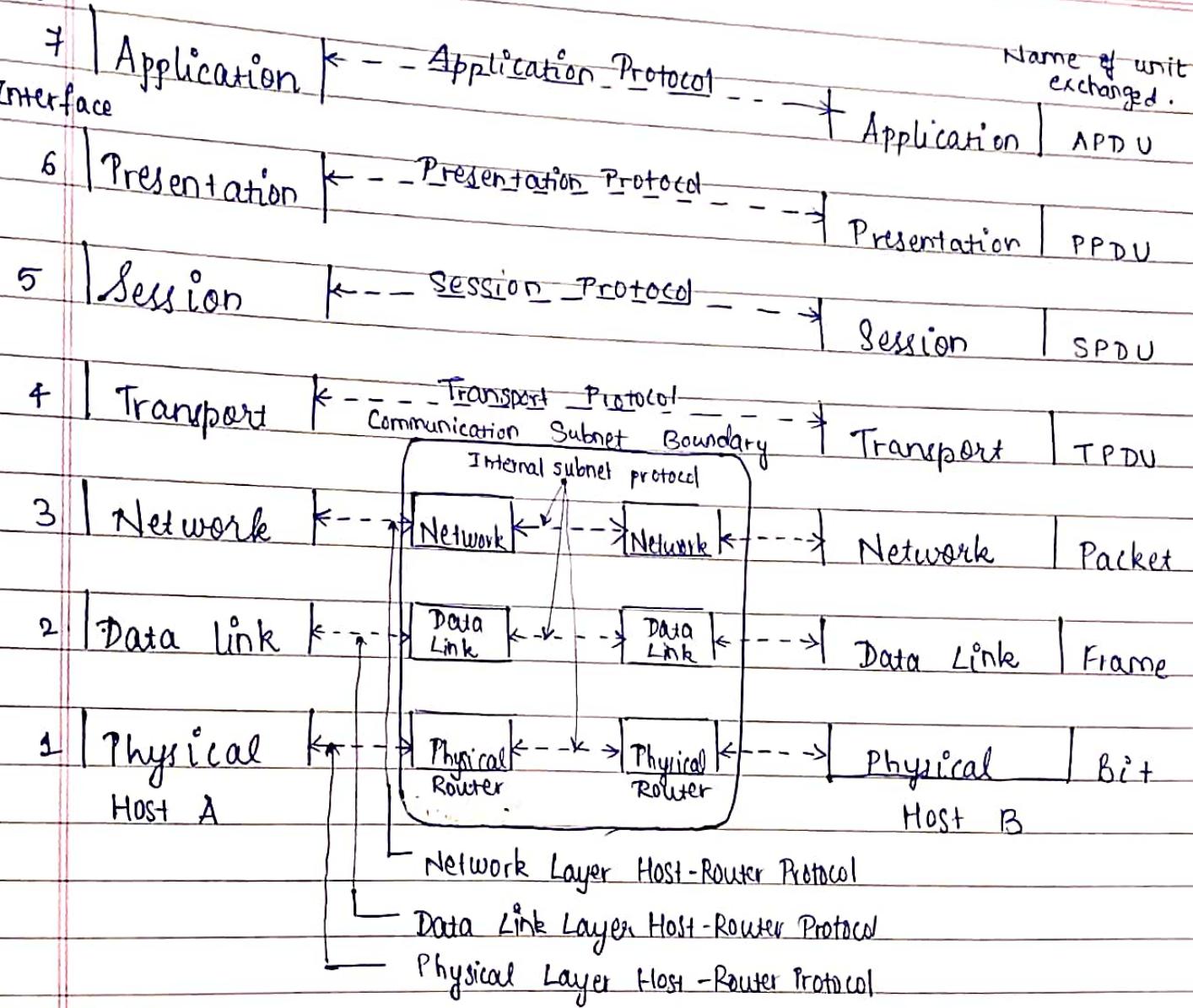


Layer



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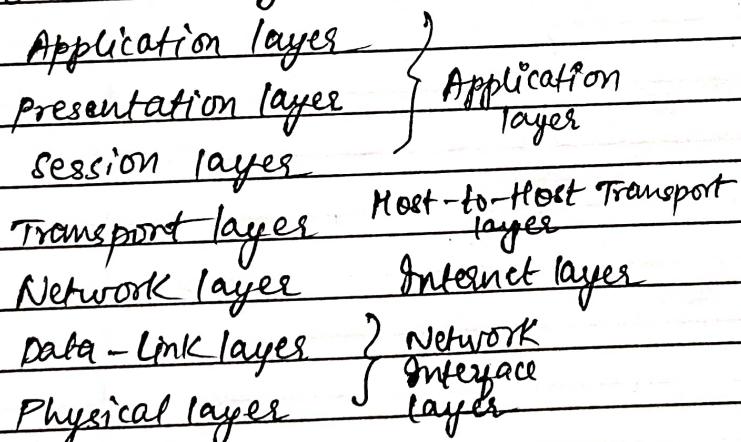
3/1/23

## // subnet

OSI

- Physical layer (Transmitting raw bits over comm' channel)
- Data link layer (error detection & if errors are there then error correction)
- Network layer (controls the operations of subnet.)
- Transport layer (accept data from above)
- Session layer (allows users on diff. machines to establish sessions b/w them).
- Presentation layer (concerned with syntax & semantics of info transmitted)
- Application layer (contains variety of protocols commonly needed by users)

## OSI Model layers



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## Mod. 5

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①

### Application layers

- Directly access the application.

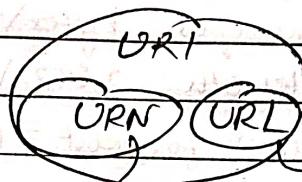
★

### HTTP Protocol

#### Features

- Connectionless
- Media Independent
- Stateless
- TCP UDP

URI (Uniform Resource Identifier)



Locator

#### Features

26/1/23  
HTTP

Request msg

Request line → URL field  
Header → HTTP version field.

→ carriage return

Response msg → Status line  
Header line  
Data

Get, Put, Post, Delete, Head → Methods in req. line

### HTTP Status codes

★

### HTTP Request e.g.

Get /index.html HTTP/1.1 \r\n

carriage return ch.  
line feed character

Host: www.net.cs.umass.edu \r\n

User-Agent: Firefox/3.6.10 \r\n

Accept: text/html \r\n

Accept-Language: en-us \r\n

Keep-Alive: 115 \r\n

Connection: keep-alive \r\n

\r\n (termination)

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## Response eg

HTTP/1.1 200 OK \r\n

Date: Sun 26 Sep 2010 20:09:10 GMT \r\n

Server: Apache/2.0.52 (centos) \r\n

Last-modified: Tue, 30 Oct 2007 17:00:02 GMT \r\n

Accept-Ranges: bytes \r\n

Content-length: 2652 \r\n

Keep-Alive: timeout=10, max=100 \r\n

Connection: keep-Alive \r\n

Content-type: text/html; charset=ISO-8859-1 \r\n

\r\n

data data data . . .

## FTP

TCP connection.  
UDP oriented.

Is an application layer protocol which moves files b/w local & remote file systems.

- runs on top of TCP.

## Electronic mail

3 protocols → Simple mail transfer protocol.

→ Post office protocol V.3      mail sending protocol

→ POP 3      ) mail access protocol.

→ Internet msg access protocol.

→ IMAP.

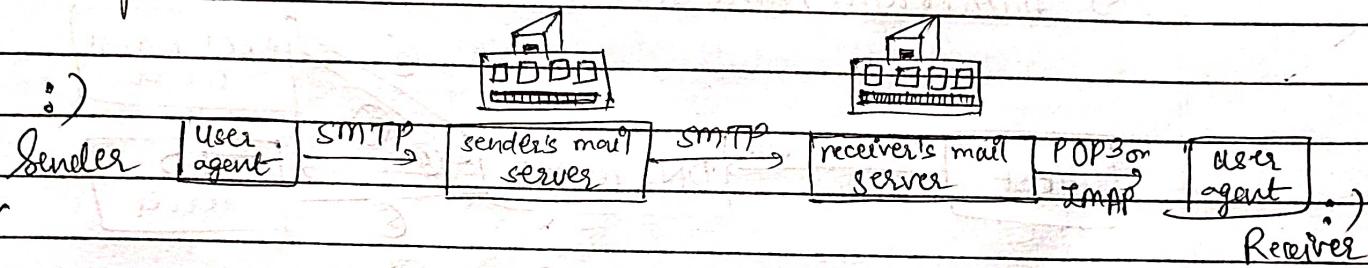
## Components of email

~~Cs User agent~~

## C Message Transfer agent

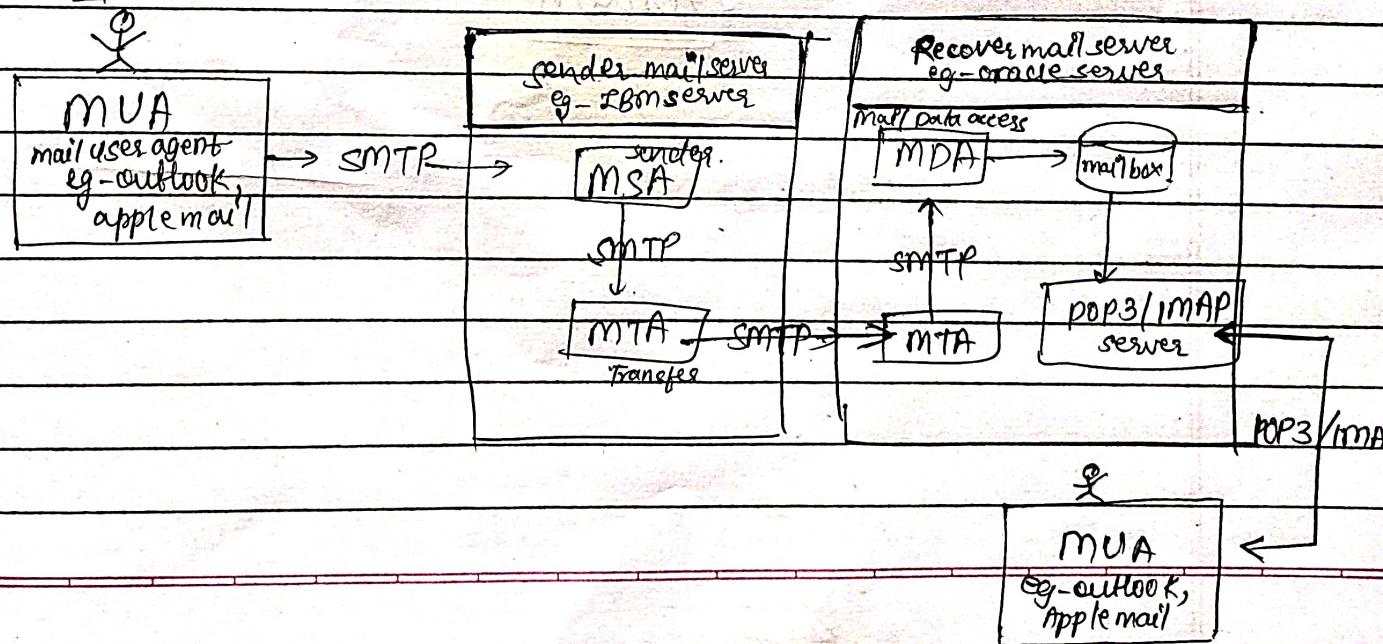
↳ Mail Box

↳ Spool file.



POP3 - serves pe mail ka copy stored nahi rehta keep mode.

JMAP — " 10 rehta

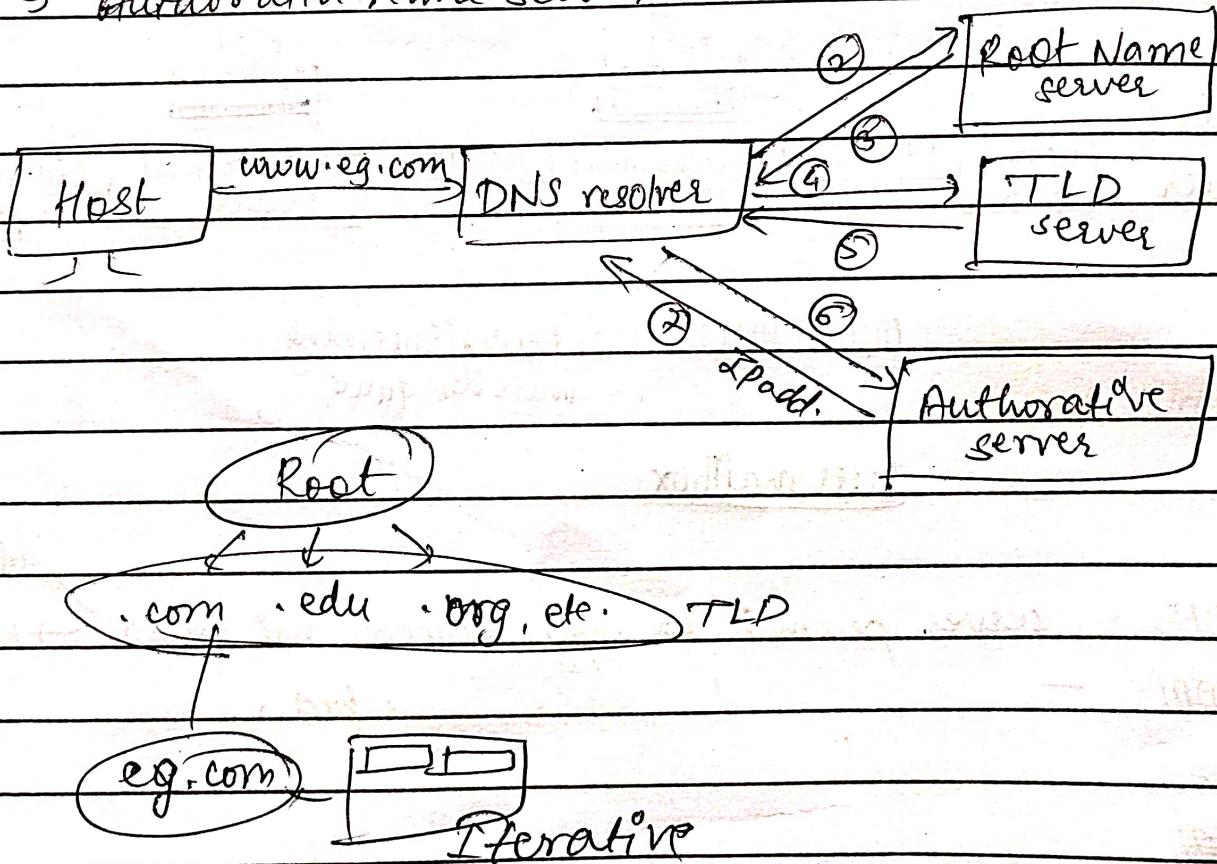


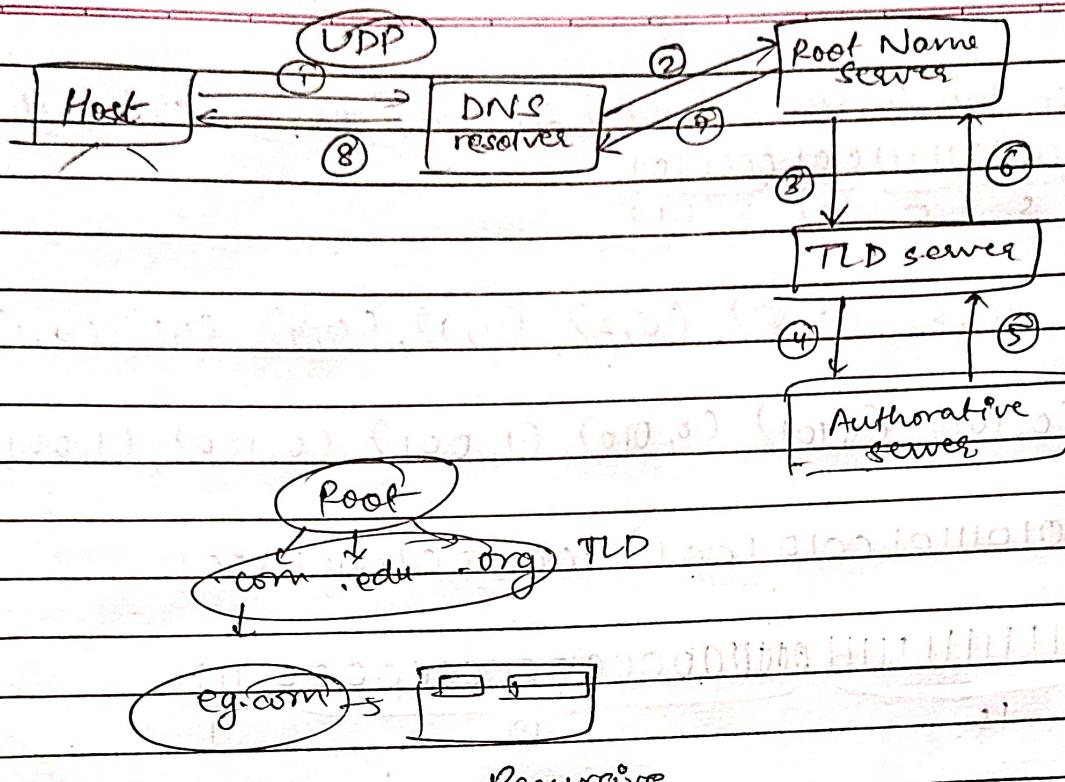
## Domain name servers (DNS)

- App/ln layer
- Translator b/w IP address & English
- Convert Domain name  $\leftrightarrow$  IP address

### Types

- ↪ DNS recursive resolver
- ↪ Root name server
- ↪ Top level domain
- ↪ Authoritative name servers





~~7/2/23~~ SNMP (Simple Network Management Protocol)

manager → ↓ → agent

Functions

- 1) Translation
- 2) Encryption
- 3) Compression

Coding techniques

- Huffman
- LZW
- RLE

(Q1) use Run length encoding for compressing string A:

$$\overbrace{00000}^{\Rightarrow 5} \overbrace{1111}^{\Rightarrow 5} \overbrace{001}^{\Rightarrow 2} \overbrace{0000101}^{\Rightarrow 4} \overbrace{0111}^{\Rightarrow 3}$$

$$\Rightarrow \underline{(0,5)}, \underline{(1,5)}, \underline{(0,2)}, \underline{(1,1)}, \underline{(0,4)}, \underline{(1,1)}, \underline{(0,1)}, \underline{(1,1)}$$

$$\Rightarrow (0,101), (1,101), (0,010), (1,001), (0,100), (1,001), (0,001) \\ (1,001)$$

$\Rightarrow$  01011101001010010100100100011001

$$(d2) \quad \overbrace{1111111111}^{15} \overbrace{000000000000000000}^{19} \overbrace{1111}^4$$

$$\Rightarrow (1, 15), (0, 19), (1, 4)$$

$$\Rightarrow (1,0111), (0,10011), (100100)$$

$\Rightarrow 10111010011100100$

(23) AAAAA BBBAAA BBBB BBBBB  
      1      2      3      4      5

$$\Rightarrow (A, 5), (B, 2), (A, 3), (B, 5)$$

$$\Rightarrow (1010, 5), (1011, 2), (1010, 3), (1011, 5)$$

$\Rightarrow 10105 \ 10112 \ 10103 \ 10115$

→ 10101010110101010011101