Switching Techniques

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Switching

Transmission of data beyond a local area communication is achieved through network of intermediate nodes called switches.

The purpose of switches is to provide switching facilities that will move the data from node to node until they reach their destination.

Three types of switching techniques

1.Circuit Switching

2.Packet Switching

3.Message Switching

Circuit switched network consists of set of switches connected by physical links.

In circuit switching there will be a dedicated communication channel between two stations.

It contain three phases

Circuit Establishment

Data transfer

Circuit disconnect

Before any signals can be transmitted an end to end connection should be established.

Connection setup means creating dedicated channels between the switches.

Data transferred and after data transfer connection removed.

It is not efficient because resources are allocated during entire duration of the connection and these resources are unavailable to other connections.

There is a delay prior to signal transfer for call establishment.

Information is transmitted at a fixed data rate with no delay other than the propagation delay through the transmission links.

Measurements in switching techniques

Propagation time: time taken by the signal to propagate from one node to the next.

Transmission time: Time taken to send out a block of data

Node delay: Time taken by the node to perform processing as it switches data.

No loss of packets or out of order packets since it is a connection oriented network.

Forwarding of information is based on time or frequency slot so there is no need to examine the header.

Data is transmitted without delay.

This guarantees reliable connection in terms of constant data rate and availability of resources.

It is used for long distance and long duration calls.

-ves: More expensive

Dedicated channels require more bandwidth

Inefficient in terms of resource utilization.

It is designed for voice traffic not suited for data transmission.

Prior to actual data transfer time required to establish physical link between two stations is too long.

Packet switching

Here data are transmitted in short packets.

Data are transmitted in variable length blocks called packets.

Each packet contains not only data but control information.

Two types of packet switching one is datagram and other is virtual circuit.

In datagram each packet treated as individually.

All packets belongs to a single message follows various paths to destination.

Datagrams reach their destination out of order.

Virtual circuit Approach

Single route is chosen between sender and receiver at the beginning of a session.

All packets are travelled one after the other along the same route.

It can ben be implemented in two ways

Switched VC: virtual circuit is created whenever it is needed and exist only for the specific exchange. SVC users get different route every time they request a connection.

Permanent VC : The circuit is dedicated for specific users. No one else can use that circuit.

PVC always use the same route.

It can be used without connection establishment and connection termination.

Message switching

Store and forward approach

A node receives a message and stores it until the appropriate route is free and sends it.

There is no direct link between sender and receiver . A message is delivered to the node along one path then rerouted along another to its destination.