

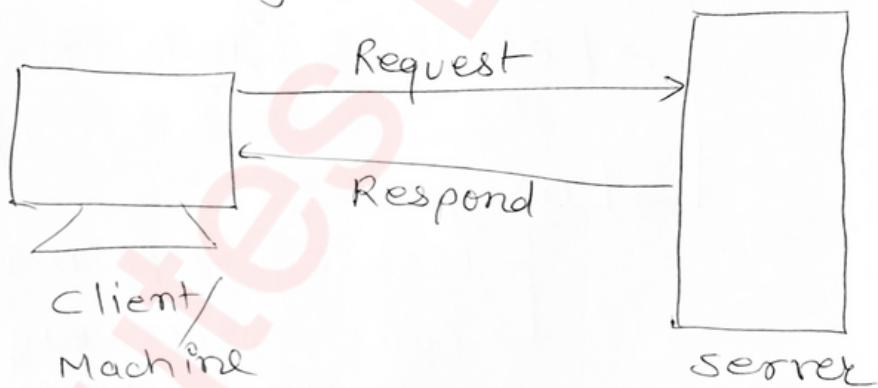
- TCP

- ① Connection oriented
- ② Reliable (\uparrow)
- ③ In order
- ④ Slow
- ⑤ EC is mandatory
- ⑥ HL = $(20-60)B$
variable
- ⑦ Byte stream
- ⑧ high overhead

VS

UDP

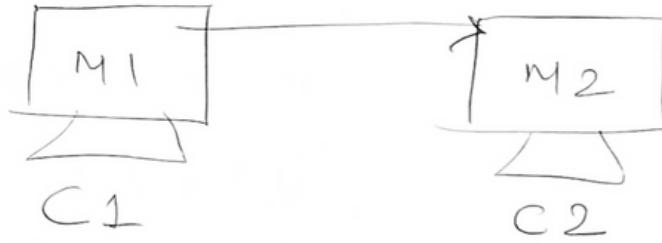
- ① Connectionless
- ② Low/Less reliable
- ③ No order
- ④ fast
- ⑤ EC is optional.
- ⑥ HL = 8 B
fixed
- ⑦ Message stream
- ⑧ Low overhead

* * Session Layer

- Authentication
- Authorization
- Session mgmt (synchronization)
- Checkpoint [Session Restoration]
- session establishment
- Dialog mgmt (log data of connection)

* Presentation Layer

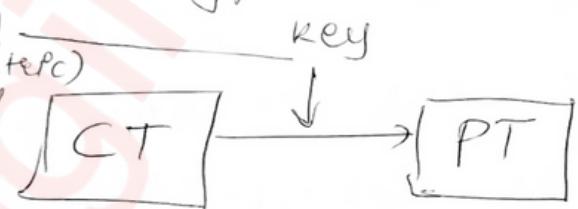
→ Translation [Accepted/understandable format]



→ Encryption



Decryption



→ Compression (zip file)

→ Lossless [Data Compaction]
"no info loss" & compression ratio is (\downarrow)

→ Lossy

loss of information

compression ratio (\uparrow)

(R) Public

(S)

E

D

(R) Private

C

(S) Private

(S)

E

(S) public

D

(R)

A

* Application Layer

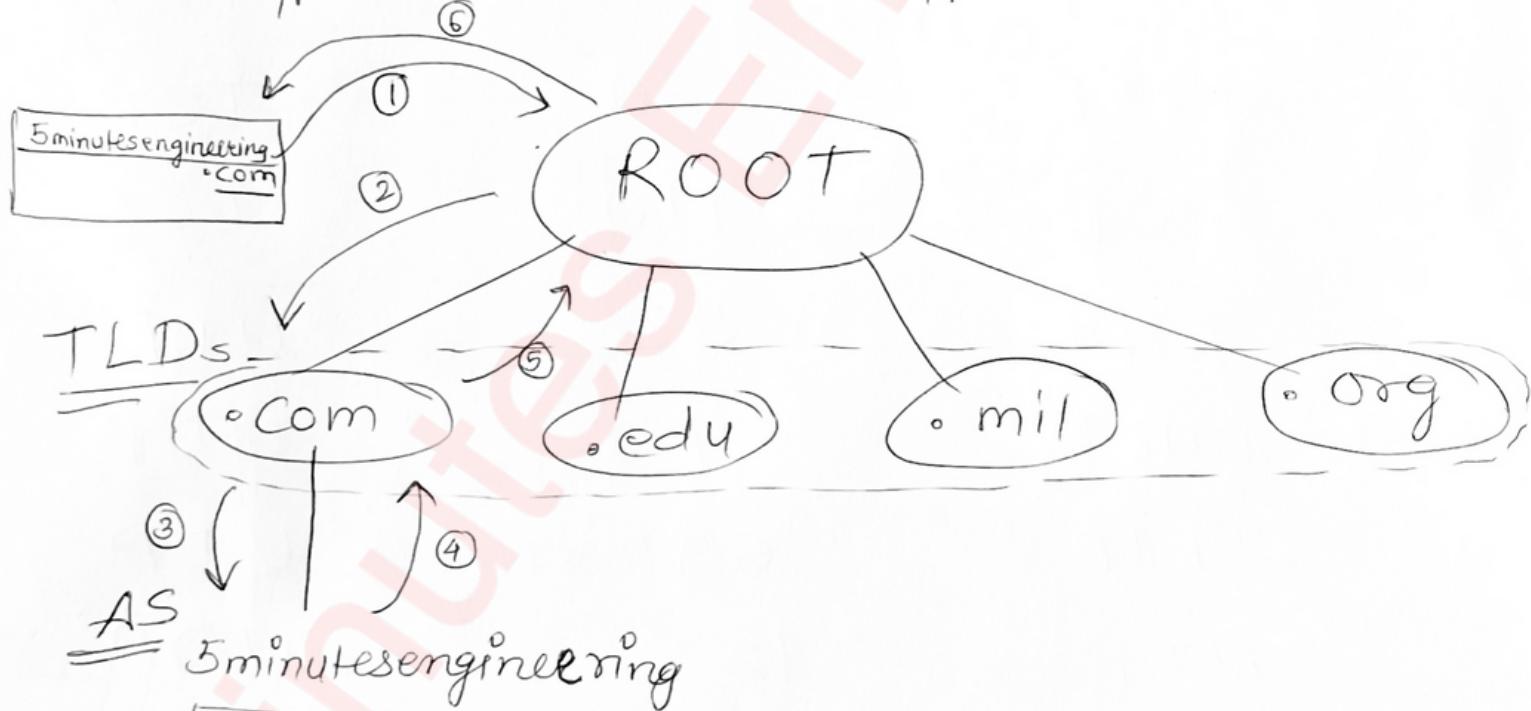
<u>Application Protocol</u>	<u>Port No</u>	<u>TL protocol</u>
<u>FTP D</u>	20	TCP
<u>FTP C</u>	21	TCP
Telnet	23	TCP
SMTP	25	TCP
<u>HTTPS</u> <small>(SSL)</small>	443	TCP
HTTP	80	TCP
POP	110	TCP
DNS	53	UDP
DHCP	67/68	UDP
TFTP	69	UDP
NTP	123	UDP
RIP	520	UDP
Echo	7	TCP/UDP

◦ DNS (Operate on AL)

◦ Iterative



◦ Recursive



* HTTP

- Port no: 80
- TCP ✓ (To get Reliability)
- Stateless [No info saving/storing]
- Inband protocol → 1 port no. → Data as well as commands.
(80)
- HTTP 1.0 (Non-Persistent)
- HTTP 1.1 (Persistent) } Connection
- NO security [HTTP runs over SSL] → HTTPS (CCIA)
- Combination of FTP & SMTP

Non-persistent

one TCP connection
is made for each
Req/ Reply.

"slow"

Persistent

Server leaves the
connection open
for more than
1 request
→ It is closed on
→ Req. of client
→ Time-out reached.

* FTP

- file transfer
- Not In band
 - Data : Port no 20
 - Control : Port no. 21
- Data connection is "non-persistent"
- Control connection is "persistent"
- stateful.
- Reliability ↑
- Performance ↑

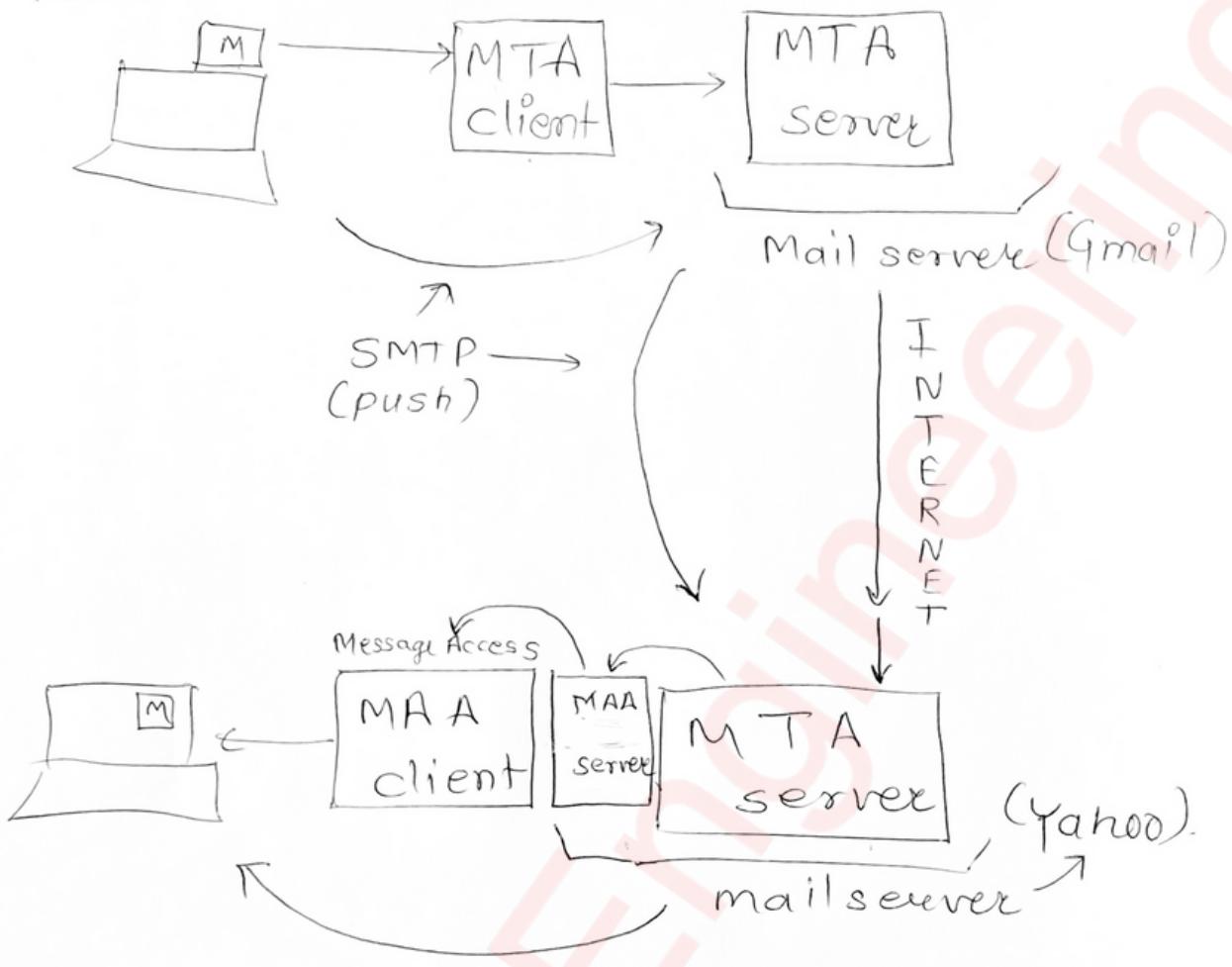
⇒ Trivial FTP (TFTP)

- Trivial / simple (Read/
write operation)
- UDP
- Port 69
- Demand : security
long-distance
transfer (X)

* SMTP (Simple mail Transfer Protocol)

- Asynchronous nature support.
- Port no: 25 for mail pushing
- MTA (message transfer agent)

Mail send



pull message
from server (POP)

Post office Protocol

version 3

(POP3)

→ TCP

→ Port no: 110

• MIME (Multipurpose Internet Mail Extension)

