POP3

- **Post Office Protocol, version 3 (POP3)** is simple but limited in functionality. The clientPOP3 software is installed on the recipient computer; the server POP3 software is installed on the mail server.

- Mail access starts with the client when the user needs to download its e-mail from the mailbox on the mail server. The client opens a connection to the server on TCP port 110.It then sends its user name and password to access the mailbox.

- The user can then list and retrieve the mail messages, one by one.

- POP3 has two modes: the *delete* mode and the *keep* mode.

- In the delete mode, the mail is deleted from the mailbox after each retrieval. In the keep mode, the mail remains in the mailbox after retrieval.

- The delete mode is normally used when the user is working at her permanent computer.

IMAP4

- Another mail access protocol is **Internet Mail Access Protocol, version 4 (IMAP4).**IMAP4 is similar to POP3, but it has more features; IMAP4 is more powerful and more complex.

- POP3 is deficient in several ways. It does not allow the user to organize her mail on the server; the user cannot have different folders on the server. In addition, POP3 does not allow the user to partially check the contents of the mail before downloading.

IMAP4 provides the following extra functions:

- ✓ A user can check the e-mail header prior to downloading.

- ✓ A user can search the contents of the e-mail for a specific string of characters priorto downloading.

- ✓ A user can partially download e-mail. This is especially useful if bandwidth is limited and the e-mail contains multimedia with high bandwidth requirements.

- ✓ A user can create, delete, or rename mailboxes on the mail server.

- ✓ A user can create a hierarchy of mailboxes in a folder for e-mail storage.

MIME:

- Electronic mail has a simple structure. **Multipurpose Internet Mail Extensions (MIME)** is a supplementary protocol that allows non-ASCII data to be sent through e-mail.
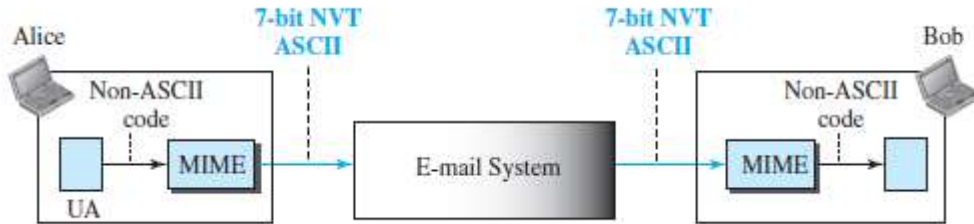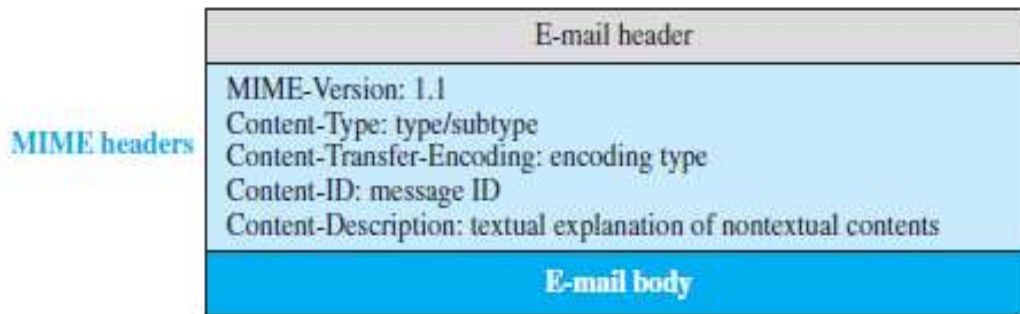
Fig: MIME.

MIME Headers:

Fig: MIME header.

MIME-Version:

- This header defines the version of MIME used.

Content-Type:

- This header defines the type of data used in the body of the message. The content type and the content subtype are separated by a slash.

Table: Data types and subtypes in MIME.

Type	Subtype	Description
Text	Plain	Unformatted
	HTML	HTML format (see Appendix C)
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

Type	Subtype	Description
		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
Type	**Subtype**	**Description**
Video		
Audio		
Application	PostScript	Adobe PostScript
	Octet-stream	General binary data (eight-bit bytes)

Table: Data Types and subtypes in MIME.

Content-Transfer-Encoding:

- This header defines the method used to encode the messagesinto 0s and 1s for transport. The five types of encoding methods are listed in table.

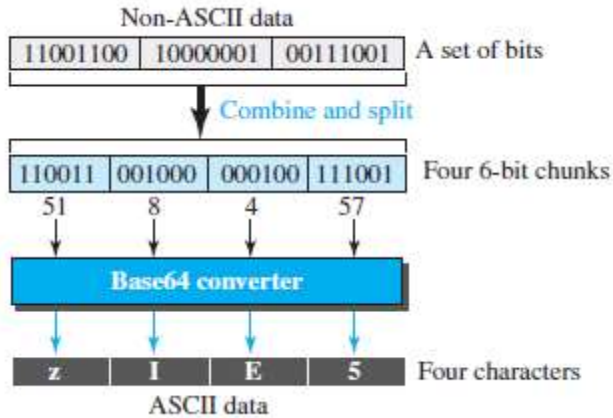| Type	Description
7-bit	NVT ASCII characters with each line less than 1000 characters
8-bit	Non-ASCII characters with each line less than 1000 characters
Binary	Non-ASCII characters with unlimited-length lines
Base64	6-bit blocks of data encoded into 8-bit ASCII characters
Quoted-printable	Non-ASCII characters encoded as an equal sign plus an ASCII code

Table: Methods for Content- Transfer – Encoding.

Fig: Base64 Conversion.

Content-ID:

- This header uniquely identifies the whole message in a multiple message environment.

Content-Description

- This header defines whether the body is image, audio, or video.
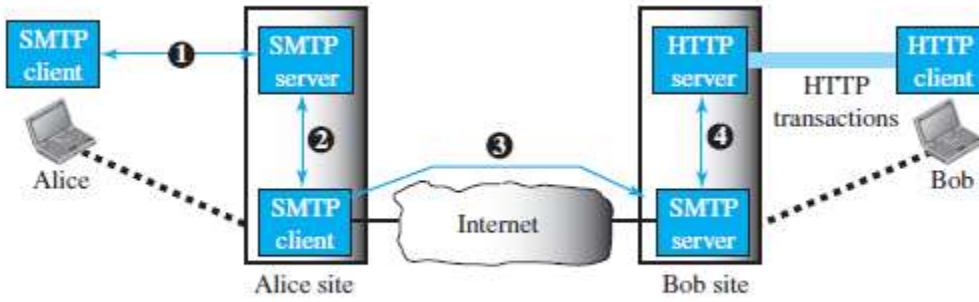
Web-Based Mail:

- E-mail is such a common application that some websites today provide this service to anyone who accesses the site. Three common sites are Hotmail, Yahoo, and Googlemail.
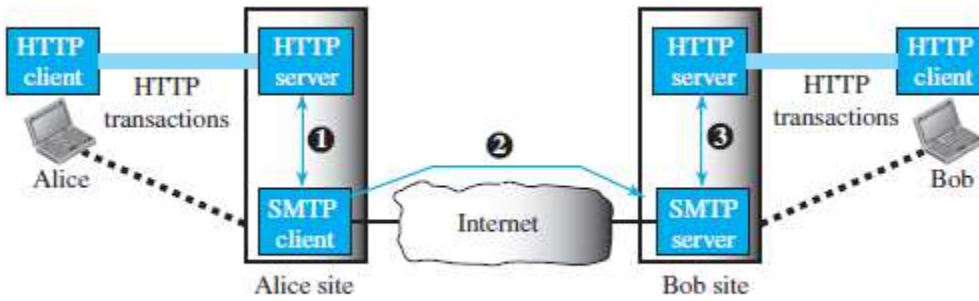
Case I

- In the first case, Alice, the sender, uses a traditional mail server; Bob, the receiver, has an account on a web-based server. Mail transfer from Alice's browser to her mail server is done through SMTP. The transfer of the message from the sending mail server to the receiving mail server is still through SMTP.

- However, the message from the receiving server (the web server) to Bob's browser is done through HTTP. In other words, instead of using POP3 or IMAP4, HTTP is normally used.

Case II:

- In the second case, both Alice and Bob use web servers, but not necessarily the same server. Alice sends the message to the web server using HTTP transactions. Alice sends an HTTP request message to her web server using the name and address of Bob's mailbox as the URL.

- The server at the Alice site passes the message to the SMTP client and sends it to the server at the Bob site using SMTP protocol. Bob receives the message using HTTP transactions.

- However, the message from the server at the Alice site to the server at the Bob site still takes place using SMTP protocol.

Fig: Web- based e-mail, cases I and II.