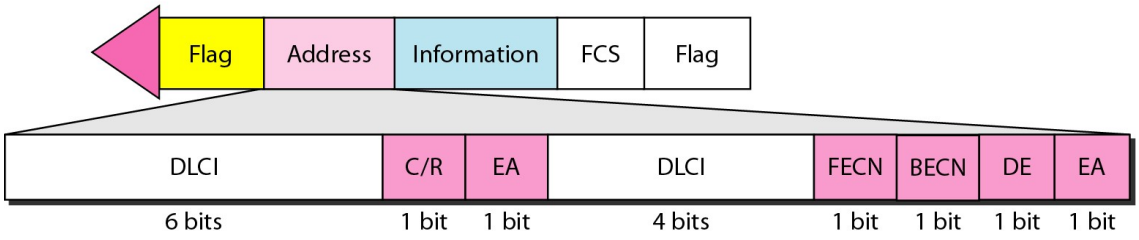
Course Name: A Level (2nd Sem) Subject: DCN

Topic: Frame Relay contd.. Date: 12-06-20

## Frame Format:

C/R: Command/response
EA: Extended address
FECN: Forward explicit congestion notification
BECN: Backward explicit congestion notification
DE: Discard eligibility
DLCI: Data link connection identifier

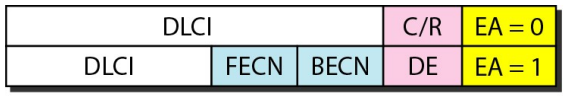



The descriptions of the fields are as follows:

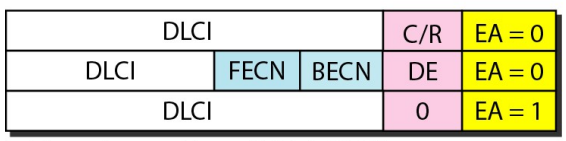
- **Address (DLCI) field**: The first 6 bits of the first byte makes up the first part of the DLCI. The second part of the DLCI uses the first 4 bits of the second byte. These bits are part of the IO-bit data link connection identifier defined by the standard.

- **Command/response (CIR)**: The command/response (C/R) bit is provided to allow upper layers to identify a frame as either a command or a response. It is not used by the Frame Relay protocol.

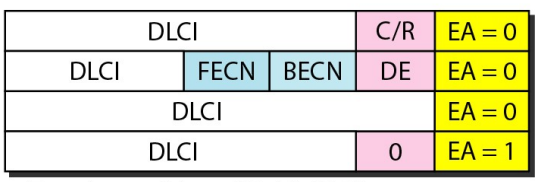
- **Extended address (EA)**: The extended address (EA) bit indicates whether the current byte is the final byte of the address. An EA of 0 means that another address byte is to follow (extended addressing is discussed later). An EA of 1 means that the current byte is the final one.
  To increase the range of DLCIs, the Frame Relay address has been extended from the original 2-byte address to 3- or 4-byte addresses. Figure shows the different addresses. The EA field defines the number of bytes; it is 1 in the last byte of the address, and it is ain the other bytes. In the 3- and 4-byte formats, the bit before the last bit is set to 0.




a. Two-byte address (10-bit DLCI)




b. Three-byte address (16-bit DLCI)




c. Four-byte address (23-bit DLCI)

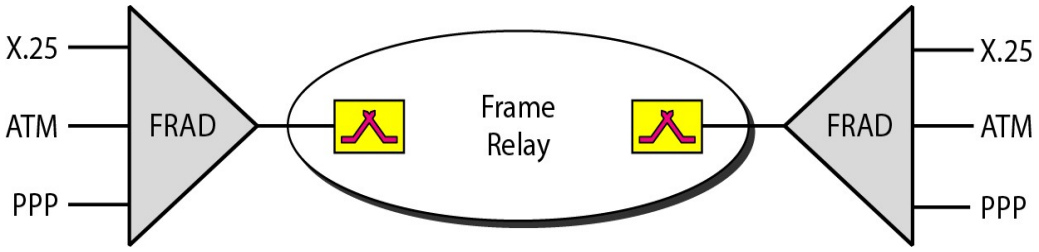
- **Forward explicit congestion notification (FECN)**: The forward explicit congestion notification (FECN) bit can be set by any switch to indicate that traffic is congested. This bit informs the destination that congestion has occurred. In this way, the destination knows that it should expect delay or a loss of packets.

- **Backward explicit congestion notification (BECN)**: The backward explicit congestion notification (BECN) bit is set (in frames that travel in the other direction) to indicate a congestion problem in the network. This bit informs the sender that congestion has occurred. In this way, the source knows it needs to slow down to prevent the loss of packets.

- **Discard eligibility (DE):** The discard eligibility (DE) bit indicates the priority level of the frame. In emergency situations, switches may have to discard frames to avoid congestion due to overload. When set (DE 1), this bit tells the network to discard this frame if there is congestion. This bit can be set either by the sender of the frames (user) or by any switch in the network.

## FRAD:

- To handle frames arriving from other protocols, Frame Relay uses a device called a **Frame Relay Assembler/Disassembler (FRAD)**. A FRAD assembles and disassembles frames coming from other protocols to allow them to be carried by Frame Relay frames. A FRAD can be implemented as a separate device or as part of a switch.




## VOFR

- Frame Relay networks offer an option called **Voice Over Frame Relay (VOFR)** that sends voice through the network. Voice is digitized using PCM and then compressed. The result is sent as data frames over the network.
- This feature allows the inexpensive sending of voice over long distances. However, the quality of voice is not as good as voice over a circuit-switched network such as the telephone network. Also, the varying delay mentioned earlier sometimes corrupts real-time voice.

## LMI:

- (Frame Relay was originally designed to provide PVC connections. There was not a provision for controlling or managing interfaces.) **Local Management Information (LMI)** is a protocol added recently to the Frame Relay protocol to provide more management features. In particular, LMI can provide:

  - A keep-alive mechanism to check if data are flowing.
  - A multicast mechanism to allow a local end system to send frames to more than one remote end system.
  - A mechanism to allow an end system to check the status of a switch (e.g., to see if the switch is congested).

## Exercises:

A. **There are no sequence numbers in Frame Relay. Why?**

B. **Can two devices connected to the same Frame Relay network use the same DLCIs?**

C. **Describe the role of Extended Address (EA) field in Frame Relay?**

D. **What is VOFR?**