

# Lab 2 HTTP & Socket Programming

## Exercise 3: Using Wireshark to understand basic HTTP request/response messages

10	4.694850	192.168.1.102	128.119.245.12	HTTP	555 GET /ethereal-labs/lab2-1.html HTTP/1.1
12	4.718993	128.119.245.12	192.168.1.102	HTTP	439 HTTP/1.1 200 OK (text/html)
13	4.724332	192.168.1.102	128.119.245.12	HTTP	541 GET /favicon.ico HTTP/1.1
14	4.750366	128.119.245.12	192.168.1.102	HTTP	1395 HTTP/1.1 404 Not Found (text/html)

```
▶ Frame 12: 439 bytes on wire (3512 bits), 439 bytes captured (3512 bits)
▶ Ethernet II, Src: LinksysG_da:af:73 (00:06:25:da:af:73), Dst: DellComp_4f:36:23 (00:08:74:4f:36:23)
▶ Internet Protocol Version 4, Src: 128.119.245.12 (128.119.245.12), Dst: 192.168.1.102 (192.168.1.102)
▶ Transmission Control Protocol, Src Port: 80 (80), Dst Port: 4127 (4127), Seq: 1, Ack: 502, Len: 385
▼ Hypertext Transfer Protocol
  ▼ HTTP/1.1 200 OK\r\n
    ▶ [Expert Info (Chat/Sequence): HTTP/1.1 200 OK\r\n]
      Request Version: HTTP/1.1
      Status Code: 200
      Response Phrase: OK
      Date: Tue, 23 Sep 2003 05:29:50 GMT\r\n
      Server: Apache/2.0.40 (Red Hat Linux)\r\n
      Last-Modified: Tue, 23 Sep 2003 05:29:00 GMT\r\n
      ETag: "1bfd-49-79d5bf00"\r\n
      Accept-Ranges: bytes\r\n
```

### Question 1.

The status Code is 200, response phrase is OK.

### Question 2.

Last-Modified date: Tue, 23 Sep 2003 05:29:00

Response date Header: Tue, 23 Sep 2003 05:29:50

These two times are different because the last modified date is the file being last changed, while the response time is the packet created time.

### Question 3.

```
Content-Length: 73\r\n
Keep-Alive: timeout=10, max=100\r\n
Connection: Keep-Alive\r\n
Content-Type: text/html; charset=ISO-8859-1\r\n
\r\n
```

From 'Connection: Keep-Alive', we know that it is persistent.

### Question 4.

```
Accept-Ranges: bytes\r\n
▼ Content-Length: 73\r\n
  [Content length: 73]
```

73 Bytes being returned.

### Question 5.

The content inside is:

```
▼ Line-based text data: text/html
<html>\n
Congratulations. You've downloaded the file lab2-1.html!\n
</html>\n
```

## Exercise 4: Using Wireshark to understand the HTTP CONDITIONAL GET/response interaction

### Question 1.

There's no 'IF-MODIFIED-SINCE' line.

### Question 2.

```
▶ HTTP/1.1 200 OK\r\n
  Date: Tue, 23 Sep 2003 05:35:50 GMT\r\n
  Server: Apache/2.0.40 (Red Hat Linux)\r\n
  Last-Modified: Tue, 23 Sep 2003 05:35:00 GMT\r\n
```

Yes, and the last modified date is: Tue, 23 Sep 2003 05:35:50.

### Question 3.

```
Connection: keep-alive\r\n
If-Modified-Since: Tue, 23 Sep 2003 05:35:00 GMT\r\n
If-None-Match: "1bfef-173-8f4ae900"\r\n
Cache-Control: max-age=0\r\n
```

It has both "IF-MODIFIED-SINCE' and 'If-None-Match' line.

### Question 4.

```
▶ [Expert Info (Chat/Sequence): HTTP/1.1 304 Not Modified\r\n]
  Request Version: HTTP/1.1
  Status Code: 304
  Response Phrase: Not Modified
```

Status code: 304, state: Not Modified. It returned the status code and response phrase.

### Question 5.

First GET:

```
Request Version: HTTP/1.1
Status Code: 200
Response Phrase: OK
Date: Tue, 23 Sep 2003 05:35:50 GMT\r\n
Server: Apache/2.0.40 (Red Hat Linux)\r\n
Last-Modified: Tue, 23 Sep 2003 05:35:00 GMT\r\n
ETag: "1bfef-173-8f4ae900"\r\n
```

Second GET:

```
Request Version: HTTP/1.1
Status Code: 304
Response Phrase: Not Modified
Date: Tue, 23 Sep 2003 05:35:53 GMT\r\n
Server: Apache/2.0.40 (Red Hat Linux)\r\n
Connection: Keep-Alive\r\n
Keep-Alive: timeout=10, max=99\r\n
ETag: "1bfef-173-8f4ae900"\r\n
```

2nd ETag value is: 1bfef-173-8f4ae900. The value did not change.

## Exercise 5: Ping Client

```
PingClient.py
PingClient.py x
1 # COMP3331 Lab 2
2 # z5173593
3 # Zixuan Guo
4
5
6 import time
7 from socket import *
8
9
10 import sys
11 host = sys.argv[1]
12 serverPort = int(sys.argv[2])
13
14
15 clientSocket = socket(AF_INET, SOCK_DGRAM)
16 clientSocket.settimeout(1)
17
18 for i in range(0, 15):
19     sendTime = time.time()
20     # PING sequence_number time CRLF
21     message = ('PING %d %s\r\n' % (i + 1, sendTime)).encode()
22     try:
23         # send
24         clientSocket.sendto(message, (host, serverPort))
25         modifiedMessage, serverAddress = clientSocket.recvfrom(2048)
26         # RTT
27         rtt = time.time() - sendTime
28         print('ping to %s, seq = %d, rtt = %fms' % (host, i+1, rtt*1000))
29     # timeout
30     except Exception as e:
31         print('ping to %s, seq = %d: Request timed out' % (host, i+1))
32
33 clientSocket.close()
```

```
Reply not sent.
Received from 127.0.0.1: PING 11 1592838812.762217
Reply sent.
Received from 127.0.0.1: PING 12 1592838812.9422238
Reply sent.
Received from 127.0.0.1: PING 13 1592838813.0944262
Reply sent.
Received from 127.0.0.1: PING 14 1592838813.151061
Reply sent.
Received from 127.0.0.1: PING 15 1592838813.34019
Reply sent.
Received from 127.0.0.1: PING 1 1592838831.512873
Reply sent.
Received from 127.0.0.1: PING 2 1592838831.6951199
Reply sent.
Received from 127.0.0.1: PING 3 1592838831.697261
Reply sent.
Received from 127.0.0.1: PING 4 1592838831.7400162
Reply not sent.
Received from 127.0.0.1: PING 5 1592838832.741736
Reply sent.
Received from 127.0.0.1: PING 6 1592838832.8994281
Reply sent.
Received from 127.0.0.1: PING 7 1592838833.043725
Reply sent.
Received from 127.0.0.1: PING 8 1592838833.2268002
Reply not sent.
Received from 127.0.0.1: PING 9 1592838834.228687
Reply sent.
Received from 127.0.0.1: PING 10 1592838834.381375
Reply sent.
Received from 127.0.0.1: PING 11 1592838834.389813
Reply sent.
Received from 127.0.0.1: PING 12 1592838834.458108
Reply sent.
Received from 127.0.0.1: PING 13 1592838834.542388
Reply sent.
Received from 127.0.0.1: PING 14 1592838834.647537
Reply sent.
Received from 127.0.0.1: PING 15 1592838834.6641788
Reply sent.

/usr/local/Cellar/python/3.7.5/Frameworks/Python.framework/Versions/3.7/Resources/Python.app/Contents/MacOS/Python: can't open file 'PingClient.py': [Errno 2] No such file or directory
zixuanGuo@ZixuandeMacBook-Air ~ % clear
zixuanGuo@ZixuandeMacBook-Air ~ % cd Desktop/comp3331
zixuanGuo@ZixuandeMacBook-Air ~/Desktop/comp3331 % python3 PingClient.py 127.0.0.1 1125
ping to 127.0.0.1, seq = 1, rtt = 119.608164ms
ping to 127.0.0.1, seq = 2, rtt = 10.931969ms
ping to 127.0.0.1, seq = 3: Request timed out
ping to 127.0.0.1, seq = 4, rtt = 2.136230ms
ping to 127.0.0.1, seq = 5: Request timed out
ping to 127.0.0.1, seq = 6, rtt = 98.366976ms
ping to 127.0.0.1, seq = 7, rtt = 57.757139ms
ping to 127.0.0.1, seq = 8, rtt = 108.621120ms
ping to 127.0.0.1, seq = 9, rtt = 6.864309ms
ping to 127.0.0.1, seq = 10: Request timed out
ping to 127.0.0.1, seq = 11, rtt = 179.952145ms
ping to 127.0.0.1, seq = 12, rtt = 152.092218ms
ping to 127.0.0.1, seq = 13, rtt = 56.578875ms
ping to 127.0.0.1, seq = 14, rtt = 189.066887ms
ping to 127.0.0.1, seq = 15, rtt = 110.018015ms
zixuanGuo@ZixuandeMacBook-Air ~/Desktop/comp3331 % python3 PingClient.py 127.0.0.1 1125
ping to 127.0.0.1, seq = 1, rtt = 182.095051ms
ping to 127.0.0.1, seq = 2, rtt = 2.083063ms
ping to 127.0.0.1, seq = 3, rtt = 42.684793ms
ping to 127.0.0.1, seq = 4: Request timed out
ping to 127.0.0.1, seq = 5, rtt = 157.634974ms
ping to 127.0.0.1, seq = 6, rtt = 144.227743ms
ping to 127.0.0.1, seq = 7, rtt = 183.006048ms
ping to 127.0.0.1, seq = 8: Request timed out
ping to 127.0.0.1, seq = 9, rtt = 152.631760ms
ping to 127.0.0.1, seq = 10, rtt = 8.375883ms
ping to 127.0.0.1, seq = 11, rtt = 68.227053ms
ping to 127.0.0.1, seq = 12, rtt = 84.177017ms
ping to 127.0.0.1, seq = 13, rtt = 105.084181ms
ping to 127.0.0.1, seq = 14, rtt = 16.578913ms
ping to 127.0.0.1, seq = 15, rtt = 134.552240ms
zixuanGuo@ZixuandeMacBook-Air ~/Desktop/comp3331 %
```