



Lecture 08 – Week 14

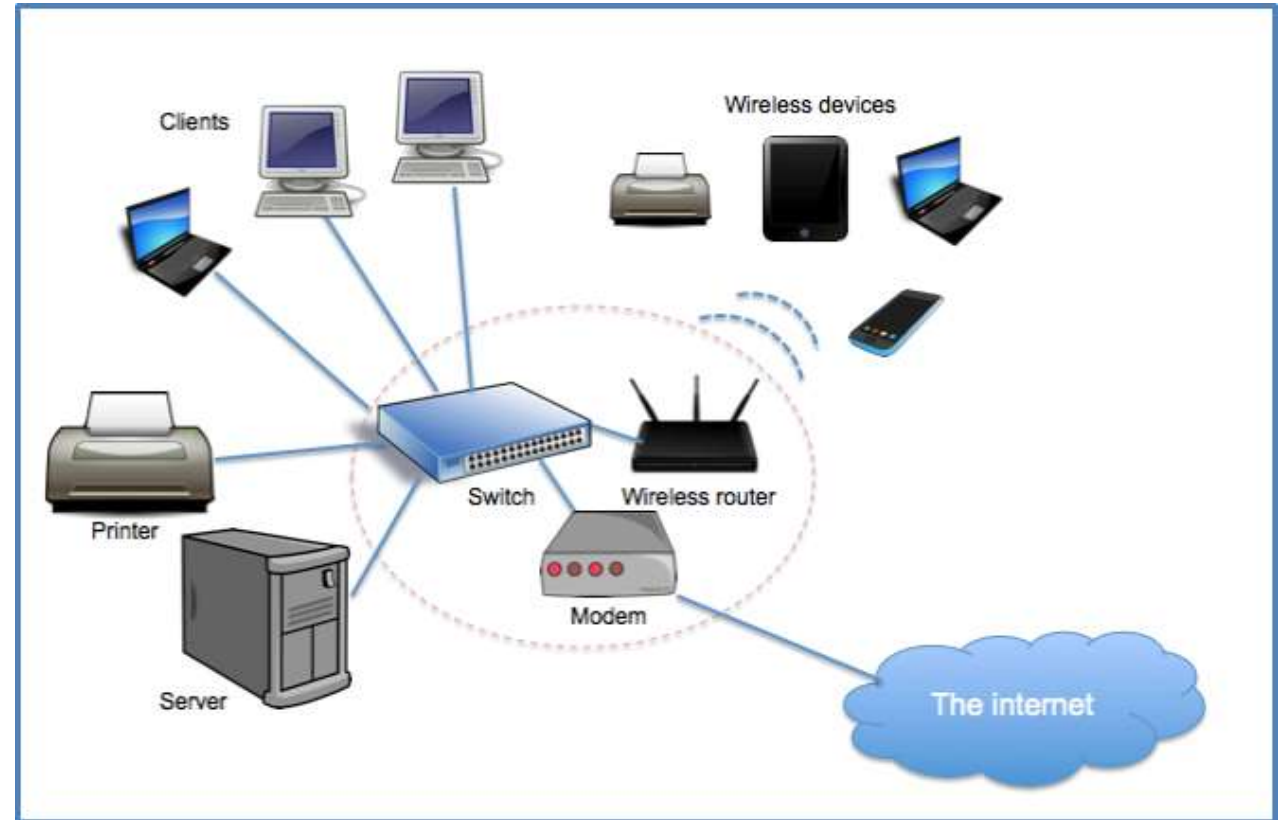
Introduction to Computer Networks

Topics to be cover

- Network & Networking Basics
- Types of Network (LAN, WLAN, PAN, WAN, MAN)
- Intranet vs Extranet
- Network Topologies
- Networking Devices
- WORKGROUP vs Domain (peer-to-peer vs client-server)
- Data transmission modes

What is Computer Network?

- In the simplest terms, a computer network is a group of computers and devices connected to each other so they can exchange data.
- The smallest network may only connect two computers; the largest the internet-connects millions.



Types of Networks

LAN (Local Area Network)

WLAN (Wireless Local Area Network)

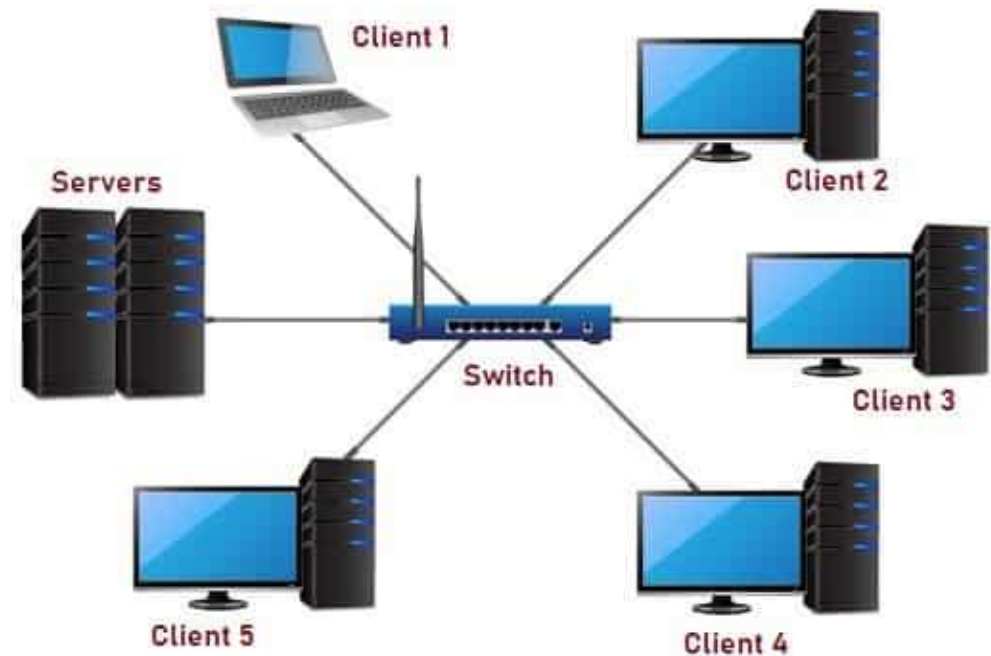
PAN (Personal Area Network)

WAN (Wide Area Network)

MAN (Metropolitan Area Network)

Local Area Network

- A school lab with its ten computers networked together is an example of a local area network.
- LANs can be set up in any defined area, such as a home, a school, an office building.
- LANs are most likely to be based on Ethernet technology.



Wireless Local Area Network

- A WLAN, or wireless LAN, is a network that allows devices to connect and communicate wirelessly.
- Unlike a traditional wired LAN, in which devices communicate over Ethernet cables, devices on a WLAN communicate via Wi-Fi.



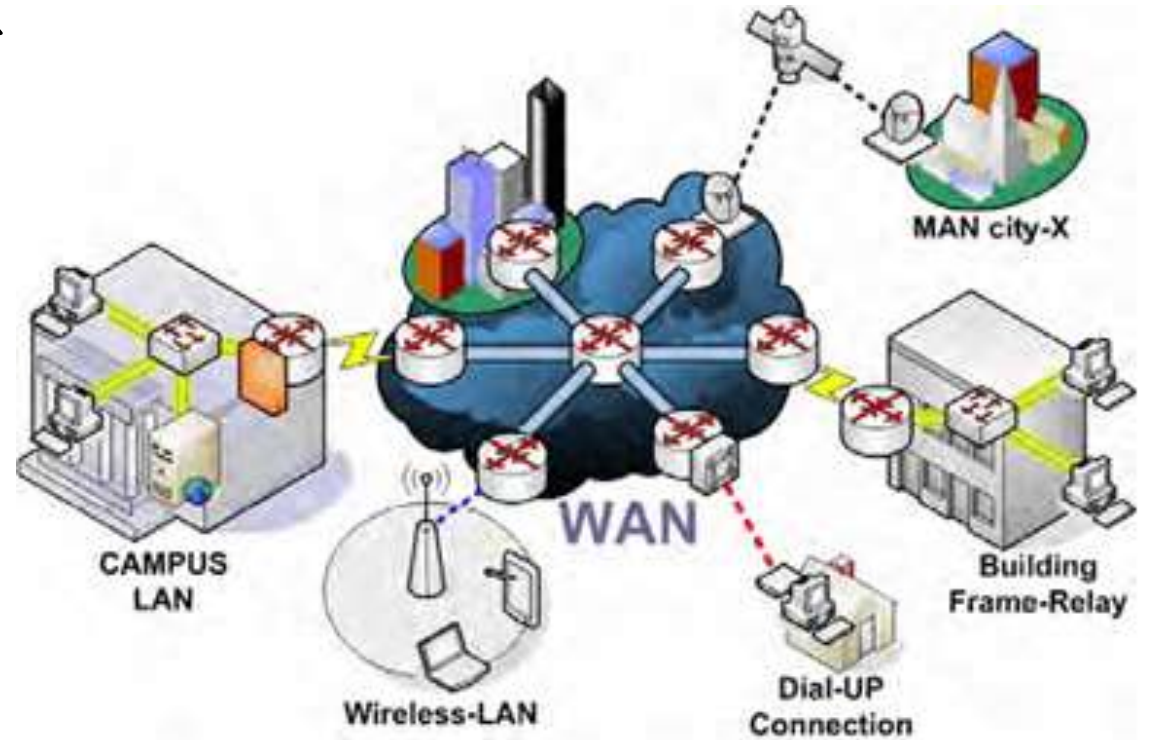
Personal Area Network

- PAN is the computer network that connects computers/devices within the range of an individual person.
- A PAN typically involves a computer, phone, tablet, printer, PDA (Personal Digital Assistant) and other entertainment devices like speakers, video game consoles, etc.



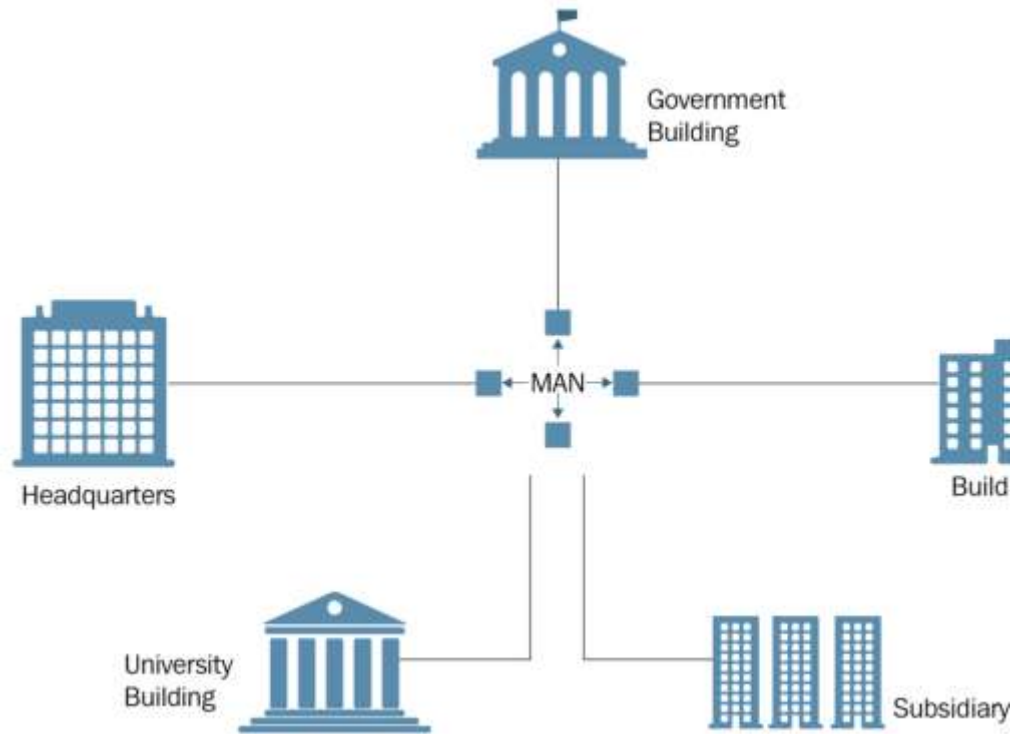
Wide Area Network

- A wide area network (WAN) connects computers and other resources that are miles or even continents apart.
- It covers large distance for communication between computers.
- The most well-known WAN is the Internet, which may cover the entire globe.




Metropolitan Area Network

- A metropolitan area network is a computer network that usually spans a city or in a large metropolitan area.
- A MAN is larger than a LAN but smaller than a WAN.



Network Topologies

Network Topology refers to the physical layout and connectivity of computers in a network.



In a computer network, there are four types of physical topology, they are:

Bus Topology

Ring Topology

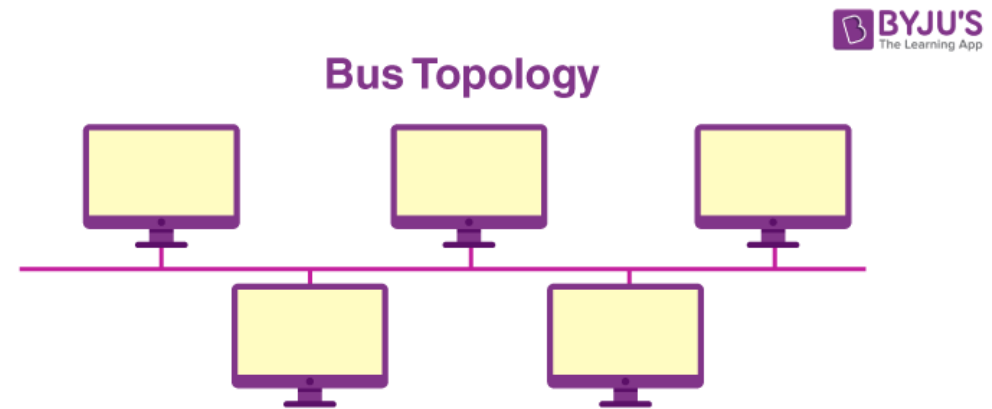
Star Topology

Mesh Topology

Bus Topology

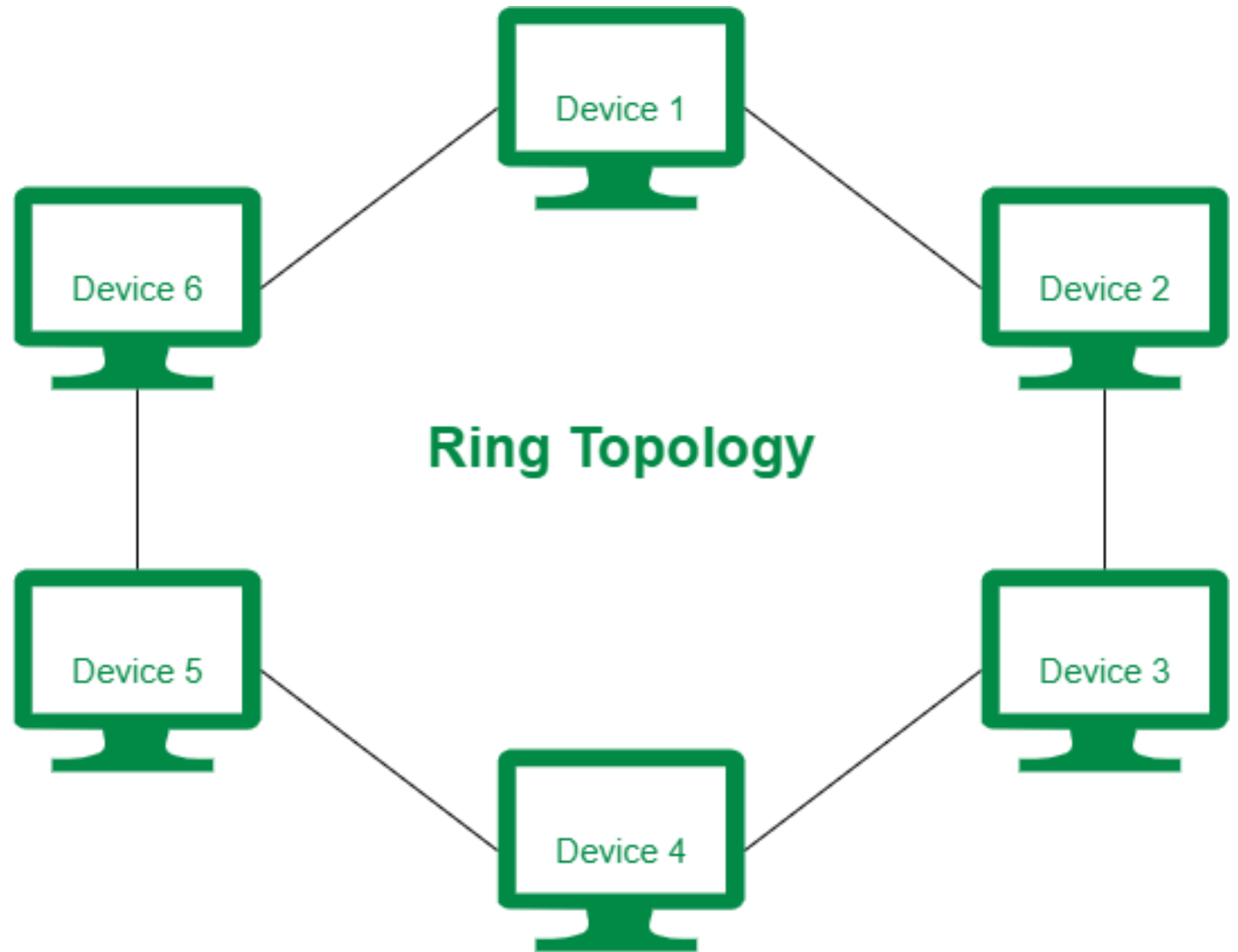
- In the bus topology, each node (computer, server or peripheral device) is attached to a single common cable.
- It is also called line topology.

<https://byjus.com/gate/bus-topology-notes/>

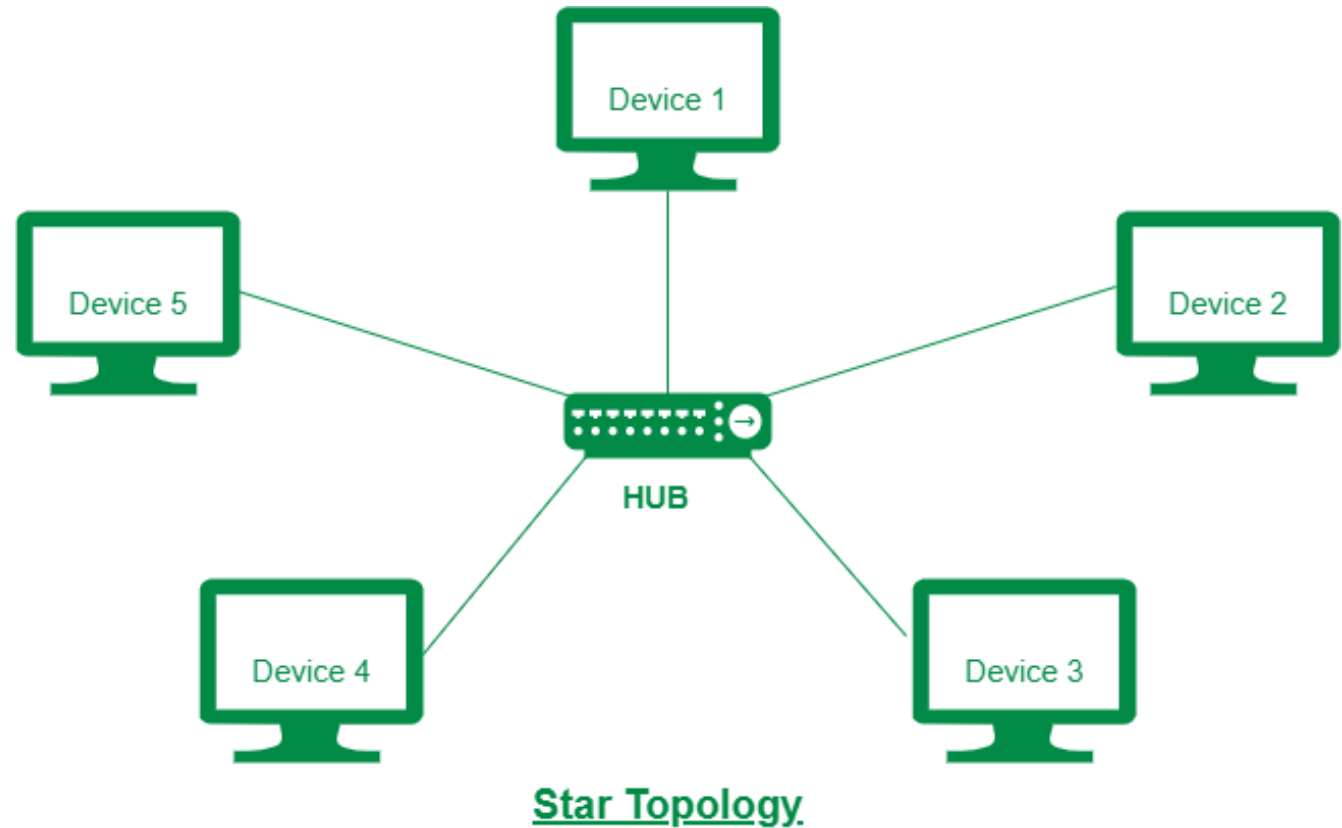


Ring Topology

- Ring topology is a topology in which each computer is connected to exactly two other computers to form the ring.



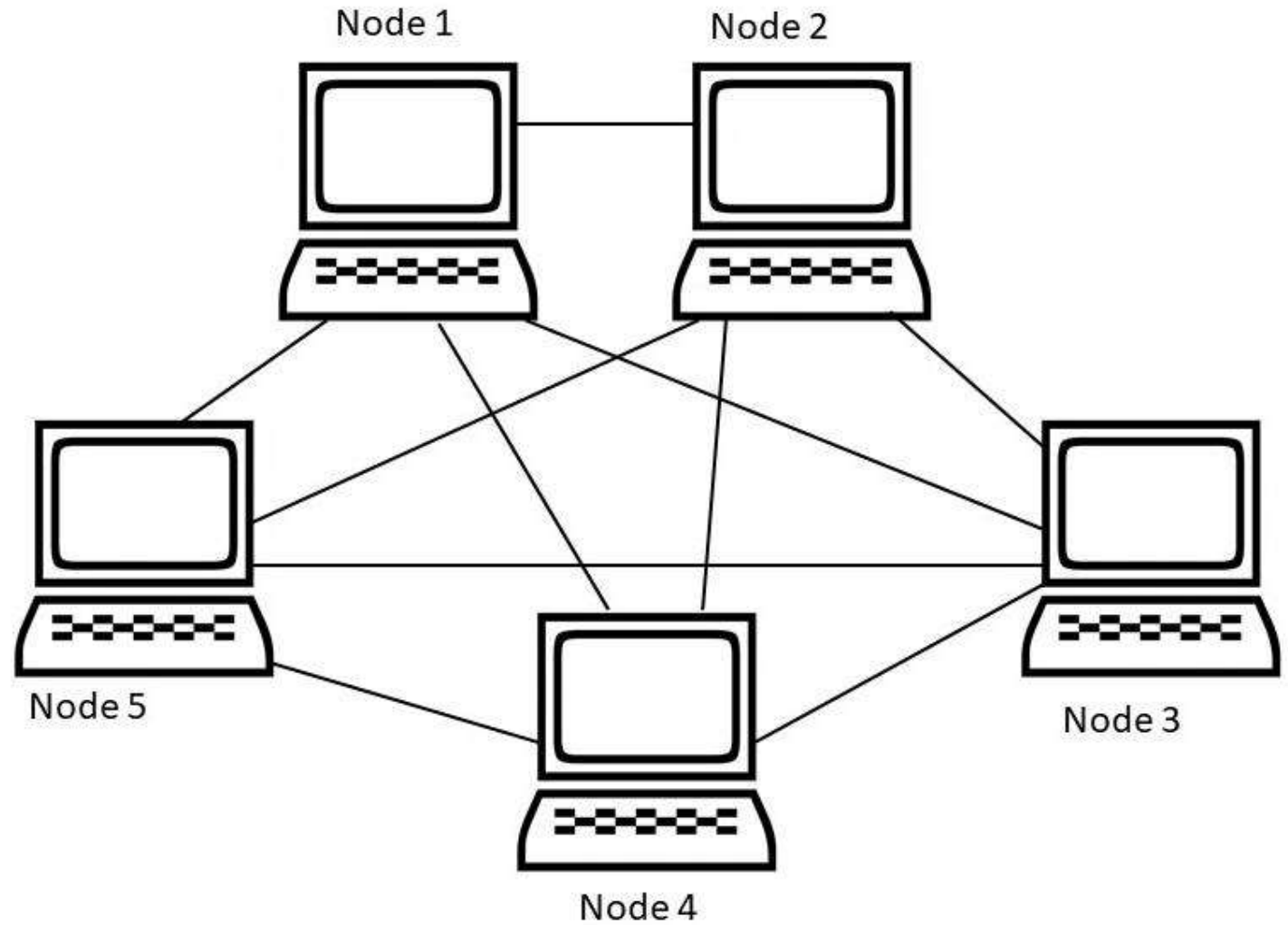
Star Topology



- In a star topology all the nodes (server, workstations) on the network are connected directly to a centralized connectivity device called hub or switch.

Mesh Topology

- In a mesh network topology, each of the network node, computer and other devices, are interconnected with one another.



Networking Devices

- Network devices, or networking hardware, are physical devices that are required for communication and interaction between hardware on a computer network.



Modem



NIC



Repeater



Hub



Switch



Router



Bridge



Gateway

Types of Network Devices

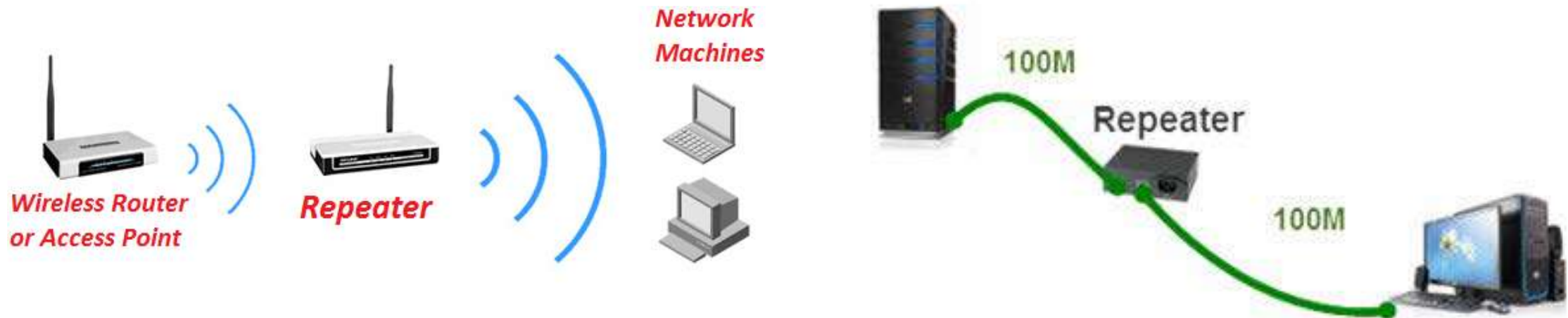
Network Adapters (NIC)

- Also called Network Interface Controller.
- It is a computer hardware component that connects a computer to a computer network.
- A network adapter can be used over a wired or wireless network.



Repeater

A network device used to regenerate or replicate a signal.



Hub

- Hubs connect multiple computer networking devices together.
- A hub is always Half Duplex, so only one device at a time can communicate.
- In a hub, a frame is passed along or “broadcast” to everyone on its ports.



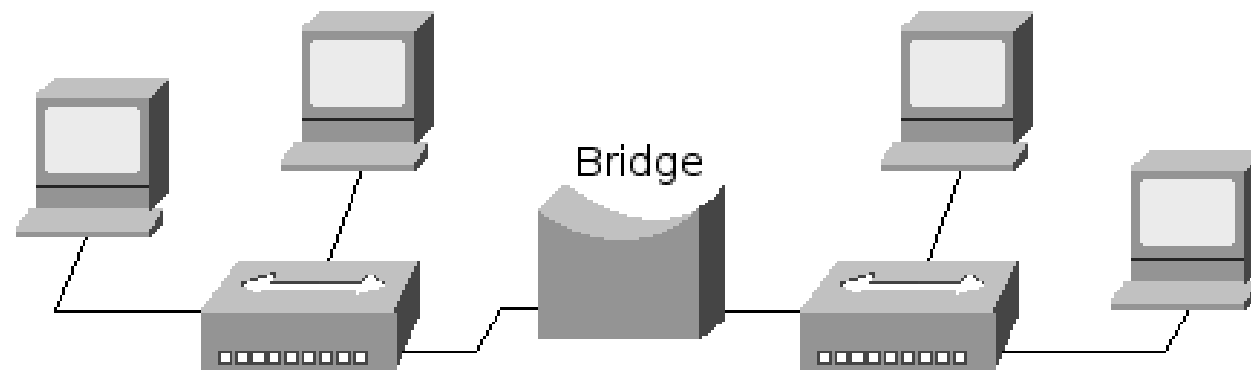
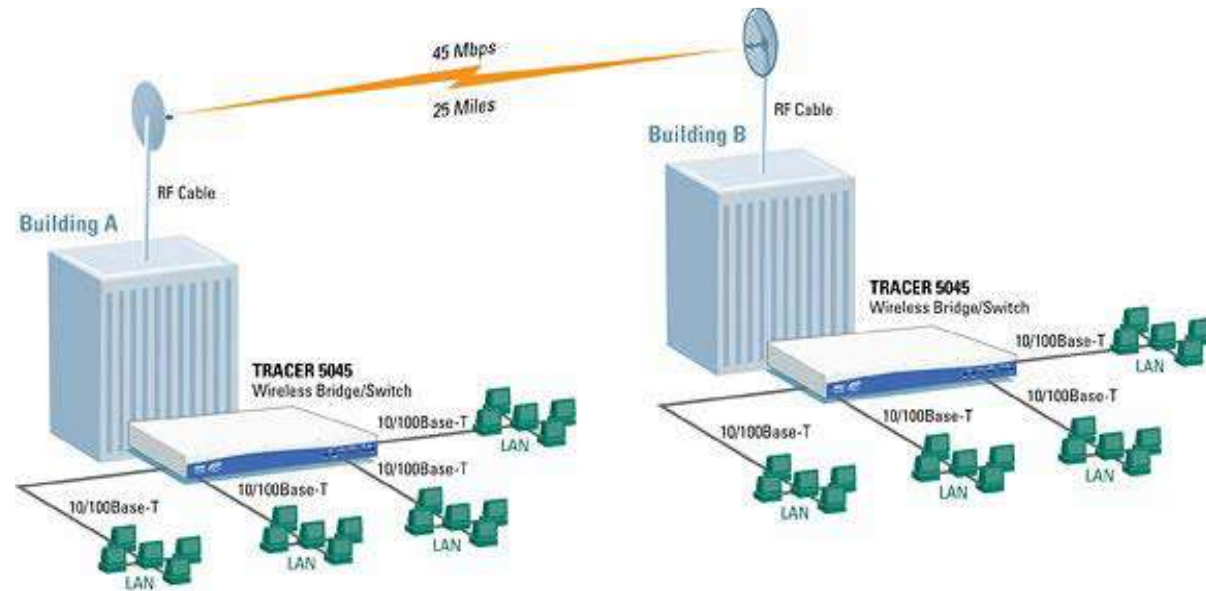
Switch

- Switches generally have a more intelligent role than hubs.
- It also provides centralized communication among connected devices in one LAN.
- Communication in switch can be full duplex.
- Switch has a MAC-Address Table to store information of the connected devices.



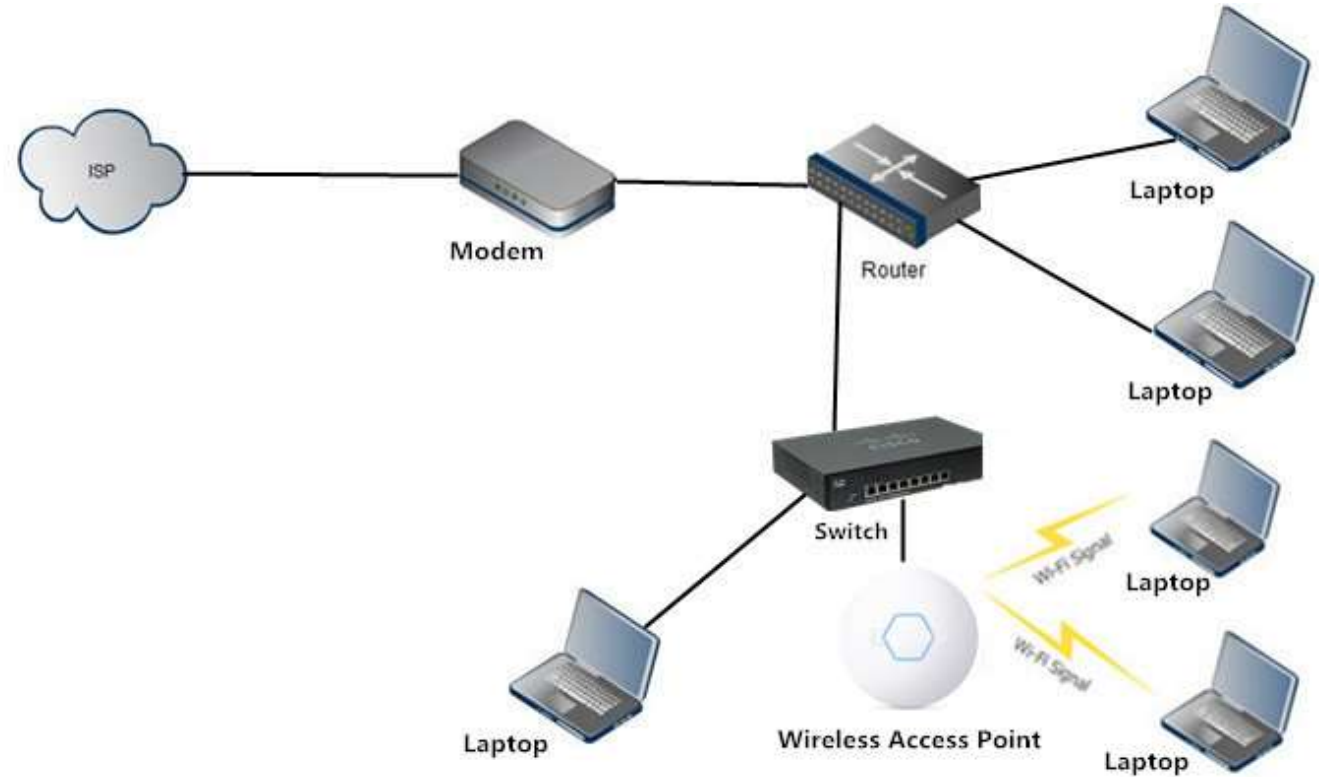
Bridge

- Bridge is a network device that provides a connection between two local area networks (LANs) or two segments of the same local area network.



Access Point

- An access point is a device that creates a wireless local area network, or WLAN, usually in an office or large building.



Router

- A router connects different networks.
- It is a WAN device.

CISCO ROUTERS

The image displays a variety of Cisco routers. At the top left is the Cisco logo and the word "ROUTERS". Below this, there are several rows of router models. The first row includes Cisco 2851, Cisco 3825, and Cisco 7603. The second row shows Cisco 2821, Cisco 3845, and Cisco 7604. The third row features Cisco 2811, Cisco 7201, and Cisco 7606. The fourth row contains Cisco 2801, Cisco 7204 VXR, and Cisco 7206 VXR. At the bottom left, there are two rack-mounted router units. In the bottom right corner, there is a call to action: "Contact US" and the website "www.fidemonline.com".

Cisco 2851 Cisco 3825 Cisco 7603

Cisco 2821 Cisco 3845 Cisco 7604

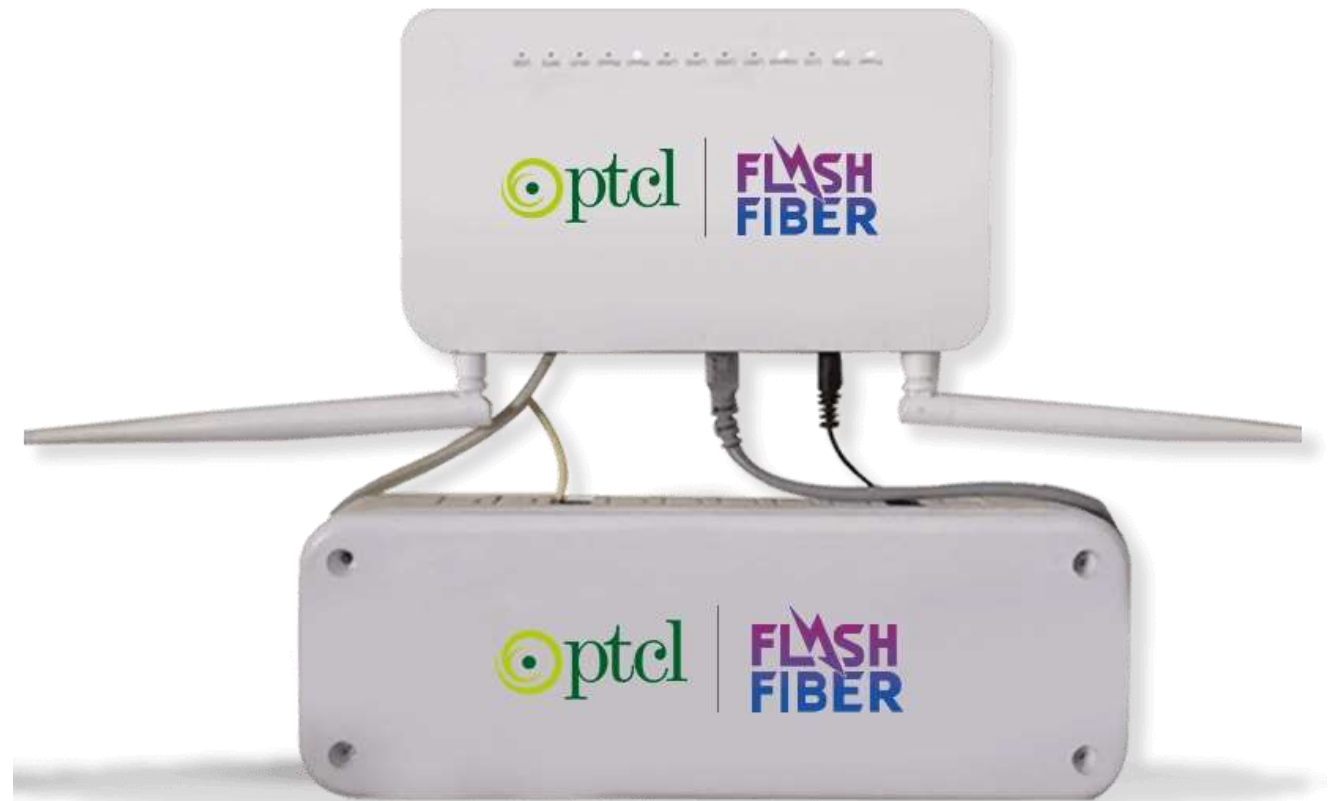
Cisco 2811 Cisco 7201 Cisco 7606

Cisco 2801 Cisco 7204 VXR Cisco 7206 VXR

Contact US
www.fidemonline.com

Modem

- A modem is a device that connects your home to your Internet Service Provider (ISP).



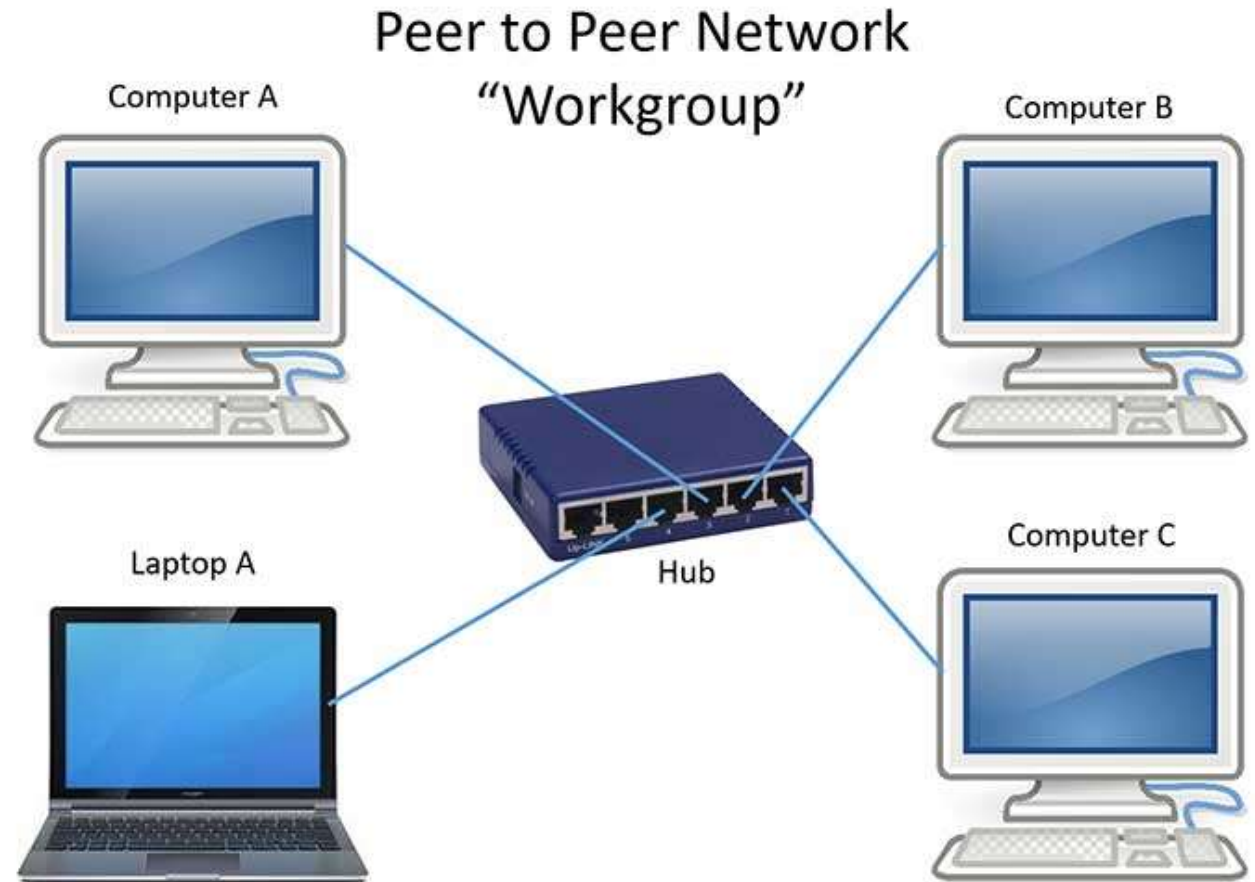
Gateway

A gateway is a device that combines the functions of a modem and a router.



Peer-to-Peer Network

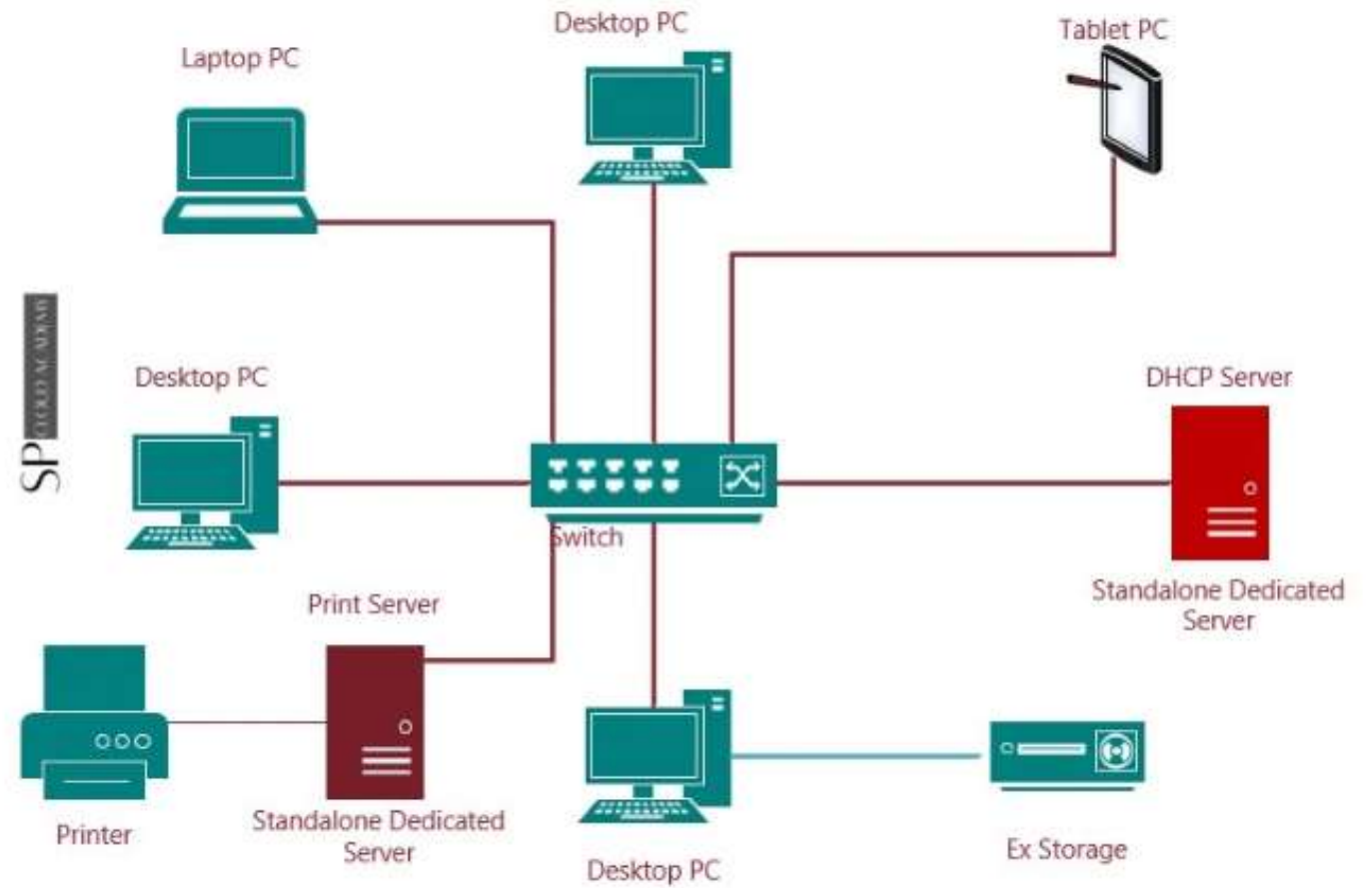
- Your peers are your equals.
- In a peer-to-peer (P2P) network, all the computers are equals.
- Peer-to-peer networks are usually small, having anywhere from two to ten computers.
- Workgroup is Microsoft's term for a peer-to-peer local area network.



Client-Server Network

- A Client Server Network is a Network Model in which one or more computers offer a service to other computers, but no computer has central authorization and controlling power all over the network.

Client-Server Network

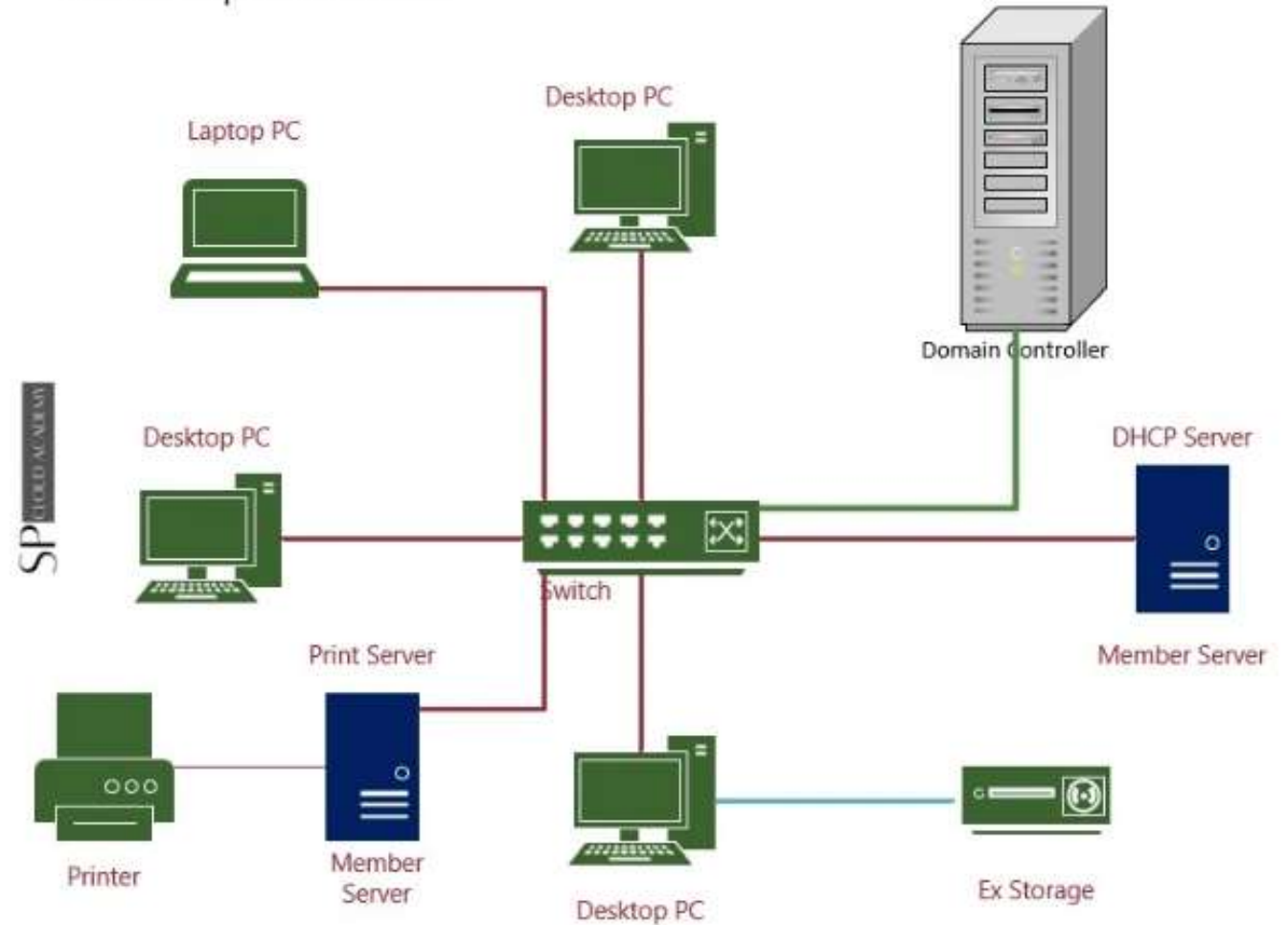


Domain based Network

- A system of centralized network administration, in which the permissions that grant access to resources in the network are maintained in one or more servers called “domain controllers”.
- Microsoft’s Active Directory is based on the domain system.

Domain Based Network

Domain: spca.education

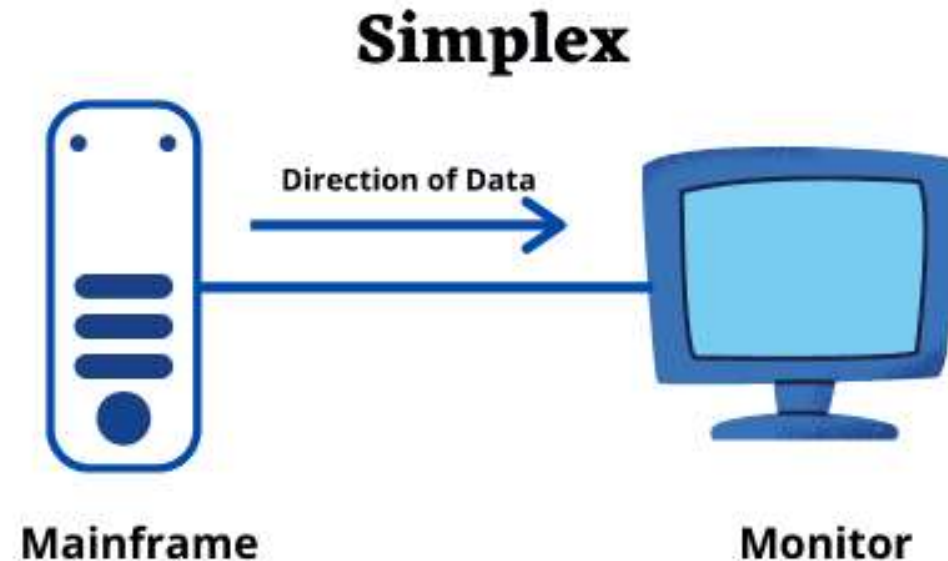


Transmission Modes in Computer Networks

- Transmission mode in computer networks is used to define the direction of signal flow between two linked devices.

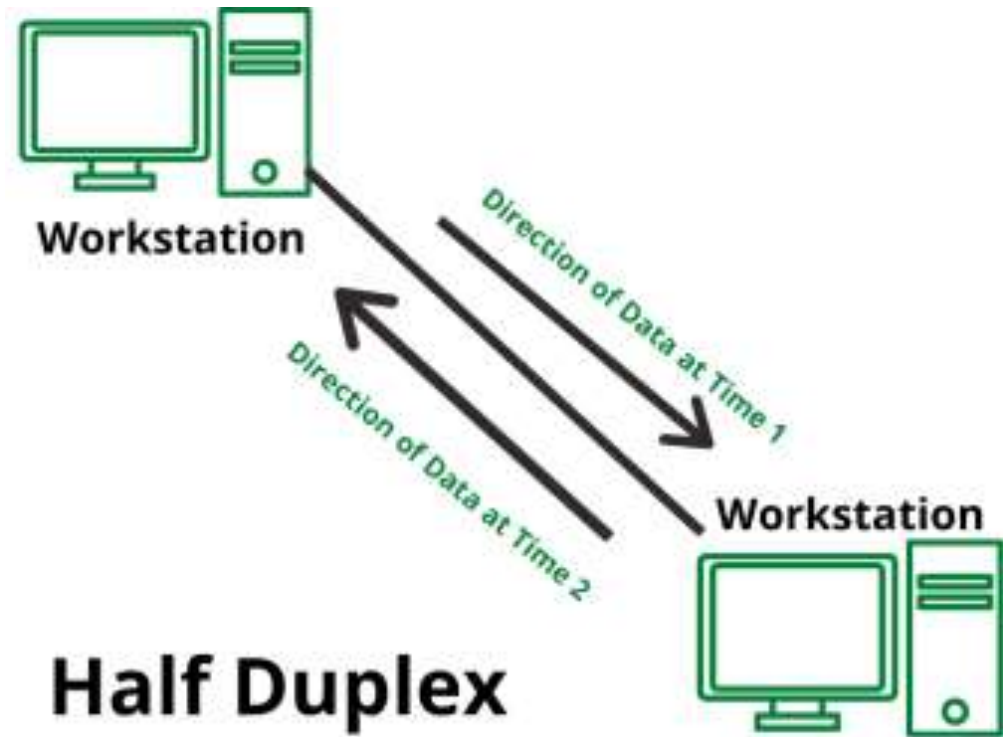
Simplex Mode

- In this type of Transmission modes in computer networks, data can be sent only through one direction i.e., communication is unidirectional as on a one-way street.
- We tend to cannot to send a message back to the sender.



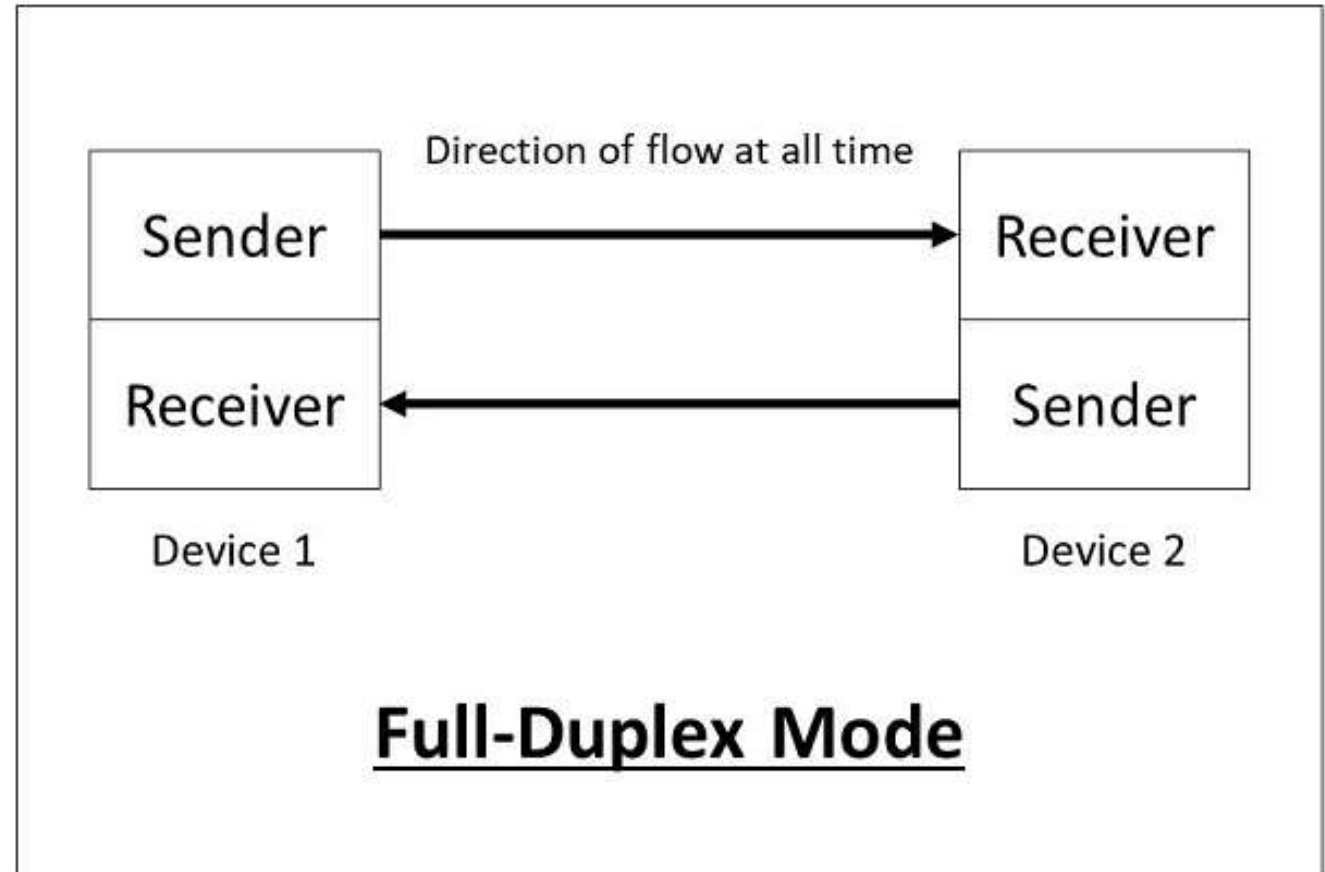
Half Duplex

- Each station can both transmit and receive, but not at the same time.
- When one device is sending, the other can only receive.



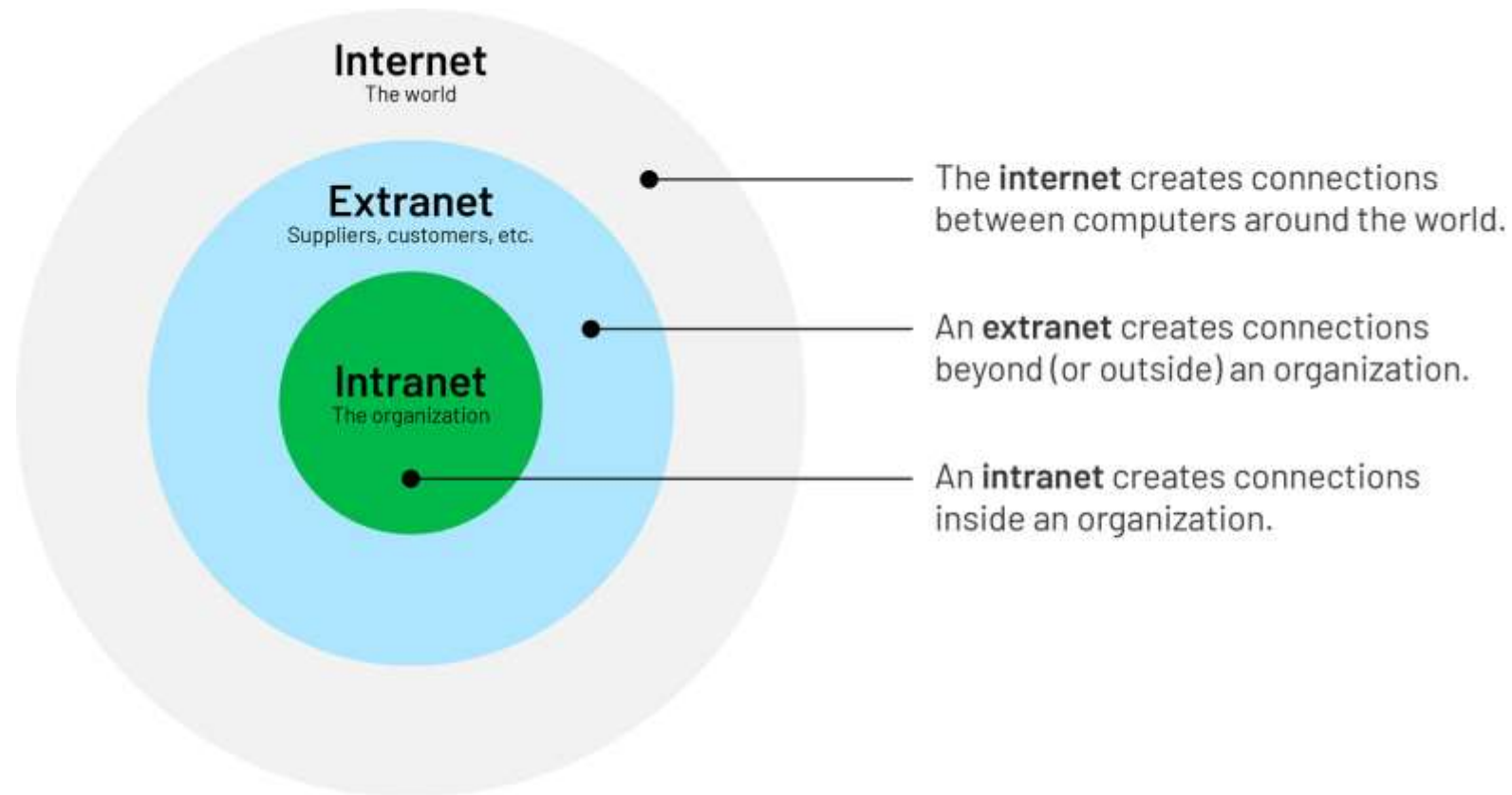
Full Duplex

- Full-duplex data transmission means that data can be transmitted in both directions on a single carrier at the same time.



Intranet vs Extranet vs Internet

- <https://resources.igloosoftware.com/blog/internet-vs-intranet-vs-extranet-whats-the-difference/>



ANY
QUESTIONS?

