

# Computer Networks

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## 1 Network Analysis

### 1.1

1.a. We have ran trace route via 4G Network ( using 4G networked mobile hotspot acting like a wifi) and Wifi from our laptop as a source and www.google.com as a destination. We have seen different IP address along the route from our personal computer source to destination. We have observed IP address are listed below:

tracert to www.google.com (142.251.42.68)

```
1 192.168.113.115
2 * * *
3 192.168.23.225
  192.168.23.193
  192.168.23.225
4 182.79.112.94
5 182.79.112.89
  182.79.112.93
6 72.14.217.194
7 * * *
8 142.251.52.228
9 74.125.243.100
  108.170.251.102
10 * * *
11 64.233.174.0
12 * * *
13 142.251.69.103
   142.251.69.105
   142.251.69.103
14 142.251.42.68
```

```

apple@Ajaykumar ~ % traceroute www.google.com
traceroute to www.google.com (142.251.42.68), 64 hops max, 52 byte packets
 1  192.168.113.115 (192.168.113.115)  3.466 ms  2.880 ms  2.244 ms
 2  * * *
 3  192.168.23.225 (192.168.23.225)  63.030 ms
    192.168.23.193 (192.168.23.193)  32.592 ms
    192.168.23.225 (192.168.23.225)  29.110 ms
 4  182.79.112.94 (182.79.112.94)  38.425 ms  47.828 ms  34.299 ms
 5  182.79.112.89 (182.79.112.89)  49.898 ms
    182.79.112.93 (182.79.112.93)  22.754 ms  38.674 ms
 6  72.14.217.194 (72.14.217.194)  34.809 ms * *
 7  * * *
 8  * 142.251.52.228 (142.251.52.228)  51.557 ms *
 9  74.125.243.100 (74.125.243.100)  71.572 ms
    108.170.251.102 (108.170.251.102)  83.757 ms *
10  * * *
11  64.233.174.0 (64.233.174.0)  101.189 ms * *
12  * * *
13  142.251.69.103 (142.251.69.103)  76.399 ms
    142.251.69.105 (142.251.69.105)  69.555 ms
    142.251.69.103 (142.251.69.103)  66.338 ms
14  bom12s21-in-f4.1e100.net (142.251.42.68)  52.710 ms  79.529 ms  58.867 ms

```

Figure 1: traceroute to google

## 1.2 Observations:

1. b. 6 columns are observed here for the routers. here is the break down(1-6):

1. 1: This is the first hop in the traceroute, indicating the first router or node in the path to the destination.

2. 192.168.113.115: This is the hostname or domain of the router or node at the current hop. this is to be observed here is, trace route can show domain names that can be of alphabetical letters may or may not include special characters(like ",-,etc.) not always.Domain name and IP address for a few routers are observed to be same. 3. 192.168.113.115: IP address of a respective router along the path from source to destination can be IPV4 or IPV6.

4. 10.791 ms: This is the round-trip time (RTT) in milliseconds for the first packet sent to the router at this hop. It indicates the time it takes for the packet

to travel from the source (your device) to the current hop and back.

5. 5.217 ms: This is the RTT for the second packet. The traceroute usually sends multiple packets to each hop to provide an average RTT.

6. 3.333 ms: This is the RTT for the third packet.

7. Missing routers(\*): The asterisks indicate that there was no response from the routers at that hop. This could be due to routers configured not to respond to ping requests or network congestion.

8. There are duplicate entries for IP addresses in hops 3 and 4 (e.g., 192.168.23.225 and 192.168.23.193). This might be an indication of network setup or routing configuration, but it's unusual to see multiple identical entries for the same hop.

9. The final hop (142.251.42.68) is the destination IP address (www.google.com) that you were tracing to is at hop 14.

10. The trace route outputted IP addresses doesn't directly display private IP addresses because these addresses are typically used within local networks and are not visible on the public internet.

11. IP addresses shown are of IPV4 addresses (private computer or laptop) are set by default. But still we can convert these addresses from IPV4 to IPV6 for our convenience using:  
traceroute -6 destination (on windows based)  
traceroute6 destination (on Linux based) respectively.

12. 64 hops max: This parameter sets the maximum number of hops (routers or nodes) that traceroute will track along the route. If the destination is not reached within 64 hops, the traceroute will stop.

13. 52 byte packets: This parameter specifies the size of the packets sent during the traceroute. In this case, packets of 52 bytes will be sent to each hop in the route.

1.c. The maximum size of ping packets that we are able to send is 255.

## 2

Code in the Python file

Source	Destination	Number of hops	latency(ms)
Germany	University of Utah	Unable to reach destination(atleast 30 hops)	146.3
Germany	CapeTown University	Unable to reach destination(atleast 30 hops)	210.03
Germany	IIT Delhi	18 hops	149.3
Germany	Google	10 hops	3.25
Germany	Facebook	11 hops	9.13
USA	Unviersity of Utah	30 hops	64.1
USA	CapeTown University	30 hops	191.8
USA	IIT Delhi	30 hops	227.3
USA	Google	13 hops	4.1
USA	Facebook	13 hops	3.7
Own device	University of Utah	Unable to reach destination(atleast 38 hops)	375.9
Own device	CapeTown University	Unable to reach destination(atleast 23 hops)	385.4
Own device	IIT Delhi	4 hops	4.02
Own device	Google	11 hops	8.5
Own device	Facebook	13 hops	41.9

Table 1: Displaying number of hops took to reach from Source to Destination

### 3

3.a Below shown table is the number of hops took to reach from the source to Destination. here Germany mean the source is from <http://www.han.de/cgi-bin/nph-trace.cgi> to the respected mentioned destination. USA mean the source from <http://www.net.princeton.edu/traceroute.html> to the respective destination. the respective hops from source to destinations are shown in the table and the below images as well.



## traceroute to www.utah.edu

---

```
traceroute to www.utah.edu (155.98.186.21), 30 hops max, 60 byte packets
 1 vsn0057.vs.mass.systems (10.92.36.120)  0.029 ms  0.013 ms  0.014 ms
 2 ae3-ui00.sxb1-cr-nunki.bb.gdinf.net (87.230.112.2)  0.287 ms  0.364 ms  0.339 ms
 3 ae1.sxb1-ibr-altair.bb.gdinf.net (87.230.112.14)  5.258 ms  5.283 ms  5.209 ms
 4 217.243.179.244 (217.243.179.244)  3.970 ms  4.044 ms  4.103 ms
 5 f-ed13-i.F.DE.NET.DTAG.DE (217.5.70.42)  4.528 ms f-ed13-i.F.DE.NET.DTAG.DE (217.5.109.58)  4.569 ms f-ed13-i.F.DE.NET.DTAG.DE (217.5.109.54)  4.654 ms
 6 80.150.170.214 (80.150.170.214)  13.430 ms  13.484 ms  13.446 ms
 7 * * *
 8 ae2.cs1.ams17.nl.eth.zayo.com (64.125.29.59)  133.557 ms * *
 9 * * *
10 * * *
11 * * *
12 * * *
13 * * *
14 * * ae5.cs1.den5.us.eth.zayo.com (64.125.29.19)  133.824 ms
15 * * *
16 ae4.mpr1.las5.us.zip.zayo.com (64.125.26.241)  133.480 ms  133.410 ms  133.553 ms
17 ae7.mcs1.las2.us.zip.zayo.com (64.125.21.202)  133.501 ms  133.434 ms  133.341 ms
18 209.66.120.14.IDIA-249109-ZYO.zip.zayo.com (209.66.120.14)  137.634 ms  137.575 ms  137.475 ms
19 ddc-pep-c-123-int.uen.net (140.197.251.32)  144.826 ms  144.805 ms  144.805 ms
20 ddc-pep-b-129-int.uen.net (140.197.253.97)  144.731 ms  144.397 ms  144.353 ms
21 ebc-pep-b-179-int.uen.net (140.197.252.76)  144.599 ms  144.580 ms  144.726 ms
22 ebc-pep-a-178-int.uen.net (140.197.252.84)  144.653 ms  144.701 ms  144.760 ms
23 * * *
24 199.104.93.22 (199.104.93.22)  144.644 ms  144.951 ms  144.605 ms
25 199.104.93.33 (199.104.93.33)  145.532 ms  146.103 ms  145.804 ms
26 155.99.130.67 (155.99.130.67)  145.685 ms  146.443 ms  155.99.130.65 (155.99.130.65)  145.482 ms
27 155.99.130.103 (155.99.130.103)  146.133 ms  155.99.130.101 (155.99.130.101)  146.803 ms  155.99.130.105 (155.99.130.105)  146.311 ms
28 * * *
29 * * *
30 * * *
```

Figure 2: traceroute from Germany to Utah



## traceroute to www.uct.ac.za

```
traceroute to www.uct.ac.za (137.158.159.192), 30 hops max, 60 byte packets
 1 vsn0057.vs.mass.systems (10.92.36.120) 0.047 ms 0.014 ms 0.013 ms
 2 ae3-u100.sxb1-cr-nunki.bb.gdinf.net (87.230.112.2) 0.442 ms 0.396 ms 0.367 ms
 3 ael.sxb1-ibr-altair.bb.gdinf.net (87.230.112.14) 0.800 ms 0.820 ms 0.736 ms
 4 ffm-b16-link.ip.twelve99.net (62.115.144.8) 2.931 ms 2.964 ms 2.930 ms
 5 ffm-bb1-link.ip.twelve99.net (62.115.132.226) 3.703 ms 3.668 ms *
 6 ffm-b11-link.ip.twelve99.net (62.115.124.119) 3.300 ms ffm-b11-link.ip.twelve99.net (62.115.124.117) 3.390 ms ffm-b11-link.ip.twelve99.net (62.115.124.119) 3.437 ms
 7 * * *
 8 be2845.ccr41.fra03.atlas.cogentco.com (154.54.56.189) 41.971 ms be2846.ccr42.fra03.atlas.cogentco.com (154.54.37.29) 4.041 ms be2845.ccr41.fra03.atlas.cogentco.com (154.54.56.189) 41.387 ms
 9 be2814.ccr42.ams03.atlas.cogentco.com (130.117.0.141) 10.497 ms be2813.ccr41.ams03.atlas.cogentco.com (130.117.0.121) 10.226 ms be2814.ccr42.ams03.atlas.cogentco.com (130.117.0.141) 10.495 ms
10 be3458.ccr21.ams04.atlas.cogentco.com (154.54.39.186) 10.684 ms 10.473 ms be3457.ccr21.ams04.atlas.cogentco.com (130.117.1.10) 10.658 ms
11 * * *
12 ae0-306-mtz1-ir1.net.tenet.ac.za (155.232.1.86) 185.286 ms 185.226 ms 185.186 ms
13 et-1-1-1-0-isdl-pe1.net.tenet.ac.za (155.232.1.153) 194.266 ms 194.228 ms 194.217 ms
14 et-1-1-4-0-cpt3-pe1.net.tenet.ac.za (155.232.1.148) 209.900 ms 209.932 ms 210.127 ms
15 et-0-0-1-0-cpt7-pe1.net.tenet.ac.za (155.232.64.70) 226.027 ms 209.764 ms 209.729 ms
16 154.114.124.1 (154.114.124.1) 210.019 ms 210.226 ms 210.030 ms
17 * * *
18 * * *
19 * * *
20 * * *
21 * * *
22 * * *
23 * * *
24 * * *
25 * * *
26 * * *
27 * * *
28 * * *
29 * * *
30 * * *
```

Figure 3: traceroute from Germany to Uct



## traceroute6 to www.iitd.ac.in

---

```
traceroute to www.iitd.ac.in (2001:df4:e000:29::212) from 2a01:488:66:1000:5c33:9112:0:1, 30 hops max, 24 byte packets
 1 2a01:488:66::a5c:2478 (2a01:488:66::a5c:2478) 0.129 ms 0.171 ms 0.079 ms
 2 ae3-ul00.cr-nunki.sxb1.bb.godaddy.com (2a01:488:bb::42) 0.372 ms 0.266 ms 0.243 ms
 3 ae1.sxb1-ibr-altair.bb.gdinf.net (2a01:488:bb00:105::2) 0.597 ms 0.774 ms 1.354 ms
 4 ae0.sxb1-ibr-tarazed.bb.gdinf.net (2a01:488:bb00:107::3) 1.91 ms 5.008 ms 1.806 ms
 5 ae7.fra10-cr-antares.bb.gdinf.net (2a01:488:bb03:101::2) 3.437 ms 3.712 ms 3.632 ms
 6 ae2.fra11-cr-polaris.bb.gdinf.net (2a01:488:bb03:100::2) 3.484 ms 3.548 ms 3.346 ms
 7 jio.com (2001:7f8::fa31:0:1) 4.011 ms * 3.861 ms
 8 * * *
 9 2405:203:89a::141e (2405:203:89a::141e) 134.455 ms 134.438 ms 134.326 ms
10 2405:8a00:a:3::2 (2405:8a00:a:3::2) 133.211 ms 133.454 ms 133.237 ms
11 2405:8a00:a:a:3 (2405:8a00:a:a:3) 144.523 ms 144.554 ms 144.524 ms
12 * * *
13 2001:4408:a::1 (2001:4408:a::1) 150.418 ms 150.417 ms 150.36 ms
14 2405:8a00:a:2::c5 (2405:8a00:a:2::c5) 153.437 ms 150.688 ms 150.696 ms
15 2405:8a00:a:2::c6 (2405:8a00:a:2::c6) 153.386 ms 153.393 ms 153.322 ms
16 2001:df4:e000:108::2 (2001:df4:e000:108::2) 147.667 ms 147.571 ms 147.165 ms
17 2001:df4:e000:26::24 (2001:df4:e000:26::24) 150.601 ms 150.721 ms 150.513 ms
18 2001:df4:e000:29::212 (2001:df4:e000:29::212) 149.379 ms 149.433 ms 149.306 ms
```

Figure 4: traceroute from Germany to IIT Delhi(IPV6)



## traceroute to www.google.com

---

```
traceroute to www.google.com (142.250.184.196), 30 hops max, 60 byte packets
 1 vsn0057.vs.mass.systems (10.92.36.120) 0.029 ms 0.014 ms 0.012 ms
 2 ae3-u100.sxbl-cr-nunki.bb.gdinf.net (87.230.112.2) 0.352 ms 0.337 ms 0.286 ms
 3 ael.sxbl-ibr-altair.bb.gdinf.net (87.230.112.14) 0.496 ms 0.511 ms 0.538 ms
 4 ffm-bl6-link.ip.twelve99.net (62.115.144.8) 3.007 ms 2.982 ms 2.953 ms
 5 * ffm-bbl-link.ip.twelve99.net (62.115.132.226) 3.371 ms 3.414 ms
 6 ffm-b11-link.ip.twelve99.net (62.115.124.119) 3.181 ms 3.338 ms ffm-b11-link.ip.twelve99.net (62.115.124.117) 3.263 ms
 7 google-ic-319726.ip.twelve99-cust.net (62.115.151.25) 3.261 ms google-ic-319727.ip.twelve99-cust.net (62.115.151.27) 3.552 ms 3.526 ms
 8 * * *
 9 192.178.74.162 (192.178.74.162) 3.545 ms 108.170.252.65 (108.170.252.65) 4.596 ms 142.250.214.202 (142.250.214.202) 5.202 ms
10 108.170.251.209 (108.170.251.209) 4.054 ms 142.251.64.187 (142.251.64.187) 3.440 ms 108.170.252.82 (108.170.252.82) 3.513 ms
11 * fra24s11-in-f4.1e100.net (142.250.184.196) 3.247 ms 3.252 ms
```

Figure 5: traceroute from Germany to Google





## traceroute to www.facebook.com

---

```
traceroute to www.facebook.com (157.240.210.35), 30 hops max, 60 byte packets
 1 vsn0057.vs.mass.systems (10.92.36.120) 0.028 ms 0.015 ms 0.010 ms
 2 ae3-ul00.sxb1-cr-nunki.bb.gdinf.net (87.230.112.2) 0.542 ms 0.353 ms 0.337 ms
 3 ae1.sxb1-ibr-altair.bb.gdinf.net (87.230.112.14) 0.761 ms 0.738 ms 0.710 ms
 4 ae0.sxb1-ibr-tarazed.bb.gdinf.net (87.230.112.19) 0.679 ms 0.662 ms 0.636 ms
 5 ae7.fra10-cr-antares.bb.gdinf.net (87.230.115.2) 3.805 ms 3.825 ms 3.801 ms
 6 ae2.fra1-cr-polaris.bb.gdinf.net (87.230.115.0) 3.430 ms 3.617 ms 3.579 ms
 7 ae1.pr02.ham3.tfbnw.net (185.1.210.174) 9.140 ms 9.811 ms 9.808 ms
 8 po202.asw02.ham3.tfbnw.net (157.240.111.196) 9.226 ms po202.asw01.ham3.tfbnw.net (157.240.111.194) 9.380 ms 9.374 ms
 9 psw02.ham3.tfbnw.net (129.134.58.116) 9.248 ms psw03.ham3.tfbnw.net (129.134.58.115) 9.224 ms psw01.ham3.tfbnw.net (129.134.58.117) 9.224 ms
10 157.240.38.71 (157.240.38.71) 9.324 ms 157.240.38.169 (157.240.38.169) 9.189 ms 173.252.67.165 (173.252.67.165) 9.215 ms
11 edge-star-mini-shv-01-ham3.facebook.com (157.240.210.35) 9.307 ms 9.146 ms 9.138 ms
```

Figure 6: traceroute from Germany to Facebook

# Traceroute

tracing path from www.net.princeton.edu to 155.98.186.21 ...

```
traceroute to 155.98.186.21 (155.98.186.21), 30 hops max, 40 byte packets
 1  128.112.128.2      1.001 ms  0.790 ms  0.753 ms
 2  128.112.12.229     0.742 ms  0.569 ms  0.734 ms
 3  128.112.12.14      1.091 ms  1.043 ms  1.135 ms
 4  204.153.48.253     1.263 ms  1.379 ms  1.689 ms
 5  172.96.130.49      4.339 ms  3.953 ms  3.937 ms
 6  172.96.130.76      5.491 ms  5.978 ms  172.96.130.60  6.042 ms
 7  163.253.5.8        5.085 ms  6.045 ms  6.022 ms
 8  163.253.1.136      63.700 ms 63.350 ms 61.768 ms
 9  163.253.1.139      62.084 ms 63.635 ms 63.119 ms
10  163.253.2.17       63.265 ms 63.487 ms 63.332 ms
11  163.253.2.18       63.250 ms 62.922 ms 62.777 ms
12  163.253.1.245      64.246 ms 63.623 ms 63.564 ms
13  163.253.1.242      63.570 ms 63.474 ms 63.117 ms
14  163.253.1.171      63.287 ms 62.156 ms 63.240 ms
15  163.253.1.152      62.891 ms 63.220 ms 63.699 ms
16  163.253.5.7        63.844 ms 64.283 ms 64.376 ms
17  140.197.249.81     62.072 ms 62.154 ms 62.737 ms
18  140.197.251.32     63.364 ms 62.686 ms 62.567 ms
19  140.197.253.97     63.057 ms 63.220 ms 62.443 ms
20  140.197.252.76     62.409 ms 62.432 ms 63.061 ms
21  140.197.252.84     63.177 ms 62.595 ms 62.682 ms
22  * * *
23  199.104.93.22      62.650 ms 63.286 ms 63.092 ms
24  199.104.93.33      64.320 ms 64.019 ms 64.133 ms
25  155.99.130.65      63.821 ms 63.794 ms 155.99.130.67  63.449 ms
26  155.99.130.107     64.450 ms 65.173 ms 155.99.130.105  64.422 ms
27  * * *
28  * * *
29  * * *
30  155.98.186.21     64.940 ms 64.792 ms 64.166 ms
```

Done.

Figure 7: traceroute from Germany to Utah

# Traceroute

tracing path from www.net.princeton.edu to 137.158.159.192 ...

```
traceroute to 137.158.159.192 (137.158.159.192), 30 hops max, 40 byte packets
 1  128.112.128.2    1.100 ms   0.989 ms   0.783 ms
 2  128.112.12.225   0.789 ms   0.551 ms   0.550 ms
 3  128.112.12.10    0.911 ms   0.897 ms   0.901 ms
 4  204.153.48.1     1.303 ms   2.245 ms   1.220 ms
 5  172.96.130.53    5.545 ms   5.983 ms   6.167 ms
 6  163.253.5.8      4.896 ms   6.031 ms   4.059 ms
 7  163.253.1.136    25.940 ms  26.487 ms  28.547 ms
 8  163.253.1.135    29.156 ms  26.231 ms  28.415 ms
 9  163.253.1.100    26.342 ms  26.484 ms  28.396 ms
10  163.253.2.33     27.219 ms  26.415 ms  26.244 ms
11  155.232.71.4     191.566 ms 191.656 ms 155.232.71.2 193.004 ms
12  155.232.64.36    191.844 ms 155.232.64.34 191.927 ms 155.232.64.144 191.883 ms
13  155.232.64.70    191.563 ms 191.456 ms 191.507 ms
14  154.114.124.1    191.841 ms 191.949 ms 191.829 ms
15  * * *
16  * * *
17  * * *
18  * * *
19  * * *
20  * * *
21  * * *
22  * * *
23  * * *
24  * * *
25  * * *
26  * * *
27  * * *
28  * * *
29  * * *
30  * * *
```

Done.

Figure 8: traceroute from USA to Uct

# Traceroute

tracing path from www.net.princeton.edu to 103.27.9.24 ...

```
traceroute to 103.27.9.24 (103.27.9.24), 30 hops max, 40 byte packets
 1  128.112.128.2    0.832 ms  0.655 ms  0.957 ms
 2  128.112.12.225   0.662 ms  0.560 ms  0.607 ms
 3  128.112.12.10    1.102 ms  0.887 ms  0.988 ms
 4  204.153.48.1     14.879 ms 7.770 ms  1.370 ms
 5  172.96.130.53    4.617 ms  4.021 ms  4.230 ms
 6  172.96.130.61    6.099 ms  6.064 ms 172.96.130.77 6.190 ms
 7  163.253.5.38     6.800 ms  6.173 ms  6.095 ms
 8  180.149.48.12    85.213 ms 85.185 ms 85.229 ms
 9  180.149.48.1     228.044 ms 180.149.48.21 85.958 ms 180.149.48.1 227.515 ms
10  180.149.48.17    228.479 ms 180.149.48.5 228.298 ms 180.149.48.17 229.027 ms
11  * 180.149.48.17  227.395 ms *
12  * * *
13  * * *
14  * * *
15  * * *
16  * * *
17  * * *
18  * * *
19  * * *
20  * * *
21  * * *
22  * * *
23  * * *
24  * * *
25  * * *
26  * * *
27  * * *
28  * * *
29  * * *
30  * * *
```

Done.

Figure 9: traceroute from USA to IIT Delhi



## traceroute to www.google.com

---

```
traceroute to www.google.com (142.250.184.196), 30 hops max, 60 byte packets
 1 vsn0057.vs.mass.systems (10.92.36.120) 0.029 ms 0.014 ms 0.012 ms
 2 ae3-u100.sxbl-cr-nunki.bb.gdinf.net (87.230.112.2) 0.352 ms 0.337 ms 0.286 ms
 3 ael.sxbl-ibr-altair.bb.gdinf.net (87.230.112.14) 0.496 ms 0.511 ms 0.538 ms
 4 ffm-b16-link.ip.twelve99.net (62.115.144.8) 3.007 ms 2.982 ms 2.953 ms
 5 * ffm-bb1-link.ip.twelve99.net (62.115.132.226) 3.371 ms 3.414 ms
 6 ffm-b11-link.ip.twelve99.net (62.115.124.119) 3.181 ms 3.338 ms ffm-b11-link.ip.twelve99.net (62.115.124.117) 3.263 ms
 7 google-ic-319726.ip.twelve99-cust.net (62.115.151.25) 3.261 ms google-ic-319727.ip.twelve99-cust.net (62.115.151.27) 3.552 ms 3.526 ms
 8 * * *
 9 192.178.74.162 (192.178.74.162) 3.545 ms 108.170.252.65 (108.170.252.65) 4.596 ms 142.250.214.202 (142.250.214.202) 5.202 ms
10 108.170.251.209 (108.170.251.209) 4.054 ms 142.251.64.187 (142.251.64.187) 3.440 ms 108.170.252.82 (108.170.252.82) 3.513 ms
11 * fra24s11-in-f4.1e100.net (142.250.184.196) 3.247 ms 3.252 ms
```

Figure 10: traceroute from USA to Google

# Traceroute

tracing path from `www.net.princeton.edu` to `31.13.71.36` ...

```
traceroute to 31.13.71.36 (31.13.71.36), 30 hops max, 40 byte packets
 1 128.112.128.2  1.169 ms  0.743 ms  1.069 ms
 2 128.112.12.225  0.787 ms  0.754 ms  0.668 ms
 3 128.112.12.10   0.895 ms  0.878 ms  0.905 ms
 4 204.153.48.1    2.322 ms  1.383 ms  1.298 ms
 5 172.96.130.53   3.308 ms  4.165 ms  3.872 ms
 6 172.96.130.77   6.073 ms  172.96.130.61  5.951 ms  6.263 ms
 7 198.71.47.232   7.510 ms  5.954 ms  6.051 ms
 8 163.253.2.123   7.161 ms  163.253.2.149  6.262 ms  5.973 ms
 9 162.252.69.205  5.094 ms  4.553 ms  162.252.69.207  4.992 ms
10 157.240.103.128  3.641 ms  157.240.103.116  3.645 ms  4.137 ms
11 157.240.107.143  4.535 ms  157.240.107.163  4.036 ms  157.240.107.189  3.823 ms
12 173.252.67.75   4.431 ms  157.240.38.65   4.539 ms  157.240.38.243   3.948 ms
13 31.13.71.36     3.812 ms  4.427 ms  3.704 ms
```

Done.

Figure 11: traceroute from USA to Facebook

```

[apple@Ajaykumar ~] % traceroute www.utah.edu
traceroute to www.utah.edu (155.98.196.21), 64 hops max, 52 byte packets
 1  10.184.0.13 (10.184.0.13)  6.615 ms  3.905 ms  4.707 ms
 2  10.264.175.5 (10.264.175.5)  5.641 ms
 3  10.264.175.1 (10.264.175.1)  3.624 ms  4.884 ms
 4  10.255.1.34 (10.255.1.34)  5.282 ms  6.367 ms  5.353 ms
 5  10.119.233.65 (10.119.233.65)  5.142 ms  4.941 ms  4.972 ms
 6  10.1.207.65 (10.1.207.65)  39.007 ms  33.457 ms  32.998 ms
 7  10.1.200.137 (10.1.200.137)  28.826 ms  26.757 ms  26.486 ms
 8  10.255.238.254 (10.255.238.254)  31.702 ms
 9  10.255.238.122 (10.255.238.122)  37.627 ms
10  10.255.238.254 (10.255.238.254)  32.996 ms
11  180.149.48.18 (180.149.48.18)  56.612 ms  55.836 ms  60.209 ms
12  180.149.48.6 (180.149.48.6)  170.801 ms
13  180.149.48.2 (180.149.48.2)  200.140 ms
14  180.149.48.6 (180.149.48.6)  172.544 ms
15  180.149.48.20 (180.149.48.20)  180.104 ms
16  180.149.48.13 (180.149.48.13)  345.228 ms
17  fourhundredge-0-0-2.4079.core1.ashb.net.internet2.edu (163.253.1.116)  367.829 ms  369.187 ms  412.613 ms
18  fourhundredge-0-0-18.4079.core2.ashb.net.internet2.edu (163.253.1.107)  408.009 ms
19  fourhundredge-0-0-18.4079.core2.ashb.net.internet2.edu (163.253.1.107)  313.243 ms
20  fourhundredge-0-0-1.4079.core2.clev.net.internet2.edu (163.253.1.139)  363.165 ms
21  fourhundredge-0-0-1.4079.core2.clev.net.internet2.edu (163.253.1.139)  406.240 ms
22  fourhundredge-0-0-2.4079.core2.eqch.net.internet2.edu (163.253.2.17)  407.750 ms
23  fourhundredge-0-0-1.4079.core2.clev.net.internet2.edu (163.253.1.139)  371.949 ms
24  fourhundredge-0-0-2.4079.core2.chic.net.internet2.edu (163.253.2.18)  405.290 ms
25  fourhundredge-0-0-2.4079.core2.eqch.net.internet2.edu (163.253.2.17)  343.345 ms
26  fourhundredge-0-0-2.4079.core2.chic.net.internet2.edu (163.253.2.18)  373.347 ms
27  fourhundredge-0-0-2.4079.core2.chic.net.internet2.edu (163.253.2.18)  406.383 ms
28  fourhundredge-0-0-1.4079.core1.kans.net.internet2.edu (163.253.1.245)  352.994 ms
29  fourhundredge-0-0-1.4079.core1.denv.net.internet2.edu (163.253.1.242)  409.889 ms
30  fourhundredge-0-0-3.4079.core1.salt.net.internet2.edu (163.253.1.171)  411.637 ms
31  fourhundredge-0-0-1.4079.core1.denv.net.internet2.edu (163.253.1.242)  314.577 ms
32  fourhundredge-0-0-1.4079.core1.lasv.net.internet2.edu (163.253.1.152)  315.263 ms
33  fourhundredge-0-0-3.4079.core1.salt.net.internet2.edu (163.253.1.171)  412.538 ms
34  163.253.5.7 (163.253.5.7)  404.213 ms
35  fourhundredge-0-0-1.4079.core1.lasv.net.internet2.edu (163.253.1.152)  375.503 ms
36  163.253.5.7 (163.253.5.7)  407.244 ms
37  tdc-beibr-b-170-int.uen.net (140.197.249.81)  407.671 ms  407.639 ms
38  tdc-beibr-b-170-int.uen.net (140.197.249.81)  415.760 ms
39  ddc-pep-c-123-int.uen.net (140.197.251.32)  403.230 ms
40  tdc-beibr-b-170-int.uen.net (140.197.249.81)  408.043 ms
41  ddc-pep-b-120-int.uen.net (140.197.253.97)  410.022 ms  371.025 ms
42  ddc-pep-c-123-int.uen.net (140.197.251.32)  408.691 ms
43  ebc-pep-b-170-int.uen.net (140.197.252.76)  406.059 ms
44  ddc-pep-b-120-int.uen.net (140.197.253.97)  415.245 ms  341.786 ms
45  ebc-pep-a-178-int.uen.net (140.197.252.84)  330.971 ms
46  ebc-pep-b-170-int.uen.net (140.197.252.76)  319.841 ms  395.872 ms
47  ebc-pep-a-178-int.uen.net (140.197.252.84)  420.431 ms * 323.223 ms
48  199.104.93.22 (199.104.93.22)  388.315 ms
49  199.104.93.29 (199.104.93.29)  422.596 ms
50  199.104.93.22 (199.104.93.22)  413.338 ms  409.623 ms
51  155.99.130.59 (155.99.130.59)  408.328 ms
52  155.99.130.29 (155.99.130.29)  406.923 ms
53  155.99.130.57 (155.99.130.57)  343.740 ms
54  155.99.130.103 (155.99.130.103)  487.645 ms
55  155.99.130.57 (155.99.130.57)  343.152 ms
56  155.99.130.105 (155.99.130.105)  374.192 ms
57  172.31.241.249 (172.31.241.249)  408.771 ms
58  172.31.241.261 (172.31.241.261)  400.812 ms
59  155.99.130.103 (155.99.130.103)  400.567 ms
60  172.31.241.22 (172.31.241.22)  408.565 ms
61  172.31.241.249 (172.31.241.249)  344.949 ms *
62  172.31.241.29 (172.31.241.29)  375.924 ms * *
63  * * *
64  * * *
65  * * *

```

Figure 12: traceroute from my Device to Utah

```

[apple@Ajaykumar ~ % traceroute www.uct.ac.za
traceroute to cms-vip-prd.uct.ac.za (137.158.159.192), 64 hops max, 52 byte packets
 1  10.184.0.13 (10.184.0.13)  6.383 ms  3.671 ms  3.259 ms
 2  10.254.175.1 (10.254.175.1)  4.372 ms
   10.254.175.5 (10.254.175.5)  4.698 ms  4.431 ms
 3  10.255.1.34 (10.255.1.34)  5.154 ms  4.436 ms  4.193 ms
 4  10.119.233.65 (10.119.233.65)  4.319 ms  5.252 ms  4.403 ms
 5  * * *
 6  10.1.207.65 (10.1.207.65)  41.223 ms  34.017 ms  34.728 ms
 7  10.1.200.137 (10.1.200.137)  27.214 ms  27.543 ms  27.291 ms
 8  10.255.238.254 (10.255.238.254)  32.927 ms  37.312 ms
   10.255.238.122 (10.255.238.122)  37.096 ms
 9  180.149.48.18 (180.149.48.18)  61.997 ms  59.239 ms  57.623 ms
10  180.149.48.2 (180.149.48.2)  199.334 ms  197.806 ms  199.043 ms
11  180.149.48.20 (180.149.48.20)  196.212 ms
   xe-0-0-2-0-600-ams1-ir1.net.tenet.ac.za (155.232.220.18)  200.545 ms  198.035 ms
12  xe-0-0-2-0-600-ams1-ir1.net.tenet.ac.za (155.232.220.18)  198.571 ms
   xe-0-0-1-1-10-mtz1-ir1.net.tenet.ac.za (155.232.1.21)  394.626 ms
   xe-0-0-2-0-600-ams1-ir1.net.tenet.ac.za (155.232.220.18)  202.471 ms
13  xe-0-0-1-1-10-mtz1-ir1.net.tenet.ac.za (155.232.1.21)  410.954 ms
   et-1-1-1-0-isd1-pe1.net.tenet.ac.za (155.232.1.153)  378.942 ms
   xe-0-0-1-1-10-mtz1-ir1.net.tenet.ac.za (155.232.1.21)  360.205 ms
14  et-1-1-4-0-cpt3-pe1.net.tenet.ac.za (155.232.1.148)  409.432 ms
   et-1-1-1-0-isd1-pe1.net.tenet.ac.za (155.232.1.153)  417.786 ms  486.574 ms
15  et-0-0-1-0-cpt7-pe1.net.tenet.ac.za (155.232.64.70)  413.422 ms
   et-1-1-4-0-cpt3-pe1.net.tenet.ac.za (155.232.1.148)  401.708 ms
   et-0-0-1-0-cpt7-pe1.net.tenet.ac.za (155.232.64.70)  409.591 ms
16  et-0-0-1-0-cpt7-pe1.net.tenet.ac.za (155.232.64.70)  401.080 ms
   154.114.124.1 (154.114.124.1)  398.651 ms
   et-0-0-1-0-cpt7-pe1.net.tenet.ac.za (155.232.64.70)  376.401 ms
17  * * 154.114.124.1 (154.114.124.1)  385.455 ms
18  * * *
19  * * *
20  * * *
21  * * *
22  * * *
23  * * *

```

Figure 13: traceroute from my Device to Uct



```
[apple@Ajaykumar ~ % traceroute www.iitd.ac.in
traceroute to www.iitd.ac.in (10.10.211.212), 64 hops max, 52 byte packets
 1  10.184.0.13 (10.184.0.13)  5.932 ms  3.241 ms  4.212 ms
 2  10.254.175.1 (10.254.175.1)  4.412 ms
    10.254.175.5 (10.254.175.5)  4.621 ms  4.370 ms
 3  10.254.236.2 (10.254.236.2)  6.400 ms
    10.254.236.22 (10.254.236.22)  4.198 ms
    10.254.236.26 (10.254.236.26)  5.222 ms
 4  www.iitd.ac.in (10.10.211.212)  3.630 ms  5.162 ms  4.020 ms
```

Figure 14: traceroute from my Device to IIT Delhi

```

[apple@Ajaykumar ~ % traceroute www.google.com
traceroute to www.google.com (142.250.195.4), 64 hops max, 52 byte packets
 1 10.184.0.13 (10.184.0.13) 5.168 ms 5.250 ms 4.241 ms
 2 10.254.175.1 (10.254.175.1) 4.367 ms
   10.254.175.5 (10.254.175.5) 4.699 ms 3.665 ms
 3 10.255.1.34 (10.255.1.34) 5.227 ms 4.369 ms 5.271 ms
 4 10.119.233.65 (10.119.233.65) 4.010 ms 4.283 ms 4.135 ms
 5 * * *
 6 * * *
 7 10.119.234.162 (10.119.234.162) 15.244 ms 5.961 ms 6.308 ms
 8 72.14.195.56 (72.14.195.56) 14.906 ms
   72.14.194.160 (72.14.194.160) 7.055 ms
   72.14.195.56 (72.14.195.56) 7.307 ms
 9 108.170.251.113 (108.170.251.113) 9.606 ms
   108.170.251.97 (108.170.251.97) 7.529 ms
   108.170.251.113 (108.170.251.113) 10.546 ms
10 142.251.52.213 (142.251.52.213) 8.340 ms
   142.251.52.211 (142.251.52.211) 9.477 ms 8.432 ms
11 del12s09-in-f4.1e100.net (142.250.195.4) 7.575 ms 9.166 ms 8.530 ms

```

Figure 15: traceroute from my Device to Google

```

apple@Ajaykumar ~ % traceroute www.facebook.com
traceroute to star-mini.c10r.facebook.com (157.240.16.35), 64 hops max, 52 byte packets
 1 10.184.0.13 (10.184.0.13) 5.776 ms 4.271 ms 4.229 ms
 2 10.254.175.5 (10.254.175.5) 6.329 ms
   10.254.175.1 (10.254.175.1) 4.686 ms 4.470 ms
 3 10.255.1.34 (10.255.1.34) 5.325 ms 3.896 ms 5.228 ms
 4 10.119.233.65 (10.119.233.65) 4.174 ms 5.719 ms 7.707 ms
 5 * * *
 6 * * *
 7 10.1.200.137 (10.1.200.137) 34.851 ms 29.267 ms 30.076 ms
 8 * * *
 9 10.152.7.214 (10.152.7.214) 66.529 ms
   10.152.7.38 (10.152.7.38) 34.376 ms 32.786 ms
10 10.152.7.233 (10.152.7.233) 59.016 ms 60.621 ms 59.435 ms
11 ae2.pr02.bom1.tfbnw.net (157.240.66.204) 36.558 ms 46.610 ms 36.099 ms
12 157.240.38.241 (157.240.38.241) 34.404 ms
   173.252.67.185 (173.252.67.185) 26.483 ms
   157.240.38.125 (157.240.38.125) 67.569 ms
13 edge-star-mini-shv-01-bom1.facebook.com (157.240.16.35) 37.206 ms 39.191 ms 41.944 ms

```

Figure 16: traceroute from my Device to Facebook

If the pair of (traceroute source, destination) are geographically close to each other, does it roughly translate into fewer hops?

Yes, If the pair of Traceroute source and Destination are geographically close to each other, number of routers in between the respected source to destination will be less than the geographically the router which is far away from a particular. so it translates into fewer hops in the traceroute due to network infrastructure (as per distancing). The data packets can take a more direct route with fewer intermediary routers, resulting in a shorter path and, consequently, fewer hops. (Note: This might not be always true because proximity geography is not the only aspect to observed, it also can depend on various other factors like peering agreements, ISPs balancing, and so on.)

Do Google and Facebook differ from the others in the number of hops required to reach them, irrespective of which traceroute source is used? Why would this be so?

Yes, Google and Facebook will differ from other destinations according to the number of hops required to reach from source to destination. These differences can be observed irrespective of which traceroute source is used. The reasons can be:

1. Network Infrastructure: Global infrastructure locating around the world can result in shorter and more direct paths for data packets, leading to fewer hops.
  2. Peering Relationships: Google and Facebook have established peering agreements with many ISPs and networks, allowing them to exchange traffic directly without going through as many intermediary routers. This direct peering can lead to fewer hops and faster connections.
  3. Optimized Routing: Large tech companies like Google and Facebook invest in advanced routing technologies to optimize traffic flow. They use tools that dynamically select the best routes based on factors like latency and congestion, leading to efficient paths with fewer hops.
- and so on.

3.b. Also report the latencies between the traceroute sources and the web-servers. Does the latency seem to be related to the number of hops, being higher when there are more hops? Why is this the case?

Yes, there is a relation (in most of the cases) in between the number of hops and the latency or round trip time in a traceroute. Higher latency tends to be associated with more hops. This is due to the time it takes for data packets to traverse each network node and the nature of network communication too because several factors contribute this like:

1. Processing Delay: Each network device needs time to examine and process the packet header, determine the next hop, and forward the packet. This delay accumulates with each hop.
2. Propagation Delay: Data packets travel at the speed of light, but there is a

finite time it takes for the signal to propagate across physical links and cables. As the packet traverses more hops, the cumulative propagation delay increases.

3. Queueing delay: Network devices can introduce delays if they have a large number of packets in their queues awaiting processing or if there is congestion on the network. These delays become more significant with more hops.
4. Transmission delay: The amount of time required to push all the packet's bits into the wire
5. Longer Paths: Longer paths, with more intermediate routers, often involve routing through different geographical locations or across different network providers. These paths can introduce additional latency due to longer physical distances. and so on.

Between every two routers there are these above mentioned delays which cause latency.

3.c I haven't found any destination web-servers that are resolved to the same IP address with google and facebook on which we have worked on. I think this is because in different parts of the world traceroute servers use their nearest location DNS servers, in which DNS servers resolve IP addresses and Google and facebook has large number of data centres with servers across the world. so they could end up showing different IP Addresses. but also found that for any destination web-servers that are resolved to the same IP address with University of Utah and University of Cape Town. This may be due to many factors like Geolocation, etc.

3.d Traceroute paths from the same starting point to different IP addresses associated with the same web-server are observed different. The IP addresses which are obtained from other continents their respective paths are longer and can't be reached in 30 hops (webserver used - [www.iitd.ac.in](http://www.iitd.ac.in)), and the IP address which is obtained from my mobile-network can be reached in 12 hops.

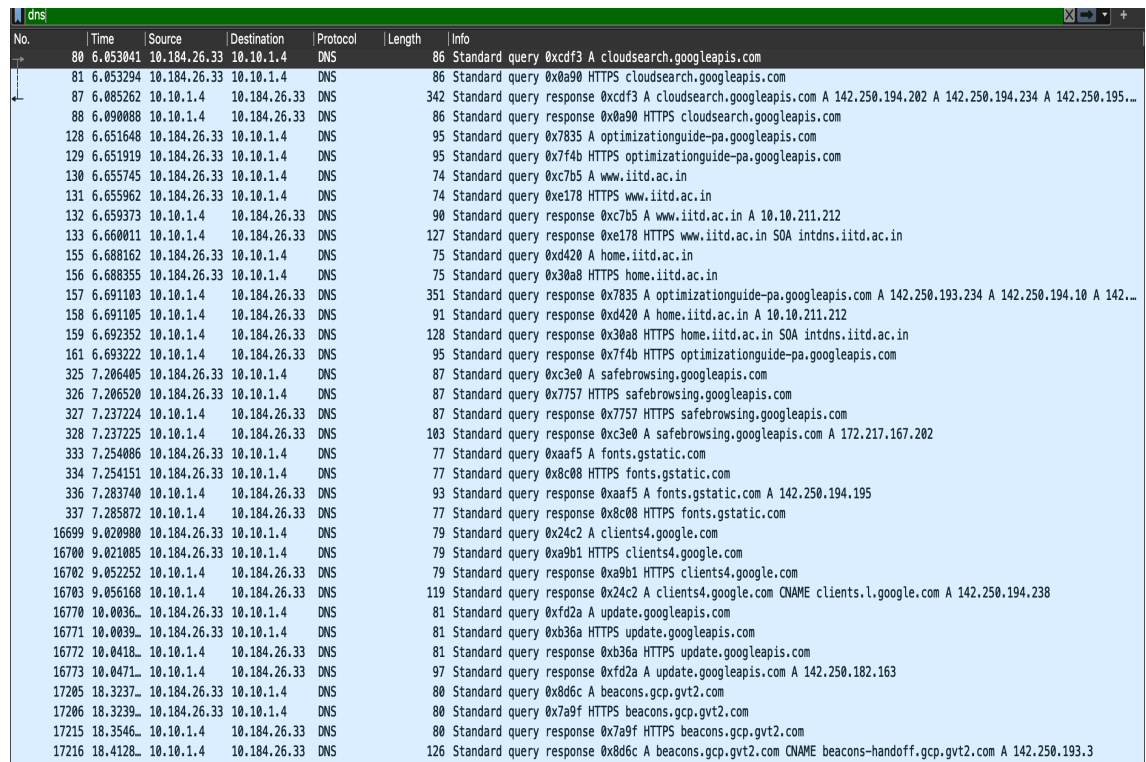
3.e. Yes I am able to find countries which have high latencies above 200 ms which implies that they do not seem to have their local ISPs directly peered with Google and Facebook namely Nairobi of Africa (approximately 430 ms) and Taipei (approximately 355 ms), etc. because data centres for these countries to achieve lower latencies are far away from them and thus they are having the high latencies when traced via Internet. others like USA, UK they have nearer data centres which have lesser latency and are seemed to be directly peered to the local ISPs.

## 4

4.a. We have used Wireshark and grabbed all packets on the wireless interface on HTTP website <http://www.iitd.ac.in> from the browser, applied DNS filter on

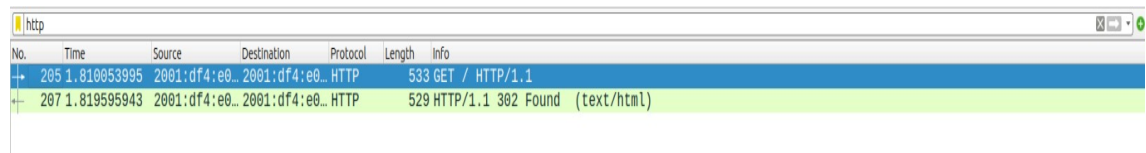
the packet trace, we have observed the DNS queries and responses on wireshark. Total time for A-type requests and responses is : 0.003628 sec. Total time for http-type requests and responses is : 0.004049 sec.

We have used wireshark and grabbed all packets on the wireless interface on HTTP website <http://act4d.iitd.ac.in> from the browser, applied dns filter on the packet trace, we have observed the DNS queries and responses on wire-shark. Total time for A-type requests and responses is : 0.003059 sec. Total time for http-type requests and responses is : 0.003996 sec.



No.	Time	Source	Destination	Protocol	Length	Info
80	6.053041	10.184.26.33	10.10.1.4	DNS	86	Standard query 0xcdf3 A cloudsearch.googleapis.com
81	6.053294	10.184.26.33	10.10.1.4	DNS	86	Standard query 0xa90 HTTPS cloudsearch.googleapis.com
87	6.085262	10.10.1.4	10.184.26.33	DNS	342	Standard query response 0xcdf3 A cloudsearch.googleapis.com A 142.250.194.202 A 142.250.194.234 A 142.250.195...
88	6.090088	10.10.1.4	10.184.26.33	DNS	86	Standard query response 0xa90 HTTPS cloudsearch.googleapis.com
128	6.651648	10.184.26.33	10.10.1.4	DNS	95	Standard query 0x7835 A optimizationguide-pa.googleapis.com
129	6.651919	10.184.26.33	10.10.1.4	DNS	95	Standard query 0x7f4b HTTPS optimizationguide-pa.googleapis.com
130	6.655745	10.184.26.33	10.10.1.4	DNS	74	Standard query 0xc7b5 A www.iitd.ac.in
131	6.655962	10.184.26.33	10.10.1.4	DNS	74	Standard query 0xe178 HTTPS www.iitd.ac.in
132	6.659373	10.10.1.4	10.184.26.33	DNS	90	Standard query response 0xc7b5 A www.iitd.ac.in A 10.10.211.212
133	6.660011	10.10.1.4	10.184.26.33	DNS	127	Standard query response 0xe178 HTTPS www.iitd.ac.in SOA intdns.iitd.ac.in
155	6.688162	10.184.26.33	10.10.1.4	DNS	75	Standard query 0xd420 A home.iitd.ac.in
156	6.688355	10.184.26.33	10.10.1.4	DNS	75	Standard query 0x30a8 HTTPS home.iitd.ac.in
157	6.691103	10.10.1.4	10.184.26.33	DNS	351	Standard query response 0x7835 A optimizationguide-pa.googleapis.com A 142.250.193.234 A 142.250.194.10 A 142...
158	6.691105	10.10.1.4	10.184.26.33	DNS	91	Standard query response 0xd420 A home.iitd.ac.in A 10.10.211.212
159	6.692352	10.10.1.4	10.184.26.33	DNS	128	Standard query response 0x30a8 HTTPS home.iitd.ac.in SOA intdns.iitd.ac.in
161	6.693222	10.10.1.4	10.184.26.33	DNS	95	Standard query response 0x7f4b HTTPS optimizationguide-pa.googleapis.com
325	7.206405	10.184.26.33	10.10.1.4	DNS	87	Standard query 0xc3e0 A safebrowsing.googleapis.com
326	7.206520	10.184.26.33	10.10.1.4	DNS	87	Standard query 0x7757 HTTPS safebrowsing.googleapis.com
327	7.237224	10.10.1.4	10.184.26.33	DNS	87	Standard query response 0x7757 HTTPS safebrowsing.googleapis.com
328	7.237225	10.10.1.4	10.184.26.33	DNS	103	Standard query response 0xc3e0 A safebrowsing.googleapis.com A 172.217.167.202
333	7.254086	10.184.26.33	10.10.1.4	DNS	77	Standard query 0xaaaf5 A fonts.gstatic.com
334	7.254151	10.184.26.33	10.10.1.4	DNS	77	Standard query 0x8c08 HTTPS fonts.gstatic.com
336	7.283740	10.10.1.4	10.184.26.33	DNS	93	Standard query response 0xaaaf5 A fonts.gstatic.com A 142.250.194.195
337	7.285872	10.10.1.4	10.184.26.33	DNS	77	Standard query response 0x8c08 HTTPS fonts.gstatic.com
16699	9.020900	10.184.26.33	10.10.1.4	DNS	79	Standard query 0x24c2 A clients4.google.com
16700	9.021085	10.184.26.33	10.10.1.4	DNS	79	Standard query 0xa9b1 HTTPS clients4.google.com
16702	9.052252	10.10.1.4	10.184.26.33	DNS	79	Standard query response 0xa9b1 HTTPS clients4.google.com
16703	9.056168	10.10.1.4	10.184.26.33	DNS	119	Standard query response 0x24c2 A clients4.google.com CNAME clients.l.google.com A 142.250.194.238
16770	10.0036...	10.184.26.33	10.10.1.4	DNS	81	Standard query 0xfd2a A update.googleapis.com
16771	10.0039...	10.184.26.33	10.10.1.4	DNS	81	Standard query 0xb36a HTTPS update.googleapis.com
16772	10.0418...	10.10.1.4	10.184.26.33	DNS	81	Standard query response 0xb36a HTTPS update.googleapis.com
16773	10.0471...	10.10.1.4	10.184.26.33	DNS	97	Standard query response 0xfd2a A update.googleapis.com A 142.250.182.163
17205	18.3237...	10.184.26.33	10.10.1.4	DNS	80	Standard query 0x8d6c A beacons.gcp.gvt2.com
17206	18.3239...	10.184.26.33	10.10.1.4	DNS	80	Standard query 0x7a9f HTTPS beacons.gcp.gvt2.com
17215	18.3546...	10.10.1.4	10.184.26.33	DNS	80	Standard query response 0x7a9f HTTPS beacons.gcp.gvt2.com
17216	18.4128...	10.10.1.4	10.184.26.33	DNS	126	Standard query response 0x8d6c A beacons.gcp.gvt2.com CNAME beacons-handoff.gcp.gvt2.com A 142.250.193.3

Figure 17: DNS filtered www.iitd.ac.in wireshark



No.	Time	Source	Destination	Protocol	Length	Info
205	1.810053995	2001:df4:e0...	2001:df4:e0...	HTTP	533	GET / HTTP/1.1
207	1.819595943	2001:df4:e0...	2001:df4:e0...	HTTP	529	HTTP/1.1 302 Found (text/html)

Figure 18: http filtered for http://iitd.ac.in wireshark

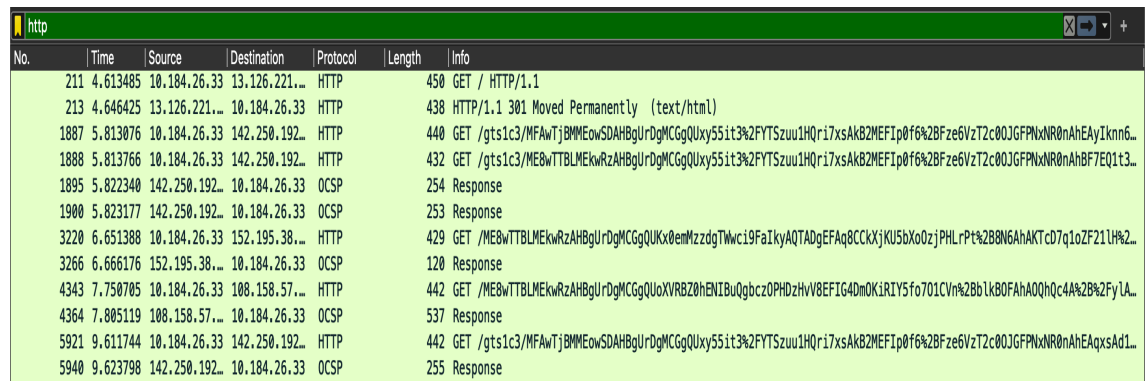
4.b. After applying http filter for www.iitd.ac.in, I am getting 1 http request and response as shown in fig.18

After applying http filter for www.act4d.iitd.ac.in, I am getting 11 http requests, requesting the server for html, css, js files required for a webpage and also images.

From this I can understand that http requests are used for requesting the html, css, js, images, etc.. required for a webpage.

4.c. No, they are not same as the number of HTTP requests for content objects that we have found in the previous part. In the previous part we have got 11 https but now here we are able to see 20 TCPs so they are different.

4.d. On doing trace for http://www.indianexpress.com we came across a few http requests on filtering http in the Wireshark. By this we can say that there is a http traffic for http://www.indianexpress.com  
yes, we have browsed the entire trace without any filters for http://indianexpress.com and we have seen the HTML file transferred, this means that the network traffic captured is not encrypted and the HTML content is being sent in clear text format.



No.	Time	Source	Destination	Protocol	Length	Info
211	4.613485	10.184.26.33	13.126.221....	HTTP	450	GET / HTTP/1.1
213	4.646425	13.126.221....	10.184.26.33	HTTP	438	HTTP/1.1 301 Moved Permanently (text/html)
1887	5.813076	10.184.26.33	142.250.192...	HTTP	440	GET /gts1c3/MFAwTjBMMEowSDAHBgUrdgMCgQUxy55it3%2FYTSzuu1HQri7xsAkB2MEFIp0f6%2BFze6VzT2c0JGFPNxnR0nAhEAyIkn6...
1888	5.813766	10.184.26.33	142.250.192...	HTTP	432	GET /gts1c3/ME8wTTBLMEKwRzAHBgUrdgMCgQUxy55it3%2FYTSzuu1HQri7xsAkB2MEFIp0f6%2BFze6VzT2c0JGFPNxnR0nAhBF7EQ1t3...
1895	5.822340	142.250.192...	10.184.26.33	OCSP	254	Response
1900	5.823177	142.250.192...	10.184.26.33	OCSP	253	Response
3220	6.651388	10.184.26.33	152.195.38...	HTTP	429	GET /ME8wTTBLMEKwRzAHBgUrdgMCgQUxy55it3%2FYTSzuu1HQri7xsAkB2MEFIp0f6%2BFze6VzT2c0JGFPNxnR0nAhBF7EQ1t3...
3266	6.666176	152.195.38...	10.184.26.33	OCSP	120	Response
4343	7.750705	10.184.26.33	108.158.57...	HTTP	442	GET /ME8wTTBLMEKwRzAHBgUrdgMCgQUxy55it3%2FYTSzuu1HQri7xsAkB2MEFIp0f6%2BFze6VzT2c0JGFPNxnR0nAhBF7EQ1t3...
4364	7.805119	108.158.57...	10.184.26.33	OCSP	537	Response
5921	9.611744	10.184.26.33	142.250.192...	HTTP	442	GET /gts1c3/MFAwTjBMMEowSDAHBgUrdgMCgQUxy55it3%2FYTSzuu1HQri7xsAkB2MEFIp0f6%2BFze6VzT2c0JGFPNxnR0nAhEAqsAd1...
5940	9.623798	142.250.192...	10.184.26.33	OCSP	255	Response

Figure 19: http filtered www.indianexpress.com.in Wireshark

