



SNS College of Engineering Coimbatore - 641107



UNIT 1

INTRODUCTION AND PHYSICAL LAYER

Computer Networks and Internet – Network Types –
Performance – OSI Model – Transmission Media

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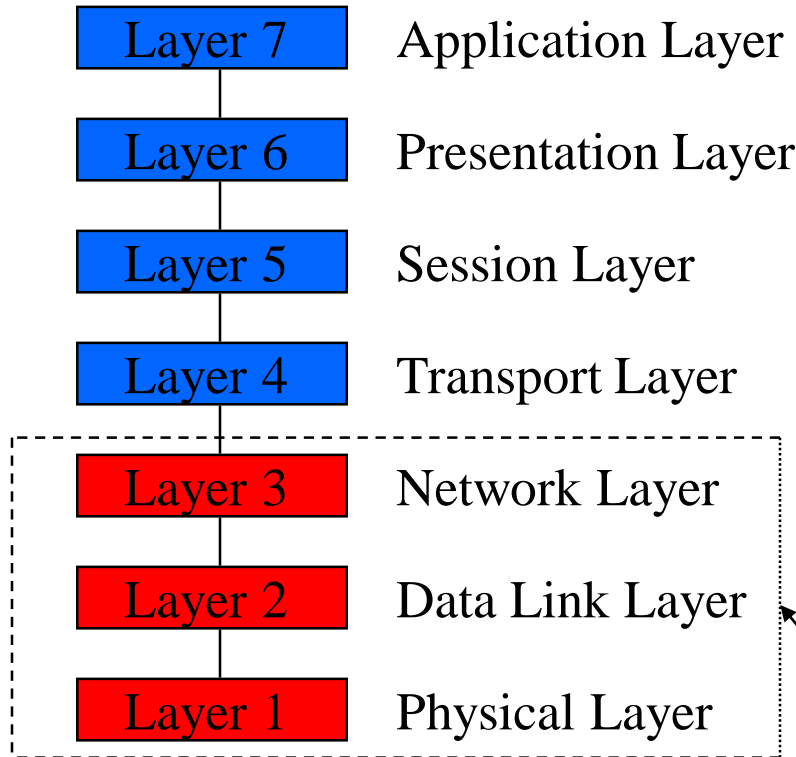
OSI Reference Model



- OSI Reference Model - internationally standardized network architecture.
- OSI = *Open Systems Interconnection*: deals with *open systems*, i.e. systems open for communications with other systems.
- Specified in ISO 7498.
- Model has 7 layers.



7-Layer OSI Model

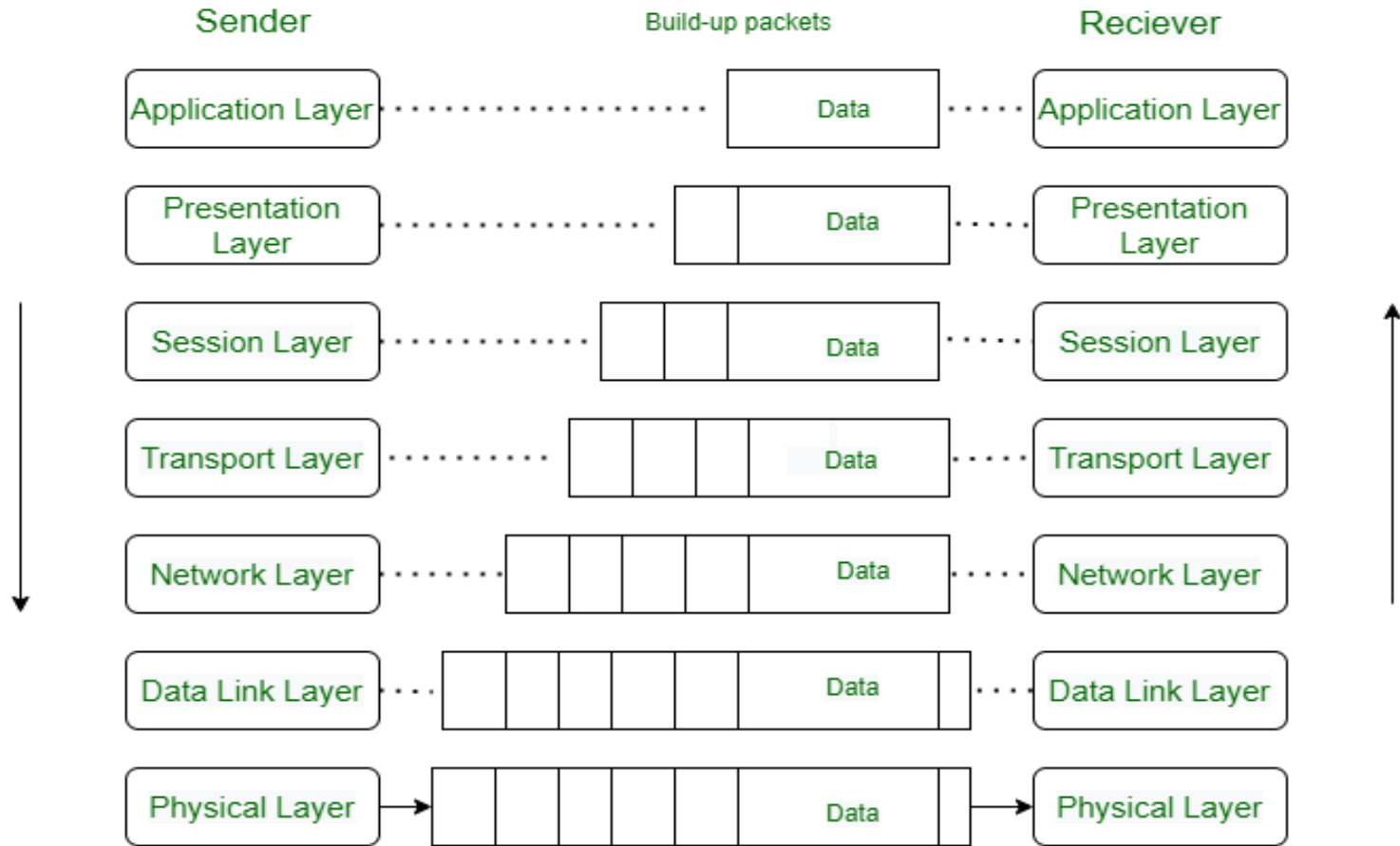


- Layers 1-4 relate to communications technology.
- Layers 5-7 relate to user applications.

Communications subnet boundary



Layers



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Layer 7: Application Layer



- Level at which applications access network services.
 - Represents services that directly support software applications for file transfers, database access, electronic mail, etc.



Layer 6: Presentation Layer (Translation Layer)



- Related to the representation of transmitted data Translates different data representations from the Application layer into a uniform standard format Providing services for secure efficient data transmission



Functions



- Translation
- Encryption/Decryption
- Compression

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Layer 5: Session Layer



- Allows two applications on different computers to establish, use, and end a session.
 - e.g. file transfer, remote login
- Establishes dialog control
 - Regulates which side transmits, plus when and how long it transmits.
- Performs *token management* and *synchronization*.



Layer 4: Transport Layer



- Manages transmission packets
 - Repackages long messages when necessary into small packets for transmission
 - Reassembles packets in the correct order to get the original message.
- Handles error recognition and recovery.
 - Transport layer at receiving acknowledges packet delivery.
 - Resends missing packets



Layer 3: Network Layer (Packets)



- Manages addressing/routing of data within the subnet
 - Addresses messages and translates logical addresses and names into physical addresses.
 - Determines the route from the source to the destination computer
 - Manages traffic problems, such as switching, routing, and controlling the congestion of data packets.



Contd.,



Routing can be:

- Based on static tables determined at the start of each session
- Individually determined for each packet, reflecting the current network load.

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Layer 2: Data Link Layer



- Packages raw bits from the Physical layer into frames (logical, structured packets for data).
- Provides reliable transmission of frames
 - It waits for an acknowledgment from the receiving computer.
 - Retransmits frames for which acknowledgment not received



Layer 2: Data Link Layer

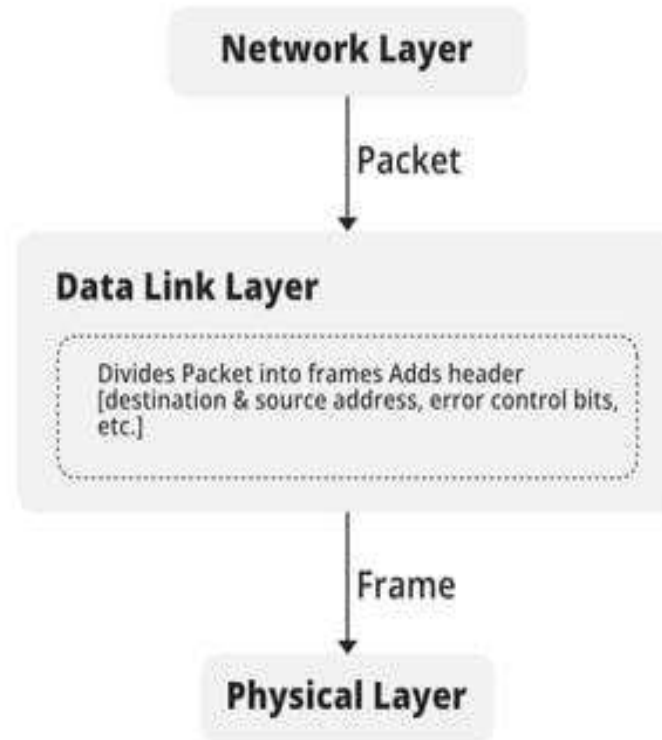


Two sublayers

- Logical link control (LLC)
- Media Access Control (MAC)



Functions





Layer 1: Physical Layer



- Transmits bits from one computer to another
- Regulates the transmission of a stream of bits over a physical medium.
- Defines how the cable is attached to the network adapter and what transmission technique is used to send data over the cable.



Contd.,



Deals with issues like

The definition of 0 and 1, e.g. how many volts represents a 1, and how long a bit lasts?

Whether the channel is simplex or duplex?

How many pins a connector has, and what the function of each pin is?



Functions



- Bit synchronization
- Bit rate control
- Physical topologies
- Transmission mode