



PES UNIVERSITY

Department of Computer Science & Engineering

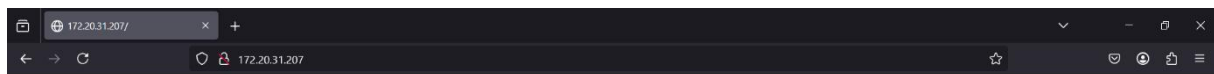
Computer Networks Lab

UE23CS252B

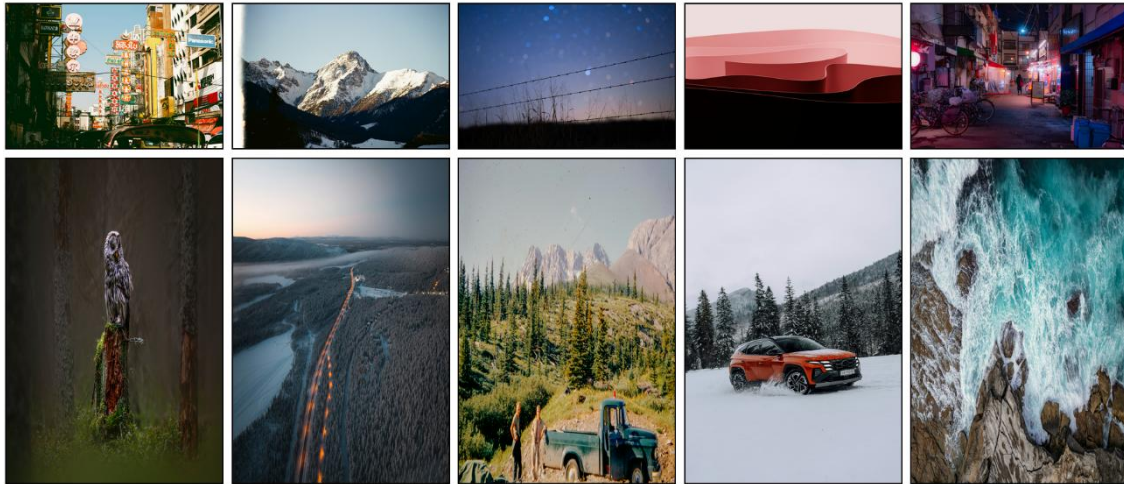
LAB 2 submission

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Section	C
Department	CSE
Campus	RR

‘Understanding Persistent and Non-persistent HTTP Connection’



Persistent vs Non-Persistent HTTP



Q1. Non-persistent connection Wireshark capture (should include all 10 images)

Nonper.pcapng					
File Edit View Go Capture Analyze Statistics Telephony Wireless Tools Help					
http					
No.	Time	Source	Destination	Protocol	Length Info
4	0.001119	172.20.16.1	172.20.31.207	HTTP	489 GET / HTTP/1.1
6	0.006003	172.20.31.207	172.20.16.1	HTTP	3727 HTTP/1.1 200 OK (text/html)
14	3.127179	172.20.16.1	172.20.31.207	HTTP	440 GET / HTTP/1.1
16	3.132787	172.20.31.207	172.20.16.1	HTTP	3727 HTTP/1.1 200 OK (text/html)
18	3.204452	172.20.16.1	172.20.31.207	HTTP	459 GET /image01.jpg HTTP/1.1
202	3.316532	172.20.31.207	172.20.16.1	HTTP	7761 HTTP/1.1 200 OK (JPEG JFIF image)
204	3.324659	172.20.16.1	172.20.31.207	HTTP	459 GET /image02.jpg HTTP/1.1
353	3.451602	172.20.31.207	172.20.16.1	HTTP	2463 HTTP/1.1 200 OK (JPEG JFIF image)
356	3.478305	172.20.16.1	172.20.31.207	HTTP	459 GET /image03.jpg HTTP/1.1
493	3.540234	172.20.31.207	172.20.16.1	HTTP	49754 HTTP/1.1 200 OK (JPEG JFIF image)
496	3.564917	172.20.16.1	172.20.31.207	HTTP	459 GET /image04.jpg HTTP/1.1
614	3.637408	172.20.31.207	172.20.16.1	HTTP	54178 HTTP/1.1 200 OK (JPEG JFIF image)
617	3.654606	172.20.16.1	172.20.31.207	HTTP	459 GET /image05.jpg HTTP/1.1
700	3.687214	172.20.31.207	172.20.16.1	HTTP	13344 HTTP/1.1 200 OK (JPEG JFIF image)
703	3.743503	172.20.16.1	172.20.31.207	HTTP	459 GET /image06.jpg HTTP/1.1
779	3.773088	172.20.31.207	172.20.16.1	HTTP	59354 HTTP/1.1 200 OK (JPEG JFIF image)
782	3.827166	172.20.16.1	172.20.31.207	HTTP	459 GET /image07.jpg HTTP/1.1
853	3.860107	172.20.31.207	172.20.16.1	HTTP	29276 HTTP/1.1 200 OK (JPEG JFIF image)
856	3.904711	172.20.16.1	172.20.31.207	HTTP	459 GET /image08.jpg HTTP/1.1
915	3.949815	172.20.16.1	172.20.31.207	HTTP	459 GET /image09.jpg HTTP/1.1
963	3.962747	172.20.31.207	172.20.16.1	HTTP	22942 HTTP/1.1 200 OK (JPEG JFIF image)
966	4.004878	172.20.16.1	172.20.31.207	HTTP	459 GET /image10.jpg HTTP/1.1
1010	4.033054	172.20.31.207	172.20.16.1	HTTP	52894 HTTP/1.1 200 OK (JPEG JFIF image)

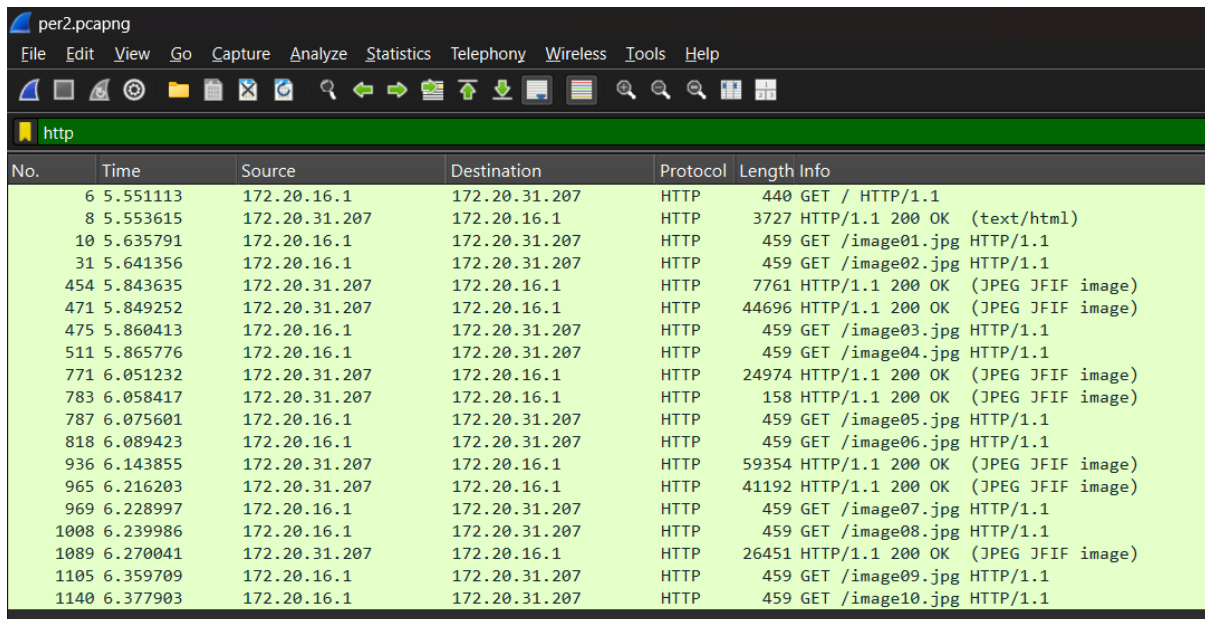
Total Page Load Time = Time of Last Response - Time of First Request

TPLT = 4.033054 – 0.001119

TPLLT = **4.031935 sec**

Q2.Persistent connections Wireshark capture

➤ Persistent = 2



per2.pcapng

File Edit View Go Capture Analyze Statistics Telephony Wireless Tools Help

http

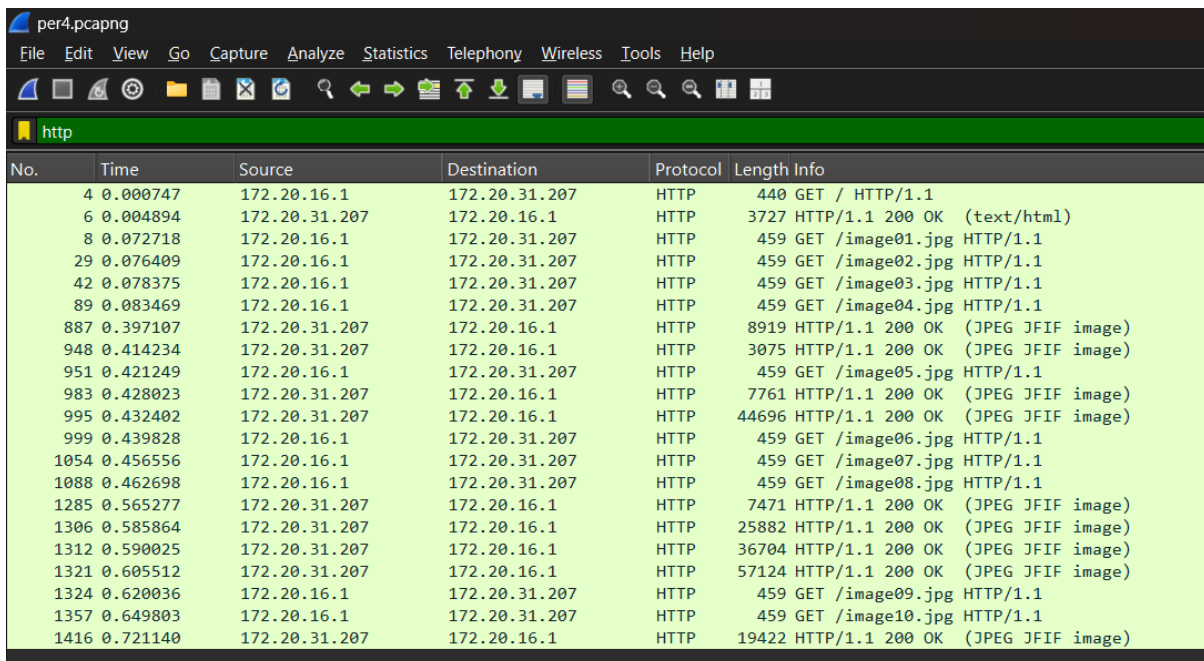
No.	Time	Source	Destination	Protocol	Length	Info
6	5.551113	172.20.16.1	172.20.31.207	HTTP	440	GET / HTTP/1.1
8	5.553615	172.20.31.207	172.20.16.1	HTTP	3727	HTTP/1.1 200 OK (text/html)
10	5.635791	172.20.16.1	172.20.31.207	HTTP	459	GET /image01.jpg HTTP/1.1
31	5.641356	172.20.16.1	172.20.31.207	HTTP	459	GET /image02.jpg HTTP/1.1
454	5.843635	172.20.31.207	172.20.16.1	HTTP	7761	HTTP/1.1 200 OK (JPEG JFIF image)
471	5.849252	172.20.31.207	172.20.16.1	HTTP	44696	HTTP/1.1 200 OK (JPEG JFIF image)
475	5.860413	172.20.16.1	172.20.31.207	HTTP	459	GET /image03.jpg HTTP/1.1
511	5.865776	172.20.16.1	172.20.31.207	HTTP	459	GET /image04.jpg HTTP/1.1
771	6.051232	172.20.31.207	172.20.16.1	HTTP	24974	HTTP/1.1 200 OK (JPEG JFIF image)
783	6.058417	172.20.31.207	172.20.16.1	HTTP	158	HTTP/1.1 200 OK (JPEG JFIF image)
787	6.075601	172.20.16.1	172.20.31.207	HTTP	459	GET /image05.jpg HTTP/1.1
818	6.089423	172.20.16.1	172.20.31.207	HTTP	459	GET /image06.jpg HTTP/1.1
936	6.143855	172.20.31.207	172.20.16.1	HTTP	59354	HTTP/1.1 200 OK (JPEG JFIF image)
965	6.216203	172.20.31.207	172.20.16.1	HTTP	41192	HTTP/1.1 200 OK (JPEG JFIF image)
969	6.228997	172.20.16.1	172.20.31.207	HTTP	459	GET /image07.jpg HTTP/1.1
1008	6.239986	172.20.16.1	172.20.31.207	HTTP	459	GET /image08.jpg HTTP/1.1
1089	6.270041	172.20.31.207	172.20.16.1	HTTP	26451	HTTP/1.1 200 OK (JPEG JFIF image)
1105	6.359709	172.20.16.1	172.20.31.207	HTTP	459	GET /image09.jpg HTTP/1.1
1140	6.377903	172.20.16.1	172.20.31.207	HTTP	459	GET /image10.jpg HTTP/1.1

Total Page Load Time = Time of Last Response - Time of First Request

TPLT = 6.377903 – 5.551113

TPLT = **0.82679 sec**

➤ Persistent = 4



per4.pcapng

File Edit View Go Capture Analyze Statistics Telephony Wireless Tools Help

http

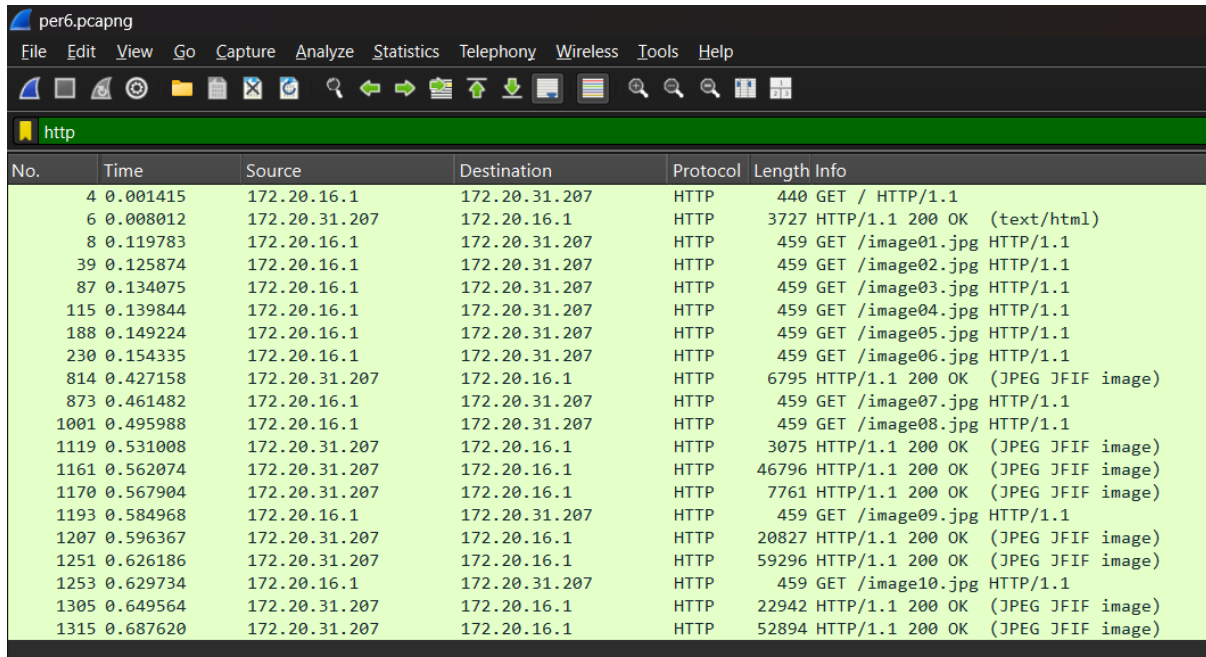
No.	Time	Source	Destination	Protocol	Length	Info
4	0.000747	172.20.16.1	172.20.31.207	HTTP	440	GET / HTTP/1.1
6	0.004894	172.20.31.207	172.20.16.1	HTTP	3727	HTTP/1.1 200 OK (text/html)
8	0.072718	172.20.16.1	172.20.31.207	HTTP	459	GET /image01.jpg HTTP/1.1
29	0.076409	172.20.16.1	172.20.31.207	HTTP	459	GET /image02.jpg HTTP/1.1
42	0.078375	172.20.16.1	172.20.31.207	HTTP	459	GET /image03.jpg HTTP/1.1
89	0.083469	172.20.16.1	172.20.31.207	HTTP	459	GET /image04.jpg HTTP/1.1
887	0.397107	172.20.31.207	172.20.16.1	HTTP	8919	HTTP/1.1 200 OK (JPEG JFIF image)
948	0.414234	172.20.31.207	172.20.16.1	HTTP	3075	HTTP/1.1 200 OK (JPEG JFIF image)
951	0.421249	172.20.16.1	172.20.31.207	HTTP	459	GET /image05.jpg HTTP/1.1
983	0.428023	172.20.31.207	172.20.16.1	HTTP	7761	HTTP/1.1 200 OK (JPEG JFIF image)
995	0.432402	172.20.31.207	172.20.16.1	HTTP	44696	HTTP/1.1 200 OK (JPEG JFIF image)
999	0.439828	172.20.16.1	172.20.31.207	HTTP	459	GET /image06.jpg HTTP/1.1
1054	0.456556	172.20.16.1	172.20.31.207	HTTP	459	GET /image07.jpg HTTP/1.1
1088	0.462698	172.20.16.1	172.20.31.207	HTTP	459	GET /image08.jpg HTTP/1.1
1285	0.565277	172.20.31.207	172.20.16.1	HTTP	7471	HTTP/1.1 200 OK (JPEG JFIF image)
1306	0.585864	172.20.31.207	172.20.16.1	HTTP	25882	HTTP/1.1 200 OK (JPEG JFIF image)
1312	0.590025	172.20.31.207	172.20.16.1	HTTP	36704	HTTP/1.1 200 OK (JPEG JFIF image)
1321	0.605512	172.20.31.207	172.20.16.1	HTTP	57124	HTTP/1.1 200 OK (JPEG JFIF image)
1324	0.620036	172.20.16.1	172.20.31.207	HTTP	459	GET /image09.jpg HTTP/1.1
1357	0.649803	172.20.16.1	172.20.31.207	HTTP	459	GET /image10.jpg HTTP/1.1
1416	0.721140	172.20.31.207	172.20.16.1	HTTP	19422	HTTP/1.1 200 OK (JPEG JFIF image)

Total Page Load Time = Time of Last Response - Time of First Request

TPLT = 0.721140 – 0.000747

TPLT = **0.720393 sec**

➤ Persistent = 6



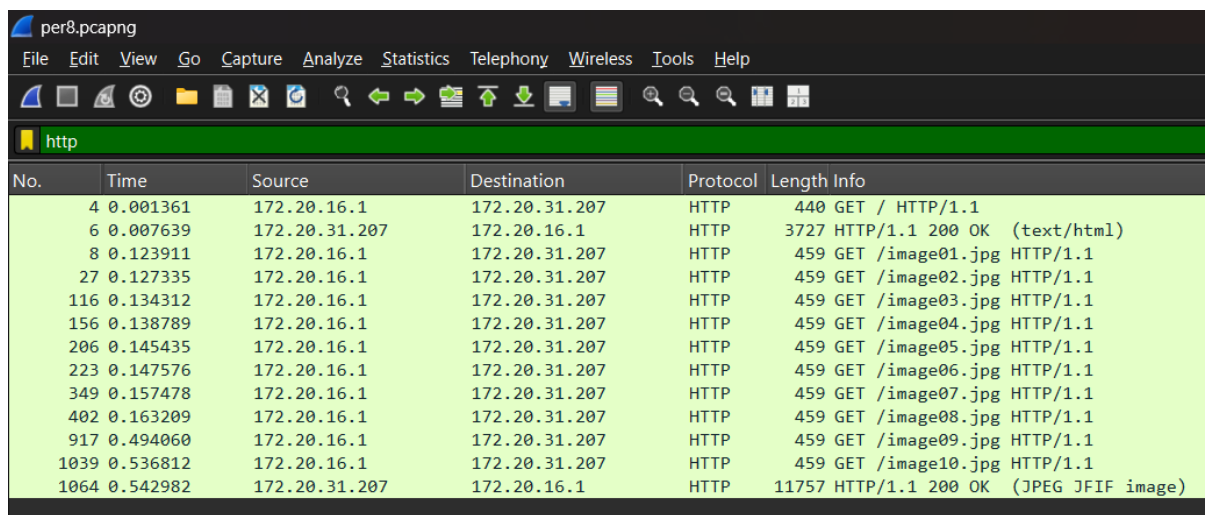
No.	Time	Source	Destination	Protocol	Length	Info
4	0.001415	172.20.16.1	172.20.31.207	HTTP	440	GET / HTTP/1.1
6	0.008012	172.20.31.207	172.20.16.1	HTTP	3727	HTTP/1.1 200 OK (text/html)
8	0.119783	172.20.16.1	172.20.31.207	HTTP	459	GET /image01.jpg HTTP/1.1
39	0.125874	172.20.16.1	172.20.31.207	HTTP	459	GET /image02.jpg HTTP/1.1
87	0.134075	172.20.16.1	172.20.31.207	HTTP	459	GET /image03.jpg HTTP/1.1
115	0.139844	172.20.16.1	172.20.31.207	HTTP	459	GET /image04.jpg HTTP/1.1
188	0.149224	172.20.16.1	172.20.31.207	HTTP	459	GET /image05.jpg HTTP/1.1
230	0.154335	172.20.16.1	172.20.31.207	HTTP	459	GET /image06.jpg HTTP/1.1
814	0.427158	172.20.31.207	172.20.16.1	HTTP	6795	HTTP/1.1 200 OK (JPEG JFIF image)
873	0.461482	172.20.16.1	172.20.31.207	HTTP	459	GET /image07.jpg HTTP/1.1
1001	0.495988	172.20.16.1	172.20.31.207	HTTP	459	GET /image08.jpg HTTP/1.1
1119	0.531008	172.20.31.207	172.20.16.1	HTTP	3075	HTTP/1.1 200 OK (JPEG JFIF image)
1161	0.562074	172.20.31.207	172.20.16.1	HTTP	46796	HTTP/1.1 200 OK (JPEG JFIF image)
1170	0.567904	172.20.31.207	172.20.16.1	HTTP	7761	HTTP/1.1 200 OK (JPEG JFIF image)
1193	0.584968	172.20.16.1	172.20.31.207	HTTP	459	GET /image09.jpg HTTP/1.1
1207	0.596367	172.20.31.207	172.20.16.1	HTTP	20827	HTTP/1.1 200 OK (JPEG JFIF image)
1251	0.626186	172.20.31.207	172.20.16.1	HTTP	59296	HTTP/1.1 200 OK (JPEG JFIF image)
1253	0.629734	172.20.16.1	172.20.31.207	HTTP	459	GET /image10.jpg HTTP/1.1
1305	0.649564	172.20.31.207	172.20.16.1	HTTP	22942	HTTP/1.1 200 OK (JPEG JFIF image)
1315	0.687620	172.20.31.207	172.20.16.1	HTTP	52894	HTTP/1.1 200 OK (JPEG JFIF image)

Total Page Load Time = Time of Last Response - Time of First Request

$$\text{TPLT} = 0.687620 - 0.001415$$

$$\text{TPLT} = \mathbf{0.686205 \text{ sec}}$$

➤ Persistent = 8



No.	Time	Source	Destination	Protocol	Length	Info
4	0.001361	172.20.16.1	172.20.31.207	HTTP	440	GET / HTTP/1.1
6	0.007639	172.20.31.207	172.20.16.1	HTTP	3727	HTTP/1.1 200 OK (text/html)
8	0.123911	172.20.16.1	172.20.31.207	HTTP	459	GET /image01.jpg HTTP/1.1
27	0.127335	172.20.16.1	172.20.31.207	HTTP	459	GET /image02.jpg HTTP/1.1
116	0.134312	172.20.16.1	172.20.31.207	HTTP	459	GET /image03.jpg HTTP/1.1
156	0.138789	172.20.16.1	172.20.31.207	HTTP	459	GET /image04.jpg HTTP/1.1
206	0.145435	172.20.16.1	172.20.31.207	HTTP	459	GET /image05.jpg HTTP/1.1
223	0.147576	172.20.16.1	172.20.31.207	HTTP	459	GET /image06.jpg HTTP/1.1
349	0.157478	172.20.16.1	172.20.31.207	HTTP	459	GET /image07.jpg HTTP/1.1
402	0.163209	172.20.16.1	172.20.31.207	HTTP	459	GET /image08.jpg HTTP/1.1
917	0.494060	172.20.16.1	172.20.31.207	HTTP	459	GET /image09.jpg HTTP/1.1
1039	0.536812	172.20.16.1	172.20.31.207	HTTP	459	GET /image10.jpg HTTP/1.1
1064	0.542982	172.20.31.207	172.20.16.1	HTTP	11757	HTTP/1.1 200 OK (JPEG JFIF image)

Total Page Load Time = Time of Last Response - Time of First Request

$$\text{TPLT} = 0.542982 - 0.001361$$

$$\text{TPLT} = \mathbf{0.541621 \text{ sec}}$$

➤ Persistent = 10

No.	Time	Source	Destination	Protocol	Length	Info
4	0.001213	172.20.16.1	172.20.31.207	HTTP	440	GET / HTTP/1.1
6	0.004126	172.20.31.207	172.20.16.1	HTTP	3727	HTTP/1.1 200 OK (text/html)
8	0.086956	172.20.16.1	172.20.31.207	HTTP	459	GET /image01.jpg HTTP/1.1
45	0.094862	172.20.16.1	172.20.31.207	HTTP	459	GET /image02.jpg HTTP/1.1
100	0.101914	172.20.16.1	172.20.31.207	HTTP	459	GET /image03.jpg HTTP/1.1
146	0.109006	172.20.16.1	172.20.31.207	HTTP	459	GET /image04.jpg HTTP/1.1
244	0.122672	172.20.16.1	172.20.31.207	HTTP	459	GET /image05.jpg HTTP/1.1
297	0.133290	172.20.16.1	172.20.31.207	HTTP	459	GET /image06.jpg HTTP/1.1
382	0.146515	172.20.16.1	172.20.31.207	HTTP	459	GET /image07.jpg HTTP/1.1
452	0.157067	172.20.16.1	172.20.31.207	HTTP	459	GET /image08.jpg HTTP/1.1
525	0.169491	172.20.16.1	172.20.31.207	HTTP	459	GET /image09.jpg HTTP/1.1
580	0.174936	172.20.16.1	172.20.31.207	HTTP	459	GET /image10.jpg HTTP/1.1
1112	0.516841	172.20.31.207	172.20.16.1	HTTP	14772	HTTP/1.1 200 OK (JPEG JFIF image)
1369	0.739528	172.20.31.207	172.20.16.1	HTTP	7761	HTTP/1.1 200 OK (JPEG JFIF image)

Total Page Load Time = Time of Last Response - Time of First Request

TPLT = 0.739528 – 0.001213

TPLT = **0.738315 sec**

NOTE : There is increase in TPLT at this point

Persistent	TPLT
2	0.82
4	0.72
6	0.68
8	0.54
10	0.74
12	0.76
14	0.82

Q3. The optimal number of HTTP persistent connections based on your observations.

Persistent=8 is optimal, increasing it further (P=10) might not improve parallelism but instead introduce inefficiencies.

THANK YOU