

# TERMINOLOGIES

Node: device

Peer: perform actions

Hub: spreads data across other devices

Media: cable, wireless etc

Protocols: rules

Packet: unit of data transmitted over a network

## LOCAL AREA NETWORK

- Group of computers confined to a small geographic area such as a single building
- Group of devices that share a common communication medium such as cable or wireless connections

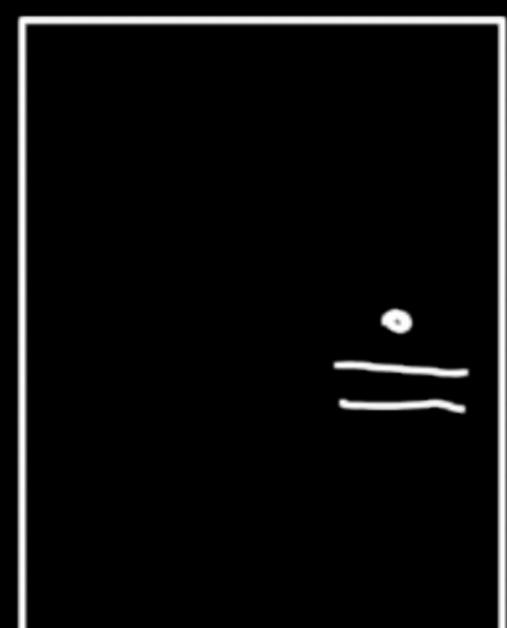
# NETWORKS

→ to exchange data

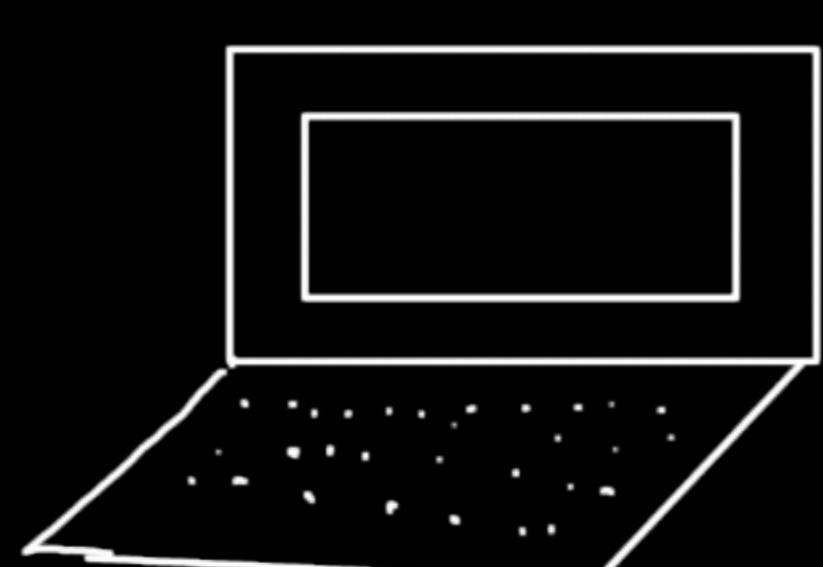
## HUB

→ basic central connecting devices

→ takes information from one port and sends the data to all devices connected to the Hub



— Hub



→ shared Bandwidth

## SWITCH

- works similar as hub but can identify intended recipient of data
- keeps track of MAC Addresses
- supports all of the bandwidth per port

## ROUTER

- Allows communication b/w 2 networks
- enables us to communicate with the internet

# How do we get connected to internet

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## Network Adapter

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- Network interface card (NIC)
- hardware device
- RJ45 connectors
- allows a device to connect to a network
- converts data from device into signals that can be transmitted over a network (wired or wireless)
- receives incoming signals and convert them back into readable data for device

## Wireless Access Point

- acts as the central connecting device for network
- bridge b/w wired LAN and wireless devices
- hardware device

## Serial Data Transfer

- transfer of one bit at a time like a one lane highway

## Data Transfer Rate

- maximum bits per second (bps) that can be transferred over a network

→ Rated in bits, lower case 'b'  
e.g. 10Mbps

## Types of Transfers:

- Broadcast → sends data to every other device on network
- Unicast → to specific device

## IP Address

- IP - Internet Protocol
- Unique address assigned to a device on the network
- Each device in a local network has a unique private IP, and the entire network shares one public IP on the internet, managed by the routers.

## • Public IP address

- > identify device on the internet
- > given by Internet Service Provider (ISP) at a monthly bill

## • Private IP address

- > identify device amongst other devices

## • VERSIONS

### - IPv4:

- Format: nnn.nnn.nnn.nnn  
where each set ranges from 0 to 255
- Supports: 4.3 billion address ( $2^{32}$ )
- Broken down into two parts:

Network id e.g: 192.168.1

• devices share same network if network id is same

Host id e.g: 1

• Uniquely identify specific device

## -IPv6:

- new iteration of IP to tackle the shortage issue - E.g., Cisco, an industry giant in networking estimated that there would be
- \* 50 billion devices connected to the internet by end of 2021.  
So IPv4 isn't enough.
- Format: eight groups of four hexadecimal digits
- Supports: 340 trillion-plus devices ( $2^{128}$ )

# Types of Networks

## • LAN

→ Computers and other devices are connected using copper-based twisted-pair cables or wireless equipment

## • Virtual LAN (VLAN)

→ Group of hosts with a common set of requirements that communicates as if they were connected together in a normal fashion on one switch, regardless of their physical location

# Network Topologies

→ physical connection of hosts  
in a computer network

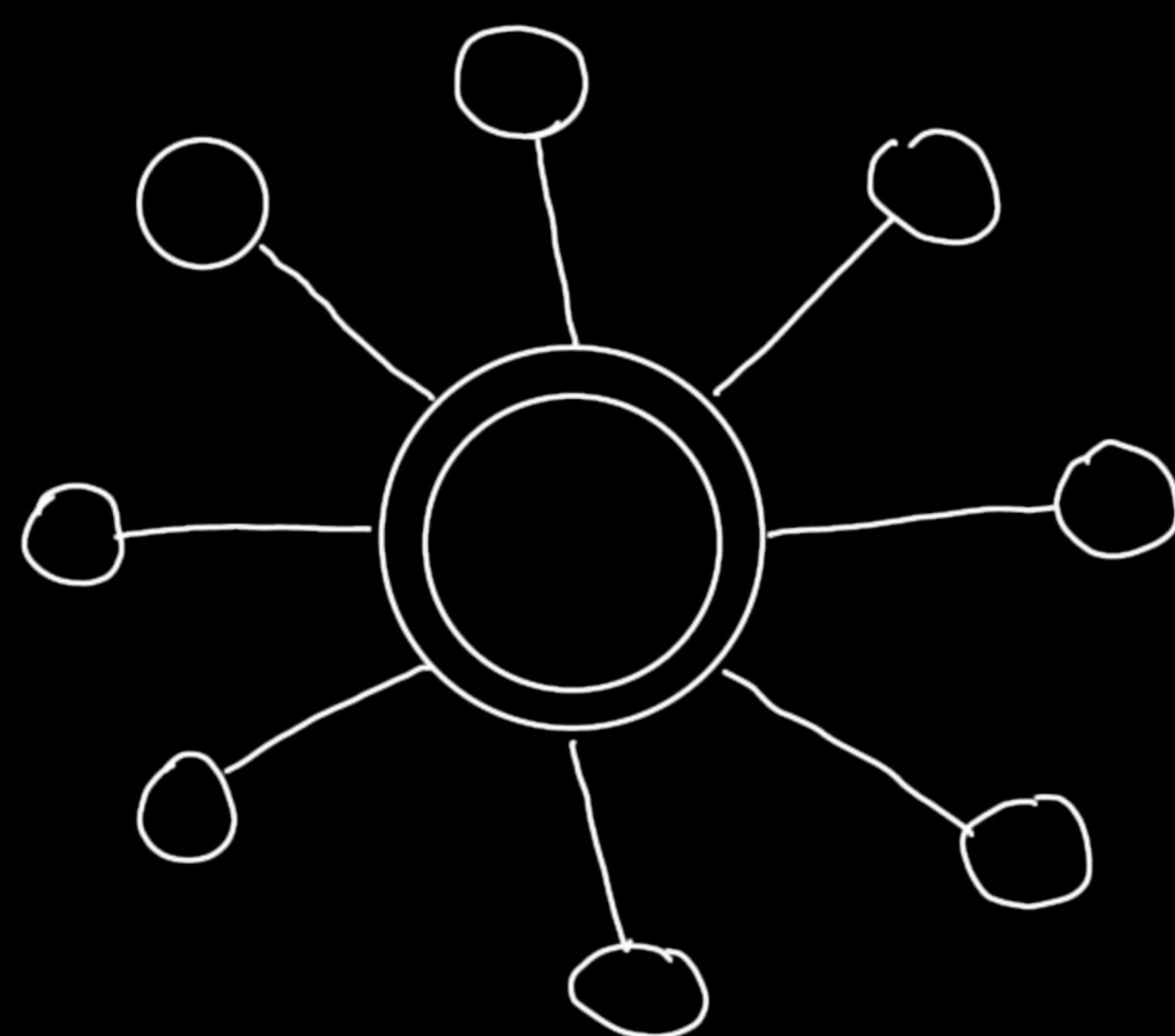
→ Several Types such as

Bus:



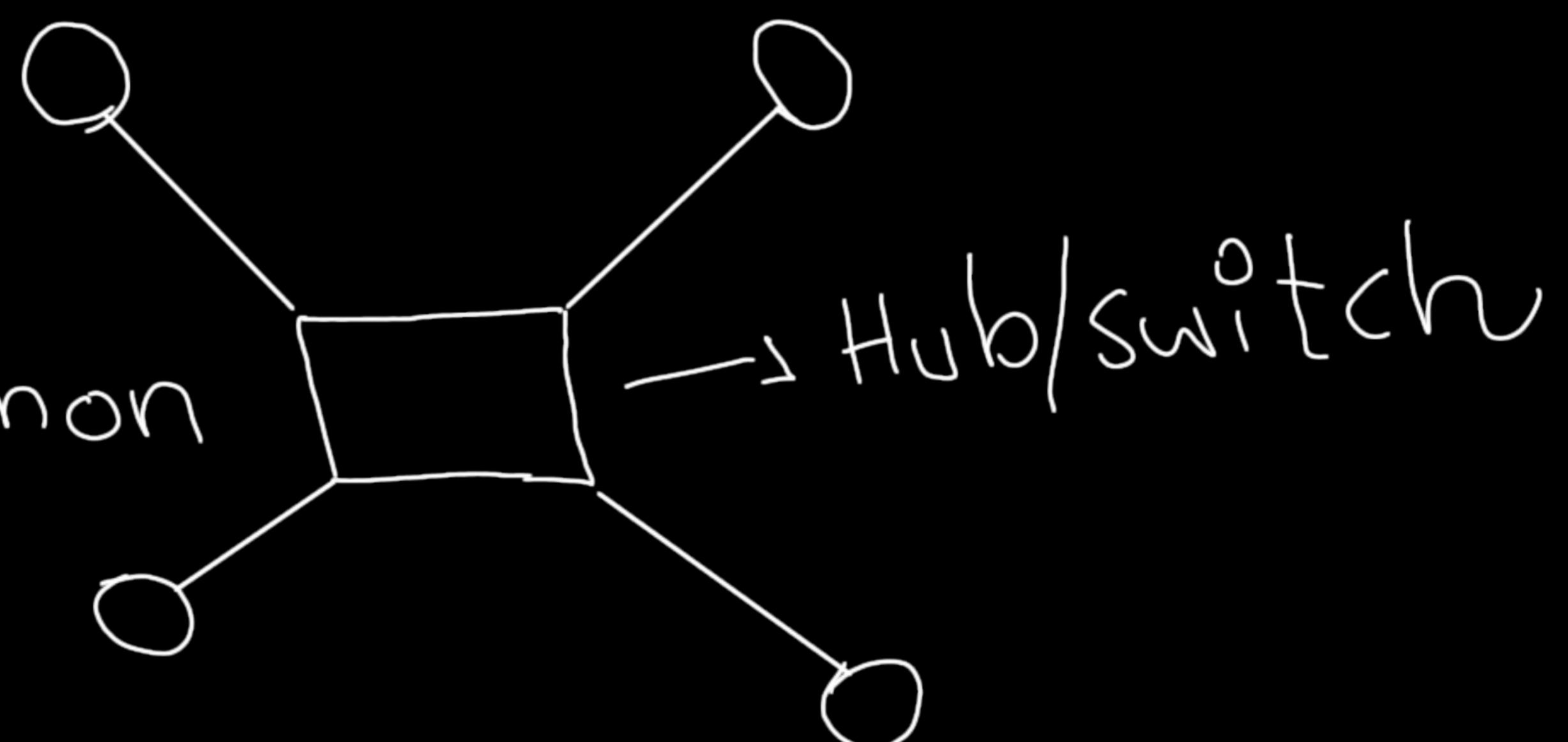
Ring:

- used by token ring

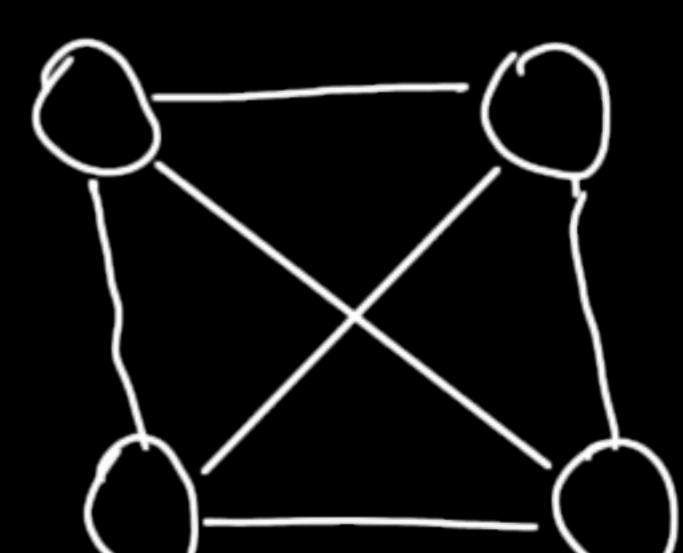


Star:

- Most common



Mesh: Everything connected to everything



Tree: devices are connected hierarchically

## TOKEN RING:

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- sends data logically in ring fashion
- token goes to each device one at a time
- physically connected in star fashion

## Ethernet:

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- how information is sent and received b/w network adapters, hubs, switches, and other devices
- de facto standard
- most widely-installed local area network technology

## Frames

- Computers on ethernet networks communicate via frames
- Sequence of bits containing a detectable beginning and end of a packet in the stream of bits
- Data packet residing on layer 2 of the OSI model

# Types of Computing

## Centralized Computing

- Central location using terminals attached to the main system
- Mainframes are powerful computers and rest of devices connected to it are known as terminals
- Each terminal consists of keyboard and display with no processing power

## Client/Server Model

- architecture that distributes applications b/w server and client computers

## Peer-to-Peer Networking

- Peers are both service requestors and service providers
- can also refer to file sharing networks

## Distributed Computing

- includes both client-server and peer-to-peer networks
- Every device has its own processing power

# Remote Desktop Services and Remote Sessions

- Based off of centralized computing model
- Thin-client computers do not have a hard drive and store an OS in RAM
- Data is stored centrally
- blend of centralized and distributive computing

## Servers

- provide services such as file sharing, print, database etc