What is Network Delay ?

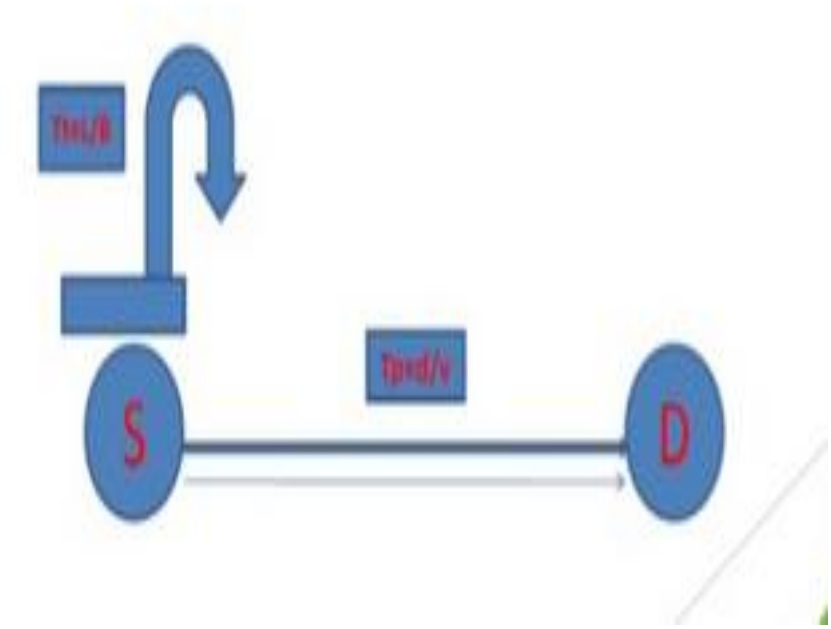
- How long a bit of data takes to travel from one node to another across the network.
- It is measured in multiple of fractions of seconds.

Type of Delay

- Transmission Delay
- Propagation delay
- Processing delay
- Queuing delay

Transmission Delay

- Time taken to transmit the packet onto the outgoing link.
- Denoted by Tt.



Transmission Delay

- Formula -

$$Tt=L/B$$

- L= Length of the packet
- B= Bandwidth of the outgoing link in bits/seconds.
- L is measured in power of 2 (2^5).
- B is measured in power of 10 (10^3).

Example

Q1. Length= 10 bits, Bandwidth= 1 bits/sec. Find Tt?

Solution: Tt=L/B

Tt=10/1 = 10 sec

Q. Length= 1 kb, Bandwidth= 1 kbps Find Tt?

Solution: L=1 kb = 2^10 = 1024 bits

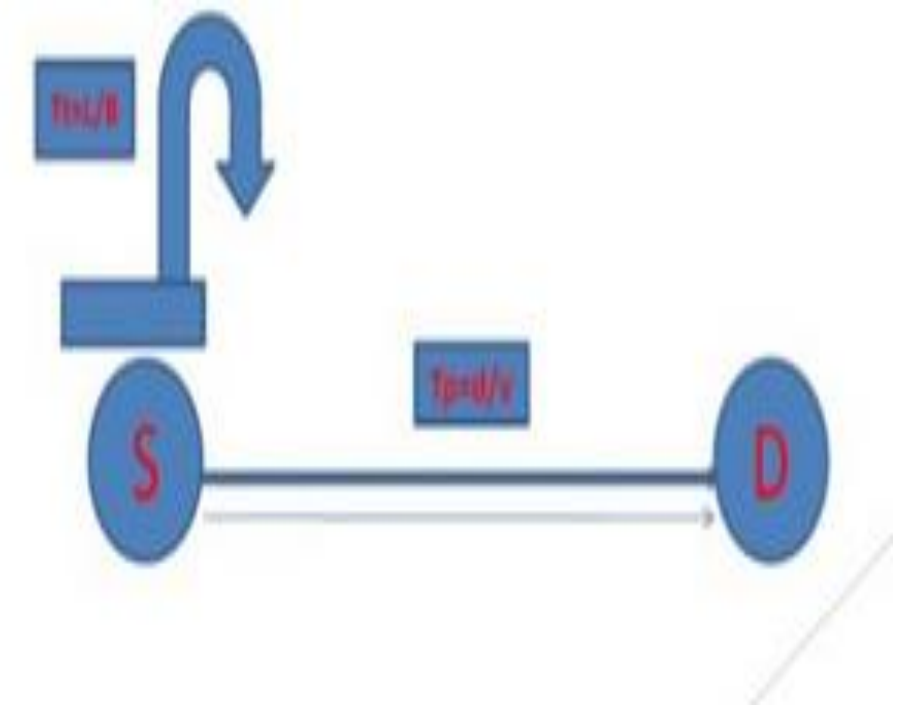
B= kbps = 10^3 = 1000 bps

Tt = 1024 bits/1000 bps

Tt = 1.024 sec

Propagation delay

- Time taken by one bit to move from one end of wire to another end of wire.
- It is denoted by Tp.



Propagation delay

- Formula

$$Tp=d/v$$

- d= Length of wire
- v= velocity of wire

Processing delay

- Time taken to process a packet by router.
- Processing of packet includes checking the destination IP address, finding the routing table, deciding the outgoing link.
- Factors that affect the processing delay:
    - i. speed of router
    - ii. size of routing table

Queuing delay

- Amount of time is spend by a packet in a queue before being taking up for processing.