



CpSc 360: Distributed and Network Programming

Email Protocols – SMTP, POP

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RFC 821, RFC 822, RFC 1939, RFC 1521, RFC 1522
<http://www.faqs.org/rfcs/rfc821.html>



Protocols

SMTP - Simple Mail Transfer Protocol

RFC 821

POP - Post Office Protocol

RFC 1939

Also:

RFC 822 *Standard for the Format of ARPA Internet Text Messages*

RFCs 1521, 1522 *Mime*



Terminology

User Agent: end-user mail program

Message Transfer Agent: responsible for communicating with remote hosts and transmitting/receiving email (both a client and server).

Mail Exchanger: host that takes care of email for a domain.



SMTP

The SMTP design is based on the following model of communication:

as the result of a user mail request, the sender-SMTP establishes a two-way transmission channel to a receiver-SMTP.

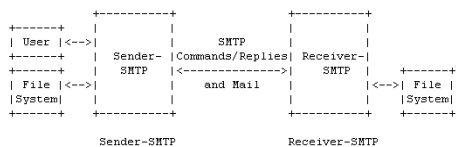
The receiver-SMTP may be either the ultimate destination or an intermediate.

SMTP commands are generated by the sender-SMTP and sent to the receiver-SMTP.

SMTP replies are sent from the receiver-SMTP to the sender-SMTP in response to the commands.



SMTP Model



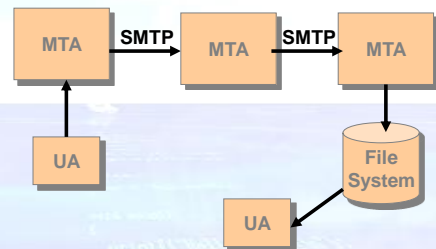
Model for SMTP Use

Figure 1



Message Transfer Agents

Message Transfer Agents use SMTP to exchange mail messages





SMTP Protocol

- ✿ SMTP sender is the client
- ✿ SMTP receiver is the server.
- ✿ Alternating dialogue:
 - ✿ client sends command and server responds with command status message.
 - ✿ Order of the commands is important!
 - ✿ Status messages include ascii encoded numeric status code (like HTTP,FTP) and text string.



SMTP Commands

- ✿ HELO - identifies sender
- ✿ MAIL FROM: - starts a mail transaction and identifies the mail originator
- ✿ RCPT TO: - identifies individual recipient. There may be multiple RCPT TO: commands.
- ✿ DATA - sender ready to transmit a series of lines of text, each ends with \r\n. A line containing only a period '.' indicates the end of the data.



Data Format

- ✿ ASCII only- must convert binary to an ASCII representation to send via email.
- ✿ What if we want to send a line containing only a period?
 - ✿ Sender prepends a period to any line starting with a period (in the message).
 - ✿ Receiver strips the leading period in any line that starts with a period and has more stuff.



Typical Exchange

```
eclipse1.cs.clemson.edu[48] telnet mailhost.cs.clemson.edu 25
Trying 130.127.48.6...
Connected to citron.cs.clemson.edu.
Escape character is '^]'.
220 cs.clemson.edu ESMTP Sendmail 8.9.3-20030918/8.9.3; Tue, 6 Apr 2004 20:12:14 -0400 (EDT)
helo cs.clemson.edu
250 cs.clemson.edu Hello eclipse1.cs.clemson.edu [130.127.48.19], pleased to meet you
mail from: zw1999@yahoo.com
250 zw1999@yahoo.com... Sender ok
rcpt to: jzwang
250 jzwang... Recipient ok
data
354 Enter mail, end with "." on a line by itself
Hello, James:
...2 dots
This is just a test of mail server. Don't reply.
....3 dots
Me.
.
250 UAA02649 Message accepted for delivery
quit
221 cs.clemson.edu closing connection
Connection to citron.cs.clemson.edu closed by foreign host.
```



Other SMTP Commands

- ✿ VRFY - confirm that a name is a valid recipient.
- ✿ EXPN - expand an alias (group email address).
- ✿ TURN - switch roles (sender <=> receiver).
- ✿ SOML - Send Or Mail
 - ✿ if recipient is logged in, display message on terminal, otherwise email.
- ✿ SAML - Send and Mail
- ✿ NOOP - send back a positive reply code.
- ✿ RSET - abort current transaction.
- ✿ QUIT, HELP



Mail Headers

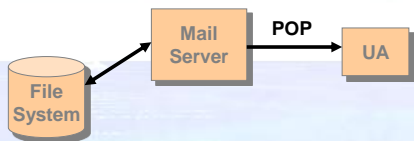
- ✿ Email messages contain many headers, some headers are created by the UA, some are automatically added by the MTA.
- ✿ Every MTA adds (at least) a "Received:" header.
- ✿ Some of the headers are read by (parsed) intermediate MTAs, but the content is ignored and passed on transparently.





POP – Post Office Protocol

- Used to transfer mail from a mail server to a UA.



Why do we need POP?

- The Post Office Protocol - Version 3 (POP3) is intended to permit a workstation to dynamically access a maildrop on a server host in a useful fashion.
- POP3 is not intended to provide extensive manipulation operations of mail on the server.
- Normally, mail is downloaded and then deleted.
- A more advanced (and complex) protocol, IMAP4, is discussed in [RFC1730].



POP (version 3)

- Similar to SMTP command/reply lockstep protocol.
- Used to retrieve mail for a single user
 - requires authentication
- Commands and replies are ASCII lines.
 - Replies start with "+OK" or "-ERR".
 - Replies may contain multiple lines.



POP3 Commands

- USER** - specify username
- PASS** - specify password
- STAT** - get mailbox status
 - number of messages in the mailbox.
- LIST** - get a list of messages and sizes.
 - One per line, termination line contains '.' only.
- RETR** - retrieve a message



More POP3 Commands

- DELE** - mark a message for deletion from the mailbox.
- NOOP** - send back positive reply
- RSET** - reset. All deletion marks are unmarked.
- QUIT** - remove marked messages and close the (TCP) connection.



Optional Commands

- TOP** - send header lines from messages.
- APOP** - alternative authentication
 - message digest based on opening greeting sent from POP server.
 - Requires shared secret!
 - No cleartext password on the network.
 - Does not authenticate the server!!!!
- UIDL** - unique-id listing.
 - A unique-id listing consists of the message-number of the message, followed by a single space and the unique-id of the message.





POP3 Exchange

```

eclipse1.cs.clemson.edu[46] telnet mailhost.cs.clemson.edu pop3
Trying 130.127.48.6...
Connected to citron.cs.clemson.edu.
Escape character is '^]'.
+OK Qpopper (version 4.0.5) at citron.cs.clemson.edu starting.
user jzwang
+OK Password required for jzwang.
pass cpsc360
+OK jzwang has 2308 visible messages (0 hidden) in 116385719 octets.
stat
+OK 2308 116385719
list
1 345
2 2334
.....

```



Retrieve Message

```

retr 2307
+OK 465 octets
Received: from cs.clemson.edu (eclipse1.cs.clemson.edu [130.127.48.19])
  by cs.clemson.edu (8.9.3-20030918/8.9.3) with SMTP id UAA03726
  for jzwang; Tue, 6 Apr 2004 20:37:54 -0400 (EDT)
Date: Tue, 6 Apr 2004 20:37:54 -0400 (EDT)
From: zw1999@yahoo.com
Message-Id: <200404070037.UAA03726@cs.clemson.edu>
X-CPSC-Clemson-MailScanner: Found to be clean
X-UIDL: /$7!TA3!!%U!!hP!
Status: RO

```

```

hello, james:
...2 dots
This is just a test.
...3 dots
me.

```

