



# NETWORK PROTOCOLS & SECURITY

## 23EC2210 R/A/E

Topic:  
**SWITCHING**

Session - 6

## AIM OF THE SESSION



To familiarize students with different switching techniques in Computer networks.

## INSTRUCTIONAL OBJECTIVES



This Session is designed to:

1. Describe the need for switching in computer networks.
2. Describe different switching techniques.

## LEARNING OUTCOMES



At the end of this session, you should be able to:

1. Understand the importance of Switching.
2. Categorize different switching techniques.

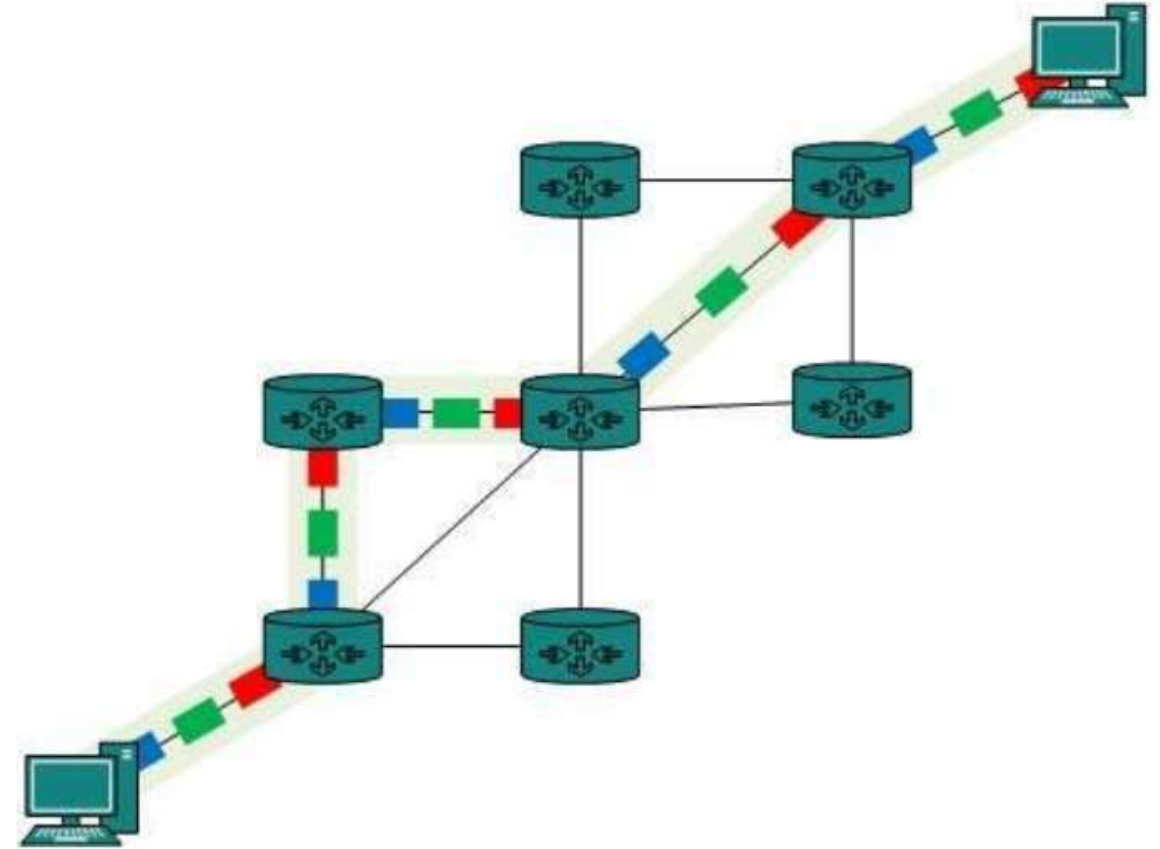
- Switching is the technique of transferring the information from one computer network to another network.
- Switching in a computer network is achieved by using switches.
- Network switches operate at layer 2 (Data link layer) in the OSI model.
- Network switches operate at Layer 2 of the OSI model, facilitating more efficient and selective data transmission.
- Switches are used to forward the packets based on MAC addresses.

### Circuit Switching:

- When two nodes communicate with each other over a dedicated communication path, it is called circuit switching.
- In circuit switching, to transfer the data, circuit must be established so that the data transfer can take place.
- Circuits can be permanent or temporary.
- Applications which use circuit switching may have to go through three phases:
  - Establish a circuit
  - Transfer the data
  - Disconnect the circuit

## Circuit Switching:

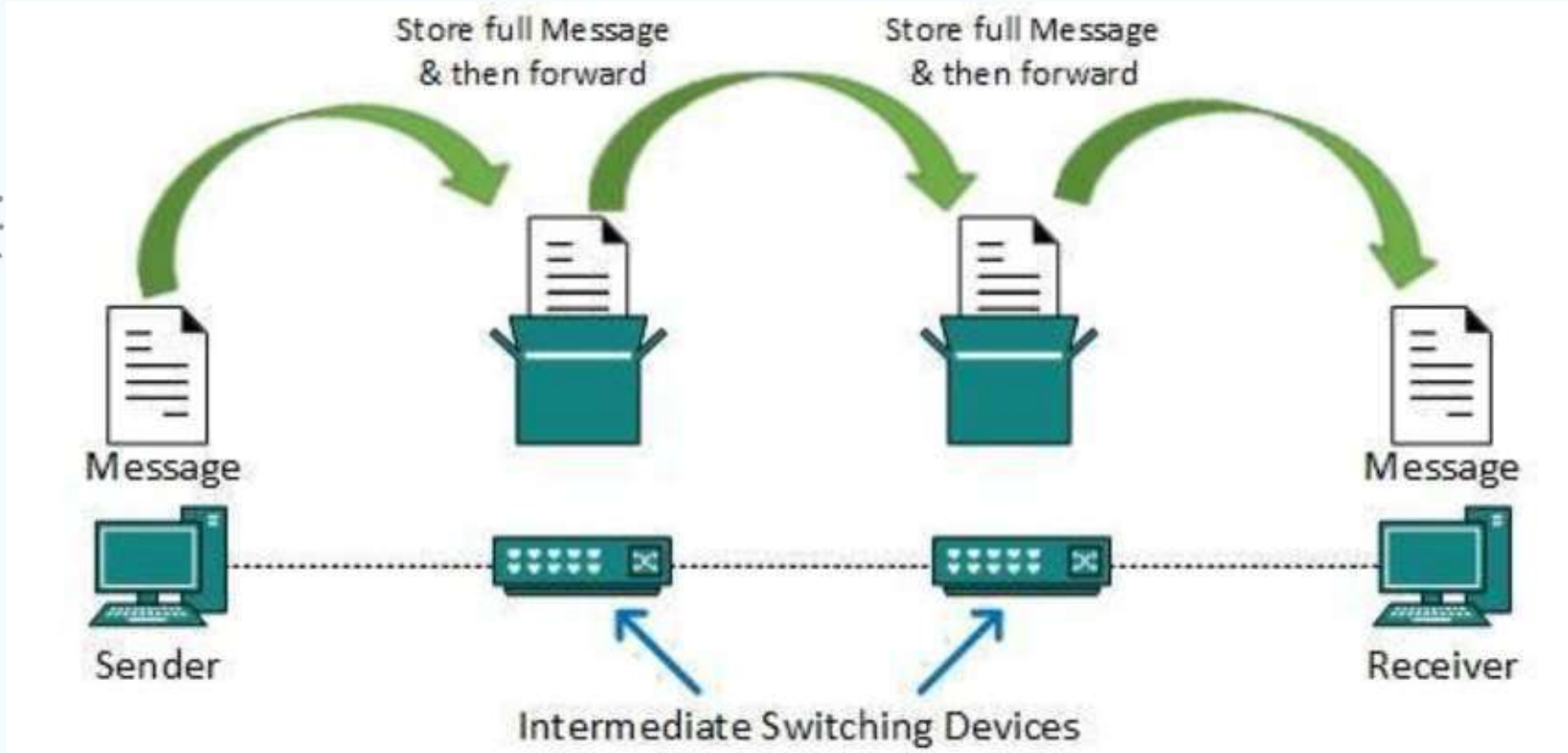
- Circuit switching was designed for voice applications.
- Telephone is the best suitable example of circuit switching.
- Before a user can make a call, a virtual path between caller and callee is established over the network.



## Message Switching:

- Message switching is in middle of circuit switching and packet switching.
- In message switching, the whole message is treated as a data unit and is transferred entirely.
- A switch working on message switching, first receives the whole message and buffers it until there are resources available to transfer it to the next hop (next switch).
- If the next hop is not having enough resource to accommodate large size message, the message is stored and switch waits.

## SWITCHING: Message Switching



### Drawbacks of Message Switching:

- Every switch in transit path needs enough storage to accommodate entire message.
- Because of store-and-forward technique, message switching is very slow.
- Message switching is not suitable for streaming media and real-time applications.

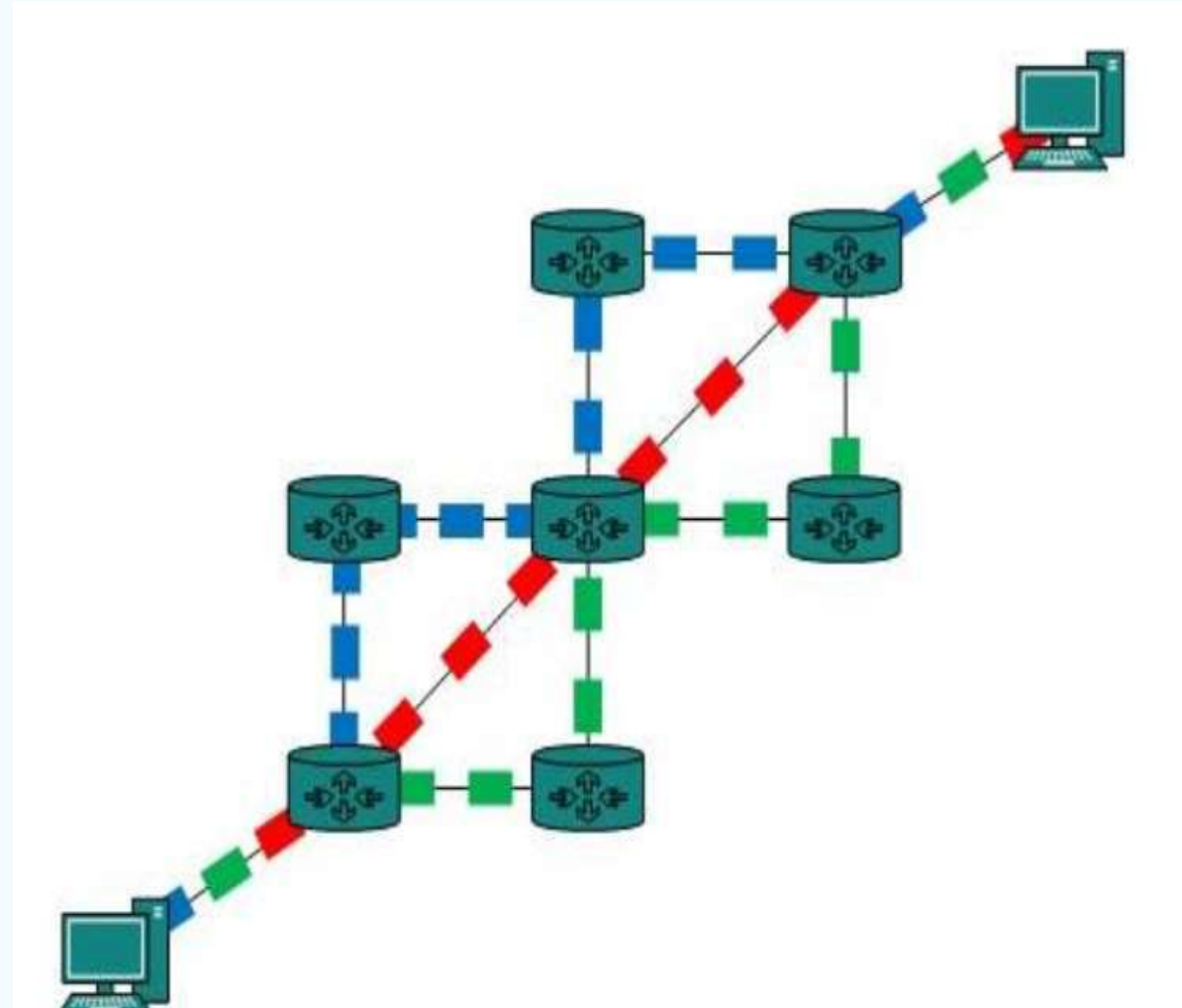


## Packet Switching:

- Shortcomings of message switching gave birth to an idea of packet switching.
- The entire message is broken down into smaller chunks called packets.
- The switching information is added in the header of each packet and transmitted independently.
- The internet uses packet switching technique.

## Advantage of Packet Switching:

- It is easier for intermediate networking devices to store small size packets.
- They do not take much resources either on carrier path or in the internal memory of switches.





## SELF-ASSESSMENT QUESTIONS

1. In which of the following switching methods, the message is divided into small packets?

- (a) Circuit Switching
- (b) Message Switching
- (c) Packet Switching
- (d) Virtual Switching

2. Which of the following switch methods creates a point-to-point physical connection between two or more computers?

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- (b) Message Switching
- (c) Packet Switching
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3. A local telephone network is an example of a \_\_\_\_\_ network.

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# Topic Summary

## Switching Techniques

- Circuit Switching
- Message Switching
- Packet Switching



### Reference Books:

1. A.S. Tanenbaum, David J. Wetheral "Computer Networks" Pearson, 5th Edition.
2. Kurose, J and Ross, K Computer Networking: A Top-Down Approach Addison-Wesley- 6th edition.

### Sites and Web links:

1. <https://www.geeksforgeeks.org/types-of-transmission-technology/>
2. [https://www.tutorialspoint.com/data\\_communication\\_computer\\_network/computer\\_network\\_topologies.htm](https://www.tutorialspoint.com/data_communication_computer_network/computer_network_topologies.htm)
3. <https://www.javatpoint.com/computer-network-transmission-modes>

THANK YOU



Team – Network Protocols & Security