

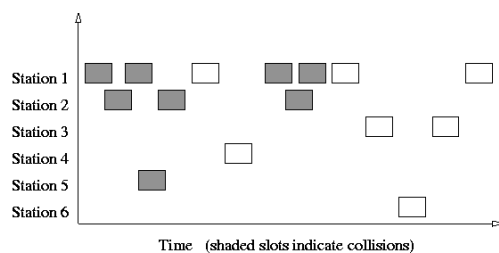
Communication Channels are of two types :

1. Point to Point
2. Multiple Access

Aloha, refers to a simple communications scheme in which node which wants to transmits, will go ahead and send the packet, without worrying that any other is transmitting or not

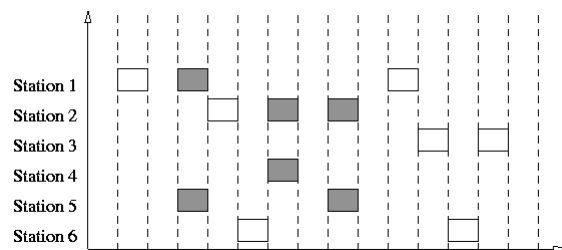
If the frame successfully reaches the destination (receiver), the next frame is sent. If the frame fails to be received at the destination, it is sent again after particular time ($\text{Time Out} = 2 \times \text{RTT}$).

When multiple sources and destinations are there which share a common data path , lot of collisions occurs and data gets lost



To reduce the collisions (i.e to reduce the data loss) Slotted Aloha is introduced .This is quite similar to Pure Aloha, differing only in the way transmissions take place. Instead of transmitting right at demand time, the sender waits for some time.

The timeline is divided into equal slots and then it is required that transmission should take place only at slot boundaries. Slotted-Aloha makes the following assumptions



- All frames are of same size .
- a slot equals the time to transmit one frame.
- Nodes start to transmit frames only at the beginnings of slots.
- The nodes are synchronized so that each node knows when the slots begin.

In both slotted and pure ALOHA, a node's decision to transmit is made independently of the activity of the other nodes

A Token Ring network is a local area network (LAN) in which all computers are connected in a **ring topology** and **token-passing scheme** is used

A Ethernet is a local area network (LAN) in which all computers are connected in a **Bus Topology** and **CSMA/CD** is used

A pure ALOHA network transmits 200-bit frames on a shared channel of 200 kbps. What is the throughput if the system (all stations together) produces

- a. 1000 frames per second b. 500 frames per second*
- c. 250 frames per second.*

Solution

The frame transmission time is 200/200 kbps or 1 ms.

- a. If the system creates 1000 frames per second, this is 1 frame per millisecond. The load is 1. In this case $S = G \times e^{-2G}$ or $S = 0.135$ (13.5 percent). This means that the throughput is $1000 \times 0.135 = 135$ frames. Only 135 frames out of 1000 will probably survive.*
- b. If the system creates 500 frames per second, this is (1/2) frame per millisecond. The load is (1/2). In this case $S = G \times e^{-2G}$ or $S = 0.184$ (18.4 percent). This means that the throughput is $500 \times 0.184 = 92$ and that only 92 frames out of 500 will probably survive. Note that this is the maximum throughput case, percentagewise.*
- c. If the system creates 250 frames per second, this is (1/4) frame per millisecond. The load is (1/4). In this case $S = G \times e^{-2G}$ or $S = 0.152$ (15.2 percent). This means that the throughput is $250 \times 0.152 = 38$. Only 38 frames out of 250 will probably survive.*

A slotted ALOHA network transmits 200-bit frames on a shared channel of 200 kbps. What is the throughput if the system (all stations together) produces

- a. 1000 frames per second b. 500 frames per second*
- c. 250 frames per second.*

Solution

The frame transmission time is 200/200 kbps or 1 ms.

- a. If the system creates 1000 frames per second, this is 1 frame per millisecond. The load is 1. In this case $S = G \times e^{-G}$ or $S = 0.368$ (36.8 percent). This means that the throughput is $1000 \times 0.0368 = 368$ frames. Only 386 frames out of 1000 will probably survive.*
- b. If the system creates 500 frames per second, this is (1/2) frame per millisecond. The load is (1/2). In this case $S = G \times e^{-G}$ or $S = 0.303$ (30.3 percent). This means that the throughput is $500 \times 0.0303 = 151$. Only 151 frames out of 500 will probably survive.*
- c. If the system creates 250 frames per second, this is (1/4) frame per millisecond. The load is (1/4). In this case $S = G \times e^{-G}$ or $S = 0.195$ (19.5 percent). This means that the throughput is $250 \times 0.195 = 49$. Only 49 frames out of 250 will probably survive.*