

## **ANALYSIS OF RESULT**

(4).

(i) Size of the objects is required to be known in prior to enable the browser to take optimal scheduling decisions thereby improving the throughput. For example, large sized objects can be downloaded over multiple TCP connections using the range header fields, number of small objects can be grouped together and pipelined over a single TCP connection.

(ii) A separate TCP connection to be opened only if size of the object being requested exceeds a pre determined threshold. This will ensure optimum network utilisation and reducing the effects of latency on overall performance. Also the network threshold is also an information which the browser can use to ensure that it optimally exploits the available bandwidth.

(iii) A number of methods can be employed to pass this information. It can be stored along with the URL. Another method would be is that the moment a URL is encountered ,a UDP packet is sent to it which returns some meta data including size and dependancies information. Further TCP communication is initiated by the browser based on this information.

(iv) The size of the objects should not be available to any other layer as that will lead to other layers getting involved with application layer functionalities. The layers below can also pass the size of congestion window/receiver window if available to ensure that the browser does not underutilise the available bandwidth. However, since this information is dyanamic, suitable restrictions would have to be imposed.

# SNAPSHOT 1

```
krishna@krishna-Vostro-3546: ~/Downloads/networks
769.551 ms | Receiving Time: 2135.162 ms | Sending Time: 0
.148999999964 ms | Connection Active Time: 5006.955 ms | Active % : 77.98
87576381 | Idle % : 22.0112423619
| Avg GoodPut : 32.4996417134 B/ms | Max GoodPut: 31
.4083660206 B/ms
=====
secure-us.imrworldwide.com
=====
Max # of TCP Connections opened: 1 | Max # of Conn Simultaneo
usly opened per doamin: 1 | Time For DNS: 0
Connection 6149 :
Establishment time : -1 ms | Waiting Time: 2036.122
ms | Receiving Time: 1.97799999932 ms | Sending Time: 0
.344999999924 ms | Connection Active Time: 3449.737 ms | Active % : 59.08
98668507 | Idle % : 40.9101331493
| Avg GoodPut : 518.200202401 B/ms | Max GoodPut: 59
2.768791775 B/ms
=====
et.nytimes.com
=====
Max # of TCP Connections opened: 4 | Max # of Conn Simultaneo
usly opened per doamin: 4 | Time For DNS: 89.1769999998
Connection 6140 :
Establishment time : 1115.763 ms | Waiting Time: 2
472.231 ms | Receiving Time: 14.8770000001 ms | Sending
Time: 0.35299999911 ms | Connection Active Time: 3367.297 ms | Active % : 73.87
11494709 | Idle % : 26.1288505291
| Avg GoodPut : 53.2365396247 B/ms | Max GoodPut: 42
.2715627669 B/ms
Connection 6148 :
Establishment time : -1 ms | Waiting Time: 2365.643
ms | Receiving Time: 4.8770000003 ms | Sending Time: 0.1750000
00127 ms | Connection Active Time: 1816.448 ms | Active % : 130.5
12681893 | Idle % : -30.5126818935
| Avg GoodPut : 162.394914897 B/ms | Max GoodPut: 12
```

The above snapshot gives the details of the TCP objects being downloaded from the website [www.nytimes.com](http://www.nytimes.com). The various details that can be extracted from the snapshot are

- Number of TCP connections opened
- Time for DNS
- Connection active time
- Receiving time
- Avg Good Put (efficiency/No. Of bytes per milli sec)

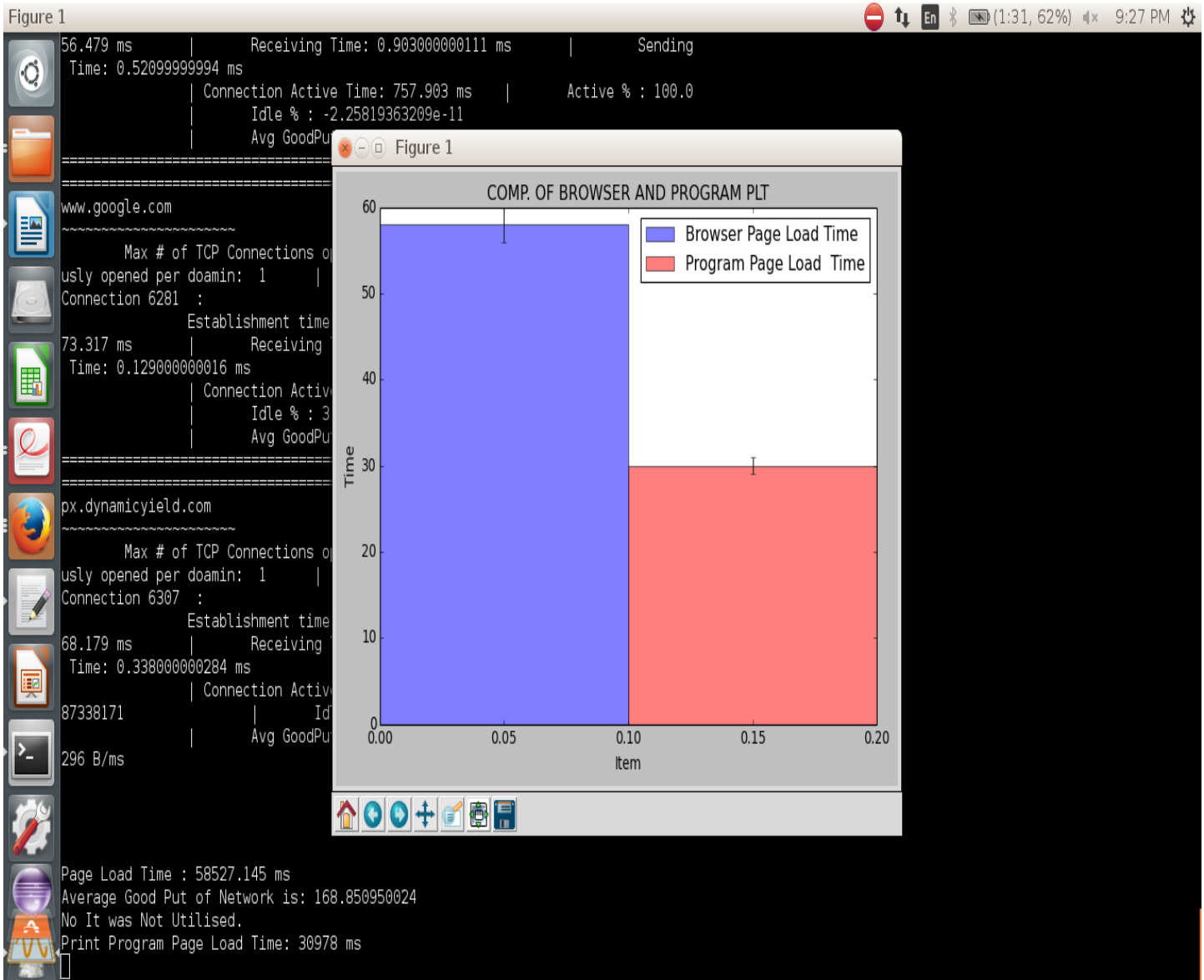
## SNAPSHOT 2

```
krishna@krishna-Vostro-3546: ~/Downloads/networks
56.479 ms | Receiving Time: 0.903000000111 ms | Sending
Time: 0.52099999994 ms
| Connection Active Time: 757.903 ms | Active % : 100.0
| Idle % : -2.25819363209e-11
| Avg GoodPut : 0.0 B/ms| Max GoodPut: 0.0 B/ms
=====
www.google.com
~~~~~
Max # of TCP Connections opened: 1 | Max # of Conn Simultaneo
usly opened per doamin: 1 | Time For DNS: 57.7130000001
Connection 6281 :
Establishment time : 458.494 ms | Waiting Time: 2
73.317 ms | Receiving Time: 2.52600000022 ms | Sending
Time: 0.129000000016 ms
| Connection Active Time: 275.972 ms | Active % : 100.0
| Idle % : 3.22186721746e-11
| Avg GoodPut : 0.0 B/ms| Max GoodPut: 0.0 B/ms
=====
px.dynamicicyield.com
~~~~~
Max # of TCP Connections opened: 1 | Max # of Conn Simultaneo
usly opened per doamin: 1 | Time For DNS: 87.0099999997
Connection 6307 :
Establishment time : 290.315 ms | Waiting Time: 9
68.179 ms | Receiving Time: 2.15500000013 ms | Sending
Time: 0.338000000284 ms
| Connection Active Time: 11337.145 ms | Active % : 8.561
87338171 | Idle % : 91.4381266183
| Avg GoodPut : 451.0440835 B/ms| Max GoodPut: 500.772797
296 B/ms

Page Load Time : 58527.145 ms
Average Good Put of Network is: 168.850950024
No It was Not Utilised.
Print Program Page Load Time: 30978 ms
```

The above snapshot gives the comparison details of page load time when web page is downloaded from the HAR file and the page load time when downloaded through program (script). It is observed that the page load time, when downloaded from the HAR file is more than that of the page load time, when downloaded from program script because HAR file is downloaded through a comparatively less speed internet connection.

## SNAPSHOT -3



The above snapshot is the bar chart comparison of page load time when web page is downloaded from the HAR file and page load time, when web page is downloaded through the program script. The HAR file taken into consideration is of the host [www.nytimes.com](http://www.nytimes.com).