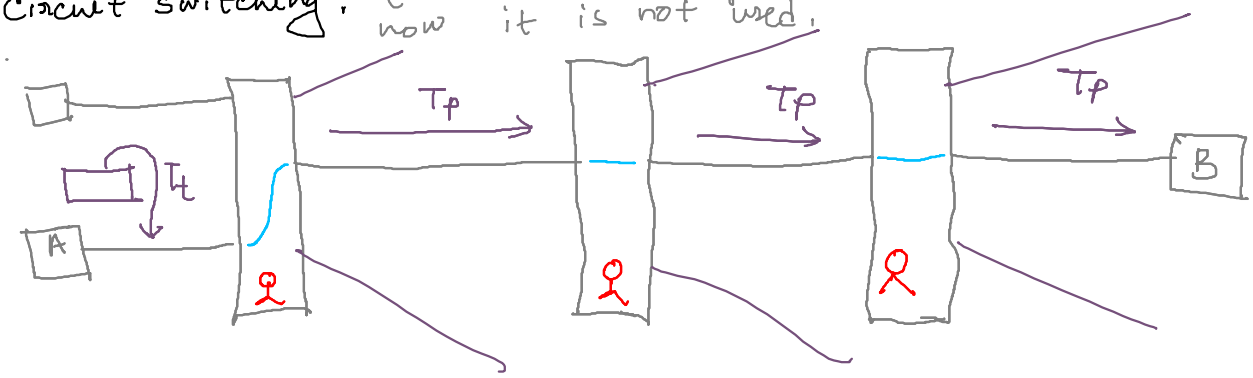
Circuit switching: the 1980's half-duplex telephones used this tech but now it is not used.



Legends

→ Telephone - exchange (Normally one in a town) all telephones in the town are connected to one telephone exchange

Telephone exchange of a town are connected to other telephone exchange of different towns with physical wires

→ Telephone exchange operator. he connects the links so that callers can connect to each other

→ physical link made by the operator to connect two callers.

Wierdest things about circuit switching:

1) It takes time for operator to connect two caller through physical links → so they usually get a number and when the number is reached operator connects them ie. A booked a call to B in morning and he got the number 100 so when the number is reached, it will be midnight.

2) the operator can listen to your call and cut your call if he find your call isn't important enough.

Delay in circuit-switching: Delay of A calling B

Setup time + transmisson Delay + Propagation Delay + Teardown

let's say mesege size M (data)

Bandwidth B

no. of hopes X

distance b/w hopes d

velocity V (velocity of sending data)

$$T_t \text{ (transmisson delay)} = \frac{M}{B}$$

$$T_p \text{ (Propagation delay)} = \frac{\text{total distance}}{\text{velocity}}$$

$$= \frac{\text{no. of hopes} * \text{distance}}{\text{velocity}}$$

$$= \frac{x * d}{V}$$

$$= \frac{xd}{V}$$

setup time is operator connecting the caller with physical links

tear down is operator disconnects the call.

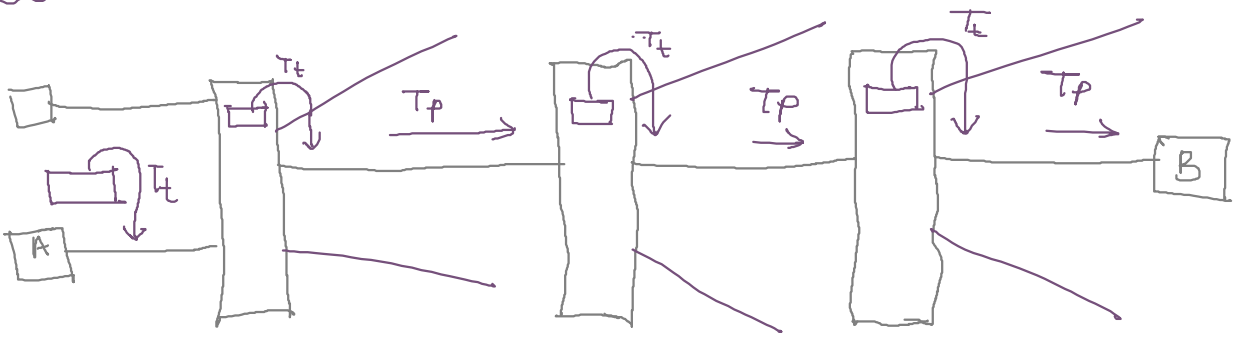
So **total delay = set up time + $\frac{M}{B}$ + $\frac{xd}{V}$ + tear down**

In circuit switching the way with which the data will be sent is set up before sending the data packet → so the way is fixed so no header in the data required to maintain the way → the way is maintained by the Operator.

In circuit switching 1st packet goes first 2nd packet goes 2nd & 3rd " " 3rd through the same way. So no reordering is required.

Circuit switching is the responsibility of of physical layer. It is currently obselete.

Packet Switching:



No operators i.e. data is stored in every hop and with the help of header & multiplexing we determine the path of the data and when we determined the path we transmit the stored data in the path from the hop.

so here we determine the path in every hop and we transmit the data in every hop.

so total transmisson delay (Tt) = no. of hopes × transmisson delay in one hop

$$= X * \frac{M}{B}$$

$$\text{Propogation delay } (Tp) = \frac{\text{Total distance}}{\text{velocity}}$$

$$= \frac{\text{no. of hopes} \times \text{distance b/w 2 hopes}}{\text{velocity}}$$

$$= \frac{X\ d}{V}$$

there is no setup time or tear down time b/c we don't have to setup the path with physical wire ; Here it is a automated process.

Total delay = $\frac{X\,M}{B} + \frac{X\,d}{v}$

CS	PS
Extra delay in setup time and teardown time So, when there is a huge data-packet we use CS b/c we don't have to go through multiple transmisson in different hops. But CS is obselete → yes but we can use the method of CS → we can just connect sender & reciever with physical wise just like CS ▷ Thus we get rid of hops and it become easier & faster to Send bursty data.	Extra delay in transmisson $(X-1)\frac{M}{B}$ So, if the message M is huge PS takes time if message is small PS takes less time SO PS is better for Small data-packets