Exercise 1

1) IP address: 129.94.208.2
   It will prevent traffic from being exchanged via the gateway, speeding things and also reducing the load
2) Localhost

Exercise 2

1&2) eth0 – 129.94.209.24

lo – 127.0.0.1

vmnet1 – 192.168.0.1

vmnet2 – 192.168.1.1

Exercise 3

Default port number is 22

Exercise 4

My system

```
weill % netstat -t
Active Internet connections (w/o servers)
Proto Recv-Q Send-Q Local Address          Foreign Address        State
tcp        1      0 weill.orchestra.c:51312 bandleader.orchest:ldap CLOSE_WAIT
tcp        0      0 weill.orchestra.c:45305 weill.orchestra.cse:ssh ESTABLISHED
tcp        1      0 weill.orchestra.c:43658 bandleader.orchest:ldap CLOSE_WAIT
tcp        1      0 weill.orchestra.c:44535 bandleader.orchest:ldap CLOSE_WAIT
tcp        0      0 weill.orchestra.cse:ssh yangs-pc.cse.unsw:52504 ESTABLISHED
tcp        1      0 weill.orchestra.c:42468 bandleader.orchest:ldap CLOSE_WAIT
tcp        1      0 weill.orchestra.c:40999 bandleader.orchest:ldap CLOSE_WAIT
tcp        1      0 weill.orchestra.c:42017 bandleader.orchest:ldap CLOSE_WAIT
tcp        0      0 weill.orchestra.cse:www flute08.orchestra:51189 TIME_WAIT
tcp        1      0 weill.orchestra.c:46140 bandleader.orchest:ldap CLOSE_WAIT
tcp        1      0 weill.orchestra.c:46136 bandleader.orchest:ldap CLOSE_WAIT
tcp        1      0 weill.orchestra.c:34779 bandleader.orchest:ldap CLOSE_WAIT
tcp        1      0 weill.orchestra.c:49978 bandleader.orchest:ldap CLOSE_WAIT
tcp        0      0 localhost:6020          localhost:60210         ESTABLISHED
tcp        1      0 weill.orchestra.c:38276 bandleader.orchest:ldap CLOSE_WAIT
```

Another Workstation

```
wagner % netstat -t
Active Internet connections (w/o servers)
Proto Recv-Q Send-Q Local Address          Foreign Address        State
tcp        1      0 wagner.orchestra.:52287 bandleader.orchest:ldap CLOSE_WAIT
tcp        1      0 wagner.orchestra.:52076 bandleader.orchest:ldap CLOSE_WAIT
tcp        1      0 wagner.orchestra.:52288 bandleader.orchest:ldap CLOSE_WAIT
tcp        1      0 wagner.orchestra.:52272 bandleader.orchest:ldap CLOSE_WAIT
tcp        1      0 wagner.orchestra.:50095 bandleader.orchest:ldap CLOSE_WAIT
tcp        1      0 wagner.orchestra.:49051 bandleader.orchest:ldap CLOSE_WAIT
tcp        1      0 wagner.orchestra.:49762 bandleader.orchest:ldap CLOSE_WAIT
tcp        1      0 wagner.orchestra.:49894 bandleader.orchest:ldap CLOSE_WAIT
tcp        0      0 wagner.orchestra.:52364 bandleader.orchest:ldap TIME_WAIT
tcp        0      0 wagner.orchestra.:52376 bandleader.orchest:ldap ESTABLISHED
tcp        1      0 wagner.orchestra.:51024 bandleader.orchest:ldap CLOSE_WAIT
tcp        1      0 wagner.orchestra.:52242 bandleader.orchest:ldap CLOSE_WAIT
tcp        0      0 wagner.orchestra.:46834 188.166.176.122:9447    ESTABLISHED
tcp        1      0 wagner.orchestra.:49071 bandleader.orchest:ldap CLOSE_WAIT
tcp        1      0 wagner.orchestra.:51311 bandleader.orchest:ldap CLOSE_WAIT
```

Exercise 5

1) www.cse.unsw.edu.au - Yes
2) www.cancercouncil.org.au – No
3) compnet.epfl.ch - Yes
4) www.intel.com.au - Yes
5) www.telstra.com.au - Yes
6) www.hola.hp – No (unknown host)
7) www.amazon.com - No
8) www.wikileaks.org - Yes
9) www.tsinghua.edu.cn - Yes
10) www.krem.ru - Yes
11) 8.8.8.8 – Yes

Reason for not being able to connect to host such as amazon maybe due to security reasons to prevent anyone from getting unauthorised data

For cancercouncil even through a Web browser you cant reach it because the connection times out

Exercise 6

```
weill % traceroute www.nyu.edu
traceroute to www.nyu.edu (128.122.119.202), 30 hops max, 40 byte packets
 1  vlan385.gaszr1.gw.unsw.EDU.AU (129.94.242.1)  0.813 ms  1.324 ms  1.524 ms
 2  129.94.6.122 (129.94.6.122)  0.714 ms  0.711 ms  0.701 ms
 3  129.94.39.17 (129.94.39.17)  1.482 ms  1.473 ms  1.462 ms
 4  libudnex1-vl-3154.gw.unsw.edu.au (149.171.253.34)  2.137 ms  2.094 ms ombudnex1-vl-3154.gw.unsw.edu.au (149.171.253.35)  2.385 ms
 5  ombcr1-po-6.gw.unsw.edu.au (149.171.255.169)  1.531 ms libcr1-po-5.gw.unsw.edu.au (149.171.255.165)  2.315 ms ombcr1-po-6.gw.unsw.edu.au (149.171.255.169)  1.589 ms
 6  unswbr1-te-7-1.gw.unsw.edu.au (149.171.255.101)  2.301 ms  1.316 ms  1.532 ms
 7  138.44.5.0 (138.44.5.0)  1.523 ms  1.546 ms  1.344 ms
 8  et-1-1-0.pe1.rsby.nsw.aarnet.net.au (113.197.15.12)  1.844 ms  1.838 ms  1.824 ms
 9  113.197.15.159 (113.197.15.159)  1.970 ms  1.943 ms  1.934 ms
10  et-1-0-0.pe1.wnpa.akl.aarnet.net.au (113.197.15.77)  24.457 ms  24.450 ms  24.559 ms
11  et-0-1-0.199.pe1.tkpa.akl.aarnet.net.au (113.197.15.71)  25.337 ms  25.308 ms et-1-2-0.199.pe1.tkpa.akl.aarnet.net.au (113.197.15.75)  25.307 ms
12  et-1-2-0.pe1.a.koa.aarnet.net.au (113.197.15.85)  104.447 ms  104.597 ms  104.590 ms
13  et-1-1-0-1100.bdr1.b.lax.aarnet.net.au (113.197.15.87)  149.015 ms  149.257 ms  148.974 ms
14  abilene-1-is-jmb-776.sttlwa.pacificwave.net (207.231.241.8)  160.068 ms  159.916 ms  159.903 ms
15  et-4-0-0.113.rtr.salt.net.internet2.edu (198.71.45.24)  175.752 ms  176.261 ms  175.895 ms
16  et-5-0-0.110.rtr.kans.net.internet2.edu (198.71.45.18)  196.084 ms  196.335 ms  196.326 ms
17  et-9-0-0.106.rtr.chic.net.internet2.edu (198.71.45.14)  206.892 ms  207.715 ms  207.670 ms
18  199.109.11.37 (199.109.11.37)  221.286 ms  221.287 ms  221.089 ms
19  199.109.7.193 (199.109.7.193)  224.581 ms  225.209 ms  225.188 ms
20  199.109.7.162 (199.109.7.162)  230.597 ms  231.166 ms  230.180 ms
21  199.109.5.6 (199.109.5.6)  293.124 ms  273.191 ms  271.720 ms
22  NYUGWA-NEW-VL10.NET.NYU.EDU (192.76.177.3)  231.276 ms  230.777 ms  231.392 ms
23  WSQDCGWA-VL902.NET.NYU.EDU (128.122.1.38)  231.637 ms  231.357 ms  230.988 ms
24  * * *
25  * * *
26  * * *
27  * * *
28  * * *
29  * * *
30  * * *
weill %
```

1) * 23 routers between my workstation and www.nyu.edu
   * 6 routers are part of the UNSW network
   * Between 113.197.15.87 to 207.231.241.8 it crosses the Pacific Ocean

2)

Traceroute to www.ucla.edu

```
traceroute to www.ucla.edu (164.67.228.152), 30 hops max, 40 byte packets
 1  vlan385.gaszr1.gw.unsw.EDU.AU (129.94.242.1)  1.121 ms  1.300 ms  1.669 ms
 2  129.94.6.122 (129.94.6.122)  0.476 ms  0.472 ms  0.462 ms
 3  129.94.39.17 (129.94.39.17)  1.240 ms  1.213 ms  1.211 ms
 4  libudnex1-vl-3154.gw.unsw.edu.au (149.171.253.34)  1.952 ms  2.041 ms  2.195 ms
 5  libcr1-po-5.gw.unsw.edu.au (149.171.255.165)  1.565 ms  1.543 ms ombcr1-po-5.gw.unsw.edu.au (149.171.255.197)  1.544 ms
 6  unswbr1-te-8-1.gw.unsw.edu.au (149.171.255.105)  1.522 ms  1.752 ms unswbr1-te-7-1.gw.unsw.edu.au (149.171.255.101)  1.580 ms
 7  138.44.5.0 (138.44.5.0)  1.740 ms  1.386 ms  1.311 ms
 8  et-1-1-0.pe1.rsby.nsw.aarnet.net.au (113.197.15.12)  1.536 ms  1.597 ms  1.620 ms
 9  113.197.15.159 (113.197.15.159)  1.948 ms  1.938 ms  1.929 ms
10  et-1-3-0-199.pe2.brwy.nsw.aarnet.net.au (113.197.15.78)  2.189 ms  2.171 ms  2.207 ms
11  et-0-0-0.pe1.a.hnl.aarnet.net.au (113.197.15.99)  95.452 ms  95.340 ms  95.423 ms
12  et-1-0-0.bb1.a.sea.aarnet.net.au (202.158.194.110)  147.010 ms  146.815 ms  146.980 ms
13  cenichpr-1-is-jmb-778.snvaca.pacificwave.net (207.231.245.129)  163.737 ms  163.737 ms  164.117 ms
14  lax-hpr3--svl-hpr2-10g.cenic.net (137.164.25.37)  171.695 ms lax-hpr3--svl-hpr2-10g-2.cenic.net (137.164.25.49)  171.806 ms lax-hpr3--svl-hp
r2-10g.cenic.net (137.164.25.37)  171.783 ms
15  * * *
16  bd11f1.anderson--cr01f1.anderson.ucla.net (169.232.4.6)  243.308 ms bd11f1.anderson--cr01f2.csb1.ucla.net (169.232.4.4)  172.236 ms  172.265
 ms
17  cr01f1.anderson--dr01f2.csb1.ucla.net (169.232.4.55)  192.846 ms cr01f2.csb1--dr01f2.csb1.ucla.net (169.232.4.53)  172.049 ms cr01f1.anderso
n--dr01f2.csb1.ucla.net (169.232.4.55)  171.984 ms
18  * * *
19  * * *
20  * * *
21  * * *
22  * * *
23  * * *
24  * * *
25  * * *
26  * * *
27  * * *
28  * * *
29  * * *
30  * * *
```

Traceroute to www.u-tokyo.ac.jp

```
traceroute to www.u-tokyo.ac.jp (210.152.135.178), 30 hops max, 40 byte packets
 1  vlan385.gaszr1.gw.unsw.EDU.AU (129.94.242.1)  1.154 ms  1.140 ms  1.526 ms
 2  129.94.6.122 (129.94.6.122)  0.305 ms  0.304 ms  0.295 ms
 3  129.94.39.17 (129.94.39.17)  1.463 ms  1.461 ms  1.451 ms
 4  ombudnex1-vl-3154.gw.unsw.edu.au (149.171.253.35)  1.915 ms libudnex1-vl-3154.gw.unsw.edu.au (149.171.253.34)  1.581 ms ombudnex1-vl-3154.gw
.unsw.edu.au (149.171.253.35)  1.710 ms
 5  libcr1-po-5.gw.unsw.edu.au (149.171.255.165)  1.529 ms libcr1-po-6.gw.unsw.edu.au (149.171.255.201)  1.503 ms libcr1-po-5.gw.unsw.edu.au (14
9.171.255.165)  1.502 ms
 6  unswbr1-te-7-1.gw.unsw.edu.au (149.171.255.101)  1.496 ms unswbr1-te-8-1.gw.unsw.edu.au (149.171.255.105)  1.457 ms  1.445 ms
 7  138.44.5.0 (138.44.5.0)  1.586 ms  1.571 ms  1.548 ms
 8  et-0-3-0.pe1.alxd.nsw.aarnet.net.au (113.197.15.153)  1.841 ms  2.004 ms  1.825 ms
 9  xe-0-0-3.pe1.wnpa.akl.aarnet.net.au (113.197.15.67)  24.408 ms  24.522 ms  24.516 ms
10  et-0-1-0.200.pe1.tkpa.akl.aarnet.net.au (113.197.15.69)  24.685 ms  24.684 ms  24.677 ms
11  xe-1-0-0.bb1.a.lax.aarnet.net.au (202.158.194.173)  149.878 ms  149.872 ms  149.842 ms
12  xe-1-0-0.bb1-a-pao.aarnet.net.au (202.158.194.171)  158.505 ms  158.480 ms  158.487 ms
13  paloalto0.iij.net (198.32.176.24)  160.311 ms  159.960 ms  160.144 ms
14  osk004bb00.IIJ.Net (58.138.88.185)  269.292 ms osk004bb01.IIJ.Net (58.138.88.189)  273.521 ms  273.263 ms
15  osk004ix51.IIJ.Net (58.138.107.174)  270.894 ms osk004ix51.IIJ.Net (58.138.107.170)  270.776 ms osk004ix51.IIJ.Net (58.138.107.174)  270.623
 ms
16  210.130.135.130 (210.130.135.130)  272.945 ms  273.269 ms  273.245 ms
17  124.83.252.250 (124.83.252.250)  277.245 ms  275.169 ms  277.392 ms
18  114.111.64.197 (114.111.64.197)  277.922 ms  277.950 ms  279.149 ms
19  ae1.fk1cr01.idc.jp (158.205.134.22)  275.774 ms  278.017 ms  276.062 ms
20  po2.l321.fk1.eg.idc.jp (158.205.121.250)  277.875 ms  278.033 ms  278.564 ms
21  * * *
22  * * *
23  * * *
24  * * *
25  * * *
26  * * *
27  * * *
28  * * *
29  * * *
30  * * *
```

Traceroute to www.lancaster.ac.uk

```
weill % traceroute www.lancaster.ac.uk
traceroute to www.lancaster.ac.uk (148.88.2.80), 30 hops max, 40 byte packets
 1  vlan385.gaszr1.gw.unsw.EDU.AU (129.94.242.1)  1.112 ms  1.367 ms  1.474 ms
 2  129.94.6.122 (129.94.6.122)  0.395 ms  0.395 ms  0.386 ms
 3  129.94.39.17 (129.94.39.17)  1.199 ms  1.286 ms  1.277 ms
 4  libudnex1-vl-3154.gw.unsw.edu.au (149.171.253.34)  2.123 ms  2.102 ms  2.247 ms
 5  ombcr1-po-5.gw.unsw.edu.au (149.171.255.197)  1.333 ms  1.328 ms libcr1-po-5.gw.unsw.edu.au (149.171.255.165)  1.314 ms
 6  unswbr1-te-8-1.gw.unsw.edu.au (149.171.255.105)  1.306 ms unswbr1-te-7-1.gw.unsw.edu.au (149.171.255.101)  1.231 ms  1.175 ms
 7  138.44.5.0 (138.44.5.0)  1.399 ms  1.683 ms  1.536 ms
 8  et-1-3-0.pe1.sxt.bkvl.nsw.aarnet.net.au (113.197.15.149)  2.012 ms  1.984 ms  1.964 ms
 9  et-0-0-0.pe1.a.hnl.aarnet.net.au (113.197.15.99)  95.179 ms  95.152 ms  95.611 ms
10  et-1-0-0.bb1.a.sea.aarnet.net.au (202.158.194.110)  147.188 ms  147.165 ms  146.832 ms
11  abilene-1-is-jmb-776.lsanca.pacificwave.net (207.231.241.131)  172.131 ms  172.104 ms  172.113 ms
12  et-1-0-0.111.rtr.hous.net.internet2.edu (198.71.45.20)  203.431 ms  203.402 ms  203.582 ms
13  et-10-0-0.105.rtr.atla.net.internet2.edu (198.71.45.12)  227.498 ms  227.501 ms  227.493 ms
14  et-9-0-0.104.rtr.wash.net.internet2.edu (198.71.45.7)  240.359 ms  240.196 ms  240.194 ms
15  internet2-gw.mx1.lon.uk.geant.net (62.40.124.44)  314.916 ms  315.052 ms  315.026 ms
16  janet-gw.mx1.lon.uk.geant.net (62.40.124.198)  314.809 ms  314.808 ms  314.780 ms
17  ae29.londpg-sbr1.ja.net (146.97.33.2)  315.372 ms  315.565 ms  315.562 ms
18  ae31.erdiss-sbr1.ja.net (146.97.33.22)  319.276 ms  319.366 ms  319.361 ms
19  ae29.manckh-sbr1.ja.net (146.97.33.42)  321.190 ms  331.849 ms  321.072 ms
20  cnl.manckh-sbr1.ja.net (146.97.41.54)  323.505 ms  323.521 ms  323.979 ms
21  * * *
22  ismx-issrx.rtr.lancs.ac.uk (148.88.255.17)  325.655 ms  325.051 ms  325.053 ms
23  dc.iss.srv.rtrcloud.lancs.ac.uk (148.88.253.3)  341.416 ms  337.714 ms  337.253 ms
24  * * *
25  * * *
26  * * *
27  * * *
28  * * *
29  * * *
30  * * *
```

They start to diverge from 202.158.194.110/171 which is from the Australian Academic and Research Network, Canberra

The number of hops is proportional to the physical distance

3)

Traceroute from http://www.speedtest.com.sg/tr.php

Traceroute From Singapore To (Hostname/IP Address):
[   ] [Submit]

Traceroute Result:

```
traceroute to 129.94.242.49 (129.94.242.49), 30 hops max, 60 byte packets
 1  * * *
 2  * * *
 3  * * *
 4  * * *
 5  * * *
 6  * * *
 7  * * *
 8  * * *
 9  * * *
10  * * *
11  * * *
12  * * *
13  * * *
14  * * *
15  * * *
16  * * *
17  * * *
18  * * *
19  * * *
20  * * *
21  * * *
22  * * *
23  * * *
24  * * *
25  * * *
26  * * *
27  * * *
28  * * *
29  * * *
30  * * *

Traceroute Completed.
```

Traceroute to http://www.speedtest.com.sg/tr.php

```
traceroute to www.speedtest.com.sg (202.150.221.172), 30 hops max, 40 byte packets
 1  vlan385.gaszr1.gw.unsw.EDU.AU (129.94.242.1)  1.341 ms  1.326 ms  1.658 ms
 2  129.94.6.122 (129.94.6.122)  0.491 ms  0.487 ms  0.478 ms
 3  129.94.39.17 (129.94.39.17)  1.262 ms  1.428 ms  1.422 ms
 4  ombudnex1-vl-3154.gw.unsw.edu.au (149.171.253.35)  1.902 ms libudnex1-vl-3154.gw.unsw.edu.au (149.171.253.34)  1.713 ms ombudnex1-vl-3154.gw
.unsw.edu.au (149.171.253.35)  1.930 ms
 5  ombcr1-po-5.gw.unsw.edu.au (149.171.255.197)  1.534 ms libcr1-po-6.gw.unsw.edu.au (149.171.255.201)  1.515 ms ombcr1-po-6.gw.unsw.edu.au (14
9.171.255.169)  1.512 ms
 6  unswbr1-te-8-1.gw.unsw.edu.au (149.171.255.105)  1.502 ms unswbr1-te-7-1.gw.unsw.edu.au (149.171.255.101)  1.241 ms unswbr1-te-8-1.gw.unsw.e
du.au (149.171.255.105)  1.230 ms
 7  138.44.5.0 (138.44.5.0)  1.966 ms  2.162 ms  2.152 ms
 8  et-0-3-0.pe1.alxd.nsw.aarnet.net.au (113.197.15.153)  1.748 ms  1.809 ms  1.788 ms
 9  xe-0-0-3.pe1.wnpa.akl.aarnet.net.au (113.197.15.67)  25.390 ms  25.556 ms  25.552 ms
10  et-0-1-0.200.pe1.tkpa.akl.aarnet.net.au (113.197.15.69)  24.857 ms  24.639 ms  24.821 ms
11  xe-1-0-0.bb1.a.lax.aarnet.net.au (202.158.194.173)  150.575 ms  150.550 ms  150.366 ms
12  * * *
13  * * *
14  * * *
15  * * *
16  * * *
17  * * *
18  * * *
19  * * *
20  * * *
21  * * *
22  * * *
23  * * *
24  * * *
25  * * *
26  * * *
27  * * *
28  * * *
29  * * *
30  * * *
weill %
```

Traceroute from https://www.telstra.net/cgi-bin/trace

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)  1.069 ms  0.330 ms  0.240 ms
 2  bundle-ether3-100.win-core10.melbourne.telstra.net (203.50.80.129)  0.989 ms  1.352 ms  2.241 ms
 3  bundle-ether12.ken-core10.sydney.telstra.net (203.50.11.122)  12.486 ms  12.098 ms  12.609 ms
 4  bundle-ether1.ken-edge901.sydney.telstra.net (203.50.11.95)  11.861 ms  11.973 ms  11.860 ms
 5  aarnet6.lnk.telstra.net (139.130.0.78)  25.856 ms  11.599 ms  11.611 ms
 6  ge-6-0-0.bb1.a.syd.aarnet.net.au (202.158.202.17)  11.859 ms  11.723 ms  11.737 ms
 7  ae9.pe2.brwy.nsw.aarnet.net.au (113.197.15.56)  12.110 ms  12.097 ms  12.112 ms
 8  et-3-1-0.pe1.brwy.nsw.aarnet.net.au (113.197.15.146)  12.358 ms  12.597 ms  12.612 ms
 9  138.44.5.1 (138.44.5.1)  12.609 ms  12.601 ms  12.612 ms
10  libcr1-te-1-1.gw.unsw.edu.au (149.171.255.102)  19.479 ms  12.599 ms  12.608 ms
11  libudnex1-po-1.gw.unsw.edu.au (149.171.255.166)  12.985 ms
12  ufw1-ae-1-3154.gw.unsw.edu.au (149.171.253.36)  12.861 ms  12.849 ms  12.861 ms
13  129.94.39.21 (129.94.39.21)  13.109 ms  13.103 ms  13.110 ms
```

There are other traceroute sites listed here.

The traceroute CGI source can be found via:
≡carpeNet

Traceroute to https://www.telstra.net/cgi-bin/trace

```
weill % traceroute www.telstra.net
traceroute to www.telstra.net (203.50.5.178), 30 hops max, 40 byte packets
 1  vlan385.gaszr1.gw.unsw.EDU.AU (129.94.242.1)  1.107 ms  1.274 ms  1.458 ms
 2  129.94.6.122 (129.94.6.122)  0.431 ms  0.429 ms  0.420 ms
 3  129.94.39.17 (129.94.39.17)  1.412 ms  1.385 ms  1.381 ms
 4  ombudnex1-vl-3154.gw.unsw.edu.au (149.171.253.35)  2.226 ms  2.478 ms  2.193 ms
 5  ombcr1-po-5.gw.unsw.edu.au (149.171.255.197)  1.717 ms ombcr1-po-6.gw.unsw.edu.au (149.171.255.169)  1.713 ms ombcr1-po-5.gw.unsw.edu.au (14
9.171.255.197)  1.711 ms
 6  unswbr1-te-8-1.gw.unsw.edu.au (149.171.255.105)  1.704 ms unswbr1-te-7-1.gw.unsw.edu.au (149.171.255.101)  1.321 ms  1.299 ms
 7  138.44.5.0 (138.44.5.0)  1.524 ms  1.482 ms  1.591 ms
 8  et-0-3-0.pe1.bkvl.nsw.aarnet.net.au (113.197.15.147)  1.893 ms  1.861 ms  1.867 ms
 9  ae9.bb1.a.syd.aarnet.net.au (113.197.15.57)  2.142 ms  2.106 ms  2.231 ms
10  gigabitethernet1-1.pe1.b.syd.aarnet.net.au (202.158.202.18)  2.419 ms  2.417 ms  2.408 ms
11  gigabitethernet3-11.ken37.sydney.telstra.net (139.130.0.77)  3.073 ms  2.772 ms  2.866 ms
12  bundle-ether13.ken-core10.sydney.telstra.net (203.50.11.94)  4.441 ms  4.113 ms  3.817 ms
13  bundle-ether12.win-core10.melbourne.telstra.net (203.50.11.123)  14.590 ms  15.843 ms  15.817 ms
14  gigabitethernet5-0.exi-service2.melbourne.telstra.net (203.50.80.132)  13.911 ms  13.967 ms  13.772 ms
15  * * *
16  * * *
17  * * *
18  * * *
19  * * *
20  * * *
21  * * *
22  * * *
23  * * *
24  * * *
25  * * *
26  * * *
27  * * *
28  * * *
29  * * *
30  * * *
```

2) Traceroute to NZ (http://www.kcbbs.gen.nz IP ADDR : 202.14.102.1)

```
weill % traceroute www.kcbbs.gen.nz
traceroute to www.kcbbs.gen.nz (202.14.102.1), 30 hops max, 40 byte packets
 1  vlan385.gaszr1.gw.unsw.EDU.AU (129.94.242.1)  1.027 ms  1.187 ms  1.366 ms
 2  129.94.6.122 (129.94.6.122)  0.269 ms  0.267 ms  0.258 ms
 3  129.94.39.17 (129.94.39.17)  1.137 ms  1.120 ms  1.292 ms
 4  libudnex1-vl-3154.gw.unsw.edu.au (149.171.253.34)  1.888 ms  1.869 ms  2.164 ms
 5  libcr1-po-6.gw.unsw.edu.au (149.171.255.201)  1.406 ms libcr1-po-5.gw.unsw.edu.au (149.171.255.165)  1.404 ms ombcr1-po-5.gw.unsw.edu.au (14
9.171.255.197)  1.391 ms
 6  unswbr1-te-7-1.gw.unsw.edu.au (149.171.255.101)  1.385 ms  1.236 ms  1.225 ms
 7  138.44.5.0 (138.44.5.0)  1.313 ms  1.519 ms  2.173 ms
 8  et-0-1-0.bdr1.msct.nsw.aarnet.net.au (113.197.15.109)  2.169 ms  2.150 ms  2.144 ms
 9  9500.syd.equinix.com (202.167.228.53)  2.558 ms  3.863 ms  3.855 ms
10  be10-2.bgnzldv02.akl.vf.net.nz (203.109.130.33)  26.440 ms  28.628 ms  27.333 ms
11  gi1-0-0.akl-grafton-bba1.ihug.net (203.109.130.34)  25.844 ms  25.822 ms  25.760 ms
12  ge-0-2-0-914.xcore1.acld.telstraclear.net (203.98.42.17)  25.393 ms  25.370 ms  25.367 ms
13  203-97-12-26.dsl.clear.net.nz (203.97.12.26)  26.290 ms  25.566 ms  25.889 ms
14  202.27.217.33 (202.27.217.33)  25.738 ms  26.283 ms  26.023 ms
15  202.27.202.194 (202.27.202.194)  26.541 ms  27.020 ms  27.190 ms
16  * * *
17  * * *
18  * * *
19  * * *
20  * * *
21  * * *
22  * * *
23  * * *
24  * * *
25  * * *
26  * * *
27  * * *
28  * * *
29  * * *
30  * * *
weill %
```

From

```
traceroute to 129.94.242.49 (129.94.242.49), 30 hops max, 60 byte packets
 1  f0-1-0-15-c7204-1.kc.net.nz (202.27.217.193)  0.491 ms  0.460 ms  0.472 ms
 2  202.27.202.193 (202.27.202.193)  1.192 ms  1.170 ms  1.137 ms
 3  202.27.217.38 (202.27.217.38)  1.300 ms  1.333 ms  1.232 ms
 4  203-97-12-25.dsl.clear.net.nz (203.97.12.25)  1.528 ms  1.500 ms  1.402 ms
 5  be10-2.bgnzftc02.akl.vf.net.nz (203.109.130.41)  2.149 ms  2.169 ms  2.294 ms
 6  * * *
 7  as7575.nsw.ix.asn.au (218.100.52.7)  24.991 ms  25.002 ms  24.967 ms
 8  et-4-3-0.pe1-brwy-nsw.aarnet.net.au (113.197.15.108)  26.194 ms  26.145 ms  26.091 ms
 9  138.44.5.1 (138.44.5.1)  25.387 ms  25.331 ms  25.398 ms
10  ombcr1-te-1-1.gw.unsw.edu.au (149.171.255.106)  49.491 ms  49.070 ms  49.061 ms
11  ombudnex1-po-2.gw.unsw.edu.au (149.171.255.170)  26.186 ms  26.234 ms  26.167 ms
12  ufw1-ae-1-3154.gw.unsw.edu.au (149.171.253.36)  26.134 ms  26.105 ms  26.057 ms
13  129.94.39.21 (129.94.39.21)  26.152 ms  26.017 ms  26.122 ms
14  * * *
15  * * *
16  * * *
17  * * *
18  * * *
19  * * *
20  * * *
21  * * *
22  * * *
23  * * *
24  * * *
25  * * *
26  * * *
27  * * *
28  * * *
29  * * *
30  * * *
```

They don't follow the same path but there is a common router in **be10-2.bgnzftc02.akl.vf.net.nz** but with different ip address. This may be due to trying to reduce traffic or security reasons

Traceroute from Plusserver(Germany, IP ADDR: 88.198.46.60)

traceroute to 129.94.242.49 (129.94.242.49), 30 hops max, 60 byte packets

1				*	*	*
2	hos-tr2.juniper1.rz13.hetzner.de	213.239.224.33	de	0.120 ms		
	hos-tr4.juniper2.rz13.hetzner.de	213.239.224.97	de	0.132 ms	0.131 ms	
3	core22.hetzner.de	213.239.245.121	de	0.313 ms	0.185 ms	0.190 ms
4	core12.hetzner.de	213.239.245.214	de	2.746 ms		
	core11.hetzner.de	213.239.245.221	de	2.754 ms	2.776 ms	
5	juniper4.rz2.hetzner.de	213.239.245.26	de	2.886 ms		
	juniper4.rz2.hetzner.de	213.239.203.138	de	2.820 ms	2.830 ms	
6	et-1-0-0-710.nbg40.core-backbone.com	81.95.15.5	de	7.685 ms	2.824 ms	2.895 ms
7	ae5-2003.fra20.core-backbone.com	80.255.15.22	de	6.568 ms	10.793 ms	
	ae14-2002.fra10.core-backbone.com	81.95.2.198	de	10.792 ms		

8	xe-1-2-0.mpr1.fra4.de.above.net	80.81.194.26	de	10.601 ms	10.760 ms	5.572 ms
9	ae27.cs1.fra9.de.eth.zayo.com	64.125.30.254	us	157.485 ms	152.353 ms	152.395 ms
10	ae0.cs1.fra6.de.eth.zayo.com	64.125.29.54	us	152.415 ms	157.374 ms	152.373 ms
11	ae2.cs1.ams17.nl.eth.zayo.com	64.125.29.59	us	152.297 ms	152.330 ms	152.281 ms
12	ae0.cs1.ams10.nl.eth.zayo.com	64.125.29.80	us	188.747 ms	187.418 ms	187.404 ms
13	ae6.cs2.lga5.us.eth.zayo.com	64.125.29.77	us	155.791 ms	152.366 ms	152.003 ms
14	ae0.cs1.lga5.us.eth.zayo.com	64.125.29.186	us	182.594 ms	152.713 ms	152.734 ms
15	ae3.cs1.ord2.us.eth.zayo.com	64.125.29.209	us	151.963 ms	151.983 ms	151.986 ms
16	ae2.cs1.sea1.us.eth.zayo.com	64.125.29.26	us	163.003 ms	163.012 ms	158.806 ms
17	ae27.mpr1.sea1.us.zip.zayo.com	64.125.29.1	us	151.973 ms	158.074 ms	158.034 ms
18				*	*	*
19	xe-1-0-1.pe2.brwy.nsw.aarnet.net.au	202.158.194.120	au	294.239 ms	294.330 ms	295.948 ms
20	et-3-1-0.pe1.brwy.nsw.aarnet.net.au	113.197.15.146	au	294.511 ms	296.244 ms	294.513 ms
21				*	*	*
22	ombcr1-te-1-1.gw.unsw.edu.au	149.171.255.106	au	294.646 ms	294.471 ms	294.496 ms
23	libudnex1-po-2.gw.unsw.edu.au	149.171.255.198	au	297.343 ms	297.313 ms	297.335 ms
24	ufw1-ae-1-3154.gw.unsw.edu.au	149.171.253.36	au	295.087 ms	294.908 ms	295.068 ms
25				*	*	*
26				*	*	*
27				*	*	*

No reply for 3 hops. Assuming we reached firewall.

Traceroute to Plusserver

```
traceroute to www.traceroute.eu (88.198.46.60), 30 hops max, 40 byte packets
 1  vlan385.gaszr1.gw.unsw.EDU.AU (129.94.242.1)  1.030 ms  1.150 ms  1.371 ms
 2  129.94.6.122 (129.94.6.122)  0.360 ms  0.360 ms  0.352 ms
 3  129.94.39.17 (129.94.39.17)  1.106 ms  1.045 ms  1.079 ms
 4  libudnex1-vl-3154.gw.unsw.edu.au (149.171.253.34)  1.885 ms  1.896 ms  1.845 ms
 5  libcr1-po-5.gw.unsw.edu.au (149.171.255.165)  1.267 ms ombcr1-po-6.gw.unsw.edu.au (149.171.255.169)  1.303 ms  1.410 ms
 6  unswbr1-te-7.gw.unsw.edu.au (149.171.255.101)  1.276 ms  1.140 ms unswbr1-te-8-1.gw.unsw.edu.au (149.171.255.105)  1.172 ms
 7  138.44.5.0 (138.44.5.0)  1.306 ms  1.386 ms  1.346 ms
 8  et-0-3-0.pe1.bkvl.nsw.aarnet.net.au (113.197.15.147)  2.004 ms  1.944 ms  2.023 ms
 9  xe-0-0-0.bb1.b.sea.aarnet.net.au (202.158.194.121)  143.812 ms  143.784 ms  143.663 ms
10  xe-4-1-1.mpr1.sea1.us.above.net (64.125.193.129)  143.774 ms  143.757 ms  143.646 ms
11  ae27.cs1.sea1.us.eth.zayo.com (64.125.29.0)  155.282 ms  155.263 ms  155.333 ms
12  ae3.cs1.sjc2.us.eth.zayo.com (64.125.29.42)  200.816 ms  200.818 ms  200.804 ms
13  ae27.cr1.sjc2.us.zip.zayo.com (64.125.30.231)  154.860 ms  155.426 ms  154.848 ms
14  ae16.mpr3.sjc7.us.zip.zayo.com (64.125.31.13)  155.884 ms  155.226 ms  155.217 ms
15  ix-5-0.tcore1.SQN-San-Jose.as6453.net (63.243.205.9)  154.937 ms  155.020 ms  154.850 ms
16  if-12-2.tcore1.NTO-New-York.as6453.net (63.243.128.28)  307.393 ms  305.376 ms  305.550 ms
17  if-11-2.tcore2.L78-London.as6453.net (63.243.128.38)  296.650 ms  295.365 ms  298.420 ms
18  if-8-2.tcore2.AV2-Amsterdam.as6453.net (80.231.131.6)  296.823 ms  296.818 ms if-2-2.tcore2.N0V-New-York.as6453.net (216.6.90.22)  307.430 m
s
19  if-4-2.tcore2.L78-London.as6453.net (80.231.131.157)  304.651 ms if-2-2.tcore1.AV2-Amsterdam.as6453.net (195.219.194.5)  304.819 ms  304.698
 ms
20  if-8-2.tcore2.AV2-Amsterdam.as6453.net (80.231.131.6)  299.163 ms if-6-3.tcore1.FNM-Frankfurt.as6453.net (195.219.194.78)  304.662 ms if-6-2
.tcore1.FNM-Frankfurt.as6453.net (195.219.194.150)  306.994 ms
21  if-2-2.tcore1.AV2-Amsterdam.as6453.net (195.219.194.5)  304.724 ms if-ae-7-2.tcore1.FR0-Frankfurt.as6453.net (195.219.50.1)  299.263 ms if-2
-2.tcore1.AV2-Amsterdam.as6453.net (195.219.194.5)  306.700 ms
22  if-6-4.tcore1.FNM-Frankfurt.as6453.net (195.219.156.61)  303.291 ms 195.219.219.10 (195.219.219.10)  291.577 ms if-6-3.tcore1.FNM-Frankfurt.
as6453.net (195.219.194.78)  306.968 ms
23  if-ae-7-2.tcore1.FR0-Frankfurt.as6453.net (195.219.50.1)  300.693 ms core21.hetzner.de (213.239.245.13)  295.366 ms  296.094 ms
24  juniper2.rz13.hetzner.de (213.239.245.122)  295.296 ms  295.851 ms 195.219.219.10 (195.219.219.10)  290.949 ms
25  hos-tr1.ex3k12.rz13.hetzner.de (213.239.224.13)  296.293 ms  296.365 ms hos-tr4.ex3k12.rz13.hetzner.de (213.239.224.109)  296.256 ms
26  * juniper2.rz13.hetzner.de (213.239.245.122)  296.524 ms juniper1.rz13.hetzner.de (213.239.245.82)  295.666 ms
27  * hos-tr1.ex3k12.rz13.hetzner.de (213.239.224.13)  296.694 ms *
28  * * *
29  * * *
```

They don't take the same paths and no common router

Exercise 7

1)

Note: All distances are the shortest distance given by google maps and Time is calculated to 3sf

www.uq.edu.au

Physical distance = 738.23 km

Shortest Time = 2.46 x 10^{-3} s

Rtt min = 16.797 ms

Ratio = 6.83

www.nus.edu.sg

Physical distance = 6,349.39km

Shortest Time = 0.021 s

Rtt min = 119.690 ms

Ratio = 5.70

www.tu-berlin.de

Physical distance = 16,090.99km

Shortest Time = 0.054 s

Rtt min = 347.280 ms

Ratio = 6.43

www.uow.edu.au

Physical distance = 63.47km

Shortest Time = 2.12 x 10^{-4} s

Rtt min = 2.792 ms

Ratio =

www.flinders.edu.au

Physical distance = 1,167.88km

Shortest Time = 3.89 x 10^{-3} s

Rtt min = 22.669 ms

Ratio =

www.uws.edu.au

Physical distance = 26.13km

Shortest Time = 8.71 x 10^{-5} s

Rtt min = 1.470 ms

Ratio =

www.tsinghua.edu.cn

Physical distance = 8,977.52km

Shortest Time = 0.0299 s

Rtt min = 189.201 ms

Ratio =

www.sutd.edu.sg

Physical distance = 6,311.56km

Shortest Time = 0.021 s

Rtt min = 342.182 ms

Ratio =

www.iit.ac.in (Site Not working)

www.epfl.ch

Physical distance = 16,742.06km

Shortest Time = 0.0558 s

Rtt min = 330.881 ms

Ratio =

www.aau.dk

Physical distance = 16,136.77km

Shortest Time = 0.0538 s

Rtt min = 330.430 ms

Ratio =

www.uio.no

Physical distance = 15,975.08km

Shortest Time = 0.0533 s

Rtt min = 337.315 ms

Ratio =

2)Most of them are constant Since the graphs show almost linear increment in delay when packet sizes increase

3) Depends on Packet size : processing delay, queuing delay, transmission delay

   Does not depend on Packet size: Propagation delay,

https://en.wikipedia.org/wiki/End-to-end_delay

http://com2networks.blogspot.com.au/2013/09/delays-in-transmission.html

4)

Cumulative Propagation delay = (6349.39 * 1000)/ (3 * 10 ^ 8) = 0.021 s

processing delay

cumulative transmission delay = L/R = (11856)/(

average queuing delay

5)

Cumulative Propagation delay = 0.054

processing delay

cumulative transmission delay = L/R = (11856)/(

average queuing delay