

Lab01 - z5119666

Exercise 1: nslookup

1. Google site (www.google.com) IP:

216.58.199.36

Several IP addresses as an output:

Multiple IP addresses means multiple servers, which enables load-balancing. Load balancing is server distribution to requesters based on their IP addresses. Users use IP address of requesting host to find best suitable server, for example: closest, least-loaded.

2. Name of 127.0.0.1:

localhost

Special about 127.0.0.1:

This address is assigned to the local machine and cannot be used by other systems. It is a computer's loopback address and TCP/IP is working on the local machine.

Exercise 2: Use ping to test host reachability

Website	Reachable by Ping?	If not, why?	Reachable by browser?
www.cse.unsw.edu.au	Y		Y
www.getfittest.com.au	N	Unknown host (Figure 2,.1)	N
www.mit.edu	Y		Y
www.intel.com.au	Y		Y
www.tpg.com.au	Y		Y
www.hola.hp	N	Unknown host (Figure 2.2)	N
www.amazon.com	Y		Y
www.tsinghua.edu.cn	Y		Y
www.kremlin.ru	Y		Y
8.8.8.8	Y		N

```
kellys-MacBook-Air:~ kelly$ ping www.getfittest.com.au
ping: cannot resolve www.getfittest.com.au: Unknown host
```

Figure 2.1

```
kellys-MacBook-Air:~ kelly$ ping www.hola.hp
ping: cannot resolve www.hola.hp: Unknown host
```

Figure 2.2

Exercise 3: Use traceroute to understand network topology

1. traceroute www.columbia.edu

```
kellys-MacBook-Air:~ kelly$ traceroute www.columbia.edu
traceroute to www.wwwr53.cc.columbia.edu (128.59.105.24), 64 hops max, 52 byte packets
 1 * * *
 2 wfw1-ae-1-3062.gw.unsw.edu.au (129.94.254.172) 3.456 ms 2.070 ms 3.994 ms
 3 libwdr1-vl-3063.gw.unsw.edu.au (129.94.254.178) 2.549 ms 2.435 ms 2.427 ms
 4 libcr1-te-4-5.gw.unsw.edu.au (149.171.255.89) 2.463 ms 2.346 ms 2.491 ms
 5 unswbr1-te-1-9.gw.unsw.edu.au (149.171.255.101) 2.739 ms 2.337 ms 2.316 ms
 6 138.44.5.0 (138.44.5.0) 2.547 ms 2.674 ms 2.943 ms
 7 et-1-3-0.pe1.sxt.bkvl.nsw.aarnet.net.au (113.197.15.149) 3.643 ms 3.637 ms 3.542 ms
 8 et-0-0-0.pe1.a.hnl.aarnet.net.au (113.197.15.99) 96.550 ms 96.502 ms 99.519 ms
 9 et-2-1-0.bdr1.a.sea.aarnet.net.au (113.197.15.201) 148.118 ms 148.591 ms 148.171 ms
10 abilene-1-lo-jmb-706.sttlwa.pacificwave.net (207.231.240.8) 148.265 ms 148.909 ms 148.737 ms
11 et-4-0-0.4079.rtsw.miss2.net.internet2.edu (162.252.70.0) 162.676 ms 166.250 ms 158.791 ms
12 et-4-0-0.4079.rtsw.minn.net.internet2.edu (162.252.70.58) 182.065 ms 181.927 ms 182.112 ms
13 et-1-1-2.4079.rtsw.eqch.net.internet2.edu (162.252.70.106) 189.766 ms 190.190 ms 190.199 ms
14 ae-1.4079.rtsw.clev.net.internet2.edu (162.252.70.130) 198.555 ms 199.303 ms 198.636 ms
15 buf-9208-i2-clev.nysernet.net (199.109.11.33) 203.140 ms 204.257 ms 202.845 ms
16 syr-9208-buf-9208.nysernet.net (199.109.7.193) 206.032 ms 240.615 ms 307.757 ms
17 nyc-9208-syr-9208.nysernet.net (199.109.7.162) 306.334 ms 231.971 ms 281.225 ms
18 columbia.nyc-9208.nysernet.net (199.109.4.14) 306.619 ms 313.943 ms 219.687 ms
19 nyser111-gw-1-x-nyser32-gw-1.net.columbia.edu (128.59.255.10) 282.574 ms 305.929 ms 307.361 ms
20 phi-core-1-x-nyser111-gw-1.net.columbia.edu (128.59.255.13) 307.345 ms 306.698 ms 276.740 ms
21 cc-conc-1-x-phi-core-1.net.columbia.edu (128.59.255.214) 212.623 ms 212.882 ms 320.548 ms
22 columbiauniversity.us (128.59.105.24) 308.282 ms 215.169 ms 211.905 ms
kellys-MacBook-Air:~ kelly$
```

- 22 routers between my workstation and www.columbia.edu
- 4 routers are part of the UNSW network
- Between router #9 (113.197.15.201) and #10 (207.231.240.8). Because #9 still in Australia, but #10 is not.

2.

traceroute www.ucla.edu :

```
kellys-MacBook-Air:~ kelly$ traceroute www.ucla.edu
traceroute to gateway.lb.it.ucla.edu (164.67.228.152), 64 hops max, 52 byte packets
 1 * * *
 2 wfw1-ae-1-3062.gw.unsw.edu.au (129.94.254.172) 2.977 ms 2.275 ms 2.266 ms
 3 libwdr1-vl-3063.gw.unsw.edu.au (129.94.254.178) 2.515 ms 2.463 ms 3.317 ms
 4 ombcr1-te-4-5.gw.unsw.edu.au (149.171.255.77) 2.946 ms 2.477 ms 2.303 ms
 5 unswbr1-te-2-13.gw.unsw.edu.au (149.171.255.105) 2.460 ms 2.886 ms 2.511 ms
 6 138.44.5.0 (138.44.5.0) 2.952 ms 2.709 ms 2.687 ms
 7 et-1-3-0.pe1.sxt.bkvl.nsw.aarnet.net.au (113.197.15.149) 3.733 ms 3.318 ms 3.467 ms
 8 et-0-0-0.pe1.a.hnl.aarnet.net.au (113.197.15.99) 96.572 ms 100.940 ms 97.460 ms
 9 et-2-1-0.bdr1.a.sea.aarnet.net.au (113.197.15.201) 148.003 ms 149.362 ms 148.121 ms
10 cenichpr-1-is-jmb-778.snvac.pacificwave.net (207.231.245.129) 164.391 ms 164.837 ms 164.544 ms
11 hpr-lax-hpr3--svl-hpr3-100ge.cenic.net (137.164.25.73) 172.536 ms 172.201 ms 172.326 ms
12 * * *
13 bd11f1.anderson--cr001.anderson.ucla.net (169.232.4.6) 173.517 ms 172.833 ms 175.612 ms
14 cr00f1.anderson--dr00f2.csb1.ucla.net (169.232.4.55) 173.074 ms 172.838 ms 172.940 ms
15 * * *
```

traceroute www.u-tokyo.ac.jp :

```
kellys-MacBook-Air:~ kelly$ traceroute www.u-tokyo.ac.jp
traceroute to www.u-tokyo.ac.jp (210.152.243.234), 64 hops max, 52 byte packets
 1 * * *
 2 wfw1-ae-1-3062.gw.unsw.edu.au (129.94.254.172)  3.956 ms  2.930 ms  2.734 ms
 3 libwdr1-vl-3063.gw.unsw.edu.au (129.94.254.178)  3.040 ms  4.183 ms  3.272 ms
 4 libcr1-te-4-5.gw.unsw.edu.au (149.171.255.89)  2.259 ms  3.187 ms  2.355 ms
 5 unswbr1-te-1-9.gw.unsw.edu.au (149.171.255.101)  2.519 ms  2.421 ms  2.435 ms
 6 138.44.5.0 (138.44.5.0)  3.899 ms  8.316 ms  4.376 ms
 7 et-0-3-0.pe1.bkvl.nsw.aarnet.net.au (113.197.15.147)  6.020 ms  12.557 ms  3.160 ms
 8 ge-4_0_0.bb1.a.pao.aarnet.net.au (202.158.194.177)  157.710 ms  157.535 ms  157.493 ms
 9 palalto0.iij.net (198.32.176.24)  159.462 ms  159.127 ms  159.550 ms
10 osk004bb01.iij.net (58.138.88.189)  310.608 ms  306.723 ms
   osk004bb00.iij.net (58.138.88.185)  306.821 ms
11 osk004ix51.iij.net (58.138.106.126)  306.356 ms
   osk004ix51.iij.net (58.138.106.130)  306.063 ms  306.192 ms
12 210.130.135.130 (210.130.135.130)  307.161 ms  306.191 ms  274.299 ms
13 124.83.228.58 (124.83.228.58)  339.961 ms  306.128 ms  307.547 ms
14 124.83.252.178 (124.83.252.178)  409.161 ms  306.918 ms  306.677 ms
15 158.205.134.26 (158.205.134.26)  307.035 ms  306.014 ms  307.698 ms
```

traceroute www.lancaster.ac.uk :

```
kellys-MacBook-Air:~ kelly$ traceroute www.lancaster.ac.uk
traceroute to www.lancs.ac.uk (148.88.65.80), 64 hops max, 52 byte packets
 1 * * *
 2 wfw1-ae-1-3062.gw.unsw.edu.au (129.94.254.172)  3.148 ms  2.367 ms  2.295 ms
 3 libwdr1-vl-3063.gw.unsw.edu.au (129.94.254.178)  2.838 ms  2.357 ms  2.448 ms
 4 libcr1-te-4-5.gw.unsw.edu.au (149.171.255.89)  2.302 ms  2.689 ms  2.521 ms
 5 unswbr1-te-1-9.gw.unsw.edu.au (149.171.255.101)  2.570 ms  2.370 ms  2.641 ms
 6 138.44.5.0 (138.44.5.0)  2.606 ms  2.733 ms  3.696 ms
 7 et-1-3-0.pe1.sxt.bkvl.nsw.aarnet.net.au (113.197.15.149)  24.780 ms  3.648 ms  4.658 ms
 8 et-0-0-0.pe1.a.hnl.aarnet.net.au (113.197.15.99)  96.673 ms  96.659 ms  96.656 ms
 9 et-2-1-0.bdr1.a.sea.aarnet.net.au (113.197.15.201)  148.237 ms  148.478 ms  148.179 ms
10 abilene-1-lo-jmb-706.stlwa.pacificwave.net (207.231.240.8)  148.243 ms  149.593 ms  148.751 ms
11 et-4-0-0.4079.rtsw.miss2.net.internet2.edu (162.252.70.0)  158.797 ms  158.727 ms  158.938 ms
12 et-4-0-0.4079.rtsw.minn.net.internet2.edu (162.252.70.58)  182.243 ms  181.700 ms  182.377 ms
13 et-1-1-2.4079.rtsw.eqch.net.internet2.edu (162.252.70.106)  191.039 ms  190.163 ms  189.821 ms
14 ae-1.4079.rtsw.clev.net.internet2.edu (162.252.70.130)  199.046 ms  199.096 ms  203.470 ms
15 et-2-0-0.4079.rtsw.ashb.net.internet2.edu (162.252.70.54)  206.963 ms  264.547 ms  307.018 ms
16 ae-2.4079.rtsw.wash.net.internet2.edu (162.252.70.136)  246.192 ms  265.051 ms  206.900 ms
17 internet2-gw.mx1.lon.uk.geant.net (62.40.124.44)  282.564 ms  327.368 ms  307.080 ms
18 janet-gw.mx1.lon.uk.geant.net (62.40.124.198)  307.704 ms  281.705 ms  330.862 ms
19 ae29.londpg-sbr2.ja.net (146.97.33.2)  309.145 ms  304.996 ms  308.500 ms
20 ae31.erdiss-sbr2.ja.net (146.97.33.22)  305.862 ms  286.233 ms  327.243 ms
21 ae29.manckh-sbr2.ja.net (146.97.33.42)  306.976 ms  287.963 ms  288.099 ms
22 ae24.lanclu-rbr1.ja.net (146.97.38.58)  290.051 ms  290.594 ms  376.431 ms
23 lancaster-university.ja.net (194.81.46.2)  308.239 ms  408.281 ms  303.465 ms
24 * * *
25 ismx-issrx.rtr.lancs.ac.uk (148.88.255.17)  292.462 ms  371.688 ms  308.277 ms
26 dc.iss.srv.rtrcloud.lancs.ac.uk (148.88.253.3)  306.273 ms  295.988 ms  419.519 ms
27 www.lancs.ac.uk (148.88.65.80)  307.219 ms !Z 306.084 ms !Z 307.049 ms !Z
```

- a. Up to router #6 the paths are consistent, but from router #7 paths start to diverge.
- b. The router is located in Australia and it's Asia Pacific Network Information Centre.
- c. No, not proportional, since

UCLA : 14 hops -> 43657.7km

Tokyo : 15 hops -> 34857.9km

Lancaster: 27 hops -> 52098.5km

3. Two server i) www.speedtest.com.sg ii) www.telstra.net

From my machine to www.speedtest.com.sg :

```
kellys-MacBook-Air:~ kelly$ traceroute www.speedtest.com.sg
traceroute to www.speedtest.com.sg (202.150.221.170), 64 hops max, 52 byte packets
 1 * * *
 2 wfw1-ae-1-3062.gw.unsw.edu.au (129.94.254.172)  2.826 ms  1.915 ms  2.002 ms
 3 libwdr1-vl-3063.gw.unsw.edu.au (129.94.254.178)  28.251 ms  81.489 ms  12.632 ms
 4 libcr1-te-4-5.gw.unsw.edu.au (149.171.255.89)  2.264 ms  2.154 ms  2.180 ms
 5 unswbr1-te-1-9.gw.unsw.edu.au (149.171.255.101)  11.731 ms  40.784 ms  7.269 ms
 6 138.44.5.0 (138.44.5.0)  2.384 ms  2.285 ms  2.644 ms
 7 et-0-3-0.pe1.alxd.nsw.aarnet.net.au (113.197.15.153)  3.922 ms  3.477 ms  2.666 ms
 8 xe-0-2-1-204.pe1.wnpa.alxd.aarnet.net.au (113.197.15.183)  25.351 ms  25.275 ms
  xe-0-0-3.pe1.wnpa.akl.aarnet.net.au (113.197.15.67)  25.226 ms
 9 et-0-1-0.200.pe1.tkpa.akl.aarnet.net.au (113.197.15.69)  26.235 ms  25.510 ms  25.490 ms
10 xe-0-2-6.bdr1.a.lax.aarnet.net.au (202.158.194.173)  148.979 ms  149.184 ms  149.008 ms
11 singtel.as7473.any2ix.coresite.com (206.72.210.63)  386.044 ms  308.425 ms  313.161 ms
12 203.208.172.173 (203.208.172.173)  313.359 ms  312.043 ms
   203.208.178.185 (203.208.178.185)  418.420 ms
13 203.208.151.233 (203.208.151.233)  361.661 ms
   203.208.177.110 (203.208.177.110)  314.426 ms
   203.208.153.121 (203.208.153.121)  618.397 ms
14 202-150-221-170.rev.ne.com.sg (202.150.221.170)  312.979 ms  260.971 ms  313.942 ms
```

From www.speedtest.com.sg to my machine :

Traceroute From Singapore To (Hostname/IP Address):

Traceroute Result:

```
traceroute to 129.94.8.60 (129.94.8.60), 30 hops max, 60 byte packets
 1 ge2-8.r01.sin01.ne.com.sg (202.150.221.169)  0.148 ms  0.160 ms  0.163 ms
 2 10.11.33.30 (10.11.33.30)  0.258 ms  0.265 ms  0.271 ms
 3 10.11.33.74 (10.11.33.74)  0.714 ms  0.721 ms  0.724 ms
 4 aarnet.sgix.sg (103.16.102.67)  235.632 ms  235.647 ms  235.659 ms
 5 xe-3-0-3.pe1.brwy.nsw.aarnet.net.au (113.197.15.206)  237.467 ms  237.494 ms  237.472 ms
 6 138.44.5.1 (138.44.5.1)  233.084 ms  233.012 ms  232.974 ms
 7 libcr1-te-1-5.gw.unsw.edu.au (149.171.255.102)  233.129 ms  233.139 ms  233.173 ms
 8 ombwdr1-te-1-1.gw.unsw.edu.au (149.171.255.94)  237.746 ms libwdr1-te-1-1.gw.unsw.edu.au
 9 wfw1-ae-1-3063.gw.unsw.edu.au (129.94.254.180)  236.774 ms  236.691 ms  236.751 ms
10 libwdr1-vl-3063.gw.unsw.edu.au (129.94.254.178)  224.721 ms  224.621 ms  224.680 ms
11 wfw1-ae-1-3063.gw.unsw.edu.au (129.94.254.180)  237.025 ms  237.038 ms  237.053 ms
12 libwdr1-vl-3063.gw.unsw.edu.au (129.94.254.178)  224.958 ms  224.990 ms  225.192 ms
13 wfw1-ae-1-3063.gw.unsw.edu.au (129.94.254.180)  237.623 ms  237.289 ms  237.353 ms
14 libwdr1-vl-3063.gw.unsw.edu.au (129.94.254.178)  225.272 ms  225.574 ms  225.116 ms
15 wfw1-ae-1-3063.gw.unsw.edu.au (129.94.254.180)  237.462 ms  237.427 ms  237.445 ms
16 libwdr1-vl-3063.gw.unsw.edu.au (129.94.254.178)  225.492 ms  225.488 ms  225.365 ms
```

From my machine to www.telstra.net :

```
kellys-MacBook-Air:~ kelly$ traceroute www.telstra.net
traceroute to www.telstra.net (203.50.5.178), 64 hops max, 52 byte packets
 1  * * *
 2  wfw1-ae-1-3062.gw.unsw.edu.au (129.94.254.172)  3.077 ms  1.975 ms  1.853 ms
 3  libwdr1-v1-3063.gw.unsw.edu.au (129.94.254.178)  1.983 ms  2.121 ms  2.082 ms
 4  libcr1-te-4-5.gw.unsw.edu.au (149.171.255.89)  2.258 ms  2.111 ms  2.213 ms
 5  unswbr1-te-1-9.gw.unsw.edu.au (149.171.255.101)  2.251 ms  2.163 ms  2.273 ms
 6  138.44.5.0 (138.44.5.0)  2.703 ms  2.364 ms  2.435 ms
 7  et-0-3-0.pe1.alxd.nsw.aarnet.net.au (113.197.15.153)  2.526 ms  2.656 ms  2.438 ms
 8  ae9.bb1.b.syd.aarnet.net.au (113.197.15.65)  2.814 ms  2.865 ms  2.978 ms
 9  gigabitethernet1-1.pe1.b.syd.aarnet.net.au (202.158.202.18)  3.021 ms  2.899 ms  2.951 ms
10  gigabitethernet3-11.ken37.sydne.telstra.net (139.130.0.77)  4.370 ms  3.485 ms  3.366 ms
11  bundle-ether13.ken-core10.sydne.telstra.net (203.50.11.94)  4.393 ms  3.431 ms  66.880 ms
12  bundle-ether10.win-core10.melbourne.telstra.net (203.50.11.123)  15.142 ms  16.824 ms  15.231 ms
13  gigabitethernet5-0.exi-service2.melbourne.telstra.net (203.50.80.132)  14.438 ms  14.555 ms  14.539 ms
```

From www.telstra.net to my machine :

Traceroute

This traceroute commences from www.telstra.net, within AS 1221.

Enter the desired destination host.domain or IPv4 or IPv6 address:

```
 1  gigabitethernet3-3.exi2.melbourne.telstra.net (203.50.77.53)  0.463 ms  0.347 ms  0.244 ms
 2  bundle-ether3-100.win-core10.melbourne.telstra.net (203.50.80.129)  1.363 ms  1.486 ms  2.243 ms
 3  bundle-ether12.ken-core10.sydne.telstra.net (203.50.11.122)  13.109 ms  12.107 ms  12.859 ms
 4  bundle-ether1.ken-edge901.sydne.telstra.net (203.50.11.95)  11.862 ms  11.856 ms  11.738 ms
 5  aarnet6.lnk.telstra.net (139.130.0.78)  11.612 ms  11.607 ms  11.613 ms
 6  ge-6-0-0.bb1.a.syd.aarnet.net.au (202.158.202.17)  11.861 ms  11.731 ms  11.738 ms
 7  ae9.pe2.brwy.nsw.aarnet.net.au (113.197.15.56)  12.986 ms  13.730 ms  12.362 ms
 8  et-3-1-0.pe1.brwy.nsw.aarnet.net.au (113.197.15.146)  12.111 ms  12.106 ms  12.113 ms
 9  138.44.5.1 (138.44.5.1)  15.984 ms  12.357 ms  12.362 ms
10  libcr1-te-1-5.gw.unsw.edu.au (149.171.255.102)  12.361 ms  12.356 ms  12.362 ms
11  libwdr1-te-1-1.gw.unsw.edu.au (149.171.255.90)  12.361 ms
12  wfw1-ae-1-3063.gw.unsw.edu.au (129.94.254.180)  12.984 ms  12.982 ms  12.986 ms
13  libwdr1-v1-3063.gw.unsw.edu.au (129.94.254.178)  13.112 ms  12.981 ms  12.987 ms
14  wfw1-ae-1-3063.gw.unsw.edu.au (129.94.254.180)  13.359 ms  13.356 ms  13.361 ms
15  libwdr1-v1-3063.gw.unsw.edu.au (129.94.254.178)  13.488 ms  13.356 ms  13.360 ms
16  wfw1-ae-1-3063.gw.unsw.edu.au (129.94.254.180)  13.610 ms  13.730 ms  13.736 ms
17  libwdr1-v1-3063.gw.unsw.edu.au (129.94.254.178)  13.735 ms  13.731 ms  13.736 ms
18  wfw1-ae-1-3063.gw.unsw.edu.au (129.94.254.180)  15.109 ms  15.106 ms  15.109 ms
19  libwdr1-v1-3063.gw.unsw.edu.au (129.94.254.178)  15.233 ms  15.105 ms  *
```

There are other traceroute sites listed [here](#).

The traceroute CGI source can be found via:



a. IP addresses:

www.speedtest.com.sg (202.150.221.170)

www.telstra.net (203.50.5.178)

b. No, not the same routers. More precisely, sometimes are exactly the same, sometimes not. Because the routes are determined based on each router.

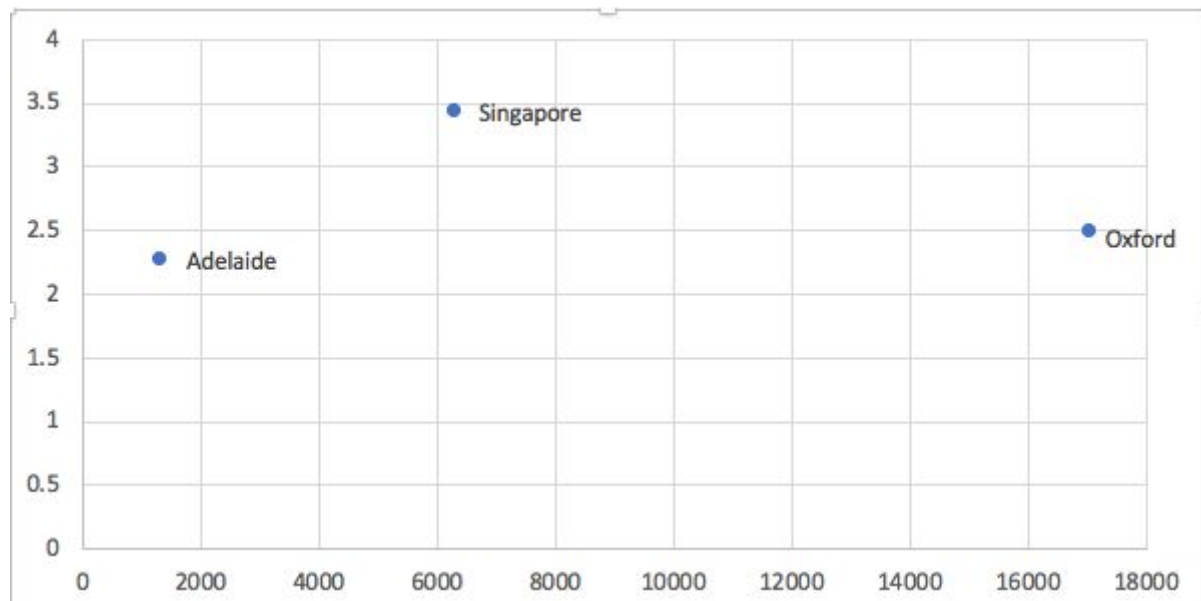
c. Yes

Exercise 4: Use ping to gain insights into network performance

Assume that the packet moves (i.e. propagates) at the speed of light, 3×10^8 m/s.

Shortest time = Distance / propagation speed

Distance from UNSW (km)	Shortest time (ms)
Flinders University 1357	≈ 4.52
National University of Singapore: 6306	≈ 21.02
Oxford University: 17047	≈ 56.82



- a. Greater than 2 because

Round-trip time counts the time required for a packet to travel from source to destination, and receives the response (back to the source). T is the shortest time to reach the destination, so RTT is at least two times the T ., so the Y axis values are greater than 2.

- b. It seems vary over time. This is due to the use of packet switching, which makes use of statistical multiplexing. The resource flow is dynamically allocated and shared.

I think the delay is partially depends on the packets size since the delay is composed by 4 delays and transmission delay depends on the packets size, while others not.

- c. No, it's hosted in the US. (104.20.228.42 is in the US)

```

kellys-MacBook-Air:~ kelly$ traceroute www.epfl.ch
traceroute: Warning: www.epfl.ch has multiple addresses; using 104.20.228.42
traceroute to www.epfl.ch.cdn.cloudflare.net (104.20.228.42), 64 hops max, 52 byte packets
 1 * * *
 2 wfw1-ae-1-3062.gw.unsw.edu.au (129.94.254.172)  2.774 ms  3.029 ms  2.250 ms
 3 libwdr1-vl-3063.gw.unsw.edu.au (129.94.254.178)  2.851 ms  2.182 ms  2.060 ms
 4 ombcr1-te-4-5.gw.unsw.edu.au (149.171.255.77)  2.092 ms  2.235 ms  2.116 ms
 5 unswbr1-te-2-13.gw.unsw.edu.au (149.171.255.105)  2.095 ms  2.097 ms  2.104 ms
 6 138.44.5.0 (138.44.5.0)  2.409 ms  2.386 ms  2.743 ms
 7 et-1-1-0.pe1.rsby.nsw.aarnet.net.au (113.197.15.12)  2.896 ms  3.044 ms  3.139 ms
 8 xe-1-1-0.pe1.eskp.nsw.aarnet.net.au (113.197.15.199)  4.197 ms  4.552 ms  4.431 ms
 9 et-0-3-0.pe1.prka.sa.aarnet.net.au (113.197.15.42)  21.361 ms  20.798 ms  20.774 ms
10 et-0-3-0.pe1.knsg.wa.aarnet.net.au (113.197.15.45)  47.216 ms  47.121 ms  48.124 ms
11 xe-2-0-0.bdr1.eper.wa.aarnet.net.au (113.197.15.172)  46.994 ms  46.996 ms  47.448 ms
12 vocus.ix.waia.asn.au (198.32.212.55)  50.530 ms  54.910 ms  50.652 ms
13 cloudflare.cust.bdr01.per02.wa.vocus.net.au (175.45.120.9)  47.707 ms  47.679 ms  47.689 ms
14 104.20.228.42 (104.20.228.42)  47.394 ms  48.031 ms  47.296 ms

```

- d. Transmission delay depends on the packet size, since it measures the time that a packet takes to be placed in the link (i.e. the time to absorb all packet bits).

Propagation delay does not, since it the time cost on physical link, so the length of packet itself is negligible. Queueing delay does not depends on packet size, and it depends on the intensity of traffic. Processing delay does not either, since it for checking purpose, and the delay is negligible.