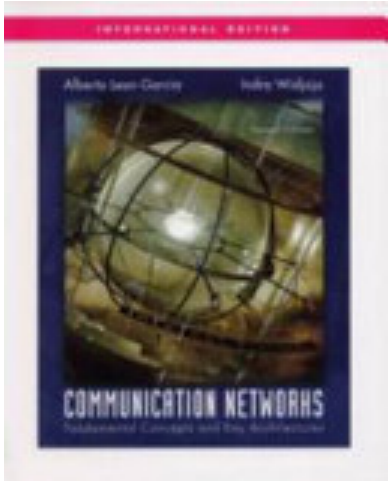
Part - III

Principles of Electronic Communication

Chapter- 9: Communication Networks

Reference:

Garcia and Widjaja, “Communication Networks”, McGraw Hill, 2006



Module I

Introduction to Communication Networks

Objectives:

- To describe the principles of communication networks
- List the different types of communication networks
- To explain the ISO OSI architecture

Introduction to Data Communication

- Multiplexer
- Multiple access
- Source coding
- Error detection and correction
- Switching
- Signaling

Introduction to Communication Networks

- Point-to-point communication
- Point-to-multipoint communication
- Broadcasting

Network switching

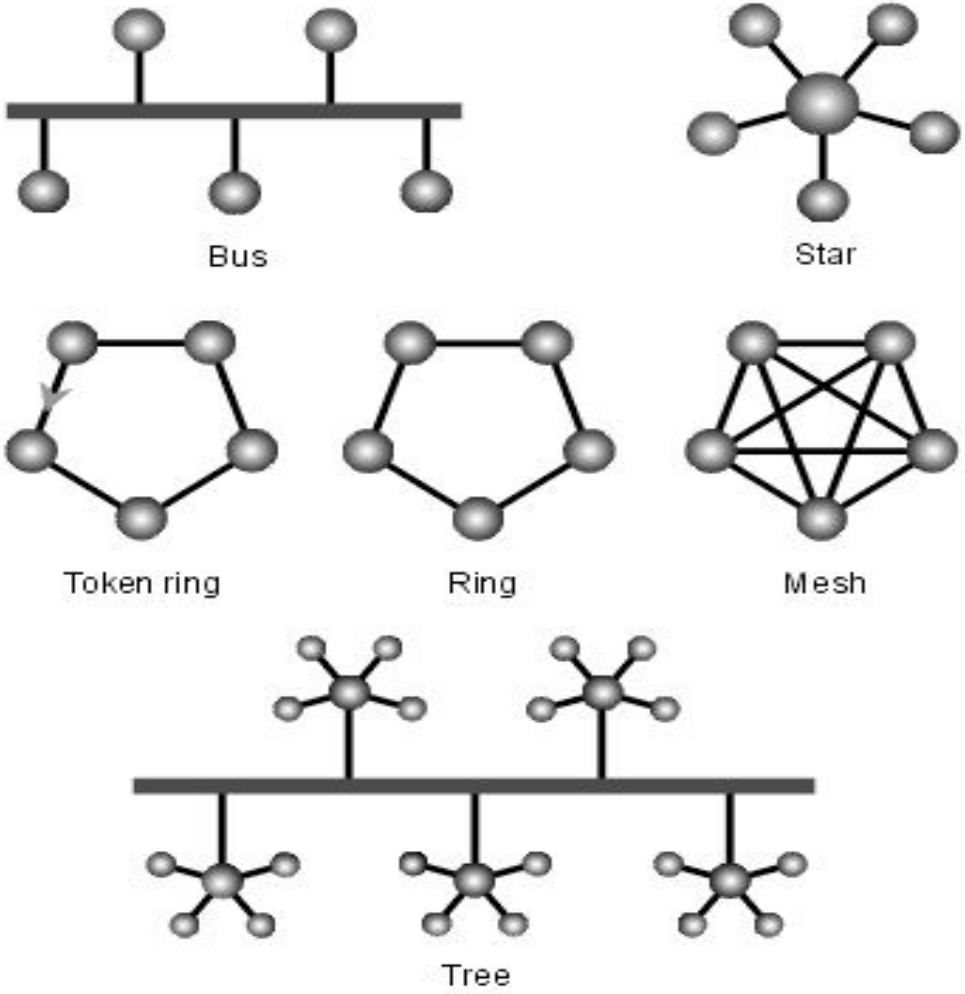
Three types of switching techniques are

- Circuit switching
- Message switching
- Packet switching

Types of communication networks

- Local Area Network(LAN)
- Wide Area Network(WAN)
- Metropolitan Area Network(MAN)
- Public Switched Network
- Wireless Network
- Satellite Network

Network topology



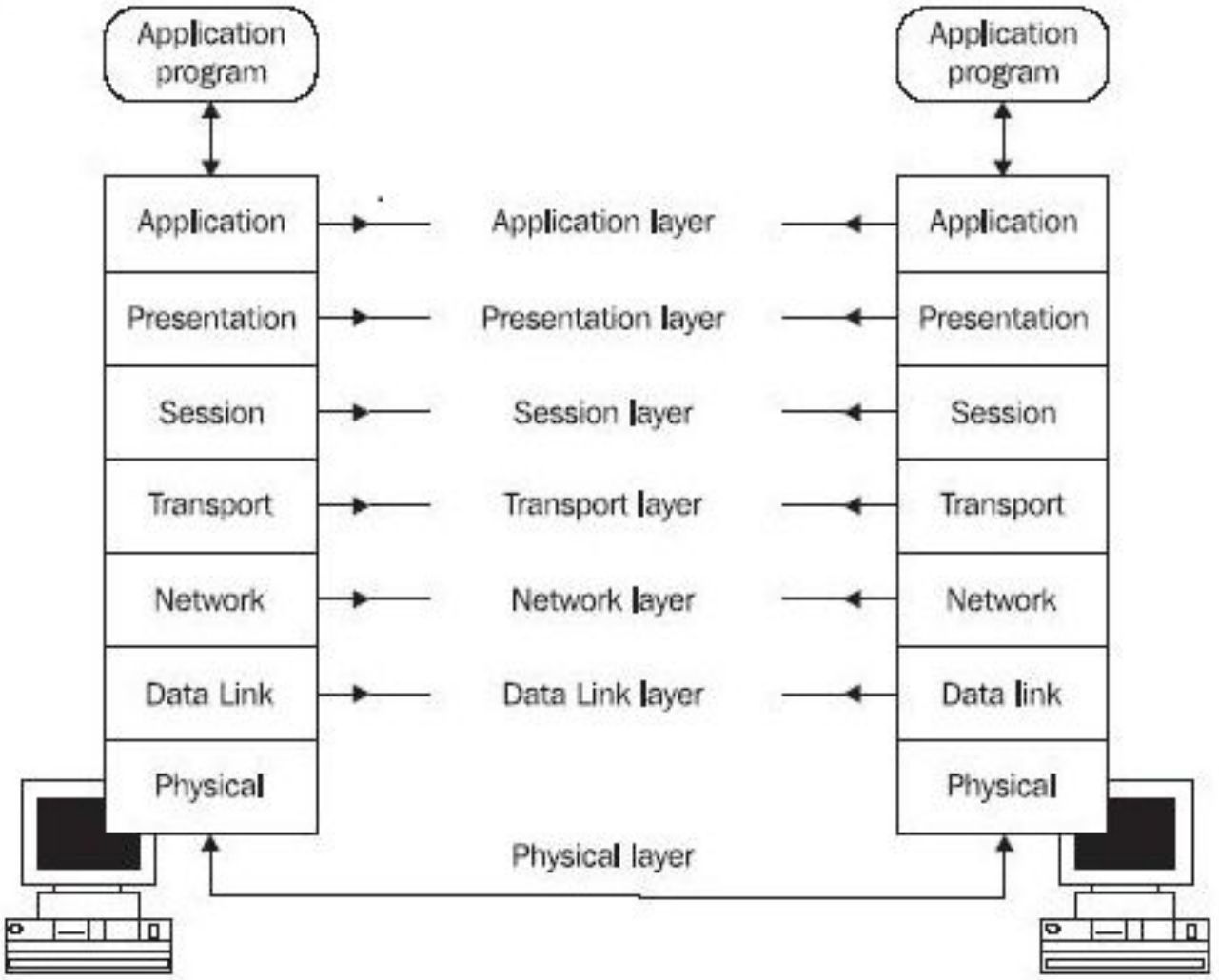
Network protocols

Network protocols define rules and conventions for communication between network devices

Need for layered approach

- Every layer will perform well-defined, specific functions
- Modifications in one layer's functionality or implementation does not affect the other layer
- A layer can be divided into sub-layers
- A layer can be eliminated or by-passed
- This multi-vendor approach benefits the end user

Seven-layer architecture of ISO OSI



Summary

In this module we have learnt:

- Key terms used in communication networks such as multiplexing, multiple access, source coding, error detection and correction, switching and signaling.
- Concept of point-to-point communication, point-to-multipoint communication and broadcasting.
- Different types of network switching techniques such as circuit switching, message switching and packet switching.
- Different forms of networks such as local area network, wide area network, metropolitan network, public switch network, wireless networks, satellite networks
- Network topology such as bus, star, ring, token ring, mesh and tree.
- Network protocols and need for layered approach.
- To draw the seven layer architecture of ISO OSI model and need for each layer.

Self Test

- List the different networks used for communication.
- Draw the various topology used in communication networks.
- Define protocol and explain the need for network protocols.
- For N devices in a network, what is the number of cable links necessary for mesh, ring, bus and star networks.

Exercises

- Compare circuit switching and message switching with packet switching.
- Give an advantage for each type of network topology.
- What is LAN, WAN and MAN? Give one example for each.