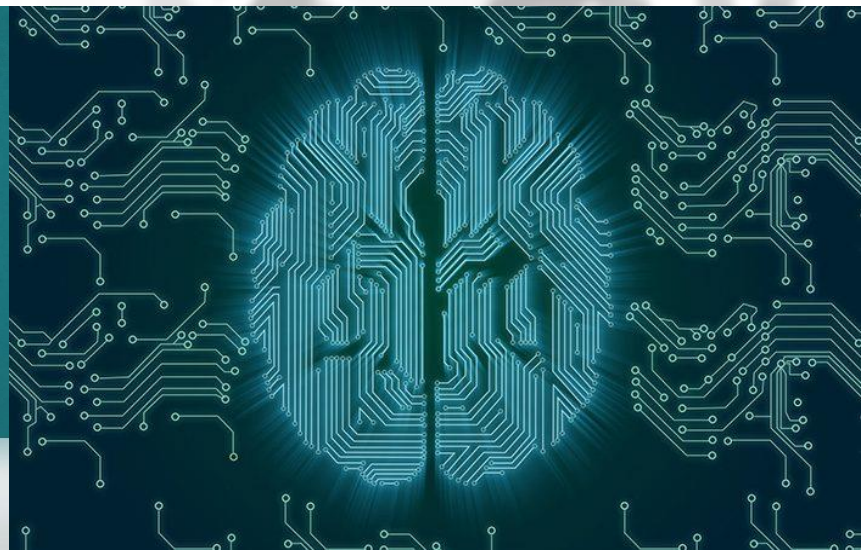
COMPUTER KNOWLEDGE

Special compilation for EPFO Exam



Course By – Dikshant Sharma

LECTURE 3 - Scope

Data Communication & Network

I. Data Communication

i. Definition
ii. Types (Simplex, Half Duplex, Full Duplex)
iii. Channels of Communication

II. Network

i. Definition
ii. Important Terms
iii. Types of Networks (LAN, WAN, MAN Etc)
iv. Network Topologies

III. Important MCQs

Data Communication

Data Communication deals with the transmission of digital data from one device to another.

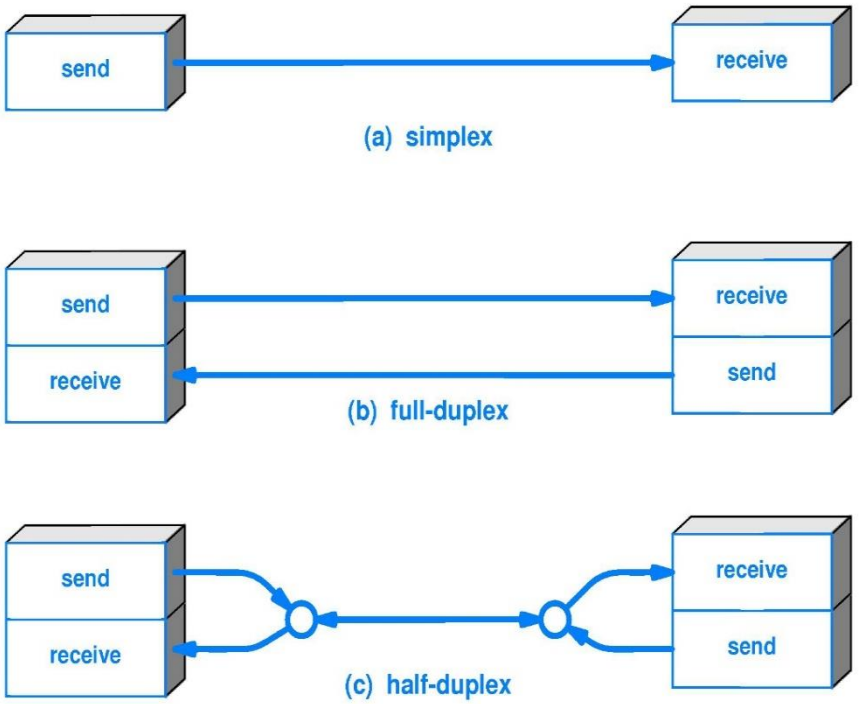
- It has certain advantages such as
  - Saving of time in physical transportation of data
  - Quick retrieval of information
  - Reduced cost of transmission

Channels of Communication –

Data is transferred through a pathway called as a communication channel which can be telephone line, satellite communication etc.

Types of Communication Channels –

1. **Simplex –** Unidirectional – Only one device can transmit
2. **Half Duplex –** Bi-directional – One device can transmit at a time
3. **Full Duplex –** Bi-directional – Both can transmit simultaneously



Data Communication

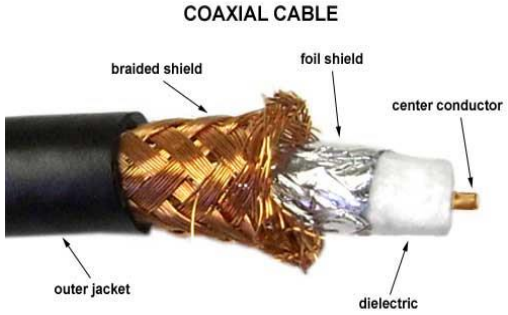
Communication Channels or Communication lines or data links:

1. Standard Telephone line

- ✓ Consists of two wires of copper covered with insulator
- ✓ Complex network of telephone lines has been already established all over the world
- ✓ Widely used in communication

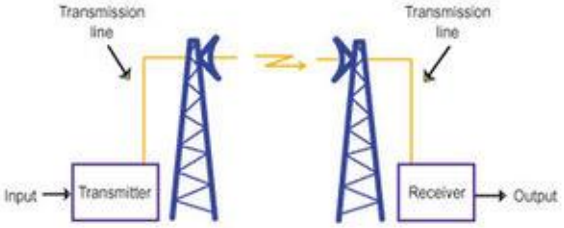
2. Coaxial Cables

- ✓ Center wire surrounded by insulation
- ✓ High quality communication lines (usually underground)
- ✓ Shield on the outside minimizes electrical and radio frequency interference
- ✓ Reduced distortion and noise



3. Microwave Transmission

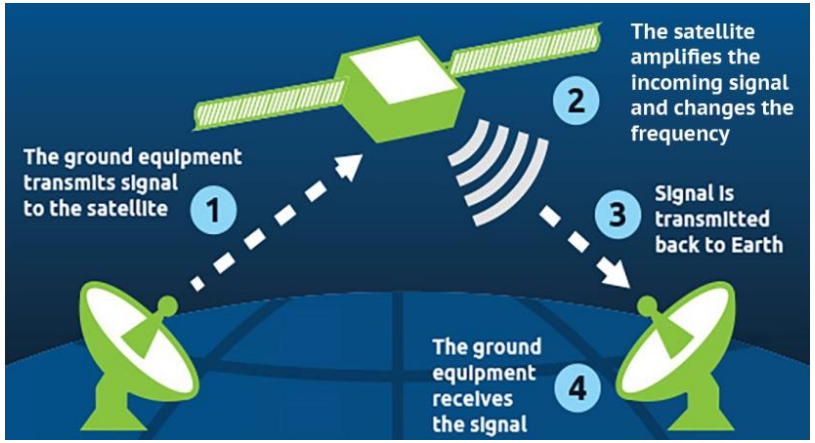
- ✓ Transmits signal through open space (Much faster than telephone line or coaxial cable)
- ✓ Data transmitted in on a line of sight path and needs an antenna to catch it
- ✓ For long distances; signals are first amplified and retransmitted from station to station
- ✓ Gets affected by rain, dust, cloud and bad weather



Data Communication

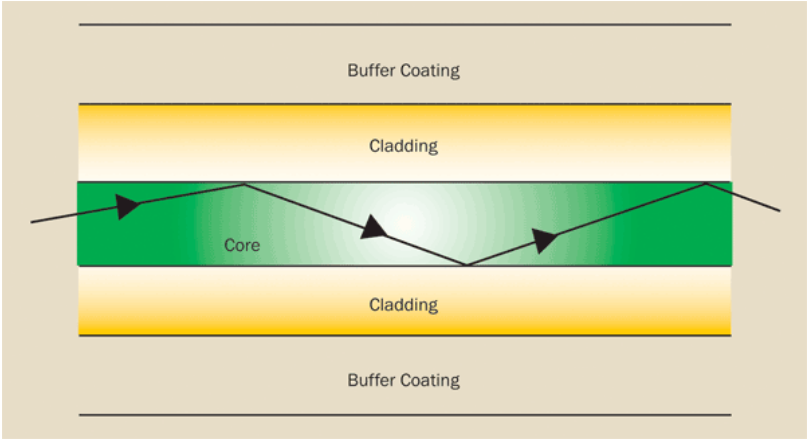
4. Satellite Communications

- ✓ Known for fast communication and long distance communication
- ✓ Earth Station sends signal to the satellite; it amplifies it and sends it back to the earth
- ✓ Used for mobile communication such as TV and radio broadcasting



5. Fiber Optics

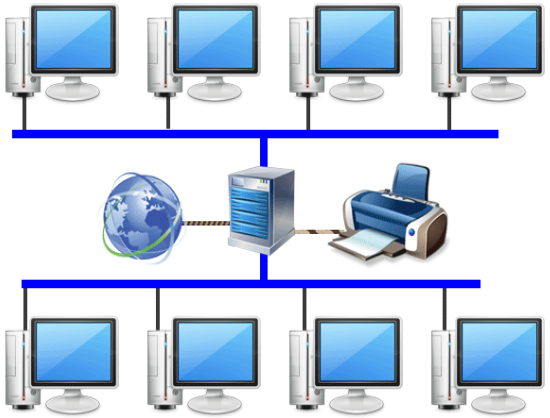
- ✓ These cables consist of one or more thin filaments of glass fiber wrapped in a layer
- ✓ Glass or plastic fiber that carries light along it length
- ✓ Free from radio frequency interference; hundred times faster than coaxial cables

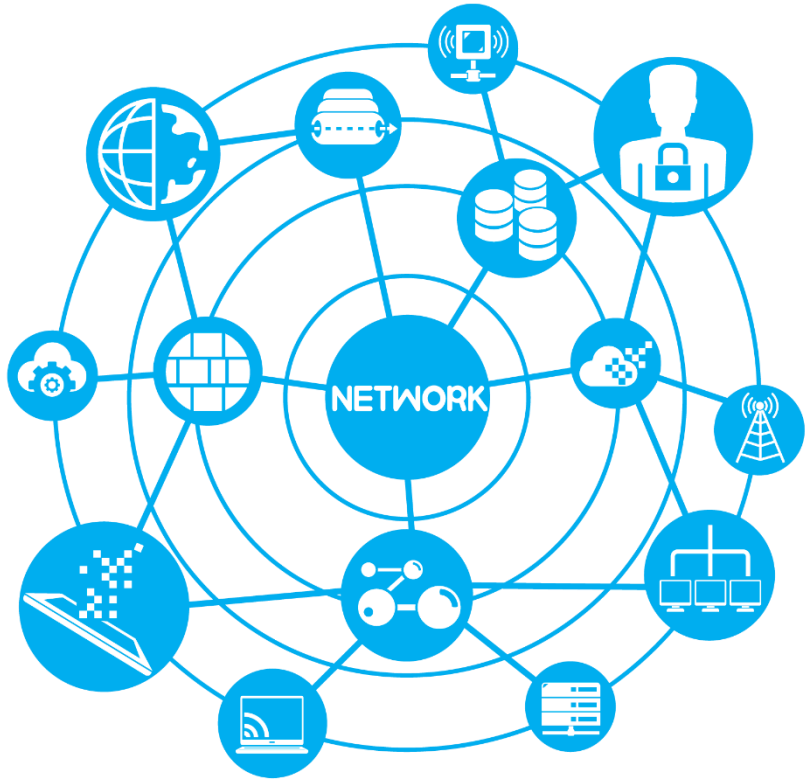


NETWORK

- A Network is a group of computers that are connected to each other for the purpose of communication.
- A computer network allows computers to **communicate** with many other computers and to share software resources and information.

IMPORTANT FACT – ARPANET was the first operational computer network in the world





NETWORK

Some Network related terms –

1) Server

- ✓ Main computer that manages resources to other computers connected to a network
- ✓ Most powerful computer on the network
- ✓ Holds the collection of data and program for PCs workstation and other computers
- ✓ Server computer needs to be fast with high RAM and a large storage capacity hard disk

2) Protocol

- ✓ A set of rules and standards which is used by computers to exchange information or data with each other across a network
- ✓ Defined as rules governing the syntax

3) Nodes

- ✓ Node is a connection point where either data transmission ends or redistribution starts

NETWORK

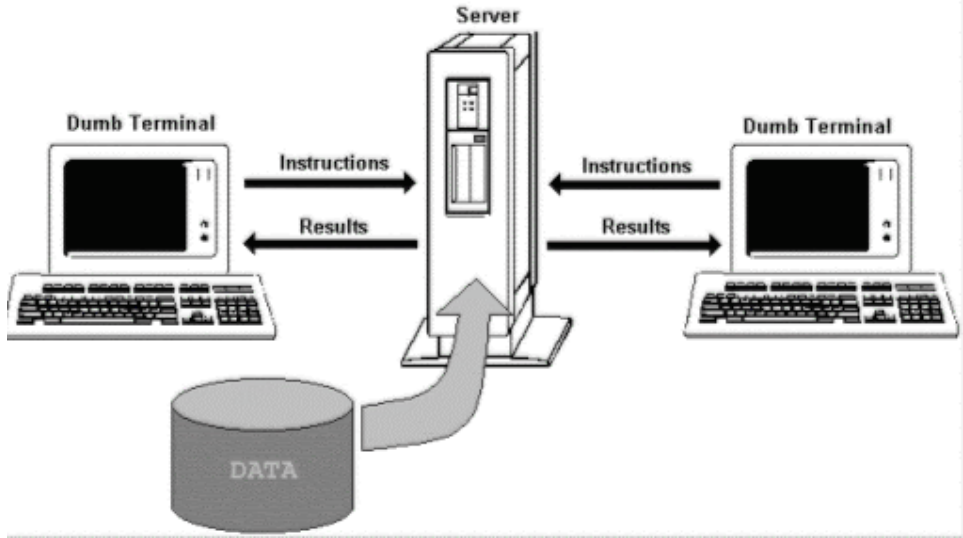
Some Network related terms –

4) Terminal

- ✓ Terminal is a computer equipment at the end of the link
- ✓ It may be another computer or a general purpose terminal device such as keyboard or monitor

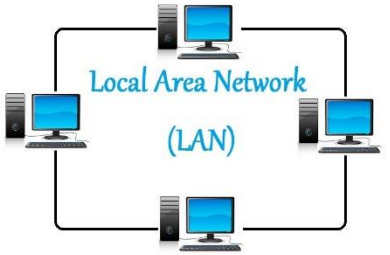
5) Dumb Terminal

- ✓ These are display and input devices which don't process data and input locally
- ✓ These can either transmit and input or can display the resulting output

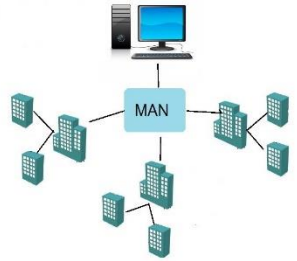


TYPES OF COMPUTER NETWORK

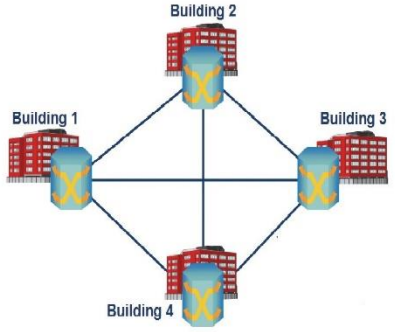
LAN	MAN	WAN
Short for local area network.	Short for metropolitan area network.	Short for wide area network.
Connects a group of computers within a limited geographic area.	Confined to a city or town. Distance coverage is larger than LAN and smaller than WAN.	Covers a large geographical area such as a state, country or a continent.
High bandwidth for data transfer.	Bandwidth is moderate for data transfer.	Low bandwidth for data transfer.
Owned by private companies or individuals.	Ownership can be private or public.	Established under distributed ownership.
Limited to 100 to 1000 meters.	Distance coverage is up to 100 kilometers.	Spans a huge area of 100,000 kilometers.
Lower setup cost due to inexpensive devices.	Moderate installation costs.	Higher setup cost than LAN and MAN.
Higher data transfer speeds with 10, 100, and 1000 Mbps high-speed Ethernet.	Speed can go up to 100 Mbps.	Low data transfer rates between 10 to 20 Mbps.



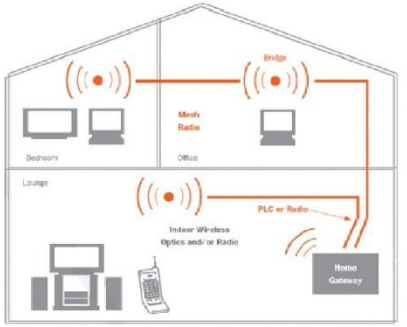
(WAN) Wide Area Network



Metropolitan Area Network



Campus Area Network(CAN)



Home Area Network(HAN)

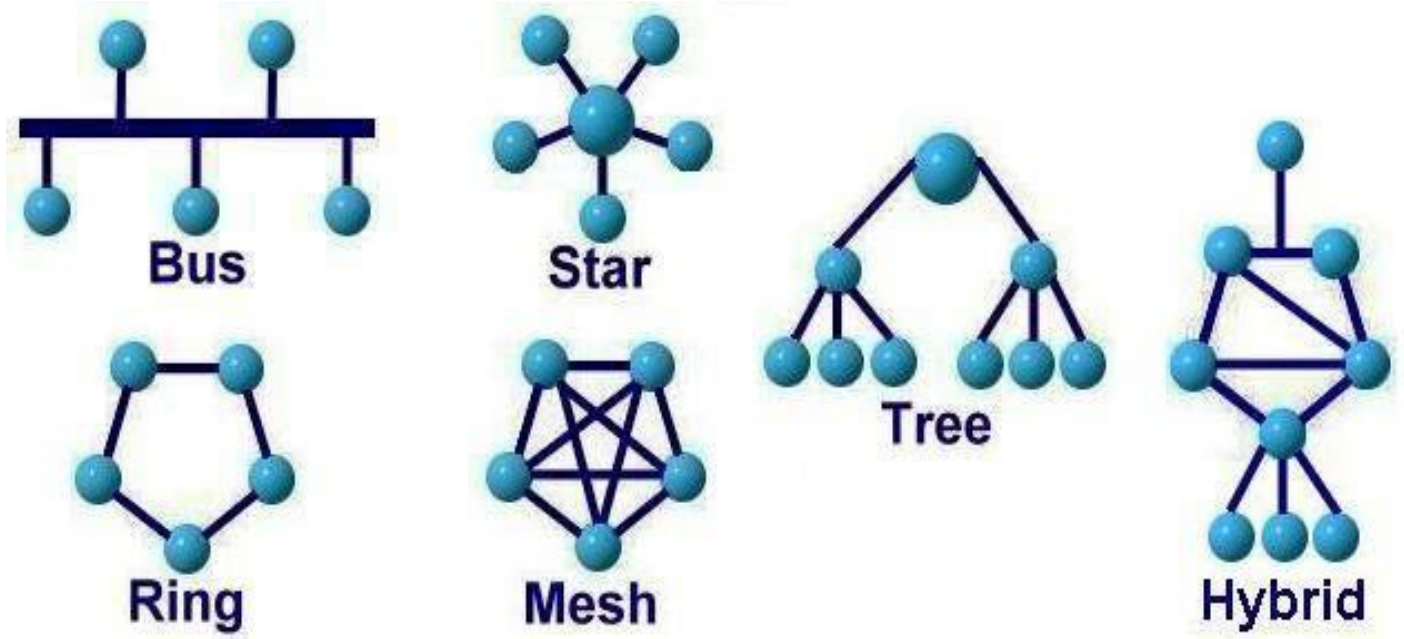
PAN	LAN
MAN	WAN
CAN	SAN

NETWORK TOPOLOGIES

What is a TOPOLOGY?

- **TOPOLOGY** of a network refers to the **physical configuration of cables, computers and other peripherals**

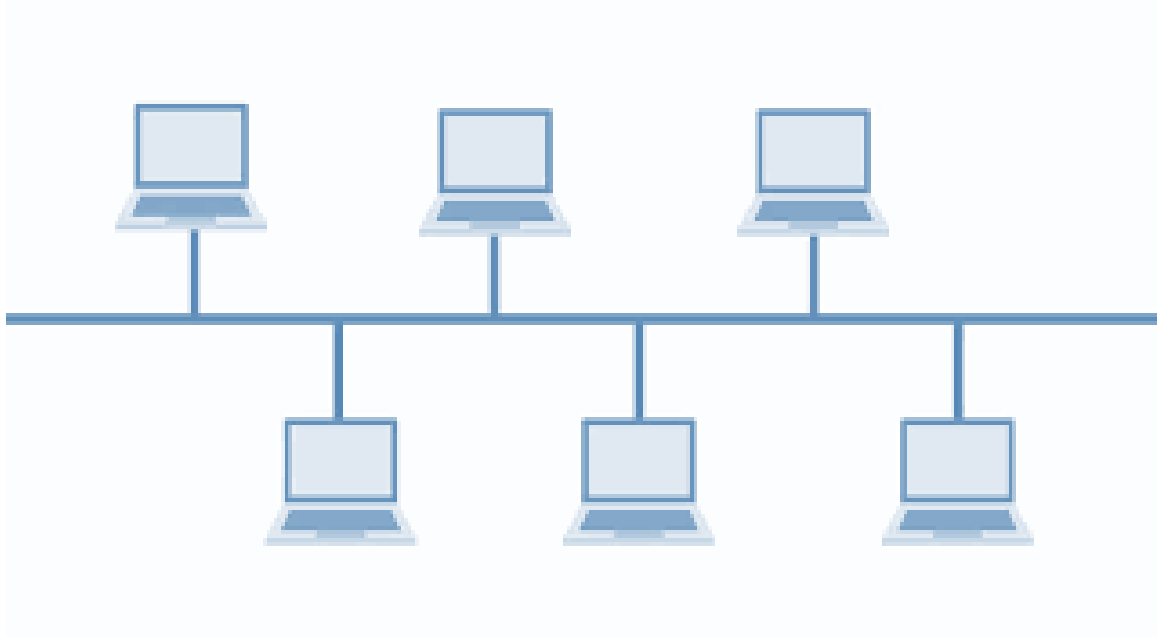
- Types of topologies :-
  1. **BUS** Topology
  2. **STAR** Topology
  3. **RING** Topology
  4. **MESH** Topology
  5. **TREE** Topology
  6. **HYBRID** Topology



NETWORK TOPOLOGIES

BUS TOPOLOGY

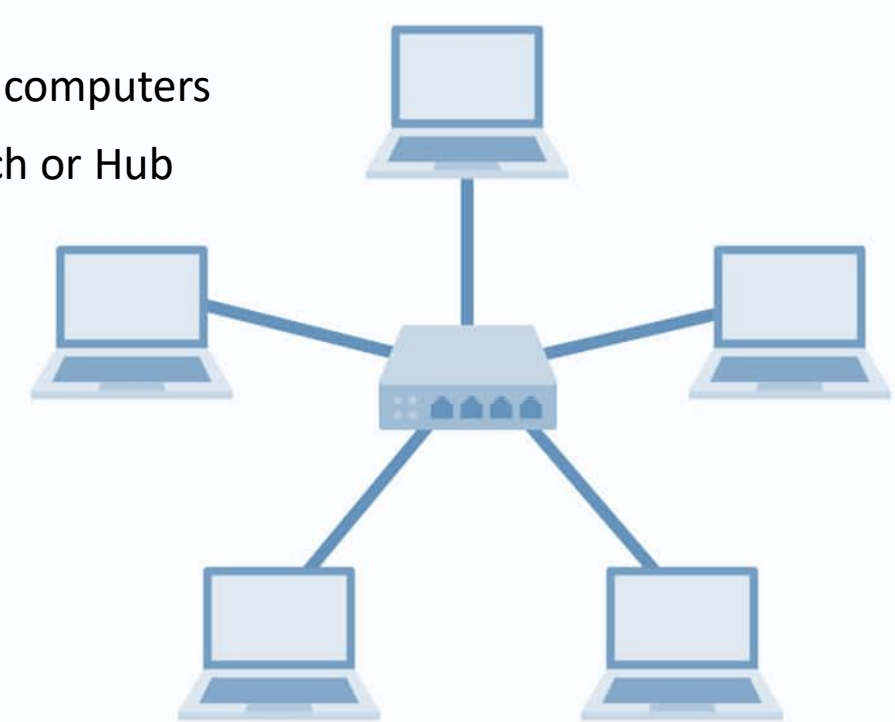
- Nodes are connected by a linear sequence of buses
- The bus can transmit data only in one direction
- Requires less cable length than other topologies
- Entire network shuts down if there is a break in the main cable
- Slow when more devices are connected



NETWORK TOPOLOGIES

STAR TOPOLOGY

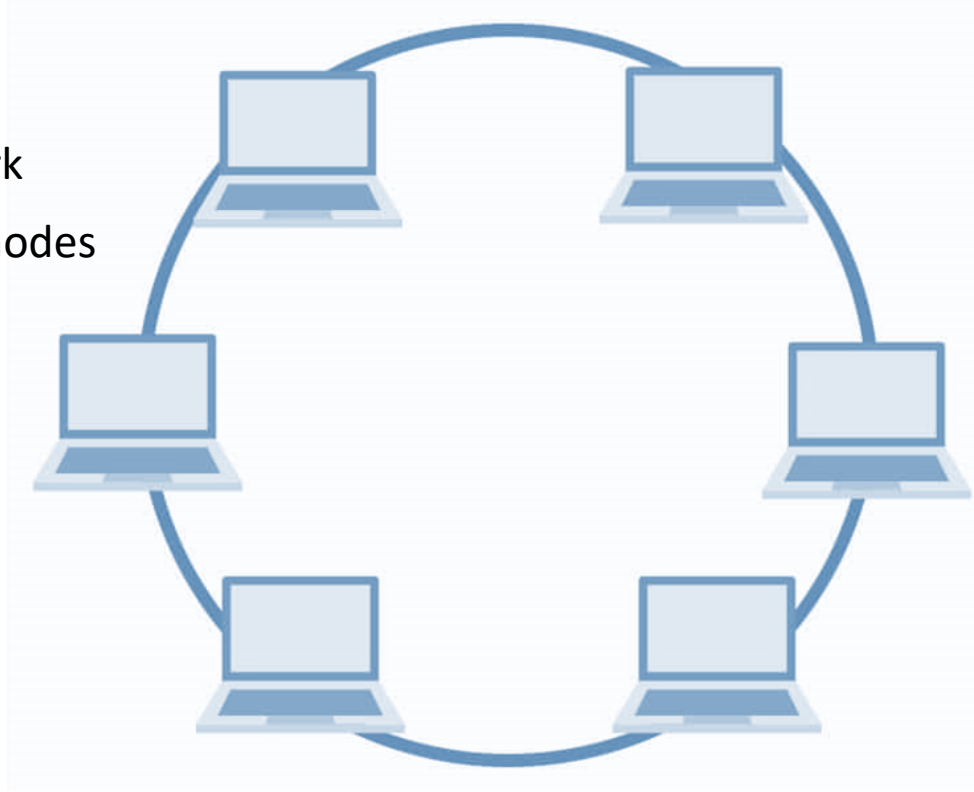
- Most common computer network topology
- Consists of a central switch, hub or a server
- All devices are connected to this node
- At any point, only 3 devices are used for communication between 2 computers
- Amount of nodes are limited – depends on the capacity of the Switch or Hub



NETWORK TOPOLOGIES

RING TOPOLOGY

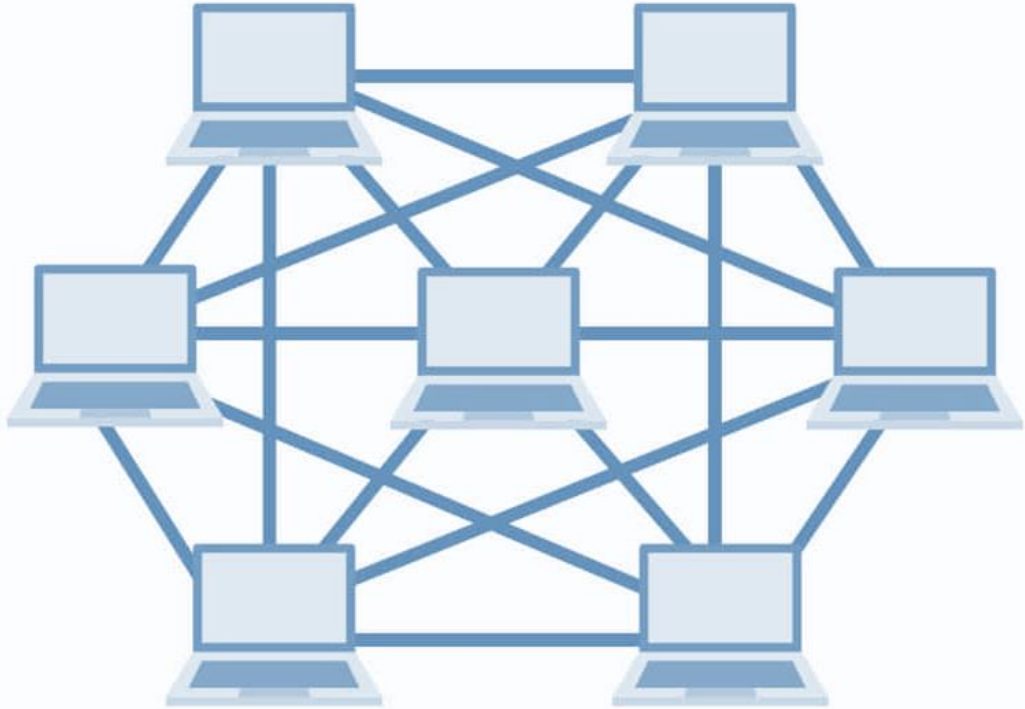
- Each node connects to exactly 2 nodes
- This forms a single continuous pathway for signals through each node
- Data travels from node to node
- Does not require a central Switch to manage connectivity
- One malfunctioning device can create problem for entire network
- Communication delay is directly proportional to the number of nodes



NETWORK TOPOLOGIES

MESH TOPOLOGY

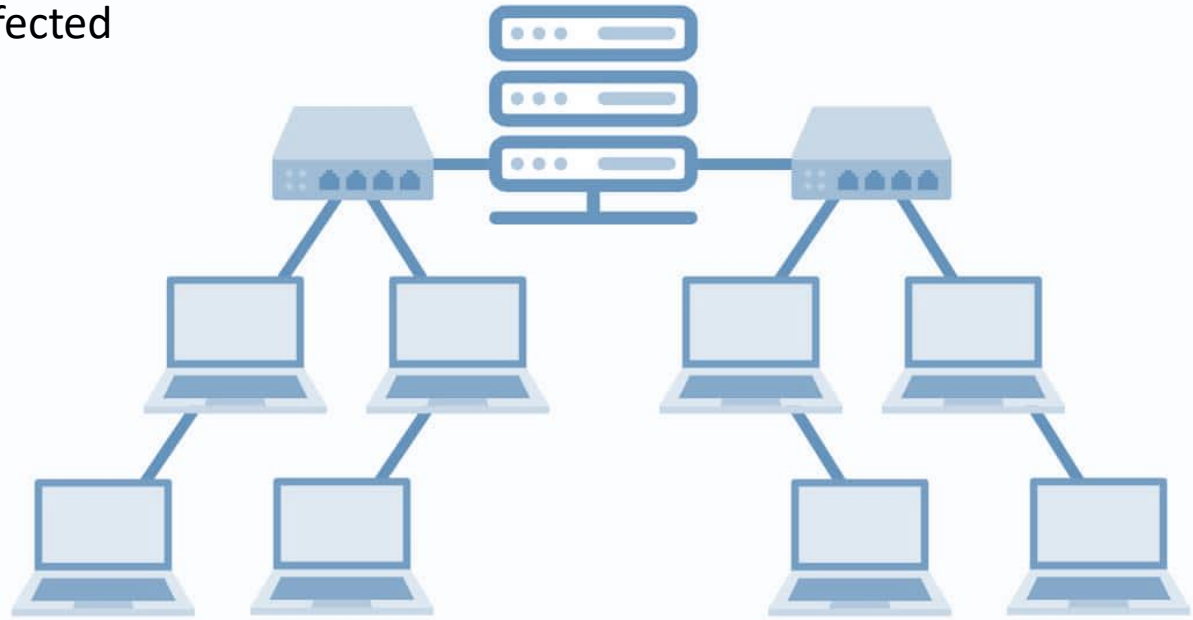
- Each node is connected to every node in the network
- Data transmission can happen from different devices simultaneously
- Even if one device malfunctions; the others can still communicate
- Overall setup cost is very high for this topology
- Setup and maintenance is also very difficult



NETWORK TOPOLOGIES

TREE TOPOLOGY

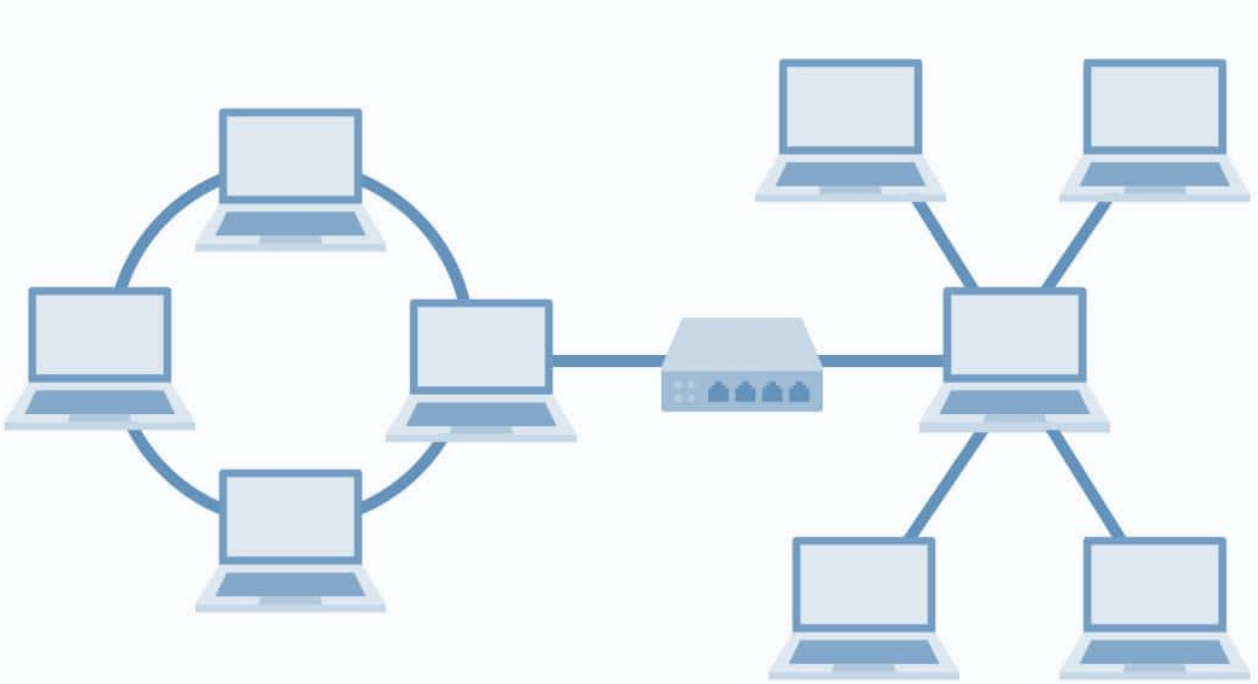
- It is the integration of Star and Bus Topology
- It is also known as **EXPANDED STAR TOPOLOGY**
- Expansion of network is possible and very easy
- Network is divided into segments
- If one segment is damaged, other segments are not affected
- Too much reliance on the main bus cable
- Maintenance is difficult



NETWORK TOPOLOGIES

HYBRID TOPOLOGY

- In this; we integrate two or more different topologies to form a resultant topology
- Very reliable – Error detection is very easy. The part with the error can be separated
- Easy to increase the size of the network
- Design is complex
- Infrastructure is very costly



LECTURE 3 - Scope

Data Communication & Network

I. Data Communication

i. Definition ✔
ii. Types (Simplex, Half Duplex, Full Duplex) ✔
iii. Channels of Communication ✔

II. Network

i. Definition ✔
ii. Important Terms ✔
iii. Types of Networks (LAN, WAN, MAN Etc) ✔
iv. Network Topologies ✔

III. Important MCQs

QUICK TEST - ABBREVIATIONS

1. FORTRAN	Formula Translation
2. ARPANET	Advanced Research Projects Agency Network
3. GIF	Graphic Interchangeable Format
4. FTP	File Transfer Protocol
5. HTML	Hypertext Markup Language
6. MBPS	Mega byte Per Second
7. JPEG	Joint Photographic Expert Group
8. HTTPS	Hyper Text Transfer Protocol Secure
9. BCC	Blind Carbon Copy
10.GPRS	General Packet Radio Service

PREVIOUS YEAR QUESTIONS

Success Tree

1. Physical or logical arrangement of network is called _____

A. Topology

B. Routing

C. Networking

D. None of the Above

2. In which topology there is a central controller or hub?

A. Star

B. Ring

C. Mesh

D. Bus

3. Data communication system spanning states, countries, or the whole world is _____?

A. LAN

B. WAN

C. MAN

D. None of the Above

PREVIOUS YEAR QUESTIONS

Success Tree

4. A _____ is a combination of hardware and software that facilitates the sharing of information between computing devices.

A. Network

B. Peripheral

C. Expansion Board

D. Digital Device

5. The first committee namely _____ gave its recommendations during the computerization in banking.

A. Dharamlingam Committee

B. Dr. C. Rangarajan Committee

C. Kumarmangalam Committee

D. Kothari Committee

6. Identify the odd one out

A. Hypertext

B. FTP

C. Segmentation

D. Internet

PREVIOUS YEAR QUESTIONS

7. Which of the following are different types of guided media?

A. Twisted Cable

B. Fiber Optical Cable

C. Co-Axial Cable

D. All of the above

8. Which of the following are a part of the data communication system?

A. Sender, Receiver

B. Transmission Medium

C. Message, Protocol

D. All of the Above

9. Which of the following is not the possible way of data exchange?

A. Simplex

B. Multiplex

C. Half- Duplex

D. Full-Duplex