Carrier Sense Multiple Access (CSMA)

Unlike Aloha, in CSMA, the station listens to the medium before it starts for transmitting.

In CSMA,

Vulnerable Time = T_p

Where T_p is the propagation delay for a frame to reach the end of the medium.

1 persistent Method:

Stations sense the medium every instant.

If medium is found to be idle, stations transmit.

Highest collision chance.

Non-persistent method

Stations do not check the medium at every instant.

If medium is found idle, immediate transmission.

If medium is found busy, stations wait random amount of time before sensing again.

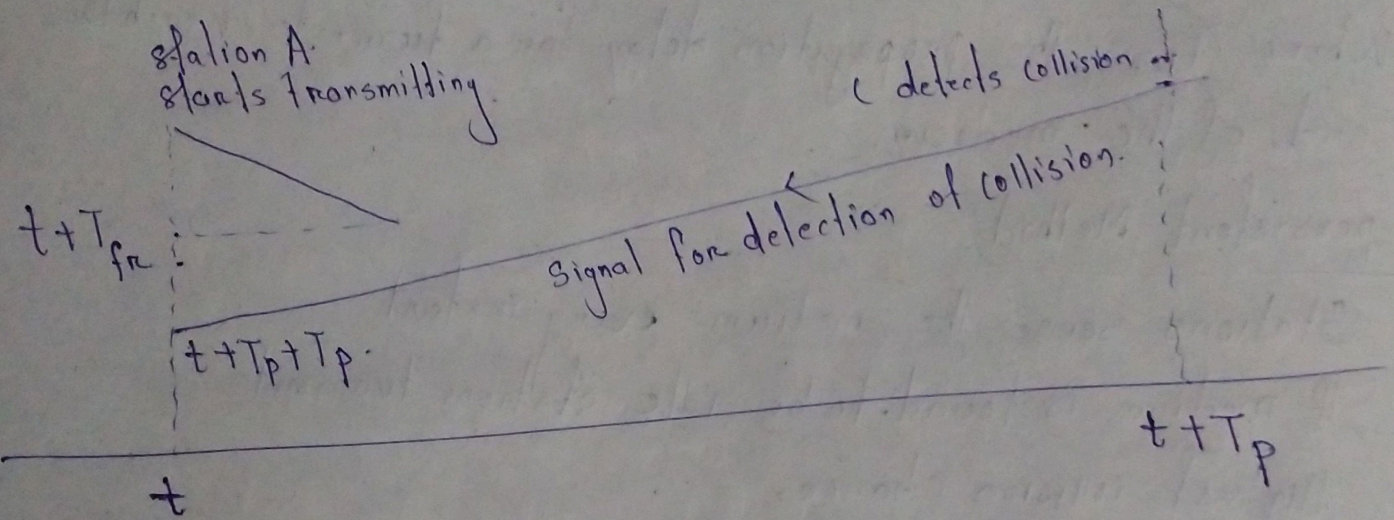Reduces the chance of collision, but efficiency is diminished.

P-Persistent:

In this scheme, even if the line is free, transmission happens with only prob P & with $1-P$, prob, station waits for the next slot. If medium is found busy, back-off procedure is employed.

CSMA/CD (Collision Detection)

Here once a station senses collision it aborts transmission

CSMA/CD imposes a limit on a minimum size of a frame. The frame size should be such that, before the frame is transmitted, collision should be detected.

station A
starts transmitting

station C
C detects collision

$t + T_{fr}$

Signal for detection of collision.

$t + T_p + T_p$

t

$t + T_p$

$$t + T_{fr} > t + 2T_p$$
$$\Rightarrow T_{fr} > 2T_p$$