# Network Topologies

- The way in which the computers/devices are physically interconnected to form a network is called a Topology.
- It can be defined as the arrangement or structure of network.
- *Types of Topologies:*
  - **Bus**
  - **Star**
  - **Tree**
  - *Ring*
  - *Mesh*

Bus Topology

- In bus topology all the nodes are connected to a main cable called backbone.

- If any node has to send some information to any other node, it sends the signal to the backbone. The signal travels through the entire length of the backbone and is received by the node for which it is intended.

- A small device called terminator is attached at each end of the backbone. When the signal reaches the end of backbone, it is absorbed by the terminator and the backbone gets free to carry another signal.
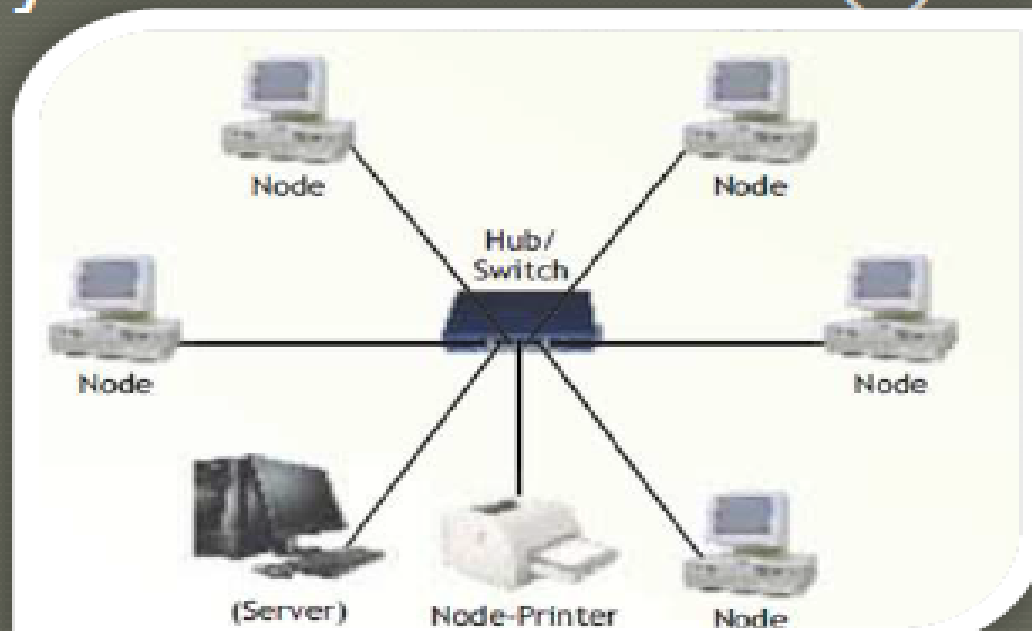
Characteristics – Bus Topology

- It is easy to install.
- It requires less cable length and hence it is cost effective.
- Failure of a node does not affect the network
- In case of cable (backbone) or terminator fault, the entire network breaks down.
- Fault diagnosis is difficult.
- At a time only one node can transmit data.
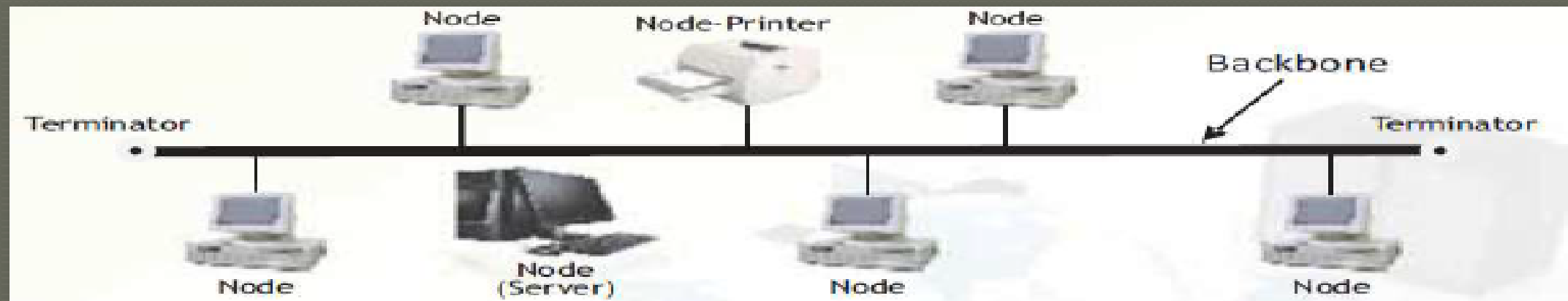
Star Topology

- In star topology each node is directly connected to a hub/switch.
- If any node has to send some information to any other node, it sends the signal to the hub/switch. This signal is then broadcast (in case of a hub) to all the nodes but is accepted by the intended node(s).
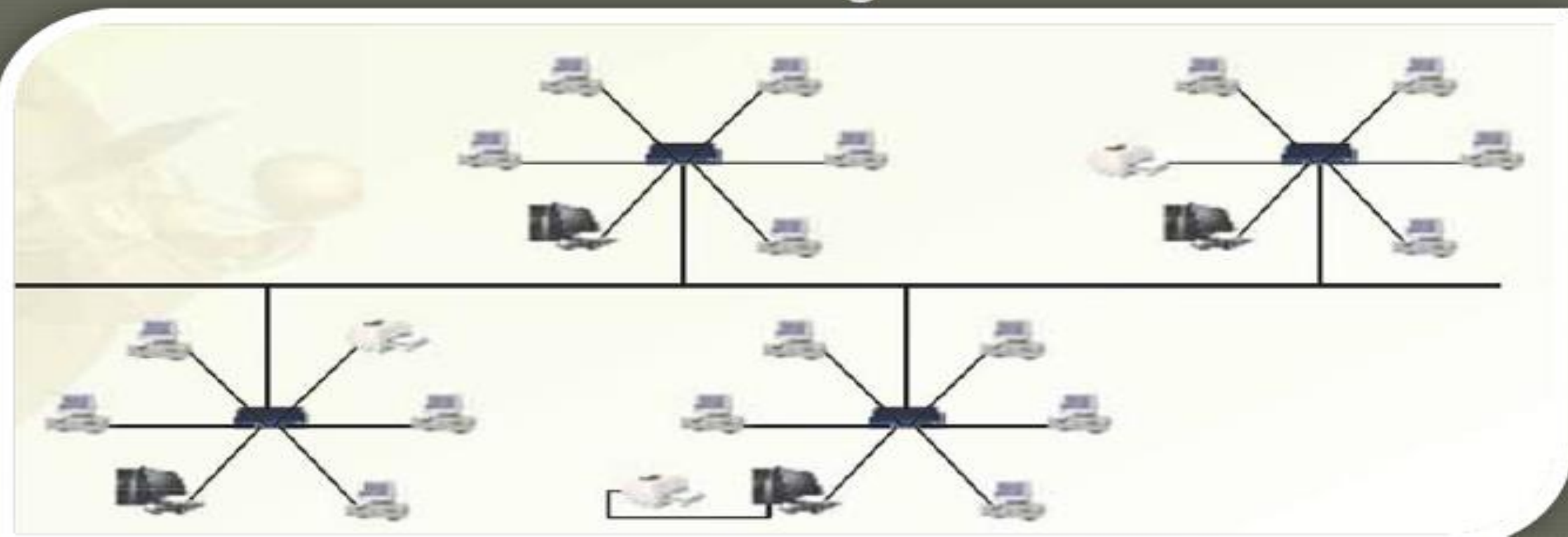
Characteristics – Star Topology

- It is easy to install
- It is easy to diagnose the fault in Star topology.
- It is easy to expand depending on the specifications of central hub/switch
- Failure of hub/switch leads to failure of entire network
- It requires more cable length as compared to bus topology.

Tree Topology

- Tree topology is a combination of bus and star topologies.
- It is used to combine multiple star topology networks.
- All the stars are connected together like a bus.

Characteristics – Tree Topology

- It offers easy way of network expansion

- Even if one network (star) fails, the other networks remain connected and working.

TYPES OF NETWORK – AREA COVERAGE

- PAN
- LAN
- MAN
- WAN

PERSONAL AREA NETWORK

- Network of communicating devices(computer, phone, MP3 etc.)
- Cover area of few meters radius
- When we transfer songs from one cell phone to another we setup a PAN of two phones
- Can be setup using guided or unguided media

LOCAL AREA NETWORK

- ✓ Network of computing/communication devices in a room, building or campus
- ✓ Cover area of few kilometer radius(approx. 1 – 10 KM)
- ✓ Can be setup using wired or wireless media
- ✓ Managed by single person or organization
- ✓ Ethernet cable or Wi-Fi is used to establish LAN

METROPOLITAN AREA NETWORK

- ✓ Network of computing/communicating devices within a city.
- ✓ Cover an area of few kilometers to few hundred kilometers radius
- ✓ Network of schools, banks, government offices within a city are example of MAN.
- ✓ It is typically formed by interconnected number of LANs
- ✓ Owned by organization or government.

WIDE AREA NETWORK

- ✓ Network of computing/communication devices crossing the limits of city, country, or continent.
- ✓ Cover area of over hundreds of kilometer radius
- ✓ Network of ATMs, BANKs, National or International organization offices spread over a country, continent are example of WAN.
- ✓ It is usually formed by interconnecting LANs, MANs or may be other WANs.
- ✓ Best example of WAN is internet