Course Name: A Level (2nd Sem) Subject: DCN

Topic: Random Access Protocols contd. [CSMA] Date: 29-04-20

Carrier Sense Multiple Access (CSMA):

- To minimize the chance of collision and, therefore, increase the performance, the CSMA method was developed.
- The chance of collision can be reduced if a station senses the medium before trying to use it.
- Carrier sense multiple access (CSMA) requires that each station first listen to the medium (or check the state of the medium) before sending.
- In other words, CSMA is based on the principle "sense before transmit" or "listen before talk." CSMA can reduce the possibility of collision, but it cannot eliminate it.

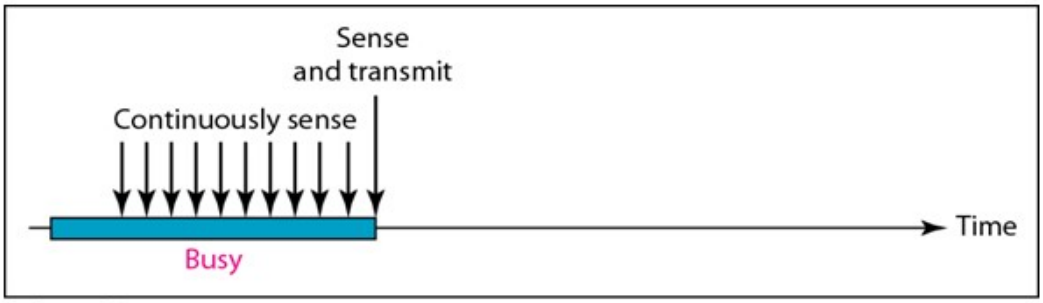
Persistence Methods:

The persistence methods have been devised to decide what a station should do if the channel is busy or idle.

There are **three** persistence methods:

a) 1-persistent method,
b) Non-persistent method, and
c) P-persistent method.

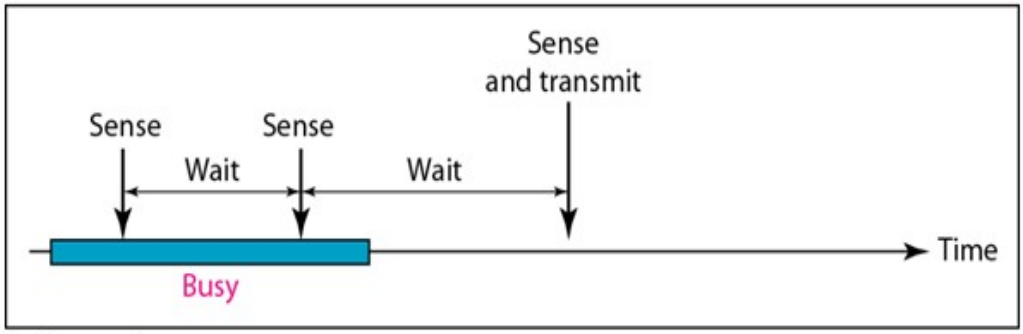
a) 1-Persistent: The **1-persistent method** is simple and straightforward. In this method, after the station finds the line idle, it sends its frame immediately (with probability 1). This method has the highest chance of collision because two or more stations may find the line idle and send their frames immediately. Ethernet uses this method.



a. 1-persistent

b) Non-persistent: In the **non-persistent method,** a station that has a frame to send senses the line. If the line is idle, it sends immediately. If the line is not idle, it waits a

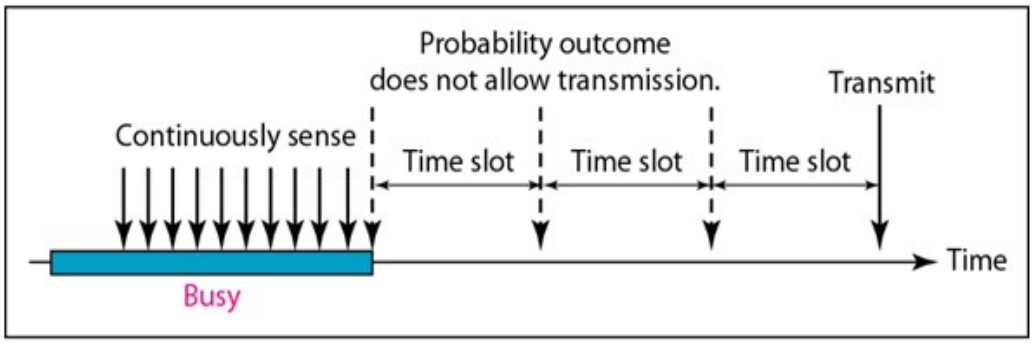
random amount of time and then senses the line again. The non-persistent approach reduces the chance of collision because it is unlikely that two or more stations will wait the same amount of time and retry to send simultaneously. However, this method reduces the efficiency of the network because the medium remains idle when there may be stations with frames to send.



b. Nonpersistent

c) **P-Persistent:** The **p-persistent method** is used if the channel has time slots with slot duration equal to or greater than the maximum propagation time. The p-persistent approach combines the advantages of the other two strategies. It reduces the chance of collision and improves efficiency. In this method, after the station finds the line idle it follows these steps:

1. With probability *p,* the station sends its frame.
2. With probability *q* = 1 - *p,* the station waits for the beginning of the next time slot and checks the line again.
    - **i.** If the line is idle, it goes to step 1.
    - **ii.** If the line is busy, it acts as though a collision has occurred and uses the backoff procedure.



c. p-persistent

Exercises:

1. **What do you understand by CSMA technique? How does it reduce the possibility of collision?**
2. **Define persistence methods in CSMA. Compare 1-persistent and non-persistent method.**