

CSC 361 Assignment #3 R2

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As deliverable for: Assignment #3 part R2

Group1

1. All five trace files use 3 probes per TTL.
2. The sequence of intermediate routers is **different**.
3. The difference in sequence of intermediate routers is likely due to changing network conditions, being node availability and routing due to traffic. To summarize the various paths we can see them in the following table:

TTL	Trace 1	Trace 2	Trace 3	Trace 4	Trace 5
1	142.104.68.167	142.104.68.167	142.104.68.167	142.104.68.167	142.104.68.167
2	142.104.68.1	142.104.68.1	142.104.68.1	142.104.68.1	142.104.68.1
3	192.168.9.5	192.168.9.5	192.168.9.5	192.168.9.5	192.168.9.5
4	192.168.10.1	192.168.10.1	192.168.10.1	192.168.10.1	192.168.10.1
5	192.168.8.6	192.168.8.6	192.168.8.6	192.168.8.6	192.168.8.6
6	142.104.252.37	142.104.252.37	142.104.252.37	142.104.252.37	142.104.252.37
7	142.104.252.24 6	142.104.252.24 6	142.104.252.24 6	142.104.252.24 6	142.104.252.24 6
8	207.23.244.242	207.23.244.242	207.23.244.242	207.23.244.242	207.23.244.242
9	206.12.3.17	206.12.3.17	206.12.3.17	206.12.3.17	206.12.3.17
10	199.212.24.64	199.212.24.64	199.212.24.64	199.212.24.64	199.212.24.64
11	206.81.80.17	206.81.80.17	206.81.80.17	206.81.80.17	206.81.80.17
12	74.125.37.91	72.14.237.123	74.125.37.91	74.125.37.91	72.14.237.123
13	72.14.237.123	74.125.37.91	72.14.237.123	72.14.237.123	209.85.249.153
14	209.85.249.155	209.85.249.109	209.85.247.63	209.85.246.219	209.85.250.59
15	209.85.250.121	209.85.250.57	209.85.245.65	209.85.250.123	209.85.247.61
16	209.85.249.153	209.85.246.219	209.85.249.155	209.85.245.65	

It's apparent that up to and including router 11 that the paths are identical. The first part of this is likely the routers managing traffic from the client to the ISP (being routers in the local domain and routers to the ISP). It's uncertain where this is necessarily over, but beyond that point to router 11 is likely a performant path which was not interrupted. From router 12 to 16, the differences are likely due to routers close to the destination performing load balancing or otherwise managing traffic.

4. Not Applicable

Group2

1. All five trace files use 3 probes per TTL.
2. The sequence of intermediate routers is **the same**.
3. Not Applicable
4. The table is:

TTL	Router IP	Trace 1	Trace 2	Trace 3	Trace 4	Trace 5
1	192.168.0.1	3.330ms	2.711ms	7.854ms	3.415ms	1.746ms
2	24.108.0.1	15.812ms	17.118ms	11.835ms	13.245ms	16.154ms
3	64.59.161.197	18.869ms	20.097ms	22.579ms	21.672ms	21.602ms
4	66.163.72.26	22.843ms	19.420ms	19.460ms	19.755ms	18.558ms
5	66.163.68.18	26.502ms	21.555ms	20.321ms	35.771ms	20.717ms
6	72.14.221.102	24.264ms	19.982ms	21.850ms	22.675ms	43.472ms
7	108.170.245.113	18.408ms	51.658ms	22.763ms	18.337ms	26.921ms
8	209.85.249.249	22.971ms	108.738ms	20.592ms	24.574ms	25.623ms

By inspecting the table, we quickly notice hops 4→5, 5→6, 6→7, and 7→8 seem to have consistently longer rtt's or outliers. So let's inspect each:

Hop 4 to 5 avg: $24.97ms = (26.502 + 21.555 + 20.321 + 35.771 + 20.717)/5$

Hop 4 to 5 mean: $21.555ms$

Hop 5 to 6 avg: $26.45ms = (24.264 + 19.982 + 21.85 + 22.675 + 43.472)/5$

Hop 5 to 6 mean: $22.675ms$

Hop 6 to 7 avg: $27.62ms = (18.408 + 51.658 + 22.763 + 18.337 + 26.921)/5$

Hop 6 to 7 mean: $22.763ms$

Hop 7 to 8 avg: $40.5ms = (22.971 + 108.738 + 20.592 + 24.574 + 25.623)/5$

Hop 7 to 8 mean: $24.574ms$

The hop with the longest average rtt of $40.5ms$ and longest mean of 24.574 is from 7 to 8 (108.170.245.113 to 209.85.249.249). Therefore it is fair to say that this hop is likely to incur the longest delay.