

E - MAIL



By

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EMAIL – Process

Behrouz Forouzan
De Anza College
Cupertino, CA 96014

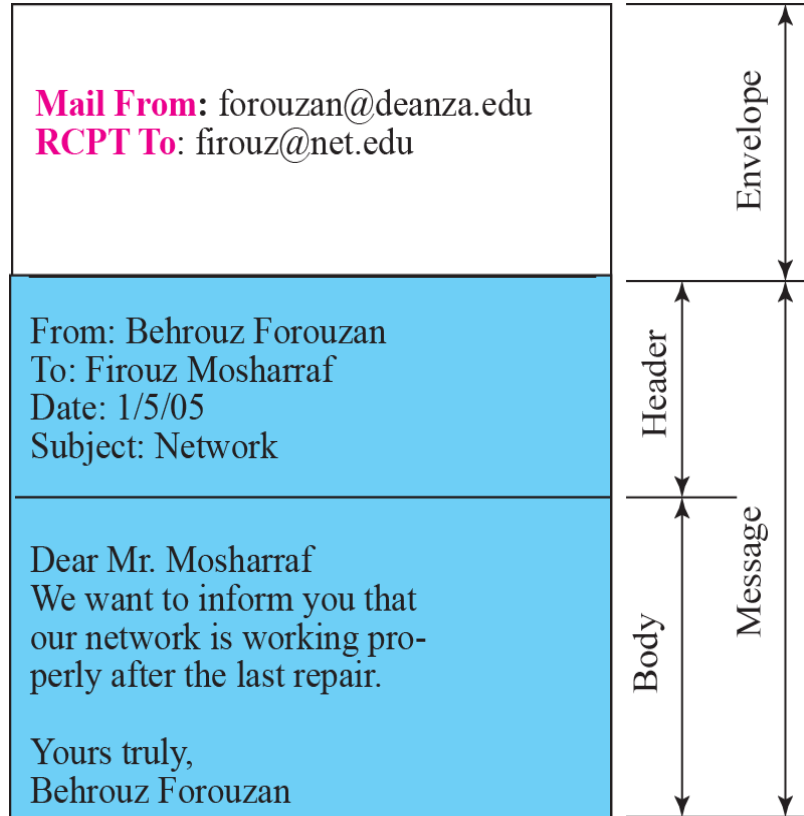
Firouz Mosharraf
Com-Net
Cupertino, CA 95014

Firouz Mosharraf
Com-Net
Cupertino, CA 95014
Jan. 5, 2005

Subject: Network

Dear Mr. Mosharraf
We want to inform you that
our network is working properly
after the last repair.

Yours truly,
Behrouz Forouzan



EMAIL – SMTP

First and Second stages of mail delivery use SMTP

SMTP is not involved in third stage SMTP

SMTP is a push protocol

SMTP pushes the message from the Client to the Server
In other words, the direction of the bulk data (messages) is from the client to the server

EMAIL – MAA

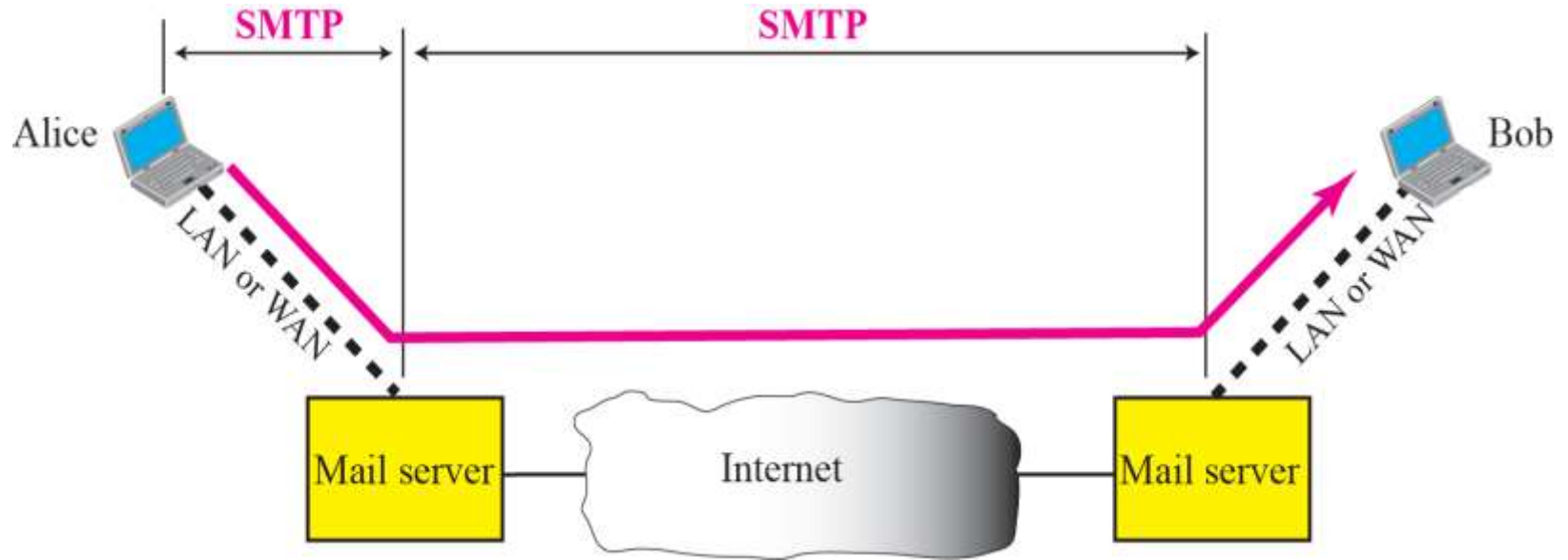
On the other hand, the third stage needs a pull protocol

The Client must Pull messages from the Server

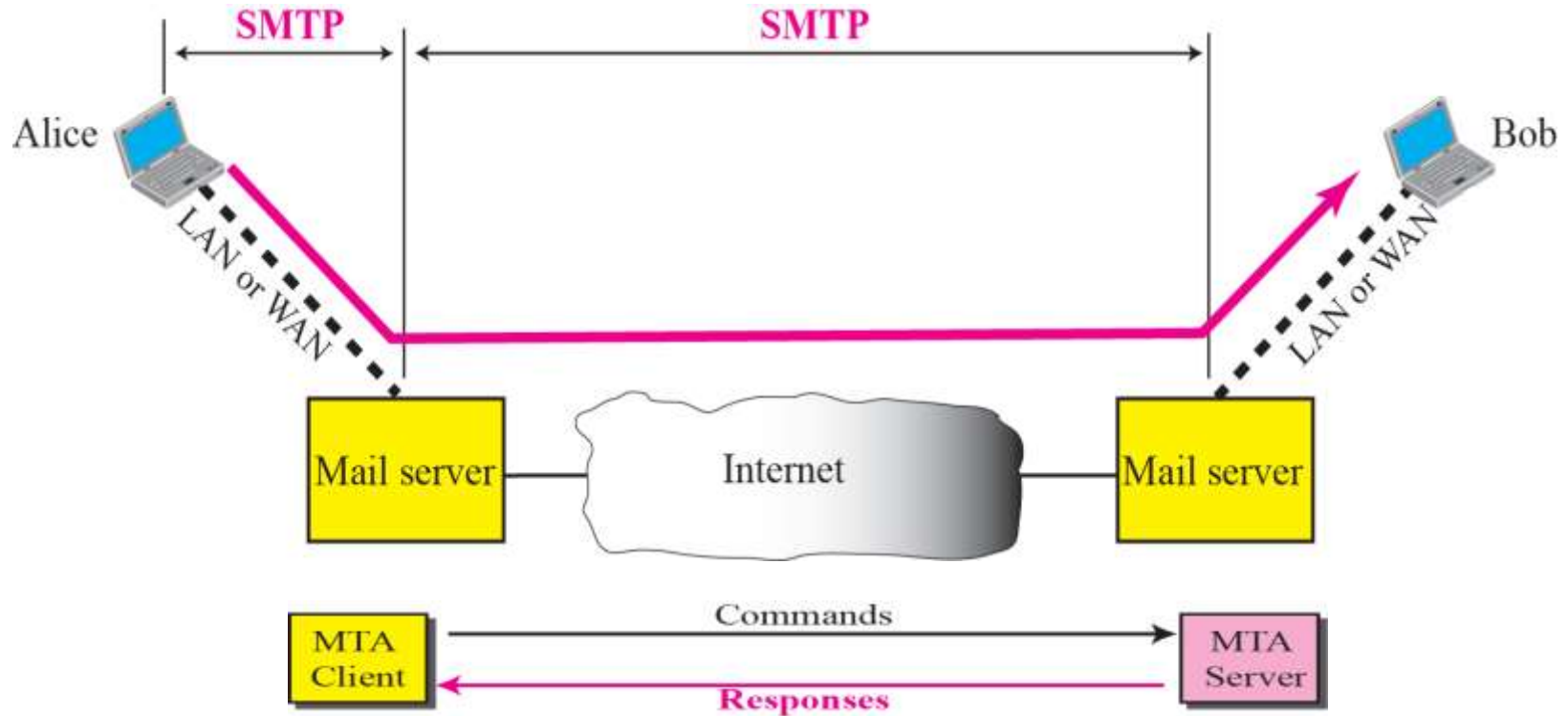
The direction of the bulk data are from the server to the client

The third stage uses a Message Access Agent

EMAIL – SMTP - Range



EMAIL – SMTP - Range



EMAIL – SMTP - Commands

Commands

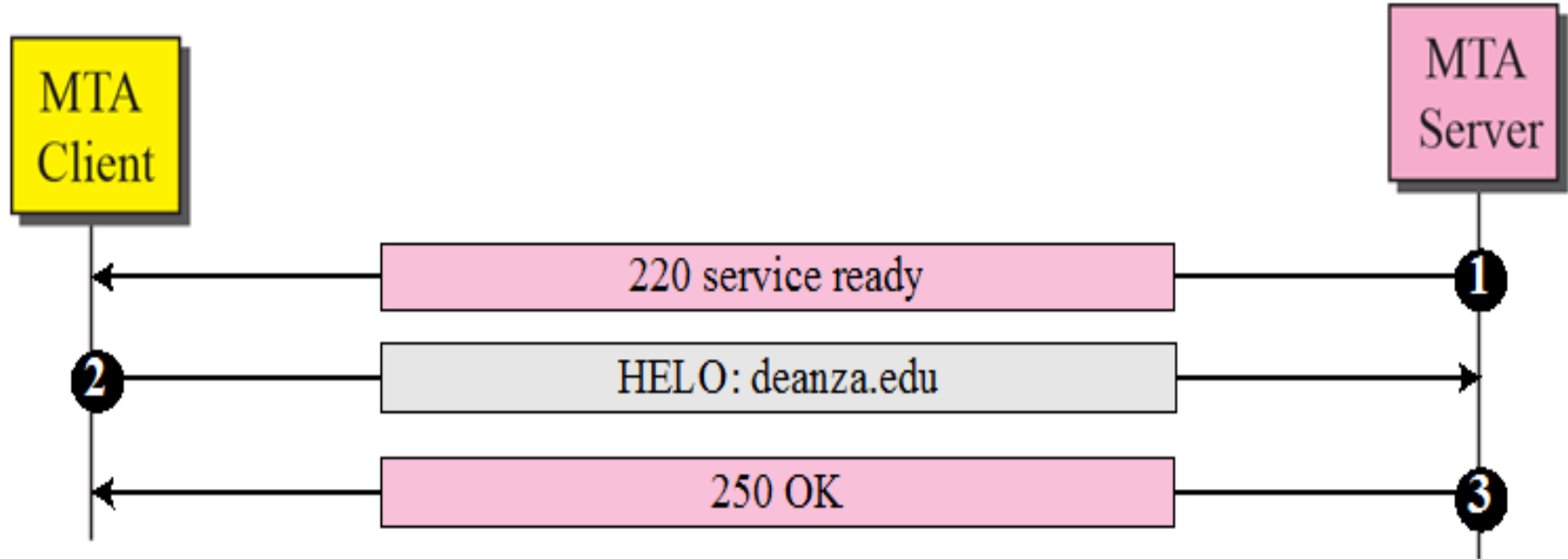
<i>Keyword</i>	<i>Argument(s)</i>	<i>Keyword</i>	<i>Argument(s)</i>
HELO	Sender's host name	NOOP	
MAIL FROM	Sender of the message	TURN	
RCPT TO	Intended recipient	EXPN	Mailing list
DATA	Body of the mail	HELP	Command name
QUIT		SEND FROM	Intended recipient
RSET		SMOL FROM	Intended recipient
VERFY	Name of recipient	SMAL FROM	Intended recipient

EMAIL – SMTP Responses

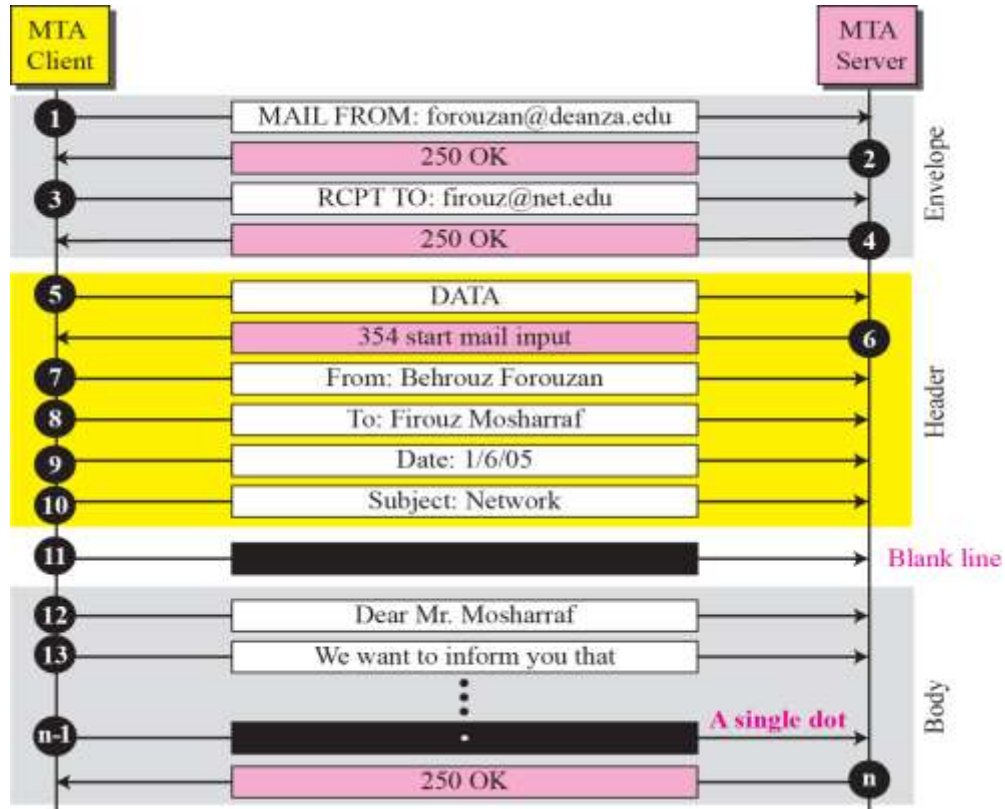
Responses

<i>Code</i>	<i>Description</i>
Positive Completion Reply	
211	System status or help reply
214	Help message
220	Service ready
221	Service closing transmission channel
250	Request command completed
251	User not local; the message will be forwarded
Positive Intermediate Reply	
354	Start mail input
Transient Negative Completion Reply	
421	Service not available
450	Mailbox not available
451	Command aborted: local error
452	Command aborted; insufficient storage
Permanent Negative Completion Reply	
500	Syntax error; unrecognized command
501	Syntax error in parameters or arguments
502	Command not implemented
503	Bad sequence of commands
504	Command temporarily not implemented
550	Command is not executed; mailbox unavailable
551	User not local
552	Requested action aborted; exceeded storage location
553	Requested action not taken; mailbox name not allowed
554	Transaction failed

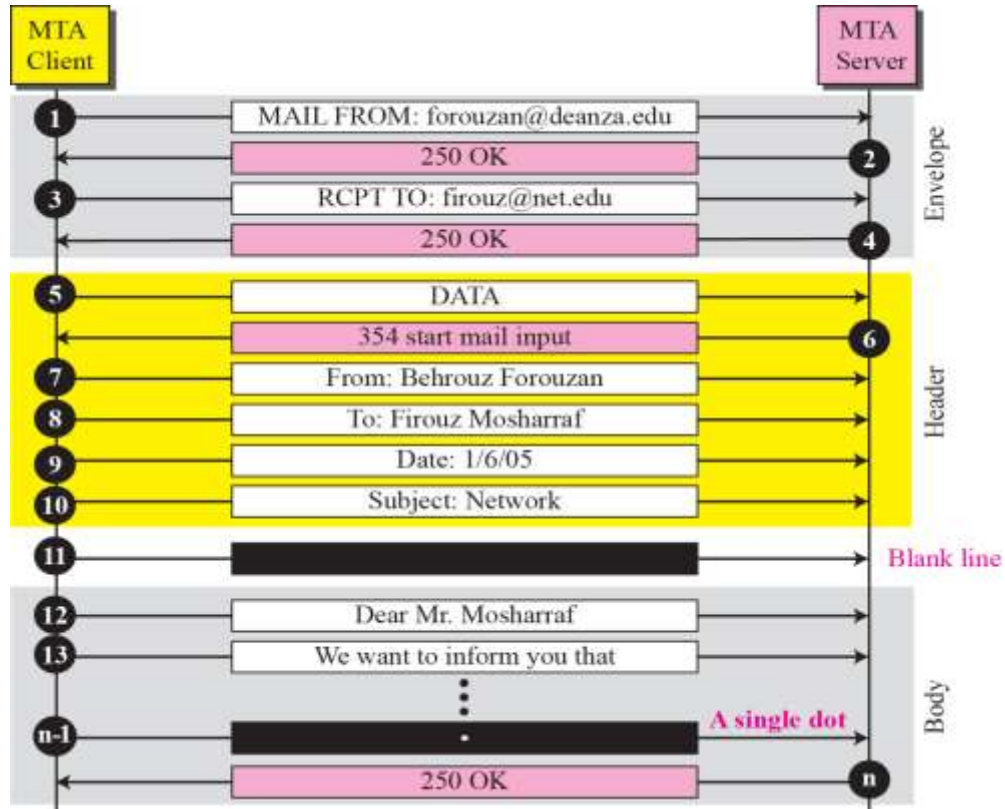
EMAIL – SMTP Connection Establishment



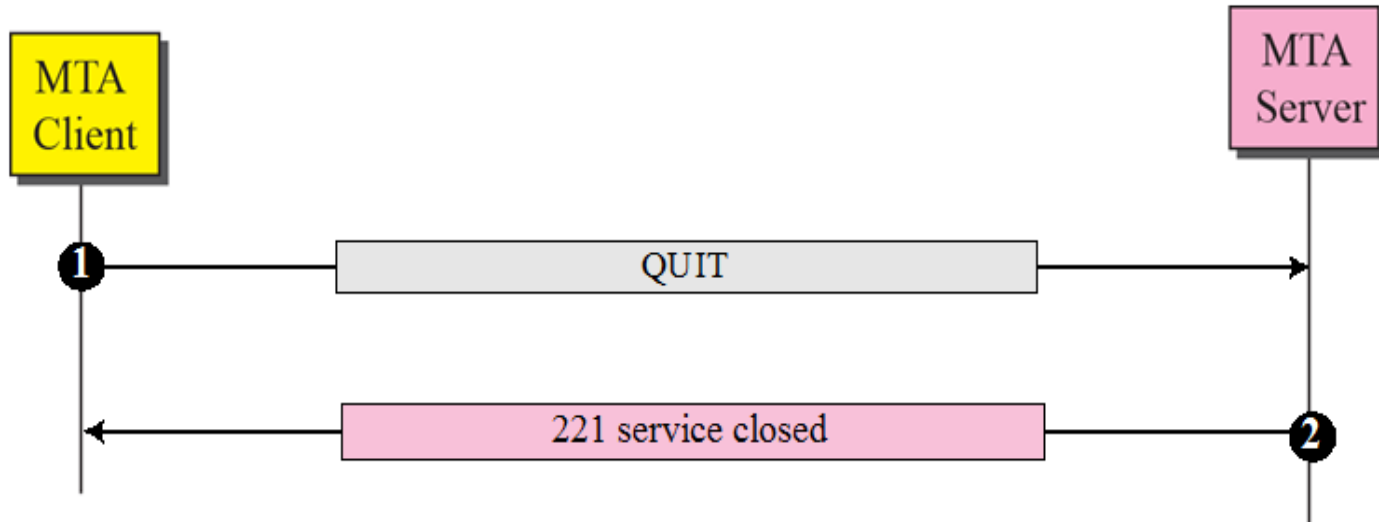
EMAIL – SMTP Message Transfer



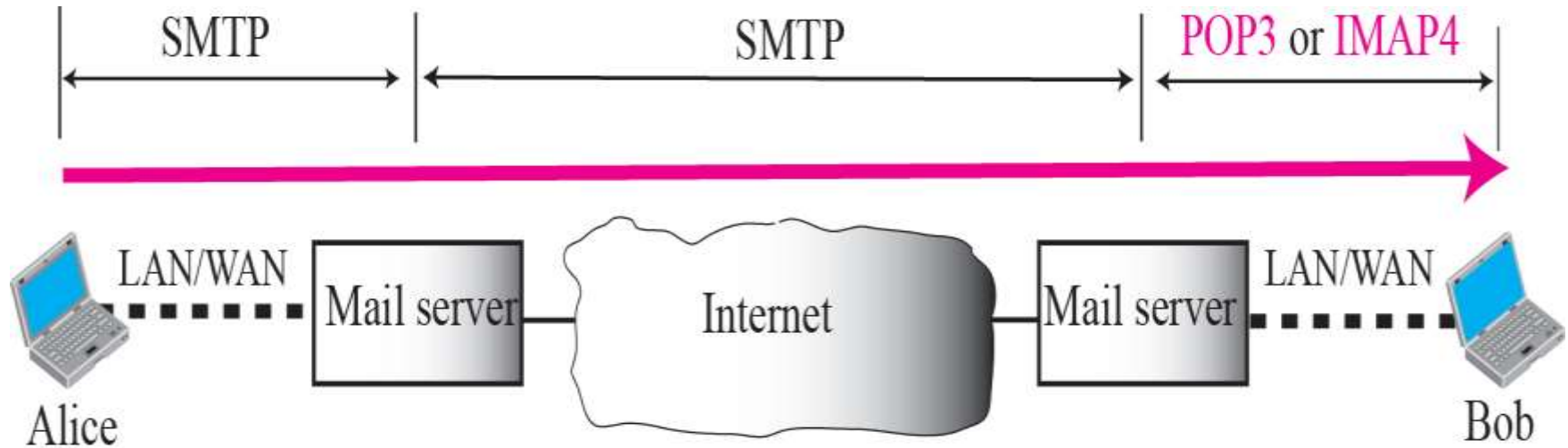
EMAIL – SMTP Message Transfer



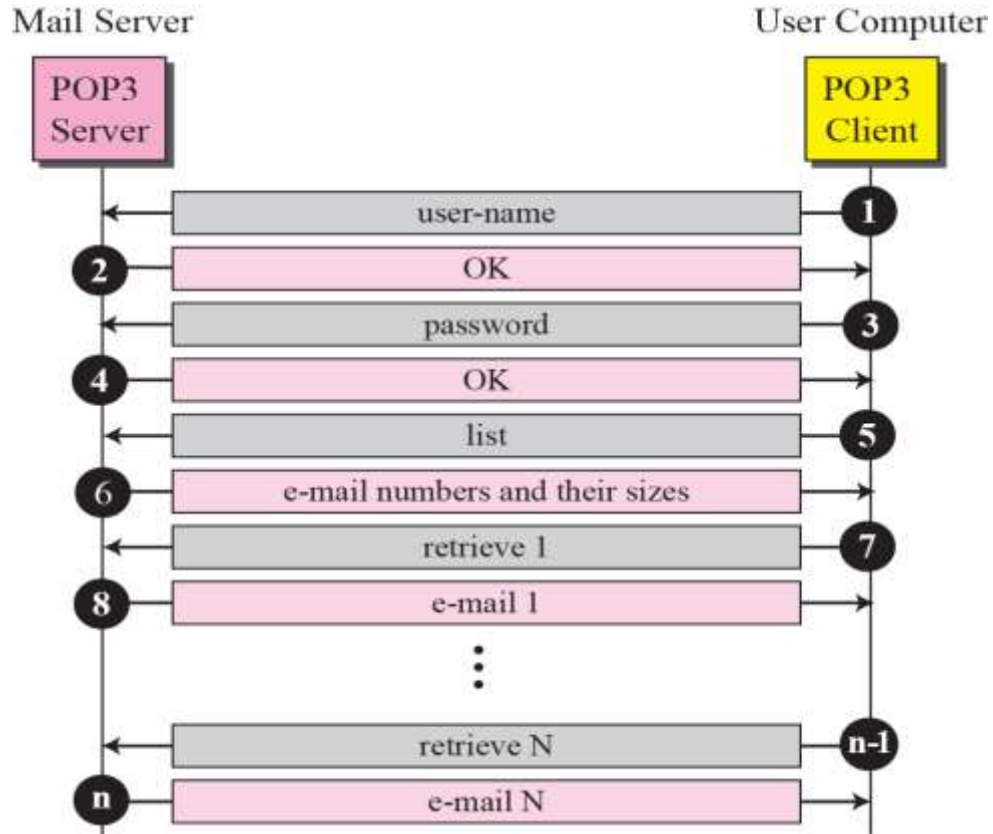
EMAIL – SMTP Connection Termination



EMAIL – POP3 or IMAP4



EMAIL – POP3 or IMAP4



EMAIL – MIME

Electronic mail has a simple structure

Its simplicity, however, comes with a price

It can send messages only in NVT 7-bit ASCII format

In other words, it has some limitations

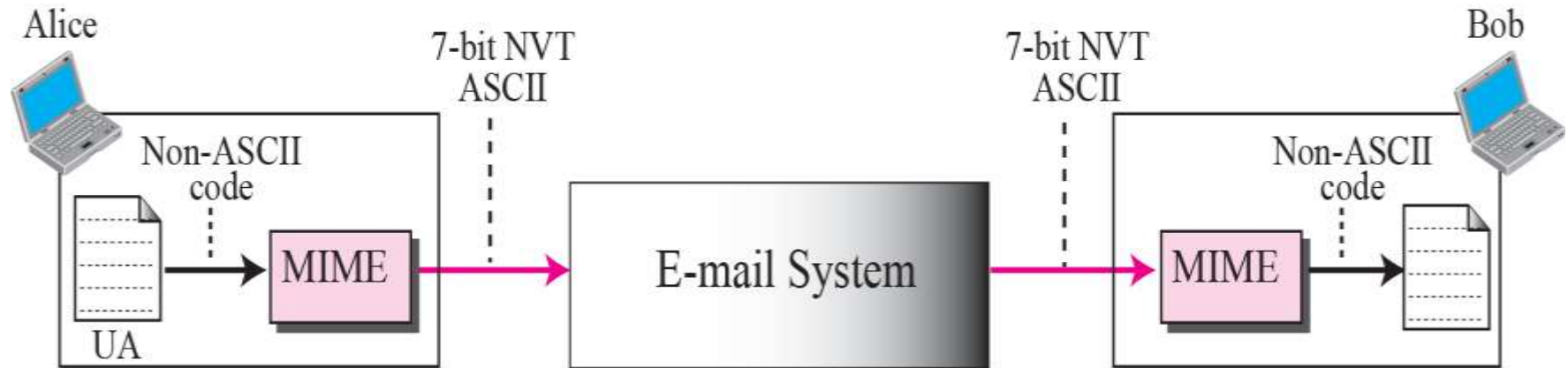
EMAIL – MIME

Multipurpose Internet Mail Extensions (MIME) is a supplementary protocol that allows non-ASCII data to be sent through e-mail.

MIME transforms non-ASCII data at the sender site to NVT ASCII data and delivers it to the client MTA to be sent through the Internet.

The message at the receiving site is transformed back

EMAIL – MIME



EMAIL – MIME

MIME headers

E-mail header
MIME-Version: 1.1 Content-Type: type/subtype Content-Transfer-Encoding: encoding type Content-Id: message id Content-Description: textual explanation of nontextual contents
E-mail body

EMAIL – MIME

Data Types and Subtypes in MIME

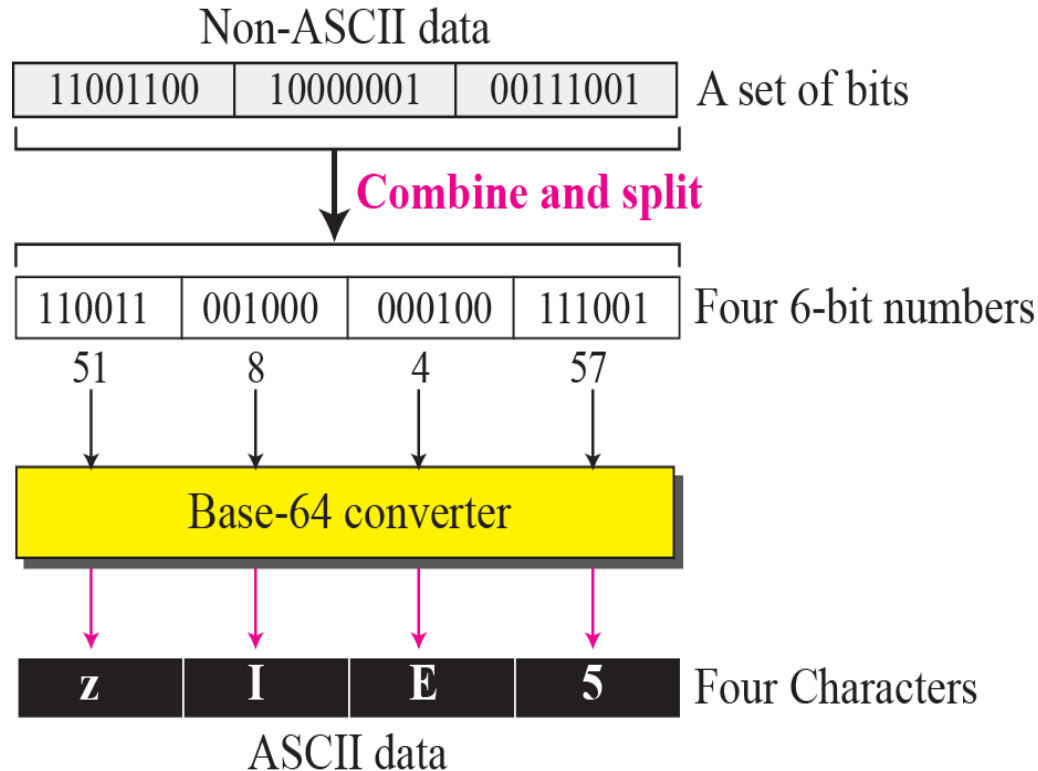
<i>Type</i>	<i>Subtype</i>	<i>Description</i>
Text	Plain	Unformatted
	HTML	HTML format (see Appendix E)
Multipart	Mixed	Body contains ordered parts of different data types
	Parallel	Same as above, but no order
	Digest	Similar to Mixed, but the default is message/RFC822
	Alternative	Parts are different versions of the same message
Message	RFC822	Body is an encapsulated message
	Partial	Body is a fragment of a bigger message
	External-Body	Body is a reference to another message
Image	JPEG	Image is in JPEG format
	GIF	Image is in GIF format
Video	MPEG	Video is in MPEG format
Audio	Basic	Single channel encoding of voice at 8 KHz
Application	PostScript	Adobe PostScript
	Octet-stream	General binary data (eight-bit bytes)

EMAIL – MIME

Content-Transfer-Encoding

<i>Type</i>	<i>Description</i>
7bit	NVT ASCII characters and short lines
8bit	Non-ASCII characters and short lines
Binary	Non-ASCII characters with unlimited-length lines
Base64	6-bit blocks of data are encoded into 8-bit ASCII characters
Quoted-printable	Non-ASCII characters are encoded as an equal sign plus an ASCII code

EMAIL – MIME

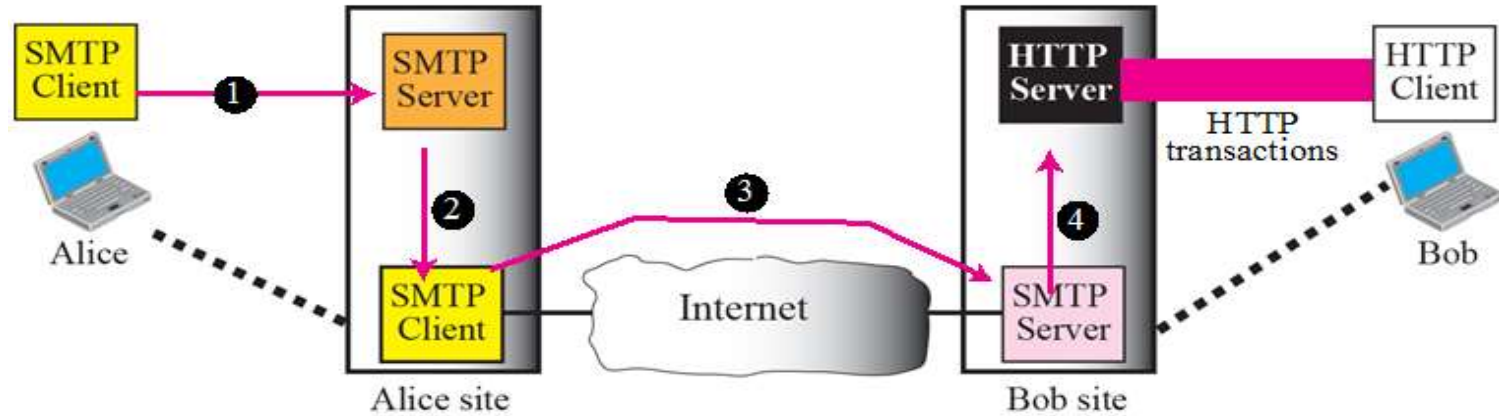


EMAIL – MIME

Base-64 Converting Table

<i>Value</i>	<i>Code</i>	<i>Value</i>	<i>Code</i>	<i>Value</i>	<i>Code</i>	<i>Value</i>	<i>Code</i>	<i>Value</i>	<i>Code</i>	<i>Value</i>	<i>Code</i>
0	A	11	L	22	W	33	h	44	s	55	3
1	B	12	M	23	X	34	i	45	t	56	4
2	C	13	N	24	Y	35	j	46	u	57	5
3	D	14	O	25	Z	36	k	47	v	58	6
4	E	15	P	26	a	37	l	48	w	59	7
5	F	16	Q	27	b	38	m	49	x	60	8
6	G	17	R	28	c	39	n	50	y	61	9
7	H	18	S	29	d	40	o	51	z	62	+
8	I	19	T	30	e	41	p	52	0	63	/
9	J	20	U	31	f	42	q	53	1		
10	K	21	V	32	g	43	r	54	2		

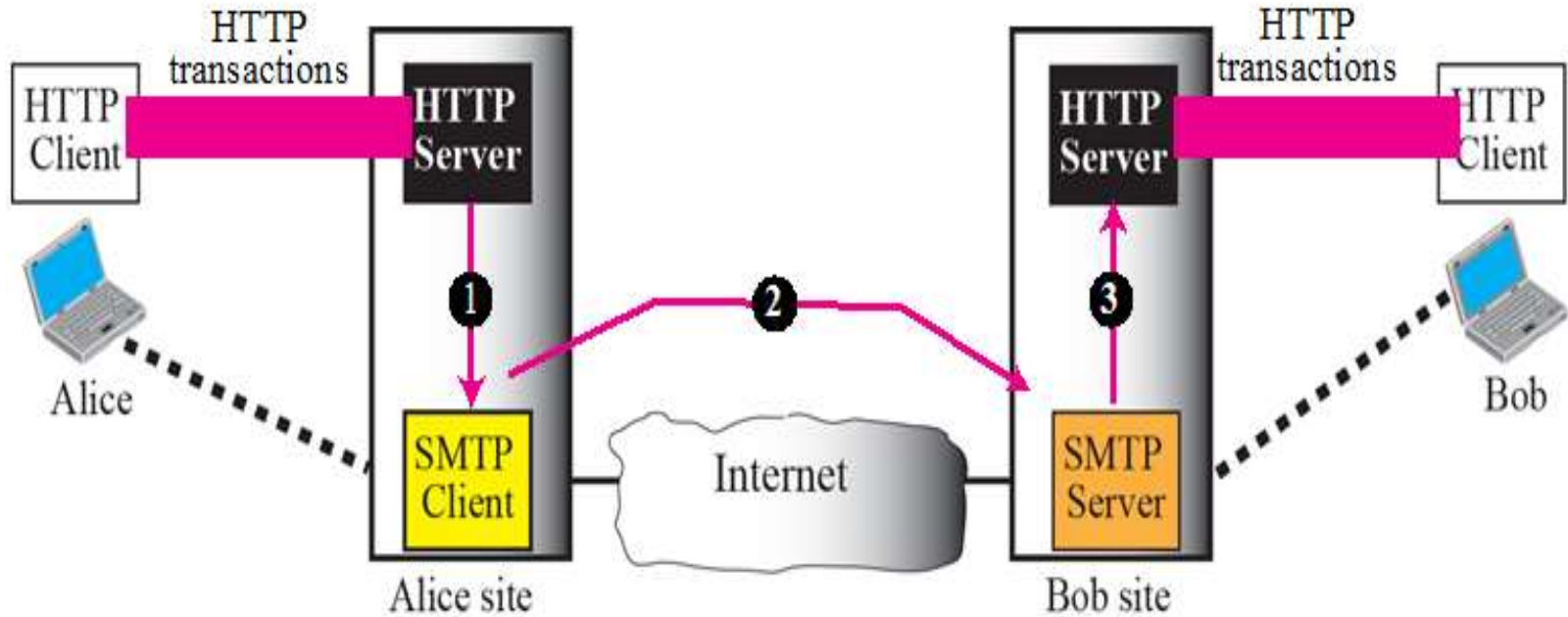
EMAIL – Web Based - Scenario 1



Websites provide E-mail service who accesses the site

Common sites: Hotmail, Yahoo, and Google.

EMAIL – Web Based – Scenario 2



EMAIL – Security

Pretty Good Privacy (PGP)

Secure MIME (S/MIME)

References

- ✓ Books: Data communication and Networking, Behrouz A Forouzan, Fourth edition
- ✓ Computer Networks, Andrew S. Tanenbaum, 4th edition, PHI
- ✓ Data Communication and Networks, Achyut Godbole, 2007, TMH.
- ✓ Computer Networks: Protocols, Standards, and Interfaces, Uyles Black, 2nd ed, PHI
- ✓ Various relevant websites

Thank You