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ALOHA

tags: Random access protocol, data flow, LAN, Data Link Layer of OSI model

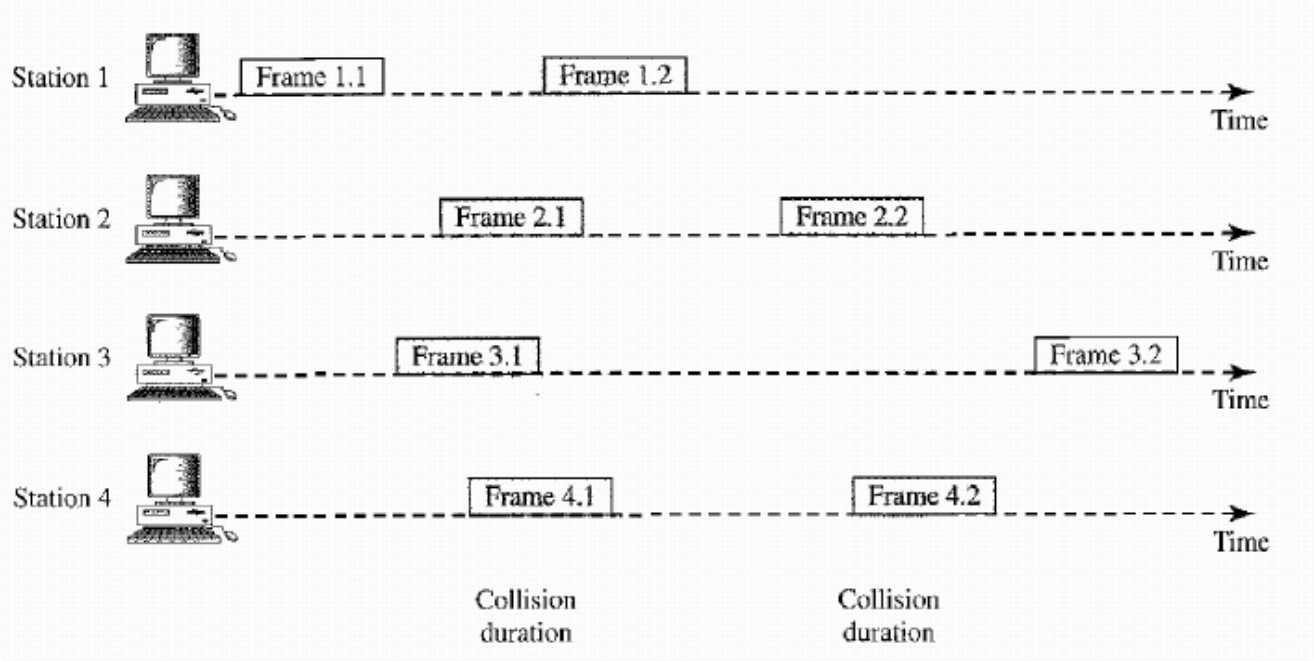
Doesn't know if the channel is busy or not.
Doesn't know if any station is sending a frame at this moment . Unlike CSMA

pure ALOHA

concept

So there are multiple stations connected with a single channel. Everyone sends frames through this one channel.

As everyone (every station) sends data frames randomly, *when ever it wants*, there is chance of collision. bellow is an example of collision.



In pure ALOHA , receiver sends and acknowledgement back to the sender.
If receiver do not get ack with in *time-out* limit, then sender will re-transmit the frame again after waiting a random amount of time . this random time is called *back-off time*

If this re-transmission attempt ,k crosses specific attempt limit ,k_{max} then the station aborts sending frames

for pure ALOHA

$$\text{vulnerable time} = 2 \times T_{frame}$$

that means, if a frame from station A takes T_{frame} time to propagate, and it starts transmitting frame in time t , then if any other stations send a frame T_{frame} time before t or T_{frame} time after t, then the A_{frame} from station A is in collision .

Thus 2 times the T_{frame} amount of time is vulnerable time.

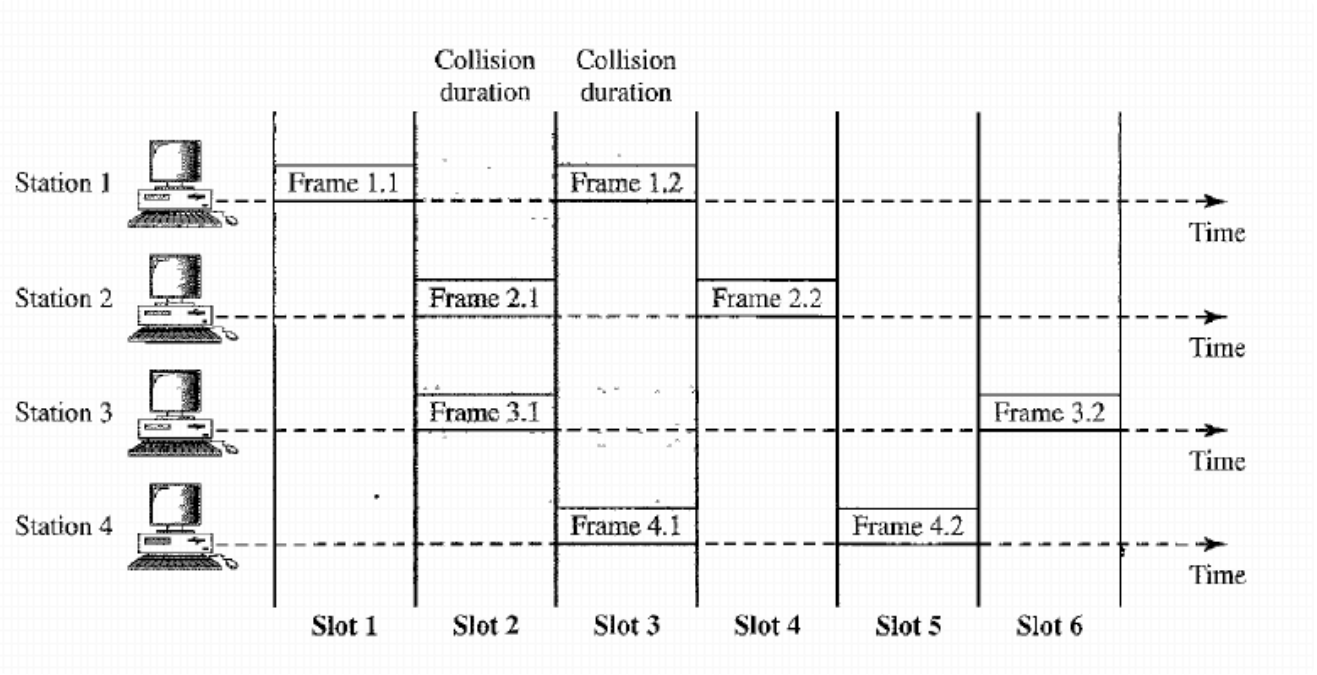
$$\text{throughput,} S = G \times e^{-2G}$$

where, G = average number of frames generated in T_{frame} time

Slotted ALOHA

concept

The time is divided into slots of T_{frame} size, a station can *only send data at the starting of a slot*



if a station will not send frame in a middle of a time slot instead wait for the next time slot to begin. Then only send in the beginning of time slot. Hence the vulnerable time gets reduced. As this is ensured that when a frame is actively propagating in a time slot, no other stations will transmit a frame .

$$\text{vulnerable time} = T_{frame}$$

and

$$\text{throughput}, S = G \times e^{-G}$$

max throughput when $G = 1$, $S_{max} = 0.368$

vulnerable time of ALOHA is related with frame generation time T_{frame}