

Name: Suman Devkota

Sem: VI

Roll.no: 26

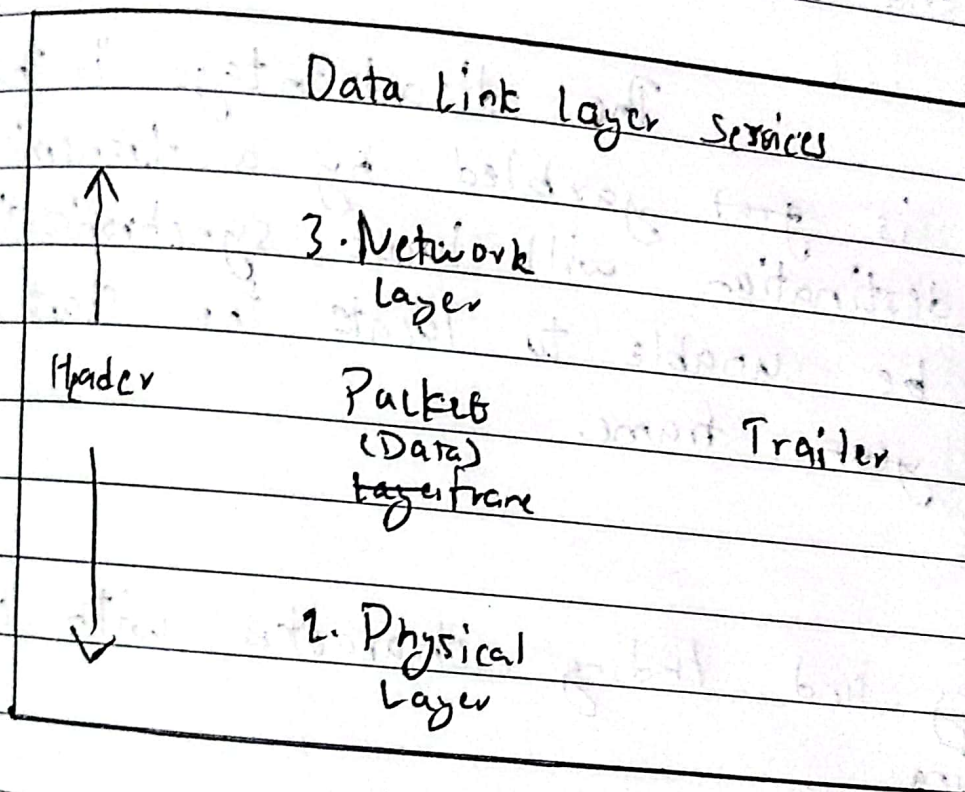
Subject: DC and CN

Describe in detail about framing and the different techniques of framing.

⇒ Framing in the data link layer refers to the process of adding a header and a trailer to a data packet in order to provide a means of identification and separation between packets. The header typically includes information such as the source and destination addresses, while the trailer contains error checking information to ensure the packet is received correctly.

In a data communication, the framing process is important in order to perfectly transmit and receive data packets over a network. It ensures that packets can be identified and correctly reassembled at the receiving end, while also helping to prevent errors and avoid collisions between packets.

There are different framing techniques used in the data link layer, including character-oriented and bit-oriented framing. Character-oriented framing involves identifying the beginning and end of a packet using special characters, while bit-oriented framing involves using a specific bit pattern to mark the beginning and end of packet.



Framing Methods / Techniques

1) Character Count:

This method uses a field in the header to specify the number of characters in the frame. When the data link layer at the destination sees the character count, it knows how many characters follow, and hence where the end of the frame is...

The disadvantage is that if the count is ~~great~~ garbled by a transmission error the destination will lose synchronization and will be unable to locate the start of the next ~~year~~ frame.

2) Starting and ending characters with character stuffing.

a) DLE STX A DLE B DLE ETX

b) DLE STX A DLE DLE B DLE ETX
 ↑
 stuffed DLE

c) DLE STX A DLE B DLE ETB

In this method, each frame starts with the ASCII character sequence DLE STX and ends with the sequence DLE ETX.

This method overcomes the drawbacks of the character count method. If the destination ever loses synchronization, it only has to look for DLE, STX and DLE ETX characters. If however binary data is being transmitted then there exists a possibility of the characters DLE, STX and DLE ETX appearing in the data.

Since this can interface with the framing, a technique called character stuffing is used. The sender's data link inserts an ASCII DLE character just before the DLE character in the data. The receiver's data link layer removes this DLE before this data is given to the network layer.

3) Starting and Ending Flags, with Bit stuffing
The third method allows data frames to contain an arbitrary number of bits and allows character codes with an arbitrary number of bits per character. At the start and end of each frame is a flag byte consisting of the special bit pattern 01111110.

Whenever the sender's data link layer encounters five consecutive 1s in the data, it automatically stuffs a zero bit into the outgoing bitstream. This technique is called bit stuffing.

4) Physical layer encoding violations:

The final framing method is physical layer encoding violations and is applied to networks in which the encoding on the physical medium contains some redundancy. In such cases normally a 1 bit is a high-pair. In such cases normally a 1 bit is a high-pair. The combinations of low-low and high-high which are used for data may be used for making frame boundaries.