

Introduction to the Course

**The Need for
Communication**

Trends and Advancements

**What is taught in this
course?**

**What is NOT taught in this
course?**

Tips and Tricks to do well

Text and References

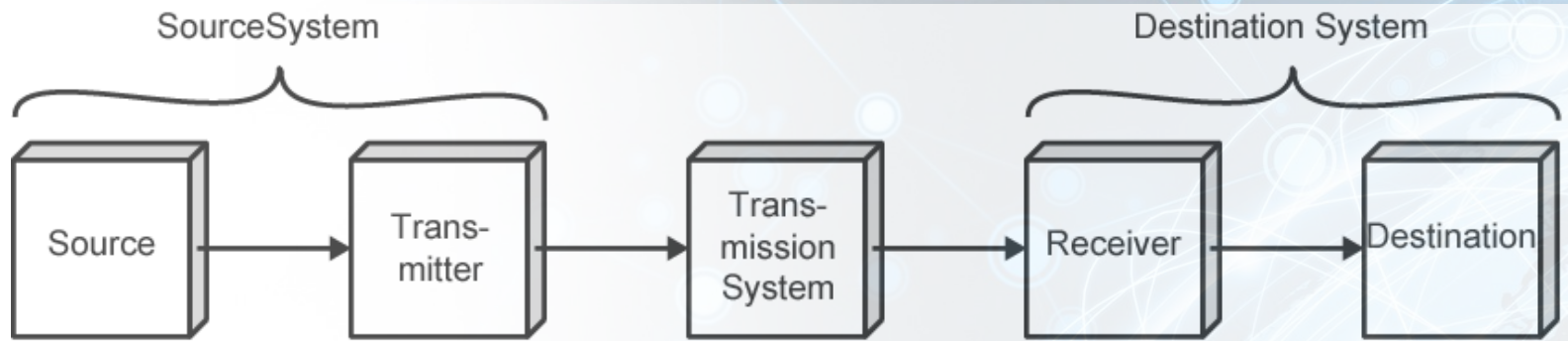
Introduction to Data Communications

Communication: Sharing of Information (Local or remote)

Telecommunications: Communication at a Distance (includes telephony, telegraph, and television etc.)

Data communications: Exchange of data between two devices via some form of transmission media

A Simple Communication Model



(a) General block diagram



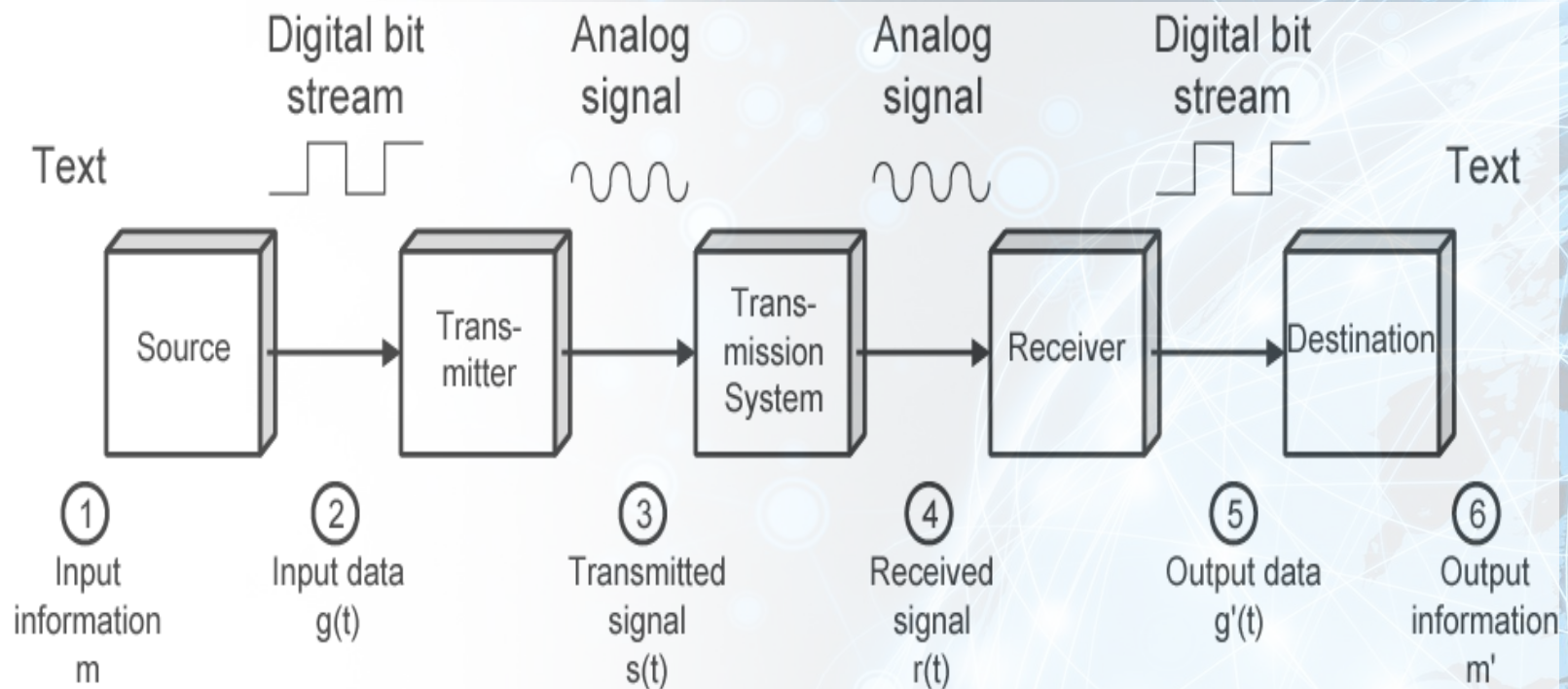
(b) Example

Characteristics of a Data Communication System

Effectiveness of a Data Communication System:

- **Delivery**
- **Accuracy**
- **Timeliness**
- **Jitter**

Characteristics of a Data Communication System

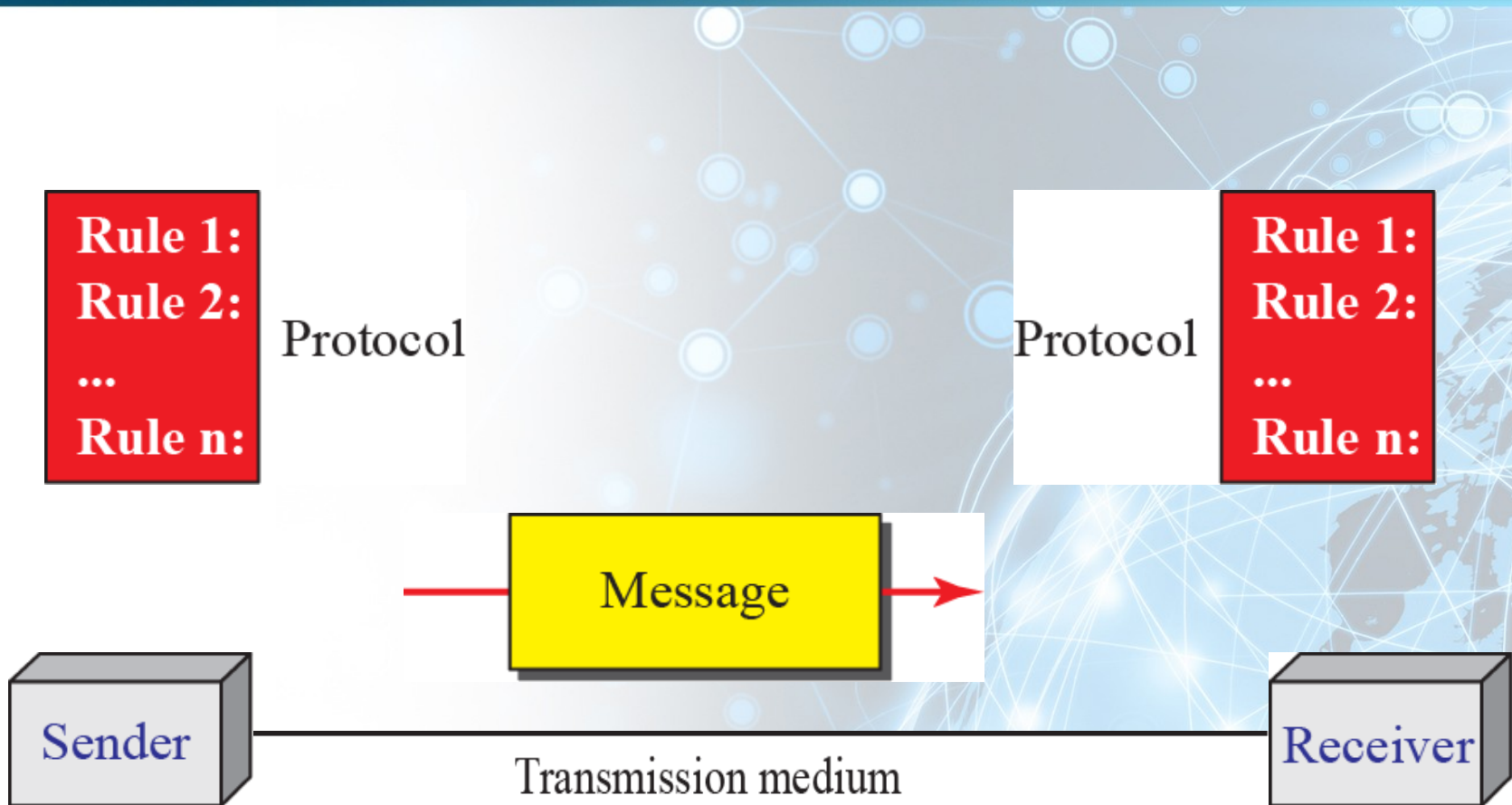


Components of a Data Communication system

A data communications system has five components



Components of Data Communication system



Data Representation and Data Flow

Forms of Information

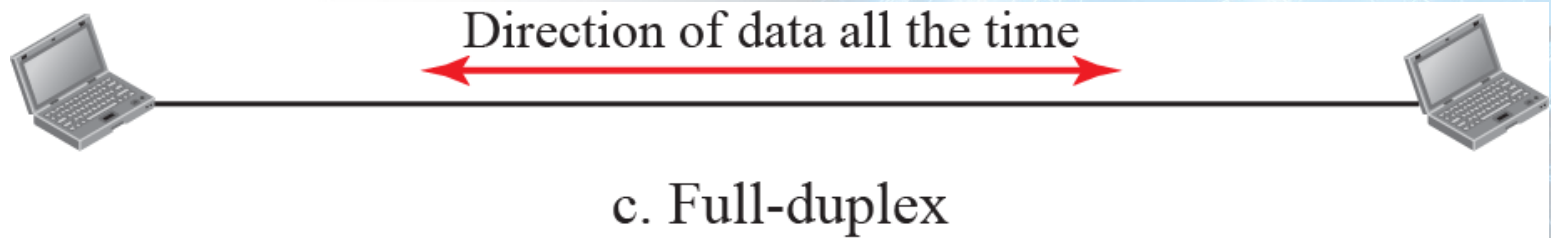
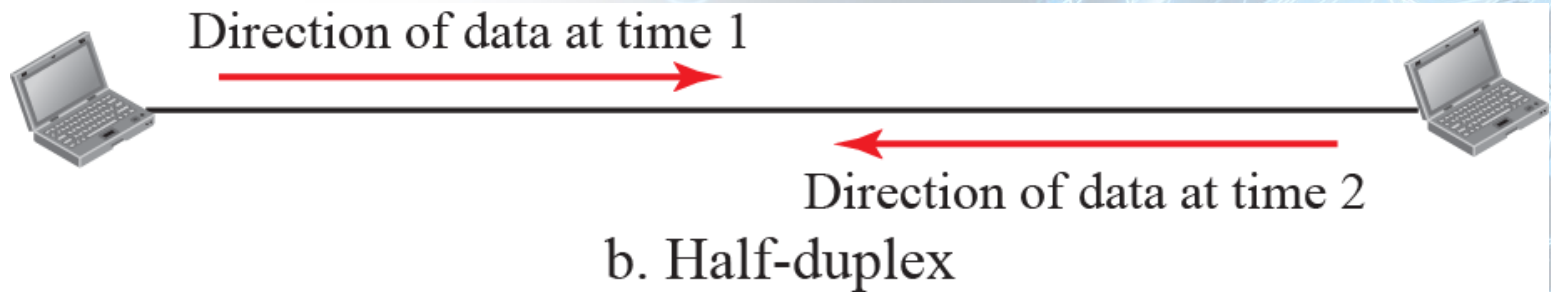
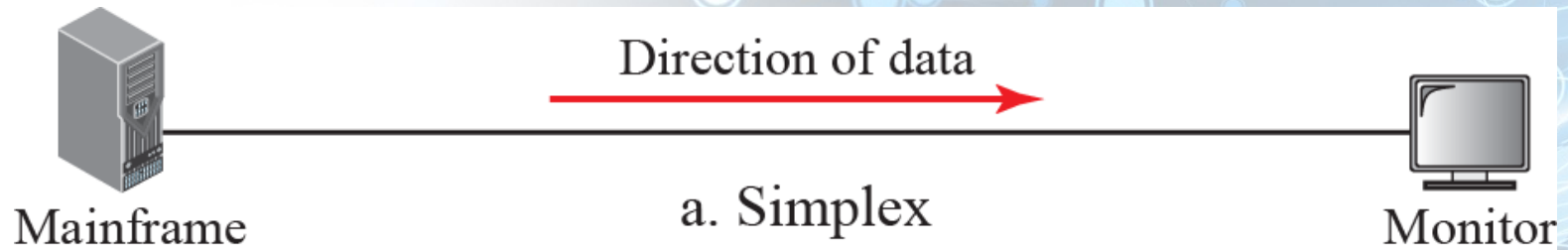
- Text
- Numbers
- Images
- Audio
- Video

Data Representation and Data Flow

Data Flow between two devices:

- **Simplex**
- **Half-Duplex**
- **Full-Duplex**

Data Flow



Networks

- **Network:**
Interconnection of a set of devices capable of communication
- **Host**
- **Connecting Device**

Network Criteria

A network must be able to meet a certain number of criteria:

- **Performance**
 - ✓ Throughput
 - ✓ Delay
- **Reliability**
- **Security**

Physical Structures

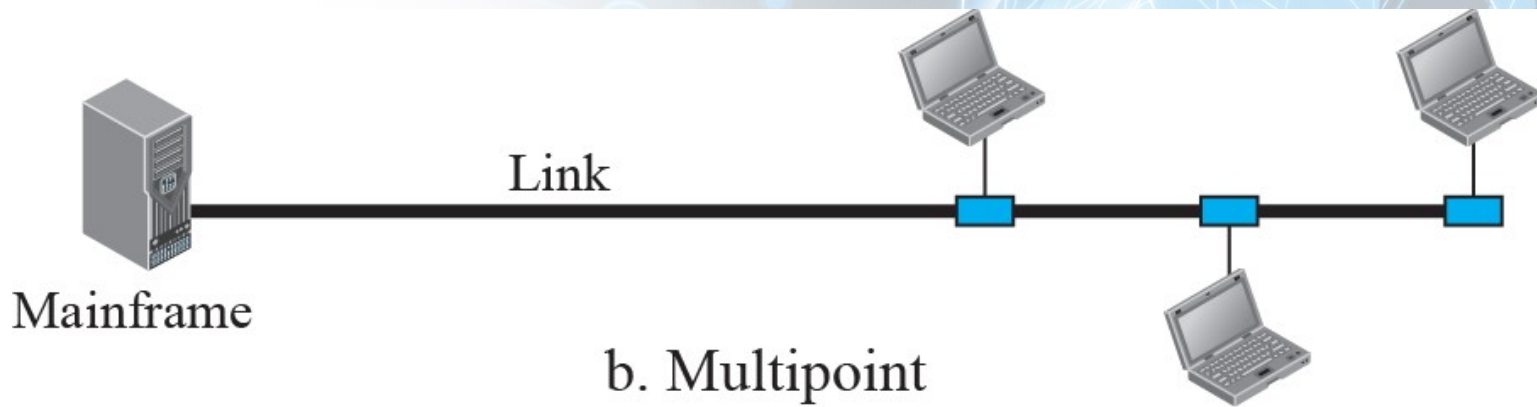
Physical Network Attributes

- **Link**
- **Type of Connection**
 - ✓ **Point-to-Point**
 - ✓ **Multipoint**

Physical Structures



a. Point-to-point

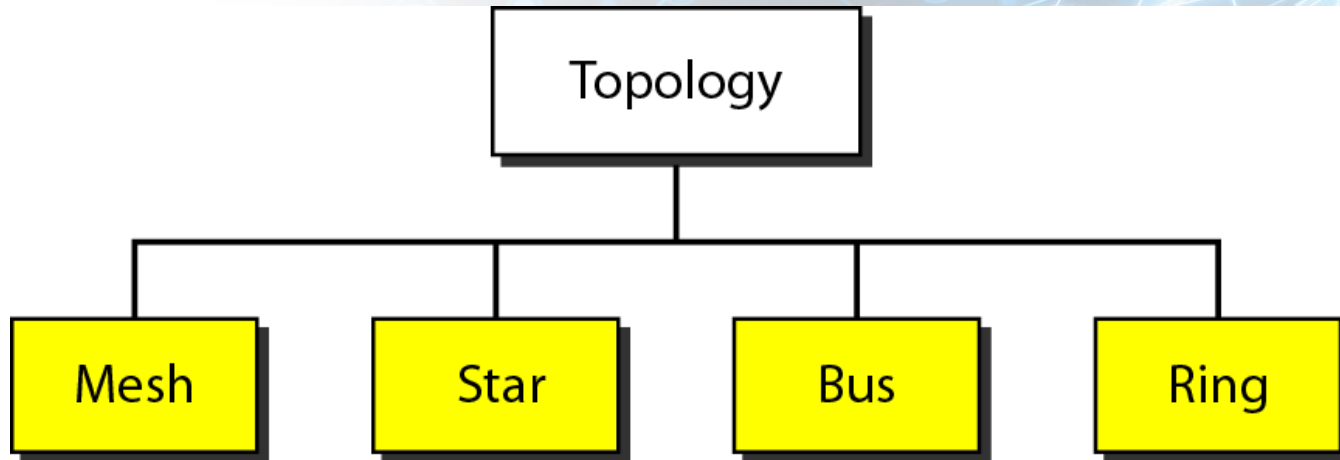


b. Multipoint

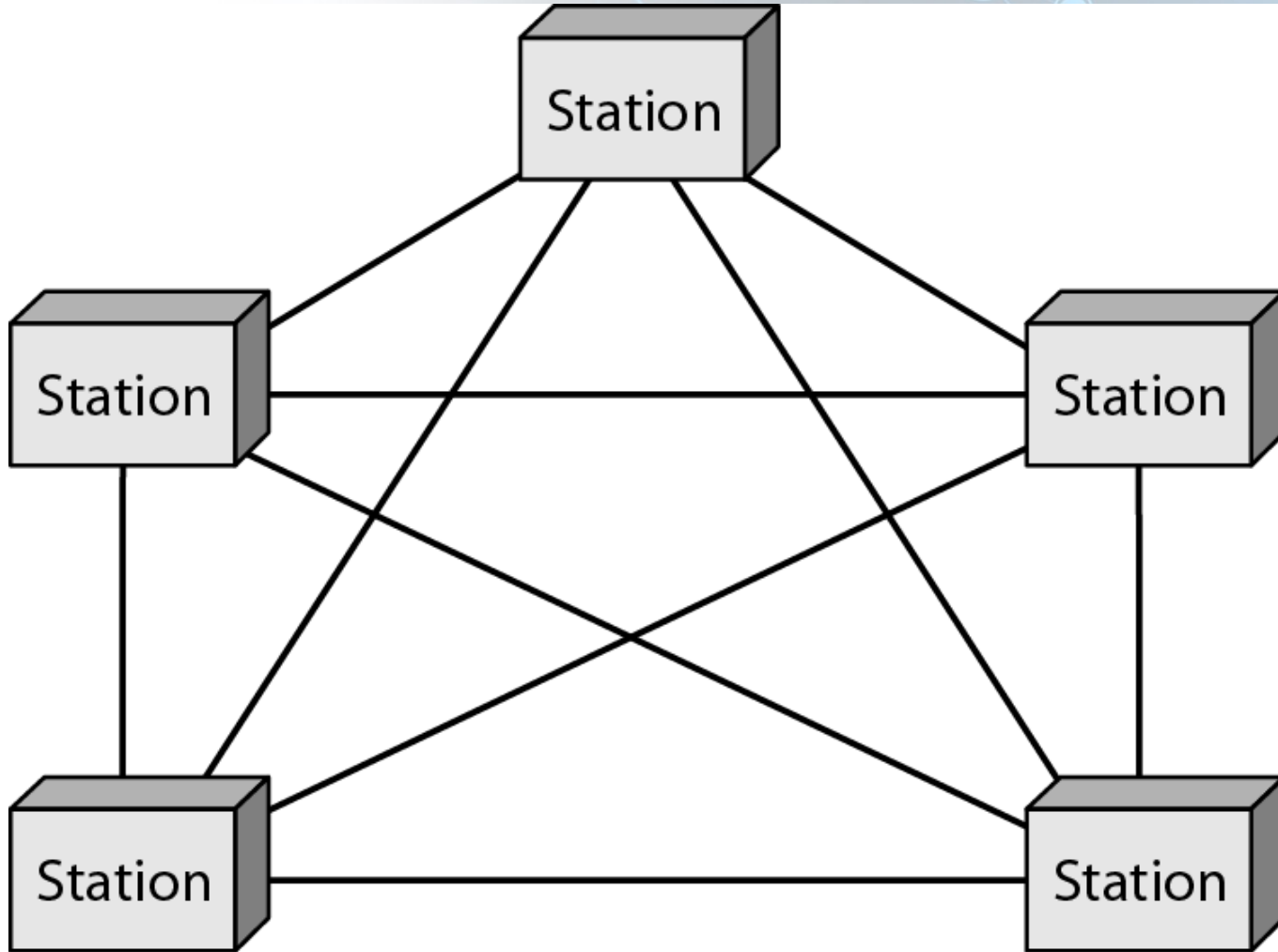
Physical Topologies

- **Physical Layout of Network**
- **Links + Nodes = Topology**
- **Physical Topologies:**
 - ✓ **Mesh**
 - ✓ **Star**
 - ✓ **Bus**
 - ✓ **Ring**

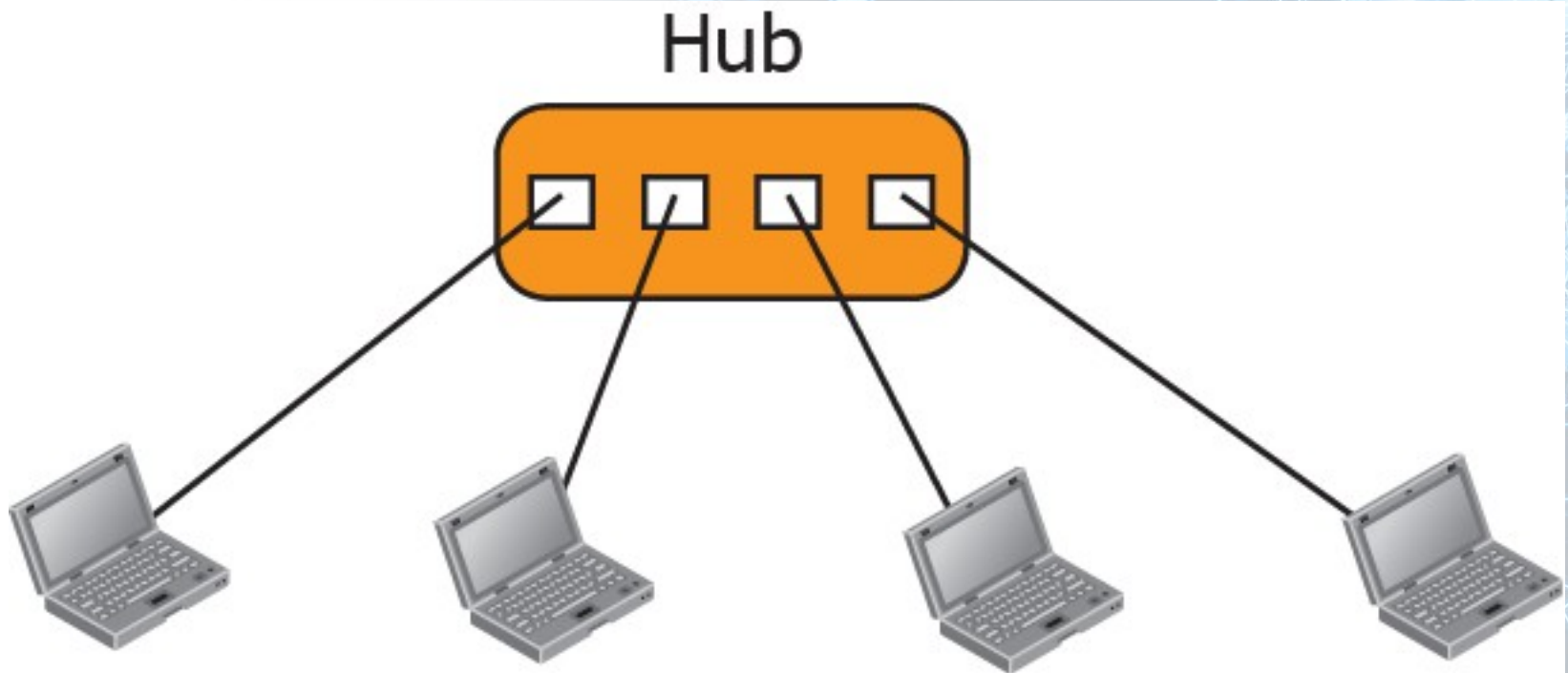
Physical Topologies



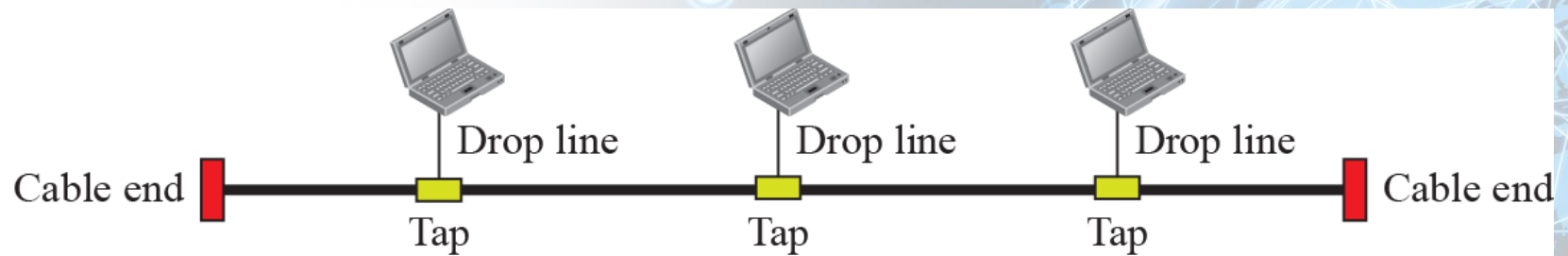
Mesh Topology



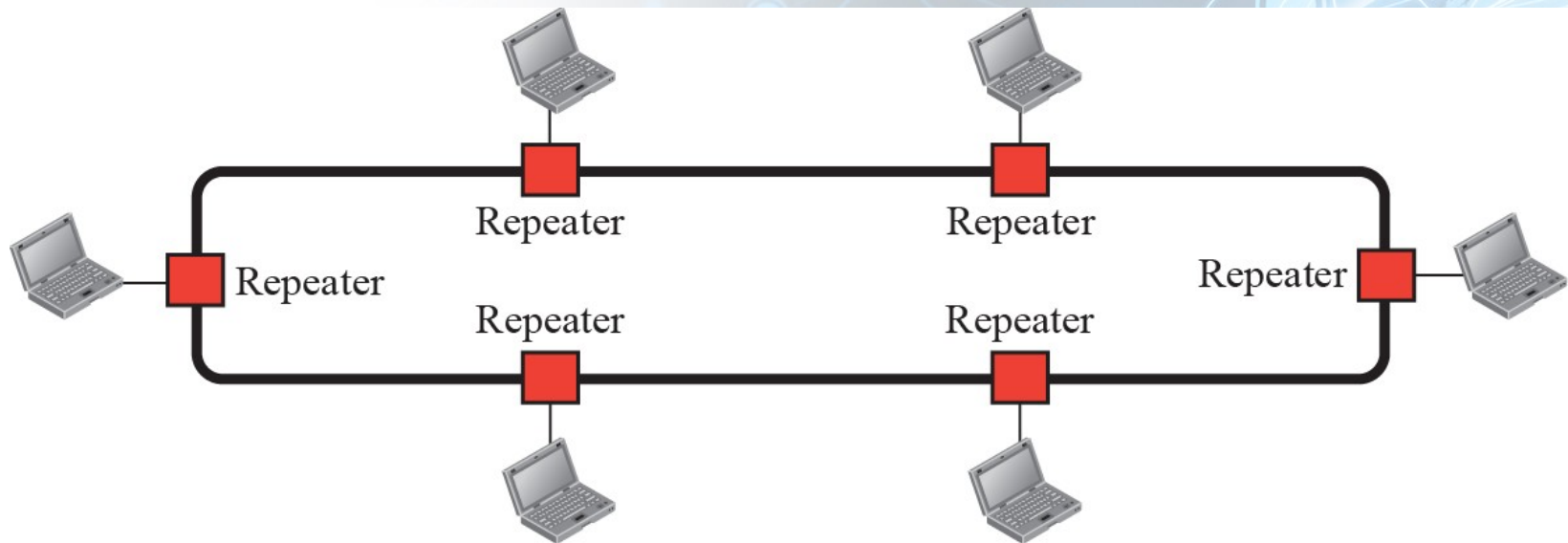
Star Topology



Bus Topology



Ring Topology



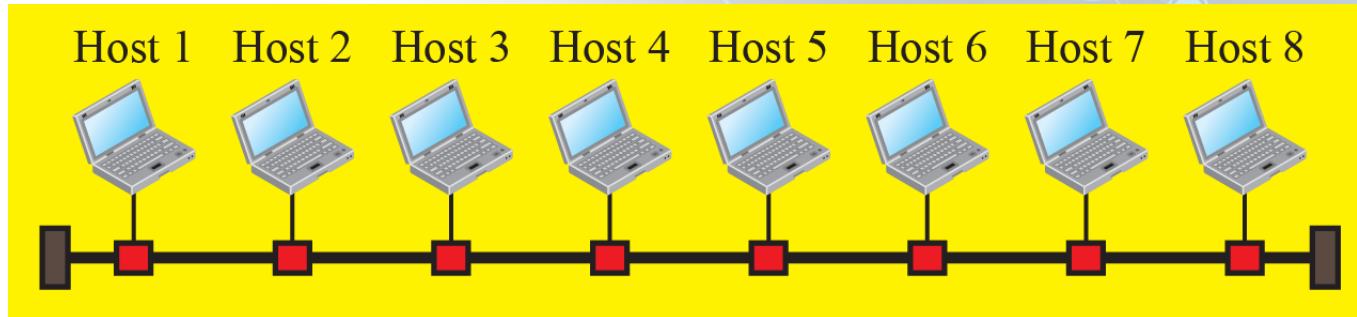
Networks Types

- **Network classification:**
 - ✓ **Size**
 - ✓ **Geographical Coverage**
 - ✓ **Ownership**
- **Local Area Networks (LANs)**
- **Wide Area Networks (WANs)**

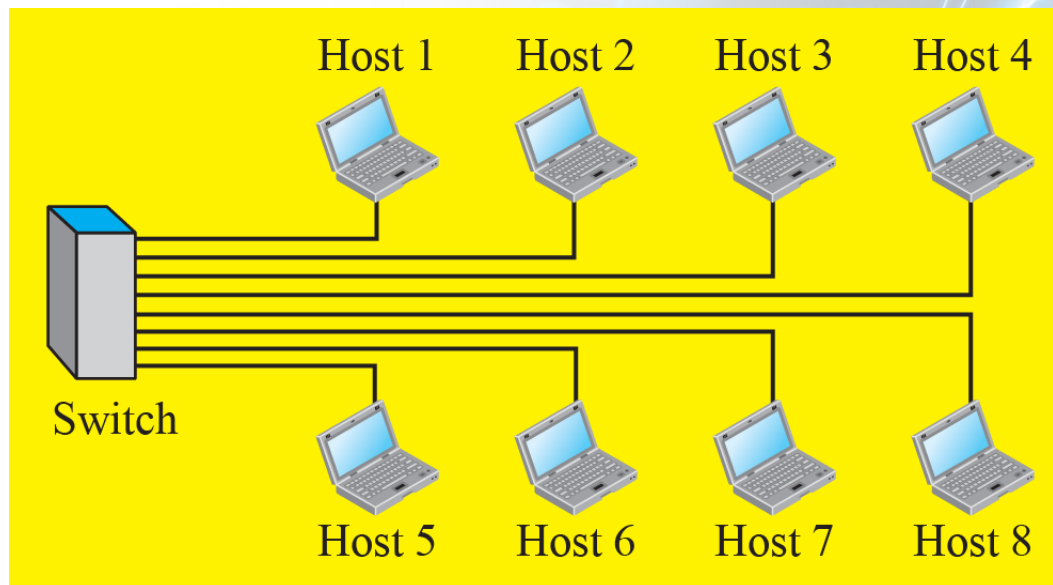
Local Area Networks

- **Usually Privately owned**
- **Connects some hosts in a single office, building, or campus**
- **Can be as simple as two PCs and a printer in someone's home office**
- **Can extend throughout a company**
- **Host Address**

Local Area Networks



a. LAN with a common cable (past)



b. LAN with a switch (today)

Legend



A host (of any type)



A switch



A cable tap



A cable end



The common cable



A connection

Wide Area Network

- **Wider geographical span than a LAN**
- **Spans a town, a state, a country, or even the world**
- **Interconnects connecting devices such as switches, routers, or modems**
- **Normally created and run by communication companies**

Wide Area Network

- **Point-to-Point WAN**
- **Switched WAN**
- **Internetwork**

Point-to-Point WANs

To another
network



To another
network

Legend

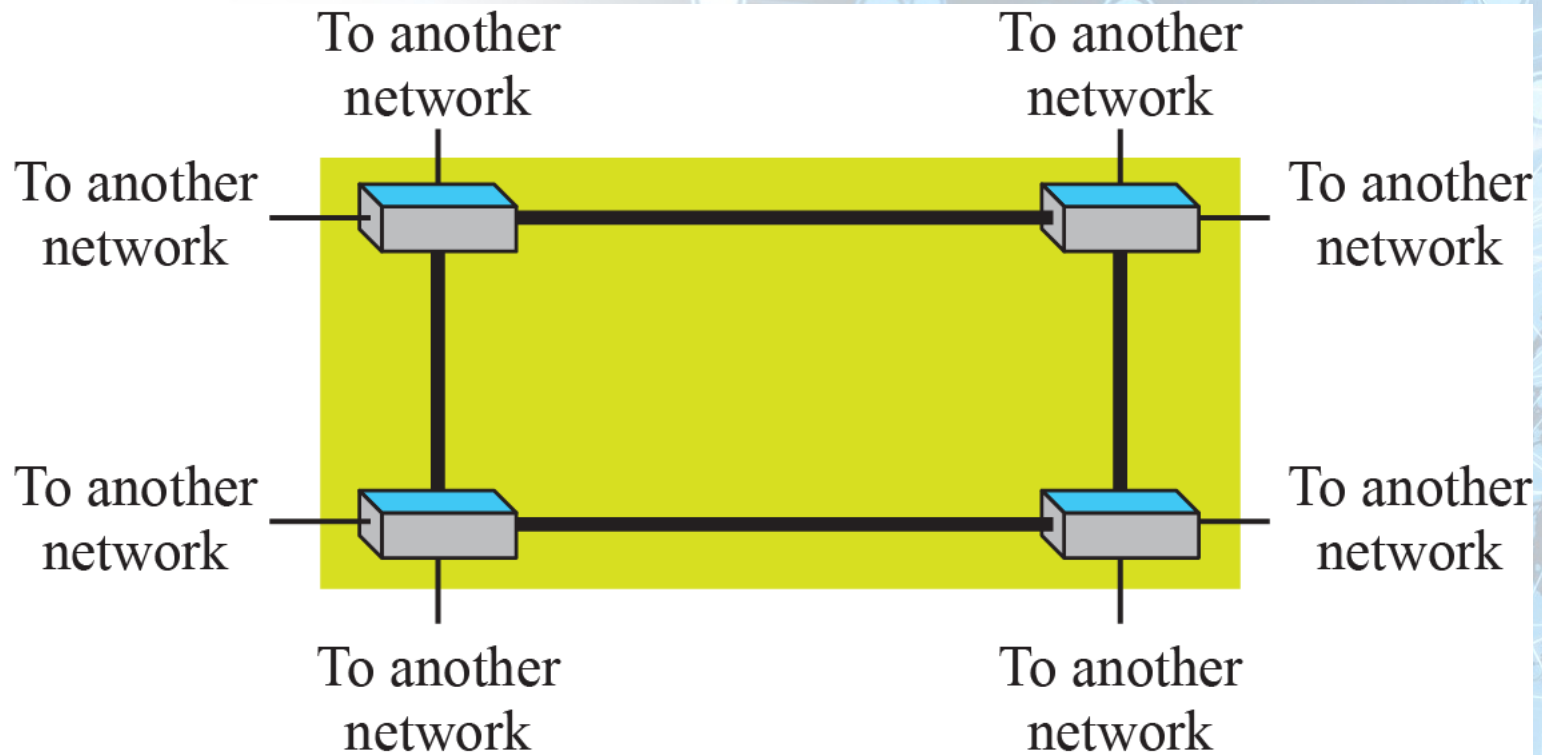


A connecting device



Connecting medium

Switched WANs



Legend

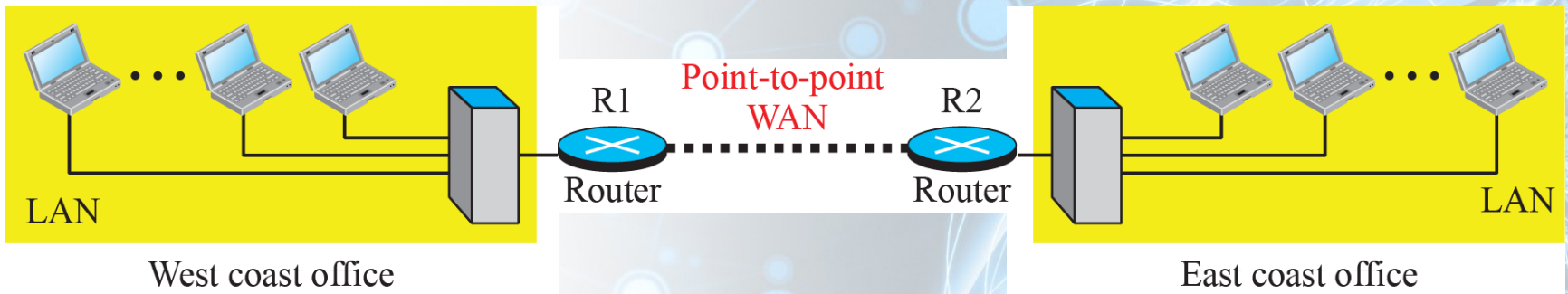


A switch



Connecting medium

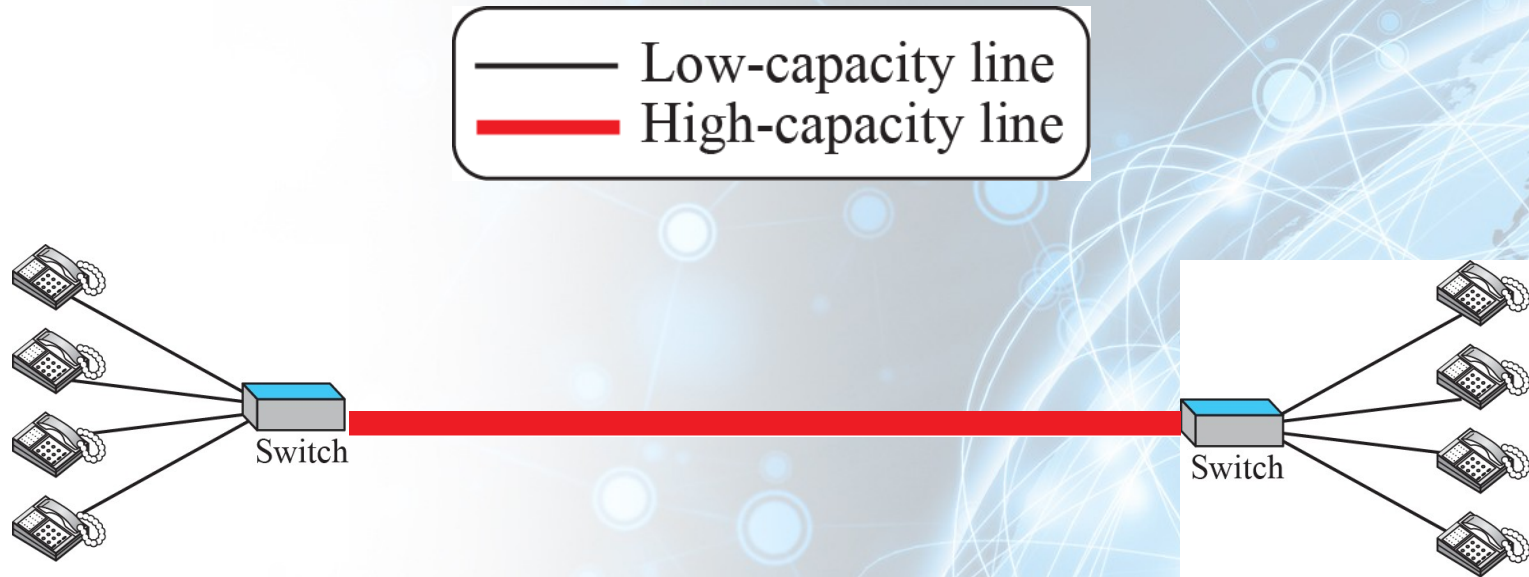
Internetwork



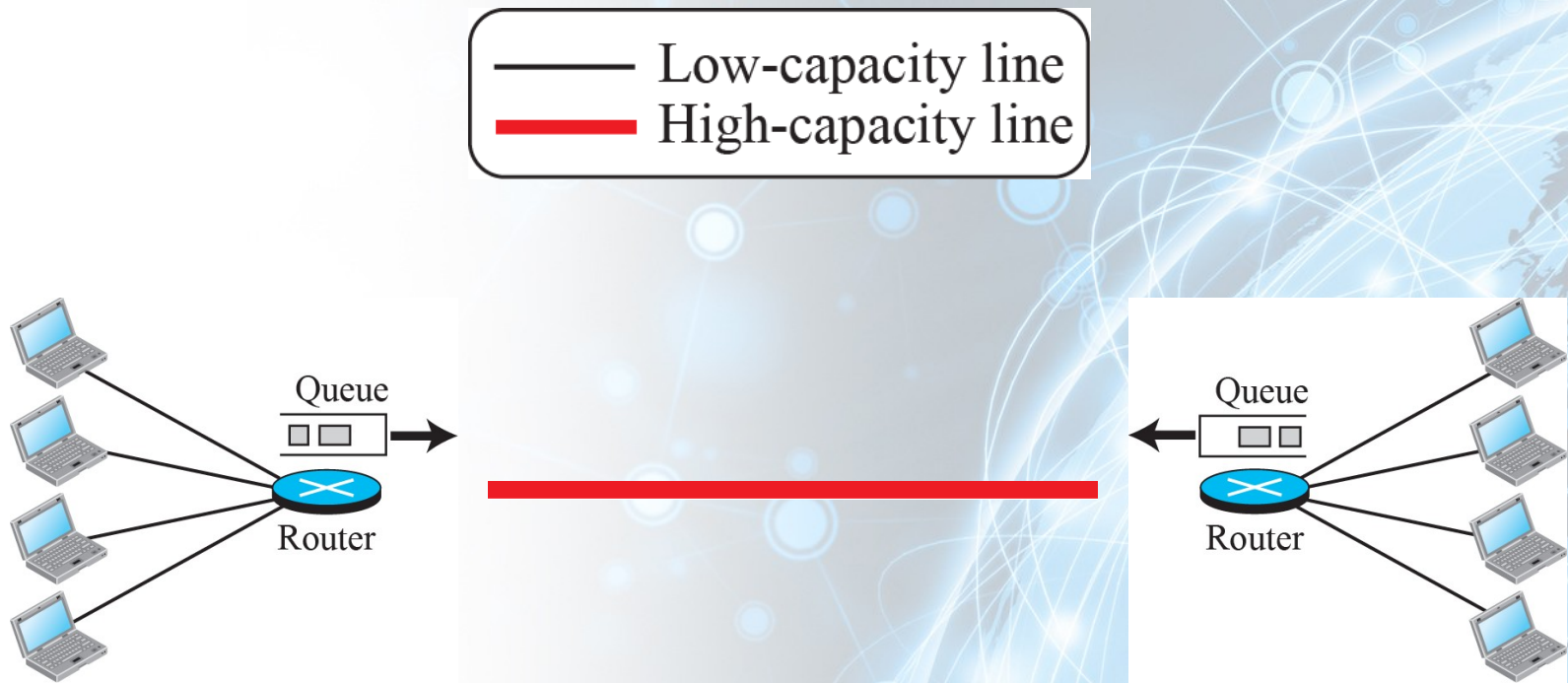
Switching

- **Switching**
 - ✓ **Circuit-Switched Network**
 - ✓ **Packet- Switched Network**

Circuit Switched Network



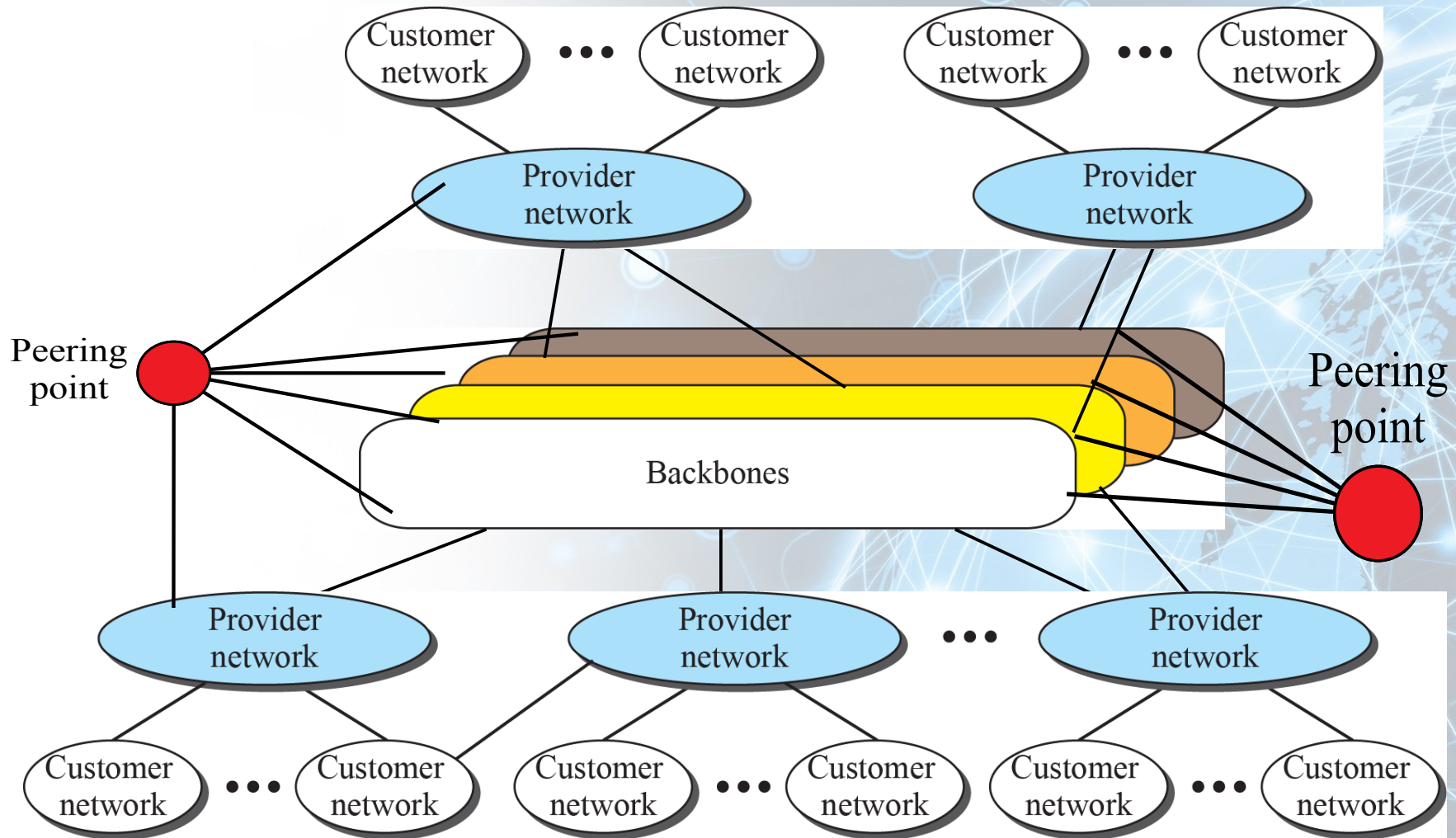
Packet Switched Network



The Internet

- An internet (note the lowercase i) is two or more networks that can communicate with each other
- The Internet (uppercase I), and is composed of thousands of interconnected networks.
- Accessing the Internet

The Internet



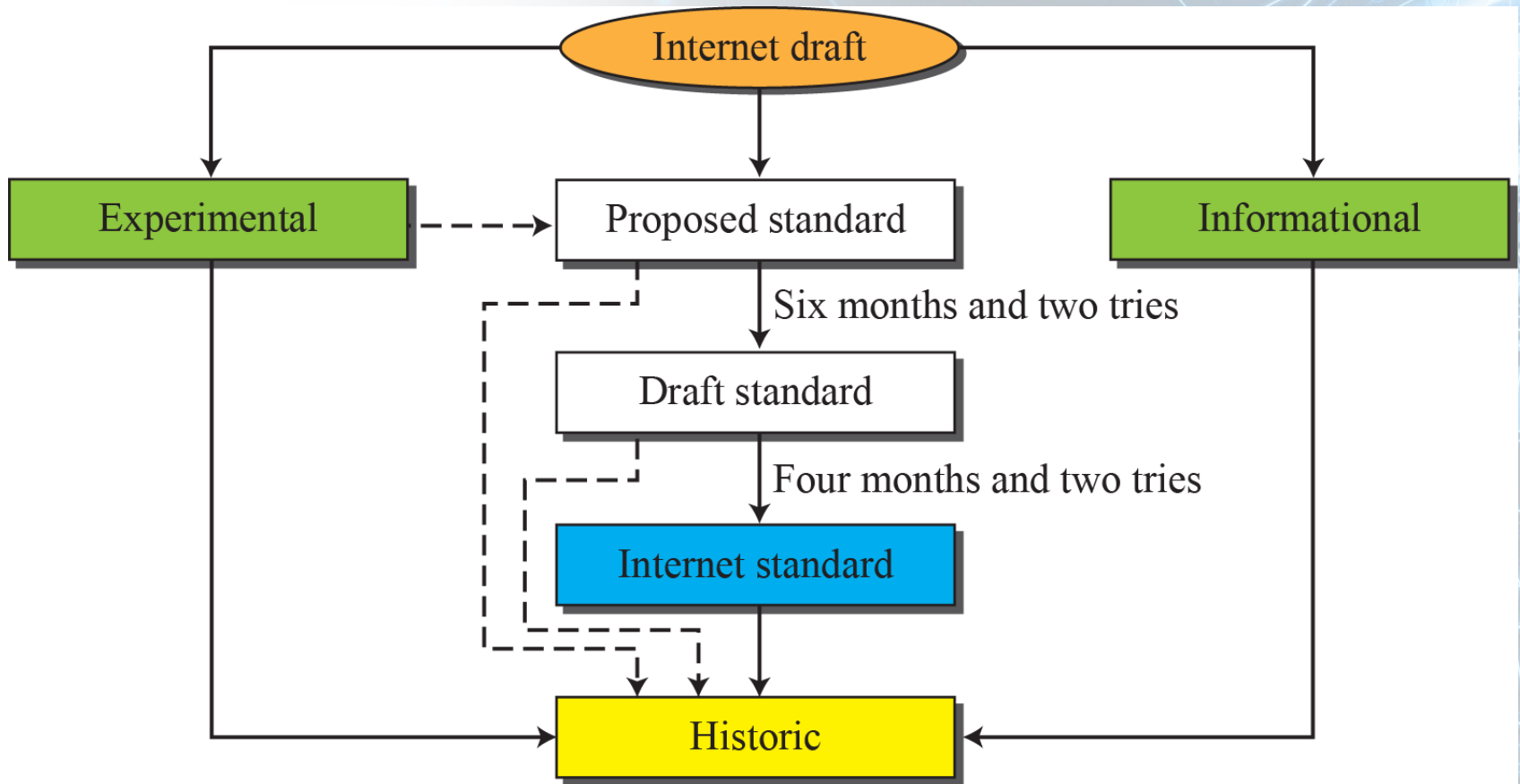
Internet History

- **Telegraph and Telephone networks, before 1960:**
 - ✓ **Constant-rate communication only**
- **ARPANET- Packet Switched**
- **Birth of the Internet & TCP/IP**
- **MILNET**
- **CSNET**
- **NSFNET**
- **Internet Today**

Internet Standards and Administration

- Internet draft
- Request for Comments (RFC)
 - ✓ Proposed Standard
 - ✓ Draft Standard
 - ✓ Internet Standard
 - ✓ Historic
 - ✓ Experimental
 - ✓ Informational

Internet Standards



Internet Administration

