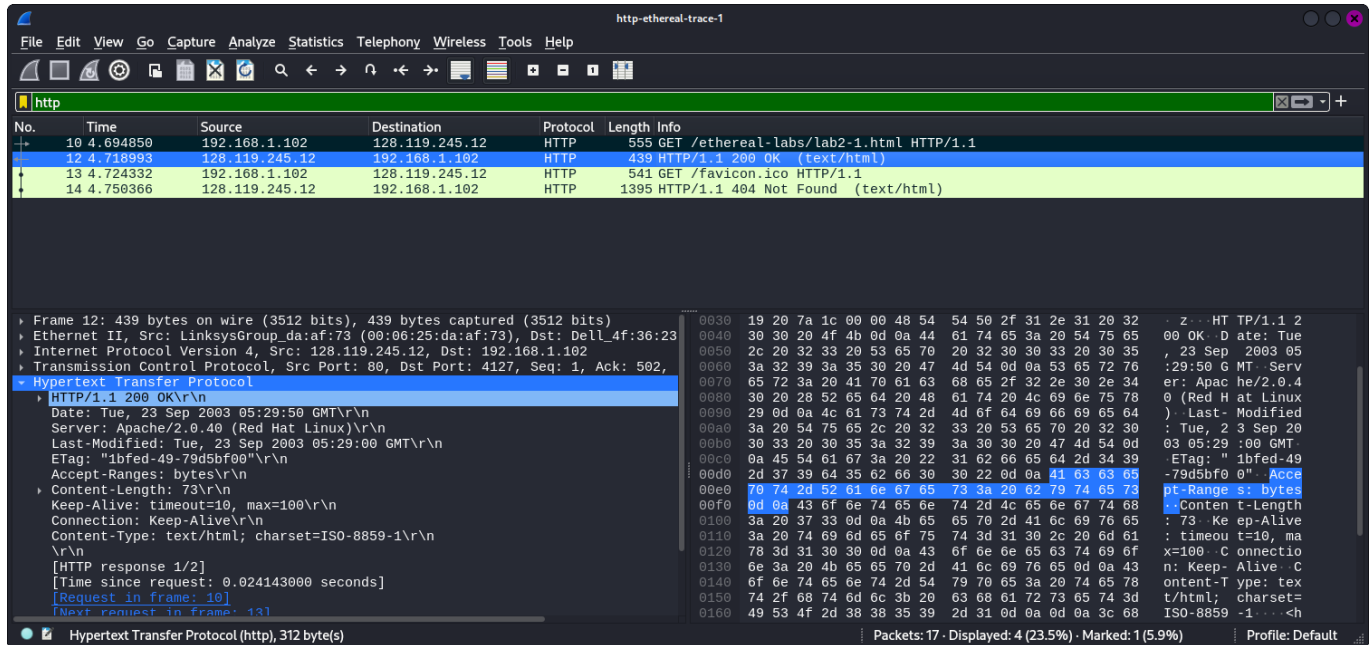


# Lab02

## Exercise 3

### 3.1)

The server returns a 200 status code to the client.



3.2) When was the HTML file the browser retrieves last modified at the server? Does the response also contain a DATE header? How are these two fields different?

The HTML file was last modified on Tue, 23 Sep 2003 05:29:00 GMT.

The response also contains a date header.

The 'date' header represents the time when the message was sent. This is contrasted by 'last modified' which tells the user when the file lab2-1.html was last changed at the server.

3.3) Is the connection established between the browser and the server persistent or non-persistent? How can you infer this?

The connection between the browser and server is persistent. We can conclude this because the 'Connection' header is 'Keep Alive' and represents the persistency of a connection. Additionally, the HTTP version used is HTTP/1.1 and this version assumes all connections are persistent unless specified.

3.4) How many bytes of content are being returned to the browser?

73 bytes of html content is returned:

```

Hypertext Transfer Protocol
  HTTP/1.1 200 OK\r\n
  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: "1bfed-49-79d5bf00"\r\n
  Accept-Ranges: bytes\r\n
  Content-Length: 73\r\n

```

### 3.5) What is the data contained inside the HTTP response packet?

The data inside the HTTP packet is a HTML file.

```

File Data: 73 bytes
Line-based text data: text/html (3 lines)
<html>\n
Congratulations. You've downloaded the file lab2-1.html!\n
</html>\n

```

## Exercise 4

### 4.1) Inspect the contents of the first HTTP GET request from the browser to the server. Do you see an "IF-MODIFIED-SINCE" line in the HTTP GET?

The first **HTTP GET** request from the browser to server does NOT have "IF-MODIFIED-SINCE" field.

The screenshot shows a Wireshark capture of an HTTP GET request. The packet list at the top shows a GET request for /ethereal-labs/lab2-2.html. The packet details pane shows the request structure, including the Host, User-Agent, Accept, Accept-Encoding, Accept-Charset, Keep-Alive, and Connection fields. The packet bytes pane shows the raw data of the request.

### 4.2) Does the HTTP response from the server indicate the last time the requested file was modified?

Yes, the server shows the last time the file was modified at: Tue, 23 Sep 2003 05:35:00 GMT\r\n

No.	Time	Source	Destination	Protocol	Length	Info
8	2.331268	192.168.1.102	128.119.245.12	HTTP	555	GET /ethereal-labs/lab2-2.htm
10	2.357902	128.119.245.12	192.168.1.102	HTTP	739	HTTP/1.1 200 OK (text/html)
14	5.517390	192.168.1.102	128.119.245.12	HTTP	668	GET /ethereal-labs/lab2-2.htm
15	5.540216	128.119.245.12	192.168.1.102	HTTP	243	HTTP/1.1 304 Not Modified

```

> Frame 10: 739 bytes on wire (5912 bits), 739 bytes captured (5912 bits)
> Ethernet II, Src: LinksysGroup_da:af:73 (00:06:25:da:af:73), Dst: Dell_4f:36:23 (00:08:74:4f:36:23)
> Internet Protocol Version 4, Src: 128.119.245.12, Dst: 192.168.1.102
> Transmission Control Protocol, Src Port: 80, Dst Port: 4247, Seq: 1, Ack: 502, Len: 685
> Hypertext Transfer Protocol
  > 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
    ETag: "1bfef-173-8f4ae900"\r\n
    Accept-Ranges: bytes\r\n
  > Content-Length: 371\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
    [HTTP response 1/2]
    [Time since request: 0.026634000 seconds]
    [Request in frame: 8]
    [Next request in frame: 14]
    [Next response in frame: 15]
    [Request URI: http://gaia.cs.umass.edu/ethereal-labs/lab2-2.html]

```

4.3) Now inspect the contents of the second HTTP GET request from the browser to the server. Do you see the “IF-MODIFIED-SINCE:” and “IF-NONE-MATCH” lines in the HTTP GET? If so, what information is contained in these header lines?

Yes, the “IF-MODIFIED-SINCE:” and “IF-NONE-MATCH” headers are present.

“IF-MODIFIED-SINCE:” makes this request conditional if it has been modified after the date *Tue, 23 Sep 2003 05:35:00*

“IF-NONE-MATCH” contains the E-tag value. It makes this request conditional if it doesn't have an E-tag header. The E-tag value is: *"1bfef-173-8f4ae900"*

No.	Time	Source	Destination	Protocol	Length	Info
8	2.331268	192.168.1.102	128.119.245.12	HTTP	555	GET /ethereal-labs/lab2-2.ht
10	2.357902	128.119.245.12	192.168.1.102	HTTP	739	HTTP/1.1 200 OK (text/html)
14	5.517390	192.168.1.102	128.119.245.12	HTTP	668	GET /ethereal-labs/lab2-2.ht
15	5.540216	128.119.245.12	192.168.1.102	HTTP	243	HTTP/1.1 304 Not Modified

▶ Frame 14: 668 bytes on wire (5344 bits), 668 bytes captured (5344 bits)  
 ▶ Ethernet II, Src: Dell\_4f:36:23 (00:08:74:4f:36:23), Dst: LinksysGroup\_da:af:73 (00:06:25:da:af:73)  
 ▶ Internet Protocol Version 4, Src: 192.168.1.102, Dst: 128.119.245.12  
 ▶ Transmission Control Protocol, Src Port: 4247, Dst Port: 80, Seq: 502, Ack: 686, Len: 614  
 ▶ Hypertext Transfer Protocol

```

GET /ethereal-labs/lab2-2.html HTTP/1.1\r\n
Host: gaia.cs.umass.edu\r\n
User-Agent: Mozilla/5.0 (Windows; U; Windows NT 5.1; en-US; rv:1.0.2) Gecko/20021120 Netscape/7.01\r\n
Accept: text/xml,application/xml,application/xhtml+xml,text/html;q=0.9,text/plain;q=0.8,video/x-mng,i
Accept-Language: en-us, en;q=0.50\r\n
Accept-Encoding: gzip, deflate, compress;q=0.9\r\n
Accept-Charset: ISO-8859-1, utf-8;q=0.66, *;q=0.66\r\n
Keep-Alive: 300\r\n
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
\r\n
[Full request URI: http://gaia.cs.umass.edu/ethereal-labs/lab2-2.html]
[HTTP request 2/2]
[Prev request in frame: 8]
[Response in frame: 15]
  
```

4.4) Question 4: What is the HTTP status code and phrase returned from the server in response to this second HTTP GET? Did the server explicitly return the file's contents? Explain

Hypertext Transfer Protocol	
HTTP/1.1 304 Not Modified\r\n	
[Expert Info (Chat/Sequence): HTTP/1.1 304 Not Modified\r\n]	
Response Version: HTTP/1.1	
Status Code: 304	
[Status Code Description: Not Modified]	
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	
\r\n	
[HTTP response 2/2]	

The response HTTP code is 304 and says 'Not Modified'. This means the file (lab2-2.html with E-tag "1bfef-173-8f4ae900" on the client) will not be resent (not explicitly return) from the server because it has not been changed from since the browser's GET request in the header "IF-MODIFIED-SINCE: Tue, 23 Sep 2003 05:35:00".

4.5) What is the value of the Etag field in the 2nd response message, and how is it used? Is the Etag value the same as in the 1st response?

The E-tags are the same in the 1st and 2nd response.

The E-tag in the 2nd response is: "1bfef-173-8f4ae900"

```
Hypertext Transfer Protocol
  HTTP/1.1 304 Not Modified\r\n
    [Expert Info (Chat/Sequence): HTTP/1.1 304
      Response Version: HTTP/1.1
      Status Code: 304
      [Status Code Description: Not Modified]
      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
```

The E-tag in the 1st response is: "1bfef-173-8f4ae900"

```
Hypertext Transfer Protocol
  GET /ethereal-labs/lab2-2.html HTTP/1.1\r\n
    [Expert Info (Chat/Sequence): GET /ethereal-labs/lab2-2.h
      Request Method: GET
      Request URI: /ethereal-labs/lab2-2.html
      Request Version: HTTP/1.1
    Host: gaia.cs.umass.edu\r\n
    User-Agent: Mozilla/5.0 (Windows; U; Windows NT 5.1; en-US;
    Accept: text/xml,application/xml,application/xhtml+xml,text
    Accept-Language: en-us, en;q=0.50\r\n
    Accept-Encoding: gzip, deflate, compress;q=0.9\r\n
    Accept-Charset: ISO-8859-1, utf-8;q=0.66, *;q=0.66\r\n
    Keep-Alive: 300\r\n
    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
```