**Sequence:**  
 Connection - HELO <SP> <domain> <CRLF>

Mail Transaction: See Below

Expand and Verify: See Below

Terminate - QUIT <CRLF>

**Connection:**

Example of Connection Opening

R: 220 BBN-UNIX.ARPA Simple Mail Transfer Service Ready

S: HELO USC-ISIF.ARPA

R: 250 BBN-UNIX.ARPA

Example 5

Example of Connection Closing

S: QUIT

R: 221 BBN-UNIX.ARPA Service closing transmission channel

**Mail Transaction:**

* MAIL <SP> FROM:<reverse-path> <CRLF>
  + Receiver starts new mail transaction
  + Resets mail state tables + recipients + mail data
  + Success: 250 OK
* RCPT <SP> TO:<forward-path> <CRLF> [repeatable]
  + If forward path known:
    - Success: 250 OK + store forward path
    - Failure: 550
  + If forward pass not known:
    - 251 – I know where it should go, forward to correct place
    - 551 – user not known, return error
* DATA <CRLF>
  + If accepted returns 354 intermediate reply
  + All lines until termination character are accepted
    - does not process commands
  + Termination character: period in a new line – Format in section 4.5.2
  + Sends 250 OK
  + Should only fail if resources or recipients don’t exist

Example:

S: MAIL FROM:<Smith@Alpha.ARPA>

R: 250 OK

S: RCPT TO:<Jones@Beta.ARPA>

R: 250 OK

S: RCPT TO:<Green@Beta.ARPA>

R: 550 No such user here

S: RCPT TO:<Brown@Beta.ARPA>

R: 250 OK

S: DATA

R: 354 Start mail input; end with <CRLF>.<CRLF>

S: Blah blah blah...

S: ...etc. etc. etc.

S: <CRLF>.<CRLF>

R: 250 OK

**Verifying and Expanding: OPTIONAL in SMTP implementation**

* VRFY string
  + If known returns Full mailbox + optional username
  + If is a mailing list of 1 known person can give success and return as can deliver to all recipients
  + If ambiguous return 553 – Ambiguous user
* EXPN <username>
  + If known returns Full mailbox + optional username for all members of MAILING LIST
    - Uses MULTILINE-RESPONSE
    - 1 username per line
  + If is a mailing list of 1 person can return 1 line, or error 550 – username not mailbox

S: VRFY Smith

R: 250 Fred Smith <Smith@USC-ISIF.ARPA>

Example of Expanding a Mailing List

S: EXPN Example-People

R: 250-Jon Postel <Postel@USC-ISIF.ARPA>

R: 250-Fred Fonebone <Fonebone@USC-ISIQ.ARPA>

R: 250-Sam Q. Smith <SQSmith@USC-ISIQ.ARPA>

R: 250-Quincy Smith <@USC-ISIF.ARPA:Q-Smith@ISI-VAXA.ARPA>

R: 250-<joe@foo-unix.ARPA>

R: 250 <xyz@bar-unix.ARPA>

**Other Commands:**

NOOP –

RSET –

Important information:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Data type | Case sensitive | Structure | Network format | Section |
| Command | Yes | 4xAlphanum <crlf>  Or  4xAlphanum <sp> parameter<crlf> | 8 bit + MSB 0 |  |
| Reply | Yes | 3digit <sp> some text | 8 bit + MSB 0 | 5.3 see list in 4.2.1 |
| Hostname | Yes |  |  |  |
| Mailbox | No |  |  |  |
| Meta-linguistic components | Yes | “<>” optional  Or < > added if in “ “ in section below |  |  |
| Username |  | Local mailbox + whatever I desire |  |  |
| Domain | Yes | Domain element [.  Domain element]\*  (1 or more domain elements separated by periods) |  |  |

**Multiline response: See appendix E**

HELP OR EXPN NORMALLY

Nth line: Response Code-(HYPHEN)data  
last line: Response Code <space!!!> data

**Mail list:**

String that maps to [username](s) + mailbox(s)

**4.5.1. MINIMUM IMPLEMENTATION:**

In order to make SMTP workable, the following minimum

implementation is required for all receivers:

COMMANDS -- HELO

MAIL

RCPT

DATA

RSET

NOOP

QUIT

**Full Command List:**

HELO <SP> <domain> <CRLF>

MAIL <SP> FROM:<reverse-path> <CRLF>

RCPT <SP> TO:<forward-path> <CRLF>

DATA <CRLF>

RSET <CRLF>

VRFY <SP> <string> <CRLF>

EXPN <SP> <string> <CRLF>

HELP [<SP> <string>] <CRLF>

NOOP <CRLF>

QUIT <CRLF>

**IMPORTANT BUT ANNOYING:**

Generate examples that I could use to work with, what is worst case scenario for each: e.g.

Domain: [123.123.123.123].#12345.derby.a-9

**Meta-linguistic Components:**

The syntax of the above argument fields (using BNF notation

where applicable) is given below. The "..." notation indicates

that a field may be repeated one or more times.

<reverse-path> ::= <path>

<forward-path> ::= <path>

<path> ::= "<" [ <a-d-l> ":" ] <mailbox> ">"

<a-d-l> ::= <at-domain> | <at-domain> "," <a-d-l>

<at-domain> ::= "@" <domain>

<domain> ::= <element> | <element> "." <domain>

<element> ::= <name> | "#" <number> | "[" <dotnum> "]"

<mailbox> ::= <local-part> "@" <domain>

<local-part> ::= <dot-string> | <quoted-string>

<name> ::= <a> <ldh-str> <let-dig>

<ldh-str> ::= <let-dig-hyp> | <let-dig-hyp> <ldh-str>

<let-dig> ::= <a> | <d>

<let-dig-hyp> ::= <a> | <d> | "-"

<dot-string> ::= <string> | <string> "." <dot-string>

<string> ::= <char> | <char> <string>

<quoted-string> ::= """ <qtext> """

<qtext> ::= "\" <x> | "\" <x> <qtext> | <q> | <q> <qtext>

<char> ::= <c> | "\" <x>

<dotnum> ::= <snum> "." <snum> "." <snum> "." <snum>

<number> ::= <d> | <d> <number>

<CRLF> ::= <CR> <LF>

<CR> ::= the carriage return character (ASCII code 13)

<LF> ::= the line feed character (ASCII code 10)

<SP> ::= the space character (ASCII code 32)

<snum> ::= one, two, or three digits representing a decimal

integer value in the range 0 through 255

<a> ::= any one of the 52 alphabetic characters A through Z

in upper case and a through z in lower case

<c> ::= any one of the 128 ASCII characters, but not any

<special> or <SP>

<d> ::= any one of the ten digits 0 through 9

<q> ::= any one of the 128 ASCII characters except <CR>,

<LF>, quote ("), or backslash (\)

<x> ::= any one of the 128 ASCII characters (no exceptions)

<special> ::= "<" | ">" | "(" | ")" | "[" | "]" | "\" | "."

| "," | ";" | ":" | "@" """ | the control

characters (ASCII codes 0 through 31 inclusive and

127)

Note that the backslash, "\", is a quote character, which is

used to indicate that the next character is to be used

literally (instead of its normal interpretation). For example,

"Joe\,Smith" could be used to indicate a single nine character

user field with comma being the fourth character of the field.

Hosts are generally known by names which are translated to

addresses in each host. Note that the name elements of domains

are the official names -- no use of nicknames or aliases is

allowed.

Sometimes a host is not known to the translation function and

communication is blocked. To bypass this barrier two numeric

forms are also allowed for host "names". One form is a decimal

integer prefixed by a pound sign, "#", which indicates the

number is the address of the host. Another form is four small

decimal integers separated by dots and enclosed by brackets,

e.g., "[123.255.37.2]", which indicates a 32-bit ARPA Internet

Address in four 8-bit fields.

The time stamp line and the return path line are formally

defined as follows:

<return-path-line> ::= "Return-Path:" <SP><reverse-path><CRLF>

<time-stamp-line> ::= "Received:" <SP> <stamp> <CRLF>

<stamp> ::= <from-domain> <by-domain> <opt-info> ";"

<daytime>

<from-domain> ::= "FROM" <SP> <domain> <SP>

<by-domain> ::= "BY" <SP> <domain> <SP>

<opt-info> ::= [<via>] [<with>] [<id>] [<for>]

<via> ::= "VIA" <SP> <link> <SP>

<with> ::= "WITH" <SP> <protocol> <SP>

<id> ::= "ID" <SP> <string> <SP>

<for> ::= "FOR" <SP> <path> <SP>

<link> ::= The standard names for links are registered with

the Network Information Center.

<protocol> ::= The standard names for protocols are

registered with the Network Information Center.

<daytime> ::= <SP> <date> <SP> <time>

<date> ::= <dd> <SP> <mon> <SP> <yy>

<time> ::= <hh> ":" <mm> ":" <ss> <SP> <zone>

<dd> ::= the one or two decimal integer day of the month in

the range 1 to 31.

<mon> ::= "JAN" | "FEB" | "MAR" | "APR" | "MAY" | "JUN" |

"JUL" | "AUG" | "SEP" | "OCT" | "NOV" | "DEC"

<yy> ::= the two decimal integer year of the century in the

range 00 to 99.

<hh> ::= the two decimal integer hour of the day in the

range 00 to 24.

<mm> ::= the two decimal integer minute of the hour in the

range 00 to 59.

<ss> ::= the two decimal integer second of the minute in the

range 00 to 59.

<zone> ::= "UT" for Universal Time (the default) or other

time zone designator (as in [[2](https://tools.ietf.org/html/rfc821#ref-2)]).

**Command Response Table:**

CONNECTION ESTABLISHMENT

S: 220

F: 421

HELO

S: 250

E: 500, 501, 504, 421

MAIL

S: 250

F: 552, 451, 452

E: 500, 501, 421

RCPT

S: 250, 251

F: 550, 551, 552, 553, 450, 451, 452

E: 500, 501, 503, 421

DATA

I: 354 -> data -> S: 250

F: 552, 554, 451, 452

F: 451, 554

E: 500, 501, 503, 421

RSET

S: 250

E: 500, 501, 504, 421

VRFY

S: 250, 251

F: 550, 551, 553

E: 500, 501, 502, 504, 421

EXPN

S: 250

F: 550

E: 500, 501, 502, 504, 421

HELP

S: 211, 214

E: 500, 501, 502, 504, 421

NOOP

S: 250

E: 500, 421

QUIT

S: 221

E: 500

TURN

S: 250

F: 502

E: 500, 503

**How to deal with that period:**

1. Before sending a line of mail text the sender-SMTP checks

the first character of the line. If it is a period, one

additional period is inserted at the beginning of the line.

2. When a line of mail text is received by the receiver-SMTP

it checks the line. If the line is composed of a single

period it is the end of mail. If the first character is a

period and there are other characters on the line, the first

character is deleted.

The mail data may contain any of the 128 ASCII characters. All

characters are to be delivered to the recipient's mailbox

including format effectors and other control characters. If

the transmission channel provides an 8-bit byte (octets) data

stream, the 7-bit ASCII codes are transmitted right justified

in the octets with the high order bits cleared to zero.

**Size of buffers:**

See section 4.5.3 – 64, 256, 512, and 1024 are magic numbers here