

# UNIT 1: COMMUNICATION NETWORK & SERVICES

## ① Comm<sup>n</sup> N/w :-

Set of equipment & facilities that provide a device; transfer of informat<sup>n</sup> between geographically separated user.

→ EG: Telephone, computer, internet, cellular, mobile, broadcasting.

Comm<sup>n</sup> n/w are like other utility systems such as electricity, water, transport & power.

## ② FUNCTIONS OF COMM<sup>n</sup> N/w :-

(a) CONNECTIVITY: Needs to provide conn b/w source & dest<sup>n</sup>.

Conn is provided through wire, cables, optical fibre

(b) SWITCHING: Transfer of info b/w transmission lines  
For  $n$  nodes, we need  $(n-1)$  lines -

Access trans lines & first level switch = access n/w

(c) MULTIPLEXER: Concentrat<sup>n</sup> of multiple flows/traffic into a trunk.

(d) ROUTING: Determines the path that informat<sup>n</sup> will flow from source to destination

(e) ADDRESSING: Used to identify user (source/dest<sup>n</sup>)

Identifier which n/w ip is connected to which o/p.

→ Types of Addressing:

Hierarchical: Uses geog. loc<sup>n</sup> info that helps routing.

Flat: Don't use loc<sup>n</sup> info: LAN  
used when no. of nodes are smaller.

(f) TRAFFIC CONTROL: TC is necessary to ensure smooth flow of info through n/w.  
TC is done by buffers.

Eg: In transport<sup>n</sup> we have stop signs, in comm<sup>n</sup> we have switches & buffers.

(g) CONGESTION & OVERLOAD CONTROL:-

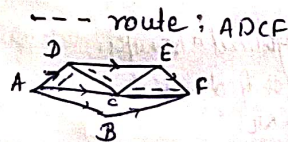
Congest<sup>n</sup> occurs as a result of traffic surge or equipment failure, n/w should apply QoS to ensure continued o/p in n/w

Info traffic must be rerouted or prevented from entering n/w

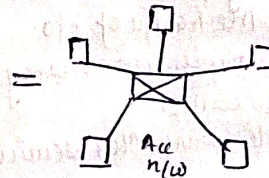
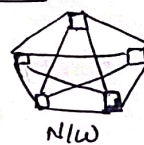
(h) NETWORK MGMT: It provides n/w maintain, By performance monitoring, fault detect<sup>n</sup> & recovery, Config n/w resource, billing, providing security, etc.

## CIRCUIT SWITCHING

- ① Dedicated bandwidth
- ② Call setup delay
- ③ Conn<sup>n</sup> oriented
- ④ Routing is done during call setup
- ⑤ nodes maintain table that shows how to route each conn<sup>n</sup>
- ⑥ Min Fixed transit-delay
- ⑦ Link fail is difficult to handle
- ⑧ No overhead
- ⑨ Suitable for streaming info: Voice
- ⑩ Blocking: new calls are blocked if b/w is occupied
- ⑪ NA
- ⑫ Informat<sup>n</sup> arrives at dest<sup>n</sup> in order.



Access n/w :-



## PACKET SWITCHING

- ① Fixed b/w
- ② No call setup
- ③ Connect<sup>n</sup> less
- ④ Done on packet by packet basis
- ⑤ Routing table should be maintained.
- ⑥ Random packet delay (variable)
- ⑦ Robust against failure
- ⑧ Packet header is overhead that reduces trans. efficiency
- ⑨ For bursty traffic: data
- ⑩ Nonblock: new ~~calls~~ calls are already admitted.
- ⑪ Add<sup>n</sup> process for packet route. Packet are routed hop by hop.
- ⑫ Packet may arrive out of sequence & require reassembly.

