



# **Chapter 1 Introduction**

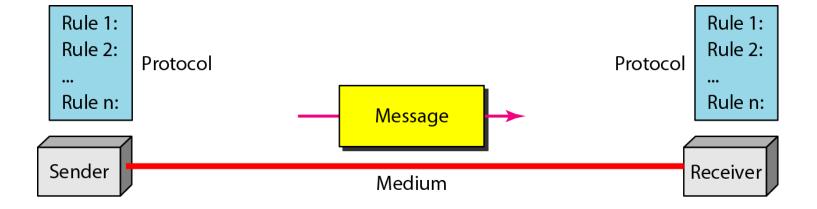
#### 1-1 DATA COMMUNICATIONS

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.

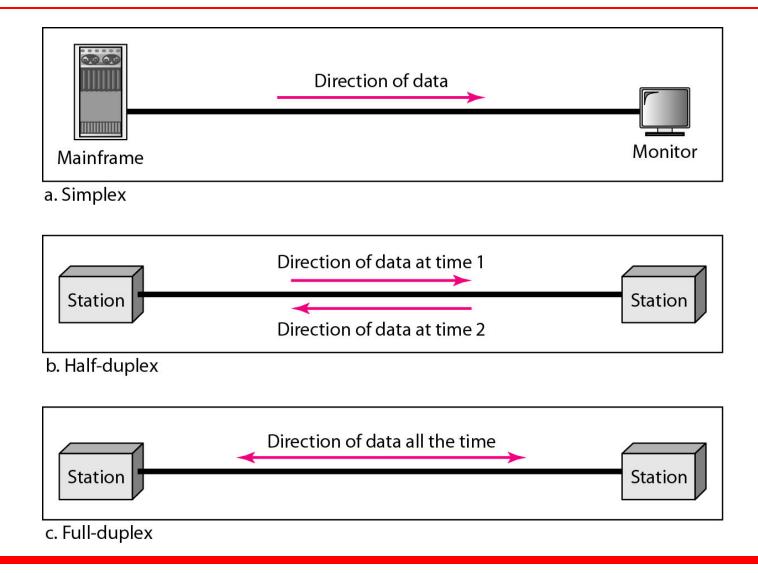
# Topics discussed in this section:

Components
Data Representation
Data Flow

Figure 1.1 Five components of data communication



## Figure 1.2 Data flow (simplex, half-duplex, and full-duplex)



## 1-2 NETWORKS

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

# Topics discussed in this section:

**Distributed Processing** 

**Network Criteria** 

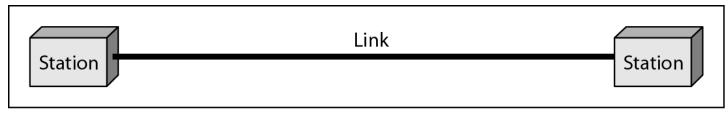
**Physical Structures** 

**Network Models** 

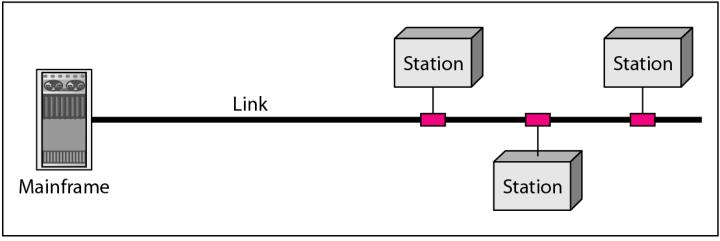
**Categories of Networks** 

**Interconnection of Networks: Internetwork** 

#### Figure 1.3 Types of connections: point-to-point and multipoint



a. Point-to-point



b. Multipoint

Figure 1.4 Categories of topology

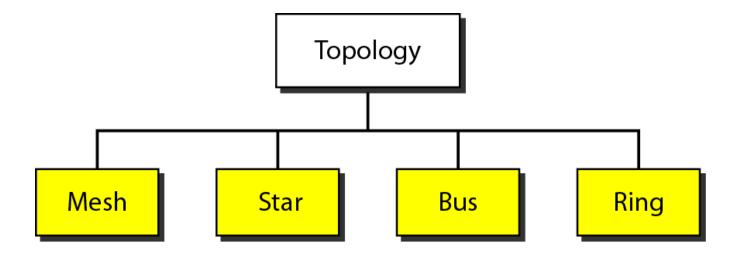


Figure 1.5 A fully connected mesh topology (five devices)

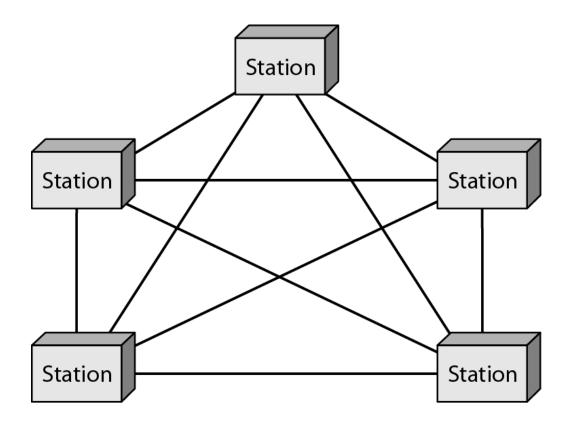
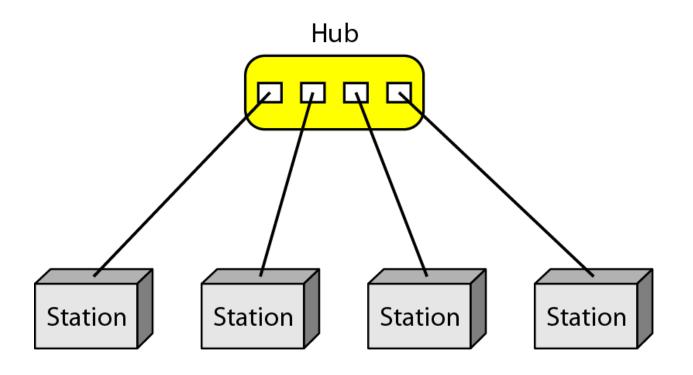


Figure 1.6 A star topology connecting four stations



#### Figure 1.7 A bus topology connecting three stations

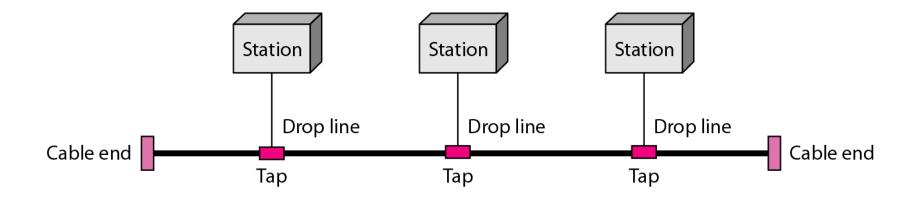


Figure 1.8 A ring topology connecting six stations

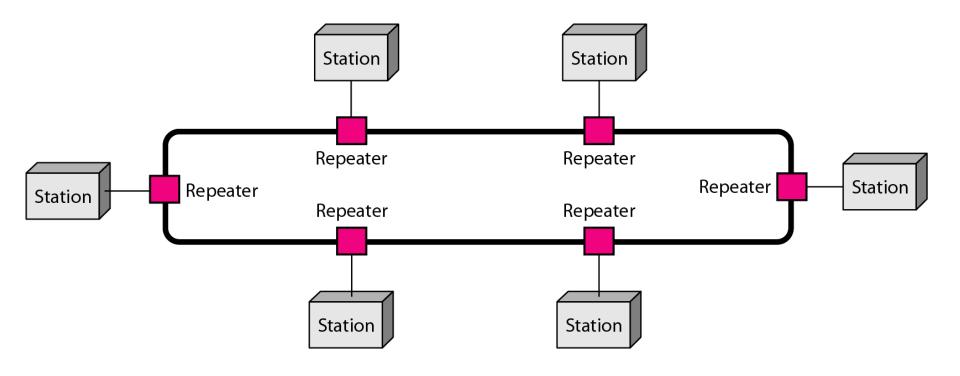


Figure 1.9 A hybrid topology: a star backbone with three bus networks

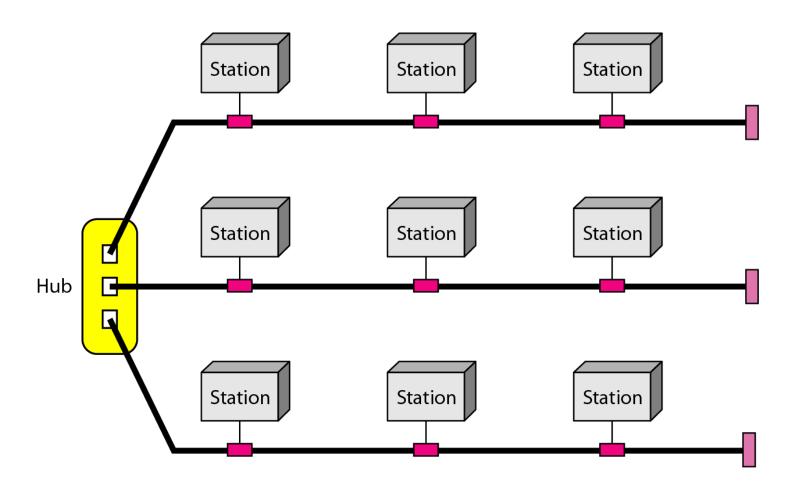


Figure 1.10 An isolated LAN connecting 12 computers to a hub in a closet

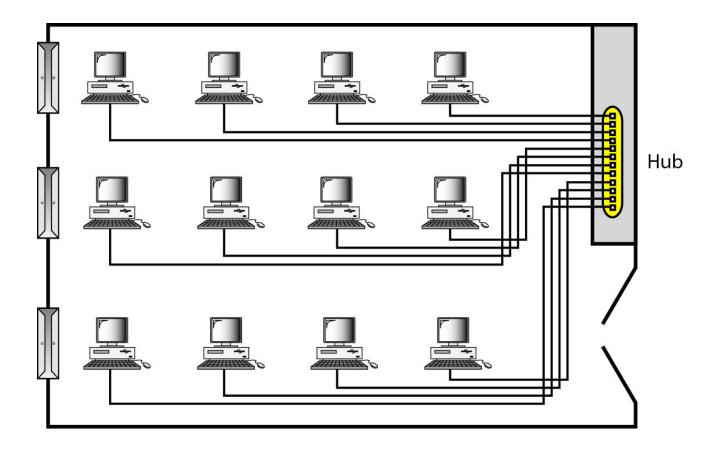
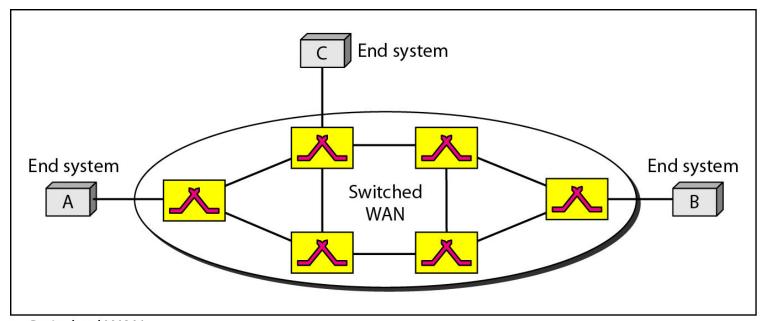
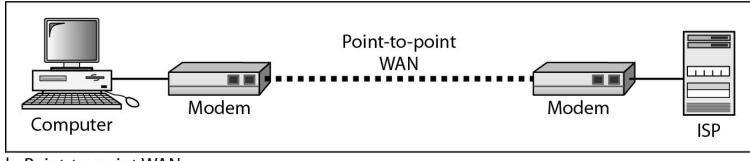


Figure 1.11 WANs: a switched WAN and a point-to-point WAN

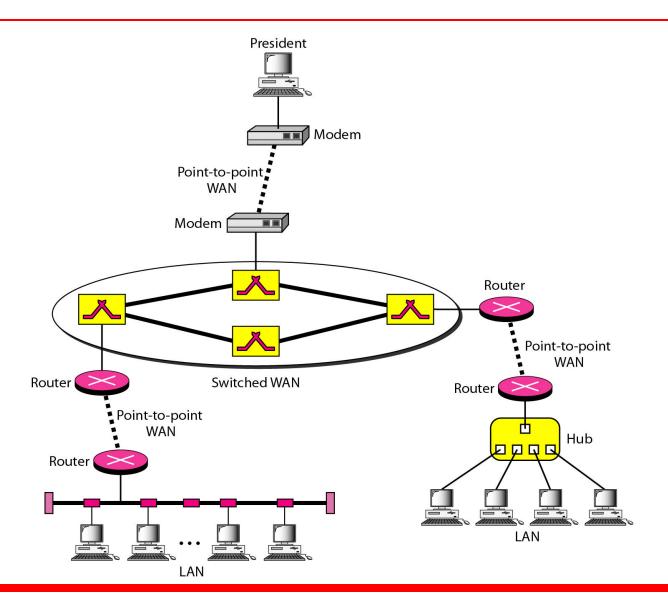


a. Switched WAN



b. Point-to-point WAN

#### Figure 1.12 A heterogeneous network made of four WANs and two LANs



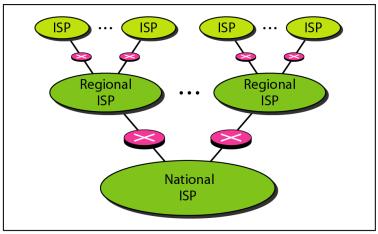
## 1-3 THE INTERNET

The Internet has revolutionized many aspects of our daily lives. It has affected the way we do business as well as the way we spend our leisure time. The Internet is a communication system that has brought a wealth of information to our fingertips and organized it for our use.

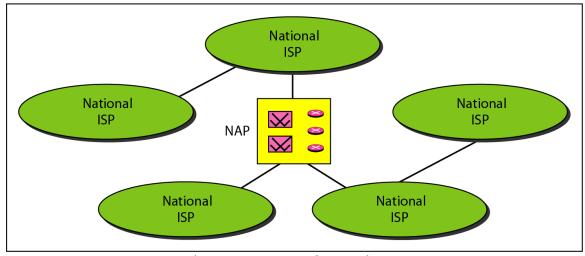
# Topics discussed in this section:

A Brief History
The Internet Today (ISPs)

#### Figure 1.13 Hierarchical organization of the Internet



a. Structure of a national ISP



b. Interconnection of national ISPs

## 1-4 PROTOCOLS AND STANDARDS

In this section, we define two widely used terms: protocols and standards. First, we define protocol, which is synonymous with rule. Then we discuss standards, which are agreed-upon rules.

# Topics discussed in this section:

Protocols
Standards
Standards Organizations
Internet Standards