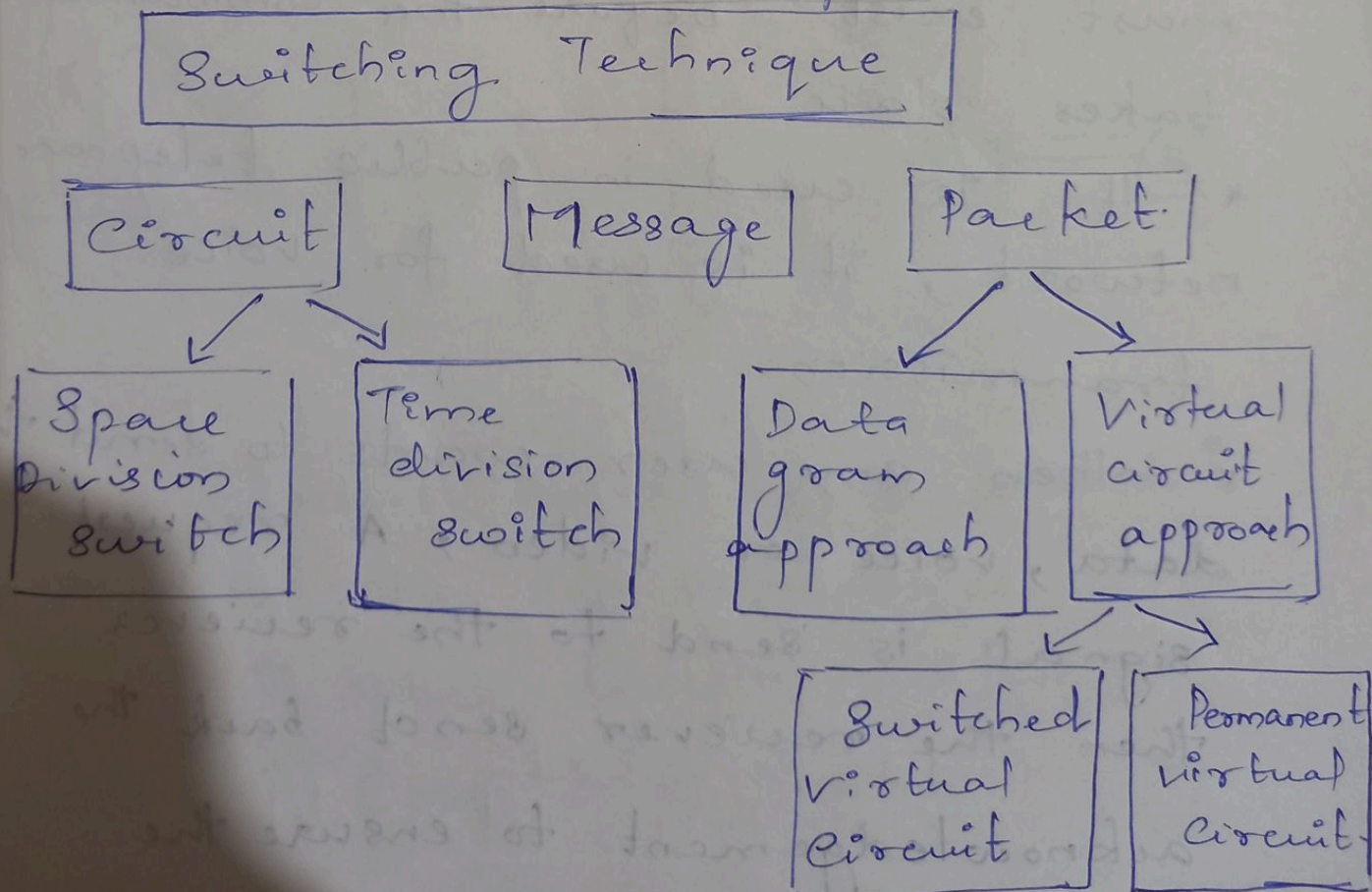


# Switching

In large networks, there can be multiple paths from sender to the receiver. The switching technique will decide the best route for data transmission.

Switching technique is used to connect the systems for making one to one communication.

## Classification of switching techniques



## i) Circuit switching

- \* It establishes a dedicated path between sender and receiver
- \* Once the connection is established, then the dedicated path will remain to exist until the connection is terminated.
- \* It operates similar way as a telephone works.
- \* A complete end to end path must exist before the communication takes place
- \* It is used in public telephone network, it is used for voice transmission
- \* When any user wants to send the data, voice or video; A request signal is send to the receiver then the receiver send back the acknowledgement to ensure the

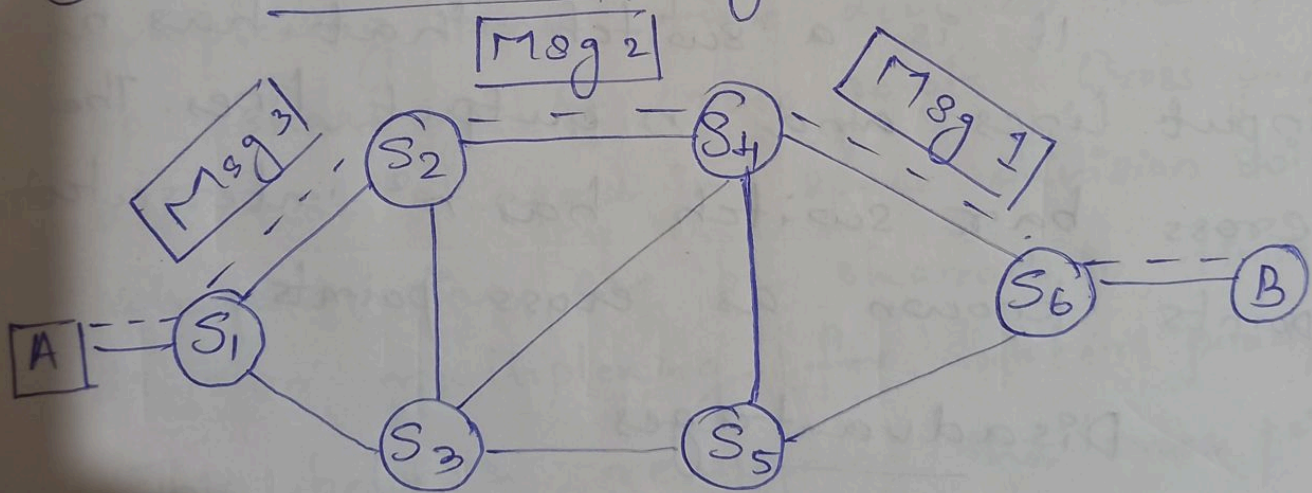


availability of the dedicated path. After receiving the acknowledgement dedicated path transfer the data.

Communication through circuit switching has 3 phases:

- a) Circuit establishment to data
- b) Data transfer
- c) Circuit disconnect.

### ① Circuit Switching



Circuit switching can be used in either of the two technologies.

- i) Space division switch
- ii) Cross Bar Switch



## i) Space division switch

- \* It is a circuit switching technology in which a single transmission path is accomplished in a switch by using a physically separate set of cross points
- \* It has high speed, high capacity and non blocking switches

## ii) Cross Bar switch

It is a switch that has  $n$  input lines and  $n$  output lines. The cross bar switch has  $n^2$  intersection points known as cross points.

### Disadvantages

The number of cross points increases as a no. of stations increase

∴ It is very expensive for a large switch

### Advantages of circuit switching



- The communication channel is dedicated
- It has fixed bandwidth

### iii) Time division switching

The incoming and outgoing signals when received are re-transmitted in a different time slot is called time division switching. Here the data is sent in time frames. The information is sliced into a sequence of time intervals or slots.

The main diff. b/w space division multiplexing and time division multiplexing is sharing of cross points. Cross points are not shared in space division switching whereas they can be shared in time division multiplexing for shorter periods.

This helps in reassigning the cross points and its associated circuitry for other connections as well.

### ② Message Switching (Stored & Forward n/w)

\* It is a switching technique in which a message is transferred as a



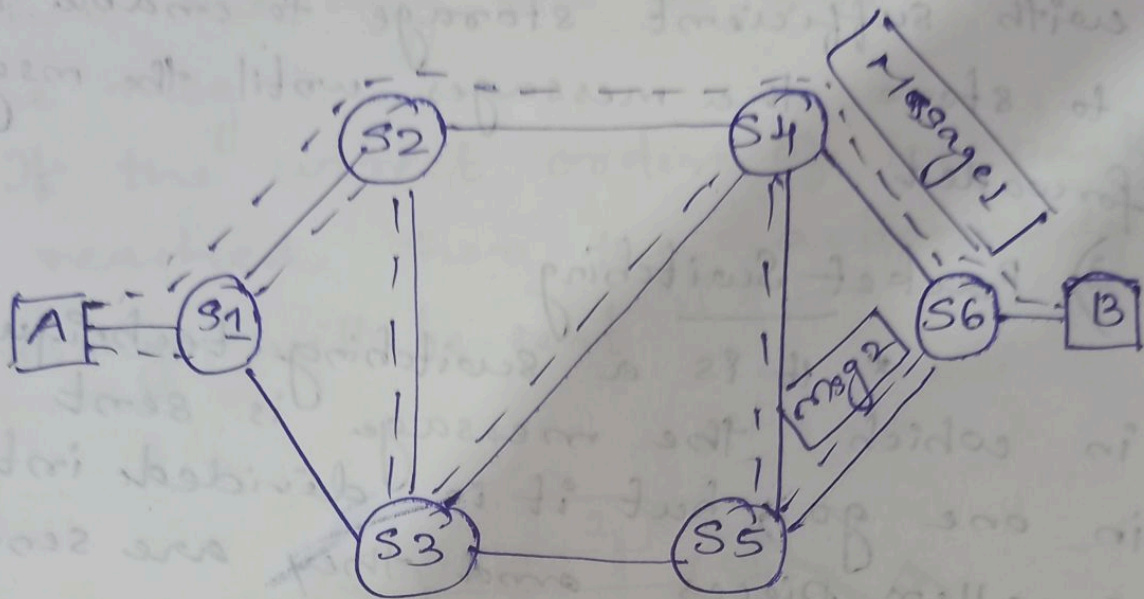
complete unit and routed through intermediate nodes at which it is stored and forwarded.

- \* Here, there is no establishment of a dedicated path b/w the sender and the receiver.

- \* Destination address is appended to the message. Message switching provides a dynamic routine as the message is routed through the intermediate nodes based on the information available in the message. It provides a dynamic routine as the message switches are programmed in such a way so that they can provide the most efficient route. Each node stores the entire message and then forwards it to the next node. This type of n/w is known as store and forward network.



message switching treats each message as an independent entity



### Advantages

- \* Data channels are shared among the communicating devices that improve the efficiency of using available bandwidth
- \* Graphic Traffic Congestion can be reduced bcoz the message is temporarily stored in the nodes
- \* Size of the message which is sent over the n/w can be varied  
 $\therefore$  It supports the data of unlimited size



## Disadvantages

- \* message switches must be equipped with sufficient storage to enable them to store the messages until the msg is forwarded.

## 3) Packet Switching

- \* it is a switching technique in which the message is sent in one go, but it is divided into smaller pieces and they are sent individually

- \* The message splits into smaller pieces known as packets and packets are given a unique no. to identify their order at the receiving end

- \* Every packet contains some information in its headers such as source address, destination address and sequence number
- \* Packets will travel across the n/w taking the shortest path as possible
- \* All the packets are reassembled

- at the receiving end at correct order
- \* If any packets is missing or corrupted, then the msg will be sent to resend the msg
- \* If the correct order of the packet is reached, then the acknowledgment message will be sent.

