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

Topic: Controlled Access Protocols Date: 13-05-20

Controlled Access:

In controlled access, the stations consult one another to find which station has the right to send. A station cannot send unless it has been authorized by other stations.

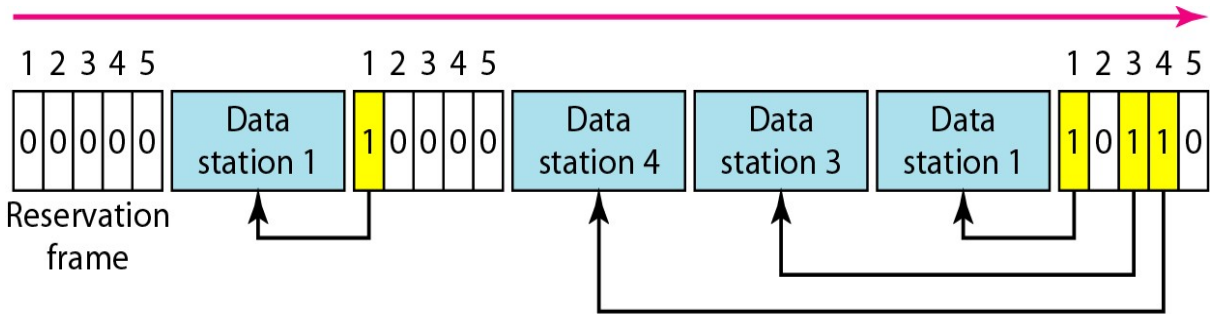
Types of Controlled Access Techniques:

The three popular controlled-access methods are:

1. **Reservation**
2. **Polling**
3. **Token Passing**

1. Reservation:

- In the reservation method, a station needs to make a reservation before sending data.
- Time is divided into intervals. In each interval, a reservation frame precedes the data frames sent in that interval.
- If there are N stations in the system, there are exactly N reservation mini slots in the reservation frame. Each mini slot belongs to a station. When a station needs to send a data frame, it makes a reservation in its own mini slot. The stations that have made reservations can send their data frames after the reservation frame.
- Figure shows a situation with five stations and a five-mini slot reservation frame. In the first interval, only stations 1, 3, and 4 have made reservations. In the second interval, only station 1 has made a reservation.



2. Polling:

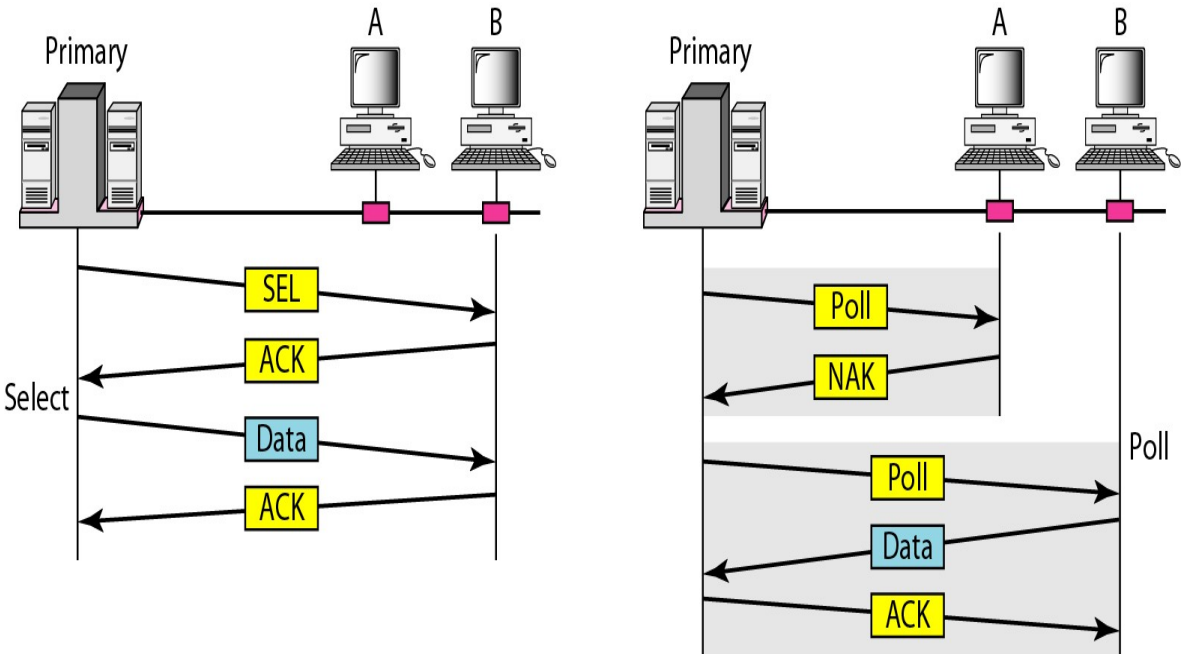
- Polling works with topologies in which one device is served as a primary station and the other devices are secondary stations. All data exchanges must be made through the primary device even when the destination is a secondary device.
- The primary device controls the link; the secondary devices follow its instructions. It is up to the primary device to determine which device is allowed to use the channel at a given time. The primary device, therefore, is always the initiator of a session.
- The primary device sends and receives data by using **Select** and **Poll** function.

Select:

- The select function is used whenever the primary device has something to send.
- Before sending data, the primary creates and transmits a one field which is select (SEL) frame that includes the address of the intended secondary that alerts the secondary to the upcoming transmission and wait for an acknowledgment of the secondary's ready status.

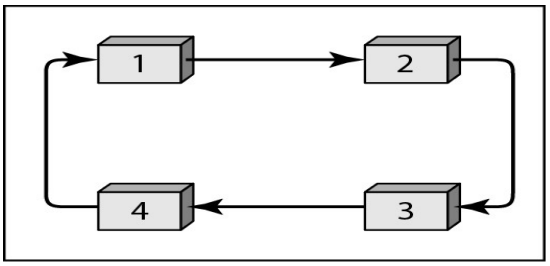
Poll:

- The select function is used whenever the primary device has something to receive.
- When the primary is ready to receive data, it must ask (poll) each device if it has anything to send. When the first secondary is approached, it responds either with a NAK frame if it has nothing to send or with data frame if it does. When the response is a data frame, the primary reads the frame and returns an acknowledgment (ACK frame), verifying its receipt.

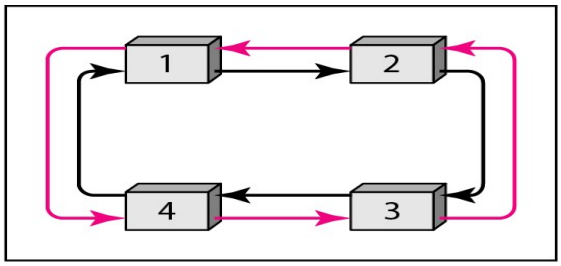


3. Token Passing:

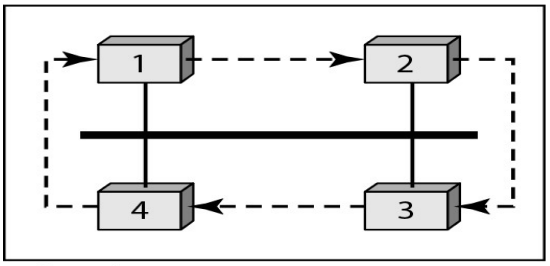
- In the token-passing method, the stations in a network are organized in a logical ring. In other words, for each station, there is a predecessor and a successor.
- In this method, a special packet called a token circulates through the ring. The possession of the token gives the station the right to access the channel and send its data.
- When a station has some data to send, it waits until it receives the token from its predecessor. It then holds the token and sends its data.
- When the station has no more data to send, it releases the token, passing it to the next logical station in the ring. The station cannot send data until it receives the token again in the next round. In this process, when a station receives the token and has no data to send, it just passes the data to the next station (successor).
- The high-speed Token Ring networks called FDDI (Fiber Distributed Data Interface) and CDDI (Copper Distributed Data Interface) use this topology. The Token Bus (also called bus ring topology) LAN, standardized by IEEE and Token Ring LAN designed by IBM, also uses this topology



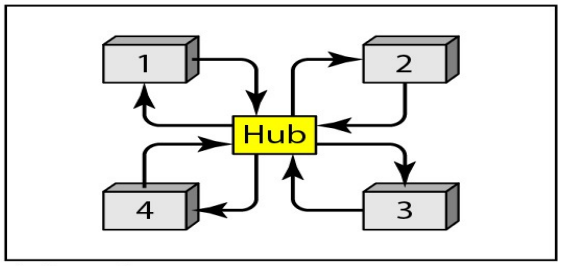
a. Physical ring



b. Dual ring



c. Bus ring



d. Star ring

Exercises:

1. **Define controlled access and list three protocols in this category.**
2. **Compare and contrast a random access protocol with a controlled access protocol.**
3. **What is the role of 'select' and 'poll' function in polling technique?**