UNIT V

LAN and WAN

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- **LAN** consist of two or more components and high capacity disk storage (file servers), which allow each computer in a network to access a common set of rules.
- LAN systems are used by colleges, universities, office buildings, and industrial plants, for making use of optical fiber.
- Range : LAN combines high speed with a geographical spread of 1 – 10 km.

LAN Special attributes and advantages:

▶ Resource sharing: Allows intelligent devices such as storage devices, programs, and data files to share resources.

▶ Area covered: LAN is normally restricted to a small geographical area, for example, office building, utility, campus.

▶ Cost and availability: Application software and interface devices are affordable and off - the – shelf.

▶ High channel speed: Ability to transfer data at rates between 1 and 10 million bits per second.

▶ Flexibility: Grow/expand with low probability of error; easy to maintain and operate.

LAN -Categories of   data transmission

▶ **Unicast transmission:** A single data packet is sent from a source node to a destination (address) on the network

▶ **Multicast transmission:** A single data packet is copied and sent to a specific subset of nodes on the network; the source node addresses the packet by using the multicast addresses

▶ **Broadcast transmission:**Asingle data packet is copied and sent to all nodes on the network; the source node addresses the packet by using the broadcast address.
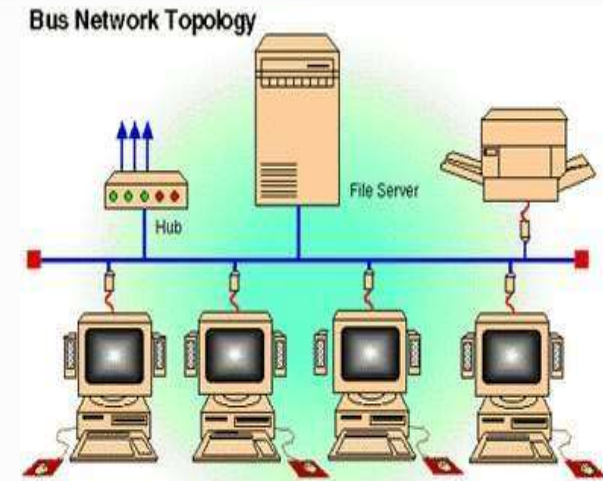
LAN topologies

▶ **Bus topology:**

- Linear LAN architecture in which transmission from network station propagates the length of the medium and is received by all other stations connected to it.
- Ethernet, is the best example of a network protocol used to connect multiple computers and used by the Internet.
- It operates at speeds up to 1 Gb/s by using a protocol based on carrier-sense multiple access (CSMA) with collision detection.
- Successful when coaxial cables are used for the bus, but **difficulties arise when optical fibers are used.**
- **Limitation:** Losses occurring at each tap, which limits the number of users.

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Bus Network Topology

► **Ring bus topology:**

- A series of devices connected to one another by unidirectional transmission links to form a single closed loop.

- Medium access control is needed to determine when   station   can insert frame using a token.

► **Star topology:**

- The end points on a network are connected to a common central hub or switch by dedicated links.

- Each   station   connected directly to central node.

- Central node can broadcast (hub)

- Classified as Active and Passive star networks:

➤ In active-star configuration, incoming optical signals are converted to the electrical domain through optical receivers.

➤ In passive star configuration, distribution takes place in the optical domain through devices
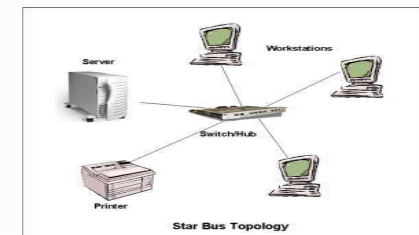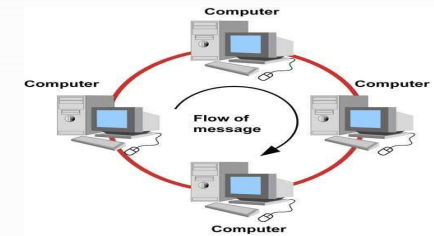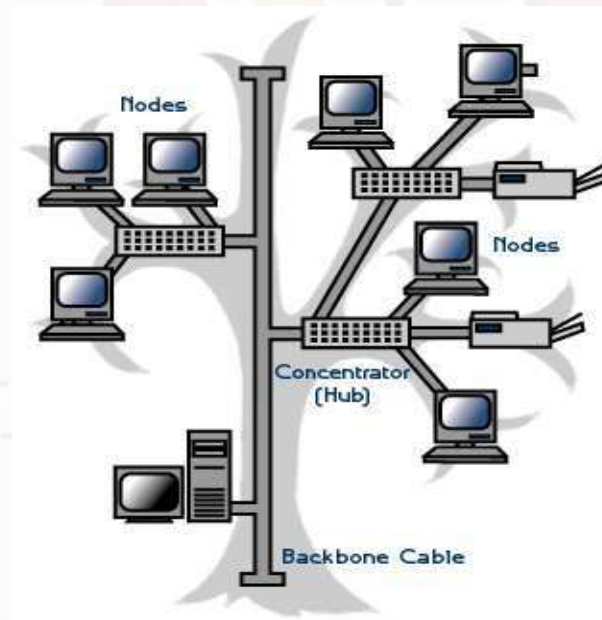

Star Bus Topology

▶ **Tree topology:**

- Identical to the bus topology except that branches with multiple nodes are also possible.

WAN – Wide Area Network

- WAN is a network that spans large geographical locations, usually to interconnect multiple Local Area Networks (LANs). The practical definition of a WAN is a network that traverses a public network or commercial carrier, using one of several WAN technologies.
- WAN is a network that covers a broad area i.e., any telecommunications network that links across metropolitan, regional, or national boundaries using private or public network transports.
- Business and government entities utilize WANs to relay data among employees, clients, buyers, and suppliers from various geographical locations.

➢ **WAN Connection Types:**
- Point-to-Point technologies
- Circuit-switched technologies
- Packet-switched technologies

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