

# OSI Model

## Open System Interconnection Model

⇒ Used to understand how data is transferred from one device to another

### 7-Layer by ISO 1984

Top → Application  
Presentation  
Session  
Transport  
Network  
Data Link  
Bottom → Physical

Each layer is packet of protocols

#### (1) Application Layer:



used by Network Applications

↳ Apps that uses internet

[  
HTTP, HTTPS  
NFS, IRC...etc]

like  
google, skype, outlooks

⇒ File Transfer over network is done by FTP Protocol

⇒ Web Surfing is done by HTTP or HTTPS

⇒ Emails SMTP protocol is used

⇒ Virtual Terminal By Telnet

## ② Presentation Layer

It receives data from application layer

App-layer

↓ (data) - in form ↗

Presentation Layer

⇒ Data is in Alphanumeric form

⇒ Presentation layer converts this data in machine understandable format

e.g ASCII to EBCDIC code

⇒ This function of presentation layer is called Transformation.

⇒ P.L reduces the bits representing data  
Technique called com data compression

↳ Lossy

↳ Lossless

⇒ Reduces file size then transfer over network  
after encryption/decryption using SSL protocol

Encryption

SSL Protocol

Secure Socket Layer Protocol

### ⇒ 3 Major Function

- (i) Translation
- (ii) Compression
- (iii) Encryption/Decryption

### ③ Session-Layer

It helps up in setting up & managing connection  
Session layer has

- (i) API : Application Programming Interfaces  
e.g

NETBIOS : Network Basic Input Output System

⇒ Before connection b/w PC & Server  
Server performs a process of Authentication

⇒ Authentication:

is the process that defines  
who you are?

⇒ Server uses User Name & Password  
If both are correct, server connects with  
PC & starts a session

⇒ After Authentication

Authorization is check

↳ whether you are allowed to  
access a file or not.

### 3-Major Roles

- (i) Session Management
- (ii) Authentication
- (iii) Authorization

(4)

## Transport Layer

↳ Controls reliability of communication through

- (a) Segmentation
- (b) Flow Control
- (c) Error Control

### Segmentation:

Division of data in small units

[Data]



[seq] [seq] [seq]  
①      ②      ③

Each segment contains

- (i) Port Num → directs segment to correct application
- (ii) Seq Num → reassembles segment in order of arrival

### Flow Control:

Control Amount of Data that is being transmitted

↳ Helps in managing data transfer rate

Error Control:

Request for missing data  
by using

Automatic Repeat Request  
Schemes

Transport Layer Protocols:

⇒ TCP Transmission Control Protocol  
⇒ UDP User Datagram Protocol

Transport Layer Roles/Services:

⇒ Connection-Oriented Transmission by TCP  
⇒ Connectionless Transmission by UDP

⇒ UDP is fast because No feedback

⇒ TCP is slow // provides Feedback

UDP used where not <sup>complete</sup> data transfer is req  
TCP is completed or a a a a

⇒ Major Function

(i) Segmentation

(ii) Flow Control

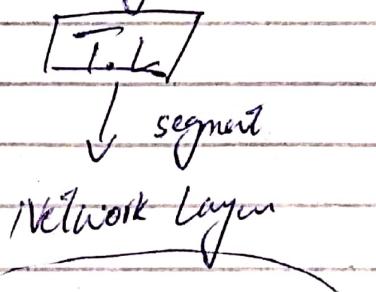
(iii) Error Control

(iv) Connection Oriented Transmission

(v) Connection less

## (5) Network Layer

Receives segments from Transport layer



Function

⇒ Logical Addressing (IP Addressing IPV4 & IPV6)

⇒ Routing (Moving Data Packets from Source to Des)

⇒ Path Determination

↳ Chossing best path from source to destination for

data delivery is

called path determination

using  
(IP Address + Mask)

Use Protocols like : OSPF {open shortest path first }

BGP {Border gateway protocol }

IS-IS {Intermediate System to IS }

## (6) Data Link Layer

Network Layer  
↓  
(data packet)

Data Link Layer

It receives data packet from network layer

⇒ Data Packet contains IP address of both sender & receiver

Addressing

Logical Addressing

Physical Addressing

⇒ Done at network layer

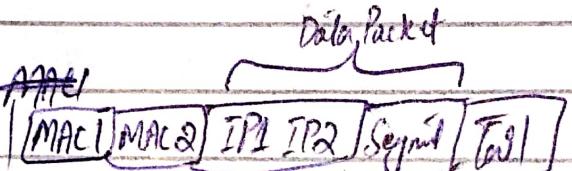
⇒ Done at datalink layer

⇒ 

IP <sub>s</sub>	IP <sub>r</sub>	Segment
under Review		

(MAC Add : 6-digit physical address)

Mac address are assigned to data packet to form a frame



## → 2 Basic Functions

Allows upper layers of OSI model to access media using techniques like framing

Controls how data is placed & received from media using techniques like

- \* Media Access Control
- \* Error Detection

## ⑦ Physical Layer

Data from Application layer

↓  
Data (Segmented by Transport layer)  
↓  
placed into (Packet) by network layer  
↓

(IP<sub>S</sub>) (IP<sub>R</sub>) / Segm

↓ (routed) by Data Link Layer which is a combination of CS and LS

↓ (MAC / MDC) / IP<sub>S</sub> / IP<sub>R</sub> / Segm / FCS

Physical layer converts these Binary Signal to BITS and Signals

Electrical Signals in case of copper Cable

Light or or or optical fiber

Radio or or air

⇒ Signals generated by physical layer depends on the type of media that is used to connect 2 devices.

⇒ At receiver ends

Phy. L receives the signals  
convert it to bits

passed it to Data Link Layer as a frame

Frame is further de-encapsulated as it moves to higher layer

Finally, data is moved to App layer

App layer protocols makes sender data visible in applications in receiver device.