Network Communication and Types

Session Objectives

After going through this session you will be able to understand

- ✔ Data Communication
- ✔ Components of Data Communication
- ✔ Type of Communication
- ✔ Network Definition and Classification

Introduction

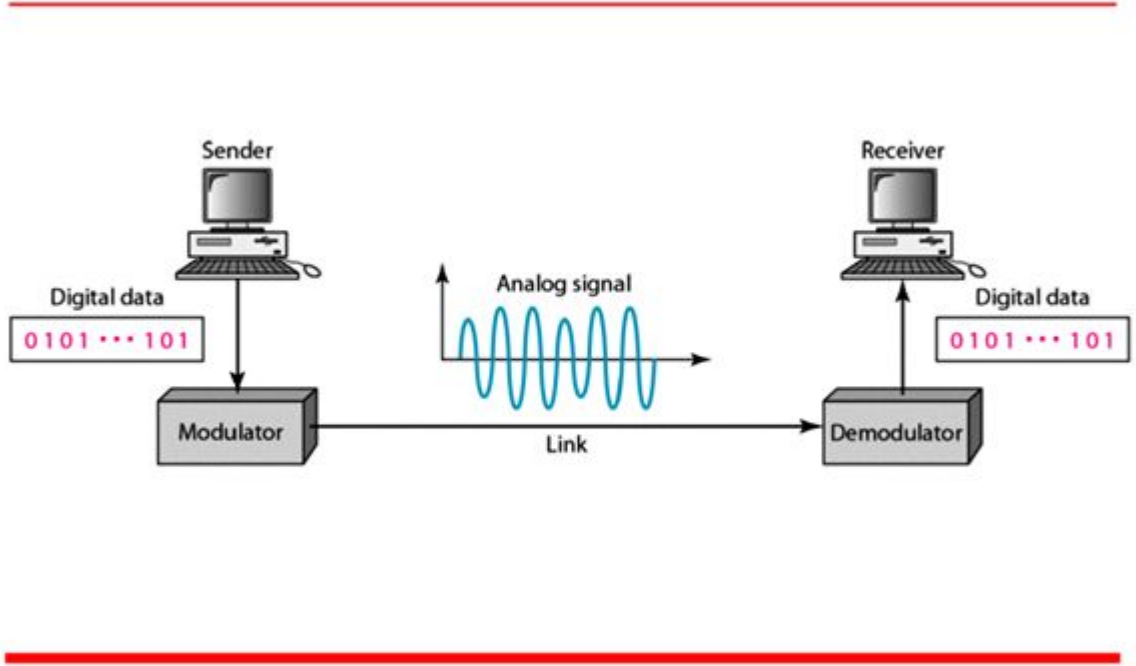
- A computer network is an interconnection of computers.
- It uses a set of common communication protocols.
- Used for sharing resources located on the network nodes.
- The interconnections between nodes are formed from a broad spectrum of telecommunication network technologies.
- The nodes of a computer network may be classified by many means as personal computers, servers, networking hardware, or general purpose hosts.
- They are identified by hostnames and network addresses.

Data Communication

- The term ***telecommunication*** means communication at a distance.
- The word ***data*** refers to information presented in whatever form is agreed upon by the parties creating and using the data.
- ***Data communications*** are the exchange of data between two devices via some form of transmission medium such as a wire cable.

Figure 1 *Five components of data communication*

1. Sender
2. Receiver
3. Protocol
4. Medium
5. Messages

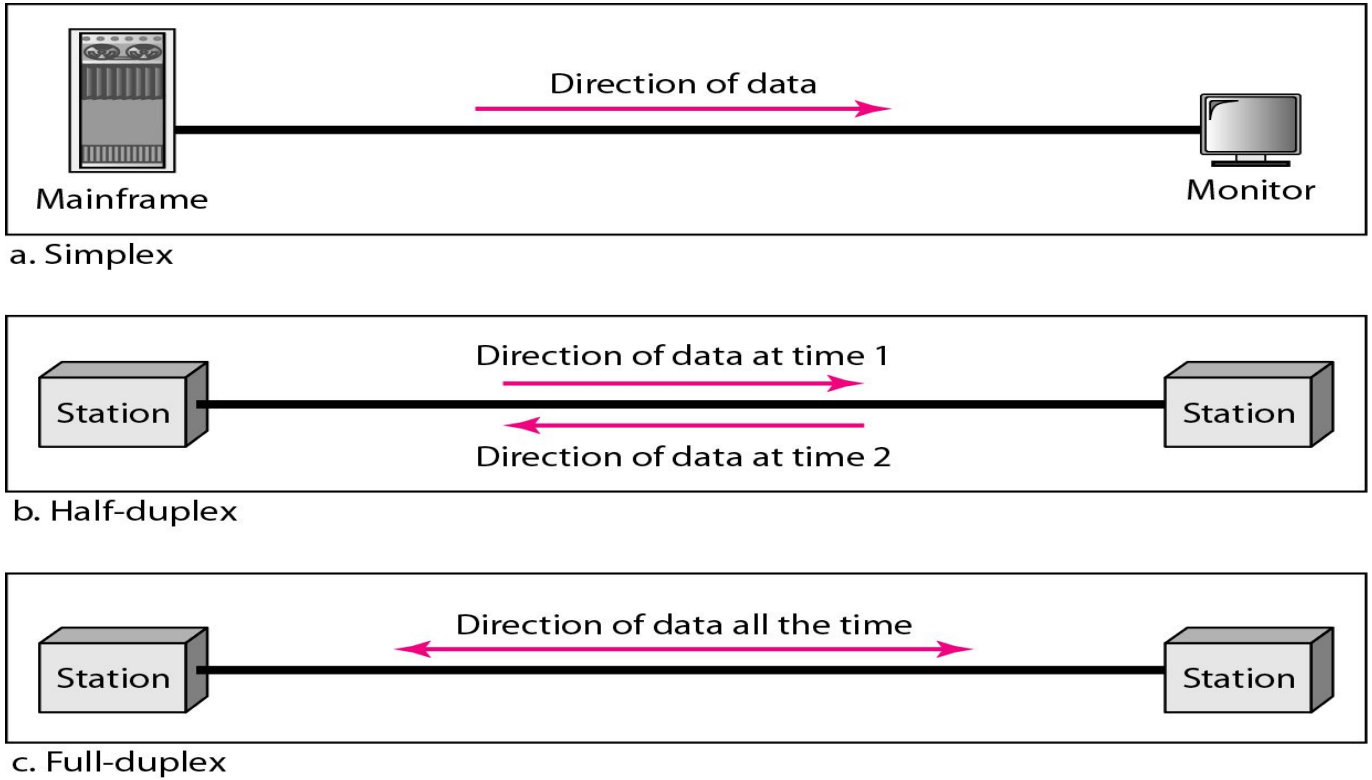


Data Representation and Flow Method

- Data is represented in the following **formats** text, numbers, images, audio, and video.

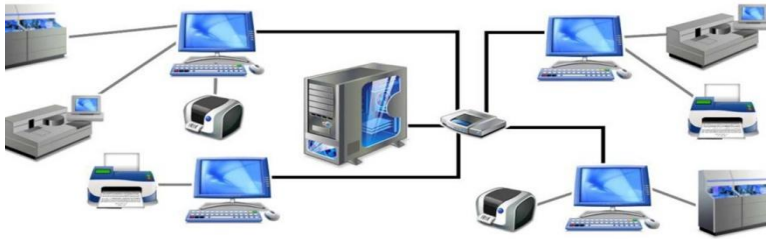
- Communication between two devices can be **simplex, half-duplex, or full-duplex** as shown in Figure 2.

Figure 2 *Data flow (simplex, half-duplex, and full-duplex)*



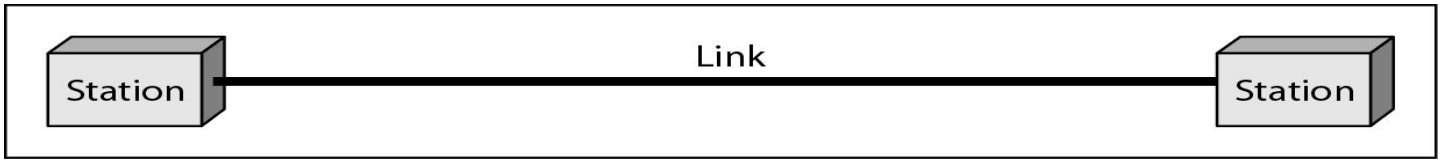
Network Definition

- A network is the **interconnection** of a set of **devices** capable of communication.
- A **device** can be a **host** such as a large computer, desktop, laptop, workstation, cellular phone, or security system.
- A **device** in this definition can also be a **connecting device** such as a router a switch, a modem that changes the form of data, and so on.
- A network must be able to meet a certain number of **criteria** such as performance, reliability, and security.

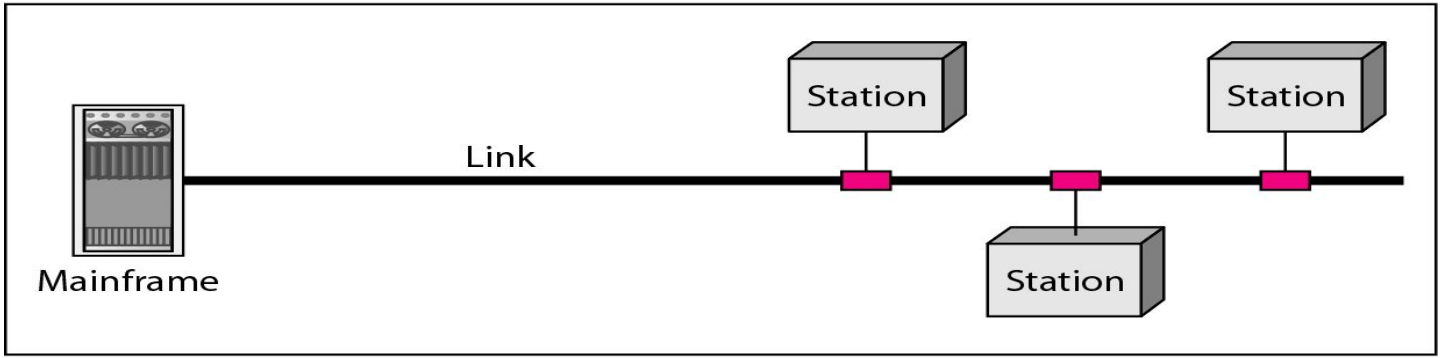


Local Area Network

Figure 3 *Types of connections: point-to-point and multipoint*



a. Point-to-point



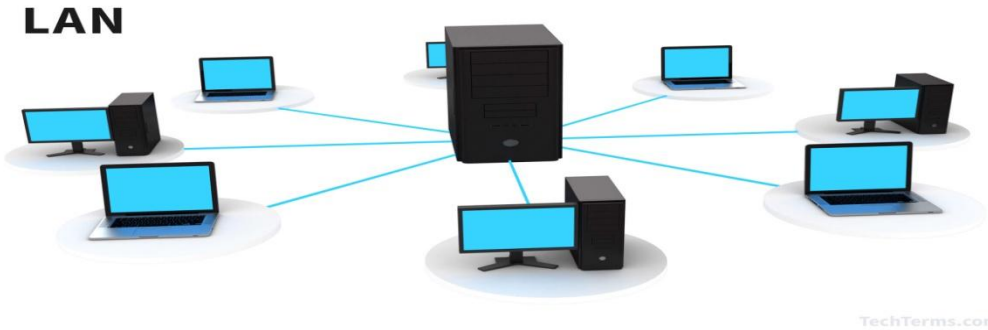
b. Multipoint

Network Classification

- The criteria of distinguishing one type of network from another is based on **few criteria** such as size, geographical coverage, and ownership to make this distinction.
- They are classified as:
  - ✔ Local Area Networks (LANs)
  - ✔ Wide Area Networks (WANs)
  - ✔ Metropolitan Area Networks (MANs)
  - ✔ Storage Area Networks (SAN)
  - ✔ Personal Area Networks (PAN)

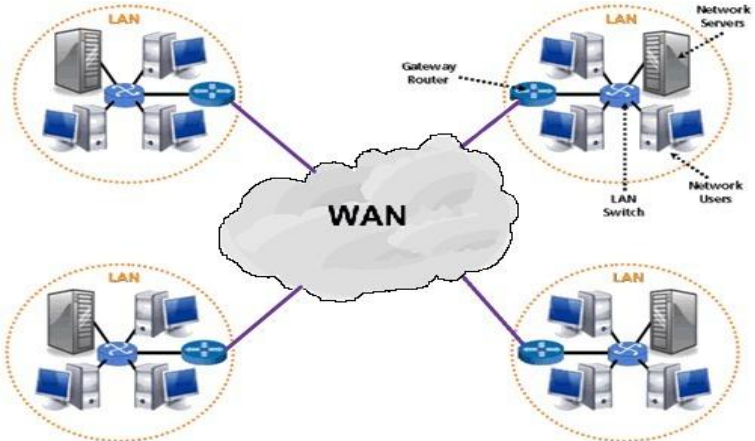
Local Area Networks (LANs)

- A LAN is a **group of computer and peripheral** devices like hard-disks, DVD-ROM, and printers.
- Work in **limited area** such as school, laboratory, home, and office building.
- Useful for **sharing resources** like files, printers, games, and other application.
- It is a **private network**.
- LAN operates at a relatively **higher speed** and follow standard of **802.3**
- There are various kinds of **media access** control methods like token ring and Ethernet.



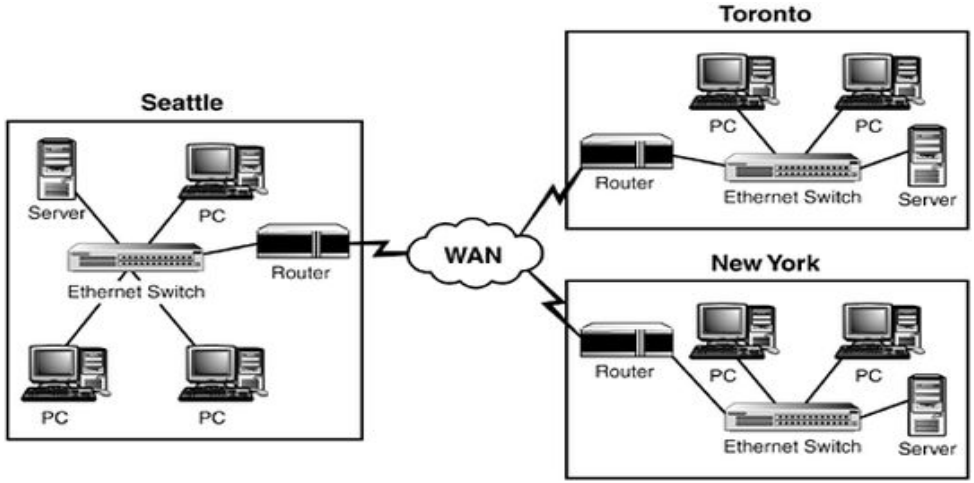
Wide Area Networks (WANs)

- WAN is **spread across** a large geographical area.
- WAN network system could be **a connection of LANs or MANs**.
- The LANs are **interconnected** using telephone lines and radio waves.
- The **software is shared** among all the users and all can access them.
- Any organization can form its **global integrated** network using WAN.
- It follows network standard as 802.11, 802.1, 802.3



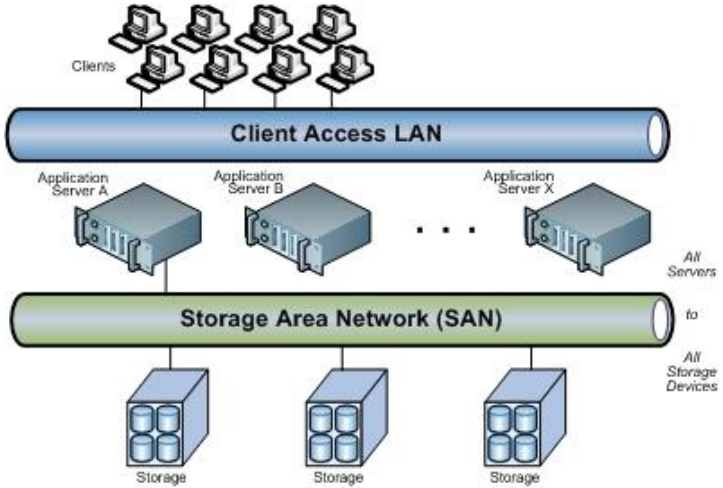
Metropolitan Area Networks (MANs)

- Consist of a **computer network across** an entire city, college campus, or a small region.
- Mostly used medium for communication is **optical fibers cables**.
- Data rates adequate for **distributed computing** applications.
- MAN network uses **dual bus** for both directions communication.
- It follows network standard as 802.11, 802.1, 802.3



Storage Area Networks (SANs)

- A SAN is a specialized, **high-speed network** access to storage devices.
- SANs are typically **composed of** hosts, switches, storage elements, and storage devices that are interconnected using a variety of technologies, topologies, and protocols.
- It uses **virtualization** to make storage available to every host connected.



Personal Area Networks (PANs)

- PANs are **short-range wireless networks** that work over a range of tens of metres.
- PANs main role is **to eliminate cables** that connect our devices to peripherals.
- **The devices are cordless products**, such as mouse devices and keyboards, that use radio or infrared.
- **Mode of communication is generally Bluetooth**, which allows enabled devices such as phones, mobiles, mouse devices, headsets, PCs, printers and keyboards to connect wirelessly.

Summary

In this section we have discussed the following:

- Data Communication
- Communication types, simplex, half-duplex and full-duplex
- Computer network definition
- Type of computer networks.


Thank
you!