

Lecture No 5

ELECTRONIC MAIL

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One of the most popular Internet services is electronic mail (e-mail). The designers of the Internet probably never imagined the popularity of this application program. Its architecture consists of several components that we discuss in this chapter.

Topics discussed in this section:

Architecture

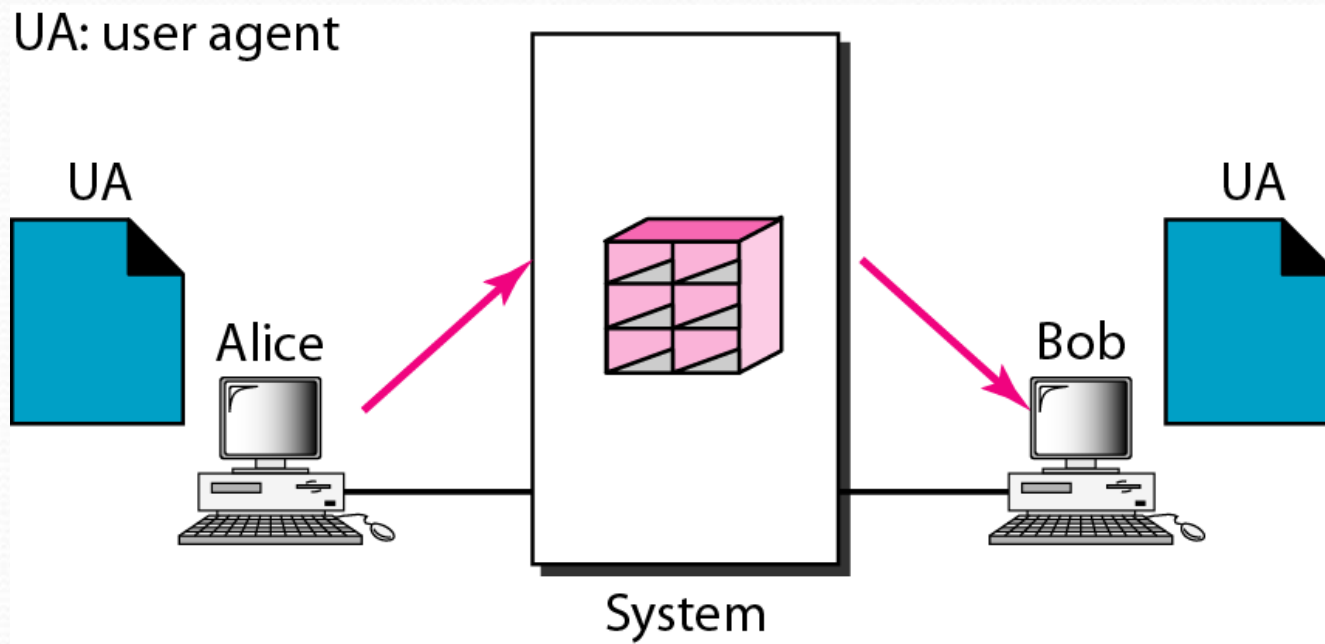
User Agent

Message Transfer Agent: SMTP

Message Access Agent: POP and IMAP

Web-Based Mail

First scenario in electronic mail



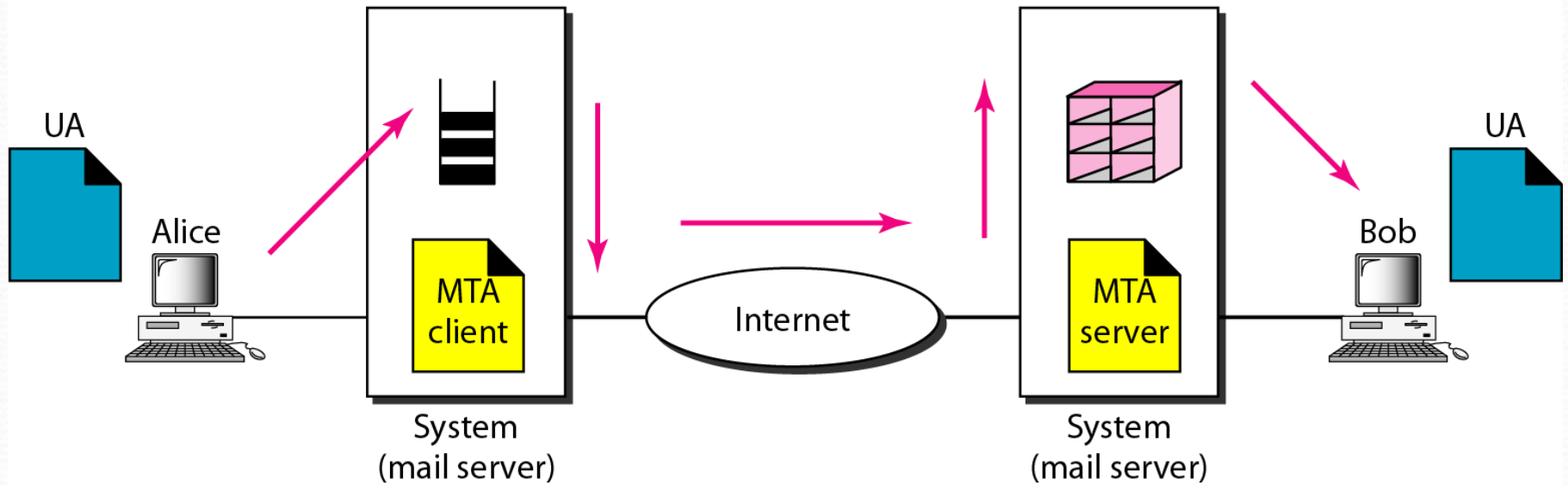


Note

When the sender and the receiver of an e-mail are on the same system, we need only two user agents.

Second scenario in electronic mail

UA: user agent
MTA: message transfer agent

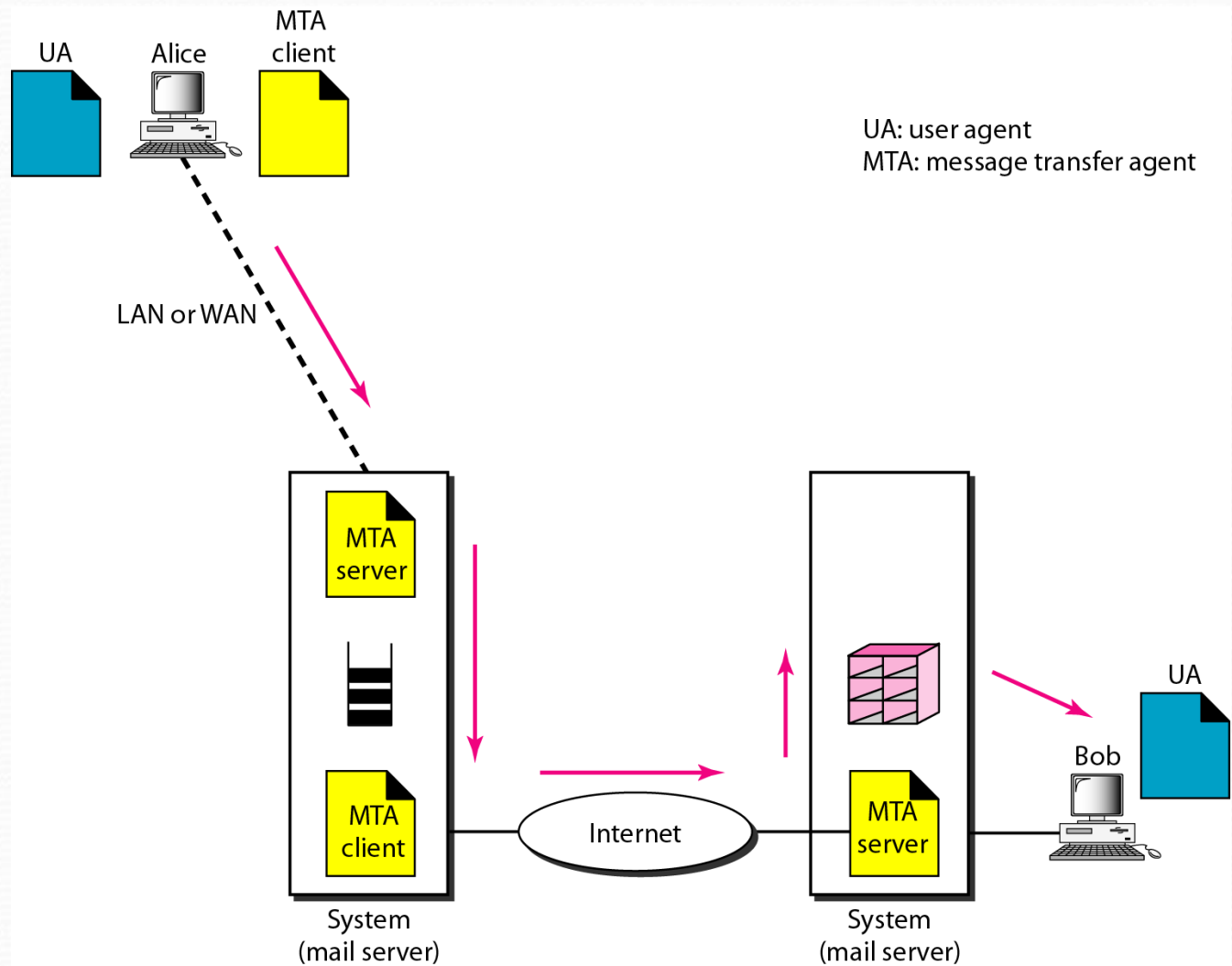




Note

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

Third scenario in electronic mail

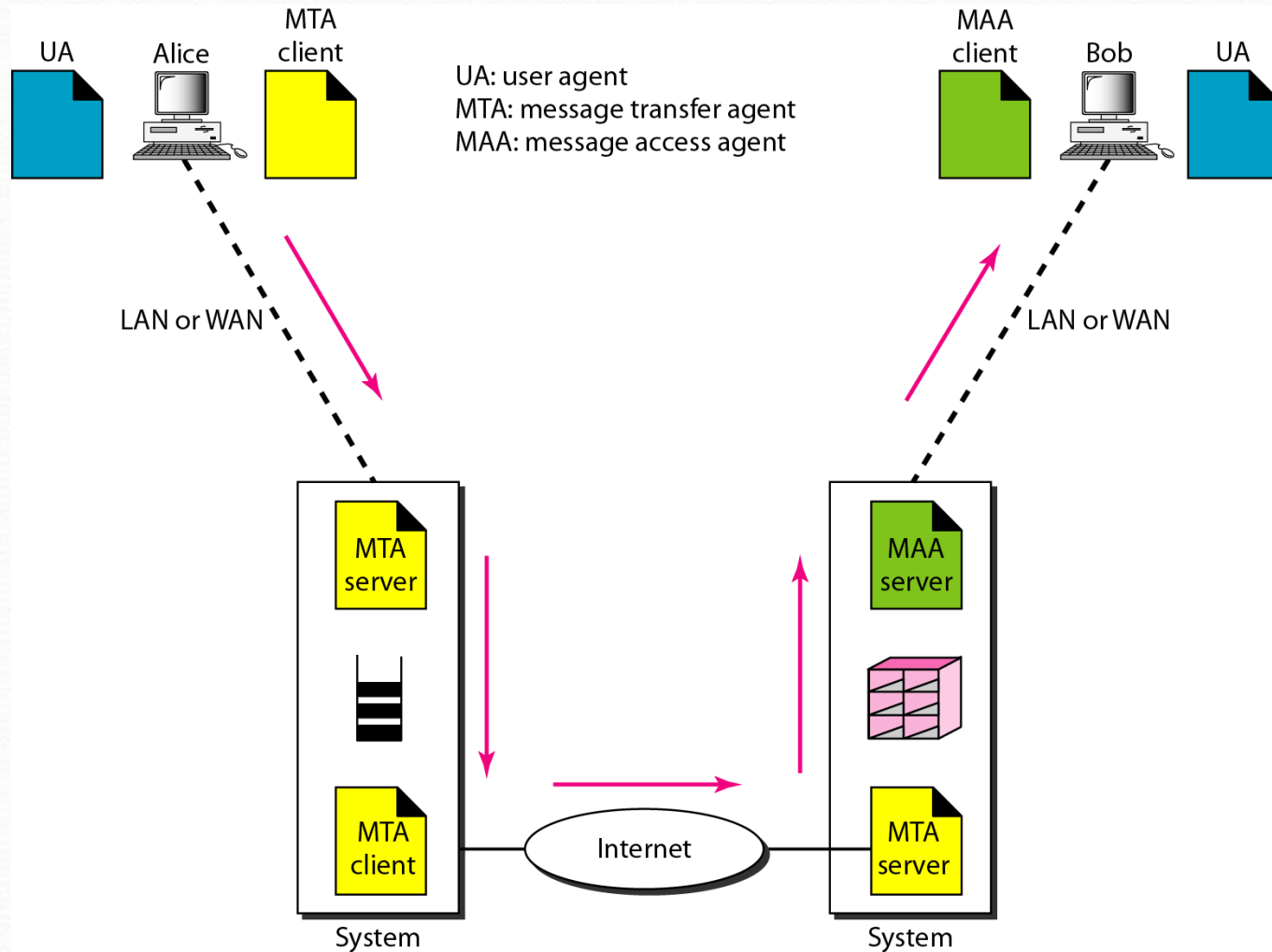




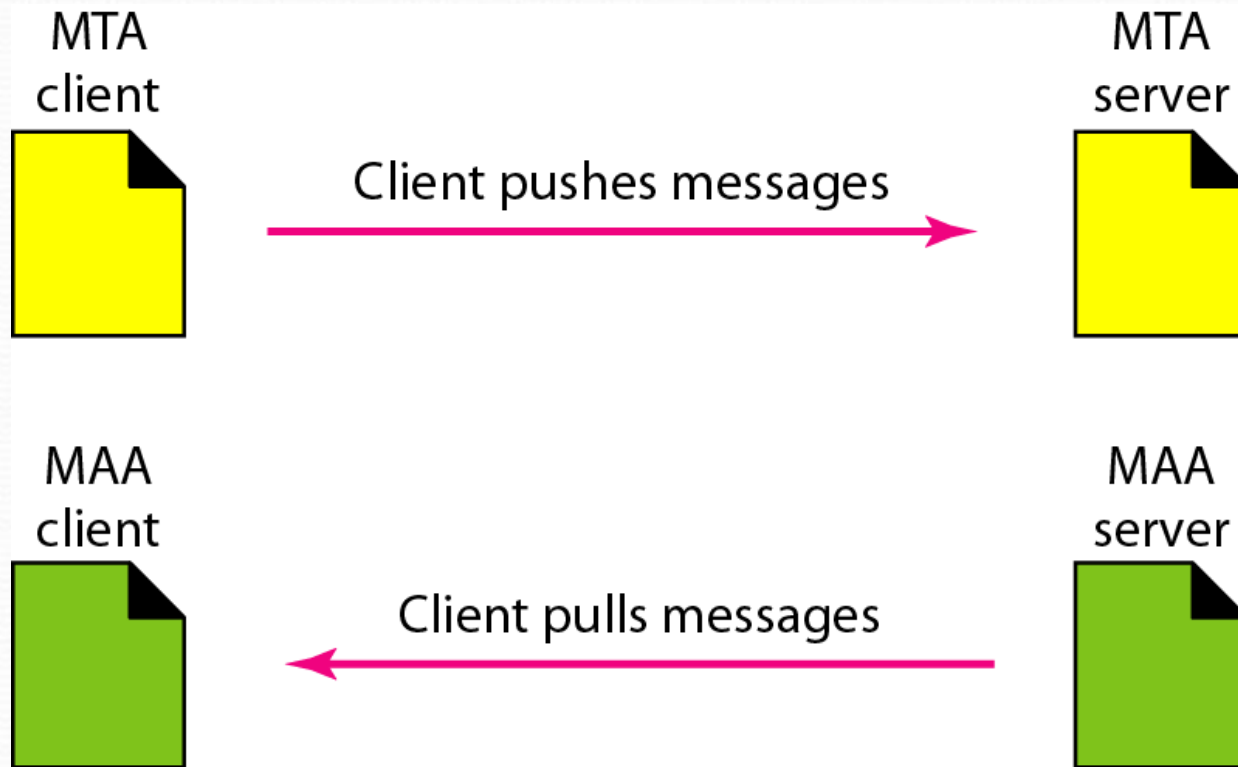
Note

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

Fourth scenario in electronic mail



Push versus pull in electronic email



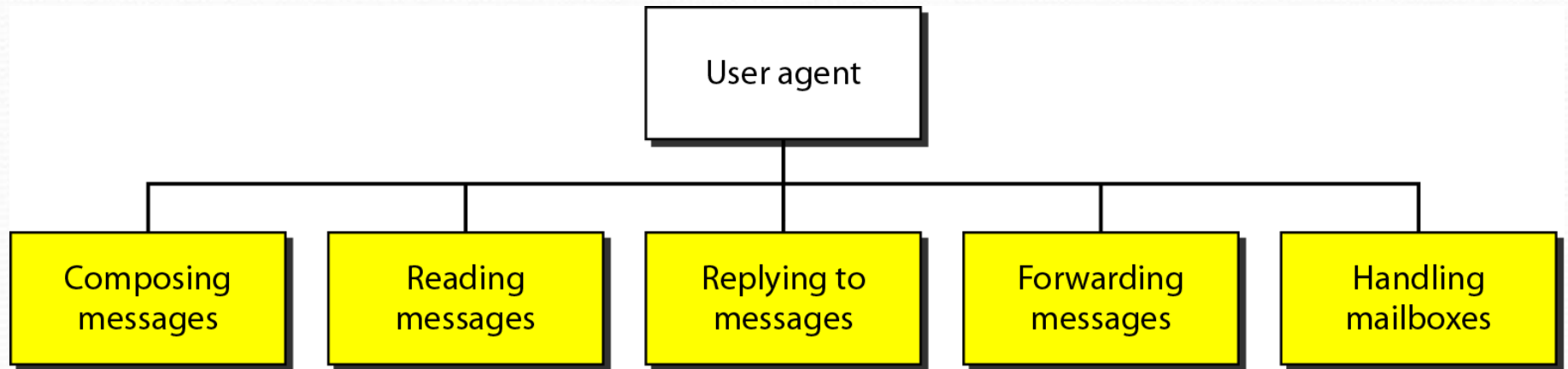


Note

When both sender and receiver are connected to the mail server via a LAN or a WAN, we need two UAs, two pairs of MTAs and a pair of MAAs.

This is the most common situation today.

Services of user agent





Note

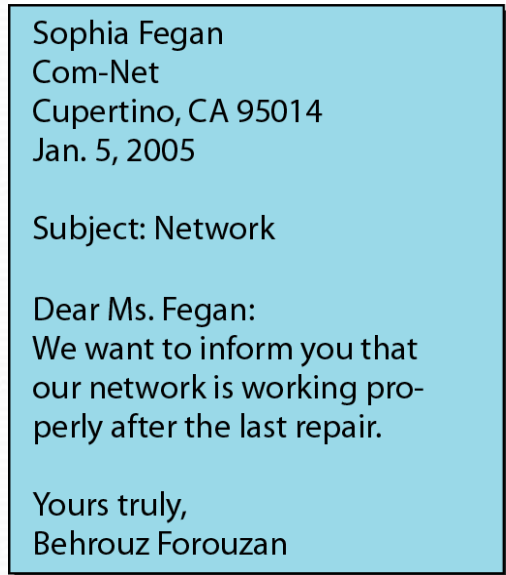
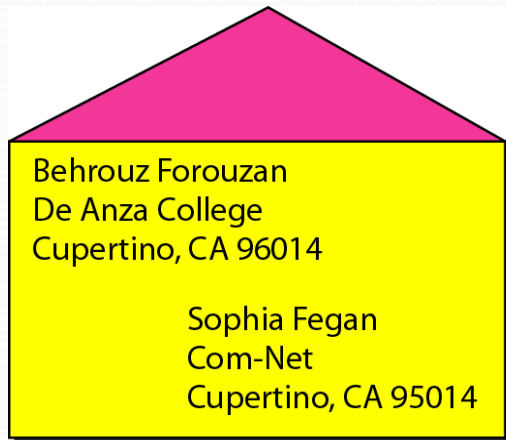
Some examples of command-driven user agents are *mail*, *pine*, and *elm*.



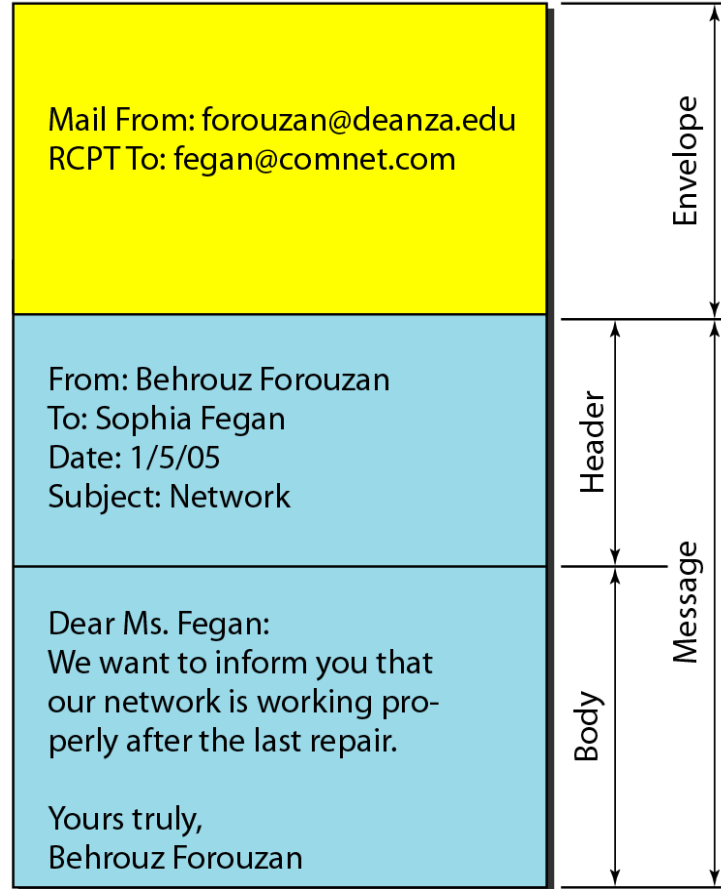
Note

Some examples of GUI-based user agents are *Eudora*, *Outlook*, and *Netscape*.

Format of an e-mail

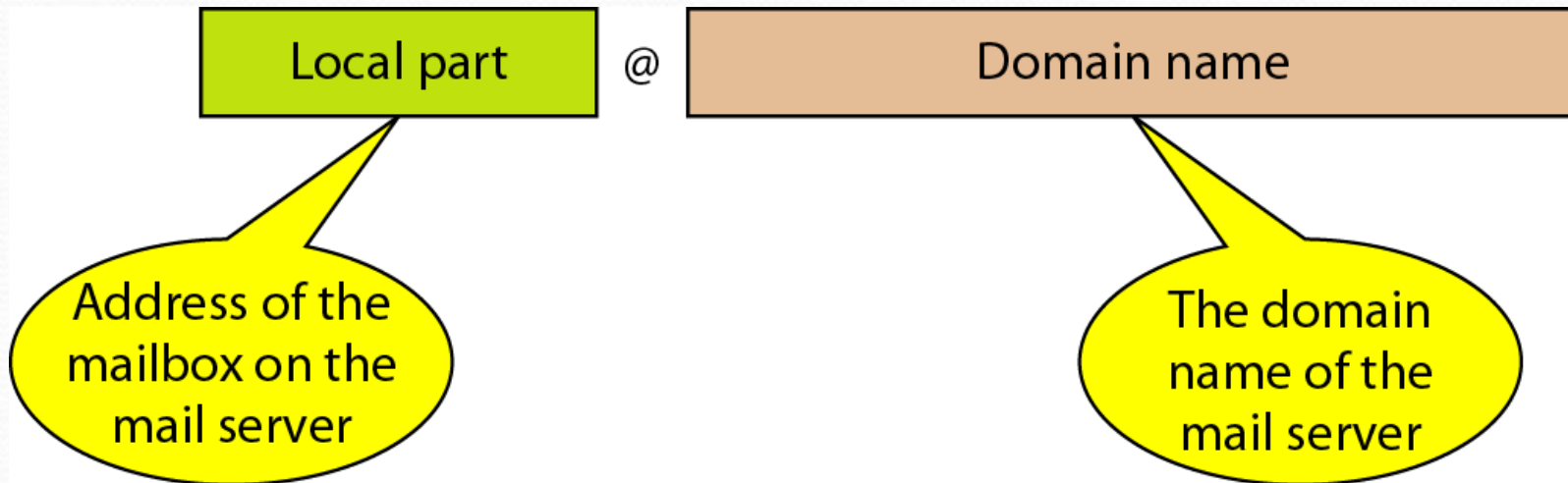


a. Postal mail

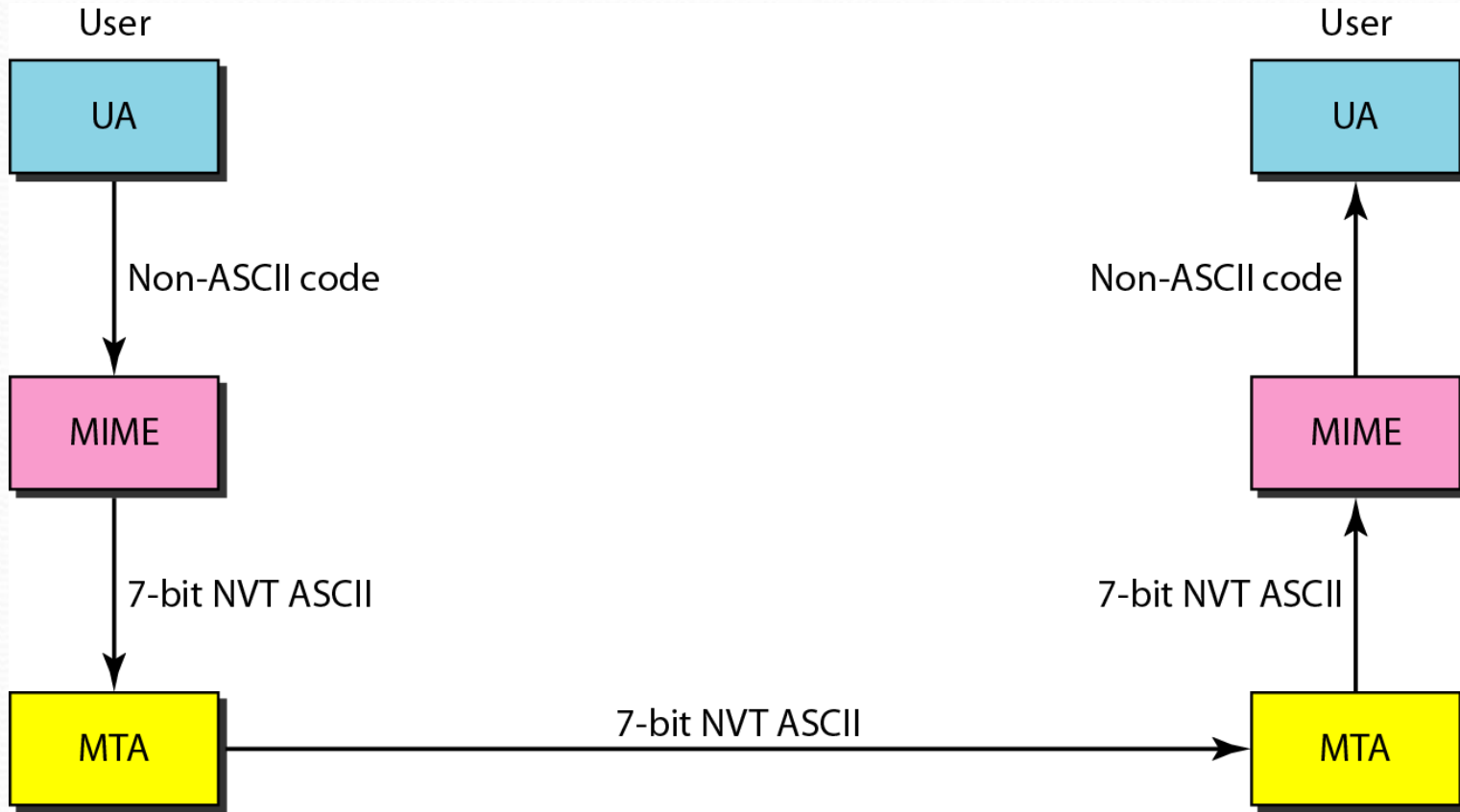


b. Electronic mail

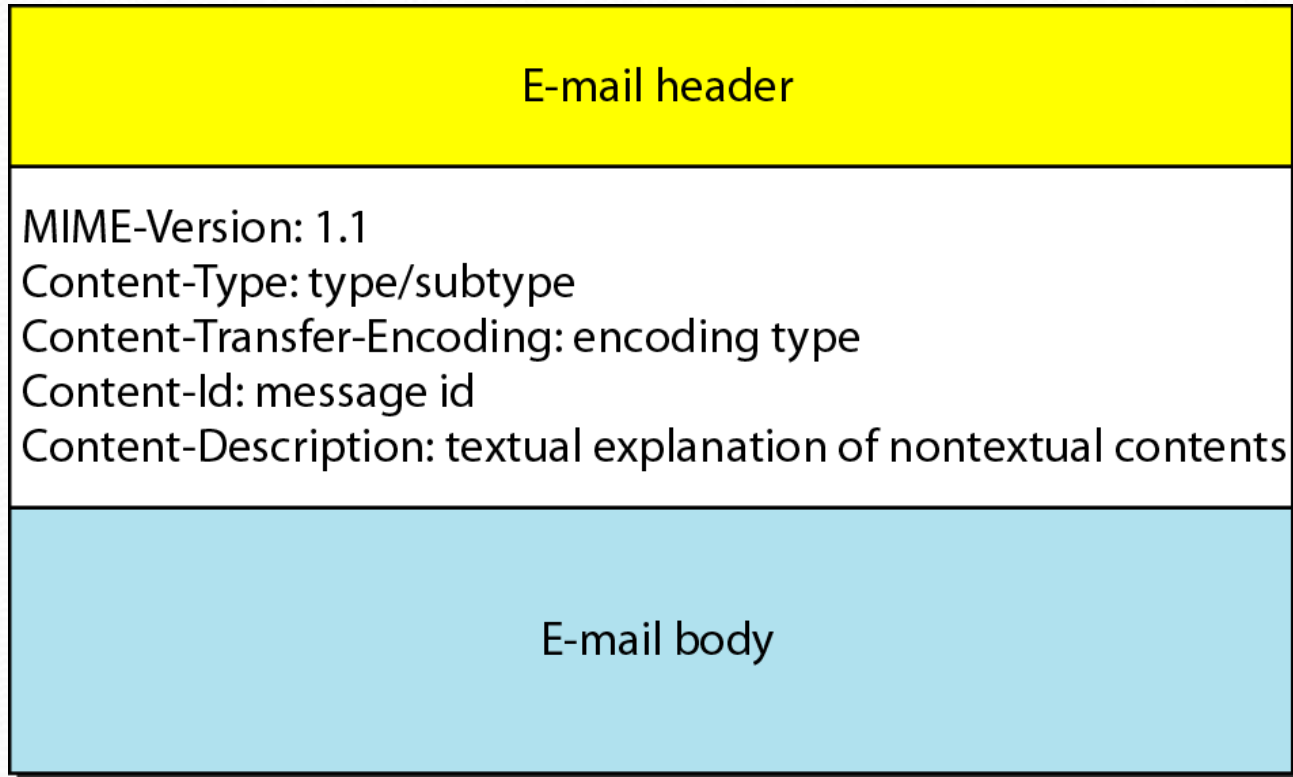
E-mail address



MIME (Multipurpose Internet mail Extension)



MIME header



MIME headers

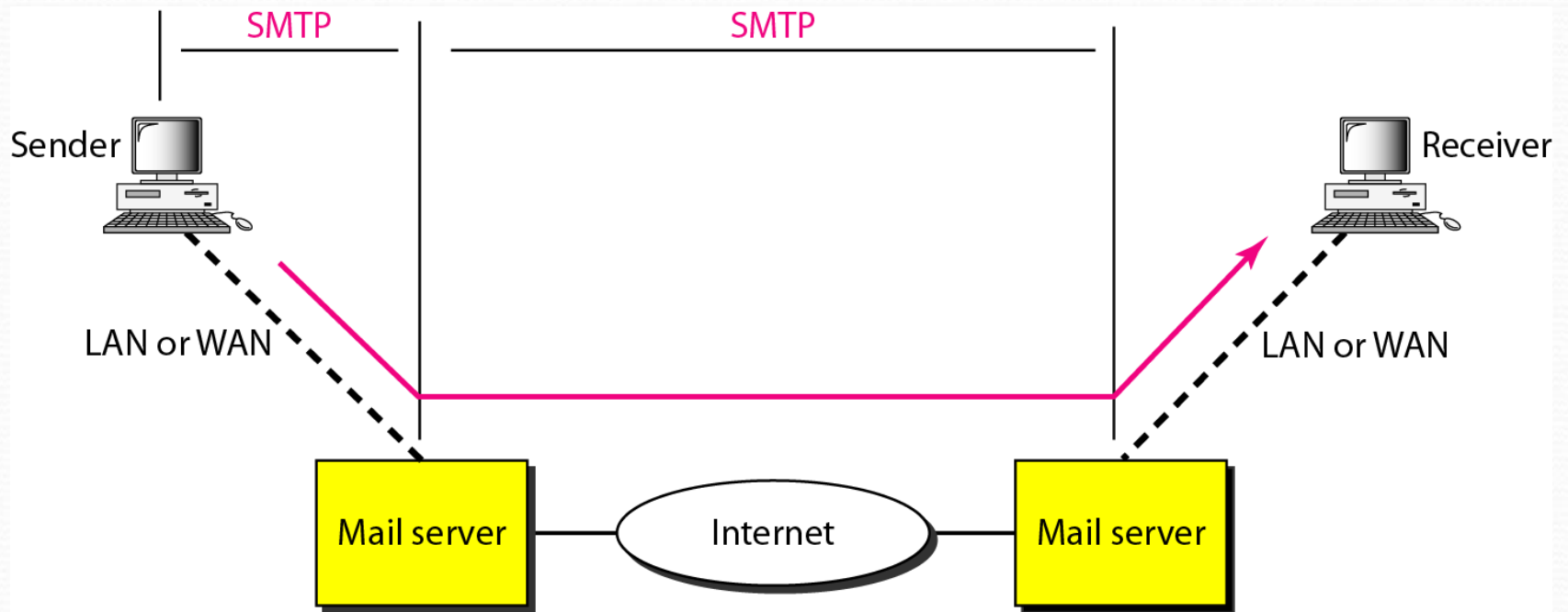
Data types and subtypes in MIME

<i>Type</i>	<i>Subtype</i>	<i>Description</i>
Text	Plain	Unformatted
	HTML	HTML format (see Chapter 27)
Multipart	Mixed	Body contains ordered parts of different data types
	Parallel	Same as above, but no order
	Digest	Similar to mixed subtypes, 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 (8-bit bytes)

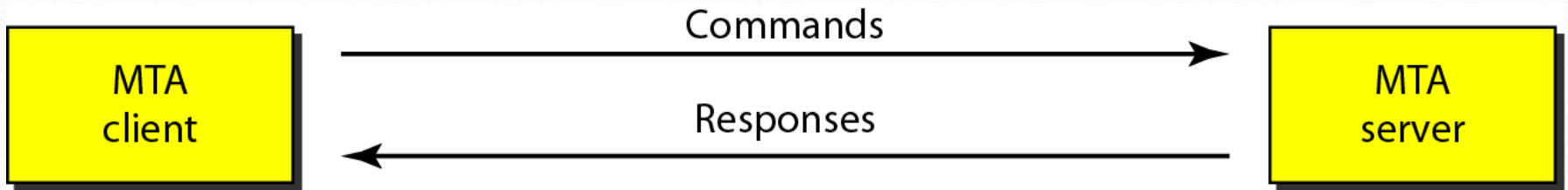
Content-transfer-encoding

<i>Type</i>	<i>Description</i>
7-bit	NVT ASCII characters and short lines
8-bit	Non-ASCII characters and short lines
Binary	Non-ASCII characters with unlimited-length lines
Base-64	6-bit blocks of data encoded into 8-bit ASCII characters
Quoted-printable	Non-ASCII characters encoded as an equals sign followed by an ASCII code

SMTP range



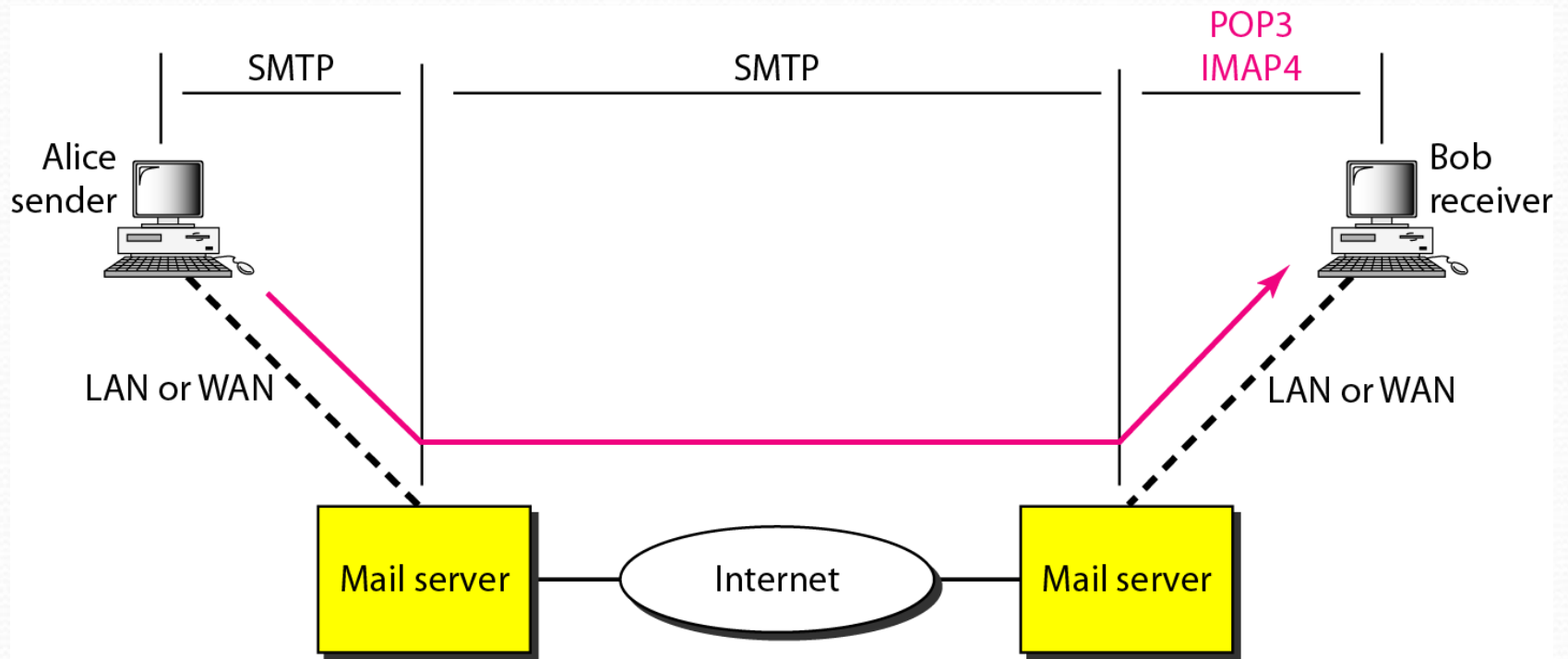
Commands and responses



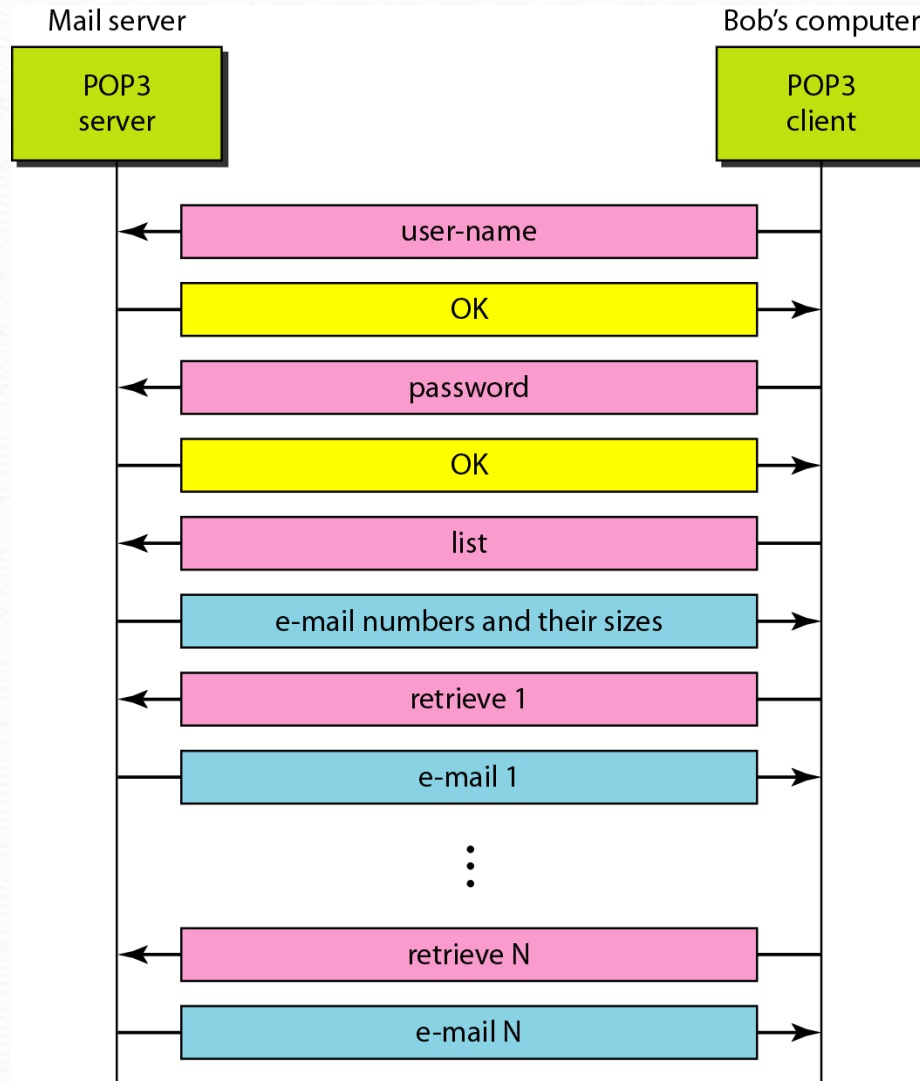
Command format

Keyword: argument(s)

POP3 and IMAP4 (Internet mail access protocol)



The exchange of commands and responses in POP3



FILE TRANSFER

Transferring files from one computer to another is one of the most common tasks expected from a networking or internetworking environment. As a matter of fact, the greatest volume of data exchange in the Internet today is due to file transfer.

Topics discussed in this section:

File Transfer Protocol (FTP)

Anonymous FTP

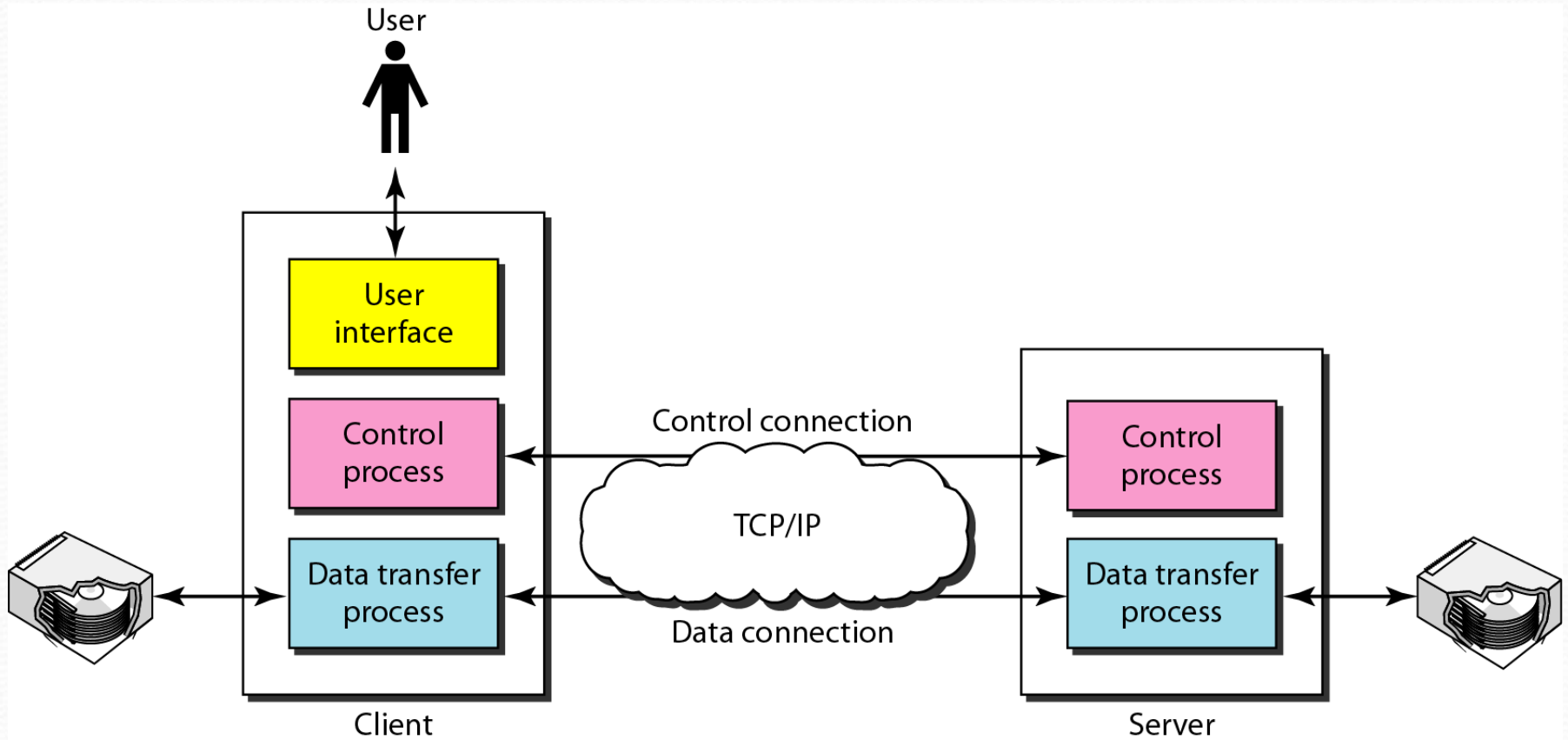


Note

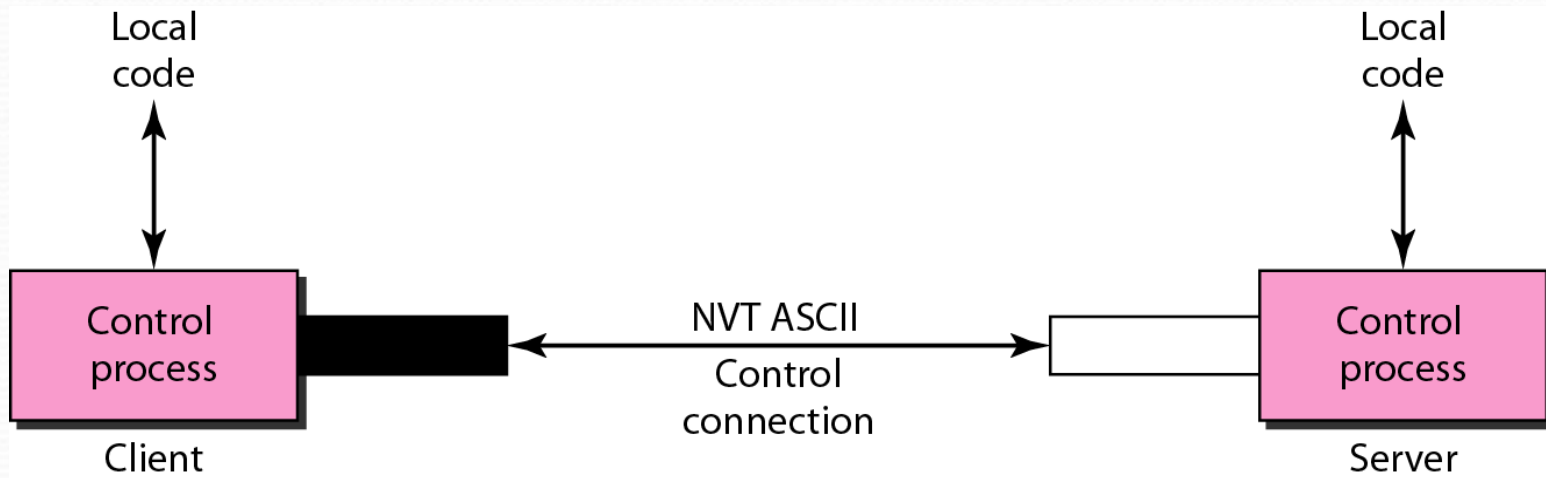
FTP uses the services of TCP. It needs two TCP connections.

The well-known port 21 is used for the control connection and the well-known port 20 for the data connection.

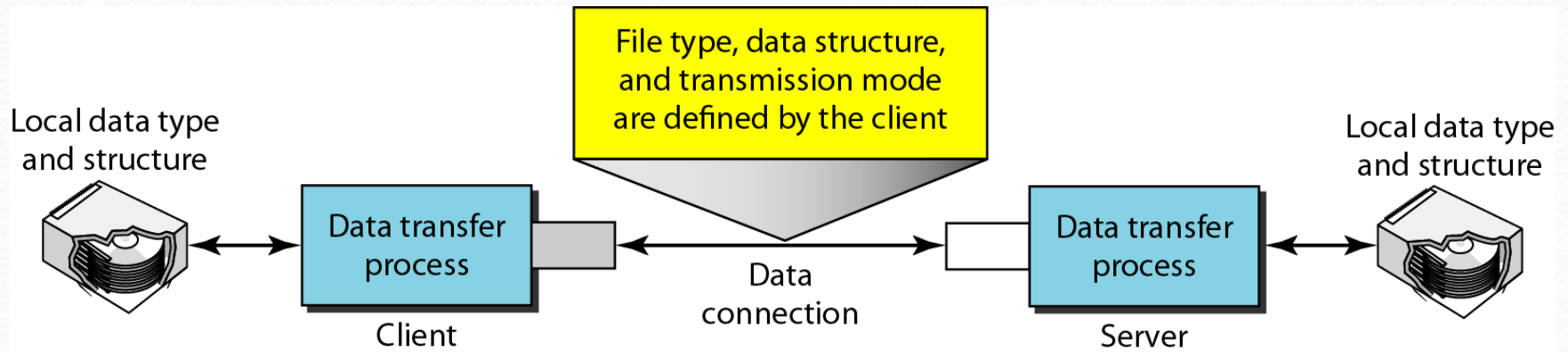
FTP



Using the control connection



Using the data connection



27-3 HTTP

The Hypertext Transfer Protocol (HTTP) is a protocol used mainly to access data on the World Wide Web. HTTP functions as a combination of FTP and SMTP.

Topics discussed in this section:

HTTP Transaction

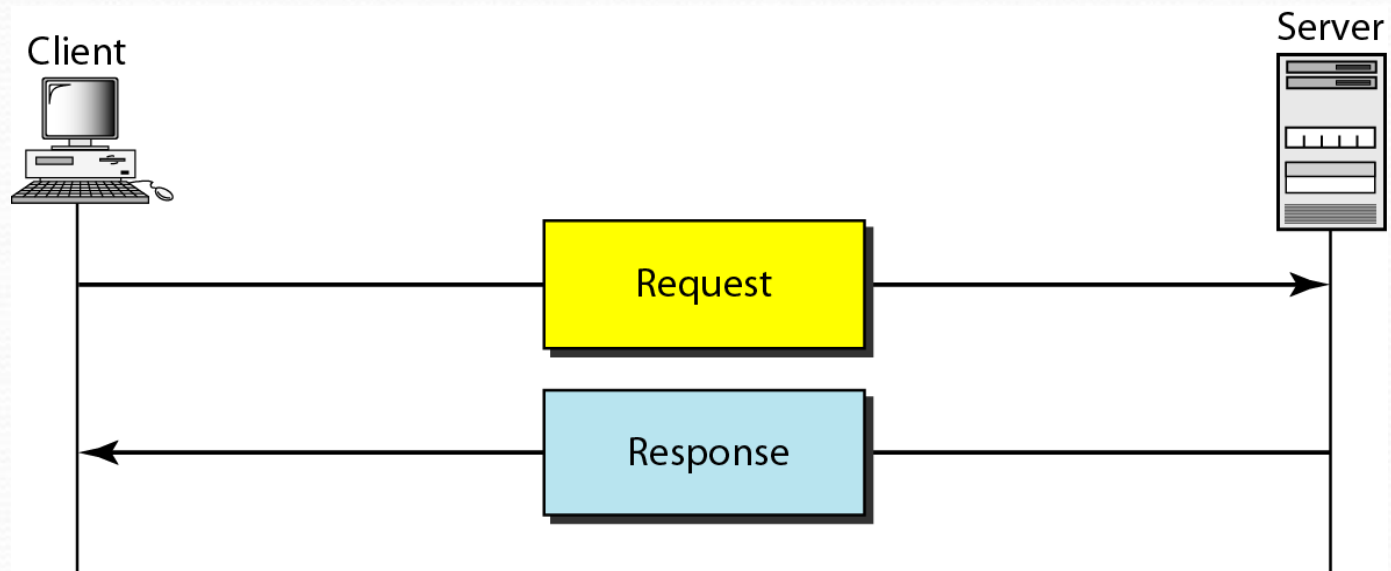
Persistent Versus Nonpersistent Connection



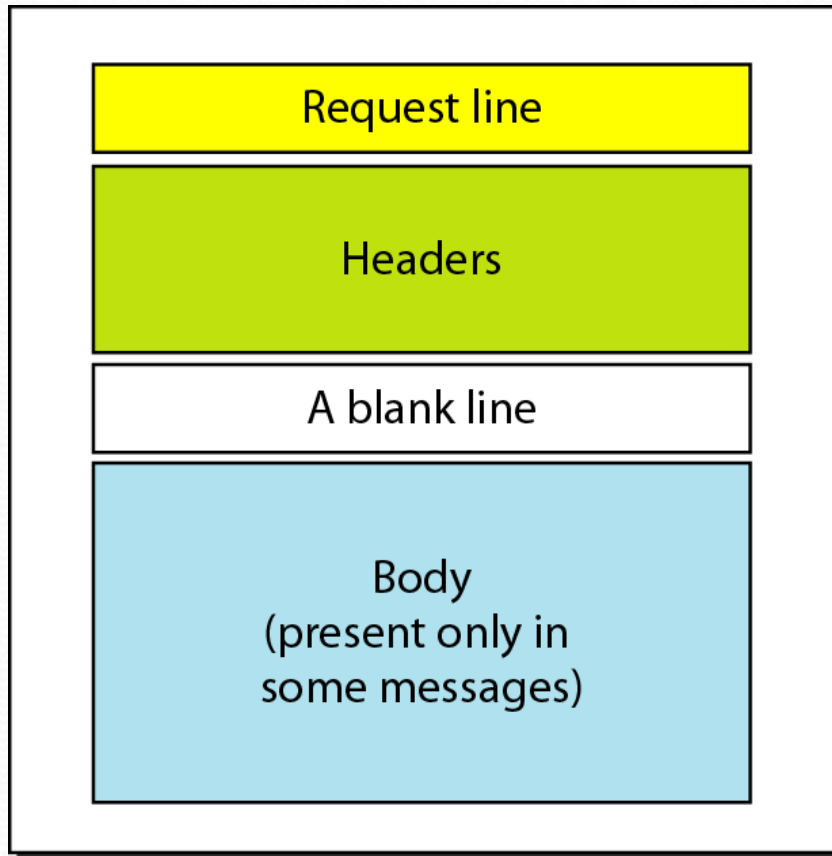
Note

HTTP uses the services of TCP on well-known port 80.

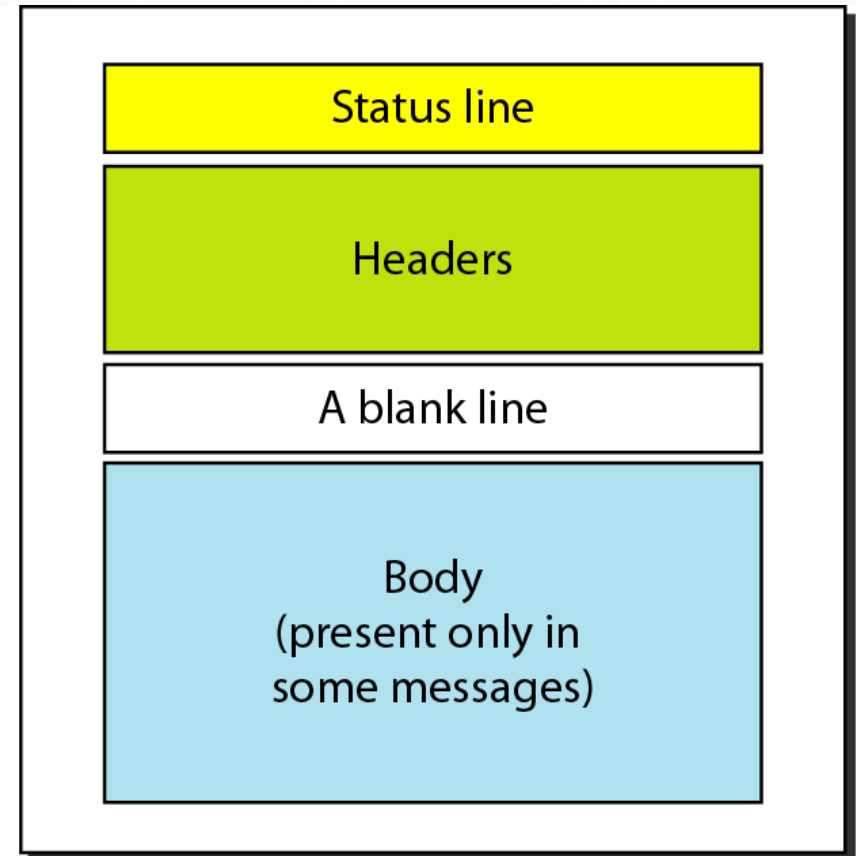
HTTP transaction



Request and response messages



Request message



Response message

Request and status lines

