GANDHINAGAR INSTITUTE OF TECHNOLGY

Department of Information Technology

Mobile Computing and Wireless Communication (2170710)

Switching Techniques

Group ID: IT_B3_09

Student Name(Enrollment No):
PATEL MAULIK SATISHKUMAR
(150124116006)

Name of Faculty: Prof. Anirudhdha Nayak

Content

- Introduction
- Definition
- Types of Switching
- Circuit Switching
- Message Switching
- Packet Switching

Introduction

- For *transmission of data* beyond a local area, communication is typically achieved by transmitting data from source to destination through a network of intermediate switching nodes.

- Switching is used - When there are many devices, it is necessary to develop suitable mechanism for *communication* between any two devices.

- This switched network design is sometimes used to implement LANs MANs as well.

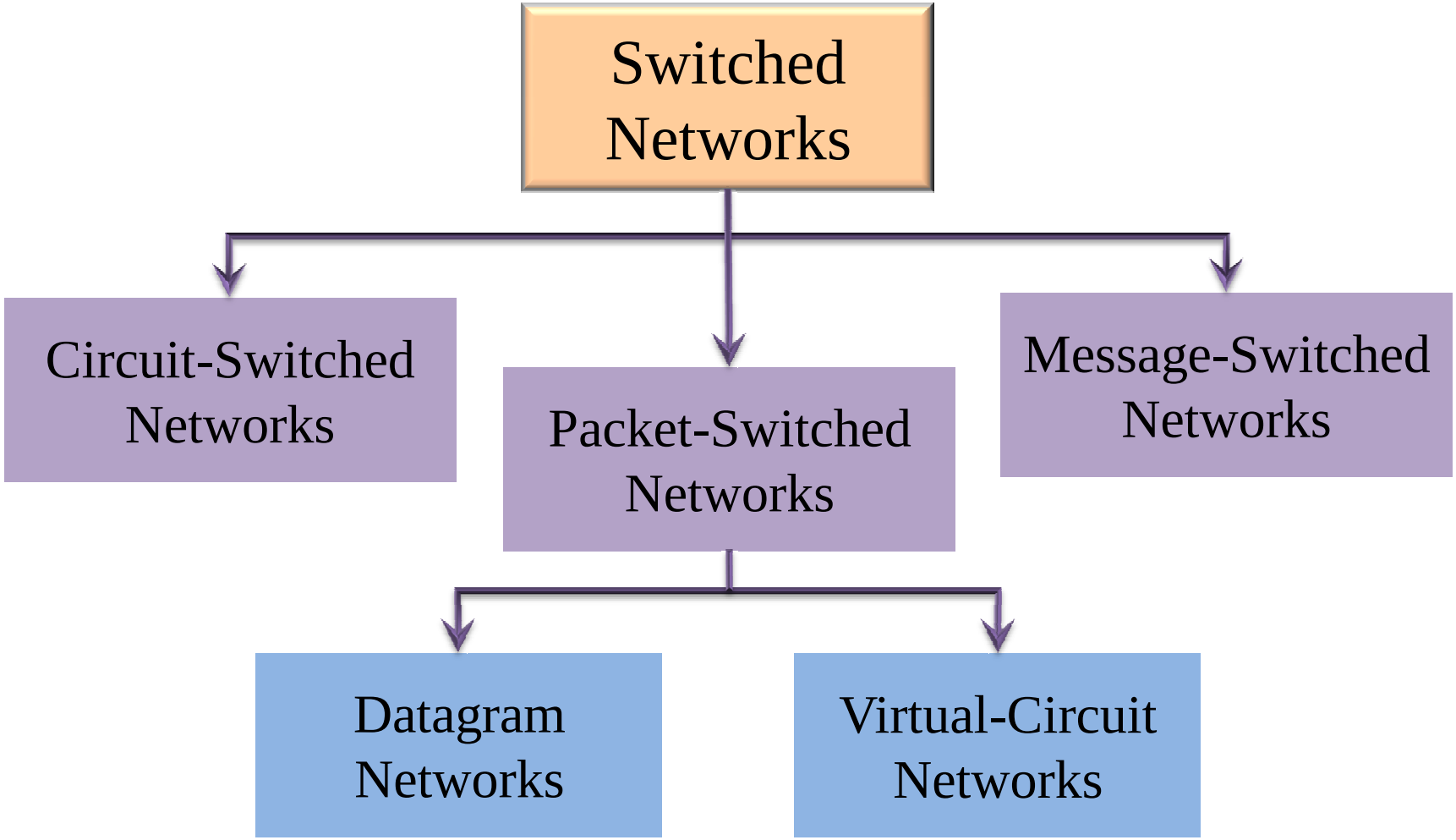
Definition

- Switching is the *process of* ***forwarding packets*** coming from one port to another port.

- It defines the connection of different network segment together and the process to transmit the data packets across the network.

- In large networks there might be multiple path linking sender and receiver. Information may be switched as it travels through various communication channels.

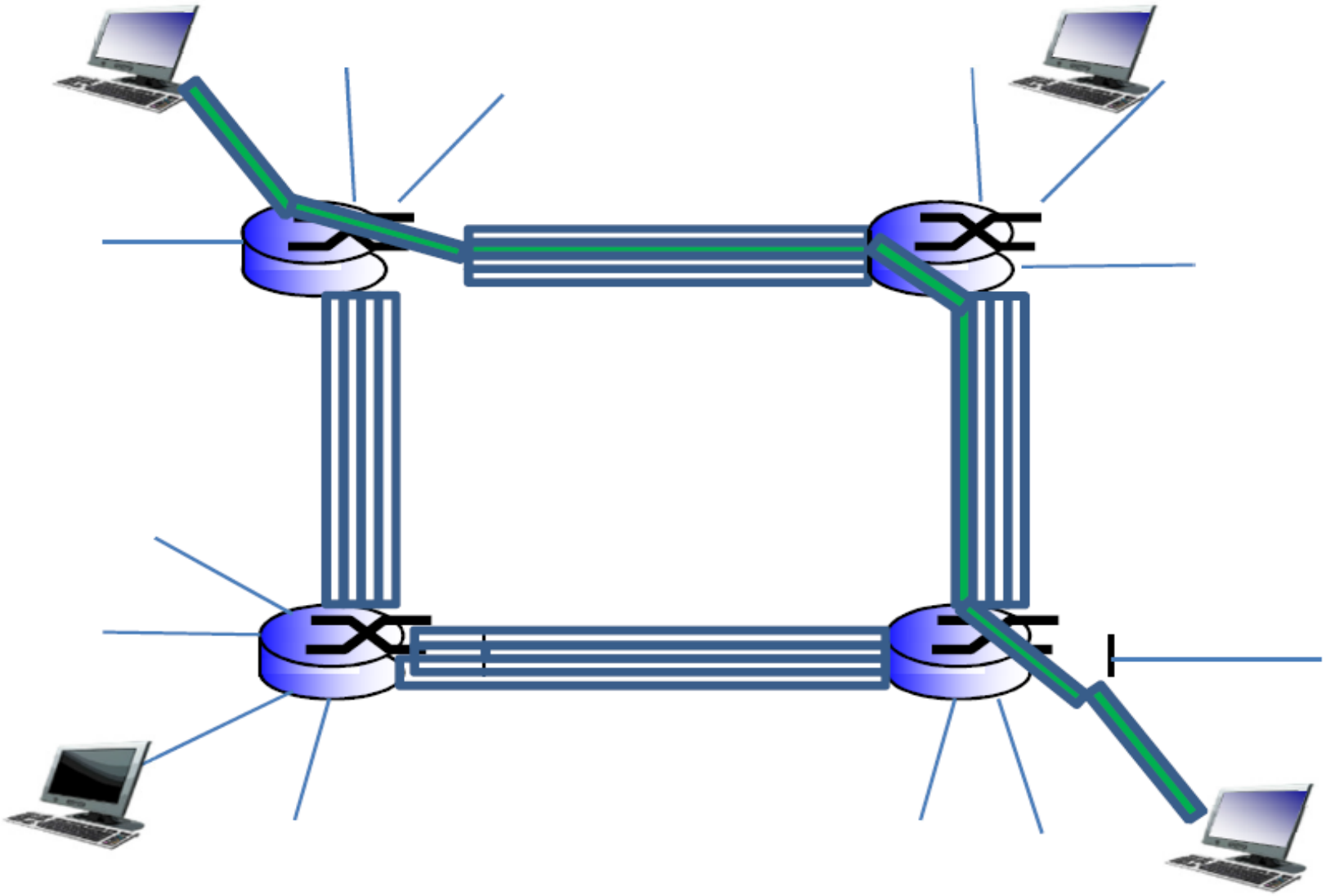
Types of Switching



Circuit Switching

- A circuit-switched network is made of a set of switches connected by ***physical links***, in which each link is divided into *n* channels.
- A circuit-switched network consists of a set of switches connected by physical links.
- A connection between two stations is a **dedicated path** made of one or more links.
- However, each connection uses only one *dedicated channel* on each link. Each link is normally divided into n channels.

Circuit Switching



Circuit Switching

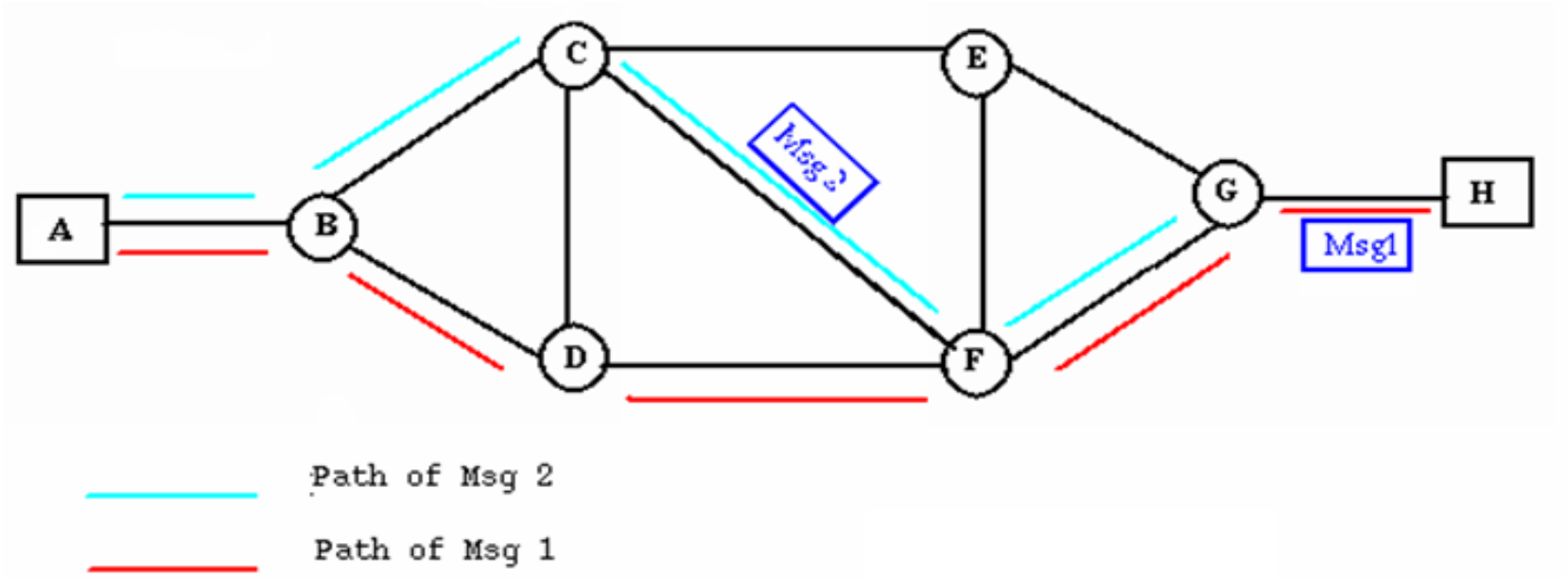
- ***Advantages:***
  - ✓ The communication channel (once established) is dedicated.

- ***Disadvantages:***
  - ✓ Possible long wait to establish a connection, (10 seconds, more on long- distance or international calls.) during which no data can be transmitted.
  - ✓ More expensive than any other switching techniques, because a dedicated path is required for each connection.
  - ✓ Inefficient use of the communication channel, because the channel is not used when the connected systems are not using it.

Message Switching

- With message switching there is ***no need to establish a* dedicated path** between two stations.
- When a station sends a message, the *destination address* is *appended to the message*.
- The message is then transmitted through the network, in its entirety, from node to node.
- Each node receives the entire message, stores it in its entirety on disk, and then transmits the message to the next node.
- This type of network is called a **store-and-forward** network.

Message Switching



- A message-switching node is typically a general-purpose computer. The device ***needs sufficient secondary-storage*** capacity to store the incoming messages, which could be long. A time ***delay is introduced*** using this type of scheme due to store- and-forward time, plus the time required to find the next node in the transmission path.

Message Switching

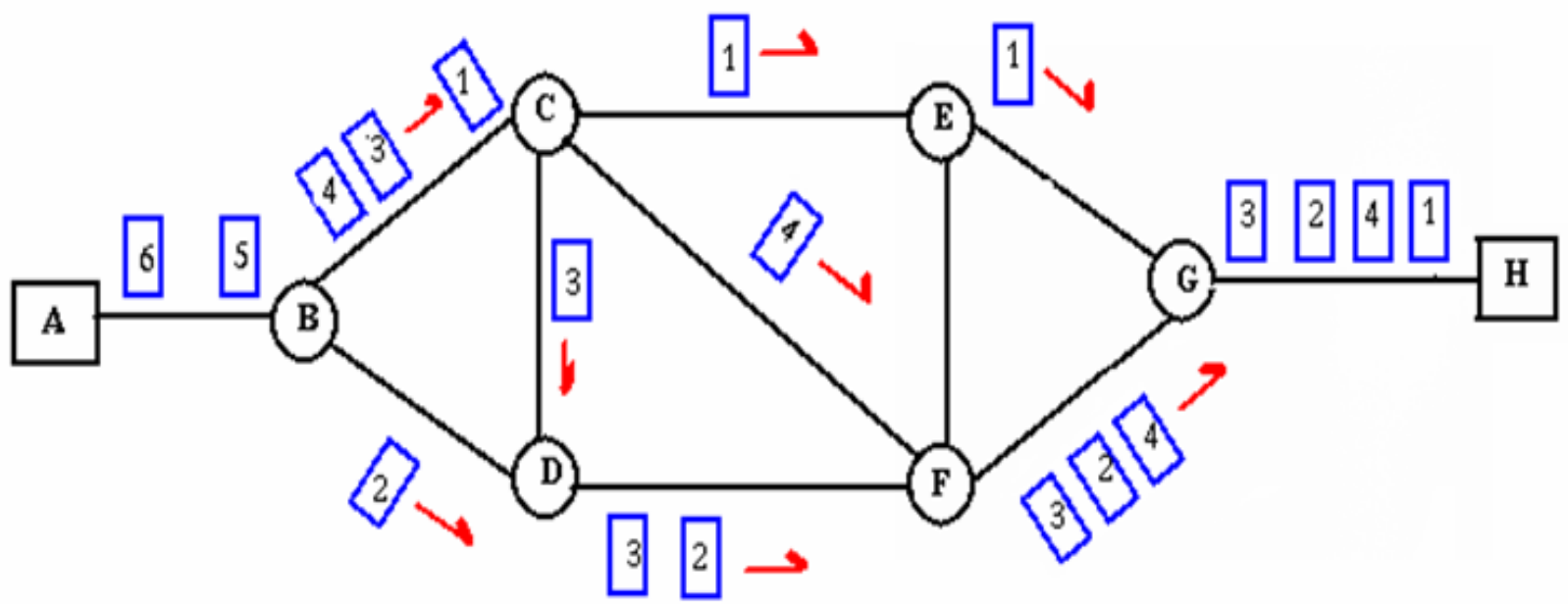
- ***Advantages:***
  - ✓ Channel efficiency can be greater compared to circuit- switched systems, because more devices are sharing the channel.
  - ✓ Traffic congestion can be reduced, because messages may be temporarily stored in route.
  - ✓ Message priorities can be established due to store-and-forward technique.
  - ✓ Message broadcasting can be achieved with the use of broadcast address appended in the message.

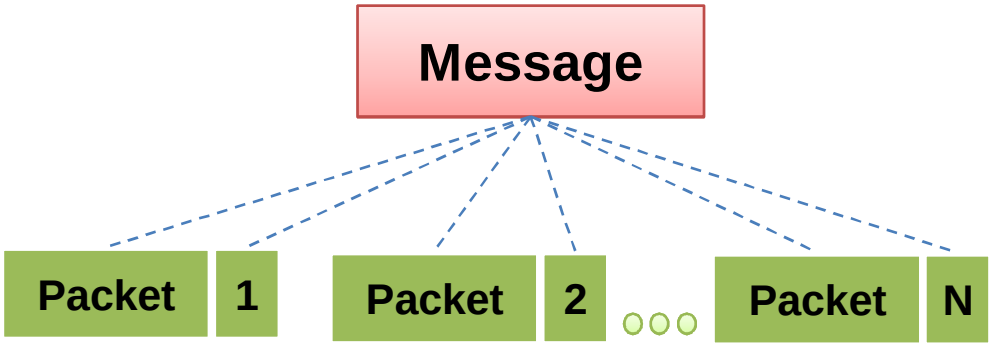
- ***Disadvantages:***
  - ✓ Message switching is not compatible with interactive applications.
  - ✓ Store-and-forward devices are expensive, because they must have large disks to hold potentially long messages.

Packet Switching

- The basic approach is not much different from message switching. It is also based on the same ***'store-and-forward'*** approach.
- Messages are divided into subsets of equal length called **Packets**.
- In packet switching approach, data are transmitted in ***short packets (few Kbytes)***. A long message is broken up into a *series of packets*.
- Each packet is tagged with appropriate source and destination addresses.(e.g. for ***reassembling***).

Packet Switching





Packet Switching

- ***Advantages:***
  - ✓ Packet switching is cost effective, because switching devices do not need massive amount of secondary storage.
  - ✓ Packet switching offers improved delay characteristics, because there are no long messages in the queue (maximum packet size is fixed).
  - ✓ Packet can be rerouted if there is any problem, such as, busy or disabled links.
  - ✓ The advantage of packet switching is that many network users can share the same channel at the same time.
  - ✓ Packet switching can maximize link efficiency by making optimal use of link bandwidth.

- ***Disadvantages:***
  - ✓ Protocols for packet switching are typically more complex. It can add some initial costs in implementation. If packet is lost, sender needs to retransmit the data.
  - ✓ Another disadvantage is that packet-switched systems still can't deliver the same quality as dedicated circuits in applications requiring very little delay - like voice conversations or moving images.

THANK YOU