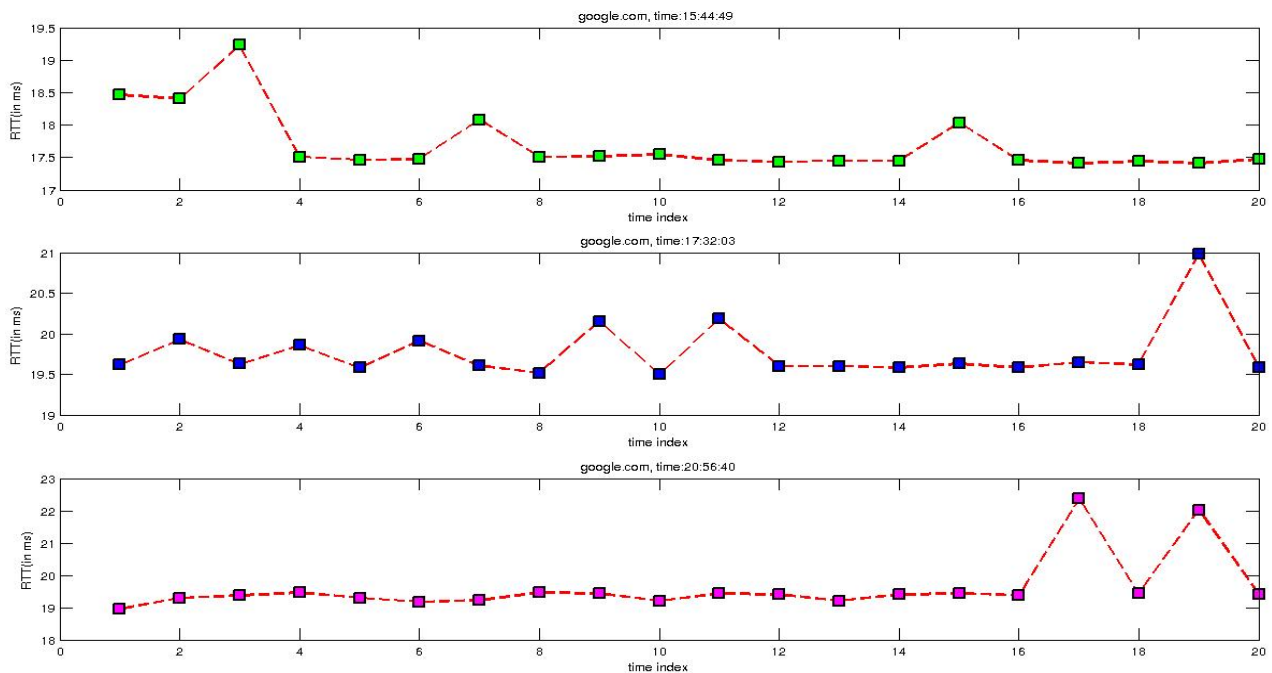


# Assignment 1: Ping and Traceroute Experiments

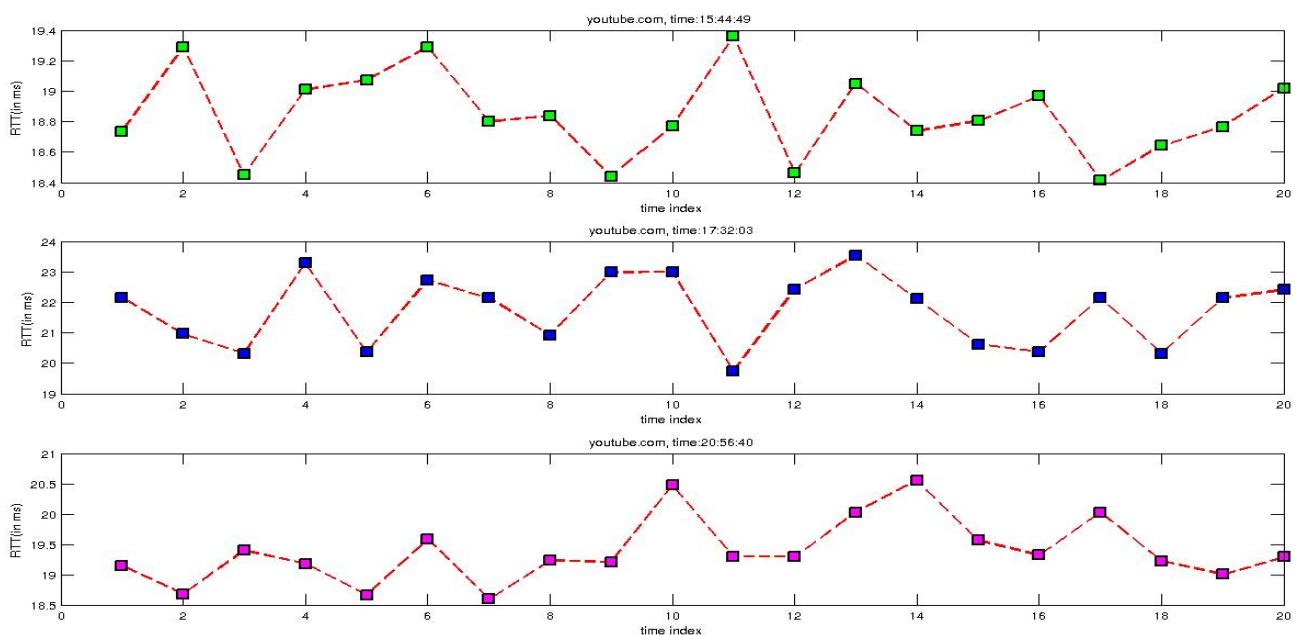
CS349 Networks Lab  
Somya Anand (120123038)

## Solution 1: Ping Experiment

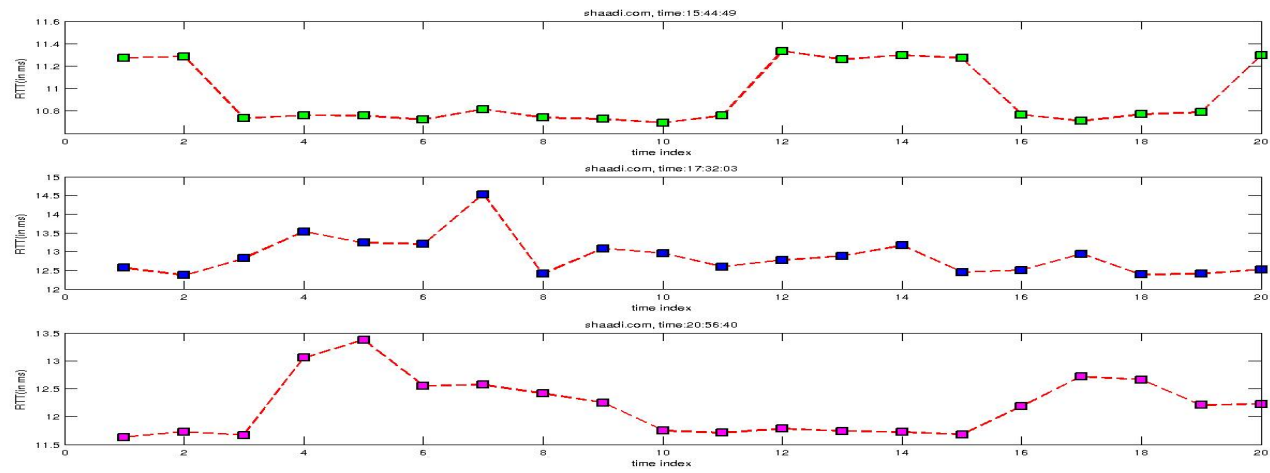
HOST 1. google.com



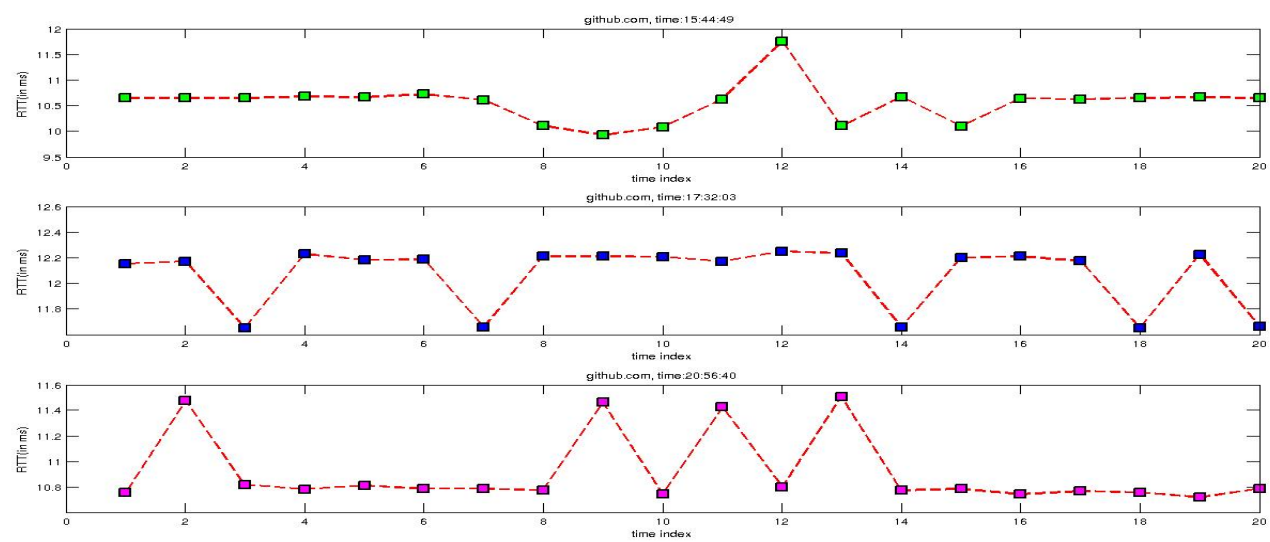
HOST 2. youtube.com



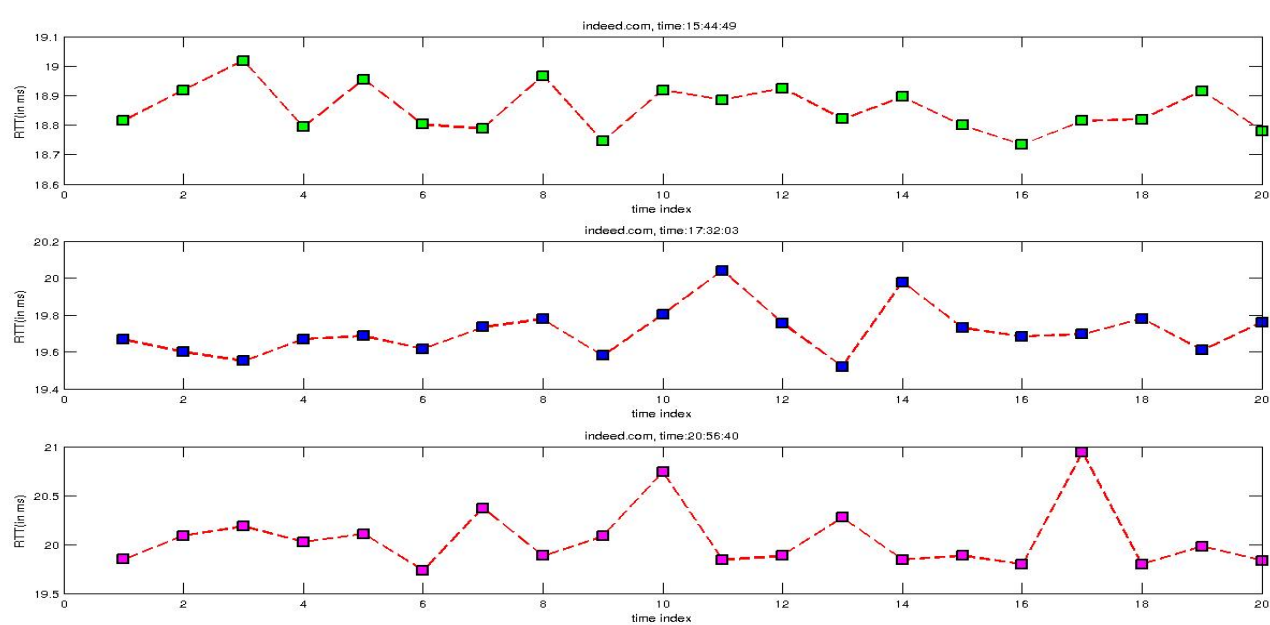
HOST 3. shaadi.com



HOST 4. github.com

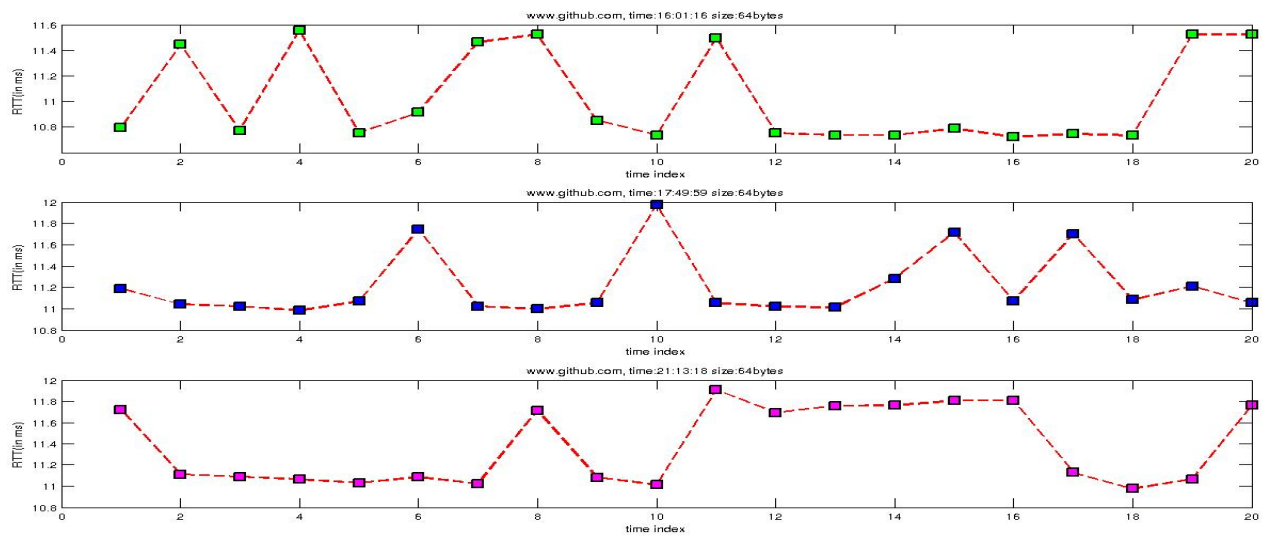


HOST 5. indeed.com

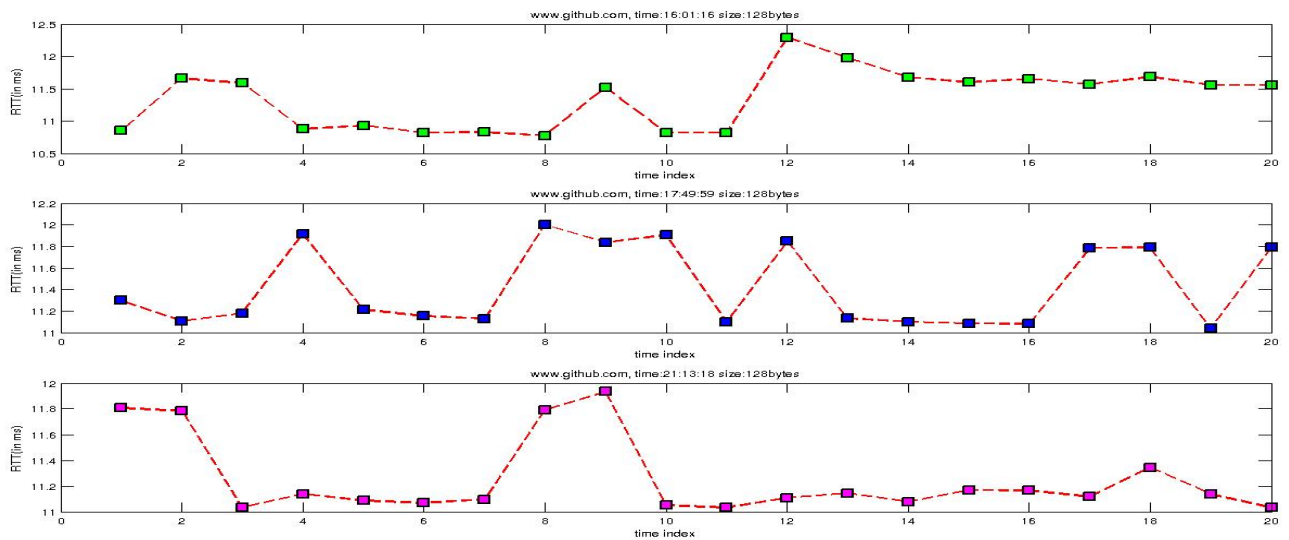


## HOST. github.com with different packet sizes

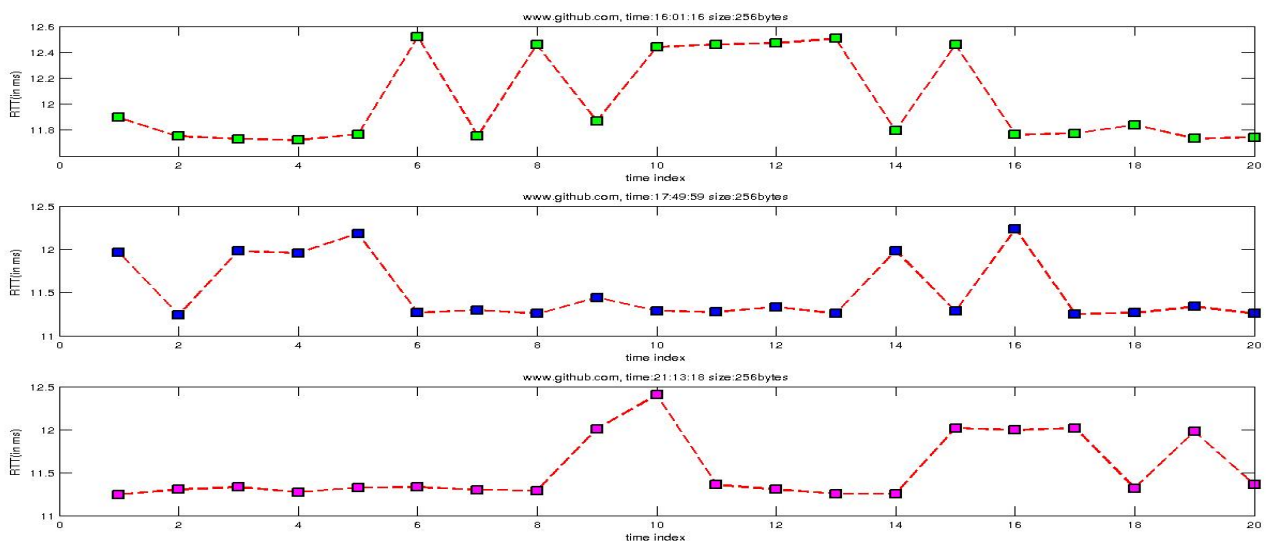
### 1) 64 bytes



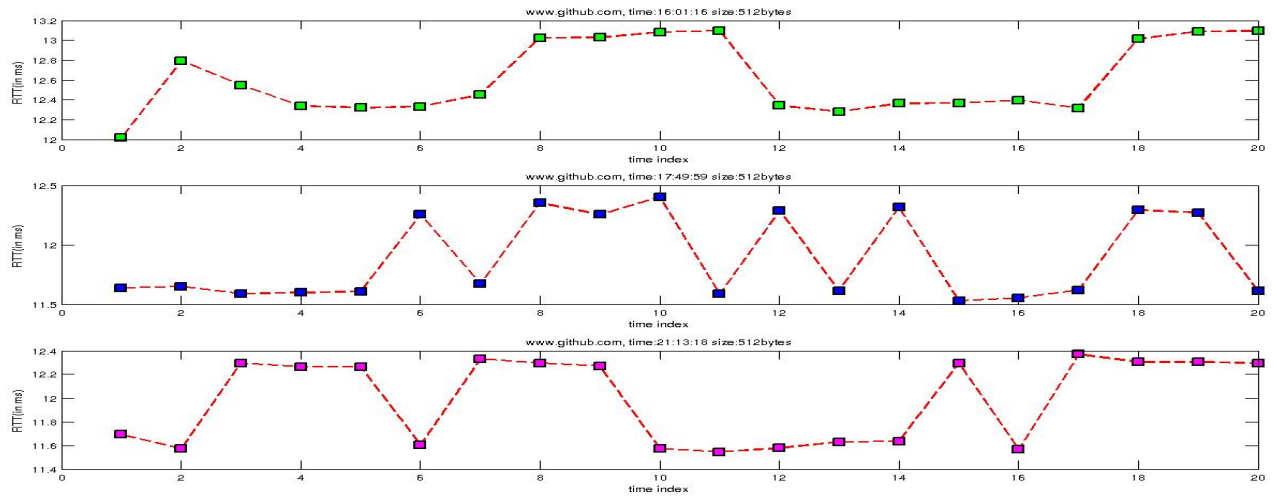
### 2) 128 bytes



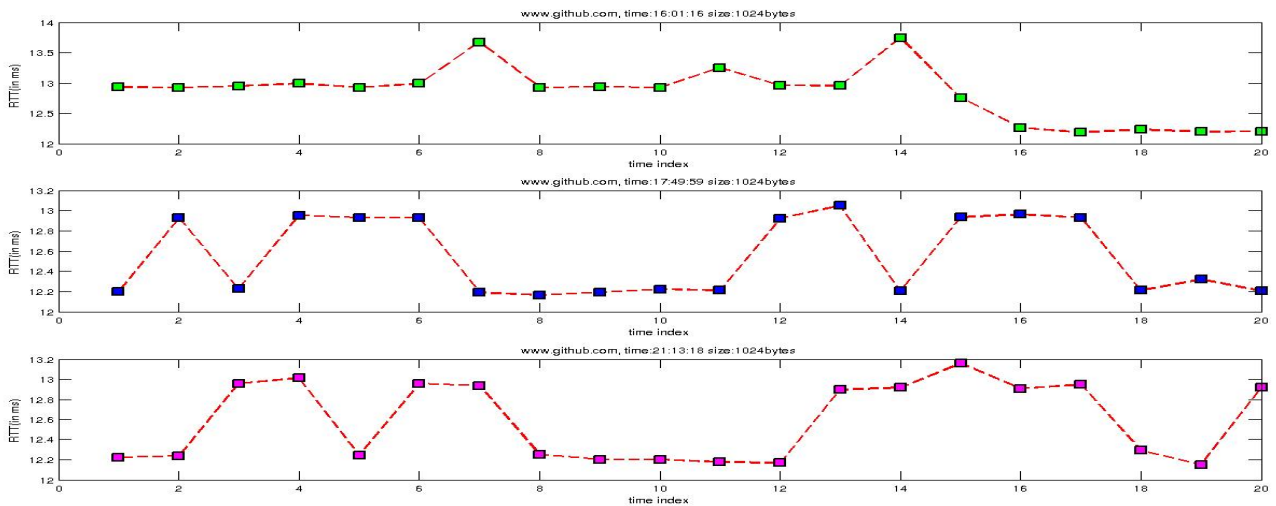
### 3) 256 bytes



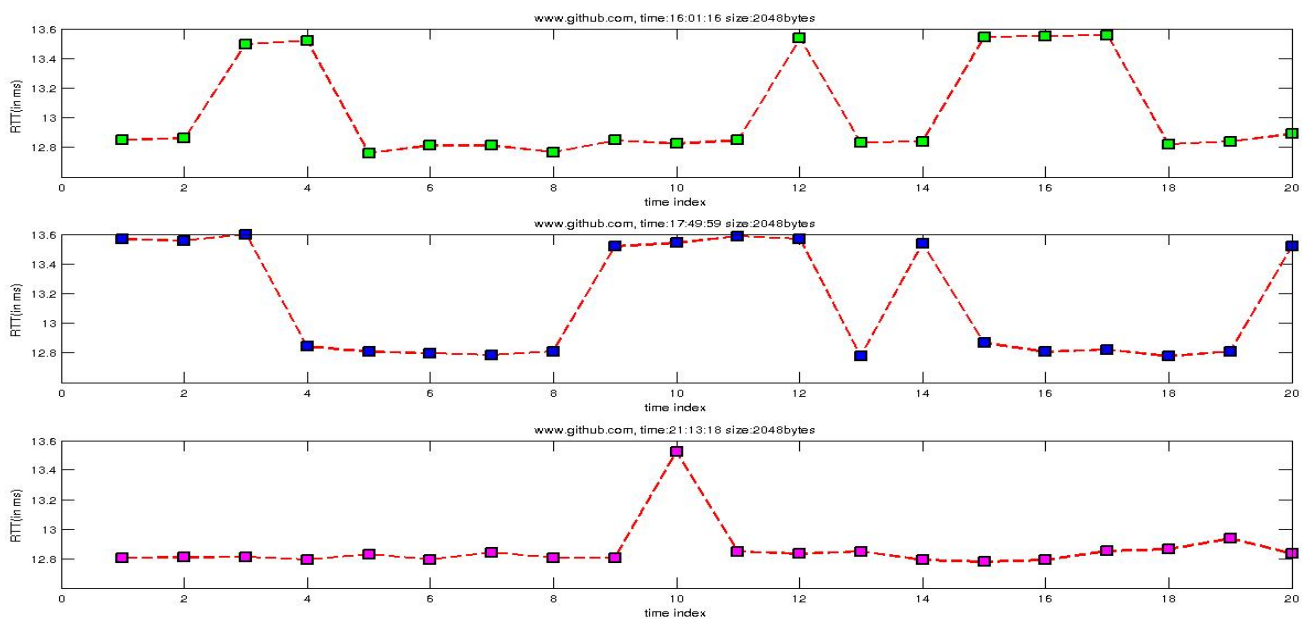
#### 4) 512 bytes



#### 5) 1024 bytes



#### 6) 2048 bytes



## Observations:

(a) Packet Loss is 2-3 % in case of indeed.com when the readings are taken at 8:00 p.m.

Reasons for this issue might be:

- The cable connections may be degraded over time and need replacing.
- The Firmware on my router might not be up to date.
- The issues may be with my ISP. (internet service provider)
- The number of hops between ECMP source and destination might be very high.
- Problem might occur with the ECMP, split horizon, or network loops.

(b) RTT depends both on time span as well as on packet size.

- According to the graph between packet size and RTT we have seen that as the size of packet increases, RTT also increases.
- At the night time (when network load is high) RTT is observed to be more than the other two time which indicates that RTT increases with the increase in network load.

## Solution 2: Traceroute Experiment

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- Hop counts at three different time intervals:

Host Name	At 4:00p.m	At 5:00p.m	At 8:00p.m
google.com	6	6	6
youtube.com	6	6	6
shaadi.com	9	11	11
github.com	6	6	6
indeed.com	11	11	11

- Routes to google.com and youtube.com have common hops:

At hop no. 2 with IP address 64.125.29.121

(b) Route of networktool.com to host(google.com), (youtube.com), (github.com) and (shaadi.com) changes during the three span of time. The reason might be due to the traffic isolation issue. For instance if you are processing traffic for two different customers, you can create two separate route domains. The same node address (such as 10.0.10.1) can reside in each route domain, in the same pool or in different pools, and you can assign a different monitor to each of the two corresponding pool members.

For reference:

TraceRoute from Network-Tools.com to 173.194.115.72 [google.com] time:1600  
TraceRoute from Network-Tools.com to 173.194.115.72 [google.com] time:2000  
TraceRoute from Network-Tools.com to 173.194.115.66 [google.com] time:1700

(c) There are no such cases where the traceroute does not find complete paths to some hosts.

(d) Yes, it possible to find the route to certain hosts which fail to respond with ping experiment. The reason regarding this might be the way we implement ping and traceroute experiment. i.e Traceroute proceeds unless all (three) sent packets are lost more than twice, then the connection is lost and route can not be evaluated while in ping experiment it only computes the final round-trip time from the destination point. So in case where a route involves multiple hops then there might be some chances of packet loss in case of ping experiment but not with the traceroute.

## Solution 3: Iperf Experiment

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Client IP : 172.16.68.159 | Server IP: 172.16.70.222

**Send TCP packets of one time write-buffer :**

Write-buffer length(in KB)	Server Side Bandwidth	Client Side Bandwidth
8	134 Mbits/sec	1.72 Gbits/sec
16	394 Mbits/sec	2.26 Gbits/sec
32	26.2 Mbits/sec	249 Mbits/sec
64	57.3 Mbits/sec	236 Mbits/sec
128	92.6 Mbits/sec	130 Mbits/sec

**Send UDP packets of different datagram size:**

Datagram size (in B)	Server Side Bandwidth	Client Side Bandwidth
1400	10.0 Mbits/sec	10.0 Mbits/sec
1600	10.0 Mbits/sec	10.0 Mbits/sec
1800	10.0 Mbits/sec	10.0 Mbits/sec
2000	10.0 Mbits/sec	10.0 Mbits/sec
2200	10.0 Mbits/sec	10.0 Mbits/sec

**Bandwidth for TCP window size as 100K, 200K, 300K and 400K.**

Window size	Server Side Bandwidth	Client Side Bandwidth
100k	93.7 Mbits/sec	93.8 Mbits/sec
200k	93.9 Mbits/sec	93.9 Mbits/sec
300k	93.9 Mbits/sec	94.0 Mbits/sec
400k	93.8 Mbits/sec	93.9 Mbits/sec

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For reference you can use

<https://drive.google.com/file/d/0B40unzkMuVklXzLFTE94VnM1NVE/view?usp=sharing>  
<https://drive.google.com/file/d/0B40unzkMuVklblpvb3FVWXg0dVk/view?usp=sharing>