CS 580 Client-Server Programming
Spring Semester, 2006
Doc 12 HTTP & POP3
Mar 2, 2006

References

Hypertext Transfer Protocol - HTTP/1.0, Berners-Lee, Fielding, Nielson, rfc1945, http://www.w3.org/Protocols/rfc1945/rfc1945

Hypertext Transfer Protocol -- HTTP/1.1, Fielding, Gettys, Mogul, Masinter, Leach, Berners-Lee, rfc2616, http://www.w3.org/Protocols/rfc2616/rfc2616.html

Uniform Resource Identifiers (URI): Generic Syntax, Berners-Lee, Fielding, Masinter, rfc2396 http://www.ietf.org/rfc/rfc2396.txt

RFC 1939, http://www.ietf.org/rfc/rfc1939.txt

Reading

HTTP/1.0 rfc1945, http://ftp.ics.uci.edu/pub/ietf/http/rfc1945.html

Post Office Protocol RFC 1939,http://www.ietf.org/rfc/rfc1939.txt

HTTP

Stateless (http 1.0)

Assigned port 80

Basic Server-Client Interaction (http 1.0)

Client: Open connection

Server: Accept/Reject connection

Client: Send request

Server: Send response to request

Connection closed

HTTP Message Format

HTTP-message   =   Simple-Request   (HTTP/0.9 messages)
    | Simple-Response
    | Full-Request   (HTTP/1.0 messages)
    | Full-Response

Full-Request   =   Request-Line
    *(General-Header | Request-Header | Entity-Header)
    CRLF
    [Entity-Body]

Full-Response =   Status-Line
    *(General-Header | Request-Header | Entity-Header)
    CRLF
    [Entity-Body]

HTTP-header   = field-name ":" [field-value] CRLF

Entity-Body   = *OCTET

HTTP Full Request

Request-Line   = Method SP URI SP HTTP-Version CRLF

rohan 13-> **telnet www.eli.sdsu.edu 80**

Trying 130.191.226.80...

Connected to www.eli.sdsu.edu.

Escape character is '^]'.

GET /courses/fall00/cs580/index.html HTTP/1.0

2 CRLF's end the full request

HTTP/1.1 200 OK

Date: Tue, 05 Sep 2000 19:31:14 GMT

Server: Apache/1.3.9 (Unix) PHP/3.0.12

Last-Modified: Mon, 04 Sep 2000 21:03:56 GMT

ETag: "14c199-7e8-39b40e3c"

Accept-Ranges: bytes

Content-Length: 2024

Connection: close

Content-Type: text/html

X-Pad: avoid browser bug

<HTML>

<HEAD>

       <TITLE>CS 580: Course Web Site</TITLE>

… stuff removed here…

Connection closed by foreign host.

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Positional Data verses Name-Value Pairs

1.0; CERN/3.0; Thursday, 21-Mar-96
17:00:45 GMT; text/html; 2686; Tuesday,
27-Feb-96 05:34:12 GMT

MIME-Version: 1.0

Server: CERN/3.0

Date: Thursday, 21-Mar-96 17:00:45 GMT

Content-Type: text/html

Content-Length: 2686

Last-Modified: Tuesday, 27-Feb-96 05:34:12 GMT

Which is more error prone?

Name-Value Pairs & Orderer

MIME-Version: 1.0

Server: CERN/3.0

Date: Thursday, 21-Mar-96 17:00:45 GMT

Content-Type: text/html

Content-Length: 2686

Last-Modified: Tuesday, 27-Feb-96 05:34:12 GMT

Server: CERN/3.0

Content-Type: text/html

MIME-Version: 1.0

Content-Length: 2686

Last-Modified: Tuesday, 27-Feb-96 05:34:12 GMT

Date: Thursday, 21-Mar-96 17:00:45 GMT

Adding new Fields

MIME-Version: 1.0

Server: CERN/3.0

Date: Thursday, 21-Mar-96 17:00:45 GMT

Content-Type: text/html

Forwarded: by http://rohan.sdsu.edu/ for cs.sdsu.edu

Content-Length: 2686

WhitneyInfo: Hi Mom

Last-Modified: Tuesday, 27-Feb-96 05:34:12 GMT

Name-Value Pairs are your Friends
Don't Program without them

Detecting End of a Message

Use termination sequence

Make the length of the message known

HTTP

Header ends in CRLFCRLF

Header contains length in bytes of message body

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HTTP/1.0 200 Document follows
MIME-Version: 1.0
Server: CERN/3.0
Date: Thursday, 21-Mar-96 17:00:45 GMT
Content-Type: text/html
Content-Length: 2686
Last-Modified: Tuesday, 27-Feb-96 05:34:12 GMT
```

Detecting End of a Message

What happens if the terminating sequence happens to be part of the message?

What if a HTTP header contains CRLFCRLF

POP3

Post Office Protocol

Purpose: Allow PC's, Macs, etc. to download mail from server

Port number 110

Protocol uses ASCII only

Stateful protocol

Multiple requests & responses on same connection

Format of commands to server

keyword blank argument1 [blank argumentk] CRLF

| keyword | = 3, 4 characters, no spaces

| argument | <= 40 characters, no spaces

keyword and arguments are separated by single space character

Server Response

Status keyword additionalInfo

Status is either "+OK" or "-ERR0.3."

A single line response ends in CRLF

If response requires more than one line:

      Each line ends in a CRLF
      The response ends in CRLF.CRLF
      If a line starts with a "." prepend a "." to it

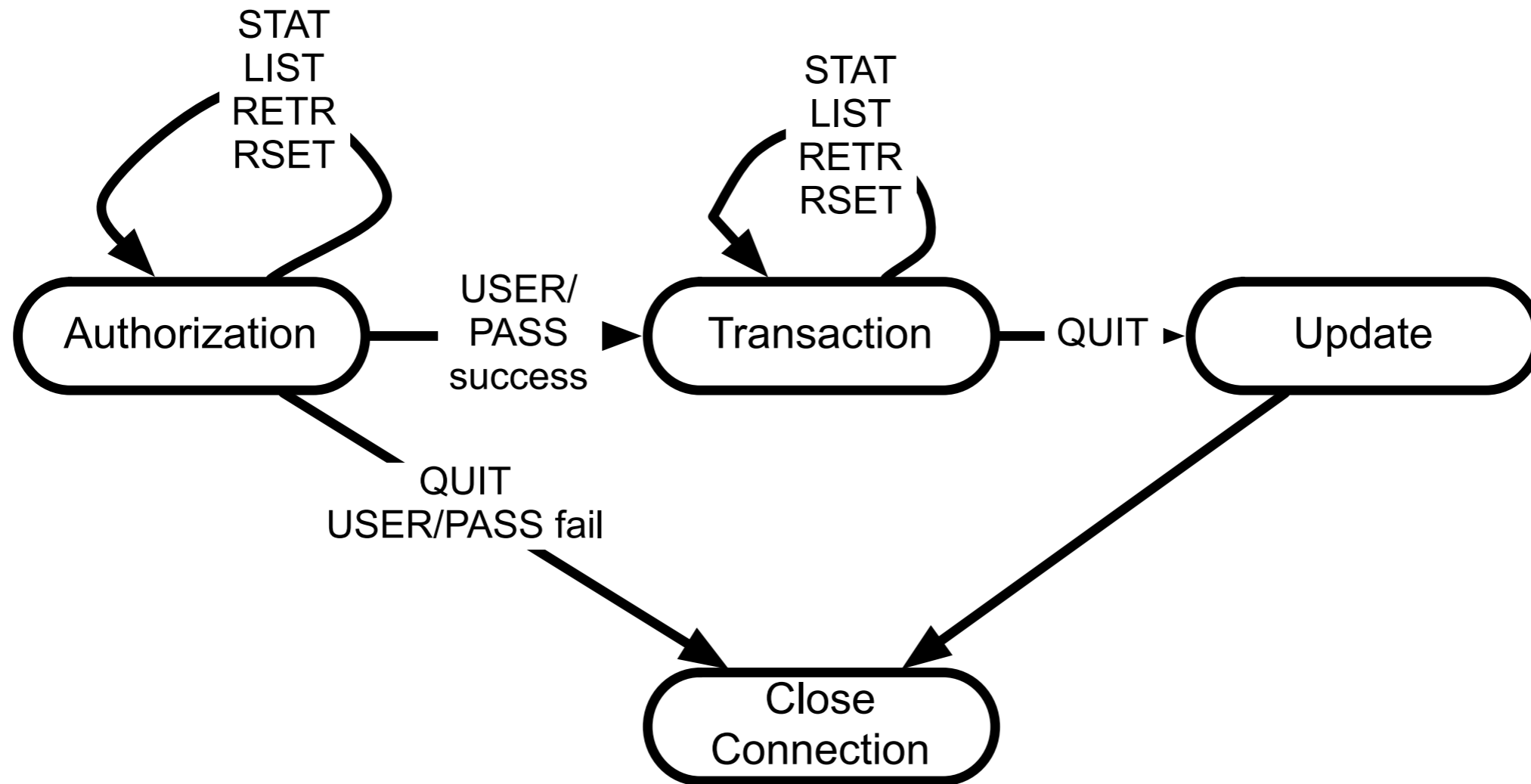When Client reads the first CRLF how does it know it is at the end of message?

Timeouts

A POP3 server may have an autologout timer

A server must wait at least 10 minutes before timing out an idle client

The POP3 server on cs.sdsu.edu times out in 2 minutes

Client Connect States

STAT
LIST
RETR
RSET

STAT
LIST
RETR
RSET

Authorization

USER/
PASS
success

Transaction

QUIT

Update

QUIT
USER/PASS fail

Close
Connection

Authorization State

Server acknowledges connection from client with

+OK "message"

+OK UCB Pop server (version 2.1.2-R3) at sciences.sdsu.edu starting.

Commands: USER, PASS, APOP, QUIT

USER PASS

Combination is used to progress to transaction state

USER must come first

PASS or QUIT must come after USER

Example

Ti 38->**telnet cs.sdsu.edu 110**

Trying 130.191.226.116...

Connected to cs.sdsu.edu.

Escape character is '^]'.

+OK QPOP (version 3.1.2) at sciences.sdsu.edu starting.

USER whitney

+OK Password required for whitney.

PASS typeYourPasswordHere

+OK whitney has 116 visible messages (0 hidden) in 640516 octets.

Transaction State

Commands: STAT, LIST, RETR, RSET, QUIT

STAT

Arguments: none
Returns "+OK" numberOfMessages SizeOfMail

STAT
+OK 22 45595

LIST

Arguments: a message-number (optional)
Returns: size of message in octets

Examples

LIST 2
+OK 2 3064

LIST
+OK 116 visible messages (640516 octets)
1 2980
2 3064   (message 3 - 116 deleted to save space)
116 1290
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Transaction State

RETR

Arguments: a message-number

Returns: the message

RETR 21

+OK 825 octets

Received: from [130.191.9.18] (ebb2p9.sdsu.edu [130.191.9.18]) by sciences.sdsu.edu
 (4.1/8.6.10) with SMTP id UAA29486 for <whitney@saturn.sdsu.edu>; Mon, 11 Mar
1996 20:16:07 -0800 (PST)

X-Sender: whitney@cs.sdsu.edu (Unverified)

Message-Id: <v02110100ad6aaaf097b6@[130.191.9.70]>

Mime-Version: 1.0
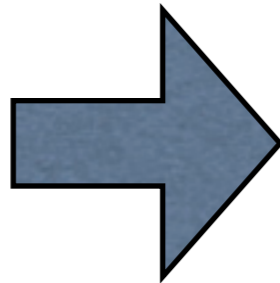
Content-Type: text/plain; charset="us-ascii"

Date: Mon, 11 Mar 1996 20:16:50 -0800

To: whitney@saturn.sdsu.edu

From: whitney@saturn.sdsu.edu (Roger Whitney)

Subject: Sample Mail

X-UIDL: 826604201.000

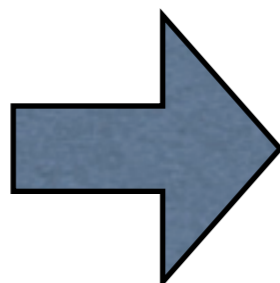this is a test

..

the end

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Transaction State

DELE

Arguments: a message-number to delete
Returns: a confirmation of deletion
Marks a message to be deleted

NOOP

Arguments: none   Why NOOP?
Returns: a positive response
Does nothing

QUIT

Arguments: none
Returns: a positive response
Send POP3 server to UPDATE state

Update State

Updates mail box to reflect transactions taken during the transaction state, then logs user out

If session ends by any method except the QUIT command during the transaction state, the update state is not entered