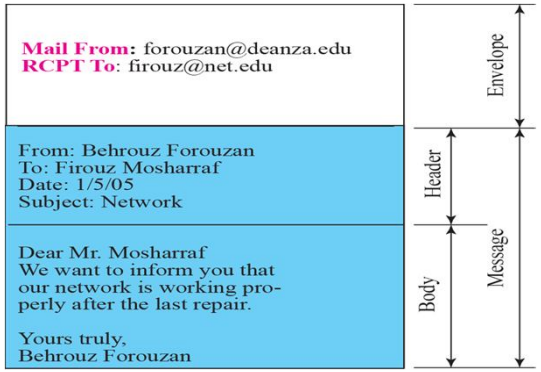
Email

V.Mareeswari
Assistant Professor
SITE, VIT University

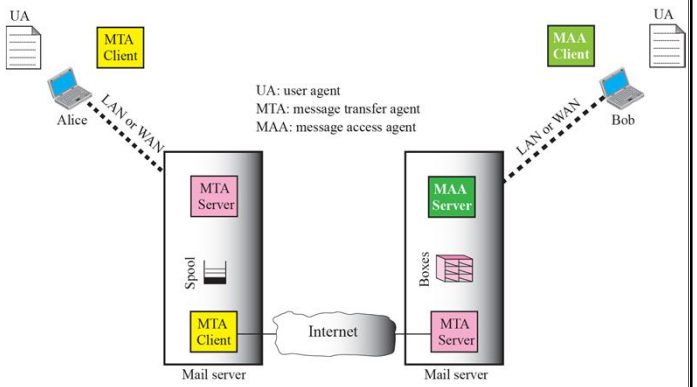
Email

- **Electronic mail (**1993) is a method of exchanging digital messages from an author to one or more recipients.
- Some early email systems required that the author and the recipient both be online at the same time, in common with instant messaging.
- Today's email systems are based on a store-and-forward model. Email servers accept, forward, deliver, and store messages.

Format of an Email



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).



User Agent

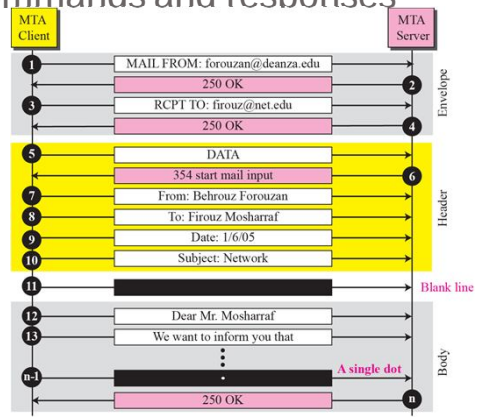
- The first component of an electronic mail system is the user agent (UA). It provides service to the user to make the process of sending and receiving a message easier.
- Some examples of command-driven user agents are mail, pine, and elm.
- Some examples of GUI-based user agents are Eudora, Outlook and Netscape.

Message Transfer Agent

- The actual mail transfer is done through message transfer agents (MTAs). To send mail, a system must have the client MTA, and to receive mail, a system must have a server MTA. The formal protocol that defines the MTA client and server in the Internet is called Simple Mail Transfer Protocol (SMTP).

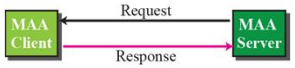
a. Client pushes messages

Commands and responses



Message Access Agent

- The first and the second stages of mail delivery use SMTP. However, SMTP is not involved in the third stage because *SMTP is a push protocol*; it 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. 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.

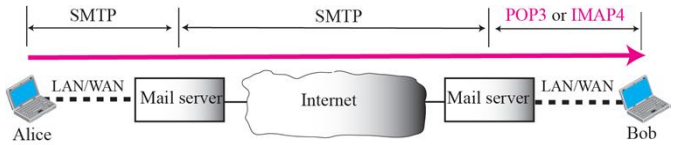


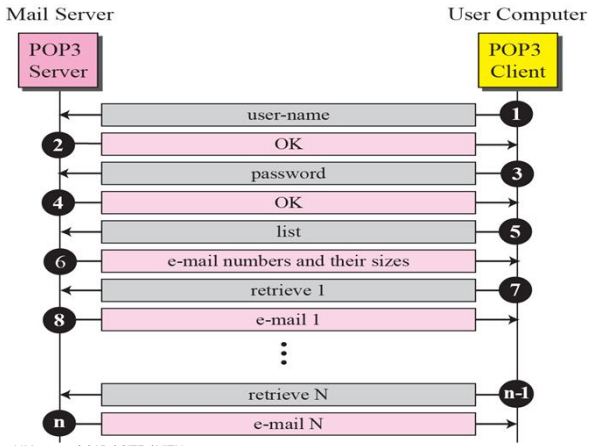
b. Client pulls messages

Mail Services

- Three major mail services:
  - Simple Mail Transfer Protocol
    - SMTP for outbound email
    - Port 25 or 2525
  - Post Office Protocol
    - POP3 for inbound email
    - Port 110
  - Internet Mail Access Protocol
    - IMAP or IMAP4 for inbound email
    - Port 143

Protocols range





IMAP Vs. POP

IMAP4	POP3→old
• access from any computer / any where.	• Used by one client / computer
• Store mail on server	• Store mail on client computer
• Folder can be server and clients.	• organizing mail into client-side folder.
• Send message back and forth	• Send messages one way.

Difference

- IMAP and POP are two different protocols. There are many differences between these two. The main difference is that IMAP(Internet Messaged Access Protocol) always syncs with mail server so that any changes you make in your mail client (Microsoft Outlook, Thunderbird) will instantly appear on your webmail inbox.
- On the other hand, in POP(Post Office Protocol), your mail client account and mail server are not synced. It means whatever changes you make to your email account in the mail client will not be transferred to the webmail inbox.
- In simple terms, if you are using IMAP and mark a mail as read, it gets marked as read in your web based inbox too (because the changes are happening on the server). However, this won't be the case if you are using POP, because the mails are downloaded to your PC and the changes won't reflect on the server.
- Different mail services have different settings for dealing with protocols. In Gmail you can find options to activate both the protocols: POP and IMAP (Go to settings -> Forwarding and POP/IMAP). In Hotmail, only POP is present and it doesn't support IMAP.

IMAP

- The biggest advantage of using IMAP is you can access your mail from multiple mail clients and each client detects the change in real-time. Suppose mail server is connected with two different mail clients (let's say Client 1 and Client 2) on different computers. If the user deletes a message in mail client 1, the change will appear on mail server immediately and also on mail client 2. In IMAP all messages from mail clients and servers are synced with each other.

POP

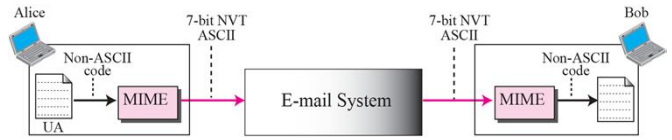
- You can download emails from mail server to your PC using POP. After downloading, the original mail is removed from the server and hence you can't access it from another computer (**Note**: In Gmail there is an option to keep the copy of mail in inbox. Thunderbird also provides an option to leave messages on server until you delete them). But there are lots of other options missing (for ex. if you send a message from mail client then you won't find that message under sent items in your mailbox).

Which is better? POP or IMAP?

- Given a choice, I'd go with IMAP. That's because IMAP offers two way connection. Changes are synchronized to the server and you don't have to worry about taking your mail client with you everywhere. However, if you are someone who hardly checks mail on any other computer then you could make use of POP too.

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.
- 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 to the original data.



MIME headers

E-mail header

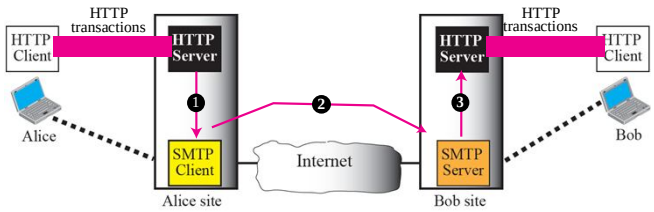
MIME-Version: 1.1
Content-Type: type/subtype
Content-Transfer-Encoding: encoding type
Content-Id: message id
Content-Description: textual explanation of nontextual contents

E-mail body

Standard Content Type

1) text
2) image
3) audio
4) video
5) application
6) multipart

Web Based Email



SMTP, FTP and HTTP

- Connections:
  - All use TCP
  - SMTP uses persistent connections
  - FTP persistent control channel, non-persistent data channel per file.
  - HTTP uses both persistent and non-persistent channels
- Data Flow
  - FTP and HTTP: pull (user requests files)
  - SMTP: push (email sent to receiver without request, result can be spam!)

- All have ASCII command/response interaction, status codes
- HTTP: each object encapsulated in its own response msg
- FTP: one data channel per file
- SMTP: multiple objects sent in multipart msg

E-MAIL SECURITY

- The protocol discussed in this chapter does not provide any security provisions per se. However, e-mail exchanges can be secured using two application-layer securities designed in particular for e-mail systems.
- Two of these protocols, Pretty Good Privacy (PGP) and Secure MIME (SMIME).

Summary

- Email is a tool used to send and receive messages through a computer over a network.
- **Local Email**
- Local email systems do NOT require any type of Internet connection. The user's computer just needs to be connected to the network (either directly or through a dial-in connection) that is supporting the mail system. (much like an electronic bulletin board).
- **Internet Email**