Destination Web servers:
- ETHZ (Switzerland): 129.132.19.216
- University of Waterloo (Canada east): 129.97.208.23
- University of Cape Town (South Africa): 137.158.158.44
- IIT Delhi (India): 103.27.9.20
- Google: 173.194.36.80
- Facebook: 173.252.88.66

Traceroute servers:
- Austria(Europe)
- Czech Republic(Europe)
- United Kingdom(Europe)
- Canada(North America)
- Brazil(South America)
- South Africa(Africa)

Observations:
1) Hops Table
   a) For traceroute servers in same continent ("Europe"), number of hops were almost same for a given destination web server. Number of hops for United Kingdom were slightly less compared to Austria and Czech Republic.(Observation based on number of hops for Google and Facebook).
   b) When destination web server and traceroute server are in same location, number of hops are significantly less. For South Africa, number of hops for University of Cape Town is only 8.
   c) Number of hops to www.google.com and www.facebook.com were almost same for different destination. This is mainly due to their data centres distributed all over world. But if specific ip are probed(as in our case), there is direct dependence on distance.

2) Latency Table
   a) Round Trip Time(RTT) for corresponding server from same continent is almost similar with United Kingdom performing slightly better.
   b) In Europe, latency for Switzerland is significantly less because it is in same continent. Similar observation can be made for South Africa and University of Cape Town.
   c) Thus RTT is directly proportional to the distance between destination and host.

3) Correlation
   a) Calculations shows that latency between source and destination server is positively correlated with number of hops between them. For example, on probing www.facebook.com, via six different traceroute server, the correlation coefficient between latency and number of hops is 0.522632.
4) Traceroute servers that have local ISPs directly peered with Google and Facebook :

a) Google was found to be directly peered to local ISP of all the six traceroute servers.
   i) Canada - 4 hops, 2 ms
   ii) United Kingdom - 7 hops, 10 ms
   iii) Brasil - 8 hops, 13 ms
   iv) South Africa - 6 hops, 2.5 ms
   This shows that google has data centres at most of places of world and have peered directly with local ISP to minimize latency.
b) Facebook was not found to be directly peered all six traceroute servers.
   i) Canada - 8 hops, 17 ms
   ii) United Kingdom - 13 hops, 130 ms. This shows facebook is not directly peered with local ISP in United Kingdom.
   iii) Brasil - 9 hops, 9 ms
   iv) South Africa - 15 hops, 250 ms. This shows not peered.
c) Here we are not probing specific ip of google or facebook, but to domain names. At different places, it may have different ip.

5) Cellular ISP vs Institute Network
   a) The main difference between cellular network and normal institute network is transmission medium. In Institute Network, there are ethernet fibre optic cables, while for cellular network there is air. And air medium is much slower compared to fibre optic cable.
   b) Moreover, in our region, there are many cellular network users compared to number of cellular towers. This results in high congestion.
   c) Also ethernet network can be directly connected to Tier-3/4 network. For cellular network, there is one more level.
   d) All these factors combine to give overall high latency.

6) Connectivity to rest of the world
   a) For ETHZ (Switzerland), University of Waterloo (Canada east), University of Cape Town (South Africa) tracert values clearly shows that my local ISP is not directly connected to them.
   b) For IIT Delhi, we expected that traceroute will be very fast, and time would be very less. But due to some reasons, traceroute wasn't able to complete trace. So we calculated it via ping, which confirmed that my local ISP is directly connected to IIT Delhi Network. (It may be vsnl-tata)
   c) For facebook, latency was 400 ms and hops were 25. This proves that facebook has not peered with my local ISP.
   d) In case of google, traceroute results were inconclusive. So we verified results via ping which turn out to be 90 ms. Hops were 14-15. Thus proving that my local ISP is directly peered with google.