

## Assignment 5 : Socket Programming

Step 4: Compare their performance in terms of time to download by providing the average time

We have used <sys/time.h> and gettimeofday() to measure the time between GET Request and Receiving the objects of the entire text file.

```
zootaxa.info/sites/zootaxa.info/files/picture-35.jpg
path :sites/zootaxa.info/files/picture-35.jpg
Sending data ...
Data sent.
Receiving data...

HTTP/1.1 200 OK
Begin HEADER ..
--Date: Tue, 05 Oct 2021 10:12:28 GMT
Server: Apache
ETag: "353c-4d9f034705c80"
Expires: Thu, 04 Nov 2021 20:12:28 GMT
Cache-Control: max-age=2628000
X-Content-Type-Options: nosniff
Last-Modified: Tue, 09 Apr 2013 16:40:02 GMT
Content-Length: 13628
Content-Type: image/jpeg
X-Varnish: 288654191 288751842
Age: 200
Via: 1.1 varnish-v4
grace: none
Connection: keep-alive
Accept-Ranges: bytes
--***type:jpeg***Content-Length: 13628
End HEADER ..

--@@@ File created as test_2.jpeg @@@--
Saving data...

Bytes recieved: 1024
Bytes recieved: 2048
Bytes recieved: 3072
Bytes recieved: 3652
Bytes recieved: 4676
Bytes recieved: 5010
Bytes recieved: 6034
Bytes recieved: 6368
Bytes recieved: 7392
Bytes recieved: 8416
Bytes recieved: 9084
Bytes recieved: 10108
Bytes recieved: 11132
Bytes recieved: 11800
Bytes recieved: 12824
Bytes recieved: 13158
Bytes recieved: 13628

Done.
Total time = 0.396933 seconds
```

Wireshark - Packet 729 - wlo1

```
HTTP/1.1 200 OK\r\n
Date: Tue, 05 Oct 2021 10:12:28 GMT\r\n
Server: Apache\r\n
ETag: "353c-4d9f034705c80"\r\n
Expires: Thu, 04 Nov 2021 20:12:28 GMT\r\n
Cache-Control: max-age=2628000\r\n
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Content-Length: 13628\r\n
Content-Type: image/jpeg\r\n
X-Varnish: 288654191 288751842\r\n
Age: 200\r\n
Via: 1.1 varnish-v4\r\n
grace: none\r\n
Connection: keep-alive\r\n
Accept-Ranges: bytes\r\n
\r\n
```

Fig : Shows our Total Time from the C program , and wireshark time matches for a given object from zootaxa.info!

--->For Input File : input2.txt [ containing png,gif,jpg,jpeg objects of zootaxa.info  
--Total : 11 objects]

Experiment No	Step2 Download Time(secs)	Step3 Download Time(secs)	Average Time(secs)
1	11.453993	8.298334	
2	13.343555	7.364385	
3	12.579892	9.248642	

4	12.146636	7.271323	For Step2: 12.8705644 -----
5	13.270016	5.736099	
6	11.042505	8.360579	
7	13.289209	7.957592	For Step3: 7.6565384 -----
8	15.450984	7.783747	
9	13.566203	7.372550	
10	12.562651	7.172133	

-----> For Input File : input.txt [ containing 10 objects from the text file we were provided from unsplash.com]

Experiment No	Step2 Download Time(secs)	Step3 Download Time(secs)	Average Time(secs)
1	2.629564	1.480318	For Step 2: 2.9065008 -----
2	2.659396	1.452261	
3	2.715049	1.452261	
4	3.217887	1.940201	
5	3.443918	1.308591	
6	2.643081	1.217142	For Step3: 1.486563
7	3.156632	1.766520	
8	2.805497	1.201063	
9	2.680708	1.817355	
10	3.113276	1.229918	

From the above results it can be witnessed that downloading objects through Persistent HTTP connection takes less time than downloading objects through Non-Persistent HTTP connection.

Step2 : No of objects == No of TCP connections

Step3 : 1 TCP connection.

Step 2:  $2 \text{ RTT} + 2 \times 10 \text{ RTT} = 22 \text{ RTT}$  [ More Connection Overhead]

Step 3:  $2 \text{ RTT} + 10 \text{ RTT} = 12 \text{ RTT}$  [Less Connection Overhead]

Therefore, Time for Step2 > Time for Step3 .