

Course Name: A Level (2nd Sem)

Subject: DCN

Topic: Data Link Layer:
Concept of Framing

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Specific responsibilities of the data link layer include **framing**, addressing, flow control, error control, and media access control. The data link layer divides the stream of bits received from the network layer into manageable data units called **frames**. The data link layer adds a header to the frame to define the addresses of the sender and receiver of the frame.

Data Link Control:

- The two main functions of the data link layer are data link control and media access control.
- The first, data link control, deals with the design and procedures for communication between two adjacent nodes: node-to-node communication.
- The second function of the data link layer is media access control, or how to share the link.
- **Data link control** functions include framing, flow and error control, and software implemented protocols that provide smooth and reliable transmission of frames between nodes.

Framing:

- Frames are nothing but manageable group of bits to be transmitted.
- Bits are packed into frames, so that each frame is distinguishable from another.
- Framing in the data link layer separates a message from one source to a destination, or from other messages to other destinations, by adding a sender address and a destination address. The destination address defines where the packet is to go; the sender address helps the recipient acknowledge the receipt.

Types of Framing:

1. Fixed-Size Framing:

Frames can be of fixed or variable size. In fixed-size framing, there is no need for defining the boundaries of the frames; the size itself can be used as a delimiter. An example of this type of framing is the ATM wide-area network, which uses frames of fixed size called cells.

2. Variable-Size Framing:

Variable-size framing, prevalent in local area networks in which we need a way to define the end of the frame and the beginning of the next. Two approaches are used for this purpose:

- a) **Character-oriented approach:** In a character-oriented protocol, data to be carried are 8-bit characters from a coding system such as ASCII. To separate one frame from the next, an 8-bit (1-byte) flag is added at the beginning and the end of a frame. (Suitable for text data only.)
- b) **Bit-oriented approach:** In bit-oriented protocol, data to be carried are 8-bit characters. To separate one frame from the next, only one bit is added (if a 0 and five consecutive 1 bits are encountered, an extra 0 is added) at the beginning and the end of a frame. (Suitable for multimedia data including text.)

Exercises:

- A. What are the functions provide by data link control? Define framing and the reason for its need.
- B. What are the types of framing? Define them.