OSI MODEL

- OPEN SYSTEM INTERCONNECTION

↓ made by

ISO (International organization for Standardization)

↓ DESIGNED

TWO N/W MODELS

DOD (Department of defence)

OSI MODEL (7 layered architecture)

↓

Reference Model (becoz TCP/IP network stack was designed based on this model)

↓ Later Came

TCP/IP

- The whole n/w of the world works on this model taking OSI as a reference Model. It consists of 4 layers.

OSI MODEL STUDY

- To understand layering concept, always follow Top to bottom approach.

1. APPLICATION LAYER

① • Any S/w through which we access internet, talk to other Persons, access resources from Server reside in the application layers

② • These Softwares ~~are~~ follow Protocols, to make these resources available to the user.

Example

when we do internet chatting via softwares like Yahoo messenger, Facebook messenger, IMO. These all are possible with the Protocols of the application layer :

- GMAIL (Application software) ——— works on ———→ SMTP
- U-TORRENT (File downloading S/W) ——— works on ———→ FTP

(3) Protocols of the Application Layer

① HTTP ② SMTP ③ FTP ④ HTTPS 5 TELNET

2. PRESENTATION LAYER

a) It is used to check Syntax of the data i.e what is the format of data ?

like MP4, AVI ——→ videos
JPG, PNG ——→ IMAGES
MP3 ——→ AUDIOS

} checks validity of the data

b) Encryption & Decryption

. Encryption & decryption of data at Sender & receiver side is done respectively.

c) Compression & Decompression

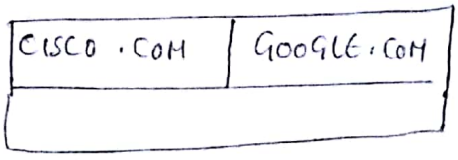
. Compression is done to reduce size of file for effective communication. at Sender's side

. Decompression is done to bring the data to its original size at the receiver end

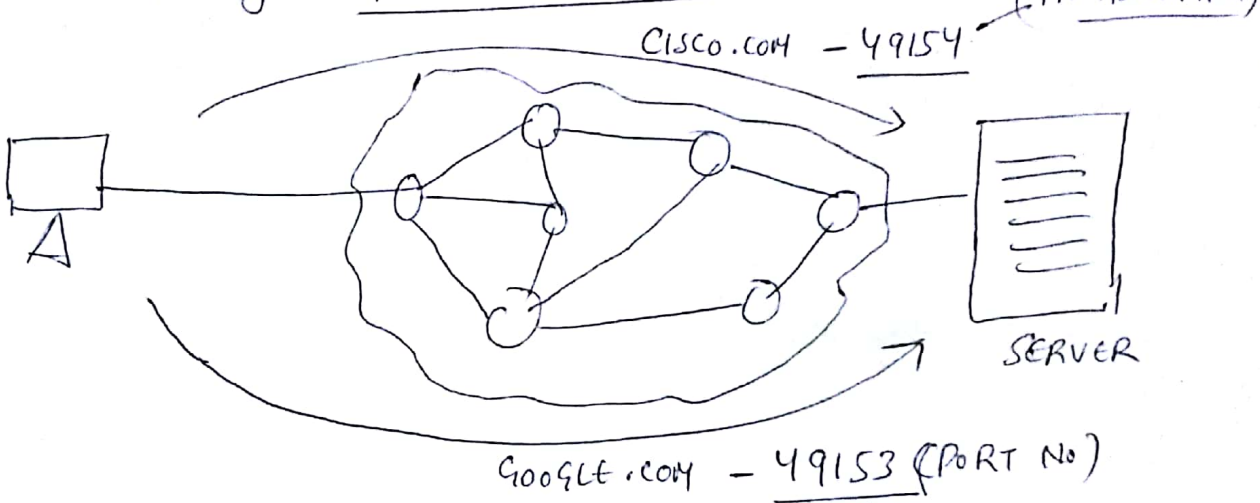
SESSION LAYER

- Creates & manages the sessions b/w end user application processes.

Example - Suppose we have opened two tabs on the Internet like



for accessing the resources, Every Session layer will establish a session for both the websites opened by the user through Port numbers



- Every Service like http, FTP etc has different Port nos

FTP (data Part) — 20 (Port no)

FTP (control Part) - 21

TELNET — 23

SNTP — 25

HTTP - 80

(4) TRANSPORT LAYER

a). End-to-End delivery of data

b). Guarantees delivery from source to destination

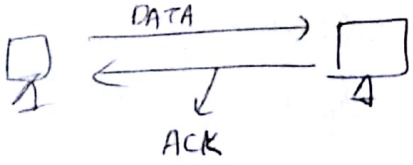
Two TYPES OF PROTOCOL USED

TCP

(1) Connection oriented Protocal

(2) NOT FAST

(3) Follows Acknowledgement Principle



(4) Example - File Sharing

UDP

(1) connectionless Protocal

(2) FAST METHOD

(3) NO ACKNOWLEDGEMENT
No guarantee of data delivery.

(4) Example - Internet calling using Skype, watsapp etc

c) FLOW CONTROL - It ensures that there is no congestion in the n/w.

d) Segmentation - Data is divided into segments so as to handle more efficiently by the network layer. (Senders side)

Receiver side -

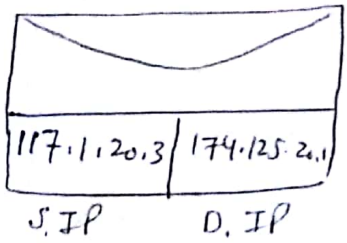
e) SEQUENCING - Sequence no assigned to each segment in order to receive effectively, the segments at the receiver side.

5. NETWORK LAYER

a) PACKETIZATION - Further divides the segments into Packets at Sender end & assemble incomming Packets into segments at receiver side to send it to upper layer

IP address Tagging –

- During Packetization, each data is encapsulated into a Packet.
- Each Packet is assigned a Source IP & Destination IP.



SIP – Source
DIP – destination

c) ROUTING – Network Layer helps to route the Packets from Source to destination using router.

- Router routs the Packets based on the routing table.

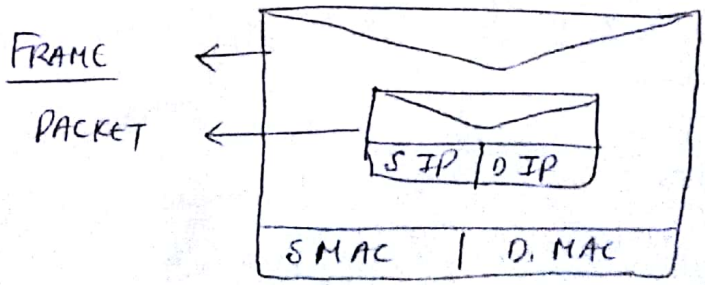
Two PROTOCOLS USED

① IP (Internet Protocal) ② IPx (Internet Protocal exchange)

6. DATA LINK LAYER

a) PHYSICAL ADDRESSING –

- In this layer, Packets received from upper layer are wrapped in a Frame. (Framing)
- This Frame contain Source MAC address & Destination MAC Address

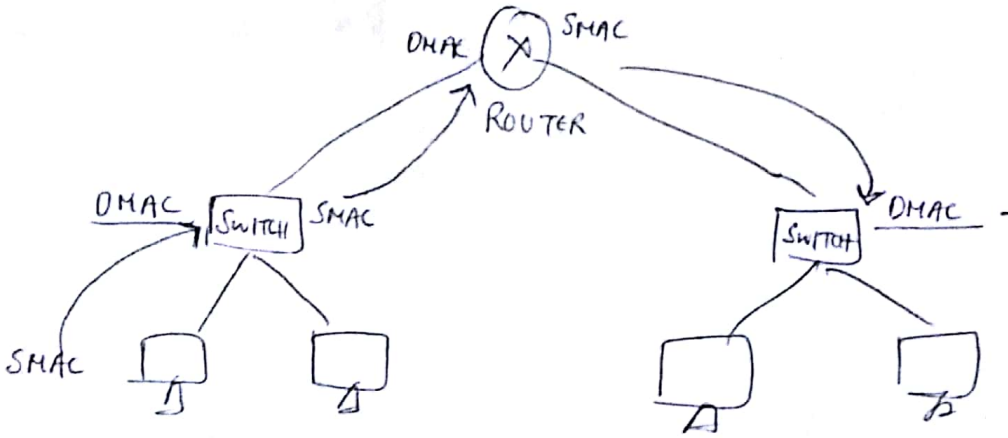


To Go To INTERNET WE NEED

Two addresses

IP address — MAC Address

NOTE - SMAC & DMAC of a computer do not change but when data moves from one device to another, Their SMAC & DMAC gets changed



DMAC - will check n/w & then will see the MAC ADDRESS OF THE DEVICE where data is to be sent.

b) FLOW CONTROL - To avoid conjestion

c) ERROR CONTROL - mechanism to detect & retransmit damaged or lost frames
also used to recognize duplicate frames

D. ACCESS CONTROL - when two or more devices are connected to the same link, DLL Provides a Protocol

Called MAC Protocol to determine which device has control over the link at any given time

MAC - Medium access control

7. PHYSICAL LAYER

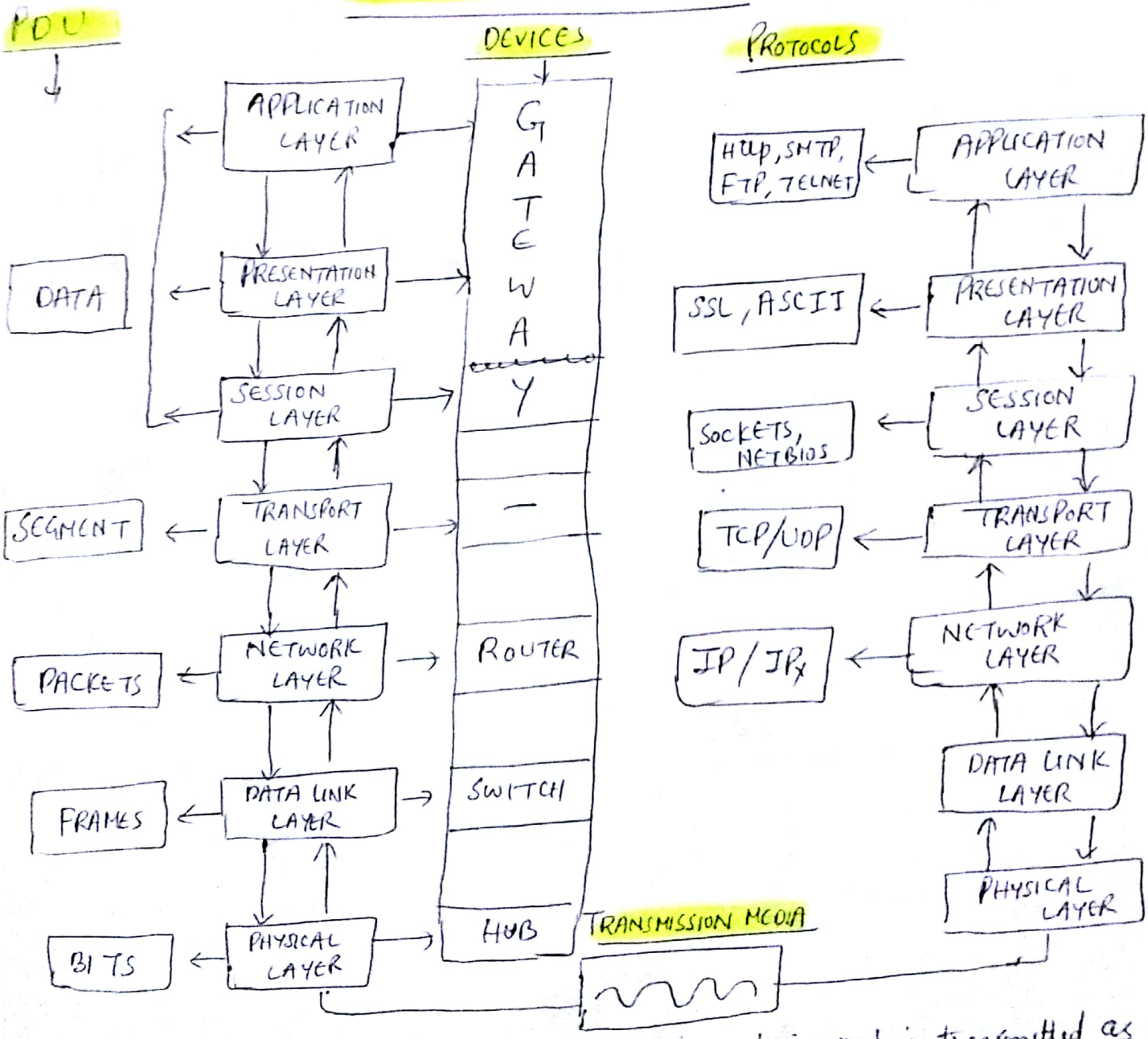
① TRANSMISSION MODE - direction of transmission b/w two devices ie Simplex, half duplex or Full duplex

② Physical topology - defines how devices are connected to make a n/w

③ BIT representation - Bits 0 & 1 are converted to signals (electrical / optical)

④

OSI LAYERED DIAGRAM

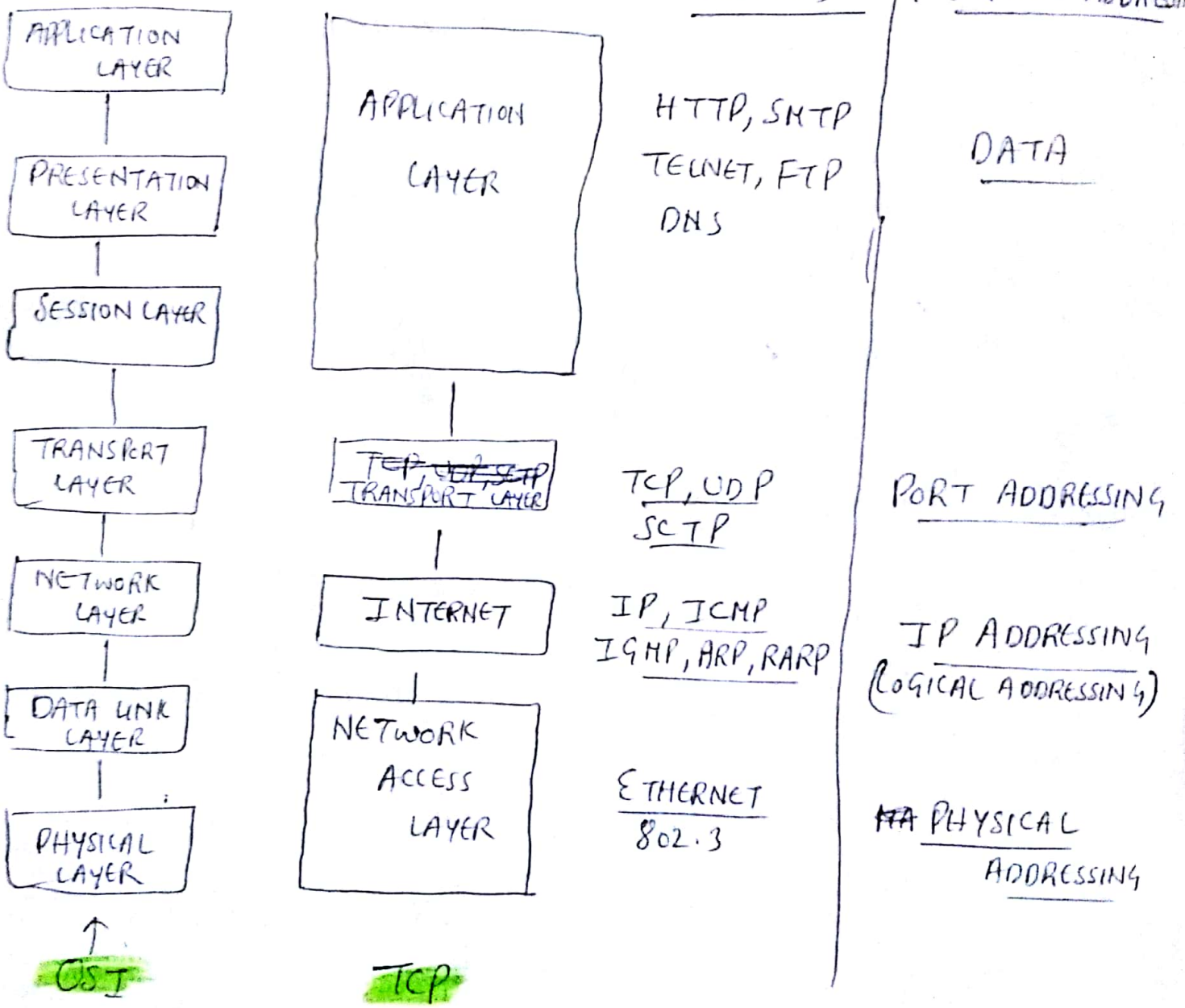


NOTE - PDU - Protocol data unit is information that is transmitted as a single unit among peer entities of a computer n/w

TCP/IP PROTOCOL

- The whole n/w of the world works on this model taking OSI as a reference model.
- It is a 4 layer architecture

Comparison of ~~OS~~ TCP/IP Model with OSI



SIMILARITY BETWEEN TCP/IP & OSI MODEL

1. BOTH Are LAYERED Architecture
2. Both are reference Models
3. Layer's Provide Similar functionality
4. Both are Protocal Stack

DIFFERENCE B/W OSI LAYER & TCP/IP LAYER

OSI	TCP/IP
(1) OSI is a generic, Protocal independent Standard	(1) TCP/IP model is based on standard Protocal around which internet was developed.
(2) It has 7 Layer's	(2) It has 4 layers
(3) Follows Horizontal approach	(3) Follows vertical approach
(4) OSI model represents an ideal	(4) TCP/IP network model represents reality in the world
(5) Model was developed before Protocal	(5) Protocals were developed first & then the model was developed
(6) OSI model has a separate Presentation Layer & Session Layer	(6) It does not have a separate Presentation & session layer
(7) Transport Layer is connection oriented	(7) TL is both connection oriented & connectionless