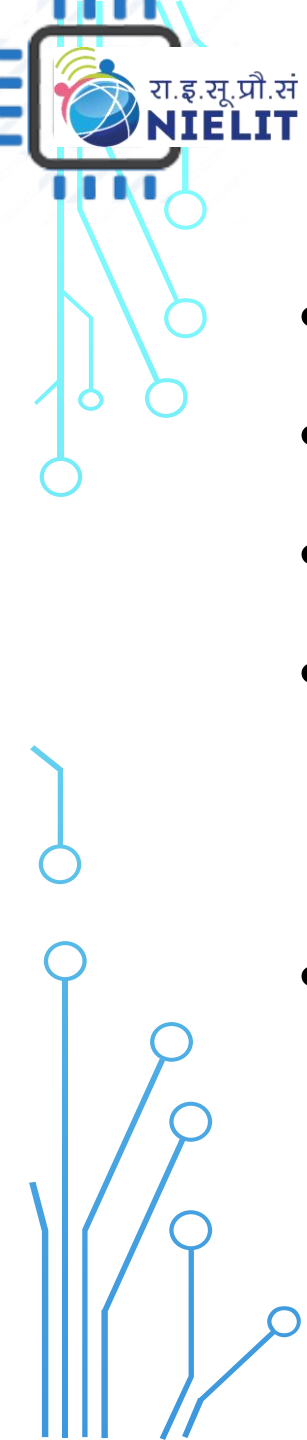


OSI MODEL





PHYSICAL LAYER

- The lowest layer of the OSI reference model is the physical layer.
- It is responsible for the actual physical connection between the devices.
- The physical layer contains information in the form of **bits**.
- When receiving data, this layer will get the signal received and convert it into 0s and 1s and send them to the Data Link layer, which will put the frame back together.
- Example: Hub, Repeater, cables, Modem are physical layer devices.





FUNCTIONS OF PHYSICAL LAYER

- **Bit synchronization:** The physical layer provides the synchronization of the bits by providing a clock.
- **Bit rate control:** The Physical layer also defines the transmission rate i.e. the number of bits sent per second.
- **Physical topologies:** Physical layer specifies the way in which the different, devices/nodes are arranged in a network i.e. bus, star, or mesh topology.
- **Transmission mode:** Physical layer defines the way in which the data flows between the two connected devices. Ex: simplex, half-duplex, full- duplex





DATA LINK LAYER

- The data link layer is responsible for the node-to-node delivery of the message.
- When a packet arrives in a network, it is the responsibility of DLL to transmit it to the Host using its MAC address.
- The packet received from the Network layer is further divided into frames depending on the frame size of NIC(Network Interface Card).
- DLL also encapsulates Sender and Receiver's MAC address in the header.
- The Receiver's MAC address is obtained by placing an ARP(Address Resolution Protocol)
- Examples: Switch & Bridge





FUNCTIONS OF DATA LINK LAYER

- Framing: Converts packets into frames.
- Physical addressing: After creating frames, the Data link layer adds physical addresses (MAC address) of the sender and/or receiver in the header of each frame.
- Error control: Data link layer provides the mechanism of error control in which it detects and retransmits damaged or lost frames.
- Flow control: The data rate must be constant on both sides else the data may get corrupted
- Access control: When a single communication channel is shared by multiple devices, the MAC sub-layer of the data link layer helps to determine which device has control over the channel at a given time.



NETWORK LAYER

- The network layer works for the transmission of data from one host to the other located in different networks.
- It also takes care of packet routing i.e. selection of the shortest path to transmit the packet, from the number of routes available.
- The sender & receiver's IP addresses are placed in the header by the network layer.
- Ex: Router



FUNCTIONS OF NETWORK LAYER

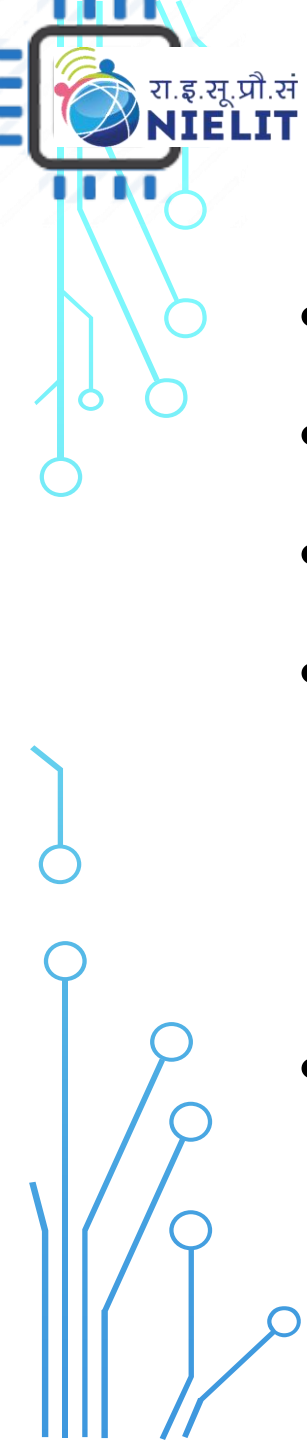
- Routing: The network layer protocols determine which route is suitable from source to destination. This function of the network layer is known as routing.
- Logical addressing: In order to identify each device on internetwork uniquely, the network layer defines an addressing scheme. The sender & receiver's IP addresses are placed in the header by the network layer.

TRANSPORT LAYER

- The data in the transport layer is referred to as *Segments*.
- It is responsible for the End to End Delivery of the complete message.
- The transport layer also provides the acknowledgement of the successful data transmission and re-transmits the data if an error is found.

SESSION LAYER

- This layer is responsible for the establishment of connection, maintenance of sessions, authentication, and also ensures security.



PRESENTATION LAYER

- The presentation layer is also called the **Translation layer**.
- Functions of presentation layer:
 - Translation: code conversion
 - Encryption/Decryption: Data encryption translates the data into another form or code. The encrypted data is known as the ciphertext and the decrypted data is known as plain text. A key value is used for encrypting as well as decrypting data
 - Compression: Reduces the number of bits that need to be transmitted on the network.



APPLICATION LAYER

- The interaction with the user or the user application takes place at this stage.
- Ex: applications- browser, TELNET, Skype