# Networking

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# Agenda

- What is a Network
- Uses of networks
- Network Devices
- Types of networks
- Network topologies
- IP addressing

# Network

- A computer network is a group of computers/devices(Nodes) that use a set of common communication protocols over digital interconnections for the purpose of sharing resources located on or provided by the network nodes

# Uses of Network

- COMMUNICATION
- ACCESSING RESOURCES
- CENTRALISATION OF DATA
- TRANSFER OF FILES.
- LEISUR (games, Multimedia, books etc)

# Network Devices

# Modem

- Modems (modulators-demodulators) are used to transmit digital signals over analog telephone lines. Thus, digital signals are converted by the modem into analog signals of different frequencies and transmitted to a modem at the receiving location.

# RJ 45 connector

- The eight-pin RJ45 connector is **a standardized interface which often connects a computer to a local area network (LAN)**. This type of connector was originally developed for telephone communications but is now used in a range of applications. The abbreviation, RJ45, stands for Registered Jack-45.

# HUB

- Hubs connect multiple computer networking devices together. A hub also acts as a repeater in that it amplifies signals that deteriorate after traveling long distances over connecting cables.

# Switch

- A switch is a multiport device that improves network efficiency. The switch maintains limited routing information about nodes in the internal network, and it allows connections to systems like hubs or routers.

# Router

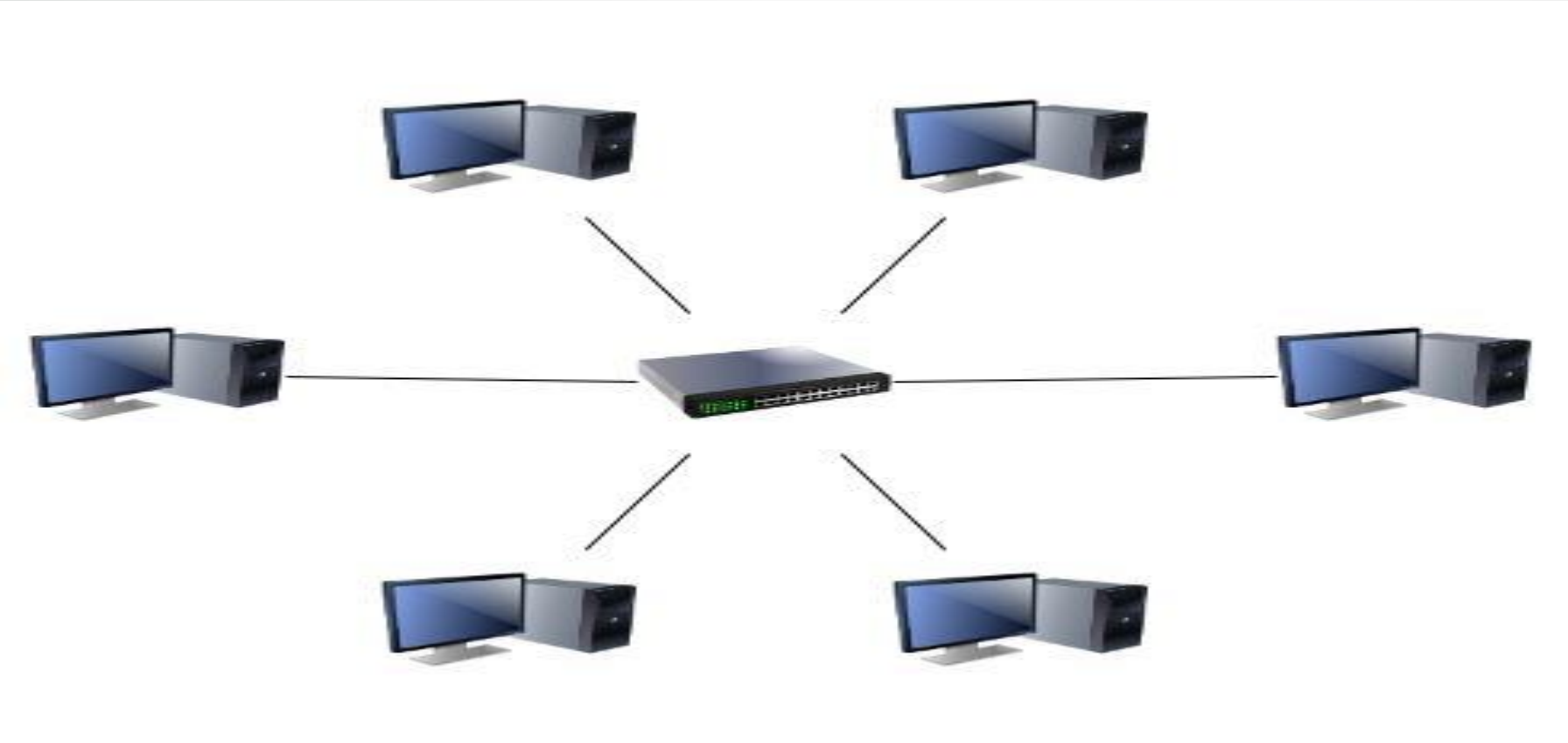
- The router is a physical or virtual internetworking device that is designed to receive, analyze, and forward data packets between computer networks.

# Types of Networks

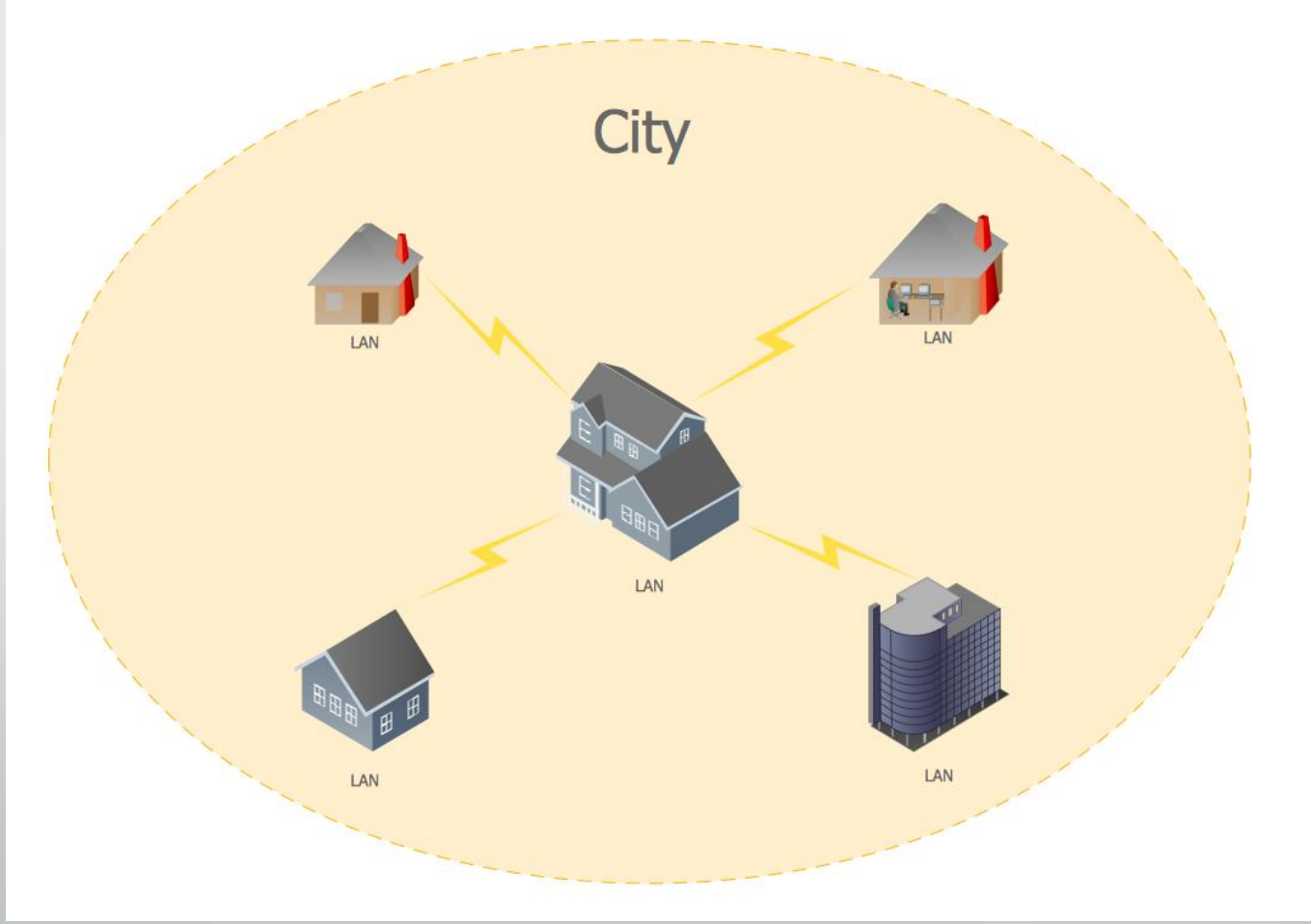
# Personal Area Network

- Personal Area Network (PAN) is a computer network used for data transmission amongst devices such as computers, telephones, tablets and personal digital assistants.
- Also Known as HAN (Home Area Network)
- PANs can be used for communication amongst the personal devices themselves (interpersonal communication), or for connecting to a higher level network and the Internet (an uplink) where one "master" device takes up the role as internet router.

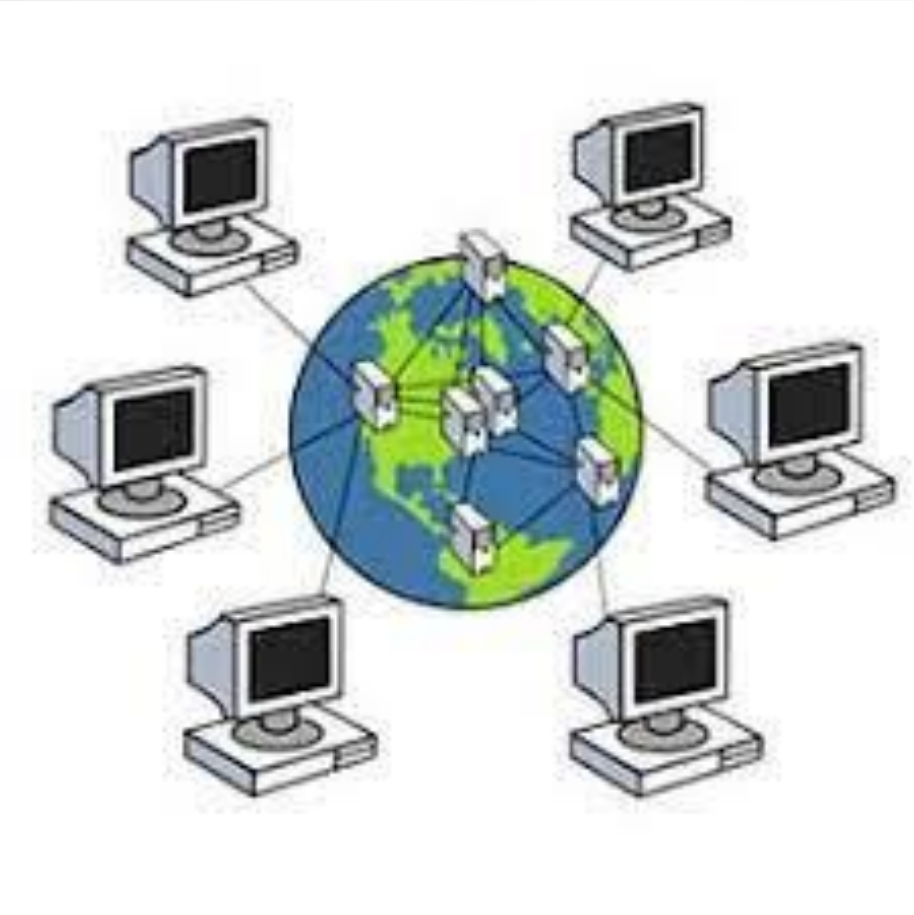
# Local Area Network



# Metropolitan Area Network (MAN)



# Wide Area Network



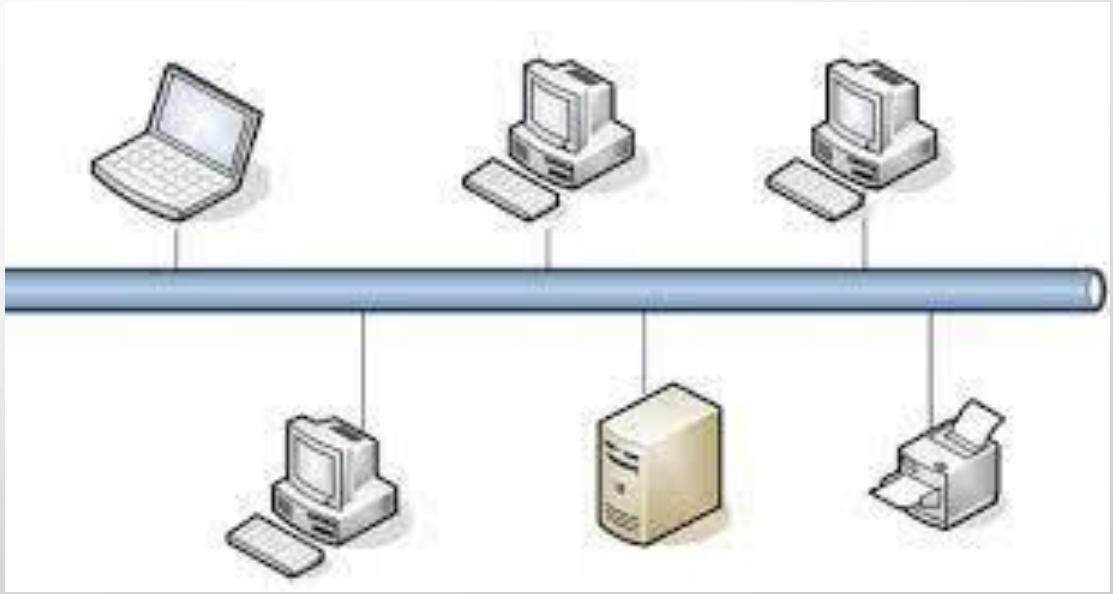
# Network Topologies

# Bus Topology

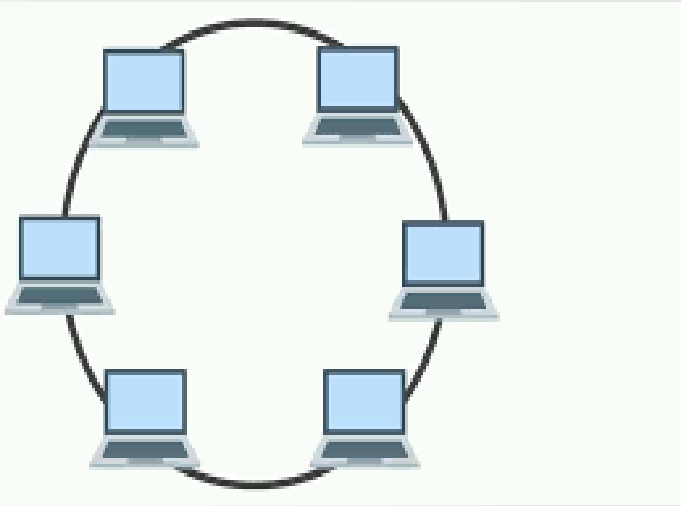
- All devices are connected to a central cable, called bus or backbone.

**Advantages:**

- There is no central controller.
- Control resides in each station
- The less interconnecting wire is required.
- Ease of installation.



# Ring Topology

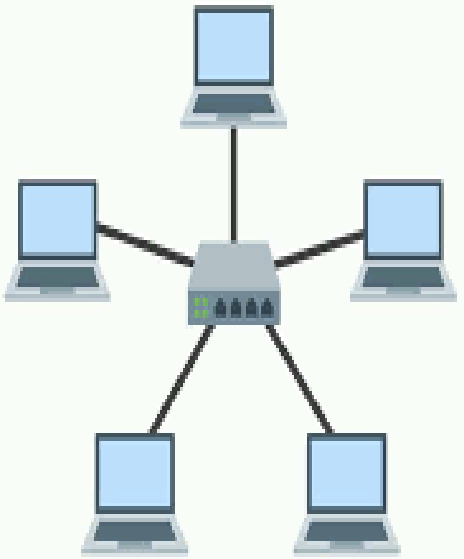


- All devices are connected to one another in the shape of a closed loop.
- Each device is connected directly to two other devices, one on either side of it.

Advantages:

- Avoids the collisions that are possible in the bus topology.
- Each pair of stations has a point-to-point connection.
- A signal is passed along the ring in one direction, from device to another, until it reaches its destination.
- Each device incorporates a repeater.

# Star Topology



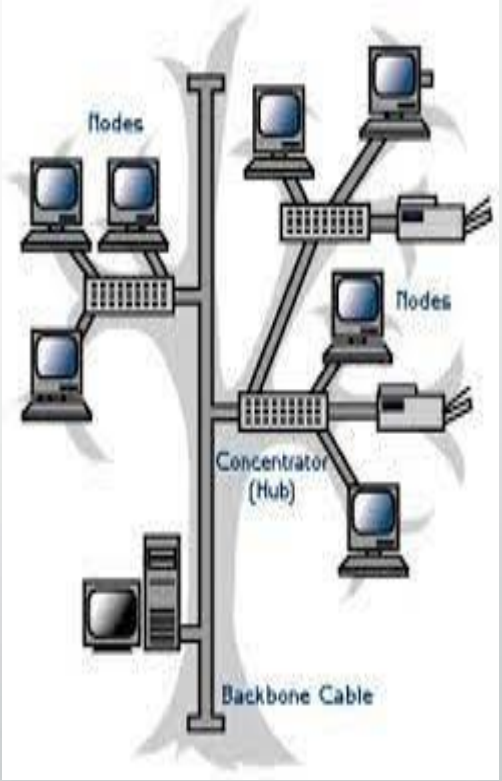
- All devices are connected to a central hub

Advantages:

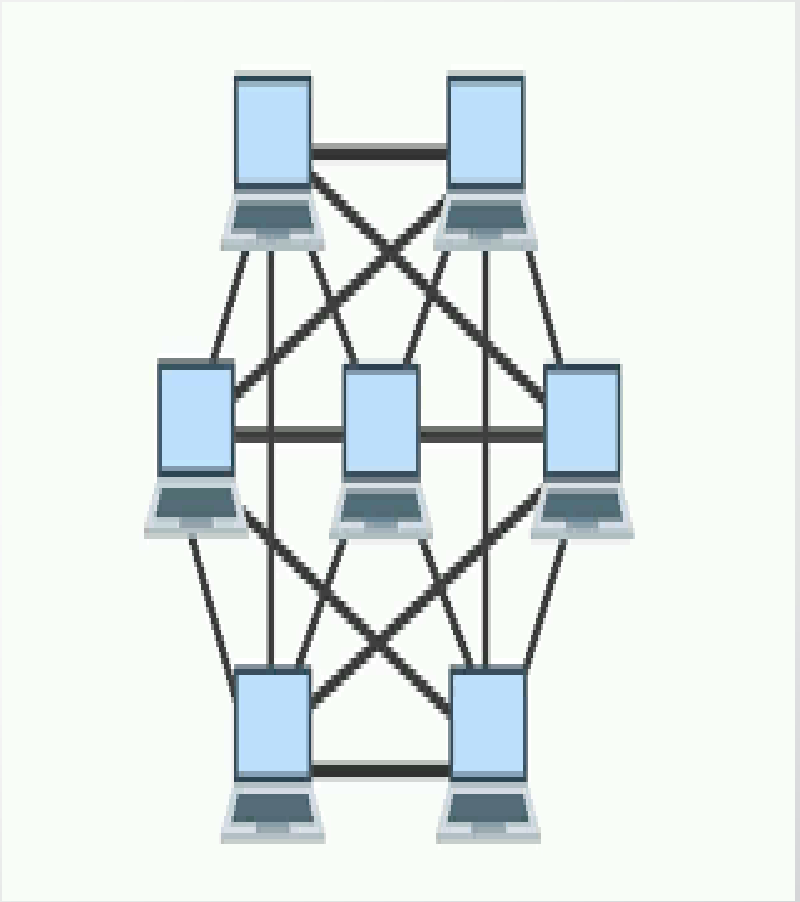
- Easy to install and reconfigure.
- Robustness, if one link fails; only that link is affected. All other links remain active.
- Easy fault identification and isolation. As long as the hub is working, it can be used to monitor link problems and bypass defective links.

# Tree/Hierarchical Topology

- It allows more devices to be attached to a single central hub and can therefore increase the distance a signal can travel between devices.
- It allows the network to isolate and prioritize communications from different computers



# Mesh Topology



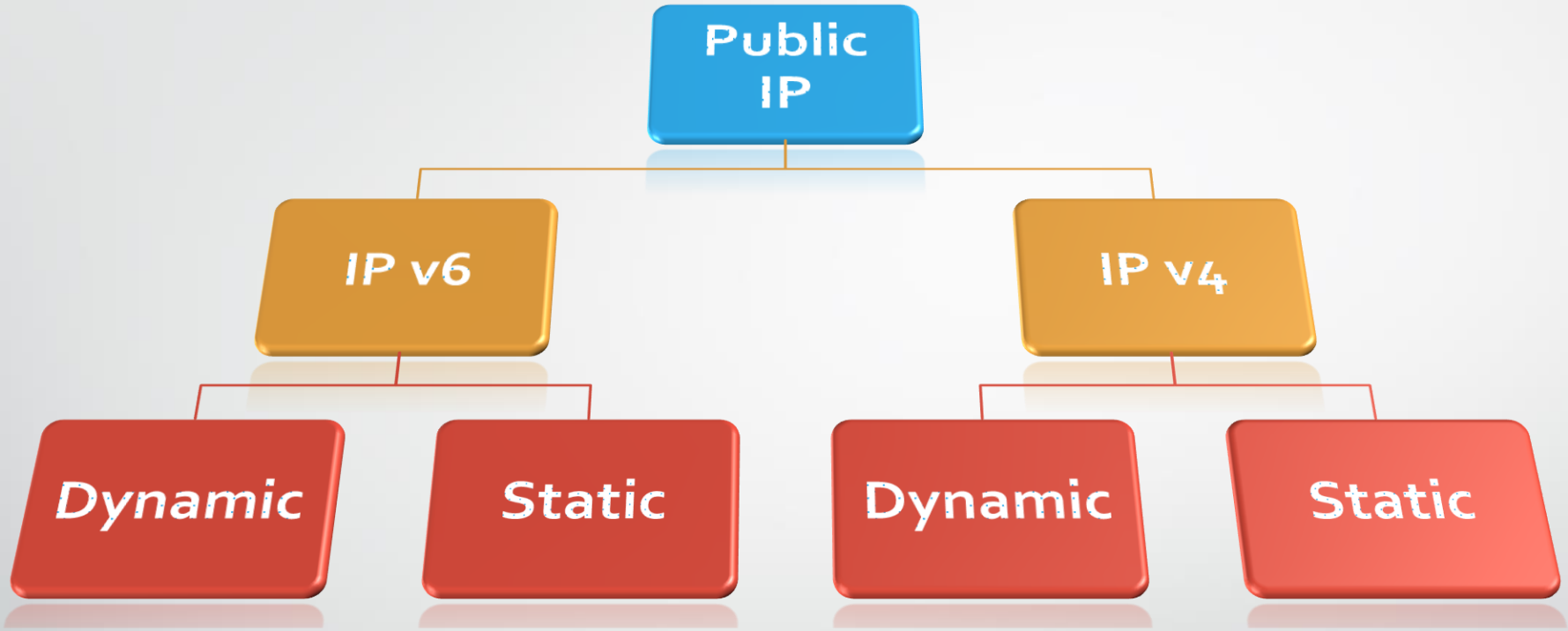
- Each host has its connections to all other hosts.
- Mesh topology is implemented to provide as much protection as possible from interruption of service

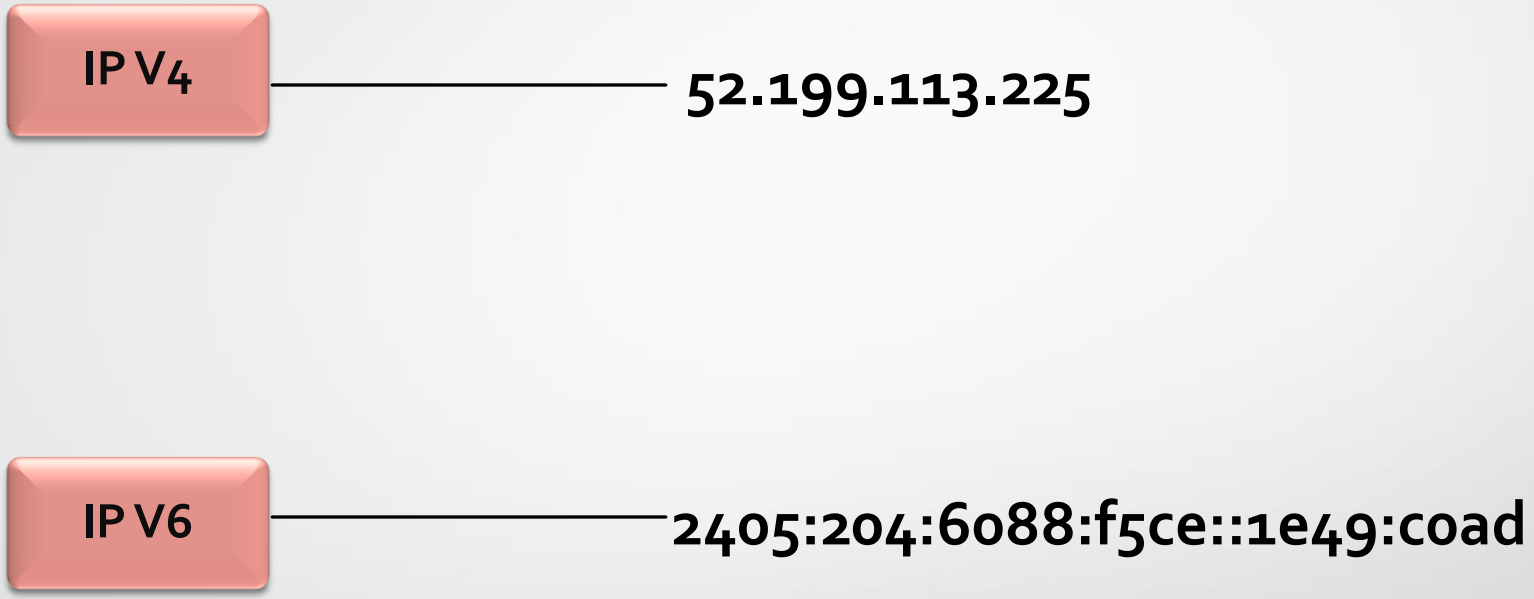
# IP address

- An IP stands for Internet Protocol.
- An IP address identifies a machine on a network.
- It is a software address, not a hardware address and is unique (when it is public).
- No two computers in the world will have same IP address at any instance.
- IP addressing was designed to allow a host on one network to communicate with a host on same network as well as with a different network.

- The Internet Assigned Numbers Authority (IANA) manages the IP address space allocations globally.
- It delegates five Regional Internet Registries (RIRs) to allocate IP address blocks to local Internet registries and other entities.

# IP ADDRESS




IP V4
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Thank you!