

E1:

1. IP address: 151.101.65.67/151.101.129.67/151.101.193.67/151.101.1.67. In my opinion, the reason why I got four IP addressed is that the answer I've received is essentially a cached or forwarded response from my local DNS sever, it is called load balancing which aims to optimize resource use and avoid overload.
2. Name: localhost. Localhost is a hostname which means this computer, and it is used to access the network service that are running on the host via the loopback network interface. Generally, it is used for testing purpose.

E2:

The reason that some hosts are not reachable is that these hosts name are wrong or not exist and DNS sever cannot find IP address corresponding to these websites, for example,

www.getfittest.com.au and www.hola.hp are unreachable by ping command.

www.kremlin.ru is unreachable by ping command but reachable from the web browser, mainly because some host severs disable ICMP protocol or set up a whitelist in order to avoid excessive ping traffic and malicious detection but web browser uses HTTP protocol, so even if ICMP is disabled, the web service can be used normally.

E3:

1. There are 22 routers between my workstation and www.columbia.edu. 5 routers along the path are part of the UNSW network. Packets cross the Pacific Ocean between No.9(113.197.15.201, AU) and No.10(207.231.240.8, USA) router.

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f5230310@v2:~$ traceroute www.columbia.edu
traceroute to www.columbia.edu (128.59.105.24), 30 hops max, 60 byte packets
 1 cserouter1-server.cse.unsw.edu.au (129.94.242.251) 0.083 ms 0.058 ms 0.074 ms
 2 129.94.39.17 (129.94.39.17) 0.837 ms 0.826 ms 0.806 ms
 3 libudnex1-vl-3154.gw.unsw.edu.au (149.171.253.34) 1.580 ms 1.591 ms ombudnex1-vl-3154.gw.unsw.edu.au (149.171.253.35) 1.388 ms
 4 ombcr1-po-6.gw.unsw.edu.au (149.171.255.169) 1.112 ms libcr1-po-5.gw.unsw.edu.au (149.171.255.165) 1.104 ms ombcr1-po-6.gw.unsw.edu.a
u (149.171.255.169) 1.099 ms
 5 unswbr1-te-2-13.gw.unsw.edu.au (149.171.255.105) 1.112 ms unswbr1-te-1-9.gw.unsw.edu.au (149.171.255.101) 1.125 ms 1.143 ms
 6 138.44.5.0 (138.44.5.0) 1.257 ms 1.387 ms 1.344 ms
 7 et-1-3-0.pe1.sxt.bkvl.nsw.aarnet.net.au (113.197.15.149) 2.043 ms 1.979 ms 2.064 ms
 8 et-0-0-0.pe1.a.hnl.aarnet.net.au (113.197.15.99) 95.034 ms 94.971 ms 94.946 ms
 9 et-2-1-0.bdr1.a.sea.aarnet.net.au (113.197.15.201) 146.477 ms 146.563 ms 146.518 ms
10 abilene-1-lo-jmb-706.sttlwa.pacificwave.net (207.231.240.8) 146.631 ms 146.576 ms 146.648 ms
11 et-4-0-0.4079.rtsw.miss2.net.internet2.edu (162.252.70.0) 160.610 ms 160.476 ms 160.146 ms
12 et-4-0-0.4079.rtsw.minn.net.internet2.edu (162.252.70.58) 180.546 ms 180.442 ms 181.020 ms
13 et-1-1-5.4079.rtsw.eqch.net.internet2.edu (162.252.70.106) 246.568 ms 196.593 ms 196.457 ms
14 ae-0.4079.rtsw3.eqch.net.internet2.edu (162.252.70.163) 188.530 ms 189.684 ms 189.647 ms
15 ae-1.4079.rtsw.clev.net.internet2.edu (162.252.70.130) 196.968 ms 196.918 ms 196.960 ms
16 buf-9208-I2-CLEV.nysernet.net (199.109.11.33) 201.269 ms 202.713 ms 202.663 ms
17 syr-9208-buf-9208.nysernet.net (199.109.7.193) 204.466 ms 204.571 ms 205.295 ms
18 199.109.7.98 (199.109.7.98) 207.238 ms 207.407 ms 207.267 ms
19 nyc-9208-alb-7600.nysernet.net (199.109.7.101) 210.147 ms 210.099 ms 210.274 ms
20 columbia.nyc-9208.nysernet.net (199.109.4.14) 209.954 ms 210.125 ms 209.981 ms
21 cc-core-1-x-nyser32-gw-1.net.columbia.edu (128.59.255.5) 210.208 ms 210.264 ms 210.271 ms
22 cc-conc-1-x-cc-core-1.net.columbia.edu (128.59.255.21) 210.413 ms 210.439 ms 210.664 ms
23 neighbors.columbia.edu (128.59.105.24) 210.213 ms 210.192 ms 210.243 ms

```

2. As we can see, the first 6 routers are the same on all these 3 paths, in addition www.ucla.edu and www.lancaster.ac.uk have same hops between No.1 and No.9.

For all 3 paths, they diverge following the No.6(138.44.5.0) router, the details of this router shows below:

```
% Information related to '138.44.5.0/24AS7575'

route:      138.44.5.0/24
origin:     AS7575
descr:      Australian Academic and Research Network
            Building 9
            Banks Street
mnt-by:      MAINT-AARNET-AP
last-modified: 2019-04-03T03:55:51Z
source:     APNIC
```

The number of hops on each path don't have proportional relationship with the physical distance, since traceroute to tokyo(www.u-tokyo.ac.jp) and LA (www.ucla.edu) have great difference physical distance but almost the same hops, 15 and 14 respectively.

```
z5230310@vx1:/tmp_amd/kamen/export/kamen/4/z5230310/Desktop$ traceroute www.ucla.edu
traceroute to www.ucla.edu (164.67.228.152), 30 hops max, 60 byte packets
 1 cserouter1-server.cse.unsw.EDU.AU (129.94.242.251) 0.115 ms 0.091 ms 0.070 ms
 2 129.94.39.17 (129.94.39.17) 0.836 ms 0.855 ms 0.807 ms
 3 ombudhex1-v1-3154.gw.unsw.edu.au (149.171.253.35) 1.338 ms libudhex1-v1-3154.gw.unsw.edu.au (149.171.253.34) 1.274 ms
 4 libcr1-po-6.gw.unsw.edu.au (149.171.255.201) 3.983 ms ombcr1-po-6.gw.unsw.edu.au (149.171.255.169) 0.997 ms 1.067 ms
 5 unswbr1-te-1-9.gw.unsw.edu.au (149.171.255.101) 1.123 ms 1.112 ms unswbr1-te-2-13.gw.unsw.edu.au (149.171.255.105) 1.123 ms
 6 138.44.5.0 (138.44.5.0) 1.876 ms 1.222 ms 1.217 ms
 7 et-1-3-0.pe1.sxt.bkvl.nsw.aarnet.net.au (113.197.15.149) 2.160 ms 2.184 ms 2.160 ms
 8 et-0-0-0.pe1.a.hnl.aarnet.net.au (113.197.15.99) 95.032 ms 95.144 ms 95.093 ms
 9 et-2-1-0.bdr1.a.sea.aarnet.net.au (113.197.15.201) 146.504 ms 146.542 ms 146.494 ms
10 cenichpr-1-is-jmb-778.srvaca.pacificwave.net (207.231.245.129) 163.110 ms 163.108 ms 163.079 ms
11 hpr-lax-hpr3--sv1-hpr3-100ge.cenic.net (137.164.25.73) 171.178 ms 171.200 ms 171.224 ms
12 * * *
13 bd11f1.anderson--cr00f2.csb1.ucla.net (169.232.4.4) 171.397 ms 171.615 ms 172.065 ms
14 cr00f2.csb1--dr00f2.csb1.ucla.net (169.232.4.53) 171.356 ms cr00f1.anderson--dr00f2.csb1.ucla.net (169.232.4.55) 171.395 ms 171.369 ms
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z5230310@vxl1:/tmp_and/kamen/export/kamen/4/z5230310/Desktop$ traceroute www.u-tokyo.ac.jp
traceroute to www.u-tokyo.ac.jp (210.152.243.234), 30 hops max, 60 byte packets
 1 cserouter1-server.cse.unsw.EDU.AU (129.94.242.251) 0.077 ms 0.079 ms 0.081 ms
 2 129.94.39.17 (129.94.39.17) 0.881 ms 0.829 ms 0.792 ms
 3 ombudnex1-v1-3154.gw.unsw.edu.au (149.171.253.35) 1.302 ms libudnex1-v1-3154.gw.unsw.edu.au (149.171.253.34) 1.188 ms
 1.449 ms
 4 libcr1-po-6.gw.unsw.edu.au (149.171.255.201) 1.094 ms ombcr1-po-6.gw.unsw.edu.au (149.171.255.169) 8.023 ms ombcr1-po-
 5.gw.unsw.edu.au (149.171.255.197) 8.051 ms
 5 unswbr1-te-2-13.gw.unsw.edu.au (149.171.255.105) 1.142 ms unswbr1-te-1-9.gw.unsw.edu.au (149.171.255.101) 1.168 ms un
 swbr1-te-2-13.gw.unsw.edu.au (149.171.255.105) 1.157 ms
 6 138.44.5.0 (138.44.5.0) 1.294 ms 1.272 ms 1.342 ms
 7 et-0-3-0.pe1.bkvl.nsw.aarnet.net.au (113.197.15.147) 1.805 ms 1.692 ms 1.713 ms
 8 ge-4-0-0.bb1.a.pao.aarnet.net.au (202.158.194.177) 156.030 ms 155.984 ms 155.950 ms
 9 paloalto0.iiij.net (198.32.176.24) 157.389 ms 157.428 ms 157.490 ms
10 osk004bb00.IIJ.Net (58.138.88.185) 288.238 ms osk004bb01.IIJ.Net (58.138.88.189) 270.820 ms 270.819 ms
11 osk004ix51.IIJ.Net (58.138.106.130) 279.078 ms osk004ix51.IIJ.Net (58.138.106.126) 288.087 ms 287.826 ms
12 210.130.135.130 (210.130.135.130) 279.173 ms 279.145 ms 270.544 ms
13 124.83.228.58 (124.83.228.58) 270.510 ms 270.694 ms 270.647 ms
14 124.83.252.178 (124.83.252.178) 276.363 ms 285.140 ms 276.548 ms
15 158.205.134.26 (158.205.134.26) 284.991 ms 285.131 ms 285.109 ms
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z5230310@vxl1:/tmp_and/kamen/export/kamen/4/z5230310/Desktop$ traceroute www.lancaster.ac.uk
traceroute to www.lancaster.ac.uk (148.88.65.80), 30 hops max, 60 byte packets
 1 cserouter1-server.cse.unsw.EDU.AU (129.94.242.251) 0.118 ms 0.095 ms 0.085 ms
 2 129.94.39.17 (129.94.39.17) 0.838 ms 0.832 ms 0.876 ms
 3 libudnex1-v1-3154.gw.unsw.edu.au (149.171.253.34) 1.650 ms 1.643 ms 1.613 ms
 4 libcr1-po-6.gw.unsw.edu.au (149.171.255.201) 1.045 ms 1.060 ms ombcr1-po-5.gw.unsw.edu.au (149.171.255.197) 1.03
 2 ms
 5 unswbr1-te-1-9.gw.unsw.edu.au (149.171.255.101) 1.081 ms unswbr1-te-2-13.gw.unsw.edu.au (149.171.255.105) 1.100 m
 s unswbr1-te-1-9.gw.unsw.edu.au (149.171.255.101) 1.121 ms
 6 138.44.5.0 (138.44.5.0) 1.228 ms 1.294 ms 1.271 ms
 7 et-1-3-0.pe1.sxt.bkvl.nsw.aarnet.net.au (113.197.15.149) 2.286 ms 2.102 ms 2.102 ms
 8 et-0-0-0.pe1.a.hnl.aarnet.net.au (113.197.15.99) 95.120 ms 95.118 ms 95.109 ms
 9 et-2-1-0.bdr1.a.sea.aarnet.net.au (113.197.15.201) 146.513 ms 146.451 ms 146.448 ms
10 abilene1-lo-jmb-706.sttlwa.pacificwave.net (207.231.240.8) 147.583 ms 147.143 ms 147.137 ms
11 et-4-0-0.4079.rtsw.miss2.net.internet2.edu (162.252.70.0) 157.531 ms 157.552 ms 157.328 ms
12 et-4-0-0.4079.rtsw.minn.net.internet2.edu (162.252.70.58) 180.638 ms 180.432 ms 180.456 ms
13 et-1-1-5.4079.rtsw.eqch.net.internet2.edu (162.252.70.106) 188.356 ms 188.499 ms 188.566 ms
14 ae-0.4079.rtsw3.eqch.net.internet2.edu (162.252.70.163) 188.786 ms 188.536 ms 188.591 ms
15 ae-1.4079.rtsw.clev.net.internet2.edu (162.252.70.130) 198.215 ms 197.365 ms 197.457 ms
16 ae-0.4079.rtsw.ashb.net.internet2.edu (162.252.70.128) 205.229 ms 205.352 ms 205.332 ms
17 ae-2.4079.rtsw2.ashb.net.internet2.edu (162.252.70.75) 205.161 ms 205.223 ms 204.946 ms
18 ae-2.4079.rtsw.wash.net.internet2.edu (162.252.70.136) 205.250 ms 205.391 ms 205.267 ms
19 internet2-gw.mx1.lon.uk.geant.net (62.40.124.44) 279.891 ms 279.769 ms 280.137 ms
20 janet-gw.mx1.lon.uk.geant.net (62.40.124.198) 280.084 ms 280.062 ms 280.760 ms
21 ae29.londpg-sbr2.ja.net (146.97.33.2) 281.120 ms 280.428 ms 280.455 ms
22 ae31.erdiss-sbr2.ja.net (146.97.33.22) 284.319 ms 284.268 ms 284.304 ms
23 ae29.manckh-sbr2.ja.net (146.97.33.42) 286.223 ms 286.129 ms 286.169 ms
24 ae24.lanclu-rbr1.ja.net (146.97.38.58) 288.436 ms 288.422 ms 288.300 ms
25 lancaster-university.ja.net (194.81.46.2) 309.562 ms 309.144 ms 310.754 ms
26 * * *
27 ismx-issrx.rtr.lancs.ac.uk (148.88.255.17) 290.147 ms 290.340 ms 290.321 ms
28 iss-servers.iscore01-ismx01.rtr.lancs.ac.uk (148.88.7.137) 295.319 ms 293.348 ms 292.936 ms
29 * * *
30 www.lancs.ac.uk (148.88.65.80) 290.195 ms !X 290.183 ms !X 290.138 ms !X
z5230310@vxl1:/tmp_and/kamen/export/kamen/4/z5230310/Desktop$ █

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3. Traceroute from www.telstra.net to my machine:

Ip address of my machine: 129.94.39.23

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1  gigabitethernet3-3.exi2.melbourne.telstra.net (203.50.77.53)  0.398 ms  0.213 ms  0.243 ms
2  bundle-ether3-100.win-core10.melbourne.telstra.net (203.50.80.129)  1.368 ms  1.738 ms  2.120 ms
3  bundle-ether12.ken-core10.sydney.telstra.net (203.50.11.122)  12.370 ms  13.863 ms  12.606 ms
4  bundle-ether1.ken-edge901.sydney.telstra.net (203.50.11.95)  11.972 ms  11.988 ms  11.978 ms
5  aarnet6.lnk.telstra.net (139.130.0.78)  11.600 ms  11.613 ms  11.597 ms
6  ge-6-0-0.bb1.a.syd.aarnet.net.au (202.158.202.17)  11.862 ms  11.834 ms  11.733 ms
7  ae9.pe2.brwy.nsw.aarnet.net.au (113.197.15.56)  11.989 ms  12.097 ms  11.985 ms
8  et-3-1-0.pe1.brwy.nsw.aarnet.net.au (113.197.15.146)  12.112 ms  12.101 ms  12.107 ms
9  138.44.5.1 (138.44.5.1)  12.487 ms  12.350 ms  12.361 ms
10 ombcr1-te-1-5.gw.unsw.edu.au (149.171.255.106)  12.357 ms  12.348 ms  12.361 ms
11 ombudnex1-po-2.gw.unsw.edu.au (149.171.255.170)  28.475 ms  12.721 ms  20.479 ms
12 ufw1-ae-1-3154.gw.unsw.edu.au (149.171.253.36)  12.858 ms  12.847 ms  12.858 ms
13 129.94.39.23 (129.94.39.23)  13.112 ms  13.099 ms  12.985 ms

```

Traceroute from my machine to www.telstra.net:

```

z5230310@vx1:/tmp_amd/kamen/export/kamen/4/z5230310/Desktop$ traceroute www.telstra.net
traceroute to www.telstra.net (203.50.5.178), 30 hops max, 60 byte packets
1  cserouter1-server.cse.unsw.EDU.AU (129.94.242.251)  0.097 ms  0.077 ms  0.056 ms
2  129.94.39.17 (129.94.39.17)  0.823 ms  0.820 ms  0.830 ms
3  libudnex1-v1-3154.gw.unsw.edu.au (149.171.253.34)  1.481 ms  1.493 ms  ombudnex1-v1-3154.gw.unsw.edu.au (149.171.253.35)  1.312 ms
4  libcr1-po-6.gw.unsw.edu.au (149.171.255.201)  1.110 ms  ombcr1-po-6.gw.unsw.edu.au (149.171.255.169)  1.145 ms  libcr1-po-5.gw.unsw.edu.au (149.171.255.165)  1.107 ms
5  unswbr1-te-2-13.gw.unsw.edu.au (149.171.255.105)  1.158 ms  1.159 ms  1.161 ms
6  138.44.5.0 (138.44.5.0)  1.205 ms  1.211 ms  1.247 ms
7  et-0-3-0.pe1.alxd.nsw.aarnet.net.au (113.197.15.153)  1.569 ms  1.472 ms  1.468 ms
8  ae9.bb1.b.syd.aarnet.net.au (113.197.15.65)  2.034 ms  2.069 ms  1.827 ms
9  gigabitethernet1-1.pe1.b.syd.aarnet.net.au (202.158.202.18)  1.853 ms  1.861 ms  1.881 ms
10 gigabitethernet3-11.ken37.sydney.telstra.net (139.130.0.77)  3.614 ms  3.515 ms  3.659 ms
11 bundle-ether2.chw-edge901.sydney.telstra.net (203.50.11.103)  2.638 ms  2.583 ms  bundle-ether13.ken-core10.sydney.telstra.net (203.50.11.94)  3.934 ms
12 bundle-ether10.win-core10.melbourne.telstra.net (203.50.11.123)  14.252 ms  bundle-ether13.chw-core10.sydney.telstra.net (203.50.11.98)  2.760 ms  bundle-ether10.win-core10.melbourne.telstra.net (203.50.11.123)  13.776 ms
13 203.50.6.40 (203.50.6.40)  15.979 ms  bundle-ether8.exi-core10.melbourne.telstra.net (203.50.11.125)  15.467 ms  203.50.6.40 (203.50.6.40)  16.451 ms
14 bundle-ether2.exi-ncprouter101.melbourne.telstra.net (203.50.11.209)  14.712 ms  17.021 ms  17.430 ms
15 www.telstra.net (203.50.5.178)  14.193 ms  14.808 ms  14.837 ms

```

Traceroute from www.speedtest.com.sg to my machine :

Traceroute Result:

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traceroute to 129.94.242.114 (129.94.242.114), 30 hops max, 60 byte packets
1  ge2-8.r01.sin01.ne.com.sg (202.150.221.169)  0.141 ms  0.133 ms  0.129 ms
2  10.15.62.210 (10.15.62.210)  0.335 ms  0.332 ms  0.329 ms
3  aarnet.sgix.sg (103.16.102.67)  223.607 ms  223.690 ms  223.688 ms
4  xe-3-0-3.pe1.brwy.nsw.aarnet.net.au (113.197.15.206)  232.871 ms  232.869 ms  232.787 ms
5  138.44.5.1 (138.44.5.1)  223.982 ms  224.064 ms  223.884 ms
6  ombcr1-te-1-5.gw.unsw.edu.au (149.171.255.106)  230.896 ms  230.784 ms  230.850 ms
7  ombudnex1-po-2.gw.unsw.edu.au (149.171.255.170)  236.297 ms  236.300 ms  236.364 ms
8  ufw1-ae-1-3154.gw.unsw.edu.au (149.171.253.36)  231.517 ms  231.537 ms  231.506 ms
9  129.94.39.23 (129.94.39.23)  224.750 ms  224.743 ms  224.691 ms
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Traceroute from my machine to www.speedtest.com.sg:

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z5230310@vx1:/tmp_and/kamen/export/kamen/4/z5230310/Desktop$ traceroute www.speedtest.com.sg
traceroute to www.speedtest.com.sg (202.150.221.170), 30 hops max, 60 byte packets
 1 cserouter1-server.cse.unsw.edu.au (129.94.242.251) 0.123 ms 0.101 ms 0.076 ms
 2 129.94.39.17 (129.94.39.17) 0.831 ms 0.831 ms 0.792 ms
 3 libudnex1-v1-3154.gw.unsw.edu.au (149.171.253.34) 1.311 ms 1.181 ms ombudnex1-v1-3154.gw.unsw.edu.au (149.171.253.35) 1.439 ms
 4 libcr1-po-6.gw.unsw.edu.au (149.171.255.201) 1.146 ms 1.136 ms ombcr1-po-5.gw.unsw.edu.au (149.171.255.197) 1.127 ms
 5 unswbr1-te-2-13.gw.unsw.edu.au (149.171.255.105) 1.202 ms unswbr1-te-1-9.gw.unsw.edu.au (149.171.255.101) 1.157 ms 1.063 ms
 6 138.44.5.0 (138.44.5.0) 1.284 ms 1.316 ms 1.295 ms
 7 et-0-3-0.pe1.alxd.nsw.aarnet.net.au (113.197.15.153) 1.624 ms 2.411 ms 2.389 ms
 8 xe-0-0-3.pe1.wnppa.akl.aarnet.net.au (113.197.15.67) 24.159 ms xe-0-2-1-204.pe1.wnppa.alxd.aarnet.net.au (113.197.15.183) 24.163 ms 24.128 ms
 9 et-0-1-0.200.pe1.tkpa.akl.aarnet.net.au (113.197.15.69) 24.439 ms 24.429 ms 24.476 ms
10 xe-0-2-6.bdr1.a.lax.aarnet.net.au (202.158.194.173) 147.861 ms 147.852 ms 147.838 ms
11 singtel.as7473.any2ix.coresite.com (206.72.210.63) 147.921 ms 147.935 ms 147.890 ms
12 203.208.171.117 (203.208.171.117) 148.248 ms 148.220 ms 203.208.182.153 (203.208.182.153) 333.968 ms
13 203.208.177.110 (203.208.177.110) 308.191 ms 316.752 ms 203.208.182.125 (203.208.182.125) 279.421 ms
14 203.208.182.253 (203.208.182.253) 314.686 ms * 314.567 ms
15 202-150-221-170.rev.ne.com.sg (202.150.221.170) 233.047 ms 203.208.177.110 (203.208.177.110) 308.046 ms 202-150-221-170.rev.ne.com.sg (202.150.221.170) 224.634 ms

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Apparently, the reverse path go through the different routers as the forward path. The reverse path and the forward path have some common routers but different IP addresses(e.g 138.44.5.0 and 138.44.5.1) because routers especially the huge routers have many interfaces, each interface have one unique IP address, and the internet environment is randomly and uncertainly. So the two paths can have common routers but different addresses.

E4:

www.nus.edu.sg is not responsive in my machine, so I select www.tsinghua.edu.cn instead.

1. Physical distance (straight line distance)from UNSW:

Brisbane: 736.26 Km

Beijing: 8963.32 Km

Berlin: 16083.34 Km

The shortest possible time:

Brisbane: $736260 / 3 * 10^8 = 2.45 \text{ ms}$

Beijing: $8963320 / 3 * 10^8 = 29.88 \text{ ms}$

Berlin: $16083340 / 3 * 10^8 = 53.61 \text{ ms}$

The minimum delay as measured by ping program:

Brisbane: 16.675 ms

Beijing: 275.089 ms

Berlin: 307.353 ms

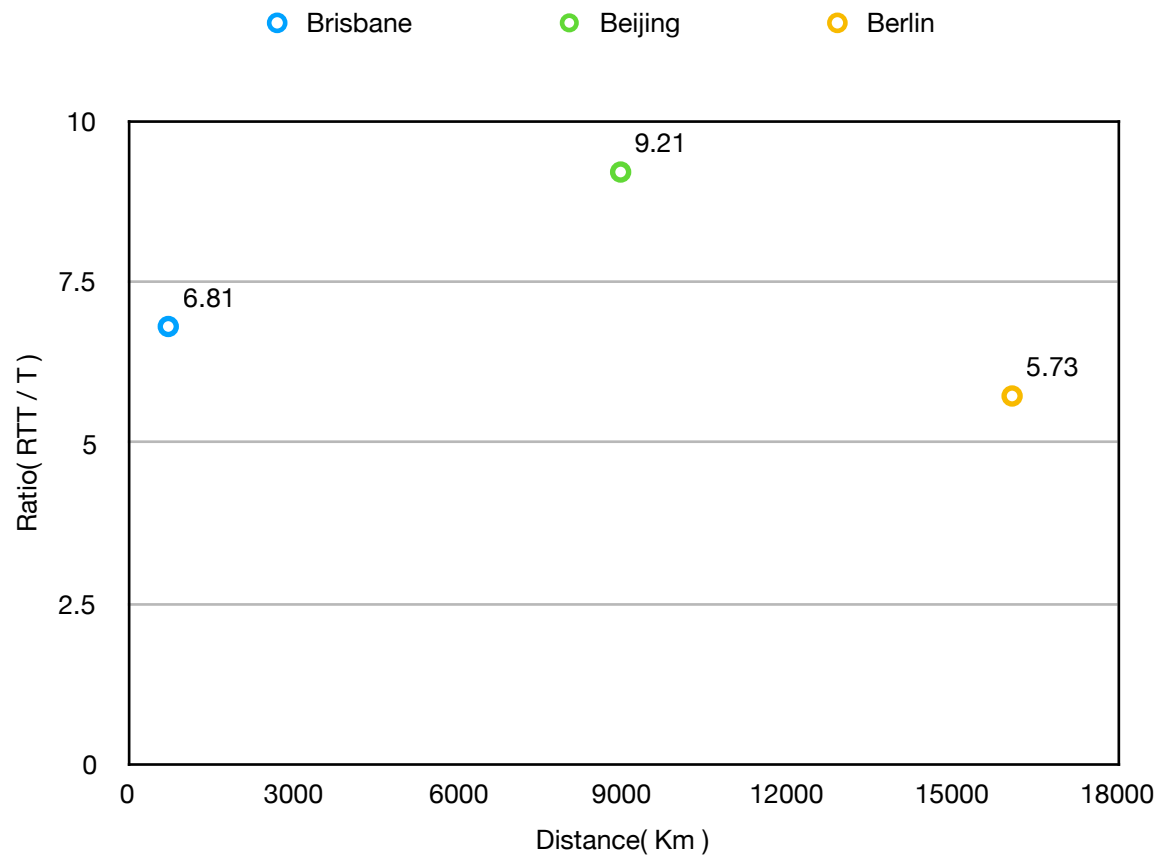
The radio(y-axis value) shows below:

Brisbane: 6.81

Beijing: 9.21

Berlin: 5.73

The following graph describe the distance and the ratio:

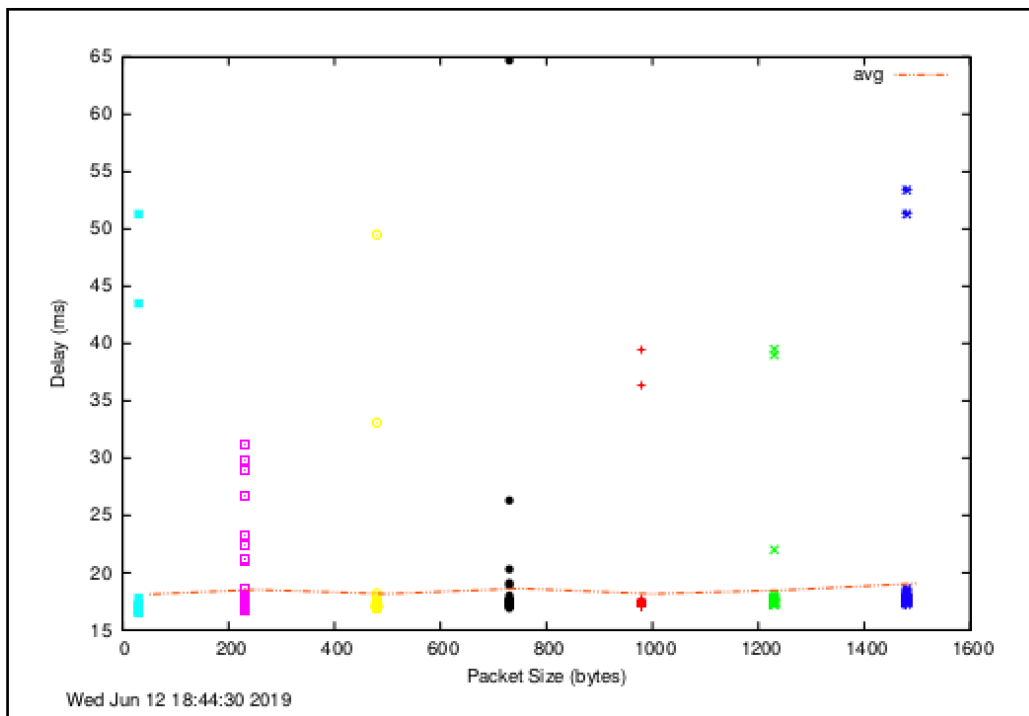
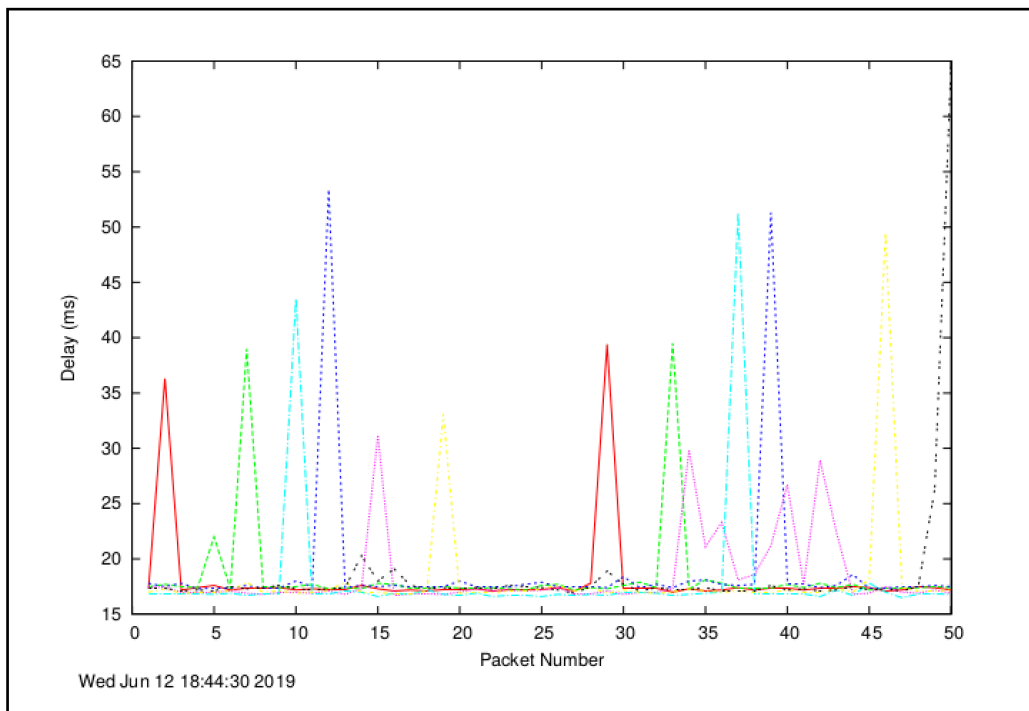


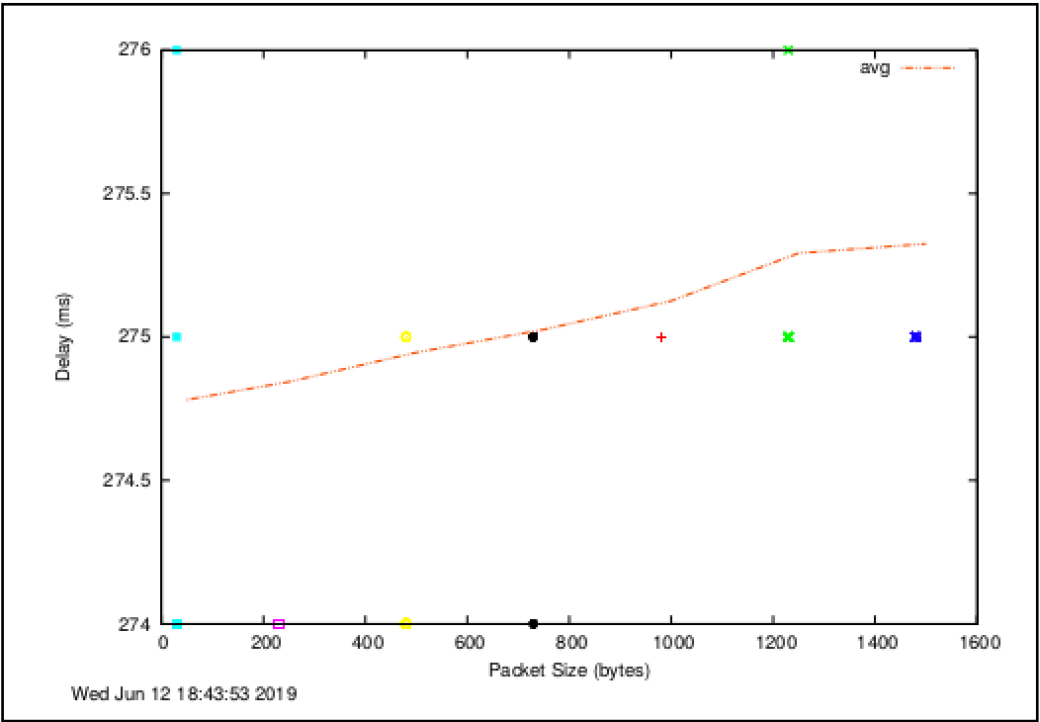
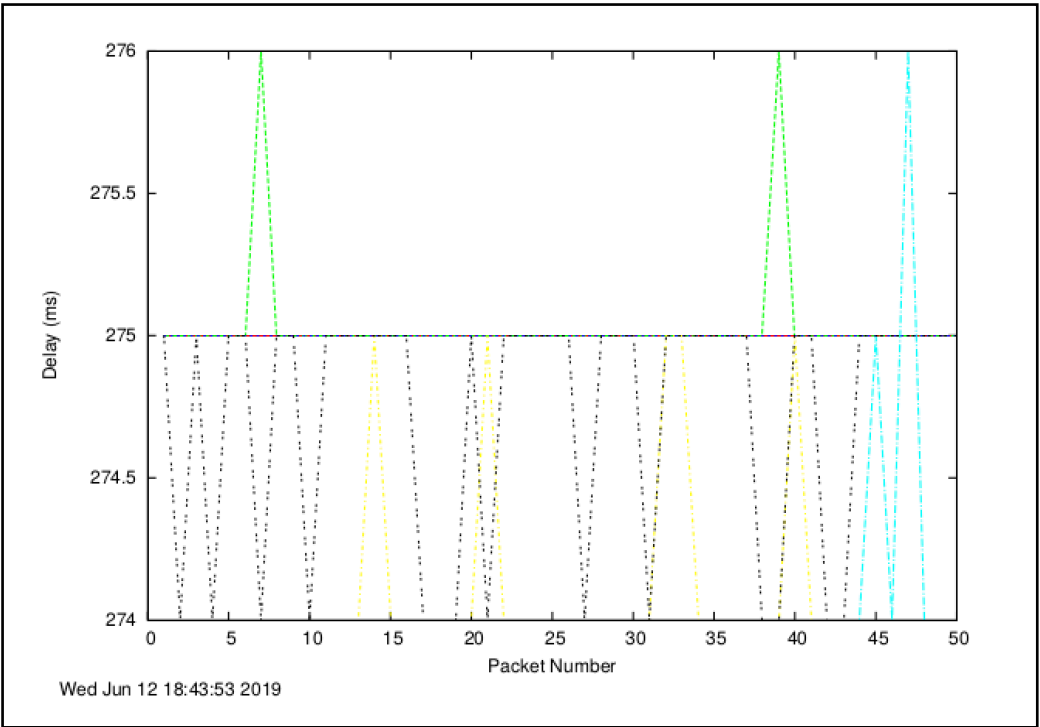
First reason: the distance from UNSW and destinations are straight line distance and the actual distance is further than straight line distance.

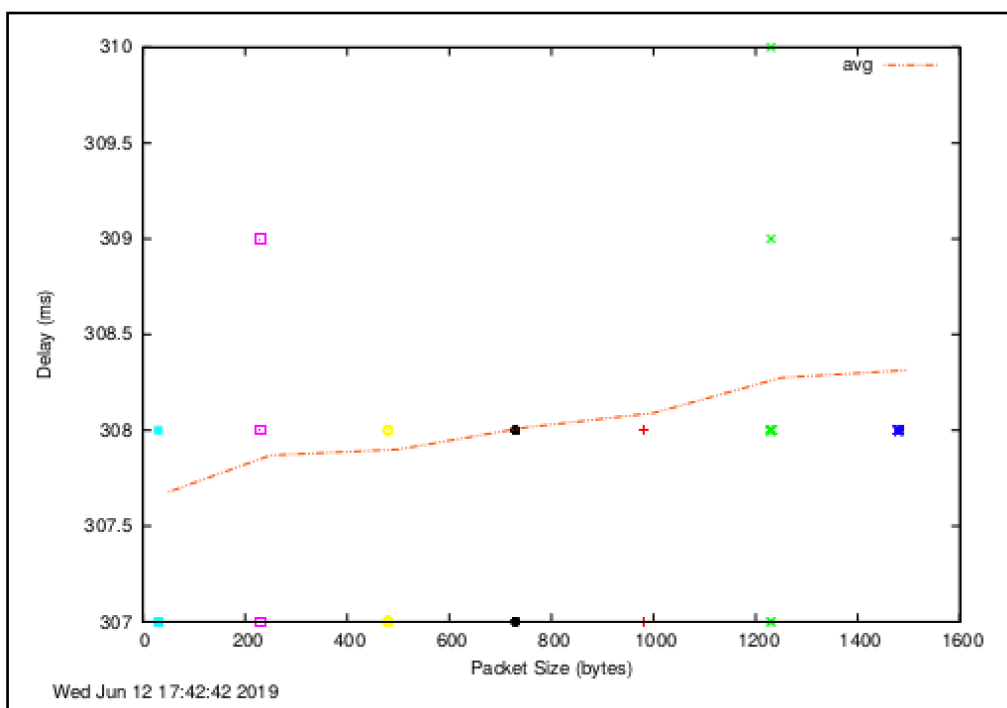
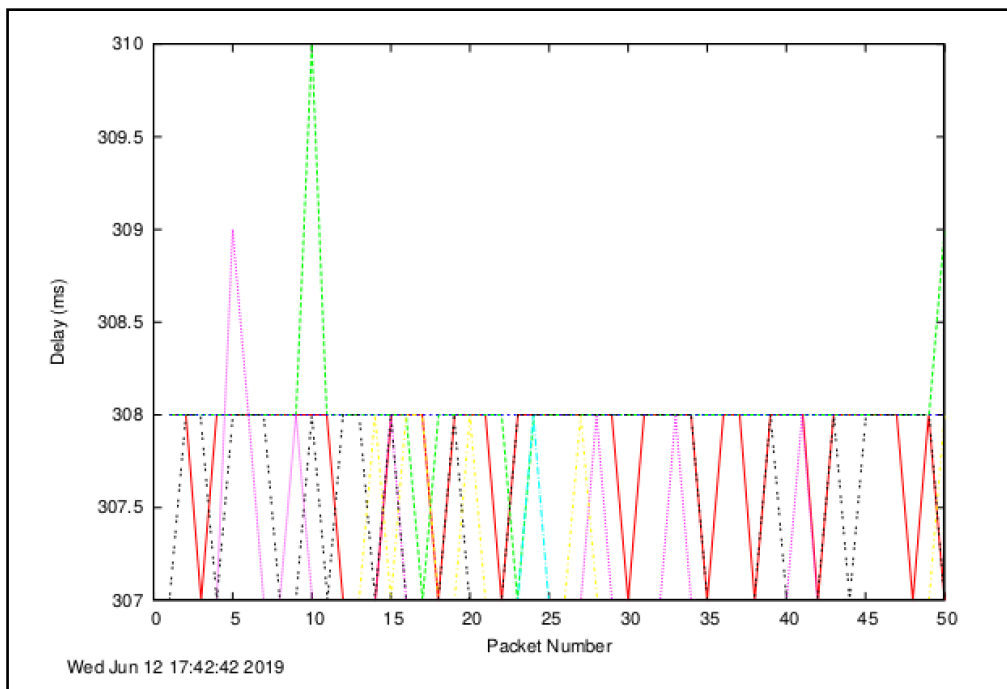
Second: the propagate speed is slower than light speed.

Third: the delay time measured by ping program also include queuing delay, processing delay through routers and switches.

2. As following graphs show:



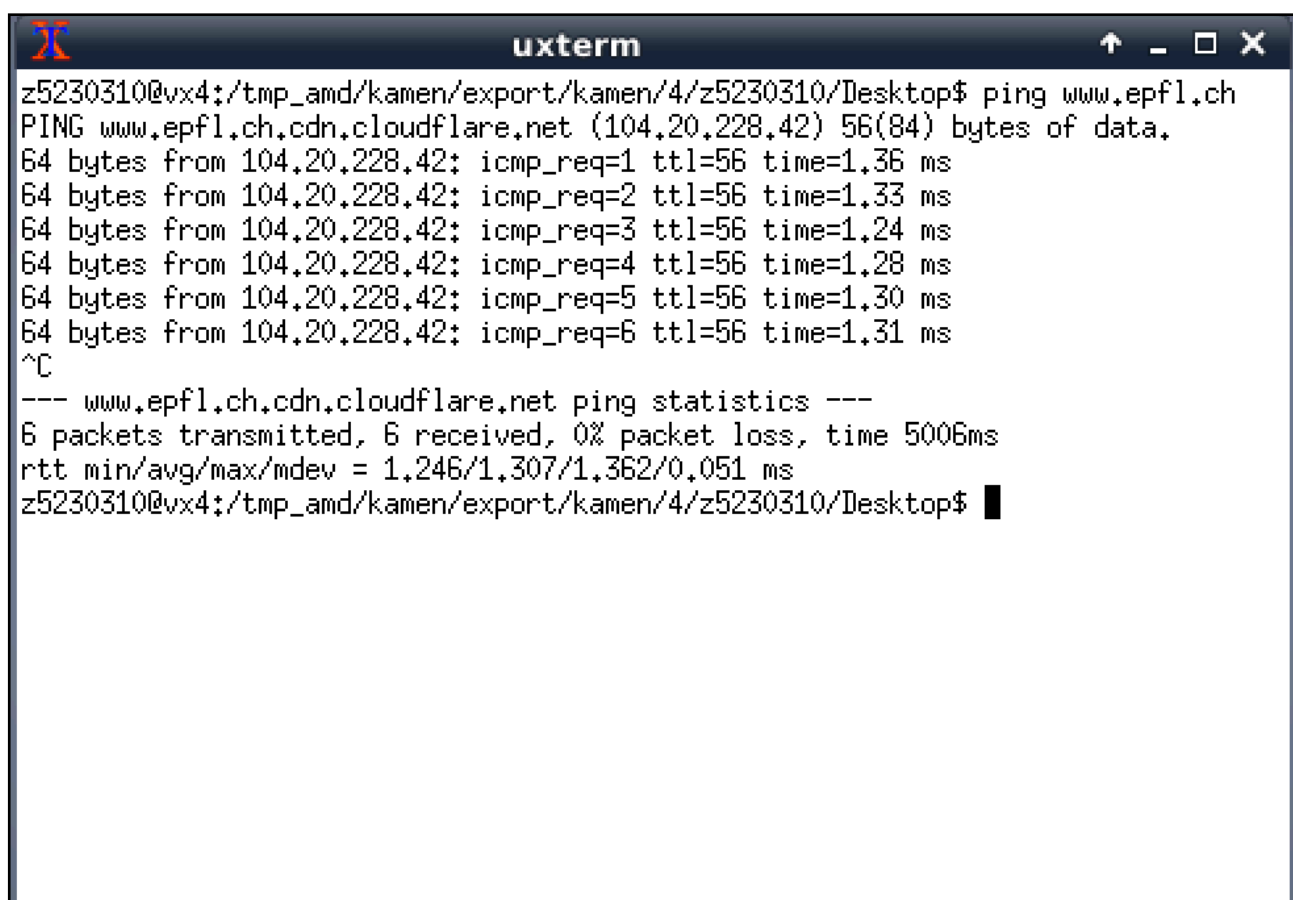




Apparently, the delay to the destinations are various over time. Especially the second (Beijing) and the third destination (Berlin), the delays various depend on packet size, for the larger packets the delay is greater. However, this is not obviously in first destination(Brisbane) the average delay does not seem to vary for different packet sizes. Perhaps that's happened because the high traffic of network and the queuing delay take a significant part of the total delay.

3. No, use 'ping' command to find the result:

Apparently, we can find the RTT are quite small, but if it really hosted in Switzerland, the RTT should be quite large. Also, the ip(104.20.228.42) is not hosted in Switzerland.



```
uxterm
z5230310@vx4:/tmp_amd/kamen/export/kamen/4/z5230310/Desktop$ ping www.epfl.ch
PING www.epfl.ch.cdn.cloudflare.net (104.20.228.42) 56(84) bytes of data:
64 bytes from 104.20.228.42: icmp_req=1 ttl=56 time=1.36 ms
64 bytes from 104.20.228.42: icmp_req=2 ttl=56 time=1.33 ms
64 bytes from 104.20.228.42: icmp_req=3 ttl=56 time=1.24 ms
64 bytes from 104.20.228.42: icmp_req=4 ttl=56 time=1.28 ms
64 bytes from 104.20.228.42: icmp_req=5 ttl=56 time=1.30 ms
64 bytes from 104.20.228.42: icmp_req=6 ttl=56 time=1.31 ms
^C
--- www.epfl.ch.cdn.cloudflare.net ping statistics ---
6 packets transmitted, 6 received, 0% packet loss, time 5006ms
rtt min/avg/max/mdev = 1.246/1.307/1.362/0.051 ms
z5230310@vx4:/tmp_amd/kamen/export/kamen/4/z5230310/Desktop$
```

4. Only transmission delay and processing delay are depend on the packet size. Propagation delay depends on the length of link and propagation speed, queuing delay depends on the congestion of network.