

# 1.Telnet

```
ComputerNetworking — -bash — 81x29
[libingjiadeMacBook-Pro:ComputerNetworking ichimaru$ telnet whu.edu.cn 25
Trying 202.114.64.84...
Connected to whu.edu.cn.
Escape character is '^]'.
220 whu.edu.cn Anti-spam GT for Coremail System (whu[20171226])
helo smtp
250 OK
auth login
334 dXNlcm5hbWU6
[REDACTED]
334 UGFzc3dvcmQ6
[REDACTED]
235 Authentication successful
mail from:<2016302580132@whu.edu.cn>
250 Mail OK
rcpt to:<347854238@qq.com>
250 Mail OK
data
354 End data with <CR><LF>.<CR><LF>
from:2016302580132@whu.edu.cn
subject:test

hello!
.
250 Mail OK queued as AQBjCgA3j43dwIBcAqySAA--.38199S2
quit
221 Bye
Connection closed by foreign host.
libingjiadeMacBook-Pro:ComputerNetworking ichimaru$
```

## 2.Exercises

### P1

True or false.

1. A user requests a Web page that consists of some text and three images. For this page, the client will send one request message and receive four response messages.
2. Two distinct Web pages (for example, [www.mit.edu/research.html](http://www.mit.edu/research.html) and [www.mit.edu/student.s.html](http://www.mit.edu/student.s.html)) can be sent over the same persistent connection.
3. With nonpersistent connections between browser and origin server, it is possible for a single TCP segment to carry two distinct HTTP request messages.
4. The Date: header in the HTTP response message indicates when the object in the response was last modified.

## Answer

a) F b) T c) F d) F f) F

## P4

Consider the following string of ASCII characters that were captured by Wireshark when the browser sent an HTTP GET message (i.e., this is the actual content of an HTTP GET message). The characters are carriage return and line-feed characters (that is, the italicized character string in the text below represents the single carriage-return character that was contained at that point in the HTTP header). Answer the following questions, indicating where in the HTTP GET message below you find the answer.

GET /cs453/index.html HTTP/1.1Host: gai a.cs.umass.eduUser-Agent: Mozilla/5.0 ( Windows;U; Windows NT 5.1; en-US; rv:1.7.2) Gec ko/20040804 Netscape/7.2 (ax) Accept:ex t/xml, application/xml, application/xhtml+xml, text /html;q=0.9, text/plain;q=0.8,image/png,;q=0.5

*Accept-Language: en-us,en;q=0.5Accept- Encoding: zip,deflateAccept-Charset: ISO -8859-1,utf-8;q=0.7,;q=0.7Keep-Alive: 300 Connection:keep-alive*

- a. What is the URL of the document requested by the browser?
- b. What version of HTTP is the browser running?
- c. Does the browser request a non-persistent or a persistent connection?
- d. What is the IP address of the host on which the browser is running?
- e. What type of browser initiates this message? Why is the browser type needed in an HTTP request message?

## Answer

- a. <http://gaia.cs.umass.edu/cs453/index>
- b. The version is 1.1
- c. The browser is requesting a persistent connection
- d. The information is not included in this message
- e. Mozilla/5.0. The browser type is needed because the server can send different versions of the same object to different types of user agent according to the browser type.

## P8

Referring to Problem P7, suppose the HTML file references eight very small objects on the same server. Neglecting transmission times, how much time elapses with

- a. Non-persistent HTTP with no parallel TCP connections?

- b. Non-persistent HTTP with the browser configured for 5 parallel connections?
- c. Persistent HTTP?

### Answer

- a.  $RTT_1 + RTT_2 + \dots + RTT_n + 2RTT_0 + 8 * 2RTT_0 = 18RTT_0 + RTT_1 + RTT_2 + \dots + RTT_n$
- b.  $RTT_1 + RTT_2 + \dots + RTT_n + 2RTT_0 + 2 * 2RTT_0 = 6RTT_0 + RTT_1 + RTT_2 + \dots + RTT_n$
- c.  $RTT_1 + RTT_2 + \dots + RTT_n + 2RTT_0 + 8RTT_0 = 10RTT_0 + RTT_1 + RTT_2 + \dots + RTT_n$

### P9

Consider Figure 2.12, for which there is an institutional network connected to the Internet. Suppose that the average object size is 850,000 bits and that the average request rate from the institution's browsers to the origin servers is 16 requests per second. Also suppose that the amount of time it takes from when the router on the Internet side of the access link forwards an HTTP request until it receives the response is three seconds on average (see Section 2.2.5). Model the total average response time as the sum of the average access delay (that is, the delay from Internet router to institution router) and the average Internet delay. For the average access delay, use  $\Delta / (1 - \Delta b)$ , where  $\Delta$  is

the average time required to send an object over the access link and  $b$  is the arrival rate of objects to the access link.

- a. Find the total average response time.
- b. Now suppose a cache is installed in the institutional LAN. Suppose the miss rate is 0.4. Find the total response time.

### Answer

a.

$$\Delta = 850000 / 15000000 = 0.0567s$$

$$\text{traffic intensity} = 0.0567 * 16 = 0.9072$$

$$t = 0.0567 / (1 - 0.9072) + 3 = 3.61s$$

b.

$$\text{traffic intensity} = 0.4 * 0.9072 = 0.36288$$

$$t = 0.4 * (0.0567 / (1 - 0.36288) + 3) = 1.24s$$

### P13

What's the difference between The Mail FROM: in SMTP and The From: on the mail message itself?

**Answer**

The MAIL FROM: in SMTP is a message from the SMTP client to identify the sender of the message to the SMTP server.

The From: on the mail message itself is merely a line in the body of the mail message.