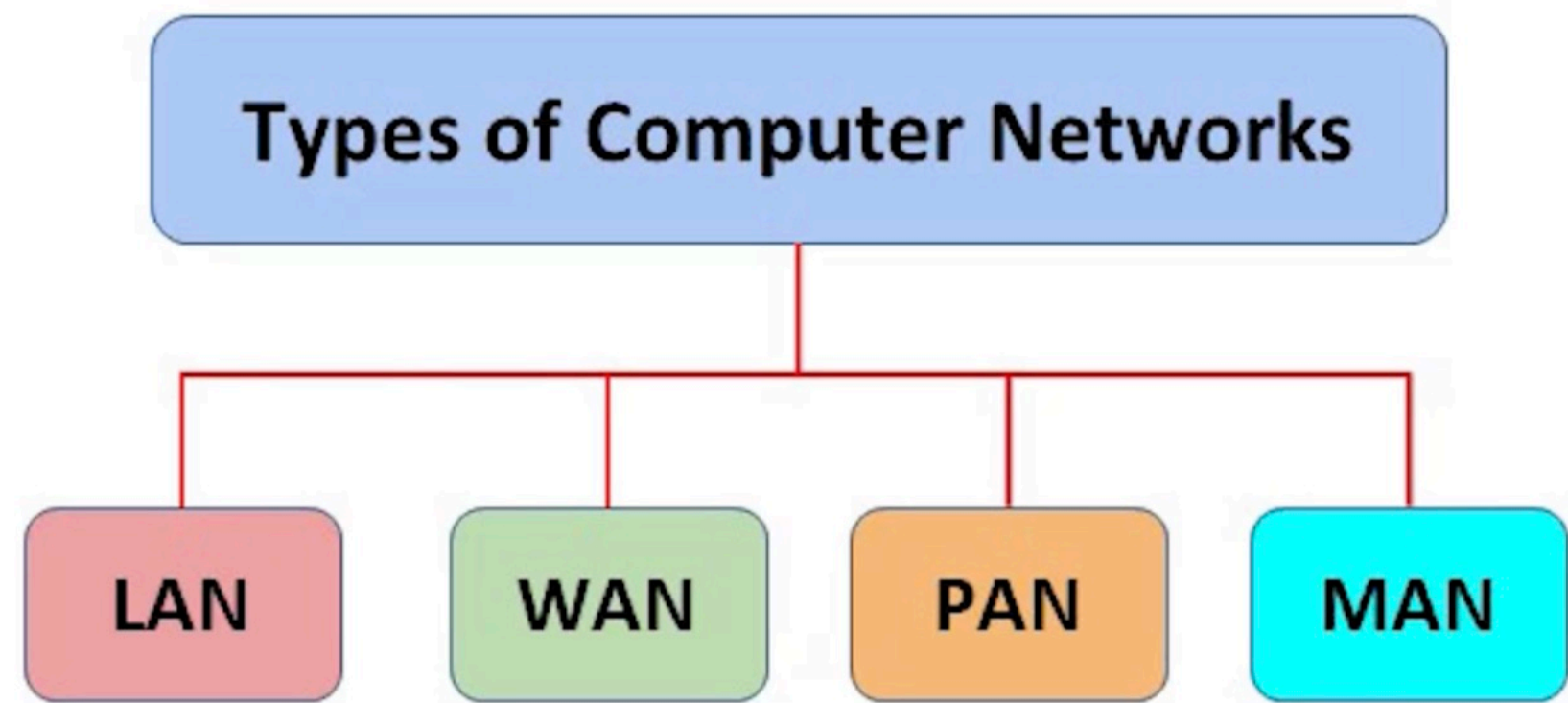


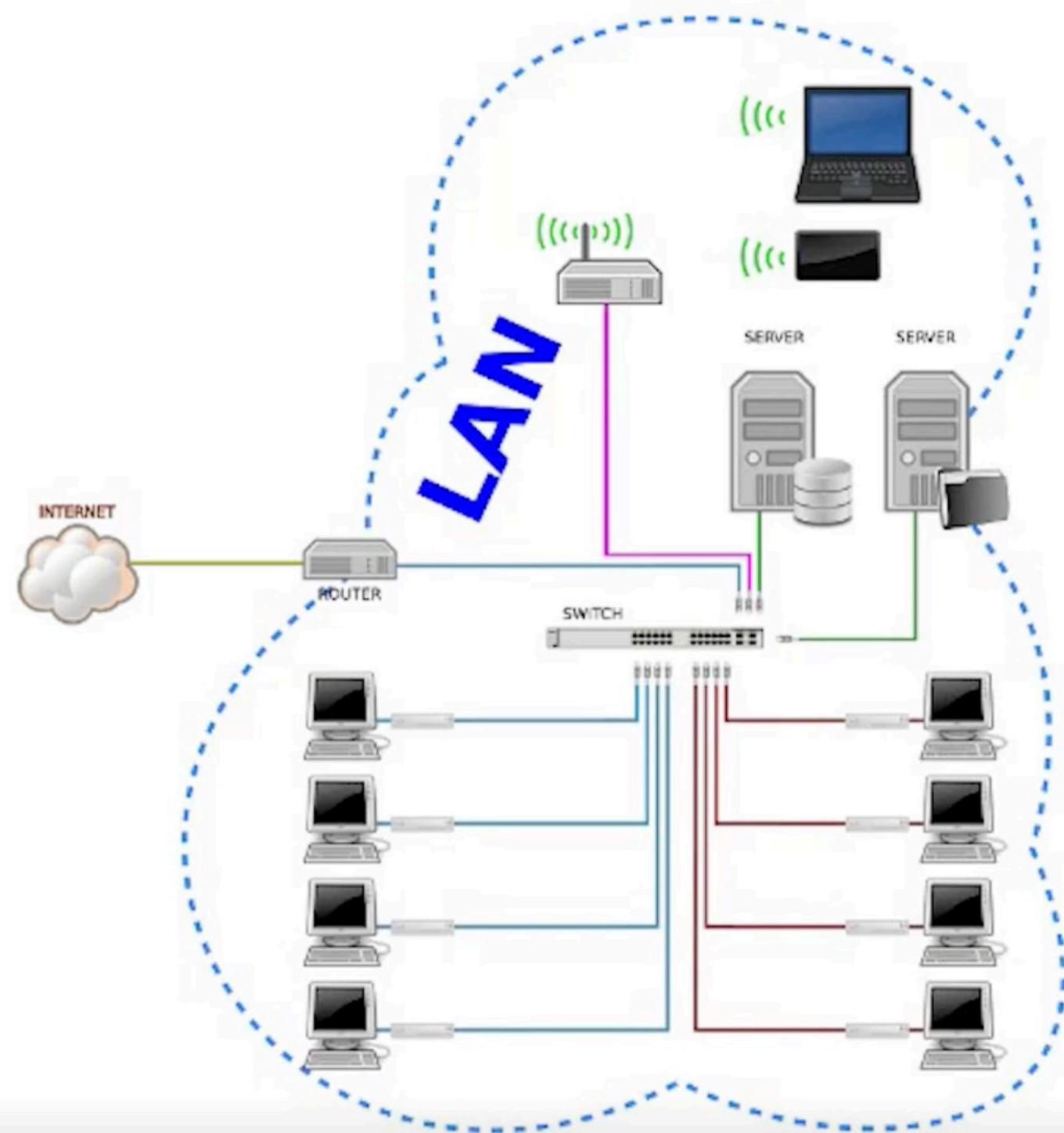
Types of Networks

- Four main types:
 - Local Area Network (LAN)
 - Wide Area Network (WAN)
 - Personal Area Network (PAN)
 - Metropolitan Area Network (MAN)



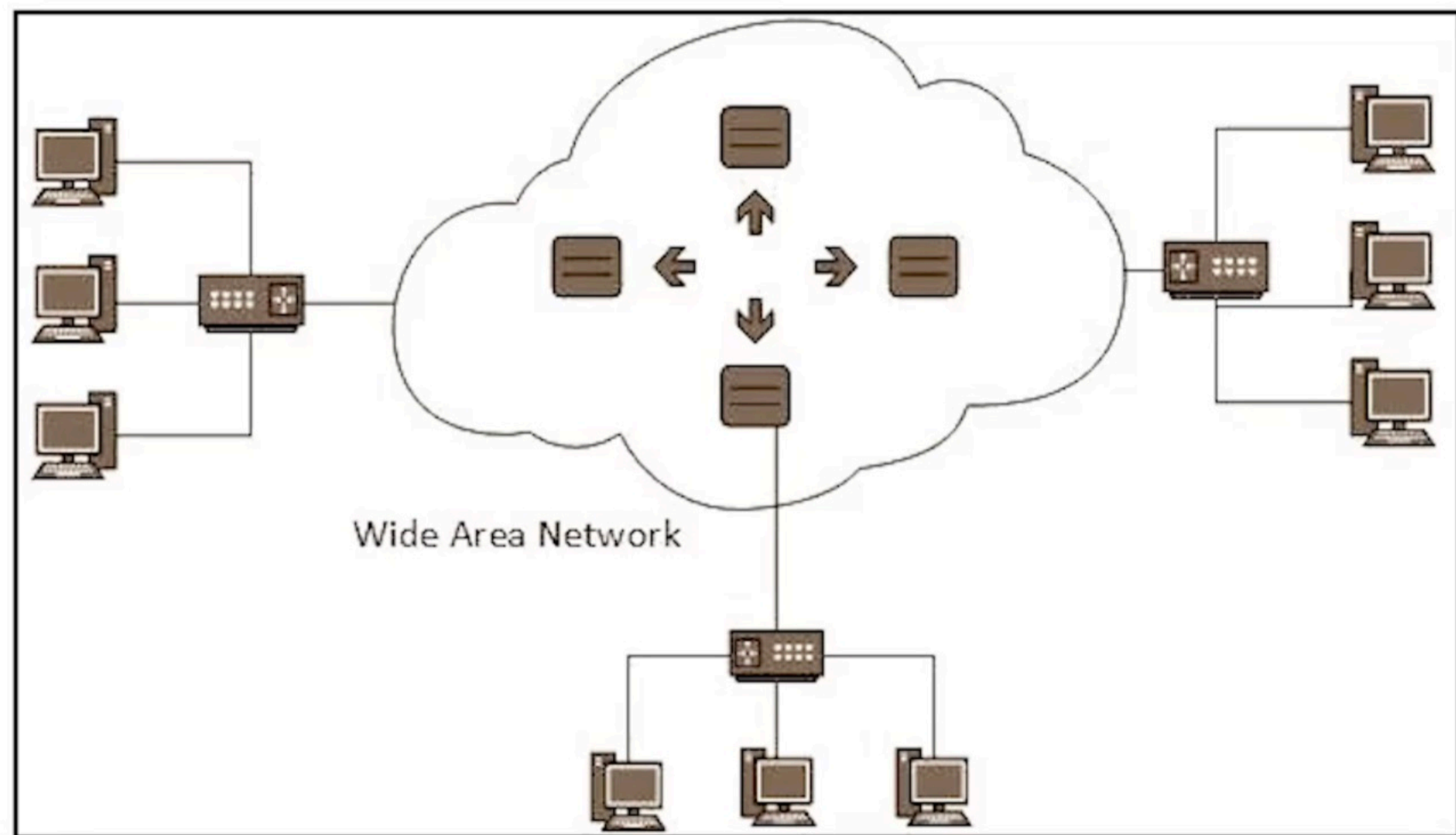
Local Area Network (LAN)

- A network that covers a small geographic area, such as a home, office, or building
- Typically uses wired connections like Ethernet cables to connect devices
- Enables users to share resources within the local network
- Suitable for small businesses or homes where the devices are relatively close to one another



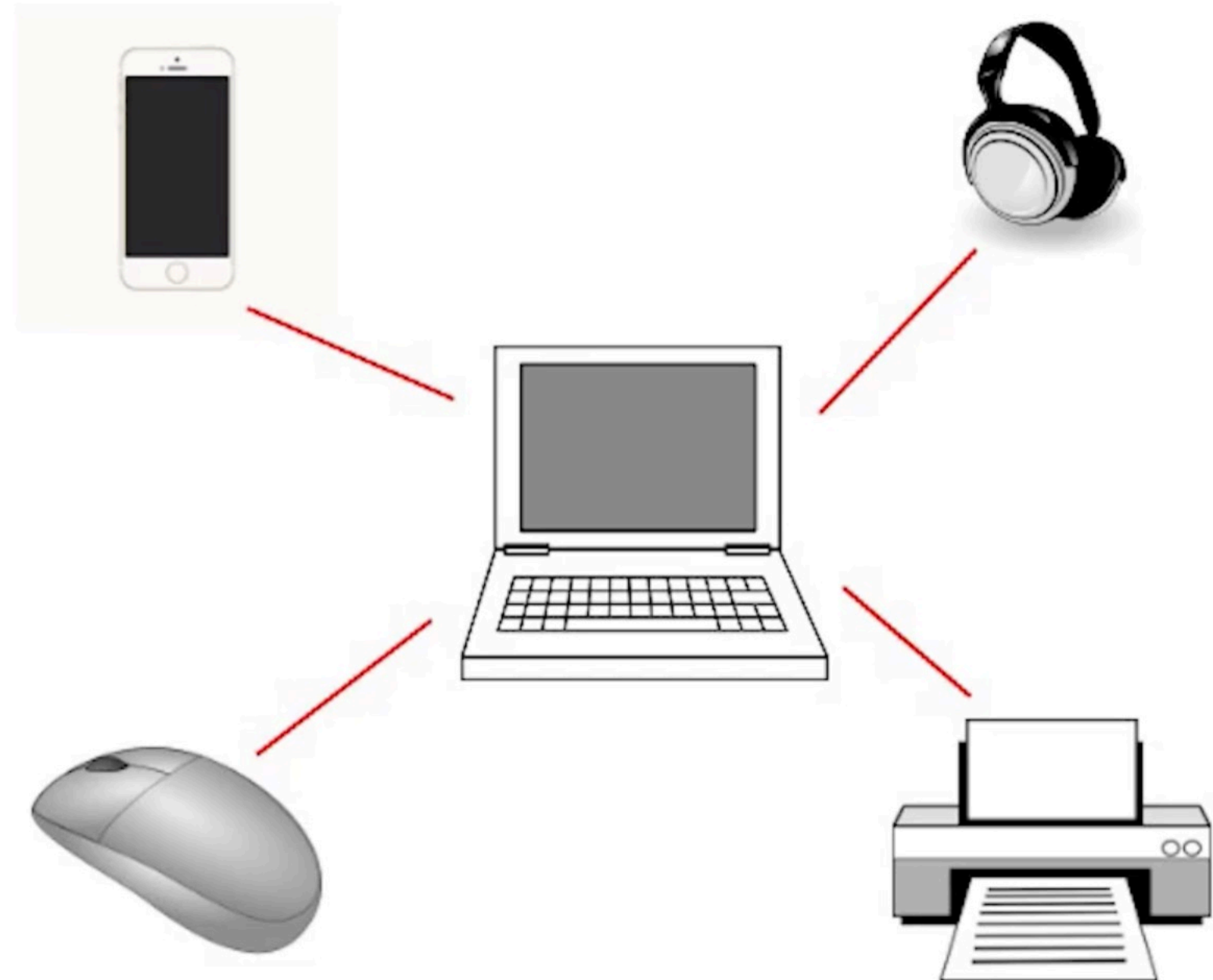
Wide Area Network (WAN)

- A network that spans a large geographic area, often connecting multiple LANs
- Uses various technologies like leased lines, satellite links, and microwave connections to transmit data between devices
- Enables the connection of offices or branches of a business that are located in different cities or countries
- The Internet is an example of a WAN



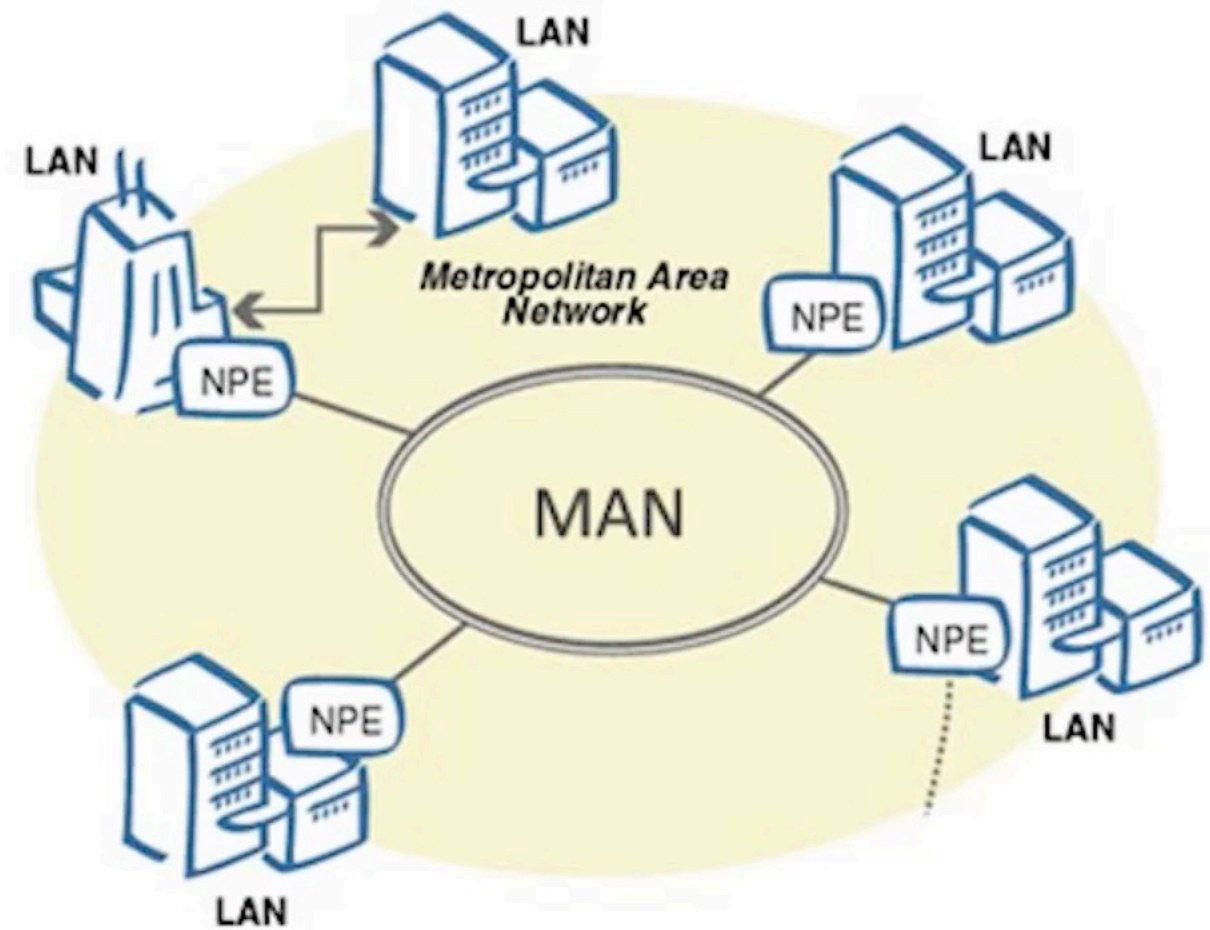
Personal Area Network (PAN)

- A network that connects devices within a person's workspace or living area
- Can be wired or wireless and is typically used for personal devices like smartphones, tablets, and wearables
- Bluetooth and Wi-Fi are standard technologies used to create wireless PANs
- Enables users to connect their devices to one another without the need for physical cables



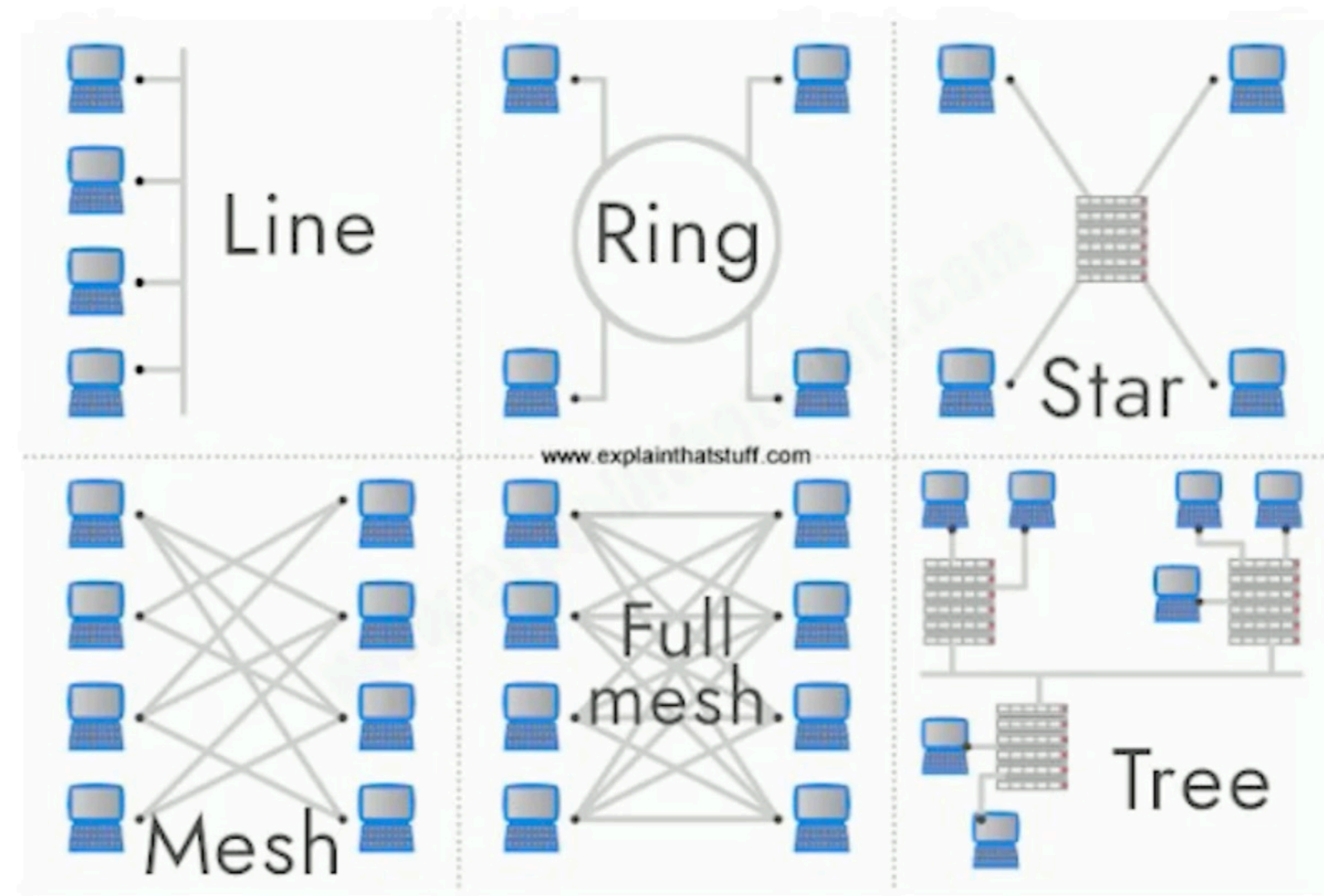
Metropolitan Area Network (MAN)

- A network that connects multiple LANs within a city or metropolitan area
- Typically uses high-speed connections like fiber-optic cables to transmit data between LANs
- Often used by large organizations or government entities to connect offices or facilities within a city or region



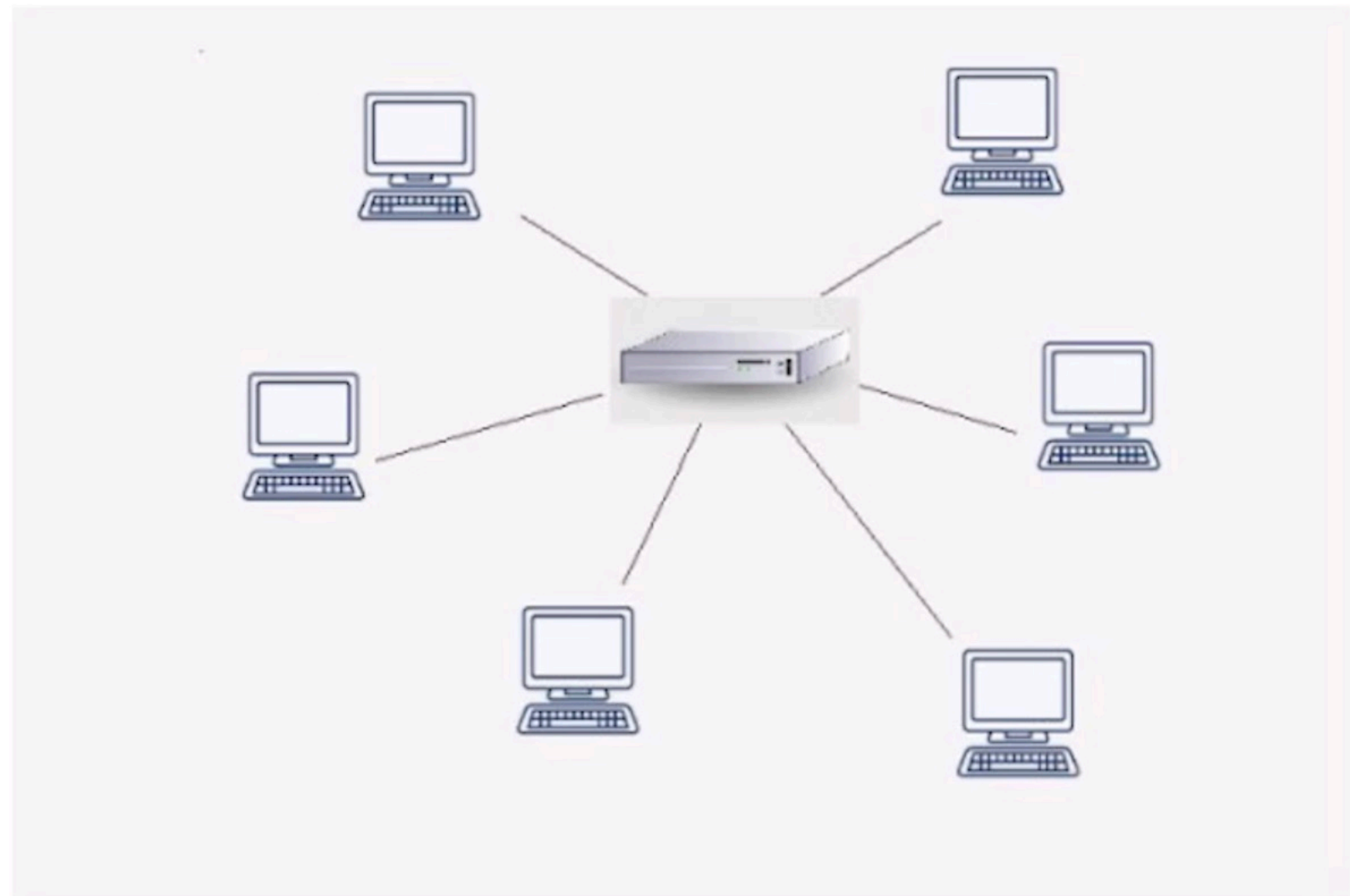
Introduction to Network Topologies

- A network topology refers to the arrangement or layout of devices and connections in a network
- The topology of a network can significantly impact its performance, reliability, and ease of management
- Types of network topologies:
 - Star
 - Bus
 - Ring
 - Mesh



Star Topology

- Each device on the network is connected to a central hub or switch
- The hub is responsible for managing and directing the flow of data between connected devices
- If a device wants to communicate with another device, it sends the data to the central hub, which then forwards it to the destination device



Advantages & Disadvantages of Star Topology

- **Advantages:**

- Easy to set up and manage
- Failure of one device does not affect the entire network
- Simple to add or remove devices without disrupting the network

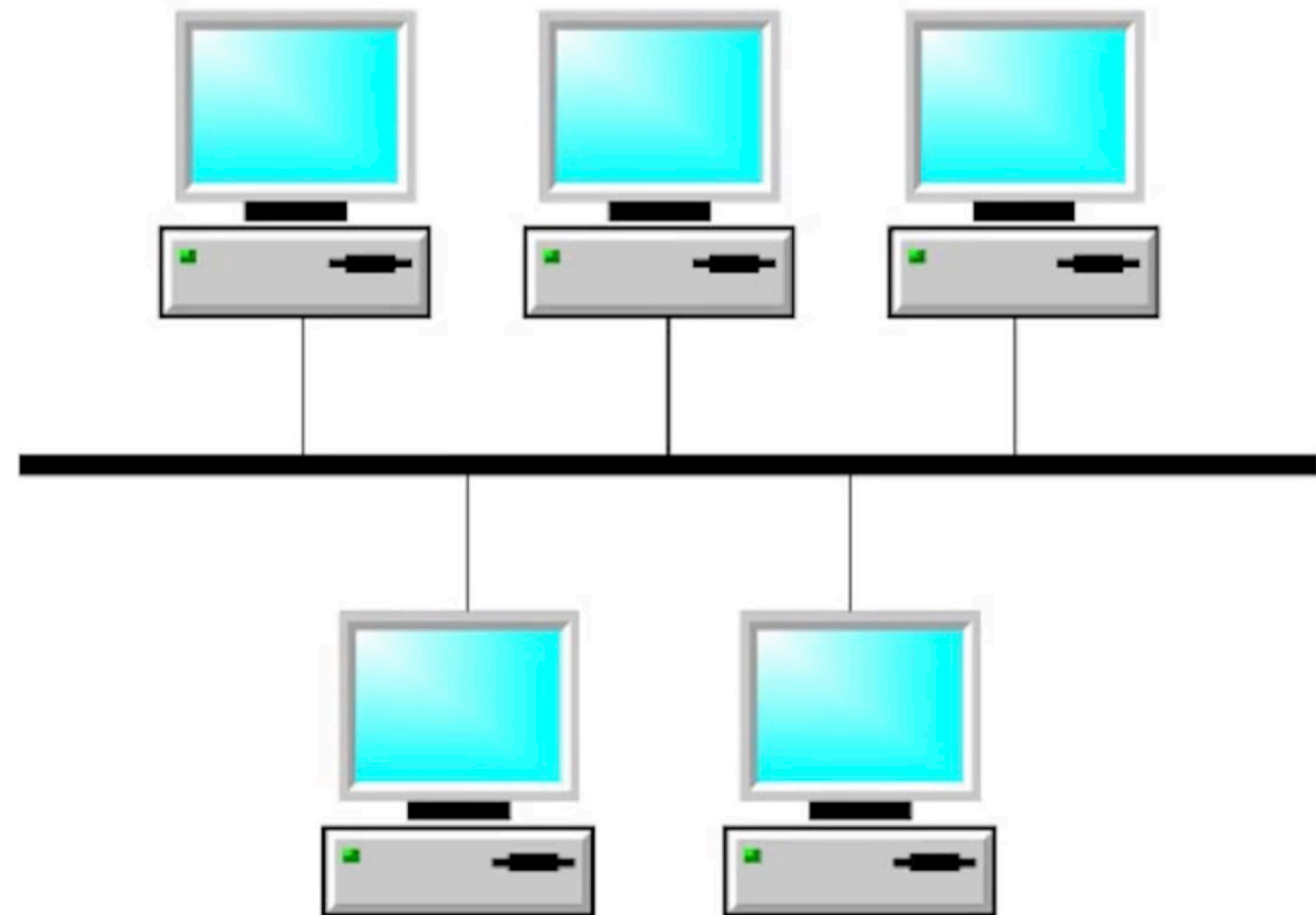
- **Disadvantages:**

- If the central hub or switch fails, the entire network is affected
- It can be more expensive due to the need for additional hardware (hubs or switches)
- Performance can be limited by the capacity of the central hub or switch



Bus Topology

- All devices are connected to a single, shared cable called a bus
- Data is transmitted along the bus, and each device listens for its own data
- Terminators are placed at both ends of the bus to prevent data from bouncing back and causing interference



Advantages & Disadvantages of Bus Topology

- **Advantages:**

- Inexpensive and simple to set up
- Uses less cabling compared to other topologies

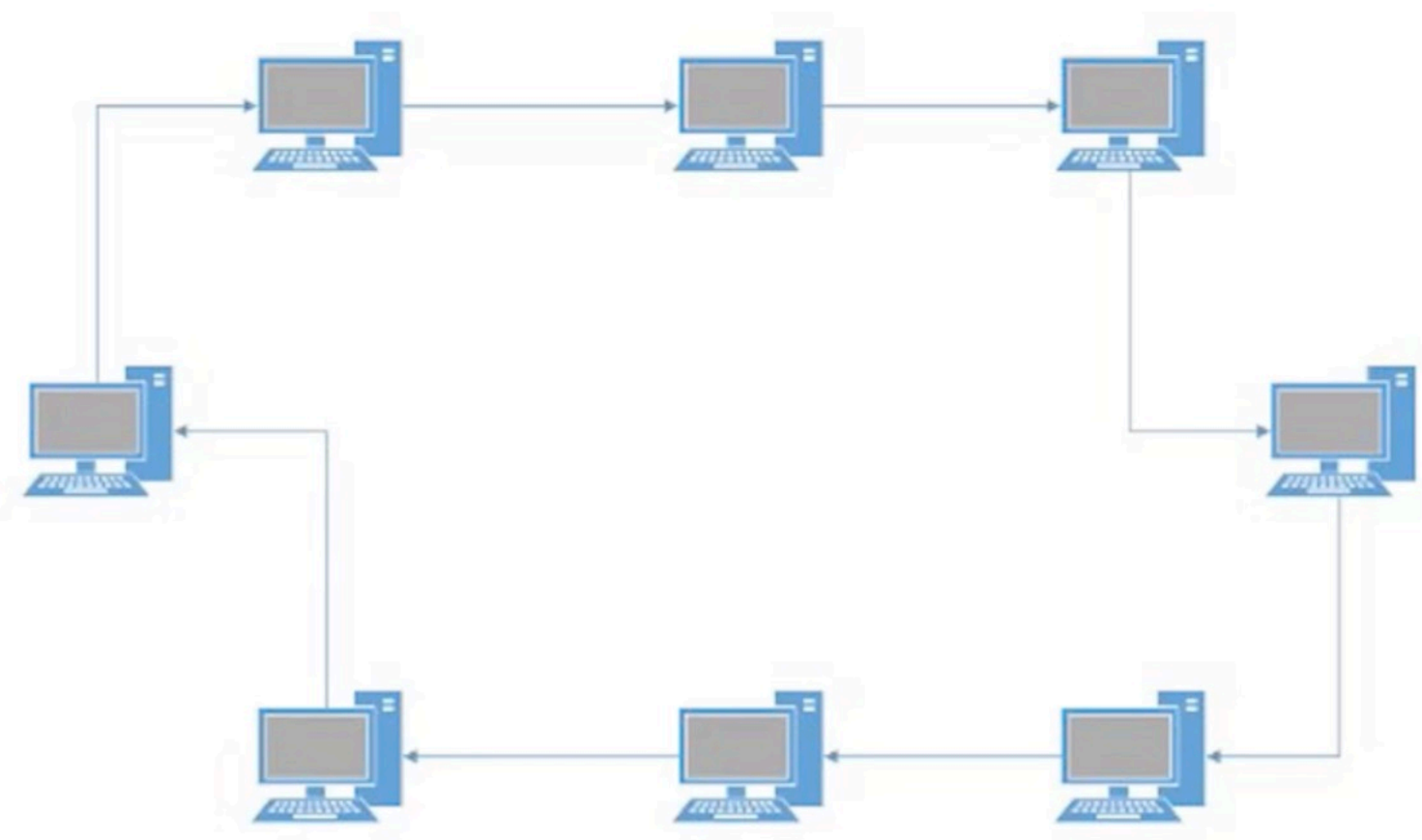
- **Disadvantages:**

- Failure of the bus can cause the entire network to fail
- As the number of devices increases, network performance can degrade
- Adding or removing devices can temporarily disrupt the network
- Limited cable length and a maximum number of devices



Ring Topology

- Each device is connected to two other devices, forming a continuous loop or ring
- Data is transmitted in one direction around the ring, passing through each device until it reaches its destination



Advantages & Disadvantages of Ring Topology

- **Advantages:**

- Can handle high volumes of data traffic
- Easy to add or remove devices without disrupting the network

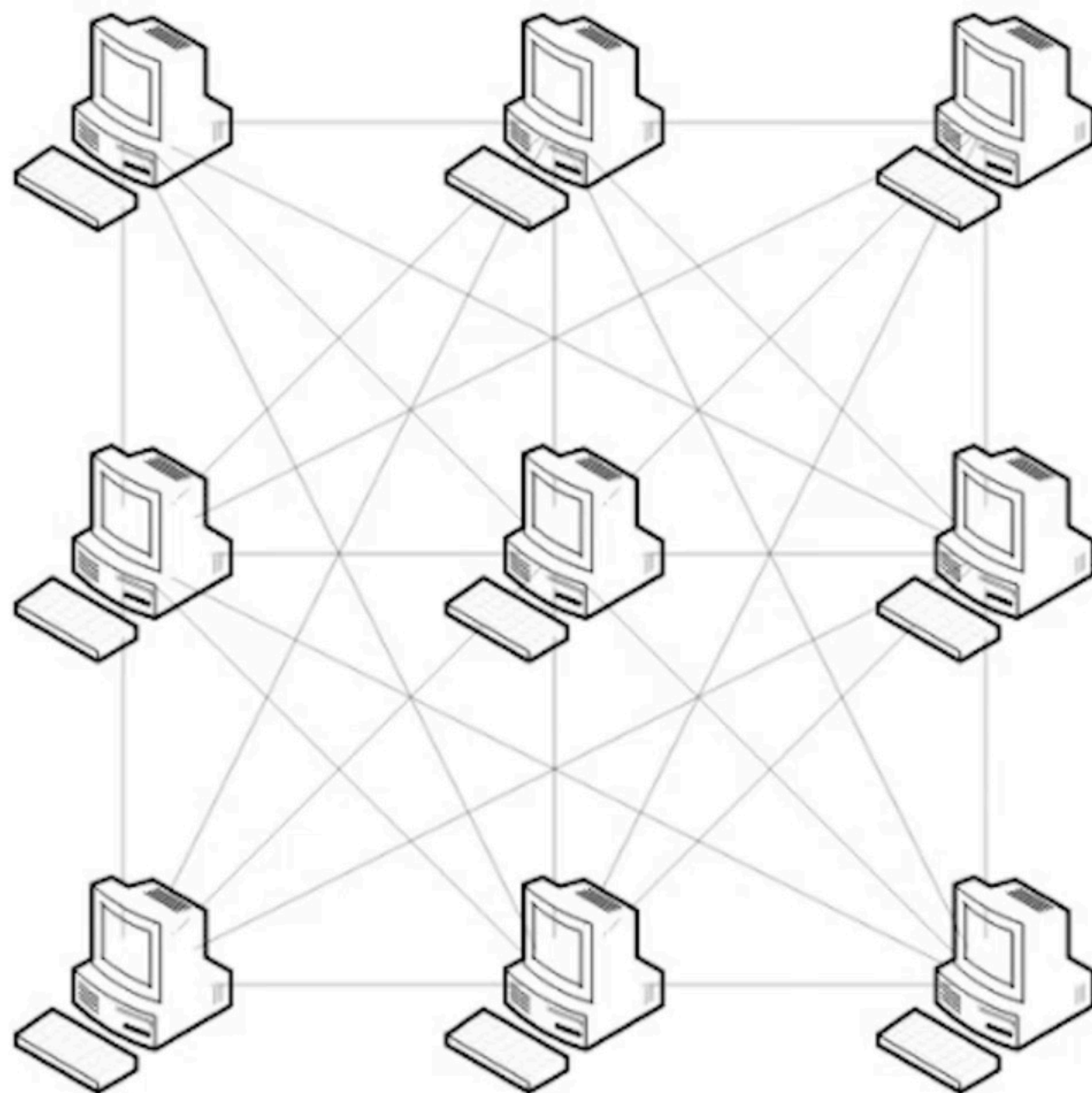
- **Disadvantages:**

- Failure of a single device or connection can cause the entire network to fail
- Troubleshooting can be more difficult due to the circular nature of the network
- Slower compared to other topologies, as data must pass through multiple devices before reaching its destination



Mesh Topology

- Each device is connected to multiple other devices, creating a web-like structure
- Can be either partial or full mesh



Advantages & Disadvantages of Mesh Topology

- **Advantages:**

- Highly reliable, as the failure of one device or connection does not affect the entire network
- Provides multiple paths for data transmission, reducing congestion and increasing performance
- Easy to expand by adding new devices

- **Disadvantages:**

- Complex and costly to set up, especially for a full mesh topology
- Requires a significant amount of cabling and network hardware, which can be expensive

