SET 4573: Data Communication and Switching System

Chapter 1: Overview

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Issues in Data Communication Network

- Current trends
  - Data traffic grows at a very high rate
  - Fast development of new services
  - Advances in data communication technologies
- Current requirements
  - High speed data communication networks
  - Integration of different data communication networks (Internet)
  - Communication over the Internet (e-commerce, social networking, etc.)

Data Communication Model

Source System

Destination System

Block diagram for Data Communication Model

Data Communication Tasks

- Transmission and switching system
- Interfacing
- Data and signal generation
- Data synchronization and exchange management
- Error detection, correction and recovery
- Flow Control
- Addressing
- Routing
- Message formatting
- Security
- Network management

Transmission System

- Transmission line is the basic building block
- Short distance transmisison
  - Twisted pair
  - Coaxial cable
  - WiFi
- Long distance transmission
  - Fiber optic
  - Satellite
- Switching system and Networking

Network Communication System

- Interconnection is required to interconnect a number of computers and servers

- Communication technologies using multimedia (voice, data, image and video)

- Categories of Data Communication Network
  - Local Area Network (LAN)
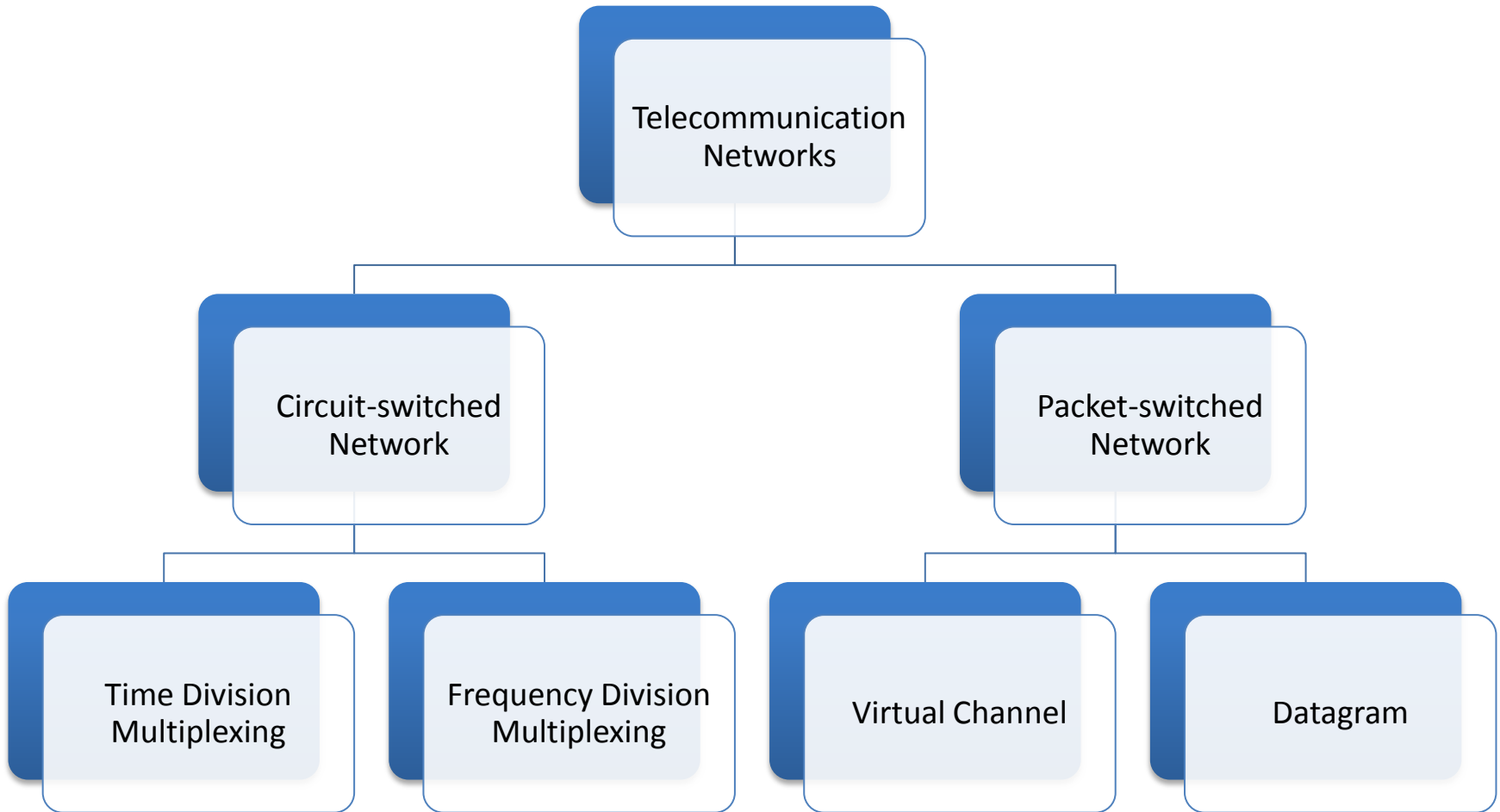 - Wide Area Network (WAN)

Local Area Network (LAN)

- Cover a small geographical area
- Private owned and managed
- High speed network
- Based on packet switching network
  - Wired network
  - Wireless network

Wide Area Network (LAN)

- Cover a large geographical area

- Public network

- Use public carrier system

- Based on the following technologies
  - Circuit switching network
  - Packet switching network

- Also known as Telecommunication Network

Telecommunication Networks

Circuit Switching

- Uses dedicated communication paths
- Consists of physical links or circuits
- Uses dedicated logical channels
- Normally for voice network
  - Telephone network

Packet Switching

- Uses packets in sending data
- No dedicated path is required to send the packets
- Packets are passed from one network to another
- Normally for computer to computer communication
  - Local area network (LAN)
  - Internet

Internet

- Interconnection of a large number of networks

- Based on Transmission Control Protocol/Internet Protocol (TCP/IP)

- The basis for a wide range of services provided to users

Internet Architecture