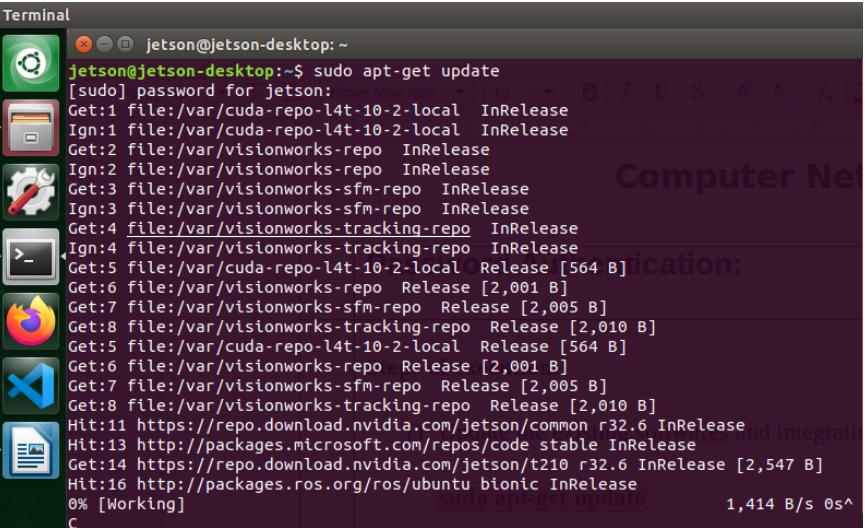
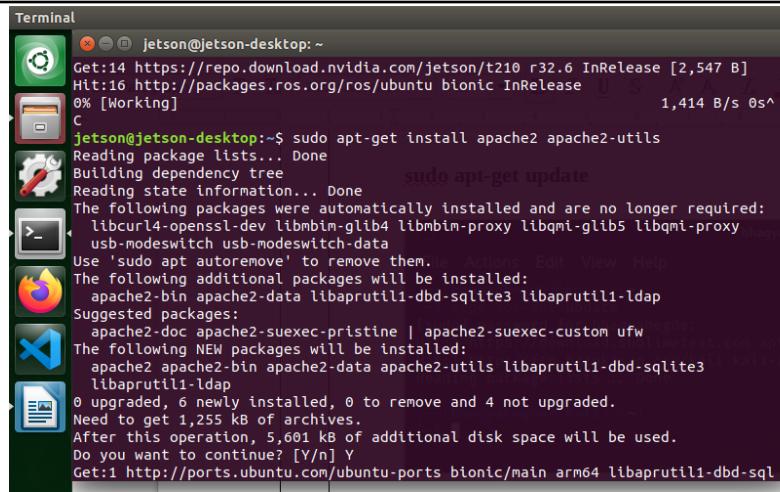


Name: Adithya M	SRN: PES1UG20CS621 Date: 16-Feb-2022	Section: 4K Week Number:3
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Computer Networks

	Password Authentication:
	<p>Steps of execution:</p> <ol style="list-style-type: none"> 1) Update the existing softwares and integrating <pre style="font-family: monospace; margin-top: 10px;">sudo apt-get update</pre>  <ol style="list-style-type: none"> 2) Installing apache utility <pre style="font-family: monospace; margin-top: 10px;">sudo apt-get install apache2 apache2-utils</pre>

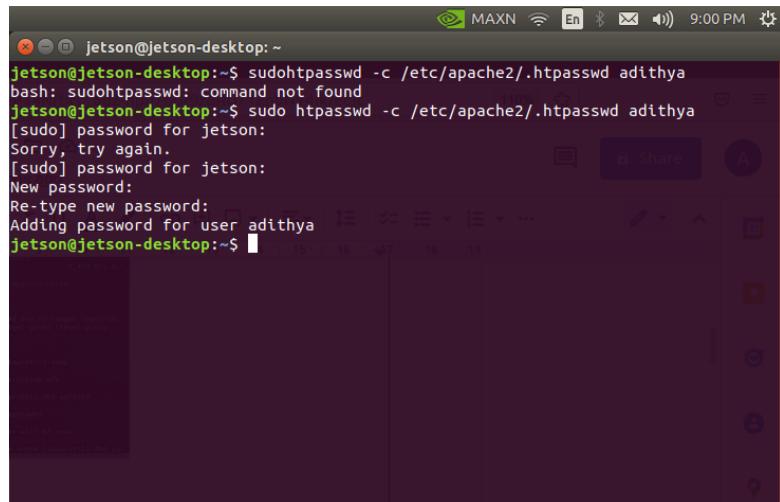
Week Assignment 3



```
Terminal
jetson@jetson-desktop:~$ sudo apt-get install apache2 apache2-utils
Reading package lists... Done
Building dependency tree
Reading state information... Done
The following packages were automatically installed and are no longer required:
  libcurl4-openssl-dev libmbim-glib4 libmbim-proxy libqmi-glib5 libqmi-proxy
  usb-modeswitch usb-modeswitch-data
Use 'sudo apt autoremove' to remove them.
The following additional packages will be installed:
  apache2-bin apache2-data libaprutil1-dbd-sqlite3 libaprutil1-ldap
Suggested packages:
  apache2-doc apache2-suexec-pristine | apache2-suexec-custom ufw
The following NEW packages will be installed:
  apache2 apache2-bin apache2-data apache2-utils libaprutil1-dbd-sqlite3
  libaprutil1-ldap
0 upgraded, 6 newly installed, 0 to remove and 4 not upgraded.
Need to get 1,255 kB of archives.
After this operation, 5,601 kB of additional disk space will be used.
Do you want to continue? [Y/n] Y
Get:1 http://ports.ubuntu.com/ubuntu-ports bionic/main arm64 libaprutil1-dbd-sqlite3 1:2.4.32-0ubuntu1 [1,255 kB]
```

3) Setting up password

sudohtpasswd -c /etc/apache2/.htpasswd adithya

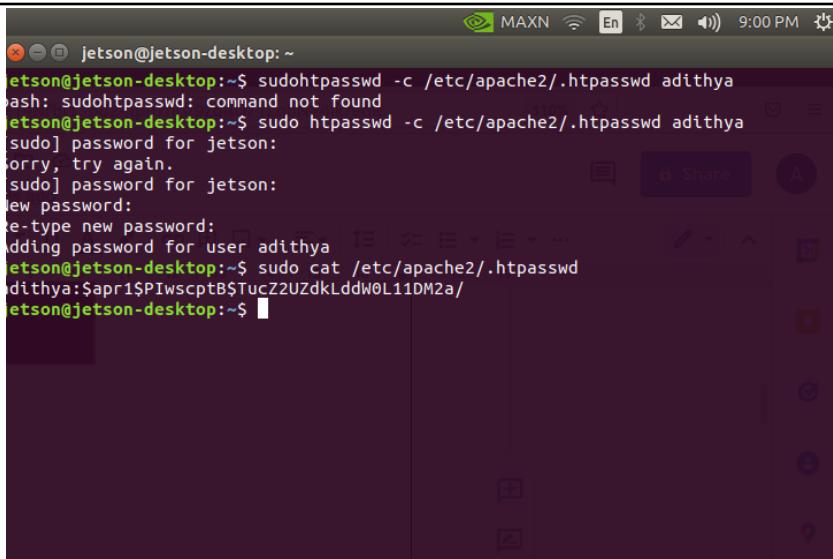


```
MAXN 9:00 PM
jetson@jetson-desktop:~$ sudohtpasswd -c /etc/apache2/.htpasswd adithya
bash: sudohtpasswd: command not found
jetson@jetson-desktop:~$ sudo htpasswd -c /etc/apache2/.htpasswd adithya
[sudo] password for jetson:
Sorry, try again.
[sudo] password for jetson:
New password:
Re-type new password:
Adding password for user adithya
jetson@jetson-desktop:~$
```

4) To view if the password is set or not

sudo cat /etc/apache2/.htpasswd

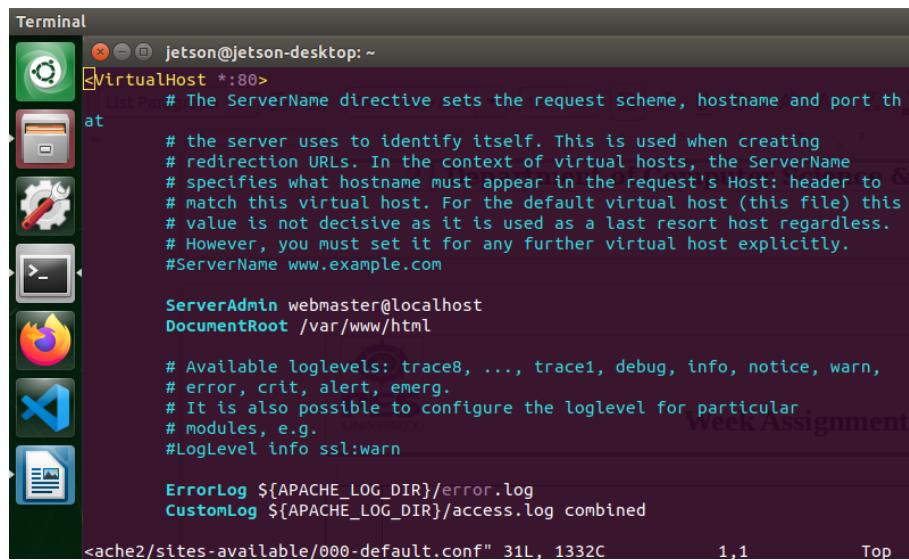
Week Assignment 3



```
jetson@jetson-desktop:~$ sudohtpasswd -c /etc/apache2/.htpasswd adithya
ash: sudohtpasswd: command not found
jetson@jetson-desktop:~$ sudo htpasswd -c /etc/apache2/.htpasswd adithya
[sudo] password for jetson:
[sudo] password for jetson:
new password:
re-type new password:
Adding password for user adithya
jetson@jetson-desktop:~$ sudo cat /etc/apache2/.htpasswd
adithya:$apr1$PIwscptB$TucZ2UZdkLddW0L11DM2a/
jetson@jetson-desktop:~$
```

5) Setting up the authentication phase

sudo vim /etc/apache2/sites-available/000-default.conf



```
Terminal jetson@jetson-desktop:~$ VirtualHost *:80>
    # The ServerName directive sets the request scheme, hostname and port th
    at
        # the server uses to identify itself. This is used when creating
        # redirection URLs. In the context of virtual hosts, the ServerName
        # specifies what hostname must appear in the request's Host: header to
        # match this virtual host. For the default virtual host (this file) this
        # value is not decisive as it is used as a last resort host regardless.
        # However, you must set it for any further virtual host explicitly.
        #ServerName www.example.com

        ServerAdmin webmaster@localhost
        DocumentRoot /var/www/html

        # Available loglevels: trace8, ..., trace1, debug, info, notice, warn,
        # error, crit, alert, emerg.
        # It is also possible to configure the loglevel for particular
        # modules, e.g.
        #LogLevel info ssl:warn

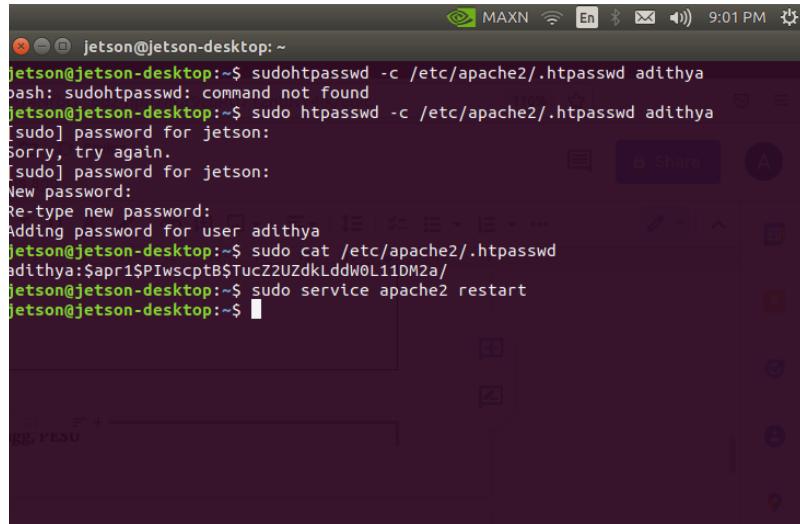
        ErrorLog ${APACHE_LOG_DIR}/error.log
        CustomLog ${APACHE_LOG_DIR}/access.log combined

```

Week Assignment 3

- 6) Restart the apache server

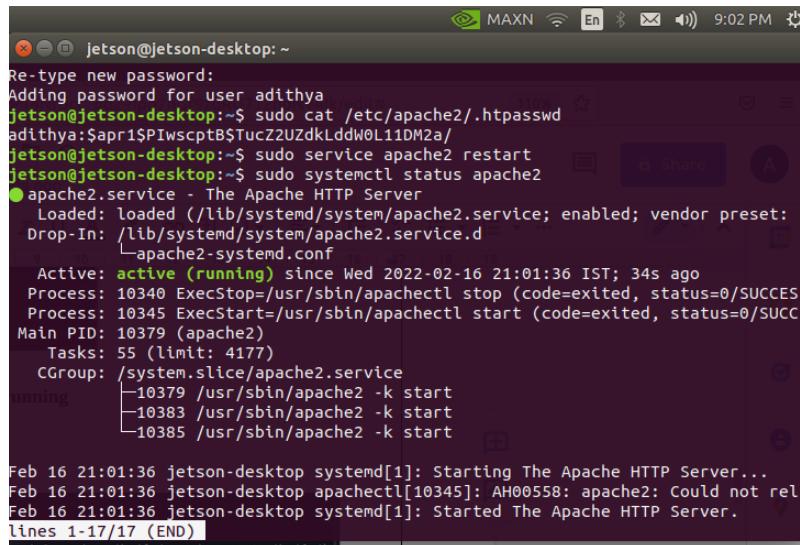
sudo service apache2 restart



```
jetson@jetson-desktop:~$ sudo htpasswd -c /etc/apache2/.htpasswd adithya
[sudo] password for jetson:
Sorry, try again.
[sudo] password for jetson:
New password:
Re-type new password:
Adding password for user adithya
jetson@jetson-desktop:~$ sudo cat /etc/apache2/.htpasswd
adithya:$apr1$PIwscptB$TucZ2UZdkLddW0L11DM2a/
jetson@jetson-desktop:~$ sudo service apache2 restart
jetson@jetson-desktop:~$
```

- 7) Check if apache server is up and running

sudo systemctl status apache2

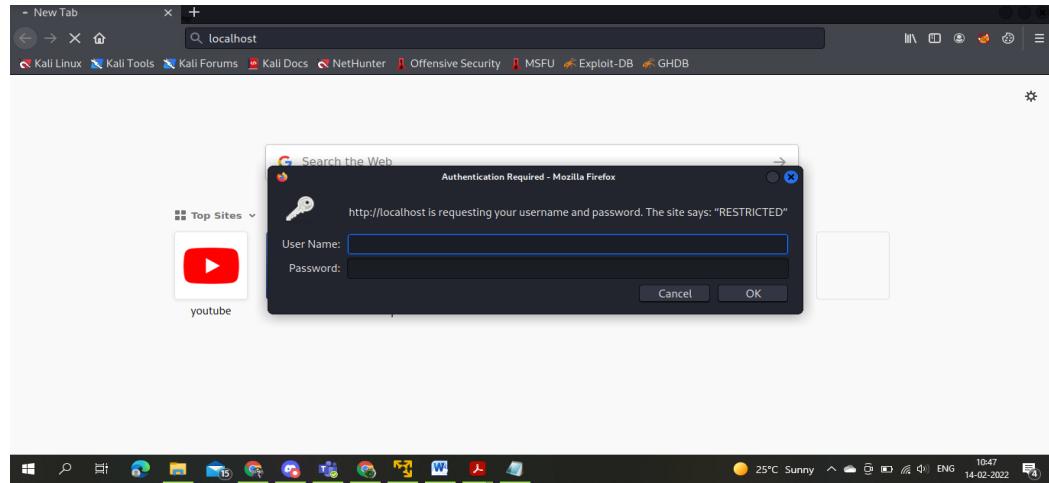


```
jetson@jetson-desktop:~$ Re-type new password:
Adding password for user adithya
jetson@jetson-desktop:~$ sudo cat /etc/apache2/.htpasswd
adithya:$apr1$PIwscptB$TucZ2UZdkLddW0L11DM2a/
jetson@jetson-desktop:~$ sudo service apache2 restart
jetson@jetson-desktop:~$ sudo systemctl status apache2
● apache2.service - The Apache HTTP Server
   Loaded: loaded (/lib/systemd/system/apache2.service; enabled; vendor preset: 
   Drop-In: /lib/systemd/system/apache2.service.d
             └─apache2-systemd.conf
     Active: active (running) since Wed 2022-02-16 21:01:36 IST; 34s ago
       Process: 10340 ExecStop=/usr/sbin/apachectl stop (code=exited, status=0/SUCCESS)
       Process: 10345 ExecStart=/usr/sbin/apachectl start (code=exited, status=0/SUCCESS)
     Main PID: 10379 (apache2)
        Tasks: 55 (limit: 4177)
       CGroup: /system.slice/apache2.service
              └─10379 /usr/sbin/apache2 -k start
                  ├─10383 /usr/sbin/apache2 -k start
                  ├─10385 /usr/sbin/apache2 -k start
                  └─10386 /usr/sbin/apache2 -k start

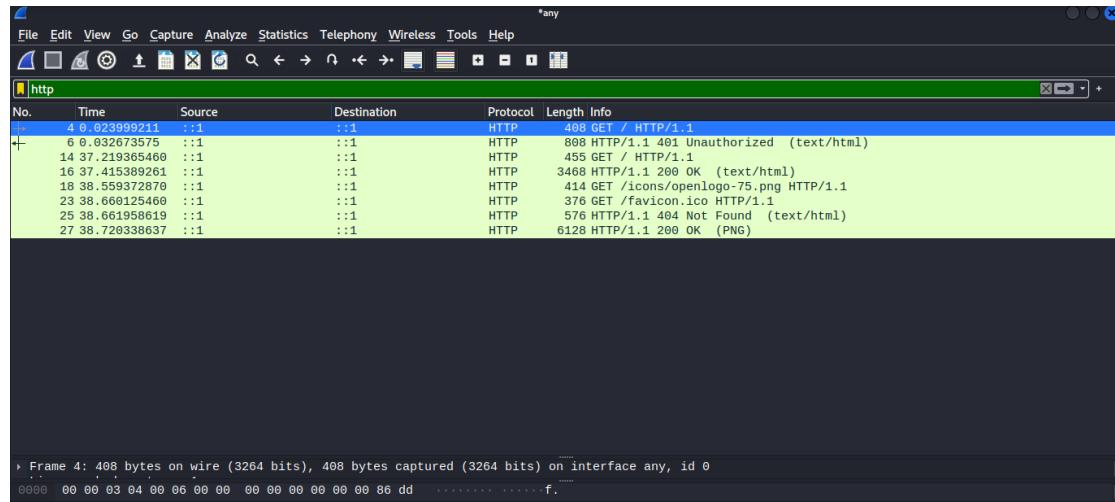
Feb 16 21:01:36 jetson-desktop systemd[1]: Starting The Apache HTTP Server...
Feb 16 21:01:36 jetson-desktop apachectl[10345]: AH00558: apache2: Could not rel
Feb 16 21:01:36 jetson-desktop systemd[1]: Started The Apache HTTP Server.
lines 1-17/17 (END)
```

Week Assignment 3

8) Access the localhost



9) Wireshark packet capture



Week Assignment 3

Wireshark - Follow TCP Stream (tcp.stream eq 1) · any

No.	Time	So
11	37.219230375	
12	37.219250372	
13	37.219264655	
14	37.21935460	
15	37.219383929	
16	37.415389261	
17	37.415406267	
18	38.559372870	
19	38.559397320	
27	38.728338637	
28	38.728385508	
32	43.725282091	
33	43.725984426	
34	43.726017368	

```

GET / HTTP/1.1
Host: localhost
User-Agent: Mozilla/5.0 (X11; Linux x86_64; rv:78.0) Gecko/20100101 Firefox/78.0
Accept: text/html,application/xhtml+xml,application/xml;q=0.9,image/webp,*/*;q=0.8
Accept-Language: en-US,en;q=0.5
Accept-Encoding: gzip, deflate
Connection: keep-alive
Upgrade-Insecure-Requests: 1
Authorization: Basic YmhhZ3lh0mJoyWd5YWhlZ2Rl

HTTP/1.1 200 OK
Date: Mon, 14 Feb 2022 05:17:58 GMT
Server: Apache/2.4.52 (Debian)
Last-Modified: Wed, 20 Oct 2021 13:01:51 GMT
ETag: "29cd-5cec861b33ec6-gzip"
Accept-Ranges: bytes
Vary: Accept-Encoding
Content-Encoding: gzip
Content-Length: 3041
Keep-Alive: timeout=5, max=100
Connection: Keep-Alive
Content-Type: text/html

.....Z[s.6.-.0..4.H.$..I].d&m<...}.B$$.a.,\....^....o..1SNS.$p...]>.|s..j...
Y.D._-x.E..0...0..^....d.h...2."o-....1...:X..Z..0.#.:....TV.....1... stvv.v.ZB&KFc..._.f(..#....W25,5..&c....a.&D
S7B_ezii_S2_v&_k6_4_9_!w_ik_$.t_Em@/_< H_ TX_ @G_ n7ST-x:&_c_3_B_ 70w@_W_ F_ %_4_FRH5&_A_.

2client_pkts, 2server_pkts, 3 turns.

```

Entire conversation (10kB) Show data as ASCII Stream 1 Find Next

Wireshark - Follow TCP Stream (tcp.stream eq 1) · any

```

GET / HTTP/1.1
Host: localhost
User-Agent: Mozilla/5.0 (X11; Linux x86_64; rv:78.0) Gecko/20100101 Firefox/78.0
Accept: text/html,application/xhtml+xml,application/xml;q=0.9,image/webp,*/*;q=0.8
Accept-Language: en-US,en;q=0.5
Accept-Encoding: gzip, deflate
Connection: keep-alive
Upgrade-Insecure-Requests: 1
Authorization: Basic YmhhZ3lh0mJoyWd5YWhlZ2Rl

HTTP/1.1 200 OK
Date: Mon, 14 Feb 2022 05:17:58 GMT
Server: Apache/2.4.52 (Debian)
Last-Modified: Wed, 20 Oct 2021 13:01:51 GMT
ETag: "29cd-5cec861b33ec6-gzip"
Accept-Ranges: bytes
Vary: Accept-Encoding
Content-Encoding: gzip
Content-Length: 3041
Keep-Alive: timeout=5, max=100
Connection: Keep-Alive
Content-Type: text/html

.....Z[s.6.-.0..4.H.$..I].d&m<...}.B$$.a.,\....^....o..1SNS.$p...]>.|s..j...
Y.D._-x.E..0...0..^....d.h...2."o-....1...:X..Z..0.#.:....TV.....1... stvv.v.ZB&KFc..._.f(..#....W25,5..&c....a.&D
S7B_ezii_S2_v&_k6_4_9_!w_ik_$.t_Em@/_< H_ TX_ @G_ n7ST-x:&_c_3_B_ 70w@_W_ F_ %_4_FRH5&_A_.

2client_pkts, 2server_pkts, 3 turns.

```

Entire conversation (10kB) Show data as ASCII Stream 1 Find Next

10) Decrypt the base64 encryption

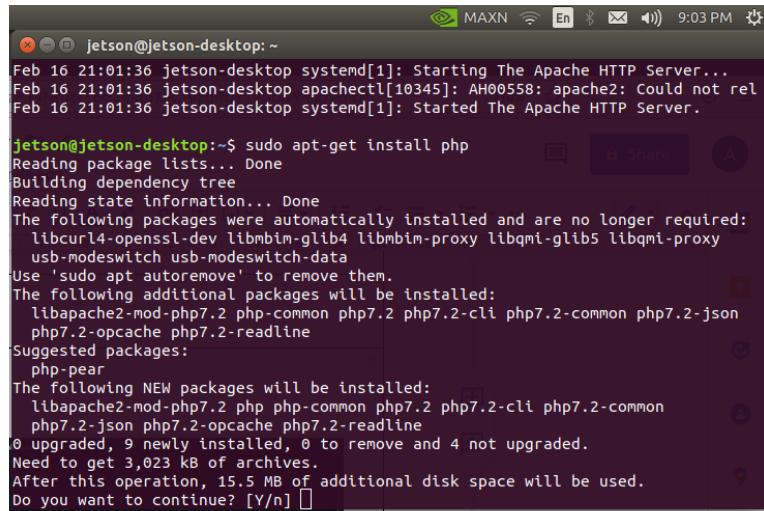
- We can observe that the authorization field stores the password we had entered to access localhost.
- This password is encrypted using the base64 algorithm before it is transmitted along the network.

Week Assignment 3

2 Setting the Cookie

- 1) Install PHP

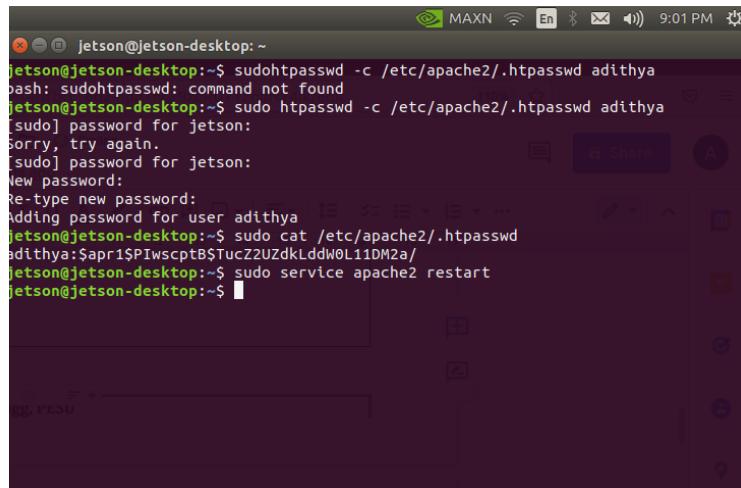
```
sudo apt-get install php
```



```
jetson@jetson-desktop:~$ sudo apt-get install php
Reading package lists... Done
Building dependency tree
Reading state information... Done
The following packages were automatically installed and are no longer required:
  libcurl4-openssl-dev libmbim-glib4 libmbim-proxy libqmi-glib5 libqmi-proxy
  libusb-modeswitch libusb-modeswitch-data
Use 'sudo apt autoremove' to remove them.
The following additional packages will be installed:
  libapache2-mod-php7.2 php-common php7.2 php7.2-cli php7.2-common php7.2-json
  php7.2-opcache php7.2-readline
Suggested packages:
  php-pear
The following NEW packages will be installed:
  libapache2-mod-php7.2 php php-common php7.2 php7.2-cli php7.2-common php7.2-json
  php7.2-opcache php7.2-readline
0 upgraded, 9 newly installed, 0 to remove and 4 not upgraded.
Need to get 3,023 kB of archives.
After this operation, 15.5 MB of additional disk space will be used.
Do you want to continue? [Y/n] 
```

- 2) Start the apache server

```
sudo service apache start
```



```
jetson@jetson-desktop:~$ sudohtpasswd -c /etc/apache2/.htpasswd adithya
jetson@jetson-desktop:~$ sudohtpasswd: command not found
jetson@jetson-desktop:~$ sudo htpasswd -c /etc/apache2/.htpasswd adithya
[sudo] password for jetson:
Sorry, try again.
[sudo] password for jetson:
New password:
Re-type new password:
Adding password for user adithya
jetson@jetson-desktop:~$ sudo cat /etc/apache2/.htpasswd
adithya:Sapr1$PiwscptB$TucZ2UZdkLddw0L11DM2a/
jetson@jetson-desktop:~$ sudo service apache2 restart
jetson@jetson-desktop:~$ 
```

- 3) Create a php file in the html home directory

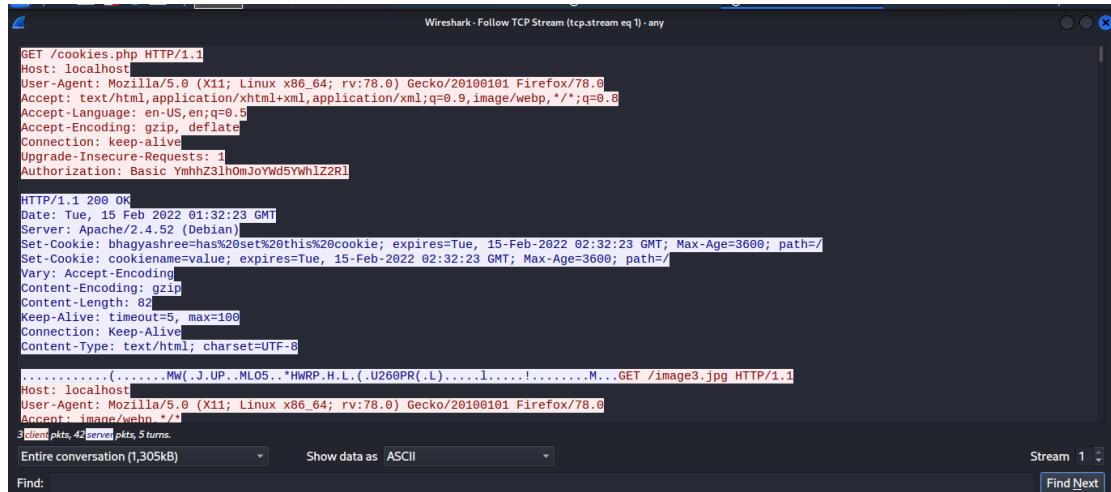
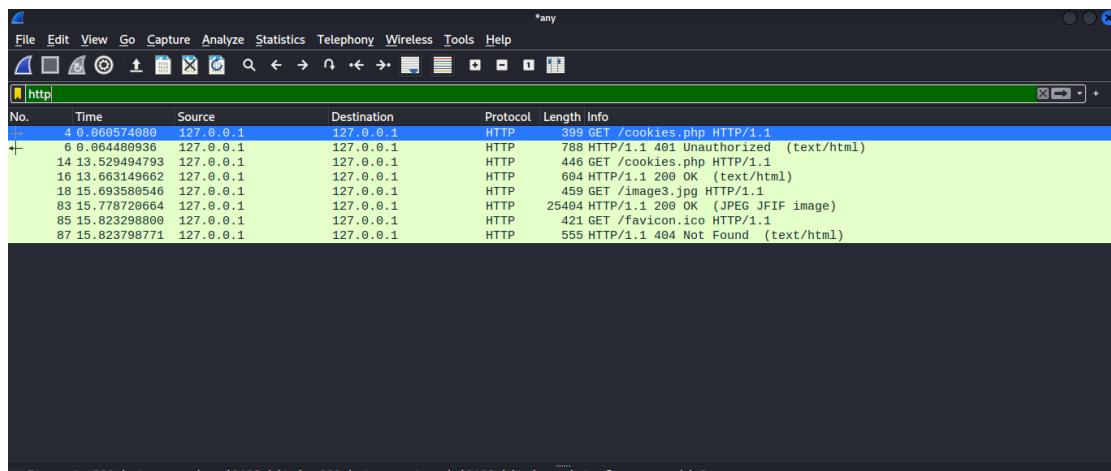
Week Assignment 3

```

        setcookie("cookiename","value",time()+3600,'/');
    ?>
<img src= "image3.jpg" height="300" width="300" /><br>
</html>

```

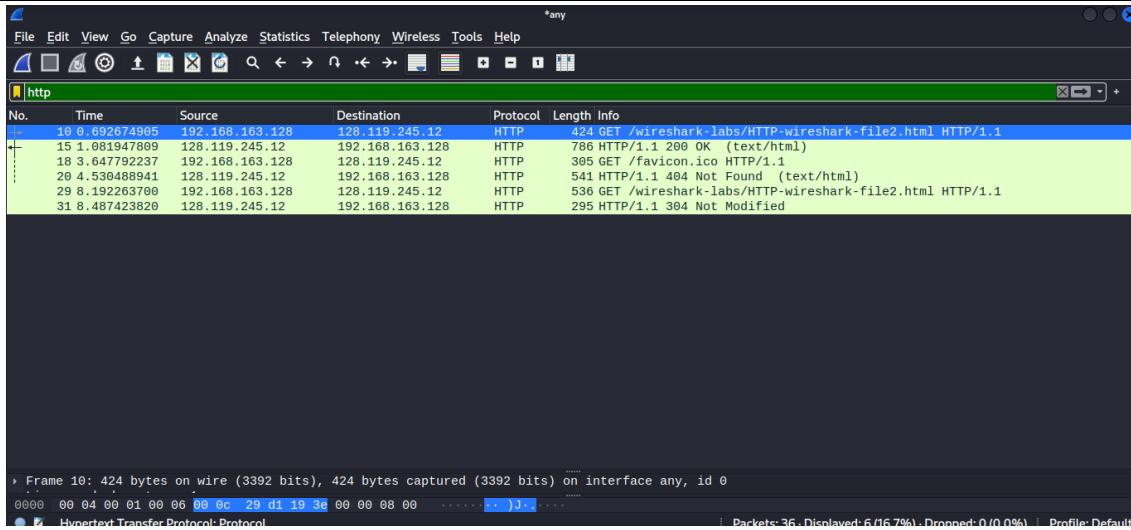
- 4) Access the created file from the browser after clearing the cache and capture the packet using wireshark.



Week Assignment 3

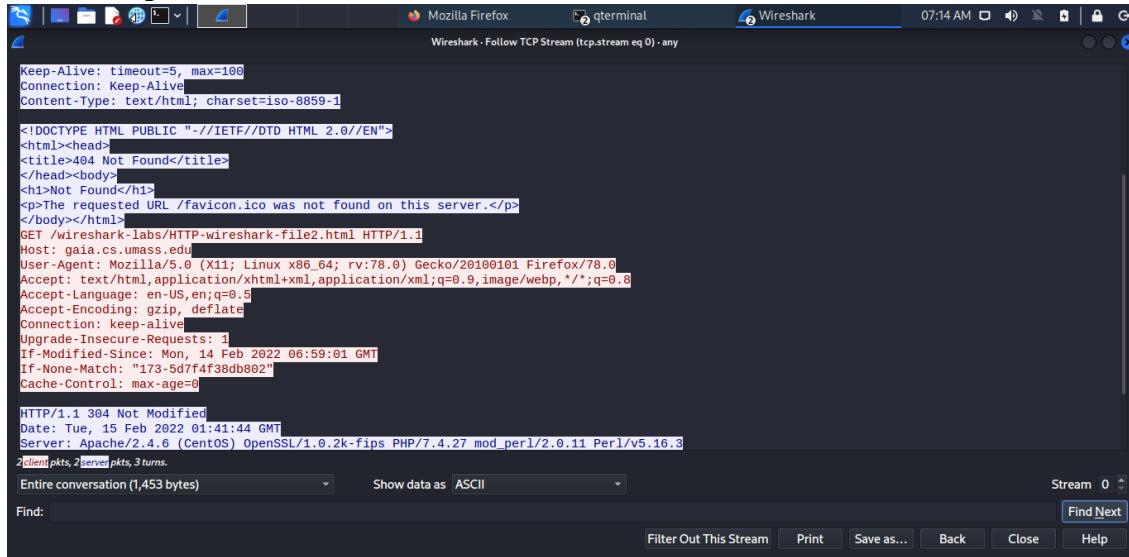
3

Conditional Get



Week Assignment 3

Second request to the server



```

Keep-Alive: timeout=5, max=100
Connection: Keep-Alive
Content-Type: text/html; charset=iso-8859-1

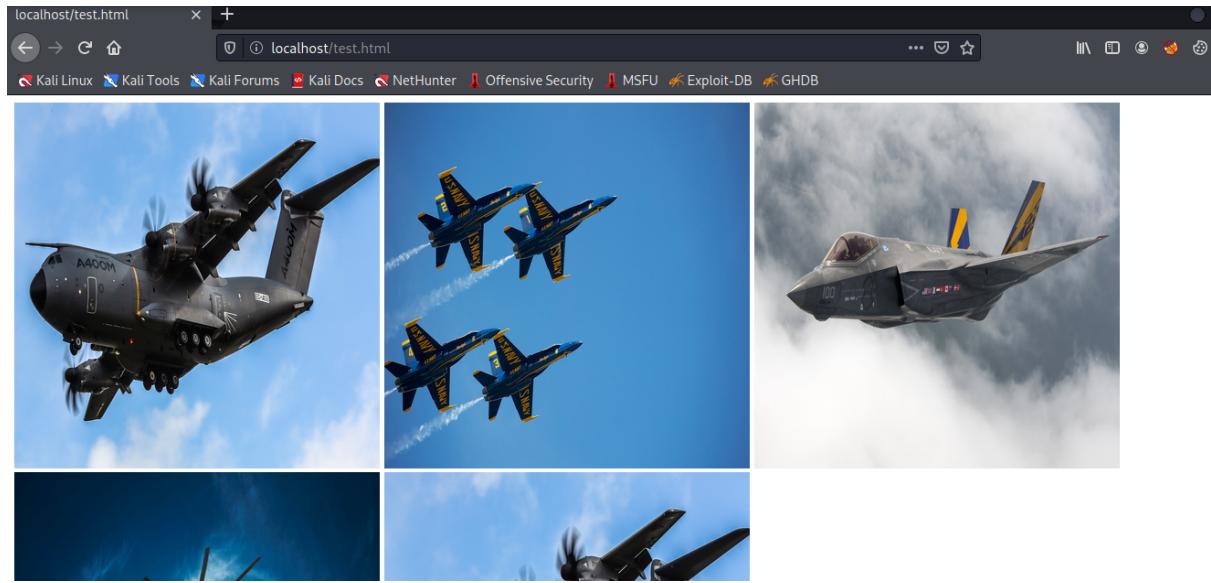
<!DOCTYPE HTML PUBLIC "-//IETF//DTD HTML 2.0//EN">
<html><head>
<title>404 Not Found</title>
</head><body>
<h1>Not Found</h1>
<p>The requested URL /favicon.ico was not found on this server.</p>
</body></html>

```

GET /wireshark-labs/HTTP-wireshark-file2.html HTTP/1.1
Host: gaia.cs.umass.edu
User-Agent: Mozilla/5.0 (X11; Linux x86_64; rv:78.0) Gecko/20100101 Firefox/78.0
Accept: text/html,application/xhtml+xml,application/xml;q=0.9,image/webp,*/*;q=0.8
Accept-Language: en-US,en;q=0.5
Accept-Encoding: gzip, deflate
Connection: keep-alive
Upgrade-Insecure-Requests: 1
If-Modified-Since: Mon, 14 Feb 2022 06:59:01 GMT
If-None-Match: "173-5d7ffaf38db802"
Cache-Control: max-age=0

HTTP/1.1 304 Not Modified
Date: Tue, 15 Feb 2022 01:41:44 GMT
Server: Apache/2.4.6 (CentOS) OpenSSL/1.0.2k-fips PHP/7.4.27 mod_perl/2.0.11 Perl/v5.16.3

Conditional Get on localhost



Week Assignment 3

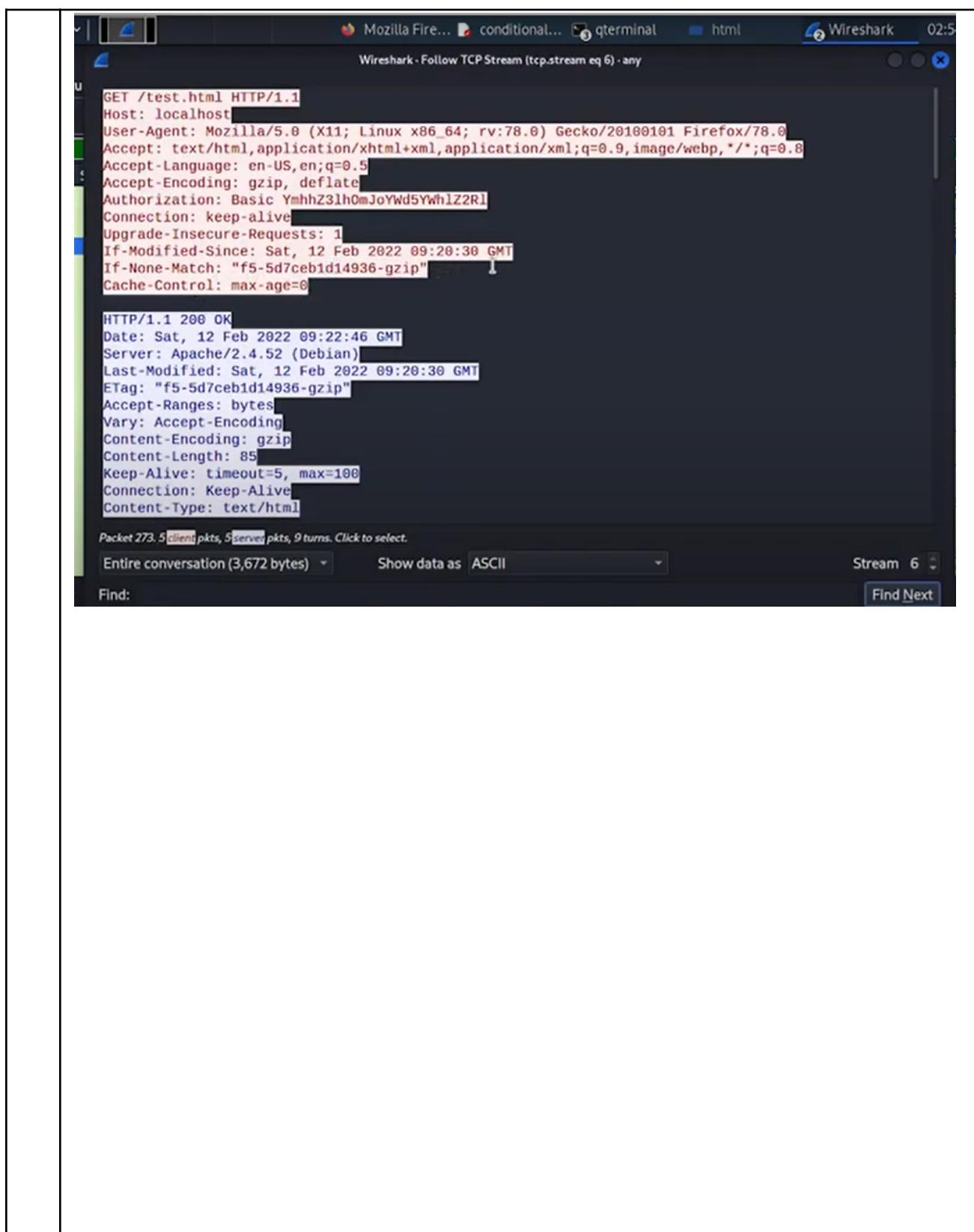
No.	Time	Source	Destination	Protocol	Length	Info
10	6.789019609	127.0.0.1	127.0.0.1	HTTP	397	GET /test.html HTTP/1.1
12	6.791218845	127.0.0.1	127.0.0.1	HTTP	788	HTTP/1.1 401 Unauthorized (text/html)
20	16.768020306	127.0.0.1	127.0.0.1	HTTP	444	GET /test.html HTTP/1.1
22	16.772658325	127.0.0.1	127.0.0.1	HTTP	488	HTTP/1.1 200 OK (text/html)
24	17.977500482	127.0.0.1	127.0.0.1	HTTP	392	GET /image1.jpg HTTP/1.1
86	18.078196290	127.0.0.1	127.0.0.1	HTTP	392	GET /image3.jpg HTTP/1.1
91	18.084668205	127.0.0.1	127.0.0.1	HTTP	392	GET /image5.jpg HTTP/1.1
102	18.092489228	127.0.0.1	127.0.0.1	HTTP	392	GET /image7.jpg HTTP/1.1
157	18.114286489	127.0.0.1	127.0.0.1	HTTP	25125	HTTP/1.1 200 OK (JPEG JFIF image)
183	18.552837554	127.0.0.1	127.0.0.1	HTTP	356	[TCP ACKed unseen segment] GET /favicon.ico HTTP/1.1
185	18.553500363	127.0.0.1	127.0.0.1	HTTP	555	HTTP/1.1 404 Not Found (text/html)
187	22.758725094	127.0.0.1	127.0.0.1	HTTP	560	GET /test.html HTTP/1.1
189	22.773540117	127.0.0.1	127.0.0.1	HTTP	487	HTTP/1.1 200 OK (text/html)
191	22.987328851	127.0.0.1	127.0.0.1	HTTP	507	GET /image1.jpg HTTP/1.1
192	22.988197943	127.0.0.1	127.0.0.1	HTTP	319	HTTP/1.1 304 Not Modified
194	23.011228264	127.0.0.1	127.0.0.1	HTTP	507	GET /image3.jpg HTTP/1.1
195	23.011652875	127.0.0.1	127.0.0.1	HTTP	319	HTTP/1.1 304 Not Modified
197	23.019741913	127.0.0.1	127.0.0.1	HTTP	507	GET /image5.jpg HTTP/1.1
198	23.020127598	127.0.0.1	127.0.0.1	HTTP	319	HTTP/1.1 304 Not Modified
200	23.025722202	127.0.0.1	127.0.0.1	HTTP	507	GET /image7.jpg HTTP/1.1
201	23.026417831	127.0.0.1	127.0.0.1	HTTP	319	HTTP/1.1 304 Not Modified

Frame 10: 397 bytes on wire (3176 bits), 397 bytes captured (3176 bits) on interface any, id 0

```
0000  00 00 03 04 00 06 00 00 00 00 00 00 00 00 00 08 00 .....
```


GET /test.html HTTP/1.1 Host: localhost User-Agent: Mozilla/5.0 (X11; Linux x86_64; rv:78.0) Gecko/20100101 Firefox/78.0 Accept: text/html,application/xhtml+xml,application/xml;q=0.9,image/webp,*/*;q=0.8 Accept-Language: en-US,en;q=0.5 Accept-Encoding: gzip, deflate Connection: keep-alive Upgrade-Insecure-Requests: 1 Authorization: Basic Ymhha2lhdG9tYWhhZ2Rl HTTP/1.1 200 OK Date: Tue, 15 Feb 2022 01:48:32 GMT Server: Apache/2.4.52 (Debian) Last-Modified: Sat, 12 Feb 2022 09:20:30 GMT ETag: "f5-5d7cebd14936-gzip" Accept-Ranges: bytes Vary: Accept-Encoding Content-Encoding: gzip Content-Length: 85 Keep-Alive: timeout=5, max=100 Connection: Keep-Alive Content-Type: text/html (J.U..ML05..*HWR.H.L.(.510P(.L)...1T....\$..&.n}.o.5...(....GET /image1.jpg HTTP/1.1 Host: localhost User-Agent: Mozilla/5.0 (X11; Linux x86_64; rv:78.0) Gecko/20100101 Firefox/78.0 3 client_pkts, 41 server_pkts, 5 turns. Entire conversation (952kB) Show data as ASCII Stream Find: Filter Out This Stream Print Save as... Back Close Help

Week Assignment 3



The screenshot shows a Wireshark window displaying an HTTP conversation. The client is a Mozilla Firefox browser on a Linux system (X11; Linux x86_64; rv:78.0) running version Gecko/20180101. The server is an Apache 2.4.52 (Debian) web server. The client sends a GET request for /test.html, including headers for User-Agent, Accept, Accept-Language, Accept-Encoding, Authorization, Connection, Upgrade-Insecure-Requests, If-Modified-Since, If-None-Match, and Cache-Control. The server responds with an HTTP/1.1 200 OK status, providing headers for Date, Server, Last-Modified, ETag, Accept-Ranges, Vary, Content-Encoding, Content-Length, Keep-Alive, Connection, and Content-Type.

```
GET /test.html HTTP/1.1
Host: localhost
User-Agent: Mozilla/5.0 (X11; Linux x86_64; rv:78.0) Gecko/20180101 Firefox/78.0
Accept: text/html,application/xhtml+xml,application/xml;q=0.9,image/webp,*/*;q=0.8
Accept-Language: en-US,en;q=0.5
Accept-Encoding: gzip, deflate
Authorization: Basic YmhhZ3lh0mJoYWd5YWhlZ2Rl
Connection: keep-alive
Upgrade-Insecure-Requests: 1
If-Modified-Since: Sat, 12 Feb 2022 09:20:38 GMT
If-None-Match: "f5-5d7ceb1d14936-gzip"
Cache-Control: max-age=60

HTTP/1.1 200 OK
Date: Sat, 12 Feb 2022 09:22:46 GMT
Server: Apache/2.4.52 (Debian)
Last-Modified: Sat, 12 Feb 2022 09:20:30 GMT
ETag: "f5-5d7ceb1d14936-gzip"
Accept-Ranges: bytes
Vary: Accept-Encoding
Content-Encoding: gzip
Content-Length: 85
Keep-Alive: timeout=5, max=100
Connection: Keep-Alive
Content-Type: text/html
```

Week Assignment 3

3b) Persistent and Non-persistent HTTP Connections

Server Side: Step 1: Checking Web Server

```
adithya@ubuntu:~$ sudo systemctl status apache2
● apache2.service - The Apache HTTP Server
   Loaded: loaded (/lib/systemd/system/apache2.service; enabled; vendor prese>
   Active: active (running) since Sat 2022-02-19 10:17:17 IST; 10min ago
     Docs: https://httpd.apache.org/docs/2.4/
   Main PID: 5392 (apache2)
      Tasks: 55 (limit: 6991)
     Memory: 6.4M
    CGroup: /system.slice/apache2.service
            └─5392 /usr/sbin/apache2 -k start
              ├─5393 /usr/sbin/apache2 -k start
              ├─5394 /usr/sbin/apache2 -k start

Feb 19 10:17:17 ubuntu systemd[1]: Starting The Apache HTTP Server...
Feb 19 10:17:17 ubuntu apachectl[5391]: AH00558: apache2: Could not reliably de>
Feb 19 10:17:17 ubuntu systemd[1]: Started The Apache HTTP Server.
lines 1-15/15 (END)
```

Step 2: Setting up the Server IP address

```
adithya@ubuntu:~$ sudo ip addr add 172.16.10.1/24 dev enp0s3
adithya@ubuntu:~$ 
RTRELEASING ANSWERS. File exists
adithya@ubuntu:~$ ip addr
1: lo: <LOOPBACK,UP,LOWER_UP> mtu 65536 qdisc noqueue state UNKNOWN group default qlen 1000
    link/loopback 00:00:00:00:00:00 brd 00:00:00:00:00:00
    inet 127.0.0.1/8 scope host lo
        valid_lft forever preferred_lft forever
    inet6 ::1/128 scope host
        valid_lft forever preferred_lft forever
2: enp0s3: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc fq_codel state UP group default qlen 1000
    link/ether 08:00:27:09:de:b8 brd ff:ff:ff:ff:ff:ff
    inet 10.0.2.15/24 brd 10.0.2.255 scope global dynamic noprefixroute enp0s3
        valid_lft 493sec preferred_lft 493sec
    inet 172.16.10.1/24 scope global enp0s3
        valid_lft forever preferred_lft forever
    inet6 fe80::21be:f18d:50d6:da2c/64 scope link noprefixroute
        valid_lft forever preferred_lft forever
adithya@ubuntu:~$
```

Week Assignment 3

Step 3: The apache2.conf file present in the etc/apache2 directory is modified as:

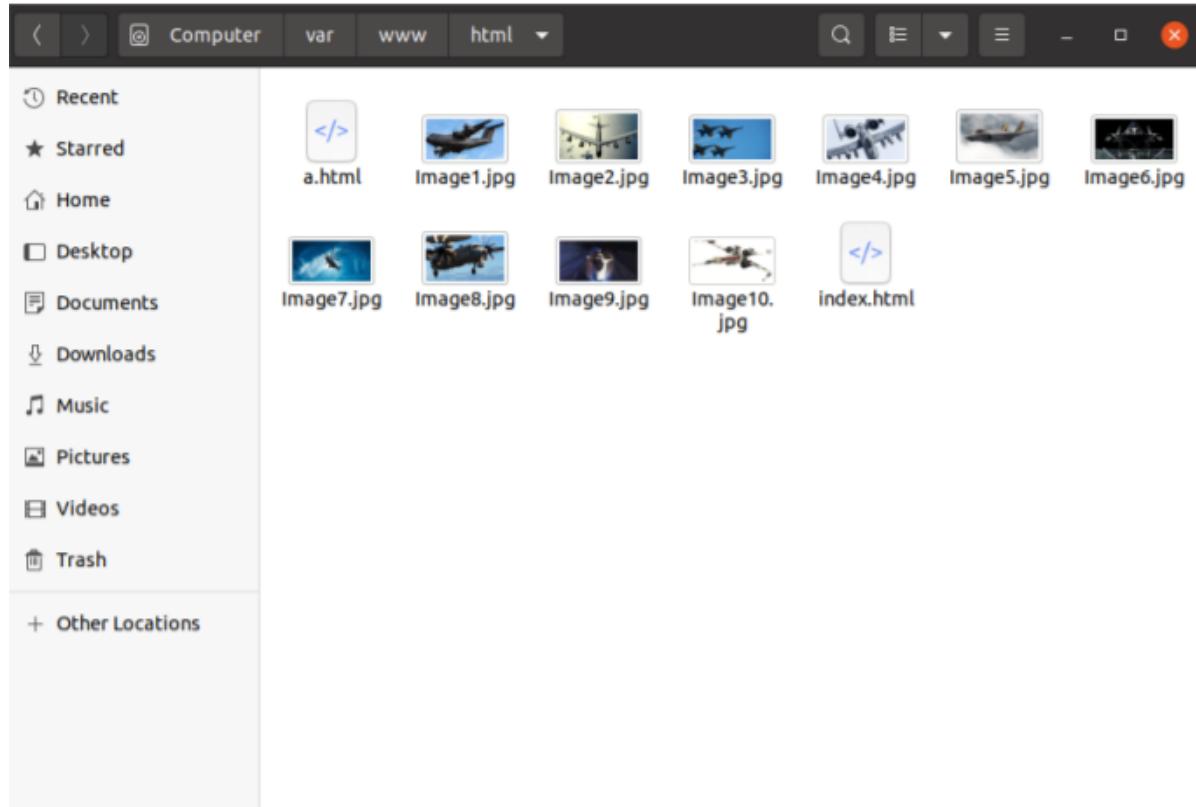
- a) The keep-alive option was set (i.e. value was made ON)
- b) The MaximumKeepAliveRequests were set to 2

```
# KeepAlive: whether or not to allow persistent connections (more than
# one request per connection). Set to "Off" to deactivate.
#
# KeepAlive On

#
# MaxKeepAliveRequests: The maximum number of requests to allow
# during a persistent connection. Set to 0 to allow an unlimited amount.
# We recommend you leave this number high, for maximum performance.
#
MaxKeepAliveRequests 2

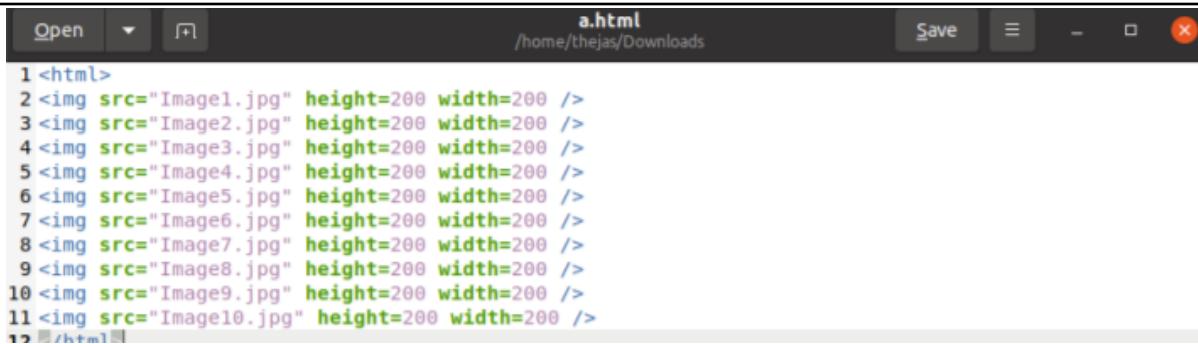
#
# KeepAliveTimeout: Number of seconds to wait for the next request from the
# same client on the same connection.
#
KeepAliveTimeout 5
```

Step 4: Store images in the server path. A html page consisting of 10 images having size > 2MB were placed and accessed by the client. This html page is stored in the location - /var/www/html/a.html.



Step 5: Preparation of webpage

Week Assignment 3



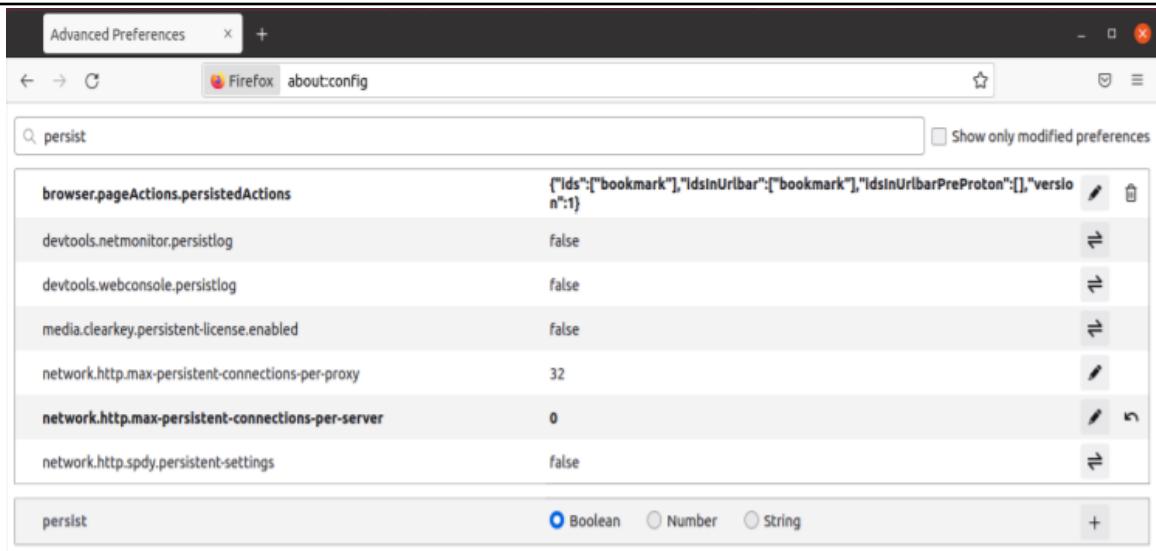
```
1 <html>
2 
3 
4 
5 
6 
7 
8 
9 
10 
11 
12 </html>
```

Client side: Step 1: Setting up the Client IP address

```
adithya@ubuntu:~$ sudo ip addr add 172.16.10.2/24 dev enp0s3
adithya@ubuntu:~$ sudo ip addr
1: lo: <LOOPBACK,UP,LOWER_UP> mtu 65536 qdisc noqueue state UNKNOWN group default qlen 1000
    link/loopback 00:00:00:00:00:00 brd 00:00:00:00:00:00
    inet 127.0.0.1/8 scope host lo
        valid_lft forever preferred_lft forever
    inet6 ::1/128 scope host
        valid_lft forever preferred_lft forever
2: enp0s3: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc fq_codel state UP group default qlen 1000
    link/ether 08:00:27:09:de:b8 brd ff:ff:ff:ff:ff:ff
    inet 10.0.2.15/24 brd 10.0.2.255 scope global dynamic noprefixroute enp0s3
        valid_lft 523sec preferred_lft 523sec
    inet 172.16.10.2/24 scope global enp0s3
        valid_lft forever preferred_lft forever
    inet6 fe80::98d1:9496:1af5:993e/64 scope link noprefixroute
        valid_lft forever preferred_lft forever
adithya@ubuntu:~$
```

PART 1: NON-PERSISTENT CONNECTION Step 1: This is done by setting the value of max-persistent-connection-per-server to 0 in the client computer

Week Assignment 3

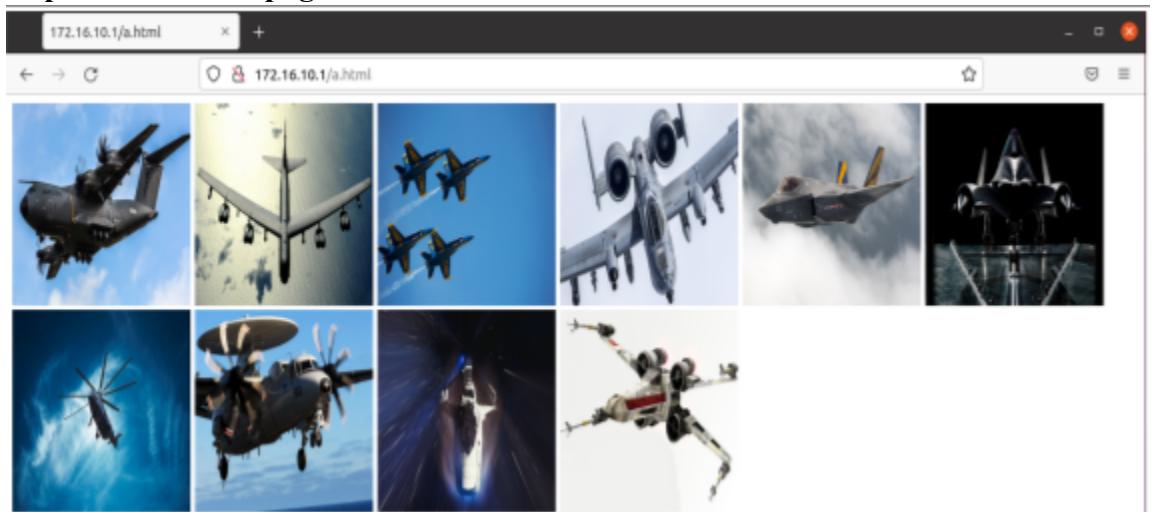


The screenshot shows the Firefox 'about:config' page with a search bar containing 'persist'. Several preferences are listed:

Preference	Value	Type
browser.pageActions.persistedActions	{"ids": ["bookmark"], "idsInUrlbar": ["bookmark"], "idsInUrlbarPreProton": [], "version": 1}	Object
devtools.netmonitor.persistLog	false	Boolean
devtools.webconsole.persistLog	false	Boolean
media.clearkey.persistent-license.enabled	false	Boolean
network.http.max-persistent-connections-per-proxy	32	Number
network.http.max-persistent-connections-per-server	0	Number
network.http.spdy.persistent-settings	false	Boolean

At the bottom, there is a search bar with 'persist', and radio buttons for Boolean, Number, and String.

Step 2: Access web page on client-side browser



Step 3: Wireshark packet capture

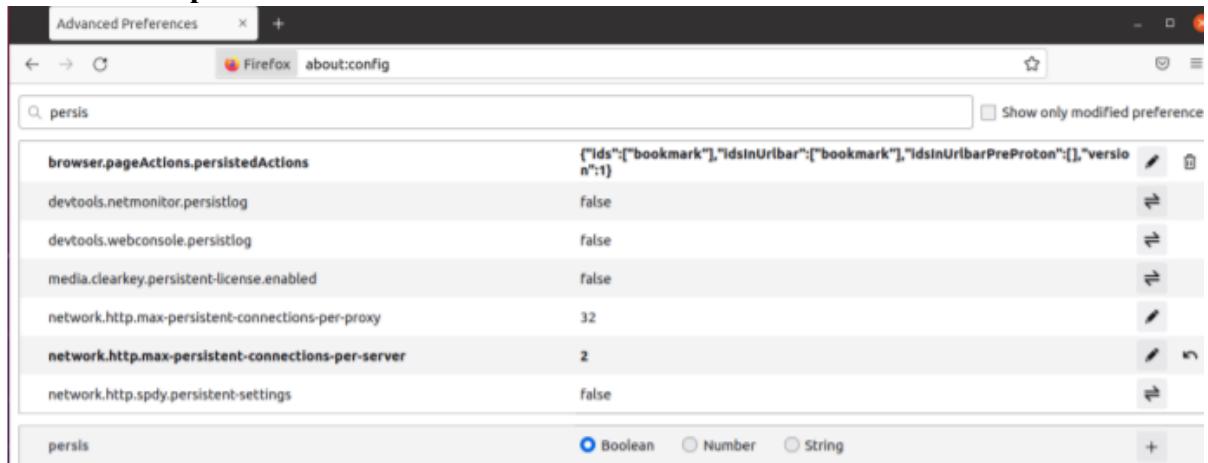
Here it is $9.354577011 - 8.282750549 = 1.071826462$

Week Assignment 3

No.	Time	Source	Destination	Protocol	Length	Info
10	8.282759549	172.16.10.2	172.16.10.1	HTTP	404	GET /a.html HTTP/1.1
12	8.388635288	172.16.10.1	172.16.10.2	HTTP	509	HTTP/1.1 200 OK (text/html)
27	8.683855861	172.16.10.2	172.16.10.1	HTTP	354	GET /Image1.jpg HTTP/1.1
160	8.734024566	172.16.10.1	172.16.10.2	HTTP	27720	HTTP/1.1 200 OK (JPEG JFIF image)
187	8.789106698	172.16.10.2	172.16.10.1	HTTP	354	GET /Image2.jpg HTTP/1.1
226	8.803149343	172.16.10.1	172.16.10.2	HTTP	11063	HTTP/1.1 200 OK (JPEG JFIF image)
229	8.819381638	172.16.10.2	172.16.10.1	HTTP	354	GET /Image3.jpg HTTP/1.1
274	8.833886567	172.16.10.1	172.16.10.2	HTTP	32018	HTTP/1.1 200 OK (JPEG JFIF image)
278	8.865403109	172.16.10.2	172.16.10.1	HTTP	354	GET /Image4.jpg HTTP/1.1
322	8.884959464	172.16.10.1	172.16.10.2	HTTP	52200	HTTP/1.1 200 OK (JPEG JFIF image)
324	8.917097706	172.16.10.2	172.16.10.1	HTTP	354	GET /Image5.jpg HTTP/1.1
363	8.930065786	172.16.10.1	172.16.10.2	HTTP	45834	HTTP/1.1 200 OK (JPEG JFIF image)
365	8.958162295	172.16.10.2	172.16.10.1	HTTP	354	GET /Image6.jpg HTTP/1.1
406	8.982964936	172.16.10.1	172.16.10.2	HTTP	7419	HTTP/1.1 200 OK (JPEG JFIF image)
408	8.992697995	172.16.10.2	172.16.10.1	HTTP	354	GET /Image7.jpg HTTP/1.1
439	9.007989224	172.16.10.1	172.16.10.2	HTTP	24342	HTTP/1.1 200 OK (JPEG JFIF image)
441	9.063160007	172.16.10.2	172.16.10.1	HTTP	354	GET /Image8.jpg HTTP/1.1
476	9.089826979	172.16.10.1	172.16.10.2	HTTP	7454	HTTP/1.1 200 OK (JPEG JFIF image)
480	9.188254472	172.16.10.2	172.16.10.1	HTTP	354	GET /Image9.jpg HTTP/1.1
534	9.247612634	172.16.10.1	172.16.10.2	HTTP	39657	HTTP/1.1 200 OK (JPEG JFIF image)
536	9.288469582	172.16.10.2	172.16.10.1	HTTP	355	GET /Image10.jpg HTTP/1.1
621	9.354577011	172.16.10.1	172.16.10.2	HTTP	20444	HTTP/1.1 200 OK (JPEG JFIF image)
623	9.587979861	172.16.10.2	172.16.10.1	HTTP	355	GET /favicon.ico HTTP/1.1
624	9.589419543	172.16.10.1	172.16.10.2	HTTP	557	HTTP/1.1 404 Not Found (text/html)

PART 2: PERSISTENT CONNECTIONS

Step 1: This is done by setting the value of max-persistent-connection-per-server to 2 in the client computer

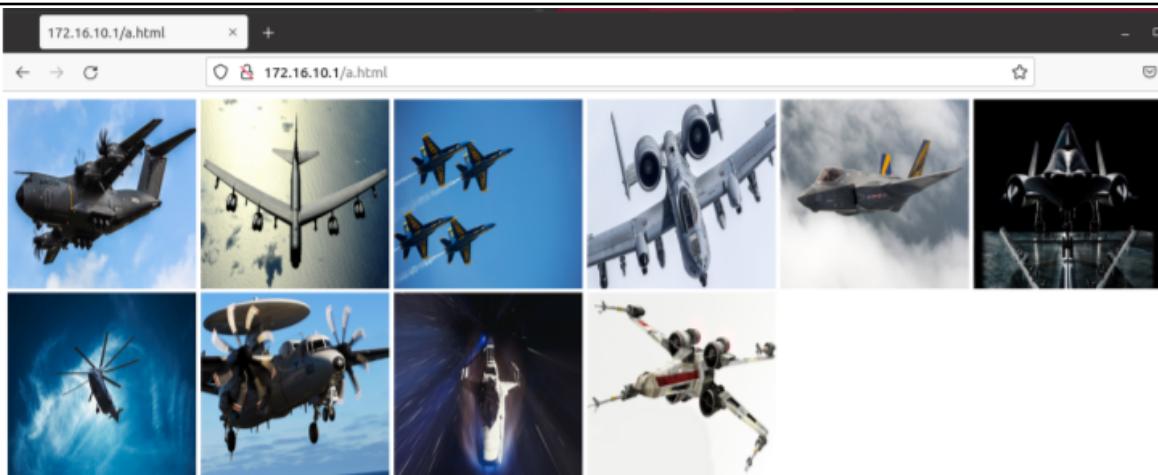


The screenshot shows the Firefox 'about:config' page with the search bar containing 'persis'. The preference 'network.http.max-persistent-connections-per-server' is highlighted and set to the value '2'. Other preferences listed include 'browser.pageActions.persistedActions', 'devtools.netmonitor.persistlog', 'devtools.webconsole.persistlog', 'media.clearkey.persistent-license.enabled', 'network.http.max-persistent-connections-per-proxy' (set to 32), and 'network.http.spdy.persistent-settings' (set to false).

Preference	Value
browser.pageActions.persistedActions	{"ids": ["bookmark"], "idsInUrlbar": ["bookmark"], "idsInUrlbarPreProton": [], "version": 1}
devtools.netmonitor.persistlog	false
devtools.webconsole.persistlog	false
media.clearkey.persistent-license.enabled	false
network.http.max-persistent-connections-per-proxy	32
network.http.max-persistent-connections-per-server	2
network.http.spdy.persistent-settings	false

Step 2: Access web page on client-side browser

Week Assignment 3



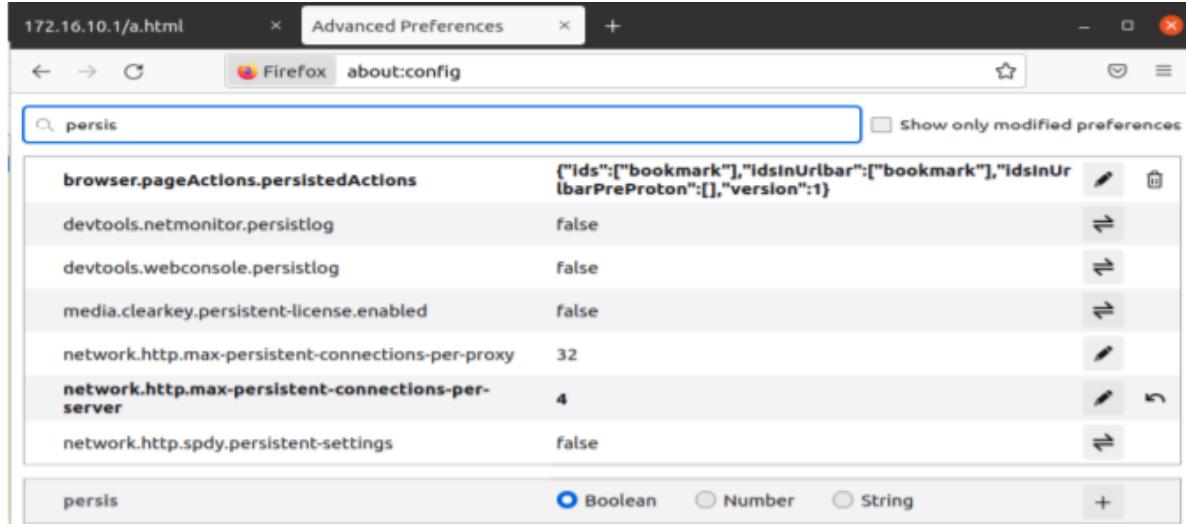
Step 3: Wireshark packet capture

No.	Time	Source	Destination	Protocol	Length: Info
203	27.925472611	34.107.221.82	192.168.214.132	HTTP	357 HTTP/1.1 200 OK (text/html)
236	28.005522938	192.168.214.132	34.107.221.82	HTTP	357 GET /success.txt?ipv4 HTTP/1.1
238	28.059056212	34.107.221.82	192.168.214.132	HTTP	276 HTTP/1.1 200 OK (text/plain)
245	34.112844977	172.16.10.2	172.16.10.1	HTTP	404 GET /a.html HTTP/1.1
247	34.134027875	172.16.10.1	172.16.10.2	HTTP	509 HTTP/1.1 200 OK (text/html)
277	34.429466654	172.16.10.2	172.16.10.1	HTTP	354 GET /Image1.jpg HTTP/1.1
282	34.429440445	172.16.10.2	172.16.10.1	HTTP	354 GET /Image2.jpg HTTP/1.1
496	34.492751060	172.16.10.1	172.16.10.2	HTTP	33584 HTTP/1.1 200 OK (JPEG JFIF image)
535	34.511561362	172.16.10.1	172.16.10.2	HTTP	29888 HTTP/1.1 200 OK (JPEG JFIF image)
537	34.568062493	172.16.10.2	172.16.10.1	HTTP	354 GET /Image3.jpg HTTP/1.1
664	34.609917082	172.16.10.2	172.16.10.1	HTTP	354 GET /Image4.jpg HTTP/1.1
645	34.618072959	172.16.10.1	172.16.10.2	HTTP	23240 HTTP/1.1 200 OK (JPEG JFIF image)
664	34.630130021	172.16.10.1	172.16.10.2	HTTP	14642 HTTP/1.1 200 OK (JPEG JFIF image)
666	34.637919760	172.16.10.2	172.16.10.1	HTTP	354 GET /Image5.jpg HTTP/1.1
723	34.671601681	172.16.10.2	172.16.10.1	HTTP	354 GET /Image6.jpg HTTP/1.1
765	34.6800862917	172.16.10.1	172.16.10.2	HTTP	5971 HTTP/1.1 200 OK (JPEG JFIF image)
771	34.694818229	172.16.10.1	172.16.10.2	HTTP	9634 HTTP/1.1 200 OK (JPEG JFIF image)
773	34.702559997	172.16.10.2	172.16.10.1	HTTP	354 GET /Image7.jpg HTTP/1.1
822	34.713712889	172.16.10.1	172.16.10.2	HTTP	19998 HTTP/1.1 200 OK (JPEG JFIF image)
824	34.737558655	172.16.10.2	172.16.10.1	HTTP	354 GET /Image8.jpg HTTP/1.1
862	34.745200196	172.16.10.1	172.16.10.2	HTTP	47998 HTTP/1.1 200 OK (JPEG JFIF image)
864	34.756436910	172.16.10.2	172.16.10.1	HTTP	354 GET /Image9.jpg HTTP/1.1
910	34.800221688	172.16.10.2	172.16.10.1	HTTP	355 GET /Image10.jpg HTTP/1.1
996	34.821584905	172.16.10.1	172.16.10.2	HTTP	39657 HTTP/1.1 200 OK (JPEG JFIF image)
1024	34.870841767	172.16.10.1	172.16.10.2	HTTP	30580 HTTP/1.1 200 OK (JPEG JFIF image)
1027	34.956385998	172.16.10.2	172.16.10.1	HTTP	355 GET /favicon.ico HTTP/1.1
1028	34.957169093	172.16.10.1	172.16.10.2	HTTP	557 HTTP/1.1 404 Not Found (text/html)

Here it is $34.870841767 - 34.112844977 = 0.75799679$

Week Assignment 3

Step 4: For 4 persistent connections, Set the value of max-persistent-connection-per-server to 4 in the client computer



The screenshot shows the Firefox 'about:config' page with a search bar containing 'persis'. The preference 'network.http.max-persistent-connections-per-server' is highlighted and set to the value '4'. Other preferences listed include 'browser.pageActions.persistedActions', 'devtools.netmonitor.persistlog', 'devtools.webconsole.persistlog', 'media.clearkey.persistent-license.enabled', 'network.http.max-persistent-connections-per-proxy', and 'network.http.spdy.persistent-settings', all of which are set to 'false'.

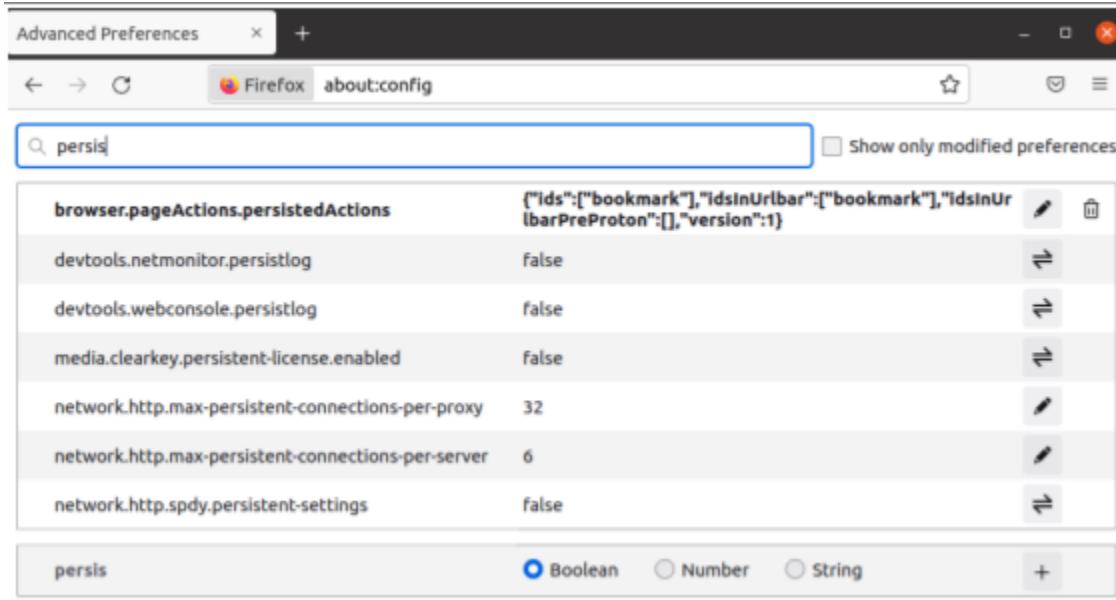
Step 5: Repeat the steps 1-3.

No.	Time	Source	Destination	Protocol	Length	Info
6	0.003738344	172.16.10.2	172.16.10.1	HTTP	404	GET /a.html HTTP/1.1
8	0.069300796	172.16.10.1	172.16.10.2	HTTP	509	HTTP/1.1 200 OK (text/html)
99	0.569587633	172.16.10.2	172.16.10.1	HTTP	354	GET /Image1.jpg HTTP/1.1
128	0.582845766	172.16.10.2	172.16.10.1	HTTP	354	GET /Image2.jpg HTTP/1.1
240	0.609824813	172.16.10.2	172.16.10.1	HTTP	354	GET /Image4.jpg HTTP/1.1
248	0.610906684	172.16.10.2	172.16.10.1	HTTP	354	GET /Image3.jpg HTTP/1.1
474	0.660196726	172.16.10.1	172.16.10.2	HTTP	5272	HTTP/1.1 200 OK (JPEG JFIF image)
515	0.677731142	172.16.10.1	172.16.10.2	HTTP	3104	HTTP/1.1 200 OK (JPEG JFIF image)
655	0.715259614	172.16.10.1	172.16.10.2	HTTP	17449	HTTP/1.1 200 OK (JPEG JFIF image)
710	0.798336601	172.16.10.1	172.16.10.2	HTTP	29123	HTTP/1.1 200 OK (JPEG JFIF image)
716	0.854222055	172.16.10.2	172.16.10.1	HTTP	354	GET /Image5.jpg HTTP/1.1
824	1.010399011	172.16.10.1	172.16.10.2	HTTP	8186	HTTP/1.1 200 OK (JPEG JFIF image)
825	1.022361131	172.16.10.2	172.16.10.1	HTTP	354	GET /Image6.jpg HTTP/1.1
914	1.121538862	172.16.10.1	172.16.10.2	HTTP	3075	HTTP/1.1 200 OK (JPEG JFIF image)
917	1.289459099	172.16.10.2	172.16.10.1	HTTP	354	GET /Image7.jpg HTTP/1.1
980	1.298793713	172.16.10.1	172.16.10.2	HTTP	14206	HTTP/1.1 200 OK (JPEG JFIF image)
983	1.451730219	172.16.10.2	172.16.10.1	HTTP	354	GET /Image8.jpg HTTP/1.1
1105	1.547076645	172.16.10.1	172.16.10.2	HTTP	21934	HTTP/1.1 200 OK (JPEG JFIF image)
1108	1.747347911	172.16.10.2	172.16.10.1	HTTP	354	GET /Image9.jpg HTTP/1.1
1279	1.992388775	172.16.10.1	172.16.10.2	HTTP	3457	HTTP/1.1 200 OK (JPEG JFIF image)
1281	2.088151100	172.16.10.2	172.16.10.1	HTTP	355	GET /Image10.jpg HTTP/1.1
1499	2.374104191	172.16.10.1	172.16.10.2	HTTP	10308	HTTP/1.1 200 OK (JPEG JFIF image)
1502	3.480827819	172.16.10.2	172.16.10.1	HTTP	355	GET /favicon.ico HTTP/1.1
1504	3.483136242	172.16.10.1	172.16.10.2	HTTP	557	HTTP/1.1 404 Not Found (text/html)

Here it is $2.374104191 - 0.003738344 = 2.370365847$

Step 6: For 6 persistent connections, set the value of max-persistent-connection-per-server to 6 in the client computer.

Week Assignment 3



The screenshot shows the Firefox 'Advanced Preferences' window with the search bar containing 'persis'. The results list several preferences related to persistent connections:

- browser.pageActions.persistedActions**: {"ids":["bookmark"],"idsInUrlbar":["bookmark"],"idsInUr
lbarPreProton":[],"version":1}
- devtools.netmonitor.persistlog**: false
- devtools.webconsole.persistlog**: false
- media.clearkey.persistent-license.enabled**: false
- network.http.max-persistent-connections-per-proxy**: 32
- network.http.max-persistent-connections-per-server**: 6
- network.http.spdy.persistent-settings**: false

At the bottom, there is a filter dropdown set to 'Boolean' and a '+' button.

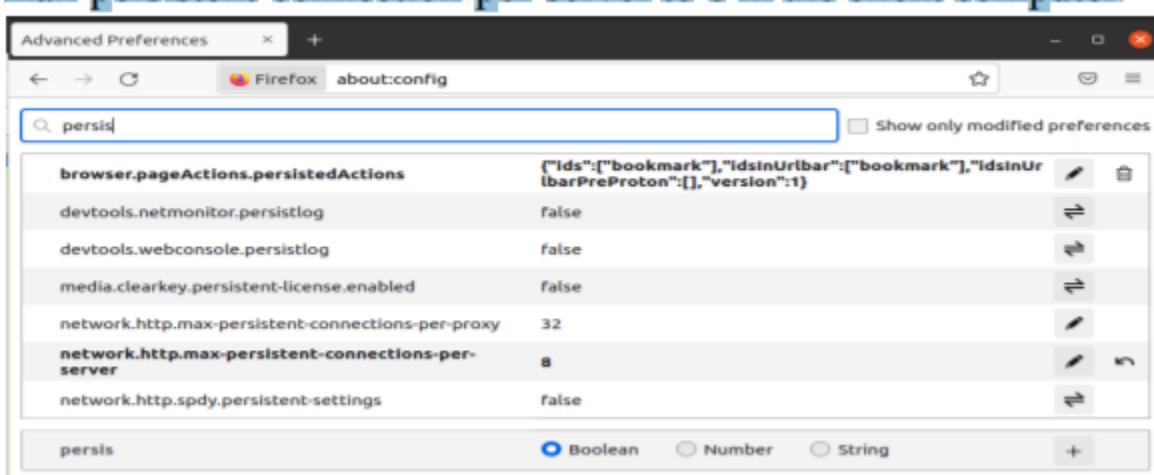
Step 7: Repeat the steps 1-3.

No.	Time	Source	Destination	Protocol	Length	Info
4	0.001458625	172.16.10.2	172.16.10.1	HTTP	404	GET /a.html HTTP/1.1
6	0.007147475	172.16.10.1	172.16.10.2	HTTP	509	HTTP/1.1 200 OK (text/html)
59	0.556182889	172.16.10.2	172.16.10.1	HTTP	354	GET /Image1.jpg HTTP/1.1
183	0.593622467	172.16.10.1	172.16.10.2	HTTP	1256	HTTP/1.1 200 OK (JPEG/JFIF image)
191	0.601742614	172.16.10.2	172.16.10.1	HTTP	354	GET /Image2.jpg HTTP/1.1
199	0.603526272	172.16.10.2	172.16.10.1	HTTP	354	GET /Image5.jpg HTTP/1.1
200	0.603858712	172.16.10.2	172.16.10.1	HTTP	354	GET /Image4.jpg HTTP/1.1
201	0.604046092	172.16.10.2	172.16.10.1	HTTP	354	GET /Image3.jpg HTTP/1.1
264	0.614190922	172.16.10.2	172.16.10.1	HTTP	354	GET /Image6.jpg HTTP/1.1
511	0.643509807	172.16.10.1	172.16.10.2	HTTP	6720	HTTP/1.1 200 OK (JPEG/JFIF image)
643	0.675762359	172.16.10.1	172.16.10.2	HTTP	13195	HTTP/1.1 200 OK (JPEG/JFIF image)
810	0.726602291	172.16.10.1	172.16.10.2	HTTP	27692	HTTP/1.1 200 OK (JPEG/JFIF image)
815	0.727638884	172.16.10.1	172.16.10.2	HTTP	3843	HTTP/1.1 200 OK (JPEG/JFIF image)
851	0.770802211	172.16.10.2	172.16.10.1	HTTP	354	GET /Image7.jpg HTTP/1.1
955	0.791306203	172.16.10.1	172.16.10.2	HTTP	25790	HTTP/1.1 200 OK (JPEG/JFIF image)
983	0.853680368	172.16.10.2	172.16.10.1	HTTP	354	GET /Image8.jpg HTTP/1.1
1052	0.869395703	172.16.10.1	172.16.10.2	HTTP	5081	HTTP/1.1 200 OK (JPEG/JFIF image)
1074	0.917298585	172.16.10.1	172.16.10.2	HTTP	19938	HTTP/1.1 200 OK (JPEG/JFIF image)
1075	0.927359673	172.16.10.2	172.16.10.1	HTTP	354	GET /Image9.jpg HTTP/1.1
1178	0.996795480	172.16.10.2	172.16.10.1	HTTP	355	GET /Image10.jpg HTTP/1.1
1372	1.120656297	172.16.10.1	172.16.10.2	HTTP	3457	HTTP/1.1 200 OK (JPEG/JFIF image)
1391	1.161052653	172.16.10.1	172.16.10.2	HTTP	172	HTTP/1.1 200 OK (JPEG/JFIF image)
1394	1.991683858	172.16.10.2	172.16.10.1	HTTP	355	GET /favicon.ico HTTP/1.1
1396	1.993339663	172.16.10.1	172.16.10.2	HTTP	557	HTTP/1.1 404 Not Found (text/html)

Here it is $1.161052653 - 0.001458625 = 1.159594028$

Step 8: For 8 persistent connections, set the value of max-persistent-connection-per-server to 8 in the client computer

Week Assignment 3



The screenshot shows the Firefox 'about:config' page with a search bar containing 'persist'. The results list several preferences related to persistent connections:

- browser.pageActions.persistedActions: {"Ids":["bookmark"], "IdsInUrlbar":["bookmark"], "IdsInUr..."}, Type: Object
- devtools.netmonitor.persistlog: false, Type: Boolean
- devtools.webconsole.persistlog: false, Type: Boolean
- media.clearkey.persistent-license.enabled: false, Type: Boolean
- network.http.max-persistent-connections-per-proxy: 32, Type: Number
- network.http.max-persistent-connections-per-server: 8, Type: Number
- network.http.spdy.persistent-settings: false, Type: Boolean

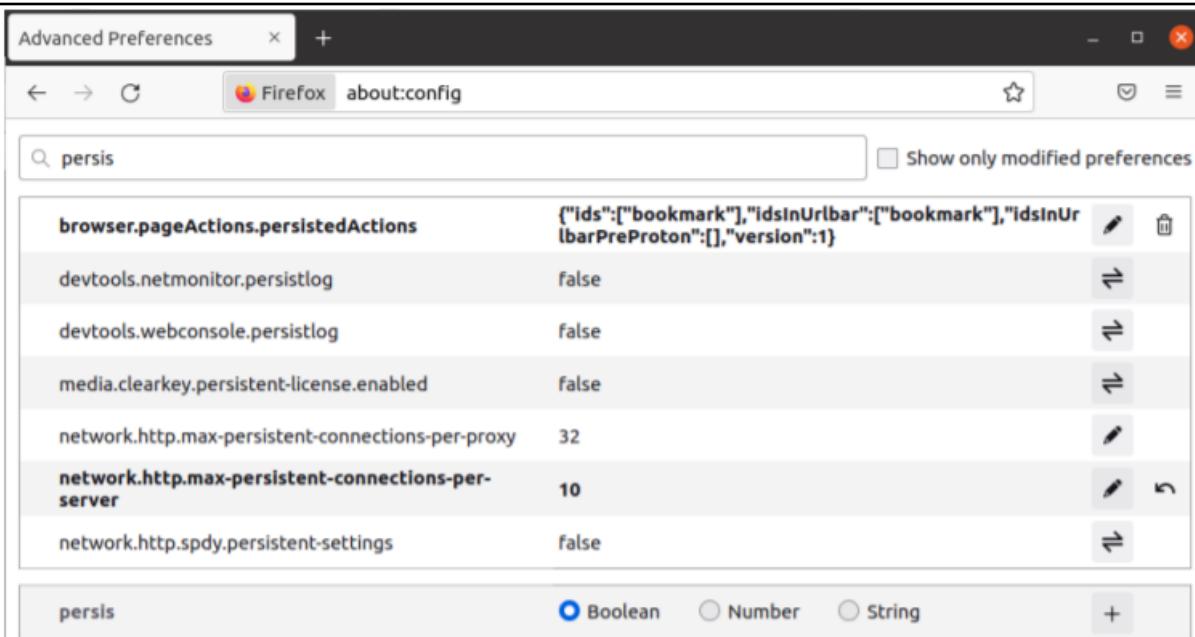
Step 9: Repeat the steps 1-3.

No.	Time	Source	Destination	Protocol	Length	Info
39	1.755166771	192.168.214.132	142.250.67.67	OCSP	481	Request
41	1.842577319	142.250.67.67	192.168.214.132	OCSP	758	Response
124	11.168315632	172.16.10.2	172.16.10.1	HTTP	404	GET /a.html HTTP/1.1
126	11.170434298	172.16.10.1	172.16.10.2	HTTP	509	HTTP/1.1 200 OK (text/html)
211	11.70677536	172.16.10.2	172.16.10.1	HTTP	354	GET /Image1.jpg HTTP/1.1
301	11.722894113	172.16.10.2	172.16.10.1	HTTP	354	GET /Image2.jpg HTTP/1.1
333	11.728951559	172.16.10.2	172.16.10.1	HTTP	354	GET /Image3.jpg HTTP/1.1
393	11.735926704	172.16.10.2	172.16.10.1	HTTP	354	GET /Image4.jpg HTTP/1.1
396	11.736373345	172.16.10.1	172.16.10.2	HTTP	5272	HTTP/1.1 200 OK (JPEG JFIF image)
504	11.749667591	172.16.10.1	172.16.10.2	HTTP	17795	HTTP/1.1 200 OK (JPEG JFIF image)
571	11.764669051	172.16.10.1	172.16.10.2	HTTP	46544	HTTP/1.1 200 OK (JPEG JFIF image)
620	11.768276035	172.16.10.1	172.16.10.2	HTTP	17449	HTTP/1.1 200 OK (JPEG JFIF image)
622	11.769461561	172.16.10.2	172.16.10.1	HTTP	354	GET /Image5.jpg HTTP/1.1
650	11.772519310	172.16.10.2	172.16.10.1	HTTP	354	GET /Image8.jpg HTTP/1.1
651	11.772610556	172.16.10.2	172.16.10.1	HTTP	354	GET /Image7.jpg HTTP/1.1
685	11.774757383	172.16.10.2	172.16.10.1	HTTP	354	GET /Image6.jpg HTTP/1.1
831	11.797517264	172.16.10.1	172.16.10.2	HTTP	28895	HTTP/1.1 200 OK (JPEG JFIF image)
985	11.809419261	172.16.10.1	172.16.10.2	HTTP	23835	HTTP/1.1 200 OK (JPEG JFIF image)
1007	11.817245713	172.16.10.1	172.16.10.2	HTTP	14267	HTTP/1.1 200 OK (JPEG JFIF image)
1073	11.828317317	172.16.10.1	172.16.10.2	HTTP	6668	HTTP/1.1 200 OK (JPEG JFIF image)
1075	11.830008133	172.16.10.2	172.16.10.1	HTTP	354	GET /Image9.jpg HTTP/1.1
1152	11.842694857	172.16.10.1	172.16.10.2	HTTP	7801	HTTP/1.1 200 OK (JPEG JFIF image)
1154	11.852386421	172.16.10.2	172.16.10.1	HTTP	355	GET /Image10.jpg HTTP/1.1
1263	11.944562221	172.16.10.1	172.16.10.2	HTTP	46508	HTTP/1.1 200 OK (JPEG JFIF image)
1273	12.762313963	172.16.10.2	172.16.10.1	HTTP	355	GET /favicon.ico HTTP/1.1
1275	12.763701407	172.16.10.1	172.16.10.2	HTTP	557	HTTP/1.1 404 Not Found (text/html)

Here it is $11.944502221 - 11.168315632 = 0.776186589$

Step 10: For 10 persistent connections, set the value of max-persistent-connection-per-server to 10 in the client computer.

Week Assignment 3



The screenshot shows the Firefox Advanced Preferences window with the search bar set to "persist". The results list several preferences related to persistence:

- browser.pageActions.persistedActions**: A JSON object with the value `{"ids": ["bookmark"], "idsInUrlbar": ["bookmark"], "idsInUrlbarPreProton": [], "version": 1}`.
- devtools.netmonitor.persistlog**: Set to false.
- devtools.webconsole.persistlog**: Set to false.
- media.clearkey.persistent-license.enabled**: Set to false.
- network.http.max-persistent-connections-per-proxy**: Set to 32.
- network.http.max-persistent-connections-per-server**: Set to 10.
- network.http.spdy.persistent-settings**: Set to false.

At the bottom, there are radio buttons for Boolean, Number, and String, and a "+" button to add new preferences.

Step 11: Repeat the steps 1-3.

No.	Time	Source	Destination	Protocol	Length	Info
33	0.327172578	192.168.214.132	142.250.67.67	OCSP	481	Request
38	0.418460091	142.250.67.67	192.168.214.132	OCSP	758	Response
79	11.089242299	172.16.10.2	172.16.10.1	HTTP	404	GET /a.html HTTP/1.1
81	11.100442584	172.16.10.1	172.16.10.2	HTTP	509	HTTP/1.1 200 OK (text/html)
138	11.501667953	172.16.10.2	172.16.10.1	HTTP	354	GET /Image1.jpg HTTP/1.1
260	11.538145097	172.16.10.1	172.16.10.2	HTTP	12960	HTTP/1.1 200 OK (JPEG JFIF image)
288	11.551626780	172.16.10.2	172.16.10.1	HTTP	354	GET /Image2.jpg HTTP/1.1
289	11.552040363	172.16.10.2	172.16.10.1	HTTP	354	GET /Image8.jpg HTTP/1.1
291	11.552488461	172.16.10.2	172.16.10.1	HTTP	354	GET /Image7.jpg HTTP/1.1
292	11.552741011	172.16.10.2	172.16.10.1	HTTP	354	GET /Image6.jpg HTTP/1.1
300	11.553542031	172.16.10.2	172.16.10.1	HTTP	354	GET /Image5.jpg HTTP/1.1
440	11.569131174	172.16.10.2	172.16.10.1	HTTP	354	GET /Image4.jpg HTTP/1.1
441	11.569389033	172.16.10.2	172.16.10.1	HTTP	354	GET /Image3.jpg HTTP/1.1
639	11.583146669	172.16.10.2	172.16.10.1	HTTP	355	GET /Image10.jpg HTTP/1.1
688	11.584581160	172.16.10.2	172.16.10.1	HTTP	354	GET /Image9.jpg HTTP/1.1
1057	11.607072405	172.16.10.1	172.16.10.2	HTTP	2343	HTTP/1.1 200 OK (JPEG JFIF image)
1170	11.612399985	172.16.10.1	172.16.10.2	HTTP	40004	HTTP/1.1 200 OK (JPEG JFIF image)
1520	11.640228927	172.16.10.1	172.16.10.2	HTTP	13247	HTTP/1.1 200 OK (JPEG JFIF image)
1600	11.650861660	172.16.10.1	172.16.10.2	HTTP	16875	HTTP/1.1 200 OK (JPEG JFIF image)
1681	11.655717764	172.16.10.1	172.16.10.2	HTTP	37721	HTTP/1.1 200 OK (JPEG JFIF image)
1957	11.686700313	172.16.10.1	172.16.10.2	HTTP	1611	HTTP/1.1 200 OK (JPEG JFIF image)
1977	11.705214509	172.16.10.1	172.16.10.2	HTTP	3824	HTTP/1.1 200 OK (JPEG JFIF image)
2486	12.110751646	172.16.10.1	172.16.10.2	HTTP	2610	HTTP/1.1 200 OK (JPEG JFIF image)
2494	12.124570089	172.16.10.1	172.16.10.2	HTTP	8861	HTTP/1.1 200 OK (JPEG JFIF image)
2496	13.638676029	172.16.10.2	172.16.10.1	HTTP	355	GET /favicon.ico HTTP/1.1
2498	13.640146422	172.16.10.1	172.16.10.2	HTTP	557	HTTP/1.1 404 Not Found (text/html)

Here it is **12.124570089-11.089242299=1.03532779**

Week Assignment 3

Number of persistent connections	Time Delay
0	1.071826462
2	0.75799679
4	2.370365847
6	1.159594028
8	0.776186589
10	1.03532779