
# Network Architecture HW-2

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**Network Architecture**

**Home Work -2**

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**1. Suppose from your computer, you clicked to obtain a web page from a remote server. The web page contains nine very small objects. Let RTT0 denote the RTTs between your computer and the remote server. Ignoring processing, queuing and transmission delay, how much time is required for the client to receives the full web page using**

**i. Nonpersistent HTTP?**

**ii. Persistent HTTP?**

**Answer:**

Given details are:

Web page contains nine small objects (n) = 9

Round Trip Time between remote server and computer (RTT) = RTT0

Processing delay = Queuing delay = Transmission delay = 0

Following calculations shows the required times taken by clients to receive full webpages from the remote server. (Which means a total response time)

**(i) Time to receive a full webpage by using Non-persistent HTTP:**

For a non-persistent HTTP connection: New TCP connections establishes for every object transfer.

Response time to establish the TCP connection = 2RTT0

For 'n' objects:

Response time for 'n' objects time is given by = n*(2RTT)

Substituting the given values in above formula,

= 9 * (2RTT0)

= 18 RTT0

Therefore, total response time = 2RTT0+18RTT0

The total response time = 20RTT0

**(ii) Time to receive a full webpage by using Persistent HTTP:**

For a persistent HTTP connection: Only one TCP connection establishes for all objects:

Response time to establish TCP connection is: 2RTT0

For 'n' objects the response time is = n*(RTT) where n=9

Therefore, Response time is given by = 2RTT + n*(RTT)

Substituting the given values in above formula,

= 2RTT0 + 9*RTT0

= 11 RTT0

Therefore, the total response time = 11RTT0

**2. Explain elaborately the procedure of registering domain names and ip address for your start-up company (what companies to contact, how much is the fee, etc.).**

**Answer:**

For start new website of any start-up company, we need to buy domain name and IP address. A brief story about Domain Name and IP address.

Domain Name:

Domain name is the point of contact to the website, which reflects the whole point of view of the website like, the business of the company, products/services provided by the company, credibility from the public etc. Domain name helps to the business/company business enhancements by driving user traffic to the site through search engines and this domain name makes the website easy for customers to remember like www.google.com , www.umkc.edu . Choosing the right and the best domain name is the first and often the hardest step in registering domain name.

IP Address:

When we put up a new website, web-hosting company provides an Internet Protocol Address (IP Address), which includes the set of numbers that pinpoints the website on the internet world. This IP address allows connecting to virtual network simpler.

Examples: 172.217.6.142 (For www.google.com)
134.193.116.82 (For umkc.edu)

Procedure to register Domain Name:

The procedure for registering domain name may vary for different registrars, here are the common procedure steps irrespective of registrar.

**1. Choose the domain name extension:**

There are multiple domain name extensions, here are few. Choose these one's based on your company/website.

- .com (Top level Domain)
- .in (India)
- .org (Organizational)
- .edu (Educational Institutions)
- .biz (business)

**2. Choose the registrar:**

There are multiple registrars available in the market such as GoDaddy, Register.com, NameCheap, name.com, GoSpace. All these companies are authorized by ICANN (Internet Corporation for Assigned Names and Numbers) to sell the domain names. Before going to any registrar, make sure that the registrar is accredited by ICANN. Have some basic idea about prices and services offered such as Web Hosting, since it varies by registrar.

**3. Decide the domain name suitable for the company:**

This is the hardest part. We may take help from the registrar as well.

Example: google.com, umkc.edu, amazon.in

Decide whether your domain would be private or public. The private domain registration reduces the amount of email spam, junk snail mails etc. The public domain registration shows the information in WHOIS website, which is an online searchable database of every domain name in use.

The registrar will assign the static IP address to the assigned domain.

Example: DNS Name: dns1.example.com
Static IP: XX:XX:XX:XX

Then the registrar registers the following Resource Records into ".com" TLD server.

Web server: (example.com, dns1.example.com, NS)
(dns1.example.com, XX:XX:XX:XX,A)
Mail server: (mail.example.com, mail1.example.com, MX)

(mail1.example.com, XX:XX:XX:XX,A)

**4. Contact information**:

There are four important contact information's

- The organization contact: which is treated as the domain names owner.
- The Administrative contact: which is the person who is responsible for administrative needs.
- The technical contact: which is responsible for all technical aspects of domain name.
- The billing contact: which pays the fees and maintains the other payment issues.

**5. Fee Structure and validity:**

The fee for any domain registration vary among the registrars.

The major factors responsible different fee structures:

- Extension name that we choose such as .com, .edu
- The length of the registration, which is by default in between 0-10 years.

You may get discount for longer registration.

Fee can be paid by using PayPal Account or Credit card or debit card.

Here is the sample example of domain prices:

| Domain Extension | Price | Duration | Comments |
|---|---|---|---|
| .com | $9.99 | One year | Top level Domain |
| .net | $11.99 | One year | Top level domain |
| .tv | $29.99 | One year | For TV video and media purpose |
| .biz | $11.99 | One year | for business purpose |
| .museum | $100 | One year | For museum related purpose |

**Laboratory Homework**

**Part 1: Telnet experiments**

**1) GET request: (Produces the response code: 200 Ok status)**

- open the command prompt in administrator mode, hit the command "telnet" to get into telnet prompt
- Type the following command: "o www.facebook.com 80" (Press Enter two times)
- Then type the following commands

"GET / HTTP/1.1" (Press Enter)
"Host: www.facebook.com" (Press Enter twice)

**Here is the response of GET request:**

**Screenshot:**

```
$ telnet facebook.com 80
Trying 31.13.66.36...
connected to facebook.com.
Escape character is '^]'.
GET / HTTP/1.1
Host: facebook.com

HTTP/1.1 200 OK
Date: Tue, 12 Mar 2018 09:20:02 GMT
MS-Author-Via: DAV
Last-Modified: Tue, 13 Mar 2018 08:00:04 GMT
ETag: "19cf7aa-68d-4694e4d4"
Accept-Ranges: bytes
Content-Length:1458
Content-Type:text/html
```

**Summary:**
The response code 200, return the success code
200 OK

**HEAD request: (Produces Response Code: 301 Moved Permanently)**

- open the command prompt in administrator mode, hit the command "telnet" to get into telnet prompt
- Type the following command: “o www.microsoft.com 80” (Press Enter two times)
- Then type the following commands

“HEAD / HTTP/1.1” (Press Enter)
“Host: www.microsoft.com” (Press Enter twice)

**Here is the response of HEAD request:**
**Screenshot:**

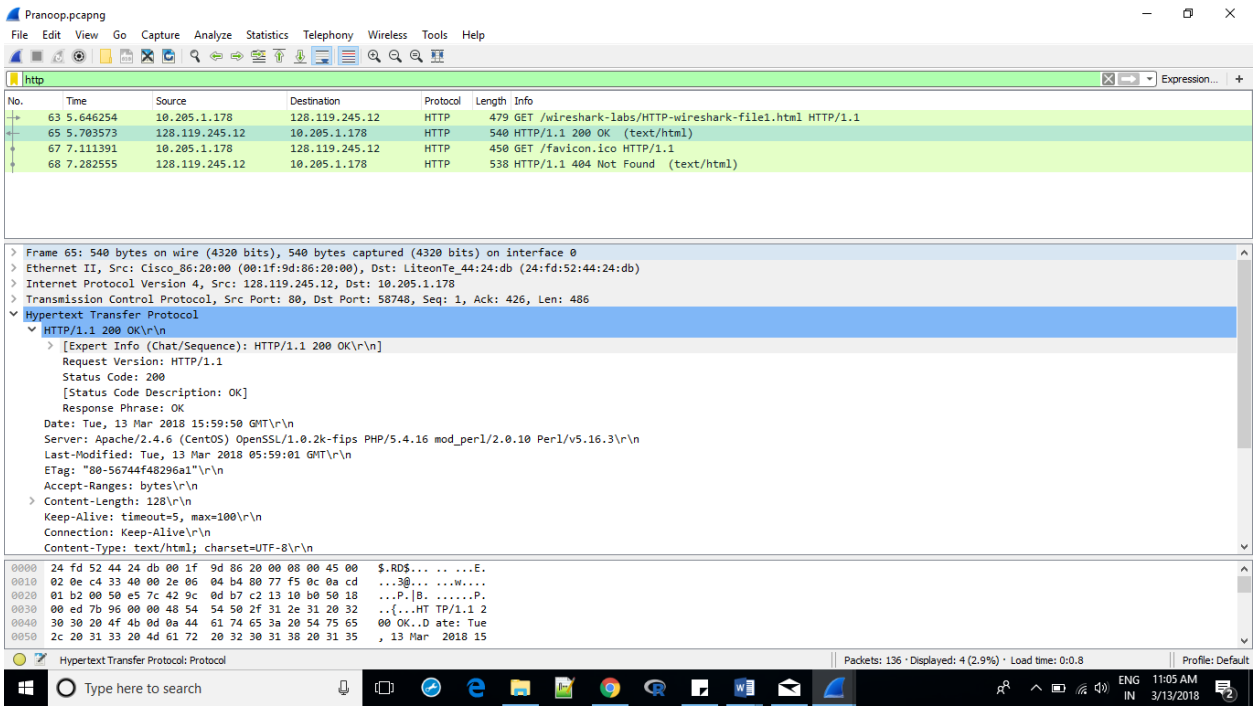
```
$ telnet microsoft.com 80
trying 207.46.232.182...
Connected to microsoft.com.
Escape character is '^]'.
HEAD / HTTP1.1

HTTP/1.1 301 Moved permanently
Connection: close
Date: Tue, 12 Mar 2018 17:32:44 GMT
Server: Microsoft-IIS/6.0
x-Powered-By: ASP.NET
Location: http://www.microsoft.com
Content-Length: 50
Content-Type: text/html
Content-Type: text/html
Set-Cookie: ASPSESSIONIDSKGRYWAS=FMPJMMPRAMKLGIPABIHHMN; path=/
Cache-control: private
```

**Connection closed by foreign host.**

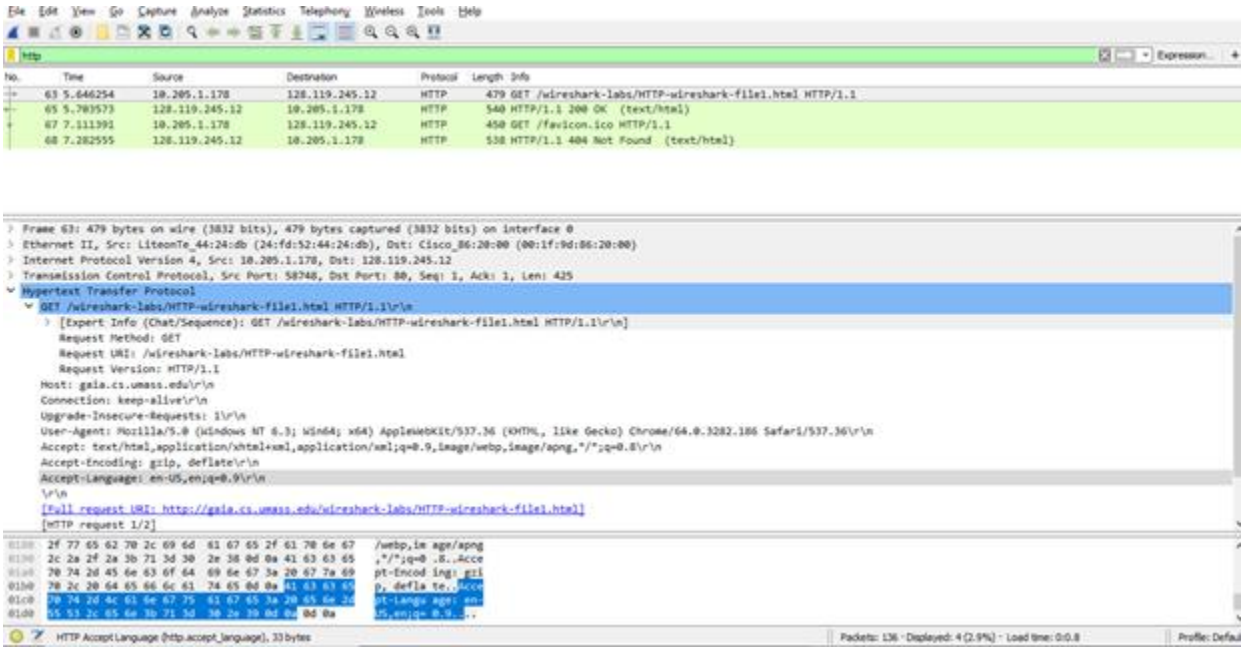
**Summary:** The target resource has been assigned a new permanent URI and any future references to this resource ought to use one of the enclosed URIs

**Part 2: Wireshark experiments:**
**PART2-1: The Basic HTTP GET/response interaction:**
**1. Is your browser running HTTP version 1.0 or 1.1? What version of HTTP is the server running?**

**Answer**: From below two Wireshark captures noticed that, client and server browsers are running on HTTP version 1.1

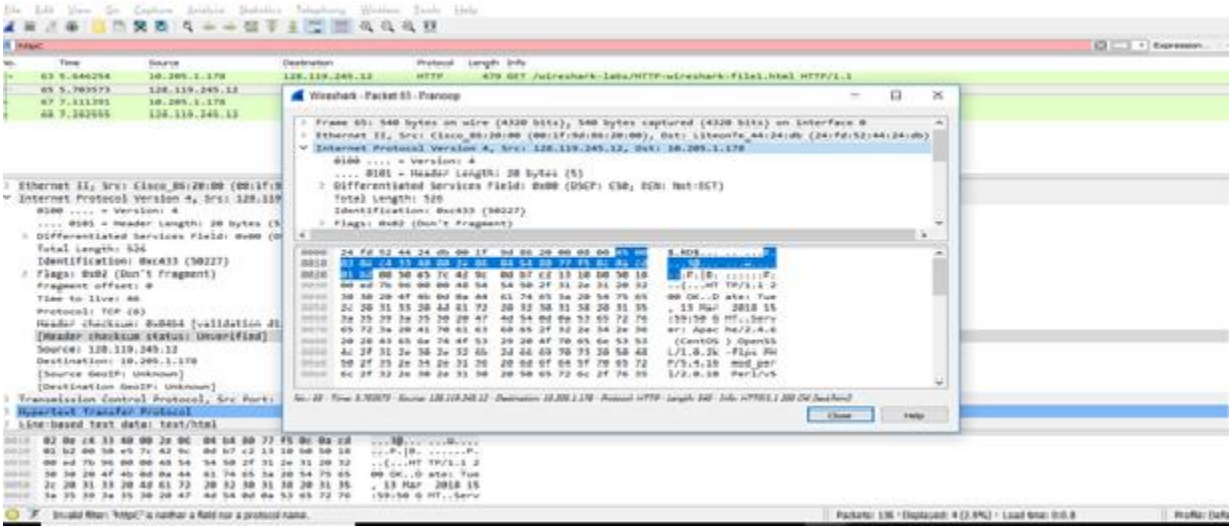



**2. What languages (if any) does your browser indicate that it can accept to the server?**
**Answer:** Browser accepts the English – US language, which is highlighted in below Wireshark capture.



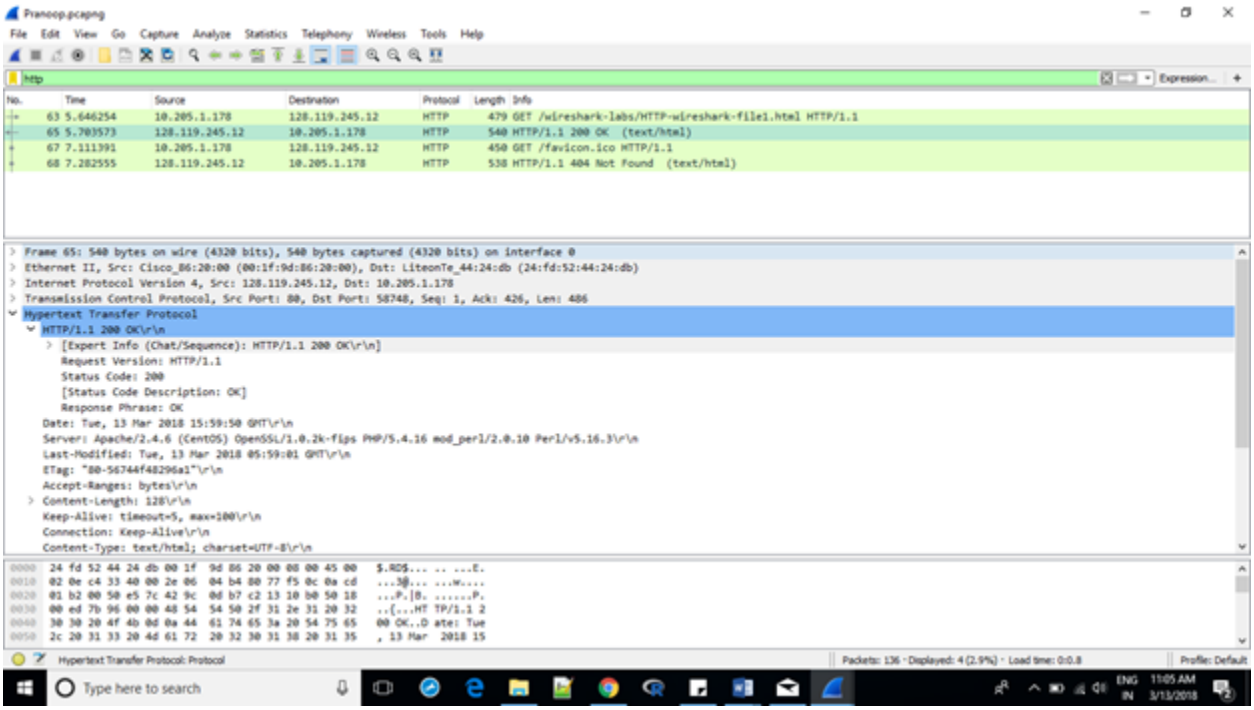

**3. What is the IP address of your computer? Of the gaia.cs.umass.edu server?**
**Answer:** My Computer IP Address: 10.205.1.178

Gaia.cs.umass.edu server IP address: 128.119.245.12, we can observe these IP addresses as Source and Destination address in below Wireshark capture.



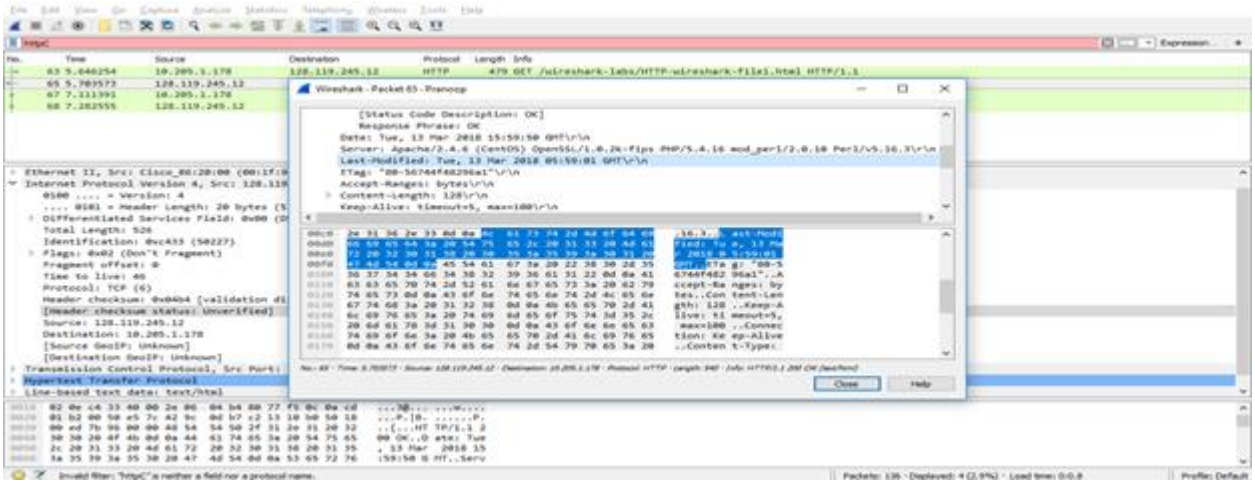
## 4. What is the status code returned from the server to your browser?

**Answer:** Status code returned from server to my browser is "200", shown in following capture. 200 means "OK".

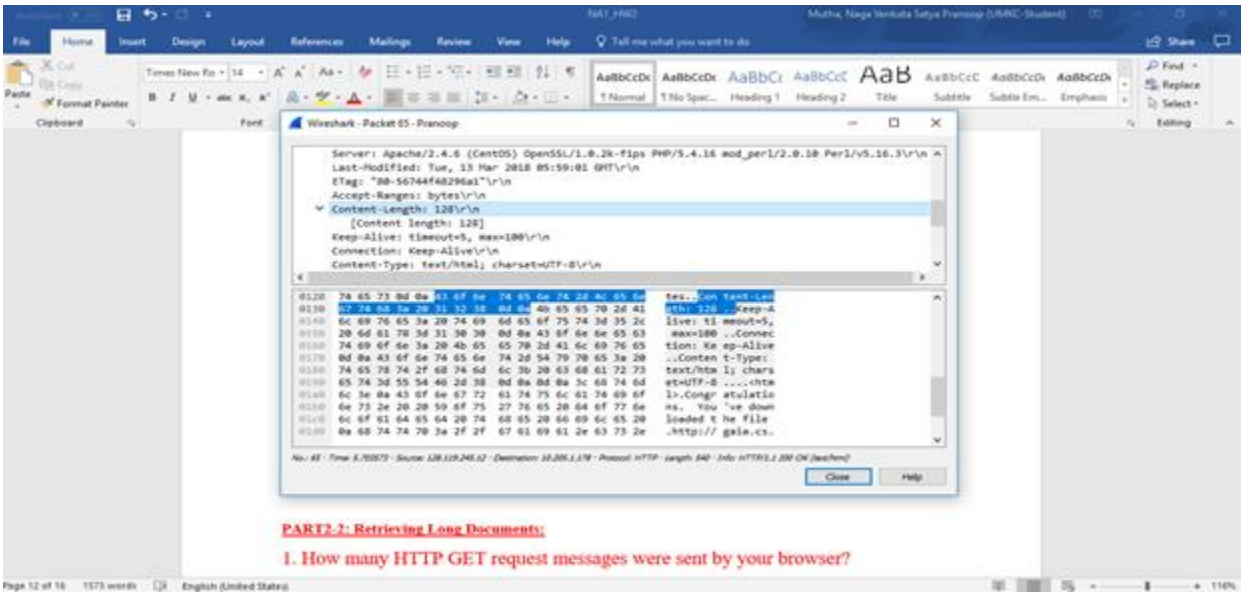



5. **When was the HTML file that you are retrieving last modified at the server?**

Answer: The HTML file was last modified on March 13th, 2018. We can see the Last Modified Field in the below screenshot.



6. **How many bytes of content are being returned to your browser?**
**Answer**: 128 bytes of content is being returned to our browser. This can be identified as content – length field. PFB the screen shot

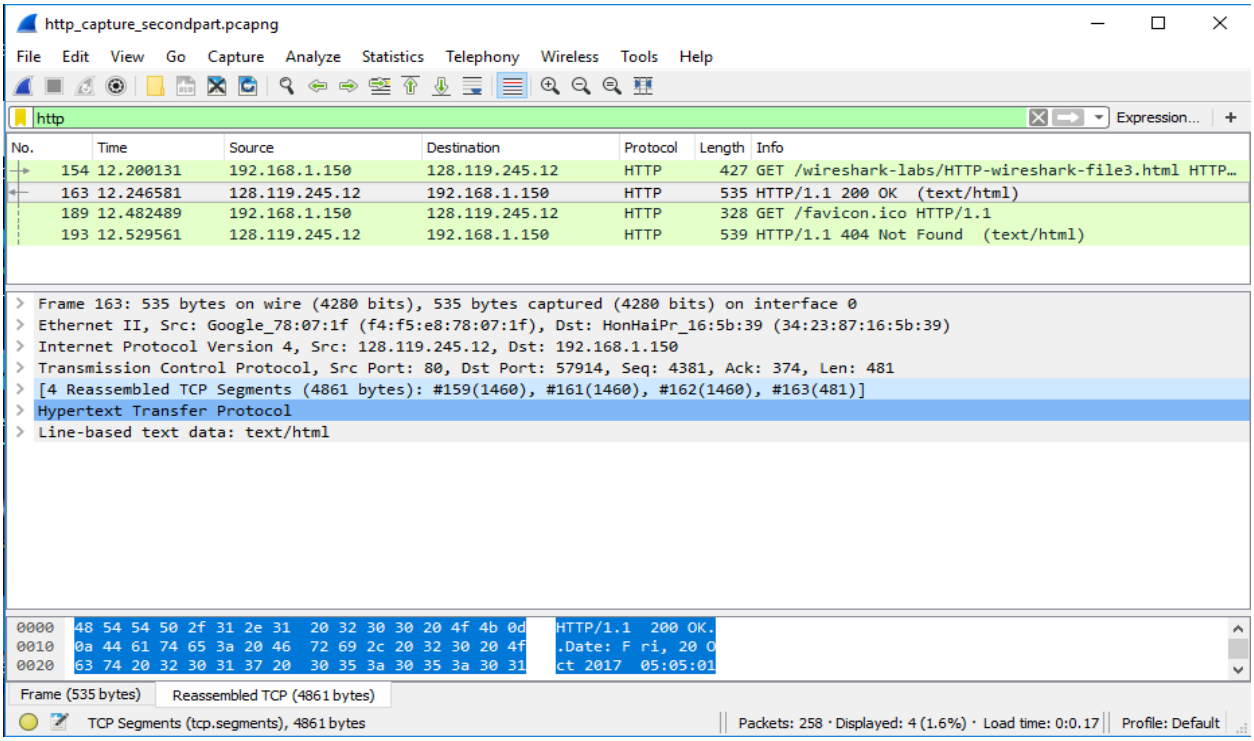



**7. By inspecting the raw data in the packet content window, do you see any headers within the data that are not displayed in the packet-listing window? If so, name one.**

**Answer:** No. I did not find any headers in the data that are not displayed in the packet-listing window

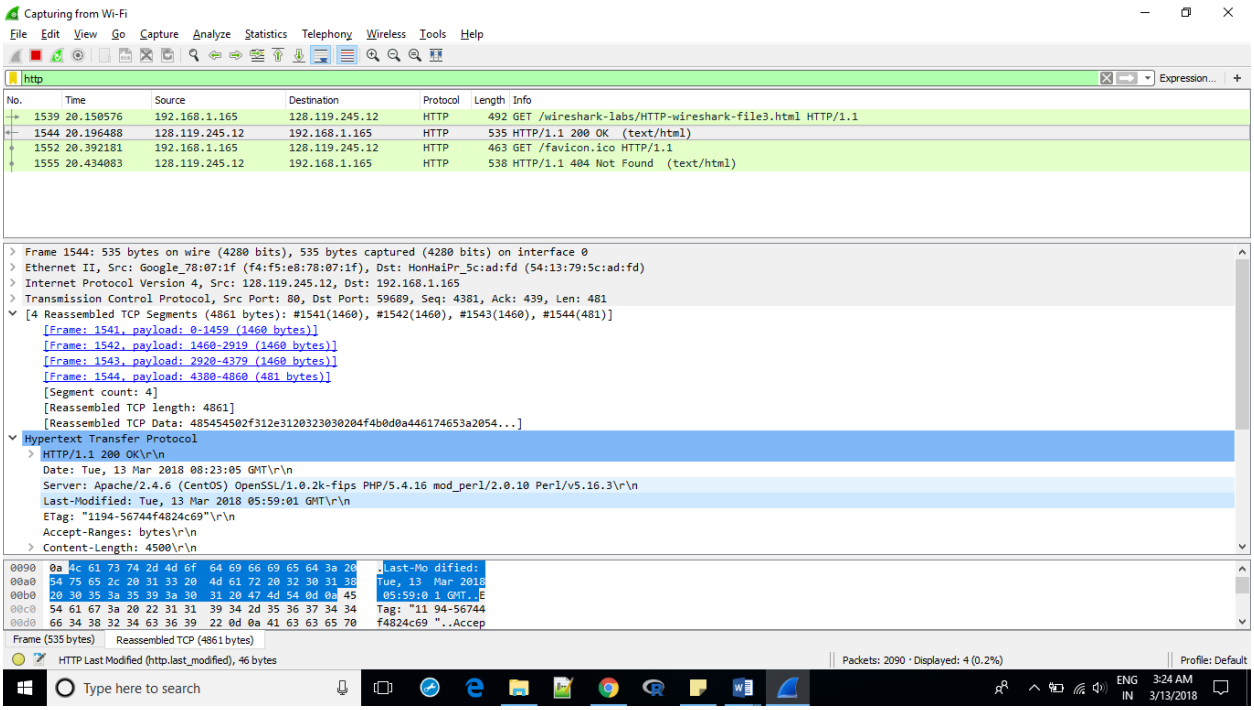
**PART2-2: Retrieving Long Documents:**

**1. How many HTTP GET request messages were sent by your browser?**
**Answer**: The number of GET messages sent by my browser to the server are: 1




**2. How many data-containing TCP segments were needed to carry the single HTTP response?**
**Answer:**

The number of TCP segments were needed to carry single HTTP response are = 4, as shown in the following capture each of size 1460 bytes, 1460 bytes, 1460 bytes, 481 bytes respectively.




**3. What is the status code and phrase associated with the response to the HTTP GET request?**
**Answer:**

i) “200 OK” for GET /wireshark-labs/HTTP-wireshark-file3.html
ii) “404 NOT FOUND” for GET /favicon.ico

**Fig: 200-OK status code**

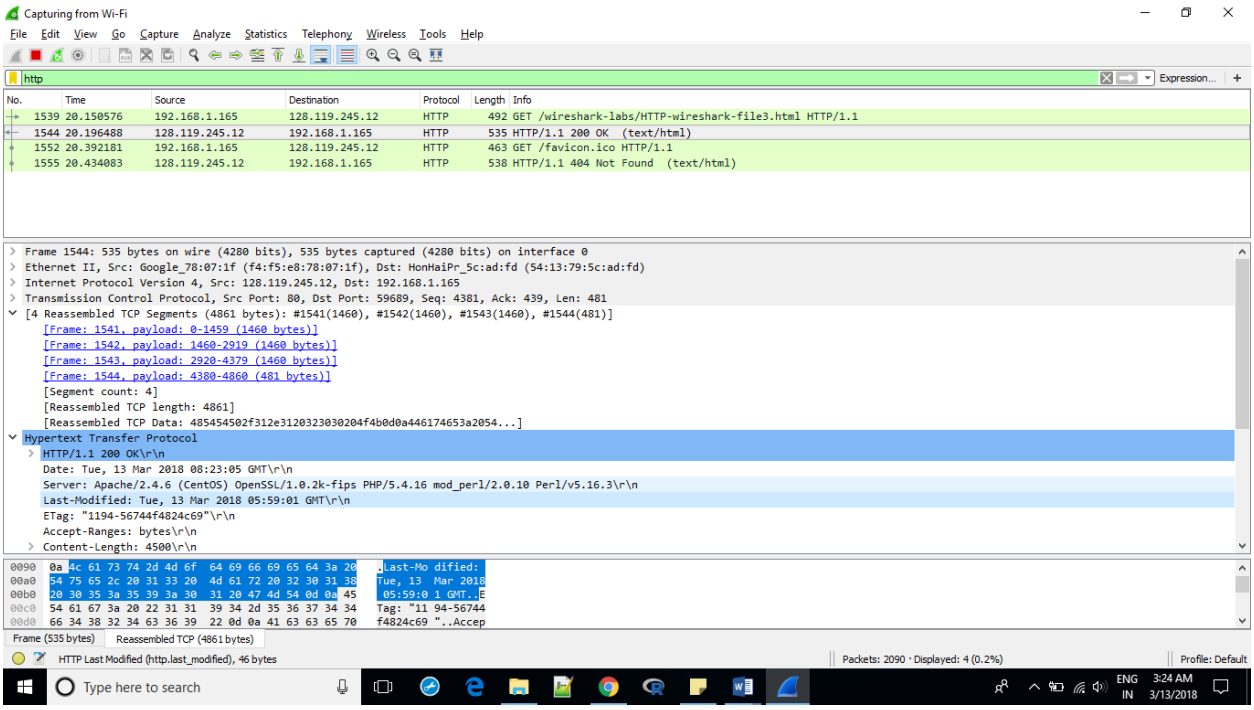
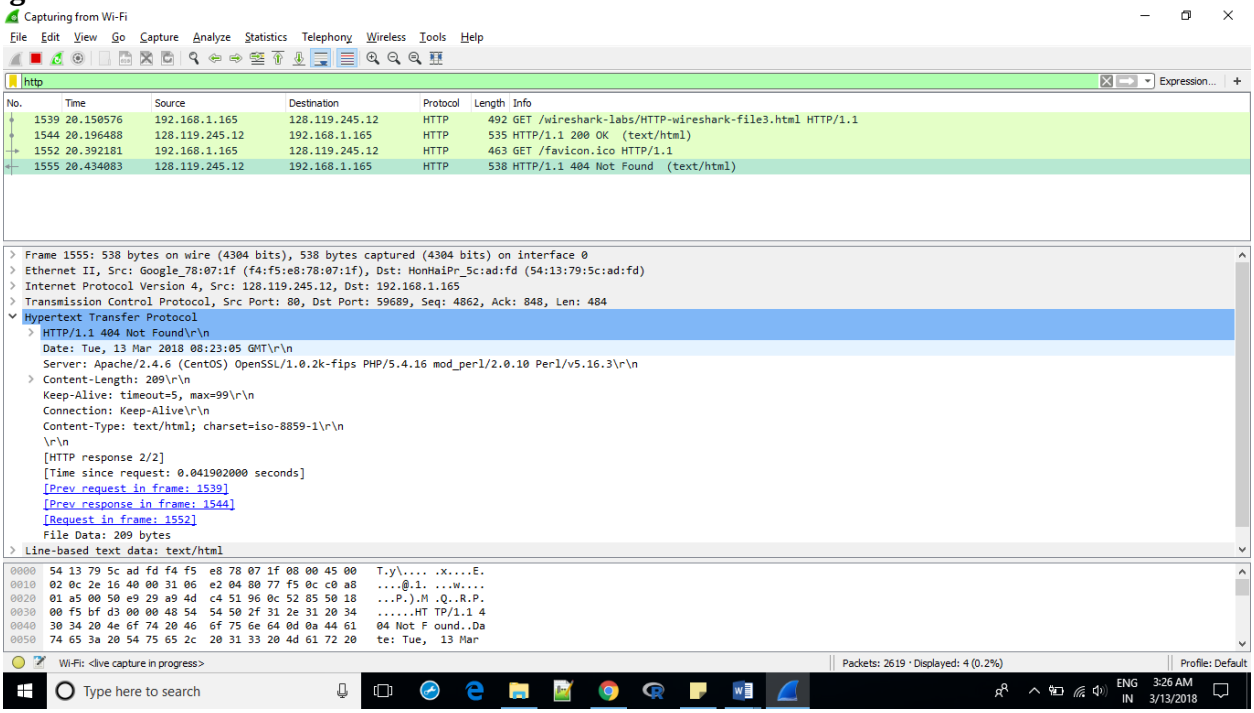


**Fig: 404 Not found status code**




**4. Are there any HTTP status lines in the transmitted data associated with a TCP induced "Continuation"?**

**Answer**: No, there are no HTTP status lines in the transmitted data associated with a TCP induced Continuation because it is the content data.