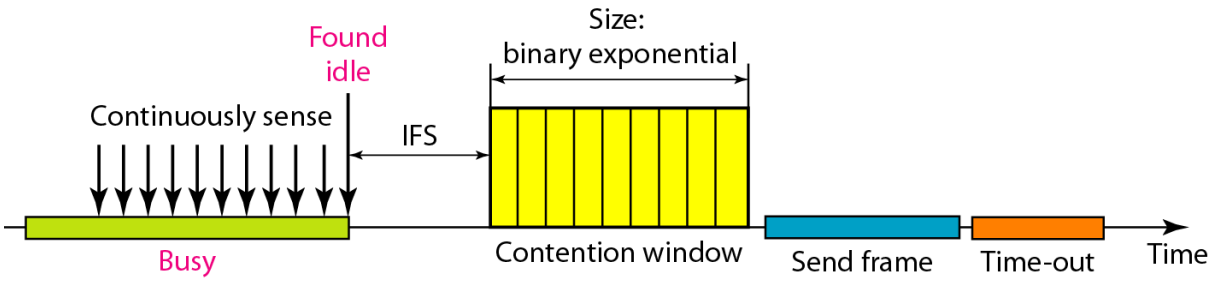
Course Name: A Level (2nd Sem) Subject: DCN

Topic: Random Access Protocols contd. [CSMA/CA] Date: 12-05-20

Carrier Sense Multiple Access with Collision Avoidance (CSMA/CA):

CSMAICA was mostly intended for use in wireless networks.We need to avoid collisions on wireless networks because they cannot be detected. Carrier sense multiple access with collision avoidance (CSMAlCA) was invented for this network. Collisions are avoided through the use of CSMAICA's three strategies: the **interframe space**, the **contention window**, and **acknowledgments**, as shown in Figure.



Interframe Space (IFS):

First, collisions are avoided by deferring transmission even if the channel is found idle. When an idle channel is found, the station does not send immediately. It waits for a period of time called the interframe space or IFS. Even though the channel may appear idle when it is sensed, a distant station may have already started transmitting. The distant station's signal has not yet reached this station. The IFS time allows the front of the transmitted signal by the distant station to reach this station. If after the IFS time the channel is still idle, the station can send, but it still needs to wait a time equal to the contention time. The IFS variable can also be used to prioritize stations or frame types. For example, a station that is assigned shorter IFS has a higher priority.

Contention Window:

The contention window is an amount of time divided into slots. A station that is ready to send chooses a random number of slots as its wait time. The number of slots in the window changes according to the binary exponential back-off strategy. This means that it is set to one slot the first time and then doubles each time the station cannot detect an idle channel after the IFS time. The station needs to sense the channel after each time slot. However, if the station finds the channel busy, it does not restart the process; it just stops the timer and restarts it when the channel is sensed as idle. This gives priority to the station with the longest waiting time.

Acknowledgment:

With all these precautions, there still may be a collision resulting in destroyed data. In addition, the data may be corrupted during the transmission. The positive acknowledgment and the time-out timer can help guarantee that the receiver has received the frame.

Exercises:

- **What do you understand by CSMA/CA technique? How does it avoid collision in the network?**