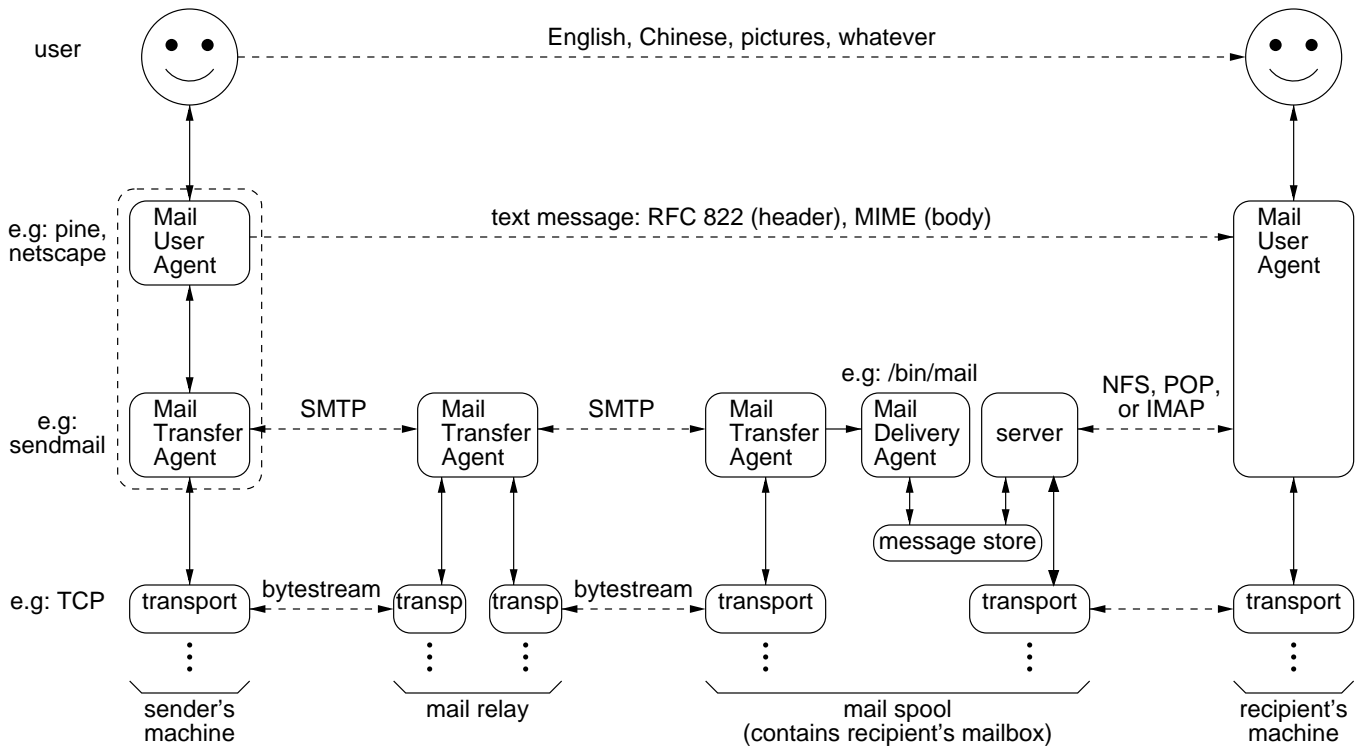


Electronic Mail

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Messages are sent to/from mailboxes, which have addresses of the form:

human name <local-part@domain>
e.g: Adam Costello <amc@cs.berkeley.edu>

Messages are lines of ASCII text:

```

header      Date: Fri, 27 Aug 1999 18:20:00 -0700
(sequence   From: Stavros Tripakis <stavros@eecs.berkeley.edu>
of fields) Subject: homework 1
            To: Adam Costello <amc@cs.berkeley.edu>
blank line
body        I've converted the slides from the first three lectures
(arbitrary) to PDF. Let's put them on the web page.
            Stavros
    
```

Some fields defined in RFC 822:

- Received: info about path taken by message
- Date: date & time message was composed
- From: authors' addresses
- Sender: sender's address if not the unique author
- Reply-To: addresses for replies if not all authors
- To: addresses of primary recipients
- Cc: addresses of secondary recipients
- Message-ID: a unique identifier for this message
- In-Reply-To: IDs of messages this message replies to
- References: IDs of other related messages
- Subject: for human consumption
- X-Foo-Bar: user-defined fields are allowed

MIME (Multipurpose Internet Mail Extensions) allows the body to contain things other than ASCII text, by putting type information in the header. Examples:

```

Content-Type: image/jpeg      (JPEG image)
Content-Transfer-Encoding: base64 (encode binary as text)

Content-Type: text/plain; charset=iso-2022-jp (Japanese text)
    
```

See also RFC 2045.

Every mail domain must have at least one Mail eXchanger (MX), a host with an MTA that accepts messages addressed to the domain. DNS maps domains to mail exchangers, for example:

domain	preference	MX host
cs.berkeley.edu	3	cs2.cs.berkeley.edu
cs.berkeley.edu	5	hofmann.cs.berkeley.edu
pat.net	100	server.icon-stl.net

See also RFC 974.

The Simple Mail Transfer Protocol (SMTP) moves messages between MTAs via a command/response exchange, for example:

```

receiver: 220 cs2.cs.berkeley.edu ESMTP Sendmail 8.9.1a...
sender: HELO stout.eecs.berkeley.edu
receiver: 250 cs2.cs.berkeley.edu Hello stout.eecs.berkeley...
sender: MAIL From:<stavros@stout.eecs.berkeley.edu>
receiver: 250 <stavros@stout.eecs.berkeley.edu>... Sender ok
sender: RCPT To:<amc@cs.berkeley.edu>
receiver: 250 <amc@cs.berkeley.edu>... Recipient ok
sender: DATA
receiver: 324 Enter mail, end with "." on a line by itself
sender: Date: Fri, 27 Aug 1999 18:20:00 -0700
sender: From: Stavros Tripakis <stavros@eecs.berkeley.edu>
sender: Subject: homework 1
sender: To: Adam Costello <amc@cs.berkeley.edu>
sender:
sender: I've converted the slides from the first three lectures
sender: to PDF. Let's put them on the web page.
sender:
sender: Stavros
sender: .
receiver: 250 OAA16903 Message accepted for delivery
sender: QUIT
receiver: 221 cs2.cs.berkeley.edu closing connection
    
```

Envelope addresses versus header addresses:
RCPT lists recipients of this copy of message; To/Cc lists them all.
Return address is used by MTAs to return undeliverable mail;
From/Reply-To are used by MUAs for sending replies.

See also RFC 821.