

COMPUTER NETWORKS LAB – WEEK 2

Name: TUSHAR Y S

SRN: PES1UG19CS545

1. CONFIGURATION OF SERVER AND CLIENT:

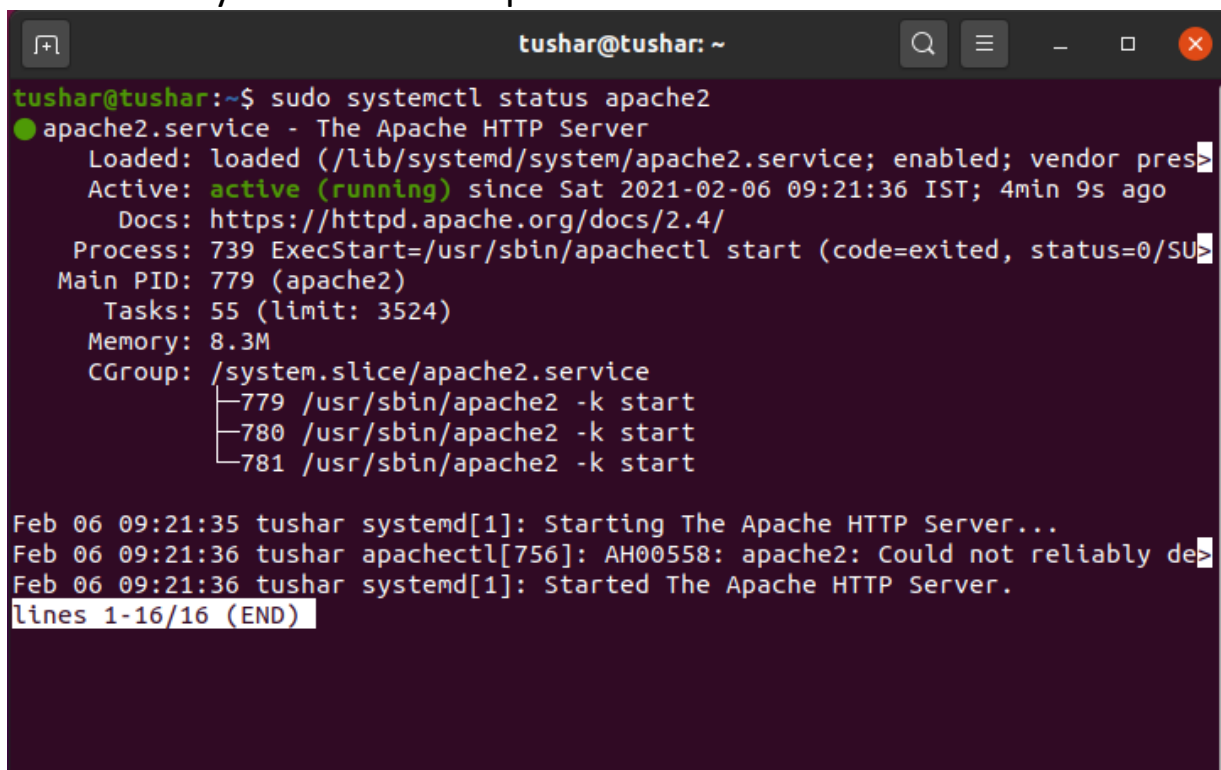
1.1. Server side(ubuntu) configuration

- The Apache server is installed in server machine using the following command:

```
sudo apt-get install apache2
```

- To make sure that the web server is running , we use the following command in the server machine:

```
sudo systemctl status apache2
```



```
tushar@tushar: ~  
tushar@tushar:~$ sudo systemctl status apache2  
● apache2.service - The Apache HTTP Server  
   Loaded: loaded (/lib/systemd/system/apache2.service; enabled; vendor preset: enabled)  
   Active: active (running) since Sat 2021-02-06 09:21:36 IST; 4min 9s ago  
     Docs: https://httpd.apache.org/docs/2.4/  
   Process: 739 ExecStart=/usr/sbin/apachectl start (code=exited, status=0/SUCCESS)  
 Main PID: 779 (apache2)  
    Tasks: 55 (limit: 3524)  
   Memory: 8.3M  
    CGroup: /system.slice/apache2.service  
            └─779 /usr/sbin/apache2 -k start  
              └─780 /usr/sbin/apache2 -k start  
                └─781 /usr/sbin/apache2 -k start  
  
Feb 06 09:21:35 tushar systemd[1]: Starting The Apache HTTP Server...  
Feb 06 09:21:36 tushar apachectl[756]: AH00558: apache2: Could not reliably determine the server's fully qualified domain name, using 127.0.0.1  
Feb 06 09:21:36 tushar systemd[1]: Started The Apache HTTP Server.  
lines 1-16/16 (END)
```

The above image says that the server is active and running successfully.

- The server IP address is set manually using “Edit Connections”.

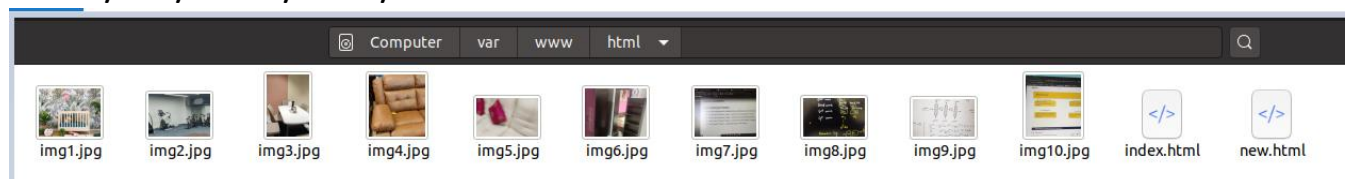
It is set to :10.0.9.12.

```
tushar@tushar: ~  
tushar@tushar:~$ 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 08:00:27:95:92:47 brd ff:ff:ff:ff:ff:ff  
    inet 10.0.9.12/24 brd 10.0.9.255 scope global noprefixroute enp0s3  
        valid_lft forever preferred_lft forever  
    inet 10.0.2.15/24 brd 10.0.2.255 scope global dynamic noprefixroute enp0s3  
        valid_lft 476sec preferred_lft 476sec  
    inet6 fe80::f865:8faf:24cf:4fd4/64 scope link noprefixroute  
        valid_lft forever preferred_lft forever  
tushar@tushar:~$
```

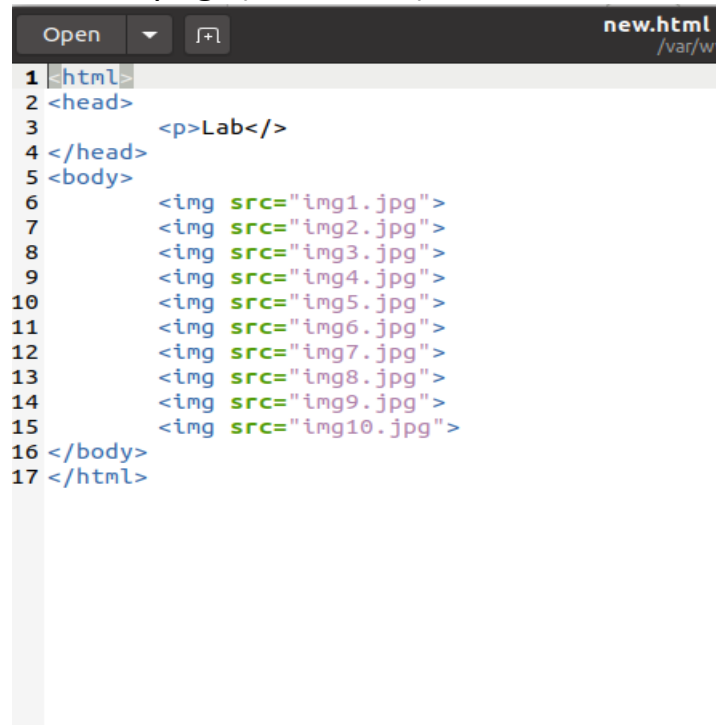
- The apache.config file in etc/apache2 directory is modified as:
 - 'keep alive' option is set to on.
 - 'MaximumKeepAliveRequests' is set to 2.

```
28 KeepAlive On  
29  
30 #  
31 # MaxKeepAliveRequests: The maximum number of requests to allow  
32 # during a persistent connection. Set to 0 to allow an unlimited amount.  
33 # We recommend you leave this number high, for maximum performance.  
34 #  
35 MaxKeepAliveRequests 2  
36
```

- A html page consisting of 10 images (img1.jpg-img10.jpg) is stored(along with the images) in the path:
 /var/www/html/new.html



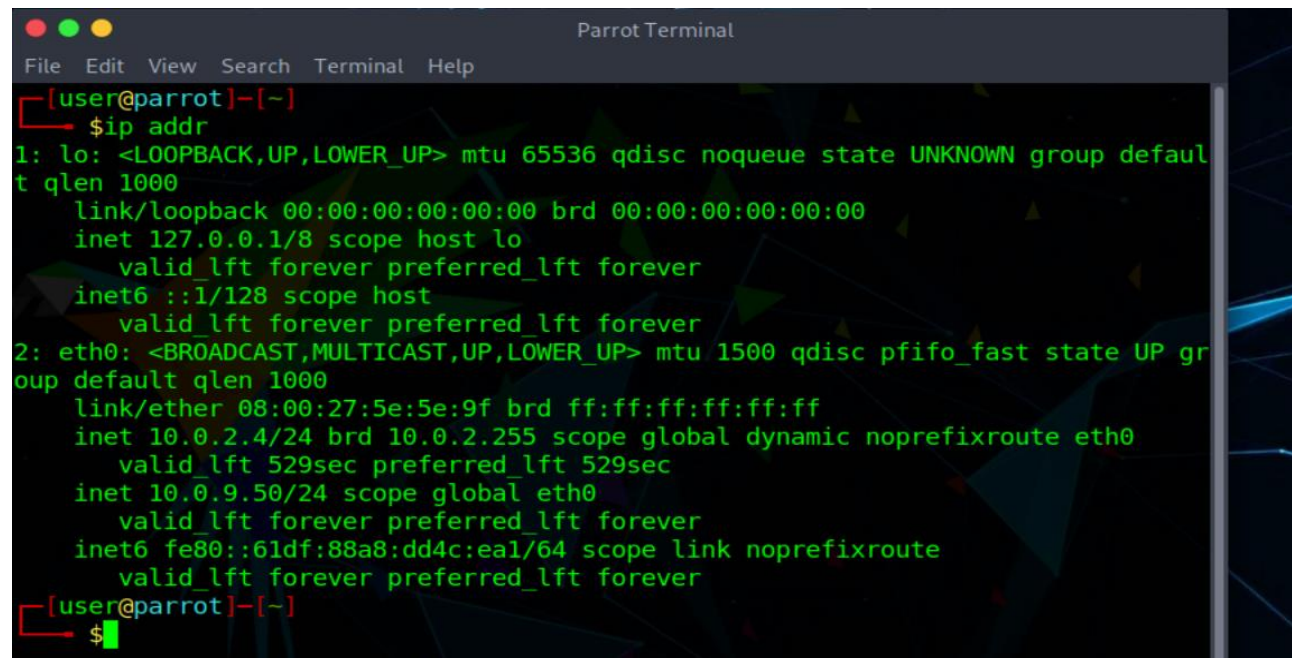
- A web page(new.html) is created as shown:

A screenshot of a text editor window titled 'new.html' with a file path of '/var/www/html/new.html'. The editor shows an HTML document structure. Line 1: <html>. Line 2: <head>. Line 3: <p>Lab</p>. Line 4: </head>. Line 5: <body>. Lines 6-15: A series of <img src='img1.jpg' through 'img10.jpg' tags. Line 16: </body>. Line 17: </html>.

```
1 <html>
2 <head>
3   <p>Lab</p>
4 </head>
5 <body>
6   
7   
8   
9   
10  
11  
12  
13  
14  
15  
16 </body>
17 </html>
```

1.2. Client side (parrot)configuration

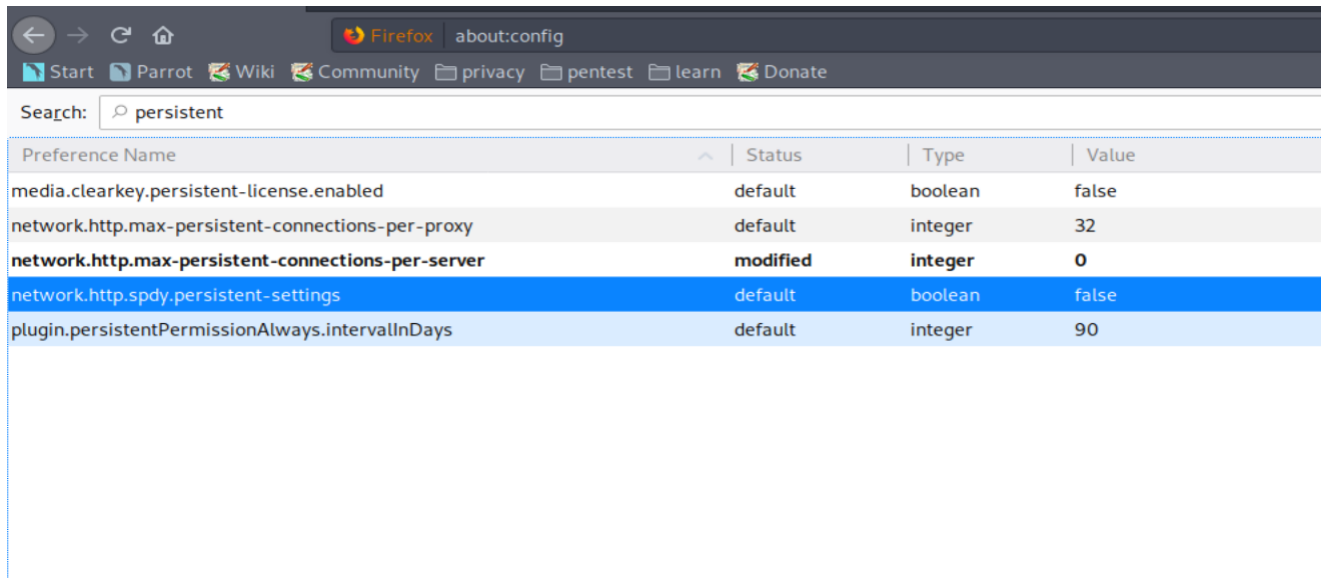
- The server IP address is set manually using “Edit Connections”. It is set to :10.0.9.50.

A screenshot of a Parrot Terminal window. The terminal shows the output of the 'ip addr' command. It displays details for the loopback interface 'lo' (127.0.0.1) and the ethernet interface 'eth0' (10.0.2.4 and 10.0.9.50). The IP address 10.0.9.50 is highlighted in green. The prompt is '[user@parrot]~\$' and the command entered is '\$ip addr'.

```
[user@parrot]~$ 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: eth0: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc pfifo_fast state UP group default qlen 1000
    link/ether 08:00:27:5e:5e:9f brd ff:ff:ff:ff:ff:ff
    inet 10.0.2.4/24 brd 10.0.2.255 scope global dynamic noprefixroute eth0
        valid_lft 529sec preferred_lft 529sec
    inet 10.0.9.50/24 scope global eth0
        valid_lft forever preferred_lft forever
    inet6 fe80::61df:88a8:dd4c:ea1/64 scope link noprefixroute
        valid_lft forever preferred_lft forever
[user@parrot]~$
```

2. NON-PERSISTENT CONNECTION:

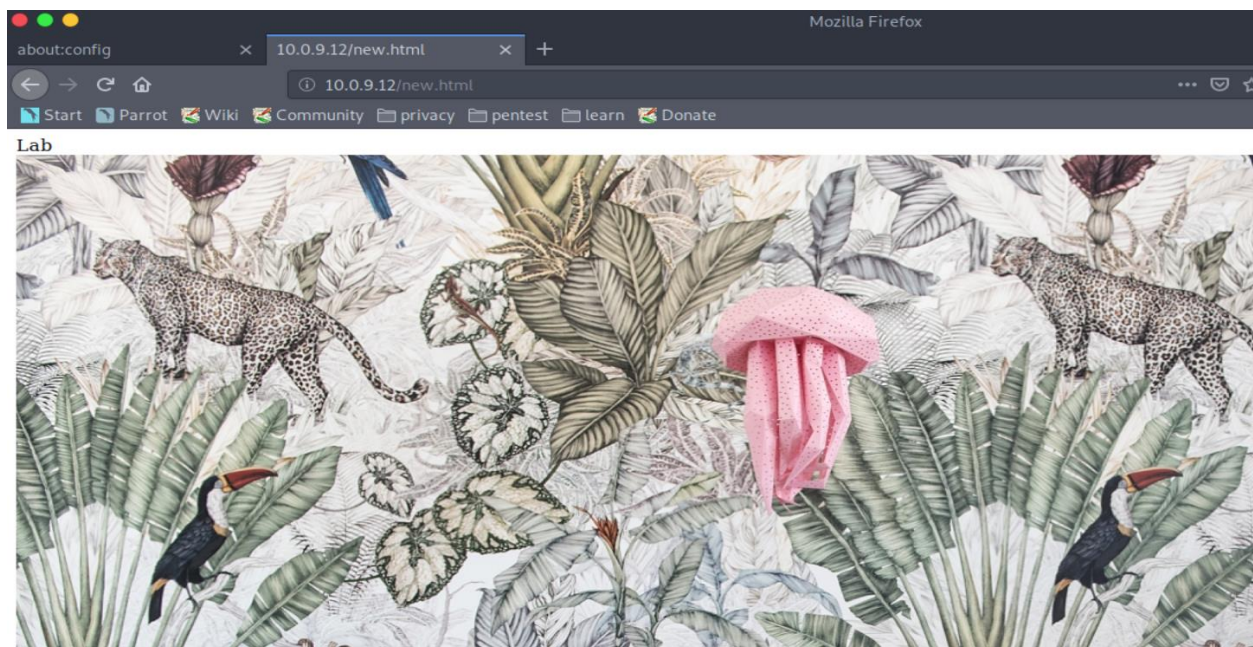
- The value of max-persistent-connections-per-server is set to 0 in the client's machine. Also, spdy.persistent-settings is set to 'false' as shown in the screenshot below.



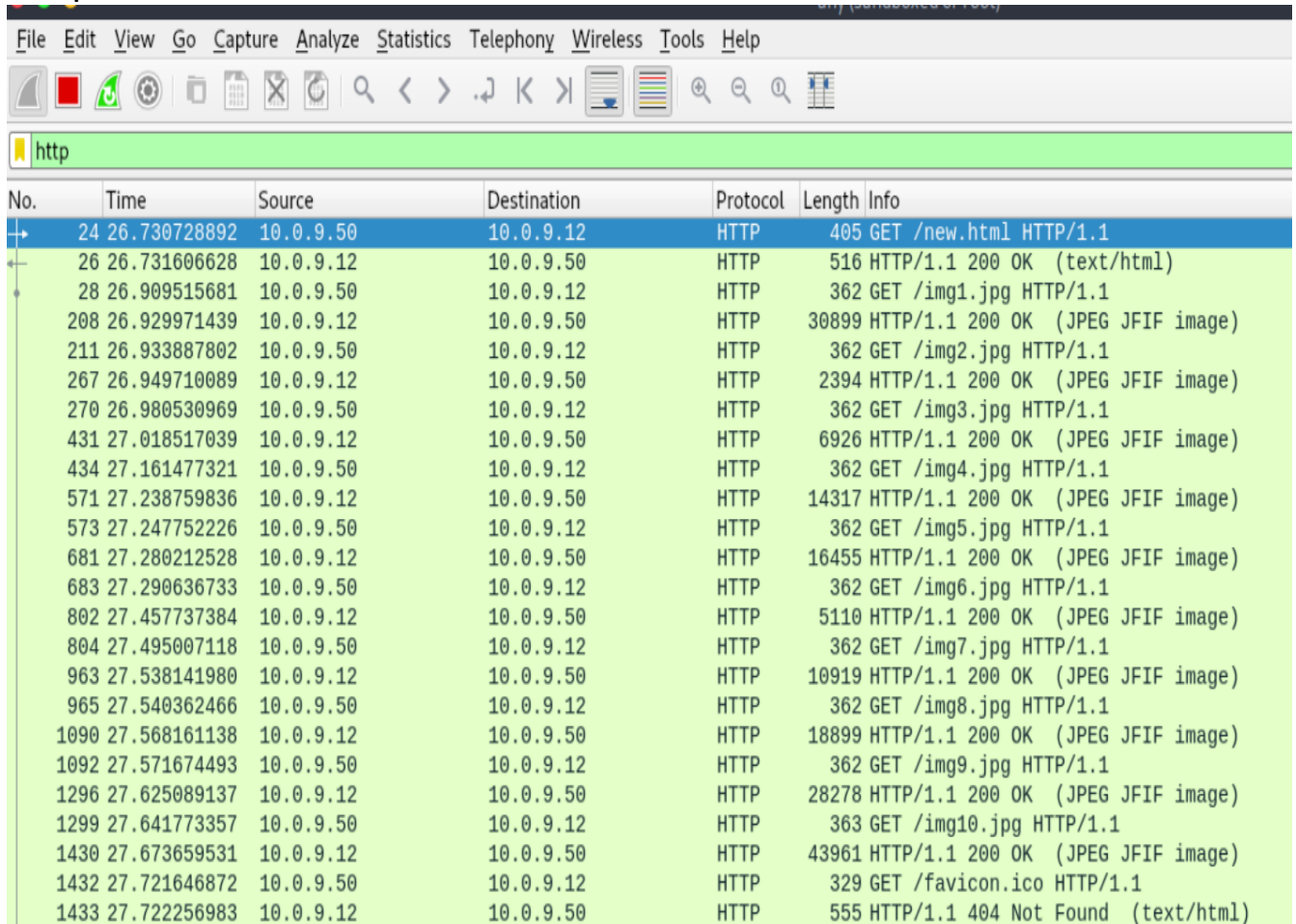
The screenshot shows the Firefox 'about:config' page with a search filter of 'persistent'. The table below lists the relevant configuration preferences.

Preference Name	Status	Type	Value
media.clearkey.persistent-license.enabled	default	boolean	false
network.http.max-persistent-connections-per-proxy	default	integer	32
network.http.max-persistent-connections-per-server	modified	integer	0
network.http.spdy.persistent-settings	default	boolean	false
plugin.persistentPermissionAlways.intervalInDays	default	integer	90

- The web page is accessed on client-side browser by typing in: 10.0.9.12/new.html, where "10.0.9.12" is server's IP address and "new.html" is the file which is in the server side.



- Wireshark is launched and 'http' filter is applied and we can observe the packets as below.



The image shows a Wireshark packet capture window with the 'http' filter applied. The packet list shows a sequence of HTTP requests and responses. The first packet is a GET request for /new.html. The subsequent packets are responses for 10 images (img1.jpg through img10.jpg) and a 404 Not Found response for favicon.ico. The packet details pane shows the structure of the HTTP packets, including the status code and content type.

No.	Time	Source	Destination	Protocol	Length	Info
24	26.730728892	10.0.9.50	10.0.9.12	HTTP	405	GET /new.html HTTP/1.1
26	26.731606628	10.0.9.12	10.0.9.50	HTTP	516	HTTP/1.1 200 OK (text/html)
28	26.909515681	10.0.9.50	10.0.9.12	HTTP	362	GET /img1.jpg HTTP/1.1
208	26.929971439	10.0.9.12	10.0.9.50	HTTP	30899	HTTP/1.1 200 OK (JPEG JFIF image)
211	26.933887802	10.0.9.50	10.0.9.12	HTTP	362	GET /img2.jpg HTTP/1.1
267	26.949710089	10.0.9.12	10.0.9.50	HTTP	2394	HTTP/1.1 200 OK (JPEG JFIF image)
270	26.980530969	10.0.9.50	10.0.9.12	HTTP	362	GET /img3.jpg HTTP/1.1
431	27.018517039	10.0.9.12	10.0.9.50	HTTP	6926	HTTP/1.1 200 OK (JPEG JFIF image)
434	27.161477321	10.0.9.50	10.0.9.12	HTTP	362	GET /img4.jpg HTTP/1.1
571	27.238759836	10.0.9.12	10.0.9.50	HTTP	14317	HTTP/1.1 200 OK (JPEG JFIF image)
573	27.247752226	10.0.9.50	10.0.9.12	HTTP	362	GET /img5.jpg HTTP/1.1
681	27.280212528	10.0.9.12	10.0.9.50	HTTP	16455	HTTP/1.1 200 OK (JPEG JFIF image)
683	27.290636733	10.0.9.50	10.0.9.12	HTTP	362	GET /img6.jpg HTTP/1.1
802	27.457737384	10.0.9.12	10.0.9.50	HTTP	5110	HTTP/1.1 200 OK (JPEG JFIF image)
804	27.495007118	10.0.9.50	10.0.9.12	HTTP	362	GET /img7.jpg HTTP/1.1
963	27.538141980	10.0.9.12	10.0.9.50	HTTP	10919	HTTP/1.1 200 OK (JPEG JFIF image)
965	27.540362466	10.0.9.50	10.0.9.12	HTTP	362	GET /img8.jpg HTTP/1.1
1090	27.568161138	10.0.9.12	10.0.9.50	HTTP	18899	HTTP/1.1 200 OK (JPEG JFIF image)
1092	27.571674493	10.0.9.50	10.0.9.12	HTTP	362	GET /img9.jpg HTTP/1.1
1296	27.625089137	10.0.9.12	10.0.9.50	HTTP	28278	HTTP/1.1 200 OK (JPEG JFIF image)
1299	27.641773357	10.0.9.50	10.0.9.12	HTTP	363	GET /img10.jpg HTTP/1.1
1430	27.673659531	10.0.9.12	10.0.9.50	HTTP	43961	HTTP/1.1 200 OK (JPEG JFIF image)
1432	27.721646872	10.0.9.50	10.0.9.12	HTTP	329	GET /favicon.ico HTTP/1.1
1433	27.722256983	10.0.9.12	10.0.9.50	HTTP	555	HTTP/1.1 404 Not Found (text/html)

Time to capture all the 10 images =

Time at last Response-Time at first GET request

= 27.673659531-26.730728892

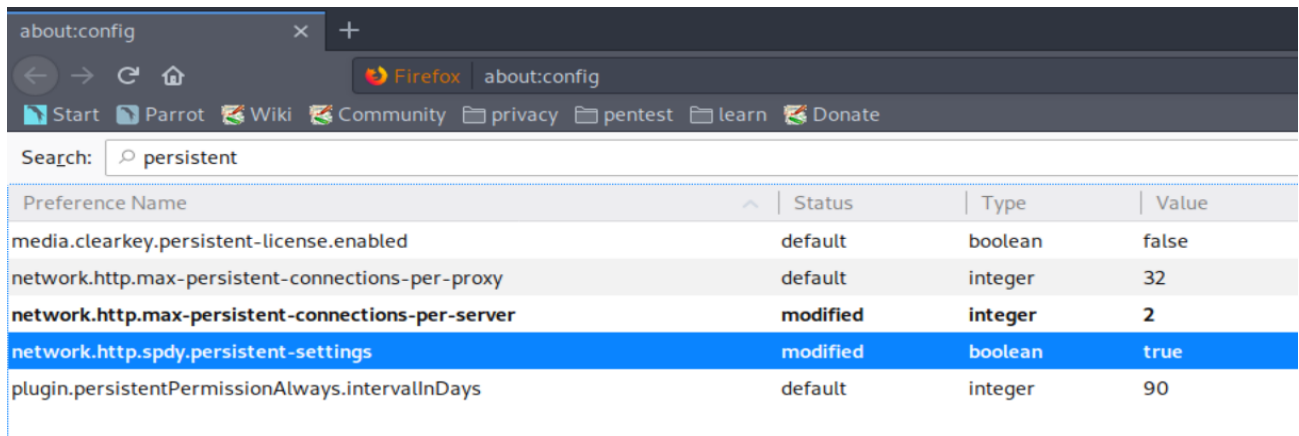
= 0.942930639

3. PERSISTENT CONNECTIONS:

- The spdy.persistent-settings is set to 'true' in all types of persistent connections in the client browser.

3.1: 2 Persistent Connections:

- The value of max-persistent-connections-per-server is set to 2 in the client's machine.



The screenshot shows the Firefox 'about:config' page with a search filter of 'persistent'. The table below lists the relevant configuration preferences.

Preference Name	Status	Type	Value
media.clearkey.persistent-license.enabled	default	boolean	false
network.http.max-persistent-connections-per-proxy	default	integer	32
network.http.max-persistent-connections-per-server	modified	integer	2
network.http.spdy.persistent-settings	modified	boolean	true
plugin.persistentPermissionAlways.intervalInDays	default	integer	90

- Wireshark packet capture:

Capturing from any (sandboxed or root)

File Edit View Go Capture Analyze Statistics Telephony Wireless Tools Help

http

No.	Time	Source	Destination	Protocol	Length	Info
74	65.363060237	10.0.9.50	10.0.9.12	HTTP	405	GET /new.html HTTP/1.1
76	65.363720763	10.0.9.12	10.0.9.50	HTTP	516	HTTP/1.1 200 OK (text/html)
78	65.519671049	10.0.9.50	10.0.9.12	HTTP	362	GET /img1.jpg HTTP/1.1
84	65.520240136	10.0.9.50	10.0.9.12	HTTP	362	GET /img2.jpg HTTP/1.1
393	65.569360555	10.0.9.12	10.0.9.50	HTTP	13523	HTTP/1.1 200 OK (JPEG JFIF image)
416	65.578037734	10.0.9.12	10.0.9.50	HTTP	12531	HTTP/1.1 200 OK (JPEG JFIF image)
418	65.582557931	10.0.9.50	10.0.9.12	HTTP	362	GET /img3.jpg HTTP/1.1
504	65.602335951	10.0.9.50	10.0.9.12	HTTP	362	GET /img4.jpg HTTP/1.1
769	65.697068869	10.0.9.12	10.0.9.50	HTTP	25750	HTTP/1.1 200 OK (JPEG JFIF image)
801	65.700761814	10.0.9.12	10.0.9.50	HTTP	2733	HTTP/1.1 200 OK (JPEG JFIF image)
803	65.725637784	10.0.9.50	10.0.9.12	HTTP	362	GET /img5.jpg HTTP/1.1
902	65.733712297	10.0.9.12	10.0.9.50	HTTP	15007	HTTP/1.1 200 OK (JPEG JFIF image)
904	65.763515111	10.0.9.50	10.0.9.12	HTTP	362	GET /img6.jpg HTTP/1.1
1007	65.787263228	10.0.9.12	10.0.9.50	HTTP	25382	HTTP/1.1 200 OK (JPEG JFIF image)
1009	65.801514482	10.0.9.50	10.0.9.12	HTTP	362	GET /img7.jpg HTTP/1.1
1010	65.802041073	10.0.9.50	10.0.9.12	HTTP	362	GET /img8.jpg HTTP/1.1
1316	65.936620518	10.0.9.12	10.0.9.50	HTTP	10919	HTTP/1.1 200 OK (JPEG JFIF image)
1319	65.942479195	10.0.9.50	10.0.9.12	HTTP	362	GET /img9.jpg HTTP/1.1
1424	65.988300445	10.0.9.12	10.0.9.50	HTTP	1523	HTTP/1.1 200 OK (JPEG JFIF image)
1432	66.003420683	10.0.9.50	10.0.9.12	HTTP	363	GET /img10.jpg HTTP/1.1
1840	66.102977815	10.0.9.12	10.0.9.50	HTTP	12350	HTTP/1.1 200 OK (JPEG JFIF image)
1843	66.103538005	10.0.9.12	10.0.9.50	HTTP	3417	HTTP/1.1 200 OK (JPEG JFIF image)
1846	66.369058960	10.0.9.50	10.0.9.12	HTTP	329	GET /favicon.ico HTTP/1.1
1847	66.369636177	10.0.9.12	10.0.9.50	HTTP	555	HTTP/1.1 404 Not Found (text/html)

Time to capture all the 10 images =

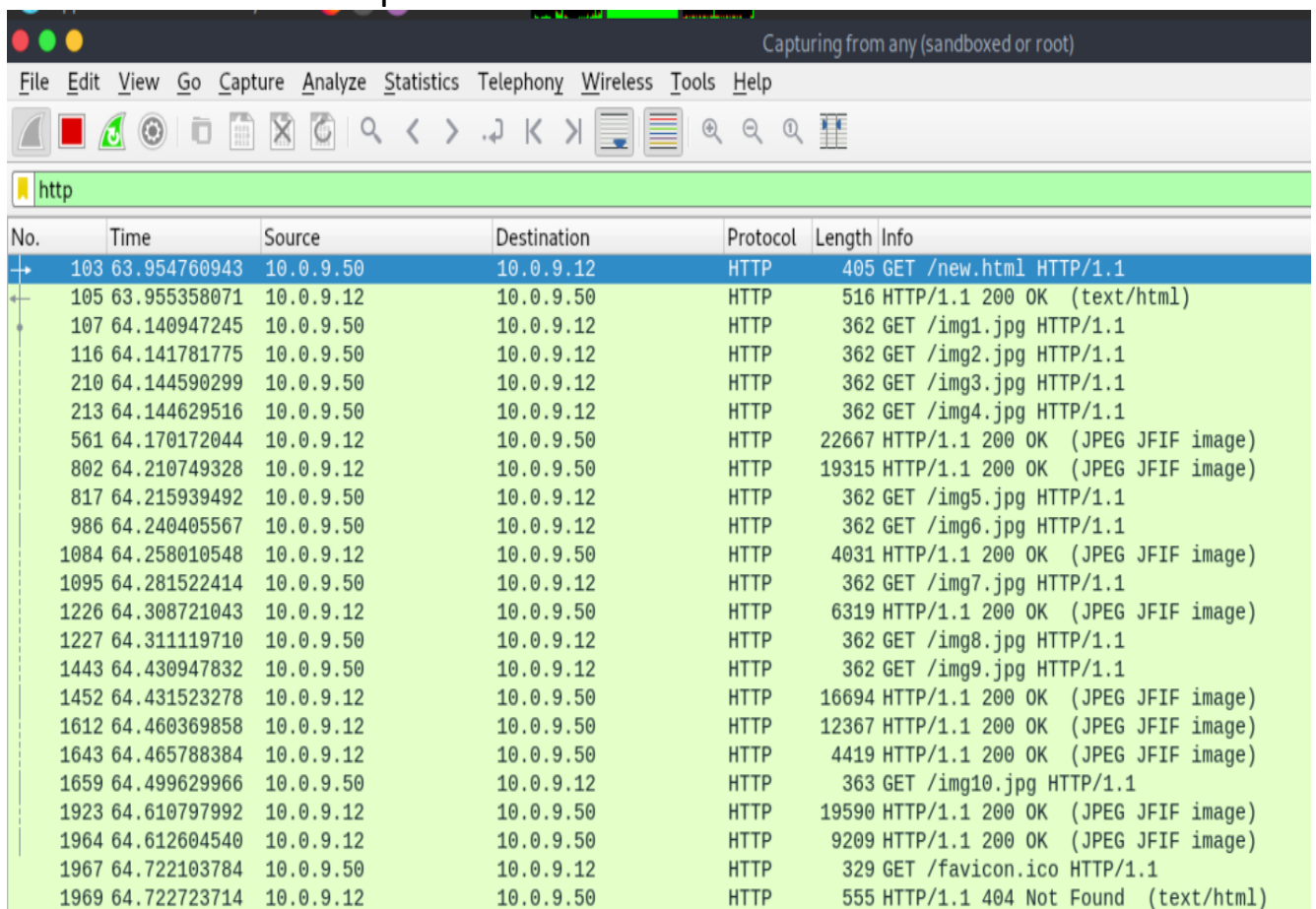
$$\begin{aligned}
 &\text{Time at last Response-Time at first GET request} \\
 &= 66.103538005 - 65.363060237 \\
 &= 0.740477768
 \end{aligned}$$

3.2: 4 Persistent Connections:

- The value of max-persistent-connections-per-server is set to 4 in the client's machine.

Preference Name	Status	Type	Value
media.clearkey.persistent-license.enabled	default	boolean	false
network.http.max-persistent-connections-per-proxy	default	integer	32
network.http.max-persistent-connections-per-server	modified	integer	4
network.http.spdy.persistent-settings	modified	boolean	true
plugin.persistentPermissionAlways.intervallnDays	default	integer	90

- Wireshark Packet Capture:



No.	Time	Source	Destination	Protocol	Length	Info
103	63.954760943	10.0.9.50	10.0.9.12	HTTP	405	GET /new.html HTTP/1.1
105	63.955358071	10.0.9.12	10.0.9.50	HTTP	516	HTTP/1.1 200 OK (text/html)
107	64.140947245	10.0.9.50	10.0.9.12	HTTP	362	GET /img1.jpg HTTP/1.1
116	64.141781775	10.0.9.50	10.0.9.12	HTTP	362	GET /img2.jpg HTTP/1.1
210	64.144590299	10.0.9.50	10.0.9.12	HTTP	362	GET /img3.jpg HTTP/1.1
213	64.144629516	10.0.9.50	10.0.9.12	HTTP	362	GET /img4.jpg HTTP/1.1
561	64.170172044	10.0.9.12	10.0.9.50	HTTP	22667	HTTP/1.1 200 OK (JPEG JFIF image)
802	64.210749328	10.0.9.12	10.0.9.50	HTTP	19315	HTTP/1.1 200 OK (JPEG JFIF image)
817	64.215939492	10.0.9.50	10.0.9.12	HTTP	362	GET /img5.jpg HTTP/1.1
986	64.240405567	10.0.9.50	10.0.9.12	HTTP	362	GET /img6.jpg HTTP/1.1
1084	64.258010548	10.0.9.12	10.0.9.50	HTTP	4031	HTTP/1.1 200 OK (JPEG JFIF image)
1095	64.281522414	10.0.9.50	10.0.9.12	HTTP	362	GET /img7.jpg HTTP/1.1
1226	64.308721043	10.0.9.12	10.0.9.50	HTTP	6319	HTTP/1.1 200 OK (JPEG JFIF image)
1227	64.311119710	10.0.9.50	10.0.9.12	HTTP	362	GET /img8.jpg HTTP/1.1
1443	64.430947832	10.0.9.50	10.0.9.12	HTTP	362	GET /img9.jpg HTTP/1.1
1452	64.431523278	10.0.9.12	10.0.9.50	HTTP	16694	HTTP/1.1 200 OK (JPEG JFIF image)
1612	64.460369858	10.0.9.12	10.0.9.50	HTTP	12367	HTTP/1.1 200 OK (JPEG JFIF image)
1643	64.465788384	10.0.9.12	10.0.9.50	HTTP	4419	HTTP/1.1 200 OK (JPEG JFIF image)
1659	64.499629966	10.0.9.50	10.0.9.12	HTTP	363	GET /img10.jpg HTTP/1.1
1923	64.610797992	10.0.9.12	10.0.9.50	HTTP	19590	HTTP/1.1 200 OK (JPEG JFIF image)
1964	64.612604540	10.0.9.12	10.0.9.50	HTTP	9209	HTTP/1.1 200 OK (JPEG JFIF image)
1967	64.722103784	10.0.9.50	10.0.9.12	HTTP	329	GET /favicon.ico HTTP/1.1
1969	64.722723714	10.0.9.12	10.0.9.50	HTTP	555	HTTP/1.1 404 Not Found (text/html)

Time to capture all the 10 images = Time at last Response-Time at first GET request
=64.612604540-63.954760943
= 0.657843597

3.3: 6 Persistent Connections:

- The value of max-persistent-connections-per-server is set to 6 in the client's machine.

Search:

Preference Name	Status	Type	Value
media.clearkey.persistent-license.enabled	default	boolean	false
network.http.max-persistent-connections-per-proxy	default	integer	32
network.http.max-persistent-connections-per-server	default	integer	6
network.http.spdy.persistent-settings	modified	boolean	true
plugin.persistentPermissionAlways.intervalInDays	default	integer	90

- Wireshark Packet Capture:

Capturing from any (sandboxed or root)

File Edit View Go Capture Analyze Statistics Telephony Wireless Tools Help

http

No.	Time	Source	Destination	Protocol	Length	Info
63	9.691070035	10.0.9.50	10.0.9.12	HTTP	405	GET /new.html HTTP/1.1
65	9.691714391	10.0.9.12	10.0.9.50	HTTP	516	HTTP/1.1 200 OK (text/html)
67	9.873094669	10.0.9.50	10.0.9.12	HTTP	362	GET /img1.jpg HTTP/1.1
113	9.876754503	10.0.9.50	10.0.9.12	HTTP	362	GET /img2.jpg HTTP/1.1
145	9.877772340	10.0.9.50	10.0.9.12	HTTP	362	GET /img4.jpg HTTP/1.1
146	9.877831245	10.0.9.50	10.0.9.12	HTTP	362	GET /img3.jpg HTTP/1.1
147	9.877868448	10.0.9.50	10.0.9.12	HTTP	362	GET /img5.jpg HTTP/1.1
148	9.877901825	10.0.9.50	10.0.9.12	HTTP	362	GET /img6.jpg HTTP/1.1
439	9.888420023	10.0.9.12	10.0.9.50	HTTP	13315	HTTP/1.1 200 OK (JPEG JFIF image)
821	9.908875207	10.0.9.12	10.0.9.50	HTTP	4872	HTTP/1.1 200 OK (JPEG JFIF image)
927	9.914368242	10.0.9.12	10.0.9.50	HTTP	2999	HTTP/1.1 200 OK (JPEG JFIF image)
985	9.920038985	10.0.9.12	10.0.9.50	HTTP	4182	HTTP/1.1 200 OK (JPEG JFIF image)
1244	9.952217801	10.0.9.12	10.0.9.50	HTTP	8259	HTTP/1.1 200 OK (JPEG JFIF image)
1247	9.965955438	10.0.9.50	10.0.9.12	HTTP	362	GET /img7.jpg HTTP/1.1
1248	9.966065482	10.0.9.50	10.0.9.12	HTTP	362	GET /img8.jpg HTTP/1.1
1407	9.982526329	10.0.9.12	10.0.9.50	HTTP	22503	HTTP/1.1 200 OK (JPEG JFIF image)
1477	9.996449288	10.0.9.12	10.0.9.50	HTTP	9823	HTTP/1.1 200 OK (JPEG JFIF image)
1479	9.997029855	10.0.9.50	10.0.9.12	HTTP	362	GET /img9.jpg HTTP/1.1
1571	10.027029025	10.0.9.50	10.0.9.12	HTTP	363	GET /img10.jpg HTTP/1.1
1713	10.036793792	10.0.9.12	10.0.9.50	HTTP	42513	HTTP/1.1 200 OK (JPEG JFIF image)
1879	10.236309243	10.0.9.12	10.0.9.50	HTTP	5867	HTTP/1.1 200 OK (JPEG JFIF image)
1985	10.253054272	10.0.9.12	10.0.9.50	HTTP	26830	HTTP/1.1 200 OK (JPEG JFIF image)
1988	10.364052067	10.0.9.50	10.0.9.12	HTTP	329	GET /favicon.ico HTTP/1.1
1990	10.364637141	10.0.9.12	10.0.9.50	HTTP	555	HTTP/1.1 404 Not Found (text/html)

Time to capture all the 10 images =

Time at last Response-Time at first GET request

= 10.253054272-9.691070035

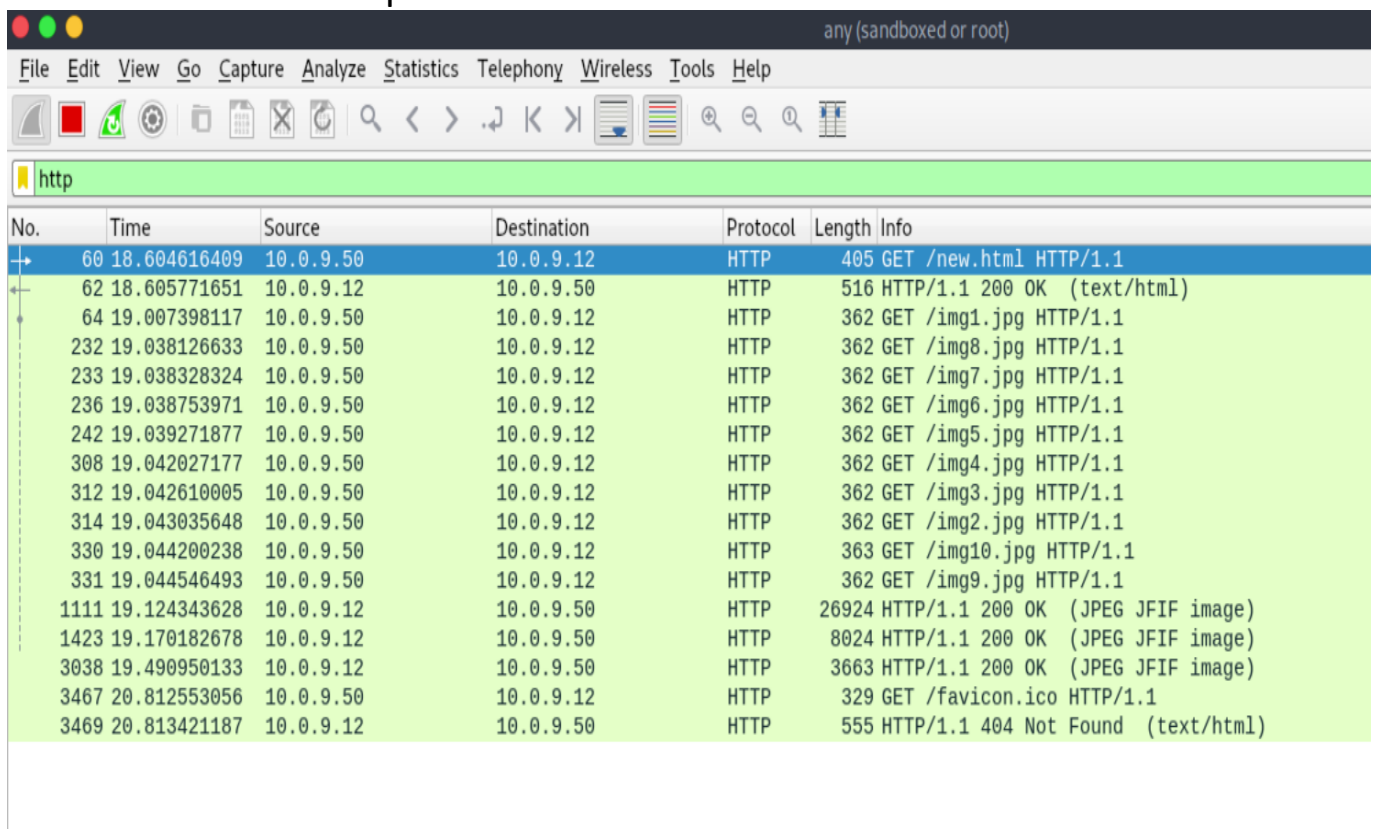
= 0.561984237

3.4: 10 Persistent Connections:

- The value of max-persistent-connections-per-server is set to 10 in the client's machine.

media.clearkey.persistent-license.enabled	default	boolean	false
network.http.max-persistent-connections-per-proxy	default	integer	32
network.http.max-persistent-connections-per-server	modified	integer	10
network.http.spdy.persistent-settings	modified	boolean	true
plugin.persistentPermissionAlways.intervallnDays	default	integer	90

- Wireshark Packet Capture:



No.	Time	Source	Destination	Protocol	Length	Info
60	18.604616409	10.0.9.50	10.0.9.12	HTTP	405	GET /new.html HTTP/1.1
62	18.605771651	10.0.9.12	10.0.9.50	HTTP	516	HTTP/1.1 200 OK (text/html)
64	19.007398117	10.0.9.50	10.0.9.12	HTTP	362	GET /img1.jpg HTTP/1.1
232	19.038126633	10.0.9.50	10.0.9.12	HTTP	362	GET /img8.jpg HTTP/1.1
233	19.038328324	10.0.9.50	10.0.9.12	HTTP	362	GET /img7.jpg HTTP/1.1
236	19.038753971	10.0.9.50	10.0.9.12	HTTP	362	GET /img6.jpg HTTP/1.1
242	19.039271877	10.0.9.50	10.0.9.12	HTTP	362	GET /img5.jpg HTTP/1.1
308	19.042027177	10.0.9.50	10.0.9.12	HTTP	362	GET /img4.jpg HTTP/1.1
312	19.042610005	10.0.9.50	10.0.9.12	HTTP	362	GET /img3.jpg HTTP/1.1
314	19.043035648	10.0.9.50	10.0.9.12	HTTP	362	GET /img2.jpg HTTP/1.1
330	19.044200238	10.0.9.50	10.0.9.12	HTTP	363	GET /img10.jpg HTTP/1.1
331	19.044546493	10.0.9.50	10.0.9.12	HTTP	362	GET /img9.jpg HTTP/1.1
1111	19.124343628	10.0.9.12	10.0.9.50	HTTP	26924	HTTP/1.1 200 OK (JPEG JFIF image)
1423	19.170182678	10.0.9.12	10.0.9.50	HTTP	8024	HTTP/1.1 200 OK (JPEG JFIF image)
3038	19.490950133	10.0.9.12	10.0.9.50	HTTP	3663	HTTP/1.1 200 OK (JPEG JFIF image)
3467	20.812553056	10.0.9.50	10.0.9.12	HTTP	329	GET /favicon.ico HTTP/1.1
3469	20.813421187	10.0.9.12	10.0.9.50	HTTP	555	HTTP/1.1 404 Not Found (text/html)

Time to capture all the 10 images=

$$\begin{aligned} & \text{Time at last Response-Time at first GET request} \\ & = 19.490950133 - 18.604616409 \\ & = 0.886333724 \end{aligned}$$

4. Observations:

- To tabulate the times required for different types of connections.

Number of Persistent connections	Time to capture all the 10 images
0 (non-persistent)	0.942930639
2	0.740477768
4	0.657843597
6	0.561984237
10	0.886333724

- The time required to load initially decreases as the number of persistent connections increases. However as the number of persistent connections further increases, the load time also increases.
- From the above table it is clear that the lowest load time corresponds to 6 persistent connections. Therefore, the optimal number of HTTP persistent connections is 6.