

# Lab 1

## 1. The Basic HTTP GET/response interaction

/var/folders/2l/36xzlpgd3lbcgxp63mx08840000gn/T//wireshark\_pcapng\_en1\_20160911134935\_4LgXlg 399 total packets, 26 shown

```

258 7.702121      192.168.1.76      128.119.245.12      HTTP      512      GET /
ethereal-labs/HTTP-ethereal-file1.html HTTP/1.1
Frame 258: 512 bytes on wire (4096 bits), 512 bytes captured (4096 bits) on interface 0
Ethernet II, Src: Apple_1f:c1:be (88:1f:al:1f:c1:be), Dst: Technico_6f:32:12 (30:91:8f:6f:32:12)
Internet Protocol Version 4, Src: 192.168.1.76, Dst: 128.119.245.12
Transmission Control Protocol, Src Port: 58990 (58990), Dst Port: 80 (80), Seq: 1, Ack: 1, Len: 446
Hypertext Transfer Protocol
GET /ethereal-labs/HTTP-ethereal-file1.html HTTP/1.1\r\n
[Expert Info (Chat/Sequence): GET /ethereal-labs/HTTP-ethereal-file1.html HTTP/1.1\r\n]
[GET /ethereal-labs/HTTP-ethereal-file1.html HTTP/1.1\r\n]
[Severity level: Chat]
[Group: Sequence]
Request Method: GET
Request URI: /ethereal-labs/HTTP-ethereal-file1.html
Request Version: HTTP/1.1
Host: gaia.cs.umass.edu\r\n
Connection: keep-alive\r\n
Upgrade-Insecure-Requests: 1\r\n
User-Agent: Mozilla/5.0 (Macintosh; Intel Mac OS X 10_11_6) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/52.0.2743.116 Safari/537.36\r\n
Accept: text/html,application/xhtml+xml,application/xml;q=0.9,image/webp,*/*;q=0.8\r\n
Accept-Encoding: gzip, deflate, sdch\r\n
Accept-Language: sv-SE,sv;q=0.8,en-US;q=0.6,en;q=0.4\r\n
\r\n
[Full request URI: http://gaia.cs.umass.edu/ethereal-labs/HTTP-ethereal-file1.html]
[HTTP request 1/2]
[Response in frame: 264]
[Next request in frame: 291]

```

Figure 1, GET

/var/folders/2l/36xzlpgd3lbcgxp63mx08840000gn/T//wireshark\_pcapng\_en1\_20160911134935\_4LgXlg 399 total packets, 26 shown

```

264 7.813953      128.119.245.12      192.168.1.76      HTTP      552      HTTP/1.1 200
OK (text/html)
Frame 264: 552 bytes on wire (4416 bits), 552 bytes captured (4416 bits) on interface 0
Ethernet II, Src: Technico_6f:32:12 (30:91:8f:6f:32:12), Dst: Apple_1f:c1:be (88:1f:al:1f:c1:be)
Internet Protocol Version 4, Src: 128.119.245.12, Dst: 192.168.1.76
Transmission Control Protocol, Src Port: 80 (80), Dst Port: 58990 (58990), Seq: 1, Ack: 447, Len: 486
Hypertext Transfer Protocol
HTTP/1.1 200 OK\r\n
[Expert Info (Chat/Sequence): HTTP/1.1 200 OK\r\n]
[HTTP/1.1 200 OK\r\n]
[Severity level: Chat]
[Group: Sequence]
Request Version: HTTP/1.1
Status Code: 200
Response Phrase: OK
Date: Sun, 11 Sep 2016 11:49:44 GMT\r\n
Server: Apache/2.4.6 (CentOS) OpenSSL/1.0.1e-fips PHP/5.4.16 mod_perl/2.0.9dev Perl/v5.16.3\r\n
Last-Modified: Sun, 11 Sep 2016 05:59:02 GMT\r\n
ETag: "7e-53c351386e187"\r\n
Accept-Ranges: bytes\r\n
Content-Length: 126\r\n
Keep-Alive: timeout=5, max=100\r\n
Connection: Keep-Alive\r\n
Content-Type: text/html; charset=UTF-8\r\n
\r\n
[HTTP response 1/2]
[Time since request: 0.111832000 seconds]
[Request in frame: 258]
[Next request in frame: 291]
[Next response in frame: 295]
Line-based text data: text/html

```

Figure 2, Response

1. By looking at *Fig. 1*, one can see that my browser (Google Chrome) is running HTTP version 1.1. The server is running HTTP version 1.1.
2. As seen in *Fig. 1*, my browser will accept sv-SE (Swedish) as well as en-US (American English).
3. My IP is: 192.168.1.76, and the servers adress is 128.119.245.12
4. The status code returned from the server is 200 and can be seen in *Fig.2*, which corresponds to a successful HTTP request.
5. Last modified: Sun, 11 Sep 2016 05:59:02 GMT can be seen in *Fig. 2*.
6. The content-length, seen in *Fig. 2*, tells us that the content is 126 bytes long.

## 2. The HTTP CONDITIONAL GET/response interaction

/var/folders/2l/36xzlpgd3lbcgxp63mx08840000gn/T//wireshark\_pcapng\_en1\_20160911143421\_2rGwOk 88 total packets, 4 shown

```

59 1.246854      192.168.1.76      128.119.245.12      HTTP      538      GET /
ethereal-labs/HTTP-ethereal-file2.html HTTP/1.1
Frame 59: 538 bytes on wire (4304 bits), 538 bytes captured (4304 bits) on interface 0
Ethernet II, Src: Apple_1f:c1:be (88:1f:al:1f:c1:be), Dst: Technico_6f:32:12 (30:91:8f:6f:32:12)
Internet Protocol Version 4, Src: 192.168.1.76, Dst: 128.119.245.12
Transmission Control Protocol, Src Port: 59898 (59898), Dst Port: 80 (80), Seq: 1, Ack: 1, Len: 472
Hypertext Transfer Protocol
GET /ethereal-labs/HTTP-ethereal-file2.html HTTP/1.1\r\n
[Expert Info (Chat/Sequence): GET /ethereal-labs/HTTP-ethereal-file2.html HTTP/1.1\r\n]
[GET /ethereal-labs/HTTP-ethereal-file2.html HTTP/1.1\r\n]
[Severity level: Chat]
[Group: Sequence]
Request Method: GET
Request URI: /ethereal-labs/HTTP-ethereal-file2.html
Request Version: HTTP/1.1
Host: gaia.cs.umass.edu\r\n
Connection: keep-alive\r\n
Cache-Control: max-age=0\r\n
Upgrade-Insecure-Requests: 1\r\n
User-Agent: Mozilla/5.0 (Macintosh; Intel Mac OS X 10_11_6) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/52.0.2743.116 Safari/537.36\r\n
Accept: text/html,application/xhtml+xml,application/xml;q=0.9,image/webp,*/*;q=0.8\r\n
Accept-Encoding: gzip, deflate, sdch\r\n
Accept-Language: sv-SE,sv;q=0.8,en-US;q=0.6,en;q=0.4\r\n
\r\n
[Full request URI: http://gaia.cs.umass.edu/ethereal-labs/HTTP-ethereal-file2.html]
[HTTP request 1/2]
[Response in frame: 64]
[Next request in frame: 85]

```

Figure 3, First GET request

/var/folders/2l/36xzlpgd3lbcgxp63mx08840000gn/T//wireshark\_pcapng\_en1\_20160911143421\_2rGwOk 88 total packets, 4 shown

```

64 1.359005      128.119.245.12      192.168.1.76      HTTP      798      HTTP/1.1 200
OK (text/html)
Frame 64: 798 bytes on wire (6384 bits), 798 bytes captured (6384 bits) on interface 0
Ethernet II, Src: Technico_6f:32:12 (30:91:8f:6f:32:12), Dst: Apple_1f:c1:be (88:1f:al:1f:c1:be)
Internet Protocol Version 4, Src: 128.119.245.12, Dst: 192.168.1.76
Transmission Control Protocol, Src Port: 80 (80), Dst Port: 59898 (59898), Seq: 1, Ack: 473, Len: 732
Hypertext Transfer Protocol
HTTP/1.1 200 OK\r\n
[Expert Info (Chat/Sequence): HTTP/1.1 200 OK\r\n]
[HTTP/1.1 200 OK\r\n]
[Severity level: Chat]
[Group: Sequence]
Request Version: HTTP/1.1
Status Code: 200
Response Phrase: OK
Date: Sun, 11 Sep 2016 12:34:23 GMT\r\n
Server: Apache/2.4.6 (CentOS) OpenSSL/1.0.1e-fips PHP/5.4.16 mod_perl/2.0.9dev Perl/v5.16.3\r\n
Last-Modified: Sun, 11 Sep 2016 05:59:02 GMT\r\n
ETag: "173-53c351386d9b7"\r\n
Accept-Ranges: bytes\r\n
Content-Length: 371\r\n
[Content length: 371]
Keep-Alive: timeout=5, max=100\r\n
Connection: Keep-Alive\r\n
Content-Type: text/html; charset=UTF-8\r\n
\r\n
[HTTP response 1/2]
[Time since request: 0.112151000 seconds]
[Request in frame: 59]
[Next request in frame: 85]
[Next response in frame: 86]
Line-based text data: text/html

```

Figure 4, First Response from server

/var/folders/2l/36xzlppd3lbcgxxp63mx0884000gn/T/wireshark\_pcapng\_enl\_20160911143421\_2rGwOk 88 total packets, 4 shown

```

85 5.184372      192.168.1.76      128.119.245.12    HTTP      624      GET /
ethereal-labs/HTTP-ethereal-file2.html HTTP/1.1
Frame 85: 624 bytes on wire (4992 bits), 624 bytes captured (4992 bits) on interface 0
Ethernet II, Src: Apple-If:cl:be (08:1f:a1:1f:c1:be), Dst: Technico_6f:32:12 (30:91:8f:6f:
32:12)
Internet Protocol Version 4, Src: 192.168.1.76, Dst: 128.119.245.12
Transmission Control Protocol, Src Port: 59898 (59898), Dst Port: 80 (80), Seq: 473, Ack: 733,
Len: 558
Hypertext Transfer Protocol
GET /ethereal-labs/HTTP-ethereal-file2.html HTTP/1.1\r\n
[Expert Info (Chat/Sequence): GET /ethereal-labs/HTTP-ethereal-file2.html HTTP/1.1\r\n]
[GET /ethereal-labs/HTTP-ethereal-file2.html HTTP/1.1\r\n]
[Severity level: Chat]
[Group: Sequence]
Request Method: GET
Request URI: /ethereal-labs/HTTP-ethereal-file2.html
Request Version: HTTP/1.1
Host: gaia.cs.umass.edu\r\n
Connection: keep-alive\r\n
Cache-Control: max-age=0\r\n
Upgrade-Insecure-Requests: 1\r\n
User-Agent: Mozilla/5.0 (Macintosh; Intel Mac OS X 10_11_6) AppleWebKit/537.36 (KHTML, like
Gecko) Chrome/52.0.2743.116 Safari/537.36\r\n
Accept: text/html,application/xhtml+xml,application/xml;q=0.9,image/webp,*/*;q=0.8\r\n
Accept-Encoding: gzip, deflate, sdch\r\n
Accept-Language: sv-SE,sv;q=0.8,en-US;q=0.6,en;q=0.4\r\n
If-None-Match: "173-53c351386d90"\r\n
If-Modified-Since: Sun, 11 Sep 2016 05:59:02 GMT\r\n
\r\n
[Full request URI: http://gaia.cs.umass.edu/ethereal-labs/HTTP-ethereal-file2.html]
[HTTP request 2/2]
[Prev request in frame: 59]
[Response in frame: 86]

```

Figure 5, Second GET request

Figure 6, Second Response from server

7. By looking at *Fig. 3*, one can see that there is no such line.
8. Yes, by looking at *Fig. 4*, the content-length is 371 bytes.
9. In *Fig. 5*, If-Modified-Since: Sun, 11 Sep 2016 05:59:02 GMT.
10. The returned code is 304, Not modified. The server did not return any file since it was already cached.

### 3. Retrieving Long Documents

11. 1 GET Request is sent, highlighted in *Fig. 7*.

5	1.773245	192.168.1.76	128.119.245.12	TCP	78	60226 → 80 [SYN] Seq=0 Win=65535 Len=0 MSS=1460 WS=32 TSval=214653488 TSecr=0 SACK..
6	1.773293	192.168.1.76	128.119.245.12	TCP	78	60227 → 80 [SYN] Seq=0 Win=65535 Len=0 MSS=1460 WS=32 TSval=214653488 TSecr=0 SACK..
7	1.883355	128.119.245.12	192.168.1.76	TCP	74	80 → 60226 [SYN, ACK] Seq=0 Ack=1 Win=28960 Len=0 MSS=1460 SACK_PERM=1 TSval=25761..
8	1.883447	192.168.1.76	128.119.245.12	TCP	66	60226 → 80 [ACK] Seq=1 Ack=1 Win=131744 Len=0 TSval=214653597 TSecr=2576131069
9	1.803150	128.119.245.12	128.119.245.12	HTTP	512	GET /ethereal-labs/HTTP-ethereal-file2.html HTTP/1.1
10	1.885026	128.119.245.12	192.168.1.76	TCP	74	80 → 60227 [SYN, ACK] Seq=0 Ack=1 Win=28960 Len=0 MSS=1460 SACK_PERM=1 TSval=25761..
11	1.885145	192.168.1.76	128.119.245.12	TCP	66	60227 → 80 [ACK] Seq=1 Ack=1 Win=131744 Len=0 TSval=214653598 TSecr=2576131070
12	1.999032	128.119.245.12	192.168.1.76	TCP	66	80 → 60226 [ACK] Seq=1 Ack=447 Win=30080 Len=0 TSval=2576131184 TSecr=214653597
13	1.999080	128.119.245.12	192.168.1.76	TCP	1514	[TCP segment of a reassembled PDU]
14	1.999087	128.119.245.12	192.168.1.76	TCP	1514	[TCP segment of a reassembled PDU]
15	1.999052	128.119.245.12	192.168.1.76	TCP	1514	[TCP segment of a reassembled PDU]
16	1.999054	128.119.245.12	192.168.1.76	HTTP	585	HTTP/1.1 200 OK (text/html)
17	1.999049	192.168.1.76	128.119.245.12	TCP	66	60226 → 80 [ACK] Seq=447 Ack=2897 Win=129064 Len=0 TSval=214653712 TSecr=2576131184
18	1.999950	192.168.1.76	128.119.245.12	TCP	66	60226 → 80 [ACK] Seq=447 Ack=4864 Win=129088 Len=0 TSval=214653712 TSecr=2576131185

Figure 7, The request from the Long document

12. 3 TCP segments were needed.

13. The status code is 200 - OK

### 4. HTML Documents with Embedded Objects

14. 3 GET requests were sent, as seen in *Fig. 8*. The requests were sent to <http://webstaff.itn.liu.se/~piede/courses/HTTP-ethereal-file4.html>, [http://www.liu.se/mall06/grafik/header/default\\_header/default\\_big\\_header.gif](http://www.liu.se/mall06/grafik/header/default_header/default_big_header.gif) and <http://www.ox.ac.uk/sites/files/oxford/pi.jpg>

26	3.752664	192.168.1.76	130.236.132.6	HTTP	599	GET /~piede/courses/HTTP-ethereal-file4.html HTTP/1.1
29	3.763390	130.236.132.6	192.168.1.76	HTTP	817	HTTP/1.1 200 OK (text/html)
37	3.802339	2001:6b0:17:f008::...	2001:6b0:17:f008::...	HTTP	583	GET /mall06/grafik/header/default_header/default_big_header.gif HTTP/1.1
68	3.833998	2001:6b0:17:f008::...	2001:2002:51e5:26b...	HTTP	215	HTTP/1.1 200 OK (GIF89a)
75	3.917294	192.168.1.76	129.67.242.154	HTTP	495	GET /sites/files/oxford/pi.jpg HTTP/1.1
287	4.126722	129.67.242.154	192.168.1.76	HTTP	877	HTTP/1.1 200 OK (JPEG JFIF image)

Figure 8, The request to the embedded objects

15. Since their time stamps differ, they were downloaded serially.

## 5. HTTP Authentication

16. The initial server response is 401 - Authorization Required as seen in *Fig. 9*

5	0.264922	192.168.1.76	130.236.132.6	HTTP	497	GET /~piede/courses/tmn031 HTTP/1.1
7	0.276167	130.236.132.6	192.168.1.76	HTTP	910	HTTP/1.1 401 Authorization Required (text/html)
14	3.180286	192.168.1.76	130.236.132.6	HTTP	532	GET /~piede/courses/tmn031 HTTP/1.1
15	3.193465	130.236.132.6	192.168.1.76	HTTP	840	HTTP/1.1 301 Moved Permanently (text/html)
17	3.398064	192.168.1.76	130.236.132.6	HTTP	533	GET /~piede/courses/tmn031/ HTTP/1.1
21	3.424333	130.236.132.6	192.168.1.76	HTTP	653	HTTP/1.1 200 OK (text/html)
25	3.430404	192.168.1.76	130.236.132.6	HTTP	518	GET /~piede/courses/tmn031/default.css HTTP/1.1
34	3.441403	130.236.132.6	192.168.1.76	HTTP	816	HTTP/1.1 200 OK (text/css)
42	3.459760	2001:2002:51e5:26b...	2a00:1450:4010:c08...	HTTP	494	GET /css?family=Arvo:400,700 HTTP/1.1
46	3.477987	2a00:1450:4010:c08...	2001:2002:51e5:26b...	HTTP	106	HTTP/1.1 200 OK (text/css)
49	3.499555	192.168.1.76	130.236.132.6	HTTP	543	GET /~piede/courses/aaa/images/main-bg.jpg HTTP/1.1
52	3.509622	192.168.1.76	130.236.132.6	HTTP	544	GET /~piede/courses/tmn031/images/img18.JPG HTTP/1.1
53	3.510184	130.236.132.6	192.168.1.76	HTTP	769	HTTP/1.1 404 Not Found (text/html)
108	3.563078	2001:2002:51e5:26b...	2a00:1450:4010:c08...	HTTP	550	GET /s/arvo/v9/rC7kKhY-eUDY-ucISTIf5PesZW2x0Q-xsNq047m550A.woff2 HTTP/1.1
114	3.565123	130.236.132.6	192.168.1.76	HTTP	731	HTTP/1.1 200 OK (JPEG JFIF image)
131	3.580951	2a00:1450:4010:c08...	2001:2002:51e5:26b...	HTTP	180	HTTP/1.1 200 OK (font/woff2)
196	3.701291	192.168.1.76	130.236.132.6	HTTP	495	GET /favicon.ico HTTP/1.1
203	3.727418	130.236.132.6	192.168.1.76	HTTP	783	HTTP/1.1 200 OK (image/x-icon)

Figure 9, The GET request and responses from the TNM031 course page

17. The second GET message includes the Credentials ice:cream, the username and password.

```
Frame 14: 532 bytes on wire (4256 bits), 532 bytes captured (4256 bits) on interface 0
Ethernet II, Src: Apple_1f:c1:b6 (08:1f:c1:b6), Dst: Technico_6f:32:12 (30:91:8f:6f:32:12)
Internet Protocol Version 4, Src: 192.168.1.76, Dst: 130.236.132.6
Transmission Control Protocol, Src Port: 60965 (60965), Dst Port: 80 (80), Seq: 432, Ack: 845, Len: 466
Hypertext Transfer Protocol
  GET /~piede/courses/tmn031 HTTP/1.1\r\n
  Host: webstaff.itn.liu.se\r\n
  Connection: keep-alive\r\n
  Authorization: Basic aWNOOmNyZWZt\r\n
    Credentials: ice:cream
  Upgrade-Insecure-Requests: 1\r\n
  User-Agent: Mozilla/5.0 (Macintosh; Intel Mac OS X 10_11_6) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/52.0.2743.116 Safari/537.36\r\n
  Accept: text/html,application/xhtml+xml,application/xml;q=0.9,image/webp,*/*;q=0.8\r\n
  Accept-Encoding: gzip, deflate, sdch\r\n
  Accept-Language: sv-SE,sv;q=0.8,en-US;q=0.6,en;q=0.4\r\n
  \r\n
[Full request URI: http://webstaff.itn.liu.se/~piede/courses/tmn031]
[HTTP request 2/5]
[Prev request in frame: 5]
[Response in frame: 15]
[Next request in frame: 17]
```

Figure 10, The second GET request contains the credentials to login

## 6. Capturing VoIP

18. The captured audio says: Test, 1, 2, 3

