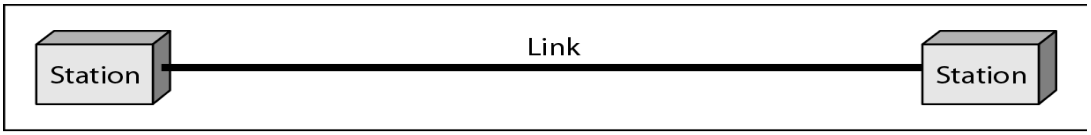
# Unit 3 - Basics of Computer Networks

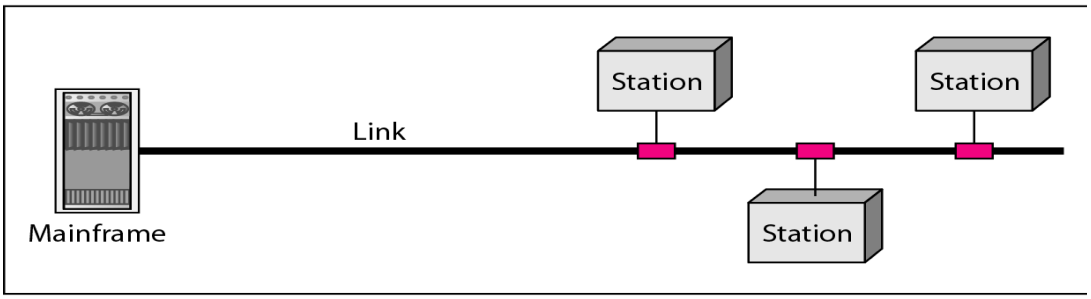
➢ What is a computer network?

- A network is a set of devices (often referred to as nodes) connected by communication links to share the computing resources.
- A node can be a computer, printer, smart phone, refrigerator, car or any other device capable of sending and/or receiving data generated by other nodes on the network.

➢ Types of connections: point-to-point and multipoint

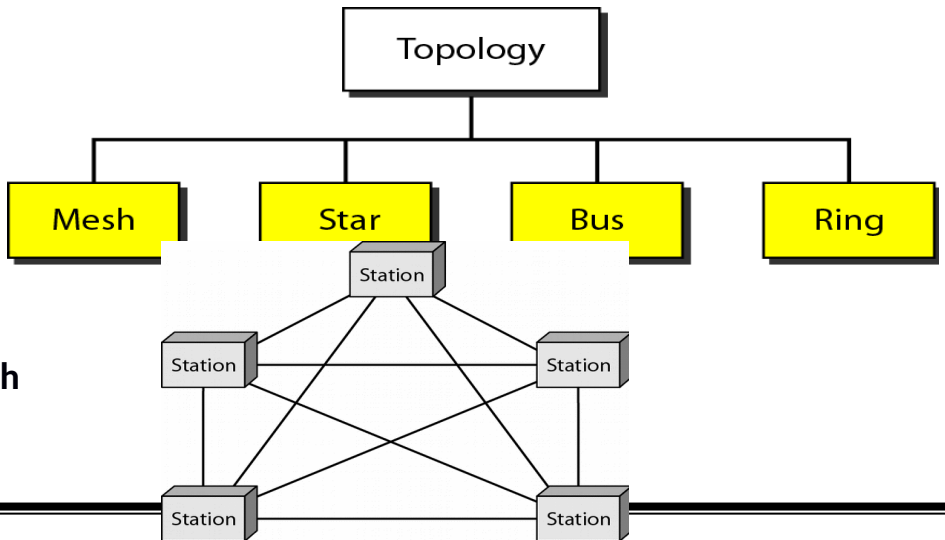



a. Point-to-point



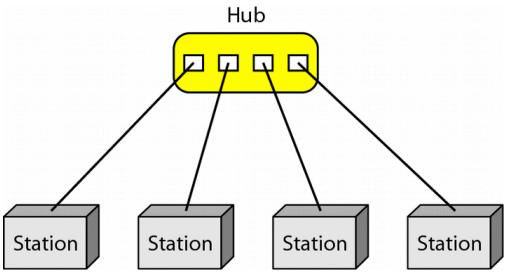

b. Multipoint

**Types of topology**

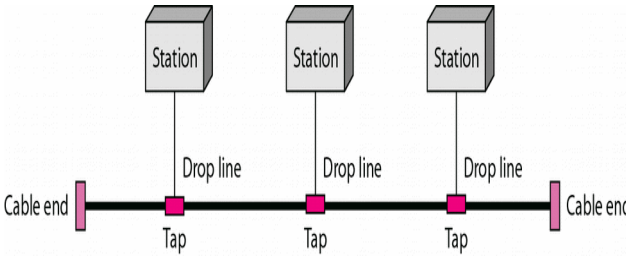



➢ **Mesh**

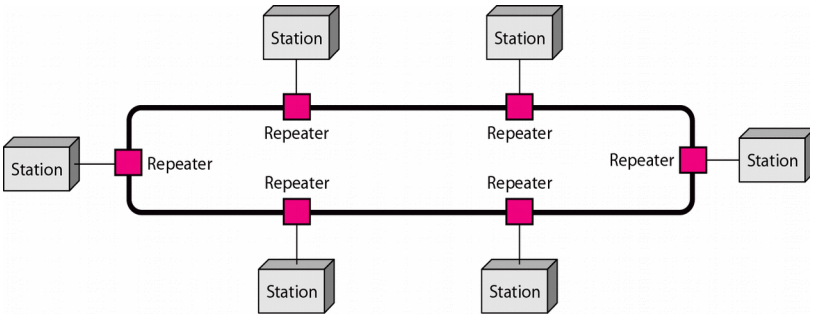
➢ **Star Topology**




➢ **Bus Topology**

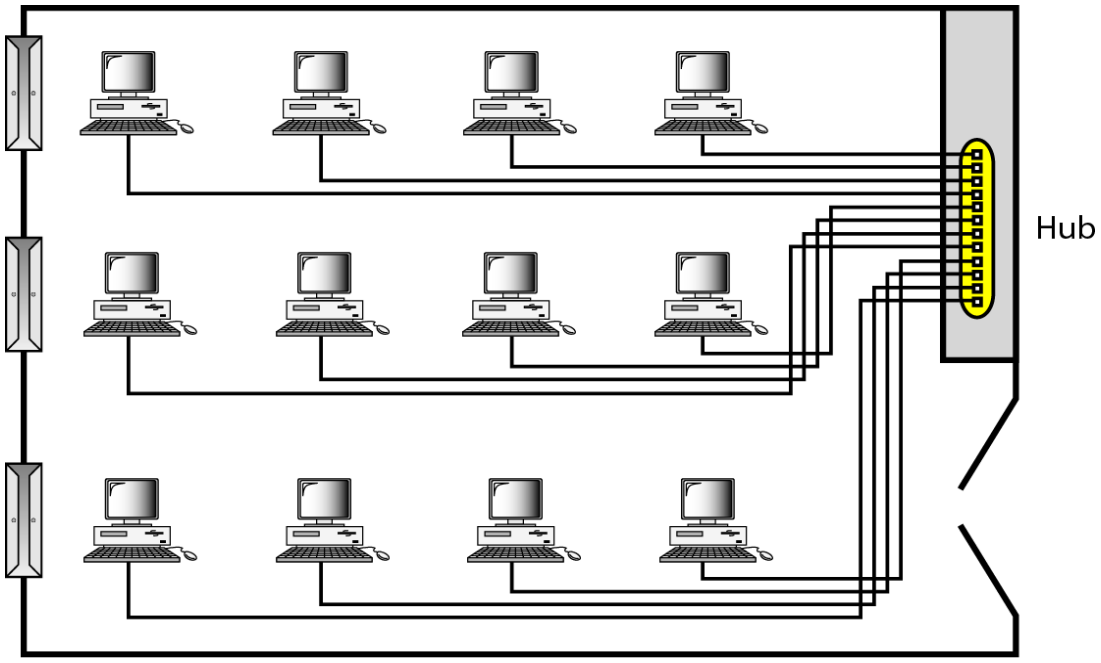



➢ **Ring Topology**

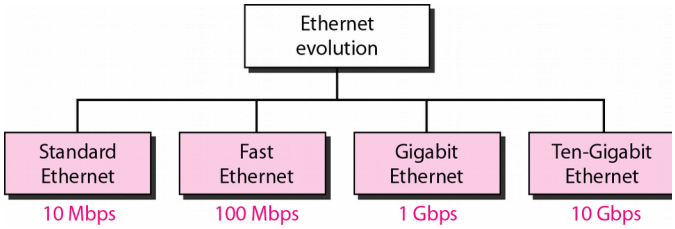



**Local Area Network (LAN)**

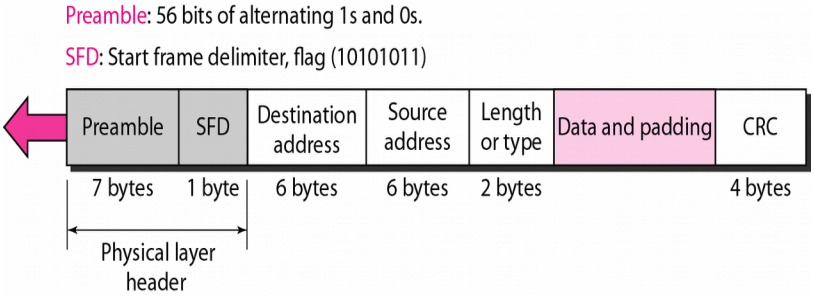
➢ A local area network (LAN) is usually privately owned and links the devices in a single office, building, or campus as shown in figure given below:



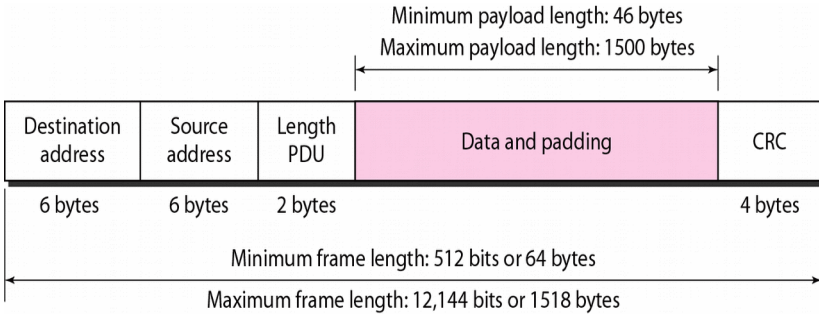

- Depending on the needs of an organization and the type of technology used, a LAN can be as simple as two PCs and a printer in someone's home office; or it can extend throughout a company and include audio and video peripherals.
- Currently, LAN size is limited to a few kilometers.
- LANs are designed to allow resources to be shared between personal computers or workstations.
- The resources to be shared can include hardware (e.g., a printer), software (e.g., an application program), or data.
- One of the computers may be given a large capacity disk drive and may become a server to clients.
- Software can be stored on this central server and used as needed by the whole group.
- In addition to size, LANs are distinguished from other types of networks by their transmission media and topology.
- The most common LAN topologies are bus, ring, and star.
- Early LANs had data rates in the 4 to 16 megabits per second (Mbps) range. Today, however, speeds are normally 100 or 1000 Mbps
- Ethernet (IEEE 802.3) is one example of LAN which has the following properties:
  - Types of frames




- Frame format 802.3

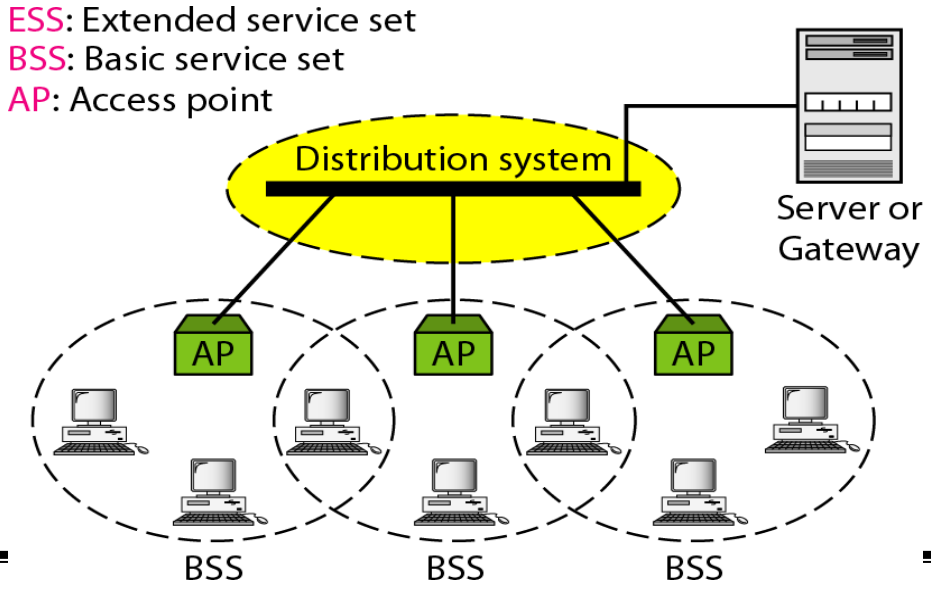



- Frame length of 802.3




**WLAN**

➢ *IEEE has defined the specifications for a wireless LAN, called IEEE 802.11, which covers the physical and data link layers.*



➢ *A BSS without an AP is called an ad hoc network; a BSS with an AP is called an infrastructure network.*

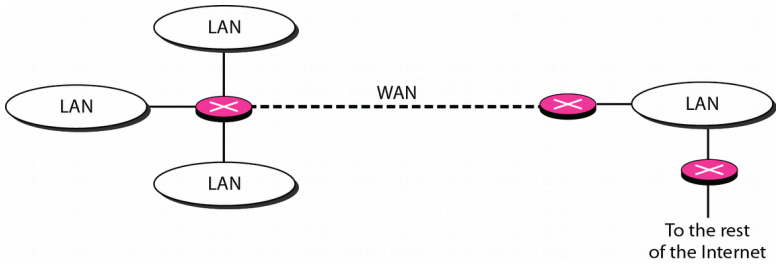
**Wide Area Network (WAN)**

➢ *A wide area network (WAN) provides long-distance transmission of data, image, audio, and video information over large geographic areas that may comprise a country, a continent, or even the whole world.*

➢ A WAN can be as complex as the backbones that connect the Internet or as simple as a dial- up line that connects a home computer to the Internet.

➢ We normally refer to the first as a **switched WAN** and to the second as a **point-to-point WAN**.

- The switched WAN connects the end systems, which usually comprise a router (internet- working connecting device) that connects to another LAN or WAN.
- The point-to-point WAN is normally a line leased from a telephone or cable TV provider that connects a home computer or a small LAN to an Internet service provider (ISP). This type of WAN is often used to provide Internet access.

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***References***

➢ Data Communications and Networking by Behrouz A. Forouzan, McGraw-Hill Forouzan Networking Series