Computer Networks Lab – Week 2
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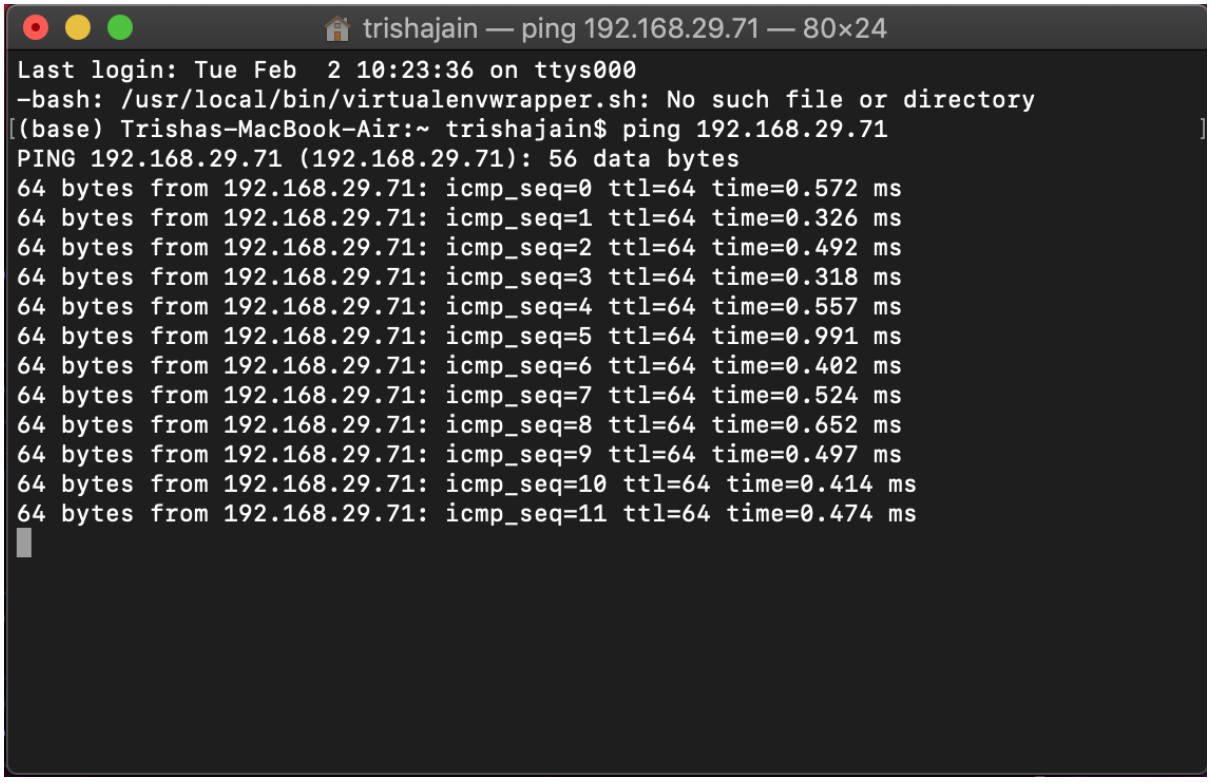
Understanding Persistent and Non-Persistent HTTP Connections

I. Setting up the client and server environments

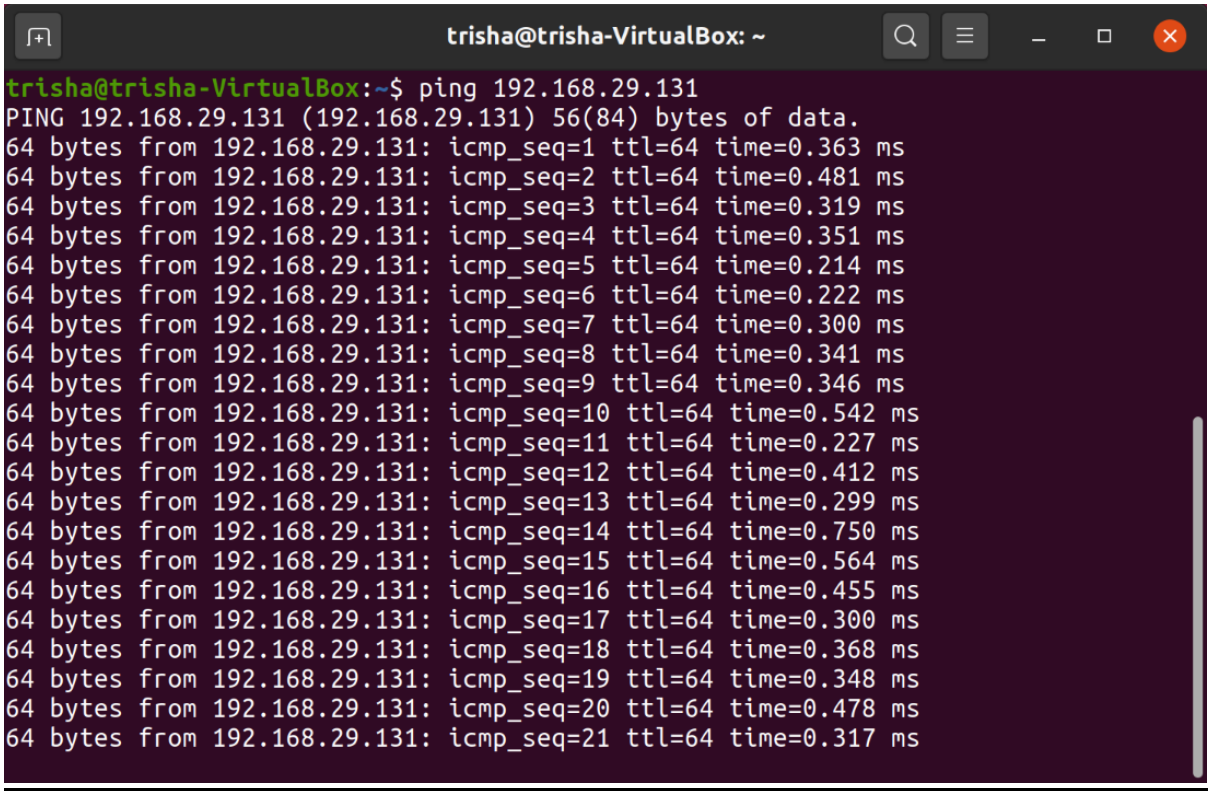
1. The client is the host system and the server is the Virtual Machine.
2. Apache Server was installed on the (server machine) Virtual Machine and a webpage consisting of 10 objects was created.
3. Then the effect of the number of persistent connections on the load time of the webpage was observed.

Client Server Setup :-

CLIENT MACHINE PINGING SERVER MACHINE



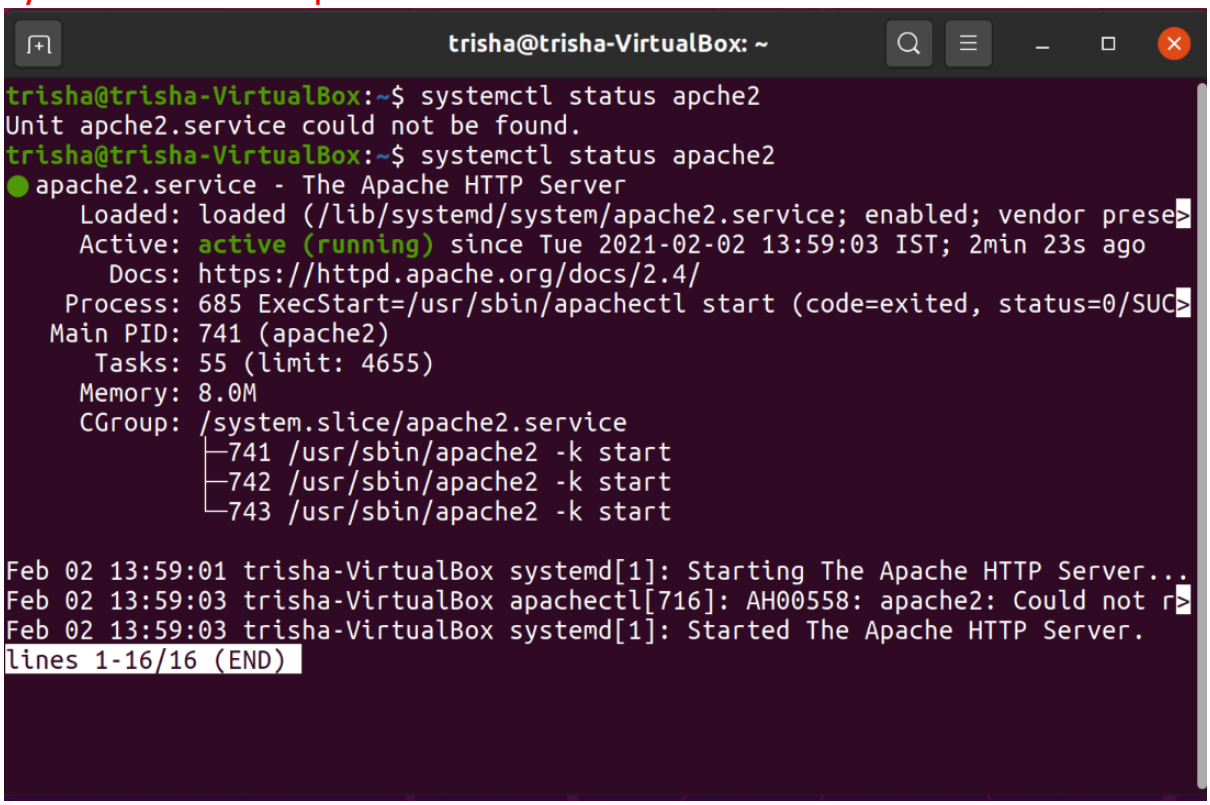
SERVER MACHINE PINGING CLIENT MACHINE



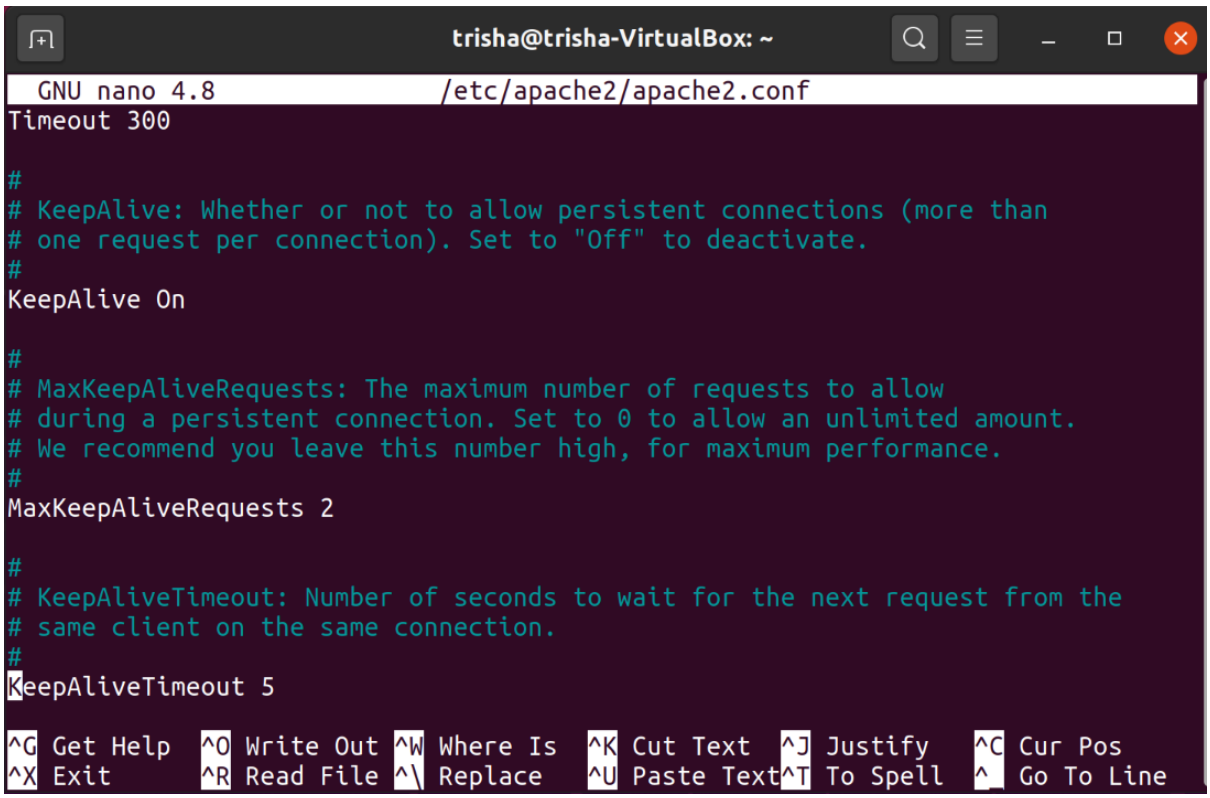
Apache Server Setup:-

The status of the server can be viewed using the command :

systemctl status apache2



Apache server needs to be configured to allow persistent connections. For achieving this, the apache2.conf configuration file is edited : **KeepAlive** to **On** and **MaxKeepAliveRequests** to **2**

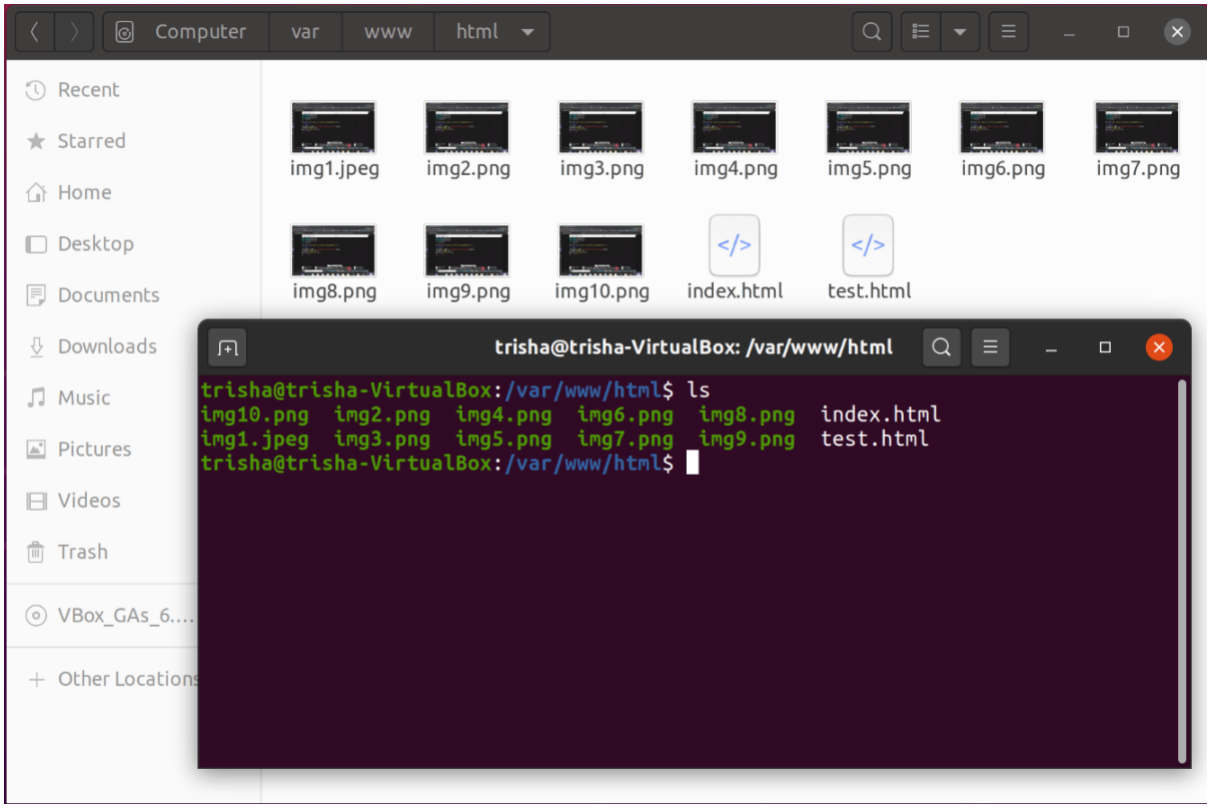


The file was edited using the command:
sudo nano etc/apache2/apache2.cong

Hosting the webpage :-

The webpage is named test.html and has ten images in it. The webpage along with the images are moved to the server path which is /var/www/html/.

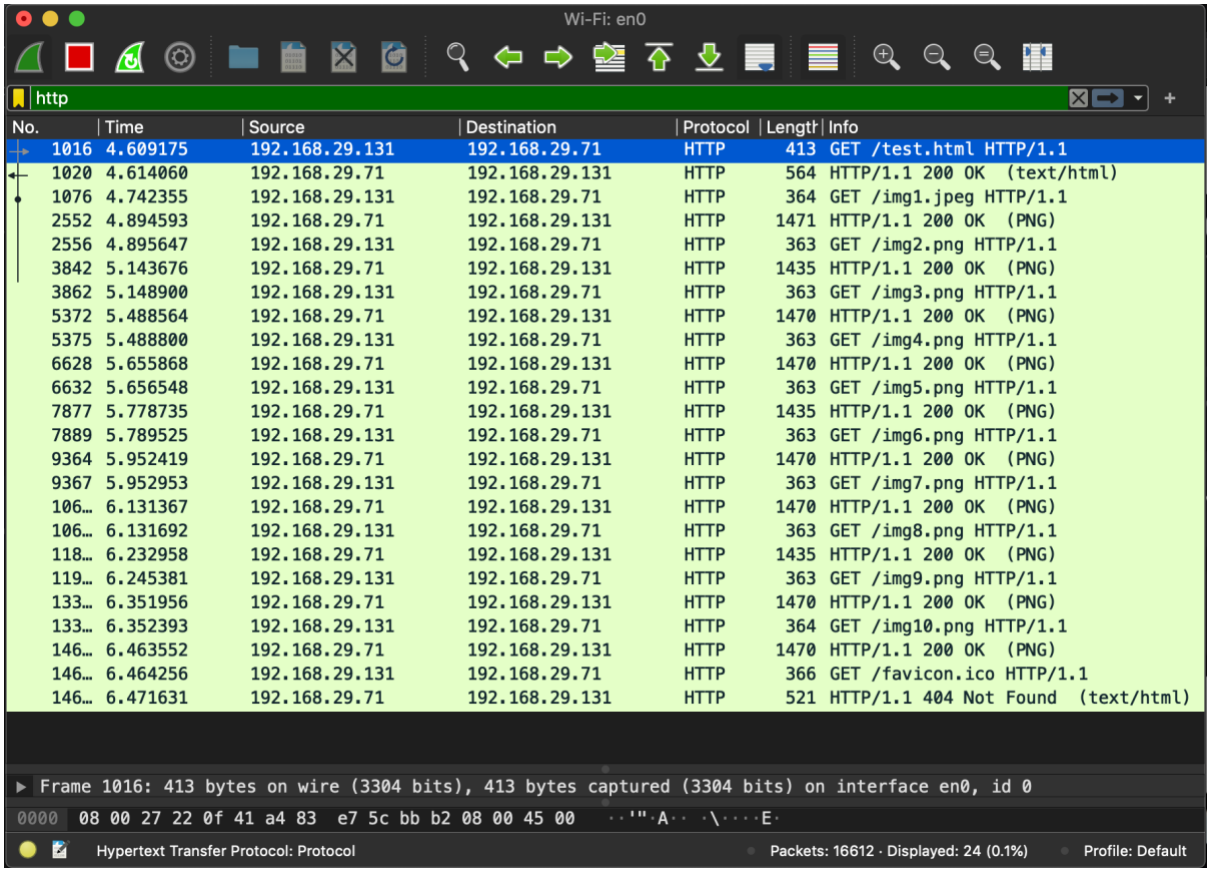
The screenshot below shows the images and the html file present in the path : /var/www/html/.


Computer
var
www
html
Recent
Starred
Home
Desktop
Documents
Downloads
Music
Pictures
Videos
Trash
VBox_GAs_6....
Other Locations
img1.jpeg
img2.png
img3.png
img4.png
img5.png
img6.png
img7.png
img8.png
img9.png
img10.png
index.html
test.html
trisha@trisha-VirtualBox: /var/www/html
trisha@trisha-VirtualBox:/var/www/html$ ls
img10.png img2.png img4.png img6.png img8.png index.html
img1.jpeg img3.png img5.png img7.png img9.png test.html
trisha@trisha-VirtualBox:/var/www/html$

II. Establishing a non - persistent connection

To establish a non-persistent connection we need to set the **max – persistent – connections – per – server** to **0** and **persistent – settings** to **false**

Capturing packets using wireshark for a non-persistent connection :-



Total load time = Last response time - First GET time

= 6.463552 – 4.609175

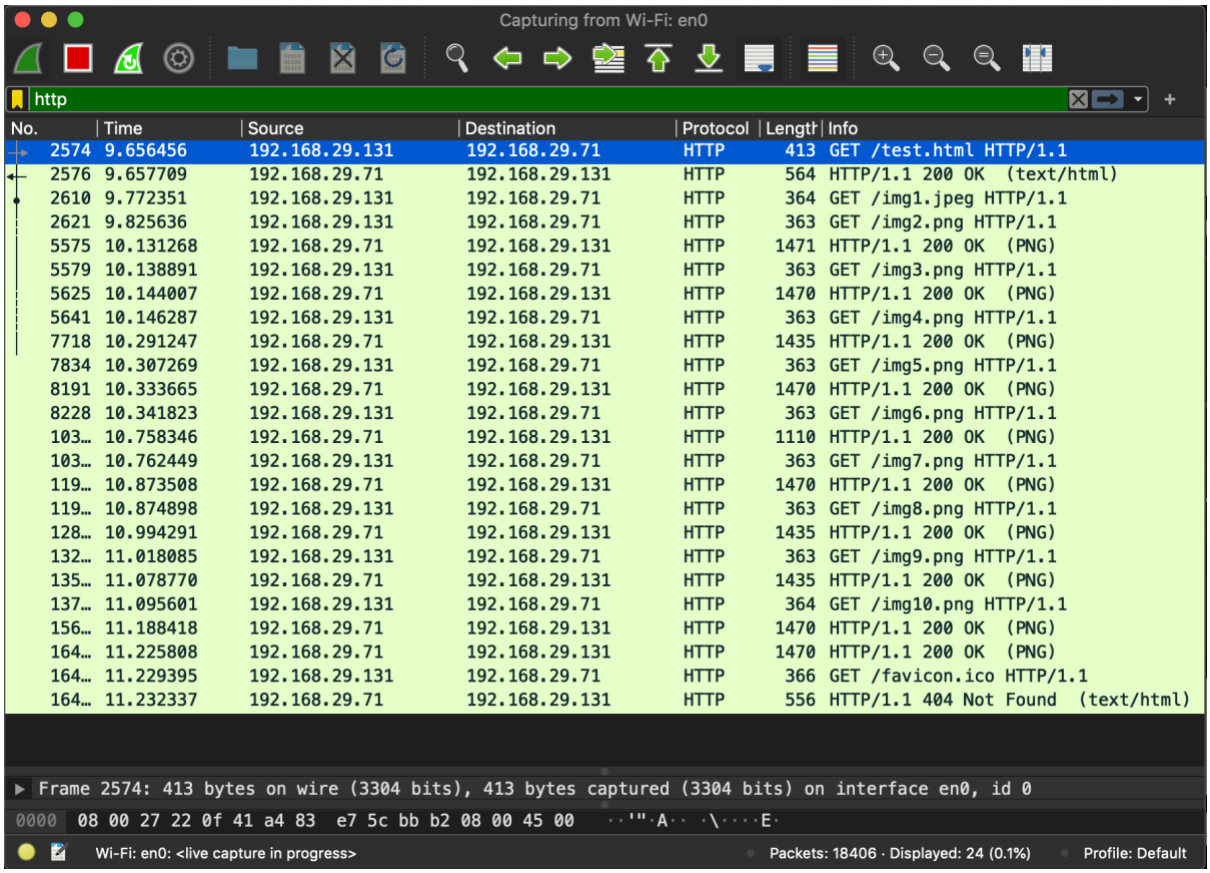
= 1.854377

III. Establishing a persistent connection

To establish a non-persistent connection we need to set the **max – persistent – connections – per – server** to **anything greater than 0** and **persistent – settings** to **true**

1) 2 Persistent Connections

Capturing packets using wireshark for 2 persistent connections :-



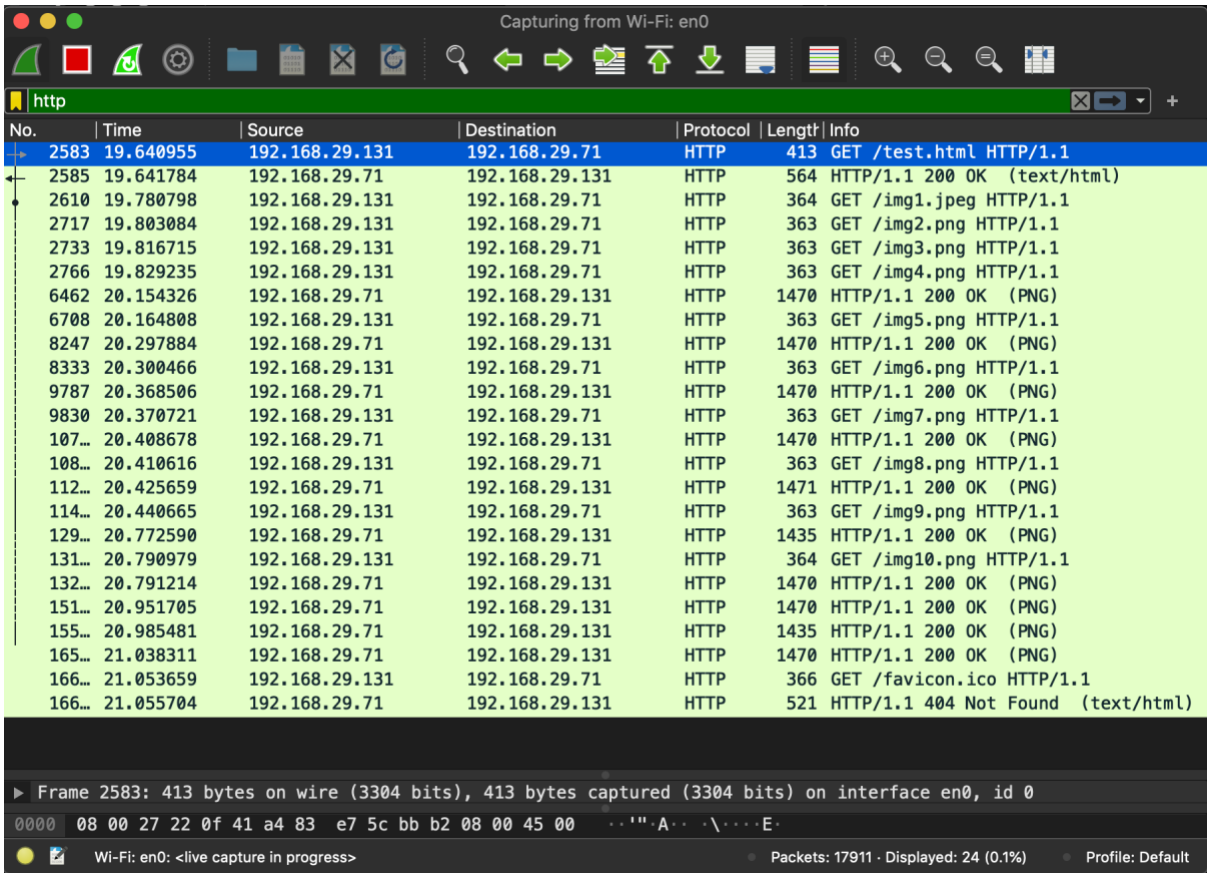
Total load time = Last response time - First GET time

= 11.225808 – 9.656456

= 1.569352

2) 4 Persistent Connections

Capturing packets using wireshark for 4 persistent connections :-



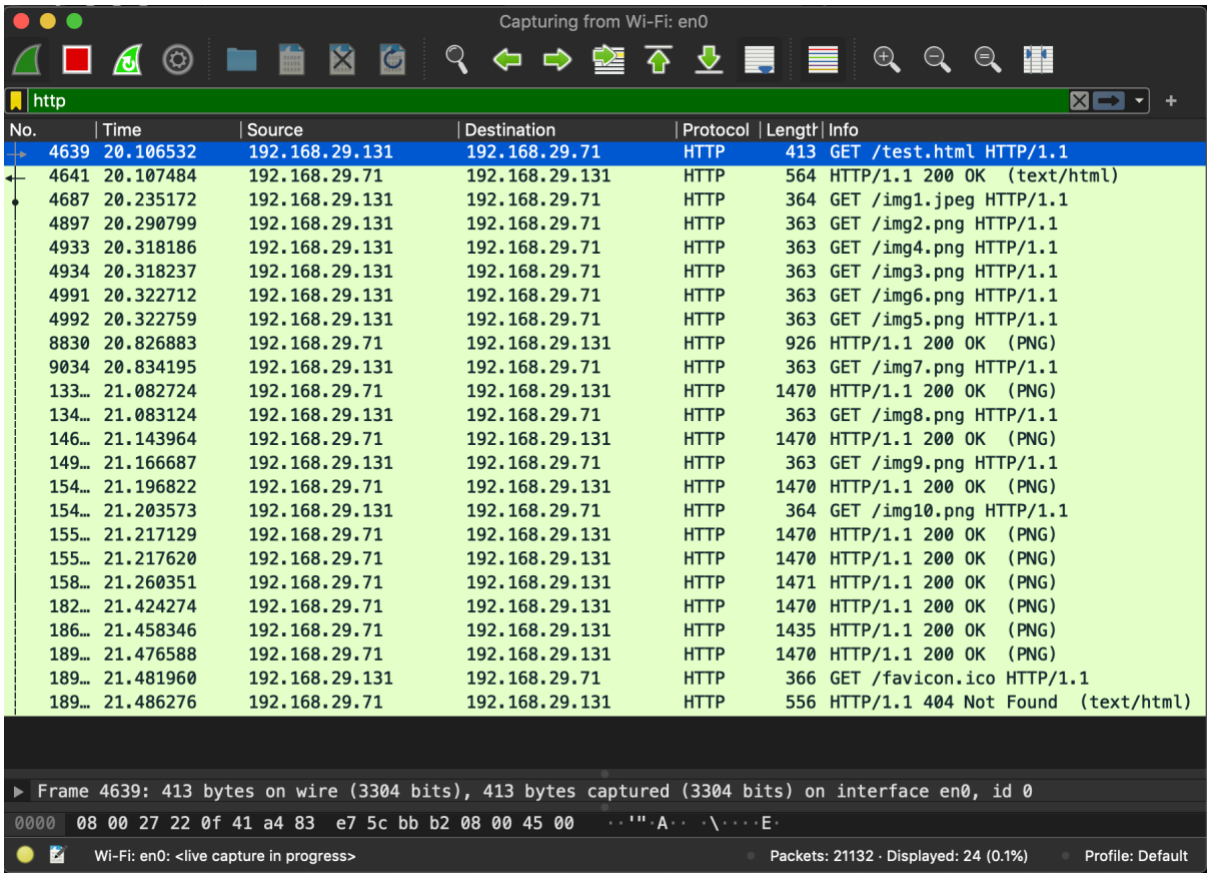
Total load time = Last response time - First GET time

= 21.038311 – 19.640955

= 1.397356

3) 6 Persistent Connections

Capturing packets using wireshark for 6 persistent connections :-



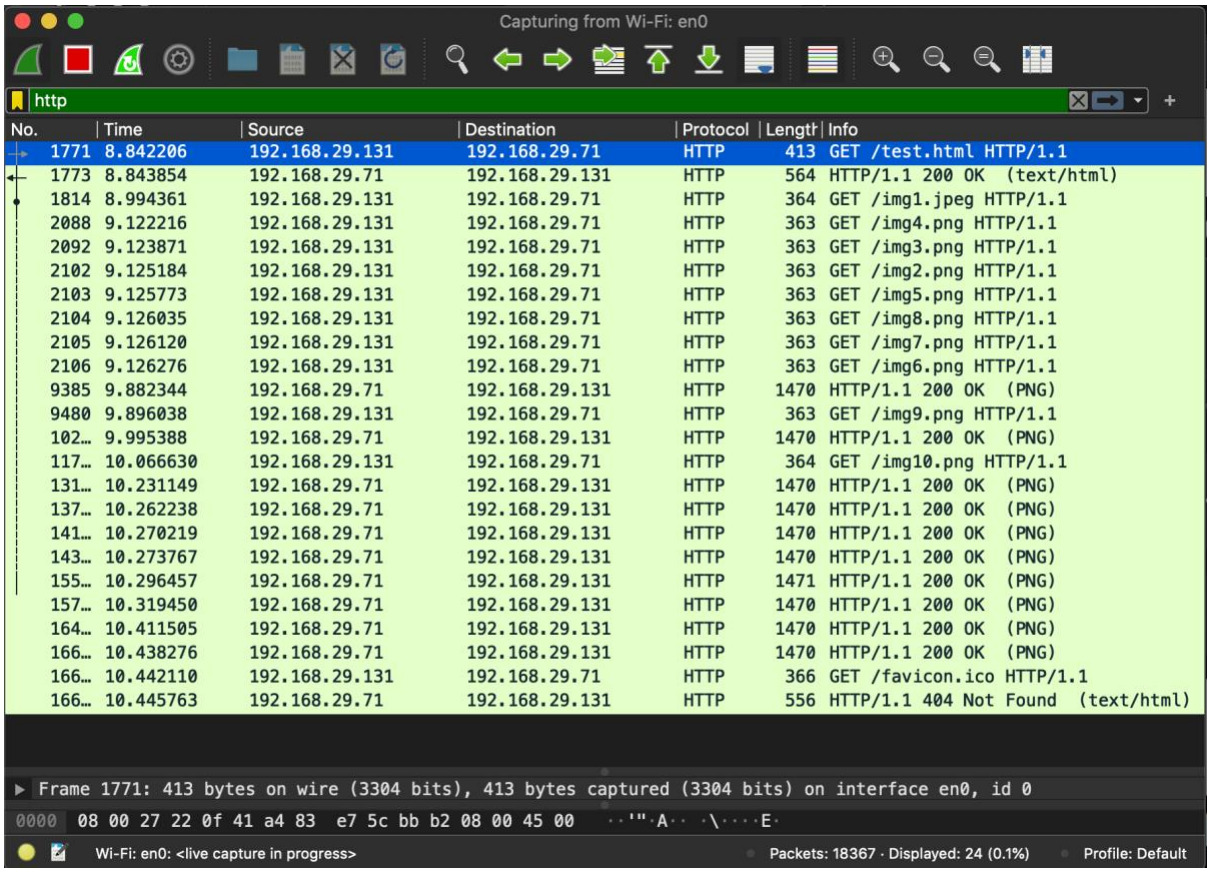
Total load time = Last response time - First GET time

=21.476588 – 20.106532

= 1.370056

4) 8 Persistent Connections

Capturing packets using wireshark for 8 persistent connections :-



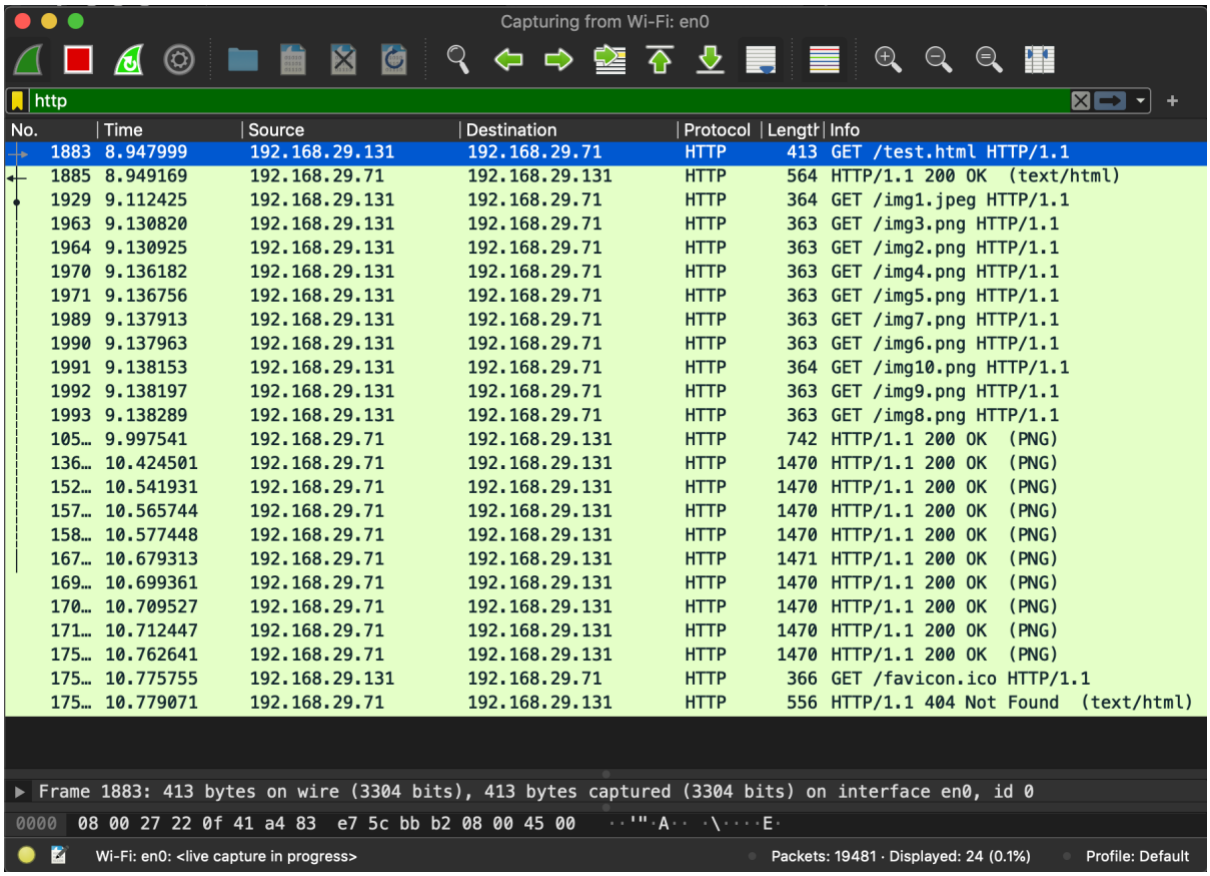
Total load time = Last response time - First GET time

=10.438276 – 8.842206

= 1.59607

5) 10 Persistent Connections

Capturing packets using wireshark for 10 persistent connections :-



Total load time = Last response time - First GET time

= 10.762641 – 8.947999

= 1.81462

Load time for different persistent connections :-

Number of persistent connections	Load Time
0	1.854377
2	1.569352
4	1.397356
6	1.370056
8	1.59607
10	1.814642

Observations:-

From the table above we observer that the *load time decreases as we increase the number of persistent connections.*

This is because persistent connections enables *pipelining* the HTTP requests and response in a connection which in turn *allows a client to make requests without waiting for a response.*

Therefore persistent connections allow the clients to make *multiple image requests without having to wait for the response.*

But as we increase the number of persistent connections at a point the load time increases in spite of having multiple persistent connections. This happens because of *decrease in throughput*. Many persistent connections cause the server to become *overloaded*.

Therefore it is not advisable to increase the number of persistent connections by a large number.

From the table shown above it is clear that the *load time is minimum when the number of persistent connections are 6.* Therefore the *optimal number of persistent connections is 6.*

And the time taken to load images for 2, 4, 6 persistent connections lesser than 10 persistent connections.