

1. The Basic HTTP GET/response interaction

1. Browser version 1.1 (Figure 1, 1.1), Server version 1.1 (Figure 2, 2.1)

```
▼ Hypertext Transfer Protocol
  ▼ GET /~rzheng/course/CAS4C03W18/Labs/HTTP/HTTP-wireshark-file1.html HTTP/1.1\r\n
    > [Expert Info (Chat/Sequence): GET /~rzheng/course/CAS4C03W18/Labs/HTTP/HTTP-wireshark-file1.html HTTP/1.1\r\n]
      Request Method: GET
      Request URI: /~rzheng/course/CAS4C03W18/Labs/HTTP/HTTP-wireshark-file1.html
      Request Version: HTTP/1.1 ← 1.1
      Host: www.cas.mcmaster.ca\r\n
      User-Agent: Mozilla/5.0 (Windows NT 10.0; Win64; x64; rv:58.0) Gecko/20100101 Firefox/58.0\r\n
      Accept: text/html,application/xhtml+xml,application/xml;q=0.9,*/*;q=0.8\r\n
      Accept-Language: en-US,en;q=0.5 ← 1.2
      Accept-Encoding: gzip, deflate\r\n
    > [truncated]Cookie: III_ENCORE_PATRON=mcmaster.ca; III_SESSION_ID=AEF8C38C36734F2BEAD1458F1ED25310; epprd-8000-PORTA
      DNT: 1\r\n
      Connection: keep-alive\r\n
      Upgrade-Insecure-Requests: 1\r\n
      \r\n
      [Full request URI: http://www.cas.mcmaster.ca/~rzheng/course/CAS4C03W18/Labs/HTTP/HTTP-wireshark-file1.html]
      [HTTP request 1/1]
      [Response in frame: 64]
```

Figure 1

```
▼ 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 ← 2.1
      Status Code: 200
      [Status Code Description: OK]
      Response Phrase: OK
      Date: Wed, 24 Jan 2018 20:04:40 GMT\r\n
      Server: Apache\r\n
      Last-Modified: Thu, 11 Jan 2018 14:50:04 GMT\r\n ← 2.2
      ETag: "3c2426-97-56281435c9f00"\r\n
      Accept-Ranges: bytes\r\n
    > Content-Length: 151\r\n ← 2.3
      Keep-Alive: timeout=15, max=200\r\n
      Connection: Keep-Alive\r\n
      Content-Type: text/html; charset=UTF-8\r\n
      \r\n
      [HTTP response 1/1]
      [Time since request: 0.008463000 seconds]
```

Figure 2

2. en-US, en (Figure 1, 1.2)

3. Computer 172.17.53.158 (Figure 3, 3.1), Server 130.113.68.10 (Figure 3, 3.2)

No.	Time	Source	Destination	Protocol	Length	Info
58	8.310379	172.17.53.158	130.113.68.10	HTTP	1003	GET /~rzheng/course/CAS4C03W18/Labs/HTTP/HTTP-wireshark-file1.html HTTP/1.1
64	8.318842	130.113.68.10	172.17.53.158	HTTP	496	HTTP/1.1 200 OK (text/html) ← 3.3

3.1

3.2

Figure 3

4. 200 (Figure 3, 3.3)

5. Thu, 11 Jan 2018 14:50:04 GMT (Figure 2, 2.2)
6. 151 bytes (Figure 2, 2.3)
7. No. (Figure 4)

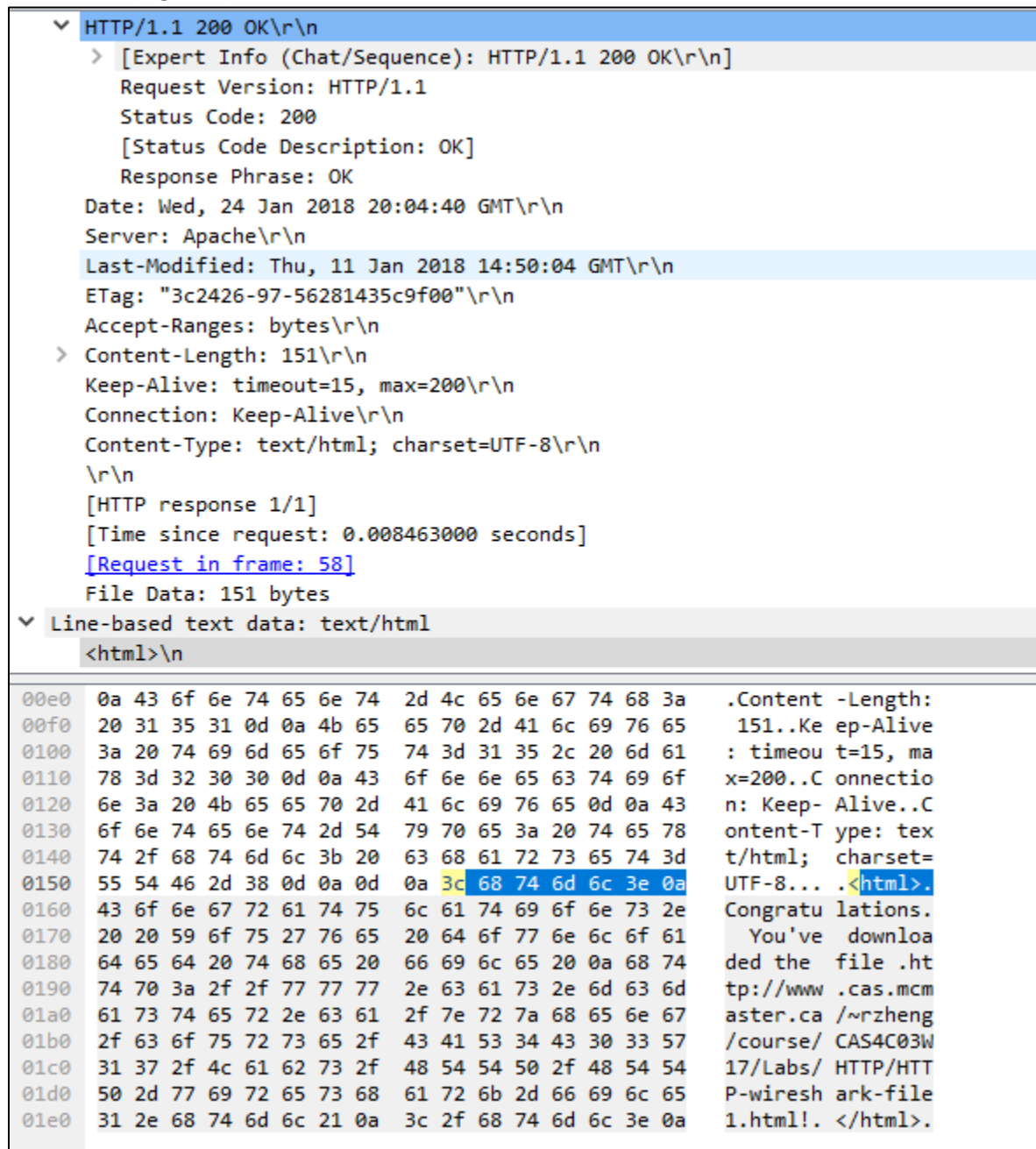


Figure 4

2. The HTTP CONDITIONAL GET/response interaction

8. No.

UMME SALMA GADRIWALA - 400021431
4C03 – ASSIGNMENT 1

No.	Time	Source	Destination	Protocol	Length	Info
19	2.090860	172.17.53.158	130.113.68.10	HTTP	1003	GET /~rzheng/course/CAS4C03W18/Labs/HTTP/HTTP-wiresh...
21	2.095260	130.113.68.10	172.17.53.158	HTTP	717	HTTP/1.1 200 OK (text/html)
27	2.170457	172.17.53.158	130.113.68.10	HTTP	863	GET /favicon.ico HTTP/1.1
28	2.172722	130.113.68.10	172.17.53.158	HTTP	1241	HTTP/1.1 200 OK (text/plain)
48	5.175181	172.17.53.158	130.113.68.10	HTTP	1122	GET /~rzheng/course/CAS4C03W18/Labs/HTTP/HTTP-wiresh...
51	5.179315	130.113.68.10	172.17.53.158	HTTP	227	HTTP/1.1 304 Not Modified

> Frame 19: 1003 bytes on wire (8024 bits), 1003 bytes captured (8024 bits) on interface 0

> Ethernet II, Src: IntelCor_6d:c3:65 (34:02:86:6d:c3:65), Dst: Cisco_ff:fd:9c (00:08:e3:ff:fd:9c)

> Internet Protocol Version 4, Src: 172.17.53.158, Dst: 130.113.68.10

> Transmission Control Protocol, Src Port: 58080, Dst Port: 80, Seq: 1, Ack: 1, Len: 949

▼ Hypertext Transfer Protocol

 ▼ GET /~rzheng/course/CAS4C03W18/Labs/HTTP/HTTP-wireshark-file2.html HTTP/1.1\r\n

 ▼ [Expert Info (Chat/Sequence): GET /~rzheng/course/CAS4C03W18/Labs/HTTP/HTTP-wireshark-file2.html HTTP/1.1\r\n]

 [GET /~rzheng/course/CAS4C03W18/Labs/HTTP/HTTP-wireshark-file2.html HTTP/1.1\r\n]

 [Severity level: Chat]

 [Group: Sequence]

 Request Method: GET

 Request URI: /~rzheng/course/CAS4C03W18/Labs/HTTP/HTTP-wireshark-file2.html

 Request Version: HTTP/1.1

 Host: www.cas.mcmaster.ca\r\n

 User-Agent: Mozilla/5.0 (Windows NT 10.0; Win64; x64; rv:58.0) Gecko/20100101 Firefox/58.0\r\n

 Accept: text/html,application/xhtml+xml,application/xml;q=0.9,*/*;q=0.8\r\n

 Accept-Language: en-US,en;q=0.5\r\n

 Accept-Encoding: gzip, deflate\r\n

> [truncated]Cookie: III_ENCORE_PATRON=mcmaster.ca; III_SESSION_ID=AEF8C38C36734F2BEAD1458F1ED25310; eprpd-8000-PORTAL-PSJSESSION

DNT: 1\r\n

Connection: keep-alive\r\n

Upgrade-Insecure-Requests: 1\r\n

\r\n

[\[Full request URI: http://www.cas.mcmaster.ca/~rzheng/course/CAS4C03W18/Labs/HTTP/HTTP-wireshark-file2.html\]](http://www.cas.mcmaster.ca/~rzheng/course/CAS4C03W18/Labs/HTTP/HTTP-wireshark-file2.html)

[HTTP request 1/3]

[\[Response in frame: 21\]](#)

[\[Next request in frame: 27\]](#)

Figure 5

9. Yes. (Figure 6, 6.1)

UMME SALMA GADRIWALA - 400021431
4C03 – ASSIGNMENT 1

21	2.095260	130.113.68.10	172.17.53.158	HTTP	717 HTTP/1.1 200 OK (text/html)
27	2.170457	172.17.53.158	130.113.68.10	HTTP	863 GET /favicon.ico HTTP/1.1
28	2.172722	130.113.68.10	172.17.53.158	HTTP	1241 HTTP/1.1 200 OK (text/plain)
48	5.175181	172.17.53.158	130.113.68.10	HTTP	1122 GET /~rzheng/course/CAS4C03W18/Labs/HTTP/HT
51	5.179315	130.113.68.10	172.17.53.158	HTTP	227 HTTP/1.1 304 Not Modified

▼ [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

[Status Code Description: OK]

Response Phrase: OK

Date: Wed, 24 Jan 2018 21:08:44 GMT\r\n

Server: Apache\r\n

Last-Modified: Thu, 11 Jan 2018 14:50:04 GMT\r\n

ETag: "3c2410-173-56281435c9f00"\r\n

Accept-Ranges: bytes\r\n

> Content-Length: 371\r\n

Keep-Alive: timeout=15, max=200\r\n

Connection: Keep-Alive\r\n

Content-Type: text/html; charset=UTF-8\r\n

\r\n

[HTTP response 1/3]

[Time since request: 0.004400000 seconds]

[\[Request in frame: 19\]](#)

[\[Next request in frame: 27\]](#)

[\[Next response in frame: 28\]](#)

File Data: 371 bytes

Line-based text data: text/html ← 6.1

\n

<html>\n

\n

Congratulations again! Now you've downloaded the file lab2-2.html.
\n

This file's last modification date will not change. <p>\n

Thus if you download this multiple times on your browser, a complete copy
\n

will only be sent once by the server due to the inclusion of the IN-MODIFIED-SINCE
\n

field in your browser's HTTP GET request to the server.\n

\n

</html>\n

Figure 6

10. Yes, followed by the date it was last modified, Thu, 11 Jan 2018 14:50:04.

UMME SALMA GADRIWALA - 400021431
4C03 – ASSIGNMENT 1

20	2.17.27.22	130.113.68.10	172.17.53.158	HTTP	1242	HTTP/1.1 200 OK (text/plain)
48	5.175181	172.17.53.158	130.113.68.10	HTTP	1122	GET /~rzheng/course/CAS4C03W18/Labs/HTTP/HT
51	5.179315	130.113.68.10	172.17.53.158	HTTP	227	HTTP/1.1 304 Not Modified

> Frame 48: 1122 bytes on wire (8976 bits), 1122 bytes captured (8976 bits) on interface 0

> Ethernet II, Src: IntelCor_6d:c3:65 (34:02:86:6d:c3:65), Dst: Cisco_ff:fd:9c (00:08:e3:ff:fd:9c)

> Internet Protocol Version 4, Src: 172.17.53.158, Dst: 130.113.68.10

> Transmission Control Protocol, Src Port: 58080, Dst Port: 80, Seq: 1759, Ack: 1851, Len: 1068

> Hypertext Transfer Protocol

GET /~rzheng/course/CAS4C03W18/Labs/HTTP/HTTP-wireshark-file2.html HTTP/1.1\r\n

[Expert Info (Chat/Sequence): GET /~rzheng/course/CAS4C03W18/Labs/HTTP/HTTP-wireshark-file2.html HTTP/1.1\r\n]

[GET /~rzheng/course/CAS4C03W18/Labs/HTTP/HTTP-wireshark-file2.html HTTP/1.1\r\n]

[Severity level: Chat]

[Group: Sequence]

Request Method: GET

Request URI: /~rzheng/course/CAS4C03W18/Labs/HTTP/HTTP-wireshark-file2.html

Request Version: HTTP/1.1

Host: www.cas.mcmaster.ca\r\n

User-Agent: Mozilla/5.0 (Windows NT 10.0; Win64; x64; rv:58.0) Gecko/20100101 Firefox/58.0\r\n

Accept: text/html,application/xhtml+xml,application/xml;q=0.9,*/*;q=0.8\r\n

Accept-Language: en-US,en;q=0.5\r\n

Accept-Encoding: gzip, deflate\r\n

[truncated]Cookie: III_ENCORE_PATRON=mcmaster.ca; III_SESSION_ID=AEF8C38C36734F2BEAD1458F1ED25310; epprd-8000-PORTAL

DNT: 1\r\n

Connection: keep-alive\r\n

Upgrade-Insecure-Requests: 1\r\n

If-Modified-Since: Thu, 11 Jan 2018 14:50:04 GMT\r\n

If-None-Match: "3c2410-173-56281435c9f00"\r\n

Figure 7

11. Status code: 304 Not Modified (Figure 8, 8.1)
Contents of file not returned (Figure 8, 8.2 – missing Line-based text data)
The browser cache already has the last version of the file data stored.

> Hypertext Transfer Protocol
> HTTP/1.1 304 Not Modified\r\n
> [Expert Info (Chat/Sequence): HTTP/1.1 304 Not Modified\r\n]
> [HTTP/1.1 304 Not Modified\r\n]
> [Severity level: Chat]
> [Group: Sequence]
> Request Version: HTTP/1.1
> Status Code: 304
> [Status Code Description: Not Modified]
> Response Phrase: Not Modified
> Date: Wed, 24 Jan 2018 21:08:47 GMT\r\n
> Server: Apache\r\n
> Connection: Keep-Alive\r\n
> Keep-Alive: timeout=15, max=198\r\n
> ETag: "3c2410-173-56281435c9f00"\r\n
> \r\n
> [HTTP response 3/3]
> [Time since request: 0.004134000 seconds]
> [Prev request in frame: 27]
> [Prev response in frame: 28]
> [Request in frame: 48]

Figure 8

3. Retrieving Long Documents

12. 1 request. Packet number 67. (Figure 9, 9.1)

No.	Time	Source	Destination	Protocol	Length	Info
67	14.91	172.17.53.158	130.113.68.10	HTTP	1003	GET /~rzheng/course/CAS4C03W18/Labs/HTTP/HTTP-wires
73	14.92	130.113.68.10	172.17.53.158	HTTP	468	HTTP/1.1 200 OK (text/html)
75	14.99	172.17.53.158	130.113.68.10	HTTP	863	GET /favicon.ico HTTP/1.1
76	14.998003	130.113.68.10	172.17.53.158	HTTP	1241	HTTP/1.1 200 OK (text/plain)

Figure 9

13. Packet number 73 (Figure 9, 9.2)

14. Status code: 200 OK (Figure 9, 9.3)

15. 4 TCP Segments.

73	14.922468	130.113.68.10	172.17.53.158	HTTP	468	HTTP/1.1 200 OK (text/html)
75	14.995081	172.17.53.158	130.113.68.10	HTTP	863	GET /favicon.ico HTTP/1.1
76	14.998003	130.113.68.10	172.17.53.158	HTTP	1241	HTTP/1.1 200 OK (text/plain)

> Frame 73: 468 bytes on wire (3744 bits), 468 bytes captured (3744 bits) on interface 0
> Ethernet II, Src: Cisco_ff:fd:9c (00:08:e3:ff:fd:9c), Dst: IntelCor_6d:c3:65 (34:02:86:6d:c3:65)
> Internet Protocol Version 4, Src: 130.113.68.10, Dst: 172.17.53.158
> Transmission Control Protocol, Src Port: 80, Dst Port: 58172, Seq: 4381, Ack: 950, Len: 414
> [4 Reassembled TCP Segments (4794 bytes): #69(1460), #70(1460), #71(1460), #73(414)]
▼ Hypertext Transfer Protocol
▼ HTTP/1.1 200 OK\r\n

Figure 10

4. HTML Documents with Embedded Objects

16. 4 GET requests, sent to 130.113.68.10, 104.93.160.122 and 128.119.240.90. (Figure 11, 11.1)

605	9.848620	172.17.53.158	130.113.68.10	HTTP	1003	GET /~rzheng/course/CAS4C03W18/Labs/HTTP/HTTP-wires
607	9.857517	130.113.68.10	172.17.53.158	HTTP	1110	HTTP/1.1 200 OK (text/html)
624	9.940251	172.17.53.158	104.93.160.122	HTTP	501	GET /etc/clientlibs/platform/aem-core/components/con...
639	9.968468	172.17.53.158	128.119.240.90	HTTP	423	GET /~kurose/cover_5th_ed.jpg HTTP/1.1
666	10.002887	128.119.240.90	172.17.53.158	HTTP	510	HTTP/1.1 302 Found (text/html)
678	10.043353	172.17.53.158	128.119.240.90	HTTP	423	GET /~kurose/cover_5th_ed.jpg HTTP/1.1
679	10.046208	104.93.160.122	172.17.53.158	HTTP	330	HTTP/1.1 301 Moved Permanently
733	10.120323	172.17.53.158	178.255.83.1	OCSP	504	Request
735	10.143671	178.255.83.1	172.17.53.158	OCSP	914	Response
819	10.249065	128.119.240.90	172.17.53.158	HTTP	526	HTTP/1.1 200 OK (JPEG JFIF image)

Figure 11

17. Serial download, because there is a GET request followed by a response and a GET request followed by another response. (Figure 11, 11.2)

5. HTTP Authentication

18. 401 Authorization Required (Figure 12, 12.1)

19. Authorization: Basic NEMwM19zdHVkZW50czo0QzAz (Figure 12, 12.2)

UMME SALMA GADRIWALA - 400021431
4C03 – ASSIGNMENT 1

27	0.925793	172.17.53.158	172.217.2.174	OCSP	494 Request	
32	0.976900	172.217.2.174	172.17.53.158	OCSP	760 Response	
169	2.029344	172.17.53.158	130.113.68.10	HTTP	998 GET /~rzheng/course/CAS4C03W18/Labs/HTTP/HTTP-wireshark-file5.html	
175	2.037045	130.113.68.10	172.17.53.158	HTTP	339 HTTP/1.1 401 Authorization Required	12.1
328	12.272776	172.17.53.158	130.113.68.10	HTTP	1045 GET /~rzheng/course/CAS4C03W18/Labs/HTTP/HTTP-wireshark-file5.html	
330	12.281257	130.113.68.10	172.17.53.158	HTTP	477 HTTP/1.1 200 OK (text/html)	
339	12.397416	172.17.53.158	130.113.68.10	HTTP	858 GET /favicon.ico HTTP/1.1	
340	12.404484	130.113.68.10	172.17.53.158	HTTP	1241 HTTP/1.1 200 OK (text/plain)	

Frame 328: 1045 bytes on wire (8360 bits), 1045 bytes captured (8360 bits) on interface 0
 Ethernet II, Src: IntelCor_6d:c3:65 (34:02:86:6d:c3:65), Dst: Cisco_ff:fd:9c (00:08:e3:ff:fd:9c)
 Internet Protocol Version 4, Src: 172.17.53.158, Dst: 130.113.68.10
 Transmission Control Protocol, Src Port: 59099, Dst Port: 80, Seq: 945, Ack: 286, Len: 991
 Hypertext Transfer Protocol

GET /~rzheng/course/CAS4C03W18/Labs/HTTP/HTTP-wireshark-file5.html HTTP/1.1\r\n

> [Expert Info (Chat/Sequence): GET /~rzheng/course/CAS4C03W18/Labs/HTTP/HTTP-wireshark-file5.html HTTP/1.1\r\n]

Request Method: GET
 Request URI: /~rzheng/course/CAS4C03W18/Labs/HTTP/HTTP-wireshark-file5.html
 Request Version: HTTP/1.1
 Host: www.cas.mcmaster.ca\r\n
 User-Agent: Mozilla/5.0 (Windows NT 10.0; WOW64; rv:56.0) Gecko/20100101 Firefox/56.0\r\n
 Accept: text/html,application/xhtml+xml,application/xml;q=0.9,*/*;q=0.8\r\n
 Accept-Language: en-US,en;q=0.5\r\n
 Accept-Encoding: gzip, deflate\r\n

> [truncated]Cookie: III_ENCORE_PATRON=mcmaster.ca; III_SESSION_ID=AEF8C38C36734F2BEAD1458F1ED25310; epprd-8000-PORTAL-PSJSESSIONID=k
 DNT: 1\r\n
 Connection: keep-alive\r\n
 Upgrade-Insecure-Requests: 1\r\n

> Authorization: Basic NEWwM19zdHVkZW50czo0QzAz\r\n

12.2

Figure 12