

Chapter 2

Q.3 What difference does it make to the network layer if the underlying data link layer provides a connection-oriented service versus a connectionless service?

Solution:

If the data link layer provides a connection-oriented service to the network layer, then the network layer must precede all transfer of information with a connection setup procedure. If the connection-oriented service includes assurances that frames of information are transferred correctly and in sequence by the data link layer, the network layer can then assume that the packets it sends to its neighbour traverse an error-free pipe.

On the other hand, if the data link layer is connectionless, then each frame is sent independently through the data link, probably in unconfirmed manner (without acknowledgments or retransmissions). In this case the network layer cannot make assumptions about the sequencing or correctness of the packets it exchanges with its neighbours.

The Ethernet local area network provides an example of connectionless transfer of data link frames. The transfer of frames using "Type 2" service in Logical Link Control (discussed in Chapter 6) provides a connection-oriented data link control example.

Q.4 Suppose transmission channels become virtually error-free. Is the data link layer still needed?

Solution:

The data link layer is still needed for framing the data and for flow control over the transmission channel. In a multiple access medium such as a LAN, the data link layer is required to coordinate access to the shared medium among the multiple users.

Q.6 Which OSI layer is responsible for the following?

(a) Determining the best path to route packets.

The network layer is concerned with the selection of paths across the network.

(b) Providing end-to-end communications with reliable service.

The transport layer is concerned with providing reliable service on an end-to-end basis across the network.

(c) Providing node-to-node communications with reliable service.

The data link layer provides for the reliable transfer of information between adjacent nodes in a network.