

Chapter 23

Sub.: E-mail: SMTP, POP, IMAP
and MIME

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→ Key protocol that enable email communication.

- ① SMTP → Simple Mail Transfer protocol
→ for sending emails from a client to a server.
- ② POP → Post office protocol.
- ③ IMAP → Internet Message Access Protocol.
- ④ MIME → Multipurpose Internet Mail Extensions.

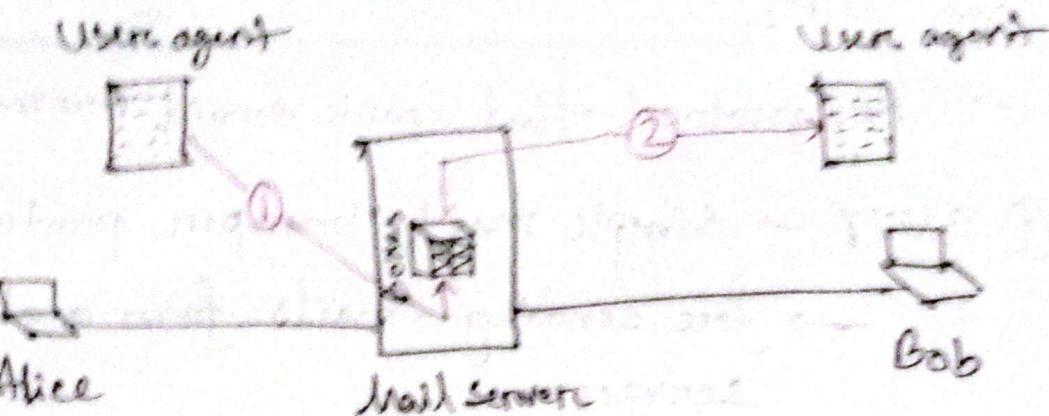
23-1: Architecture

* Email systems follow a client-server model
4 scenarios

- ① Direct Communication (Same Server)

Ex: Alice (alice@example.com) and Bob (bob@example.com) are on the same server.
- ② Communication Across Different servers
Ex: Alice (alice@gmail.com) sends an email to Bob (bob@yahoo.com)
- ③ Email with an Intermediate Mail Server
(Mail Gateway)
Ex: Alice (alice@company.com) sends an email to Bob (bob@gmail.com), but her company uses a mail gateway for security.
- ④ Multiple Hops & Protocols.
Ex: Email goes through multiple servers.

First scenario

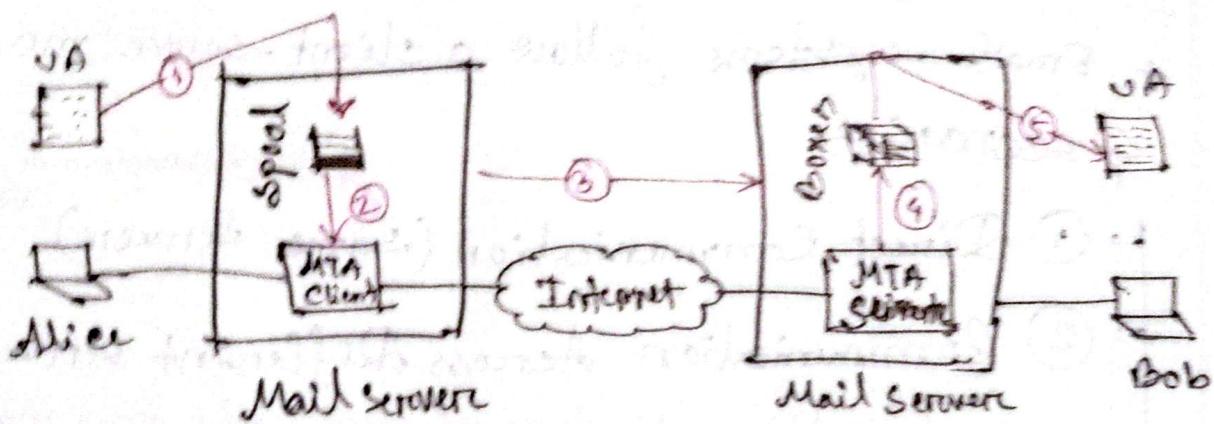


When the sender and the receiver of an email are on the same mail server, we need only two user agents.

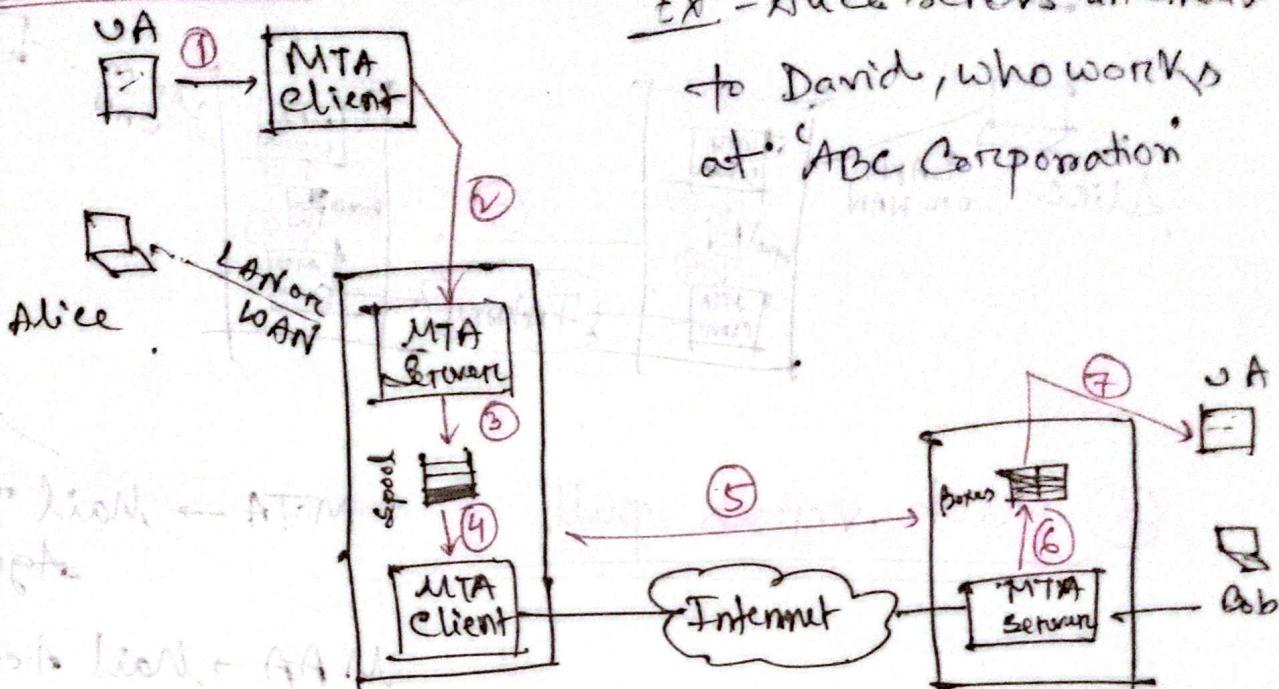
Second scenario

UA → user agent

MTA → message transfer agent



When the sender and the receiver of an e-mail are on different mail servers, we need two UAs and a pair of MTAs (client and server)

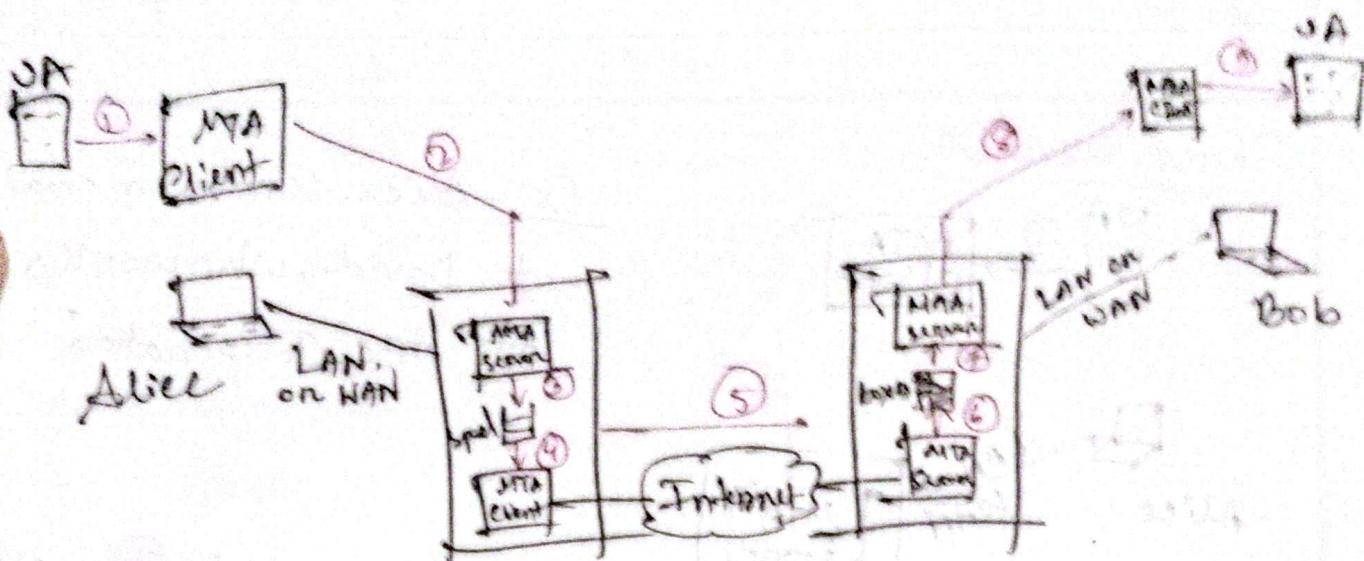
Third scenario

Ex - Alice sends an email to David, who works at ABC Corporation

When the sender is connected to the mail servers via a LAN or a WAN, we need two UAs and two pairs of MTAs (client and server)

Fourth scenario

When both sender and receiver are connected to the mail servers via a LAN or a WAN, we need two UAs, two pairs of MTAs (client and server), and a pair of MAAs (client and server). This is the most common situation today.

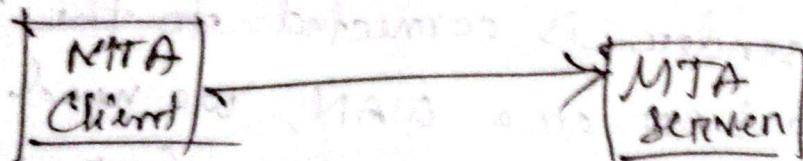


* Push versus pull

MTA → Mail Transfer Agent

MAA → Mail Access Agent

Agent
PULL

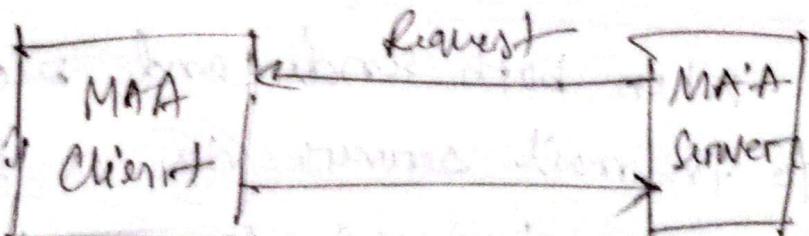


Client pushes message.

↓ Gmail without
server 2020

↓ GPT (2025)

↓ no email



b. Client pulls message.

difference between them is in MTA. (using
push)

Sub:

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23-2: User agent

→ first component of email system
→ provide service to the user
to make the process of sending and receiving
a message easier

Some common Driven UA

mail, pine, elm
✓
mutt, fig
email manager
ebuddy, no.

Some GUI-based UA

Eudora, Outlook, Netscape

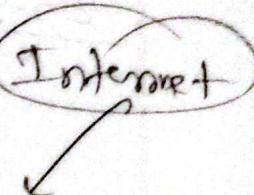
[Local part] @ [Domain name]

Mailbox address of
the recipient.

The domain name of
the mail server

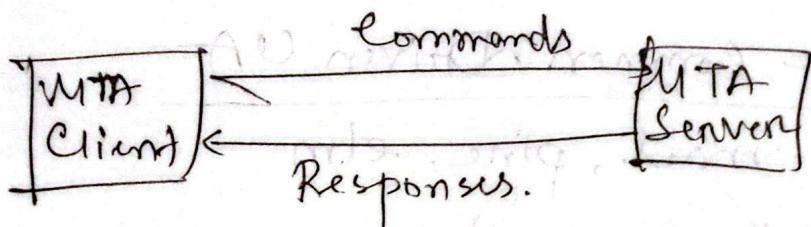
23-3 :- ATTA + MTA

→ Sender → Client MTA
→ Receiver → Server MTA

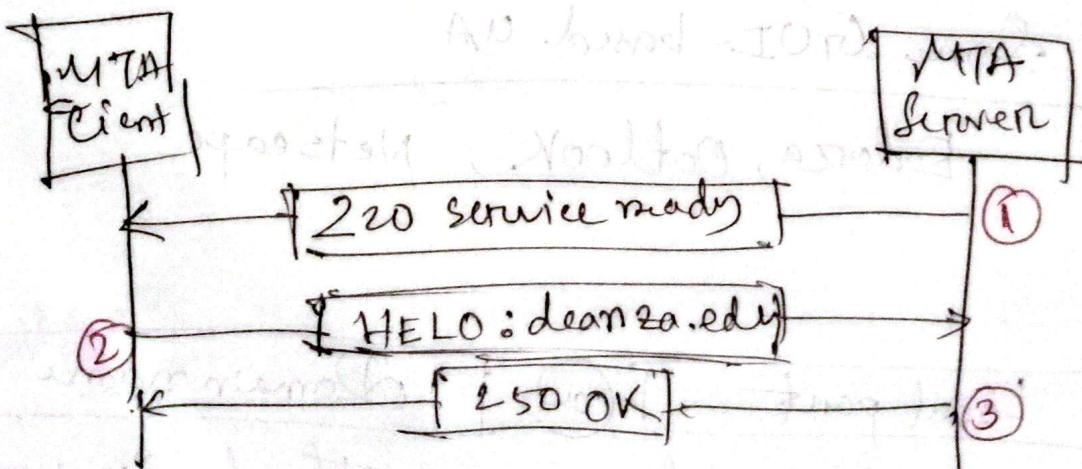


SMTP

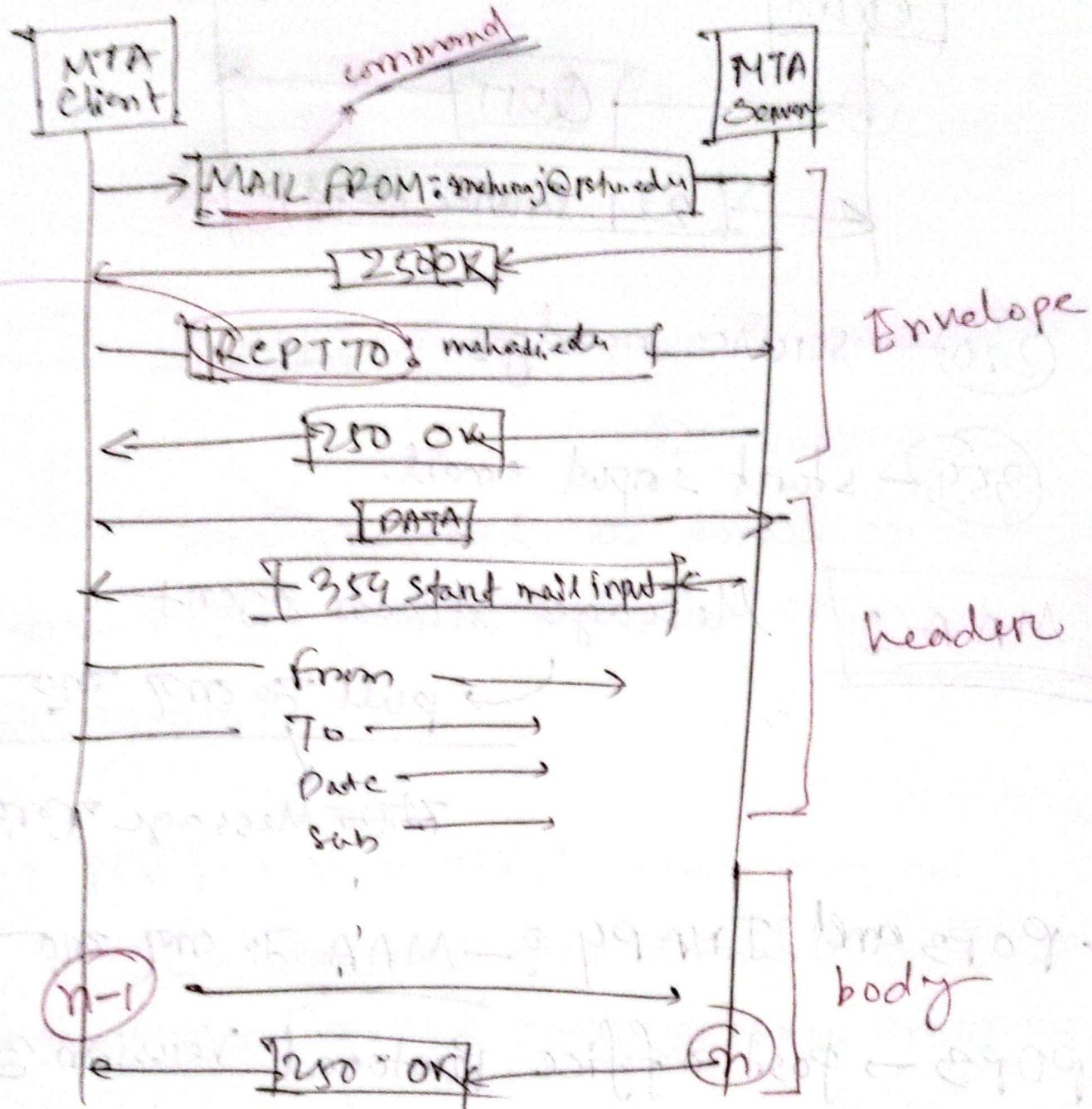
Simple Mail Transfer protocol.



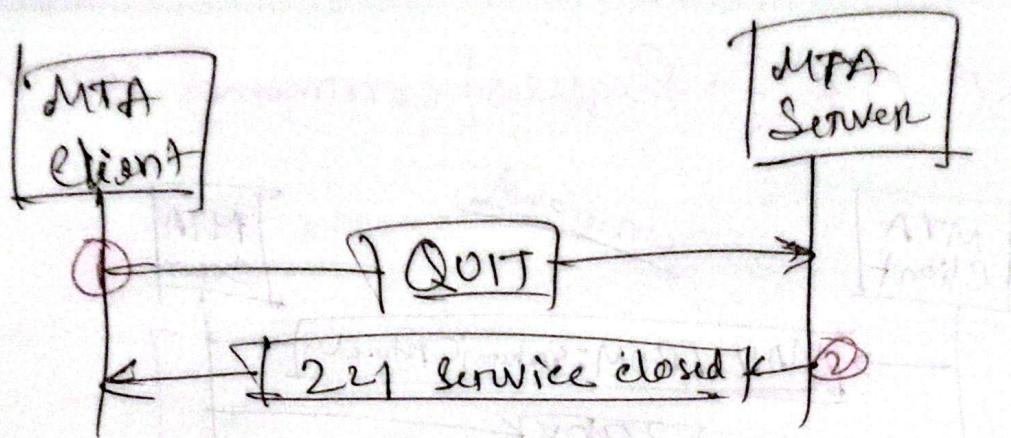
Connection establishment



250 OK → Request command complete.

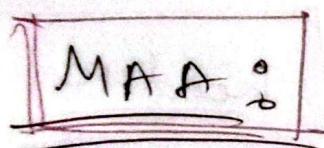


Connection termination



② 220 → service ready.

③ 354 → start input email.



Message Access Agent

→ pull ~~to~~ and ~~to~~

~~Message~~ ~~to~~ ~~to~~

⇒ POP3 and IMAP4 : — MAA to to.

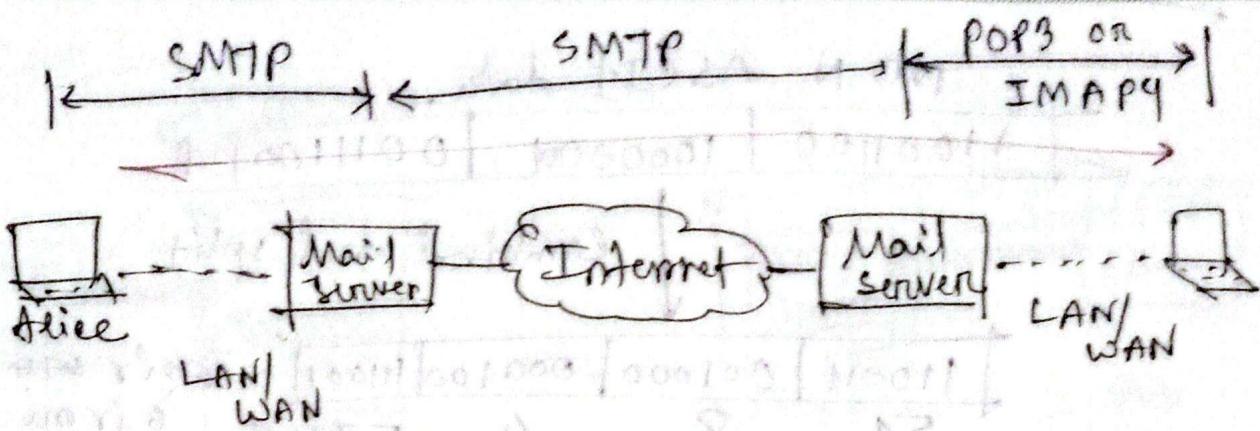
POP3 → Post office Protocol Version 3

↳ जाएं तो download एंग
ताका सेवा अपना एंग

IMAP4 →

Internet Message Access protocol.

→ email जिसे तो दो. जो view तो उसके sink
हो।



23-5: MIME Multipurpose Internet Mail Extension.

↳ transport protocol for email - ASCII
NON-ASCII (text, video, audio, text) works
→ works well.

→ NVT → Network Virtual Terminal

↳ Standard text interface (textual representation)

↳ configuration, error messages, control messages etc.

Base 64

NON ASCII data.

11001100 | 1000000 | 0011100 | F

↓ combined and split

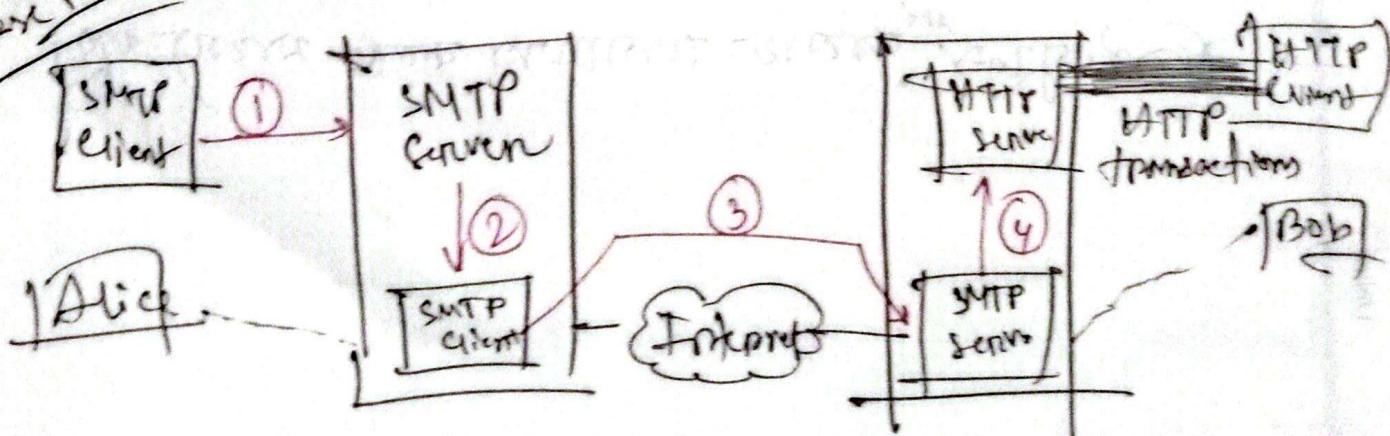
110011 | 001000 | 000100 | 11001 6 from
51 8 4 57

↓
Base-64 converter

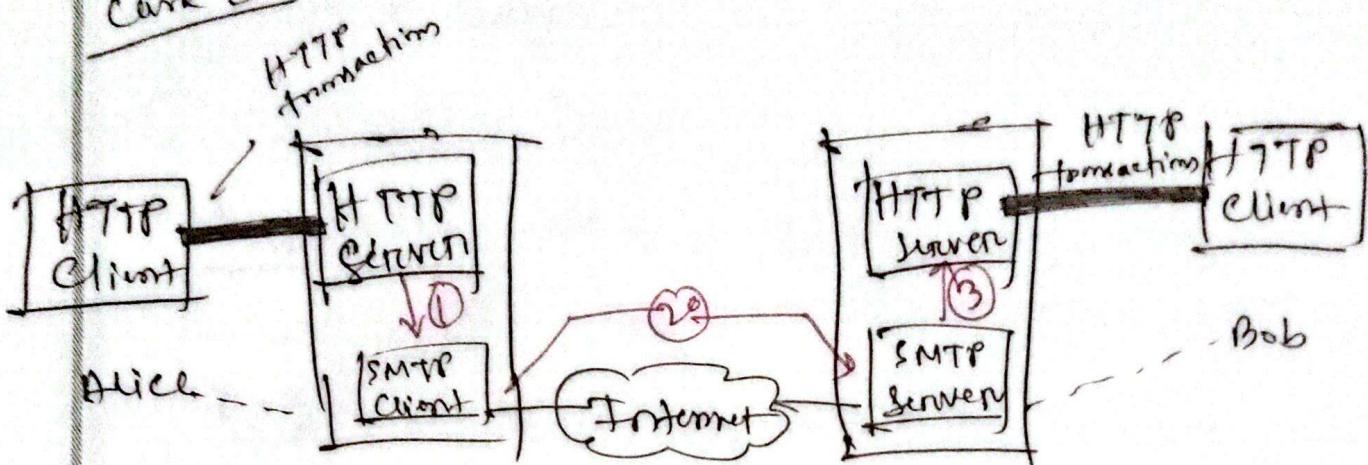
A B I L E S 5 character
order (not small ASCII data)

Web based: Hotmail, Yahoo, Google.

2 case: case I, case II



case 2



E-mail security b PGP 3 S/MIME

P G P → pretty good privacy

- ଡିମ୍‌ବେଳେ encrypted ରୋ
 - ଡିମ୍‌ବେ ନିର୍ମିତ ରୋ,

S/MIME: Secure / Multipurpose Internet Mail Extensions.

- MIME for security (Encryption + Authentication)
↳ Business / Enterprise email.