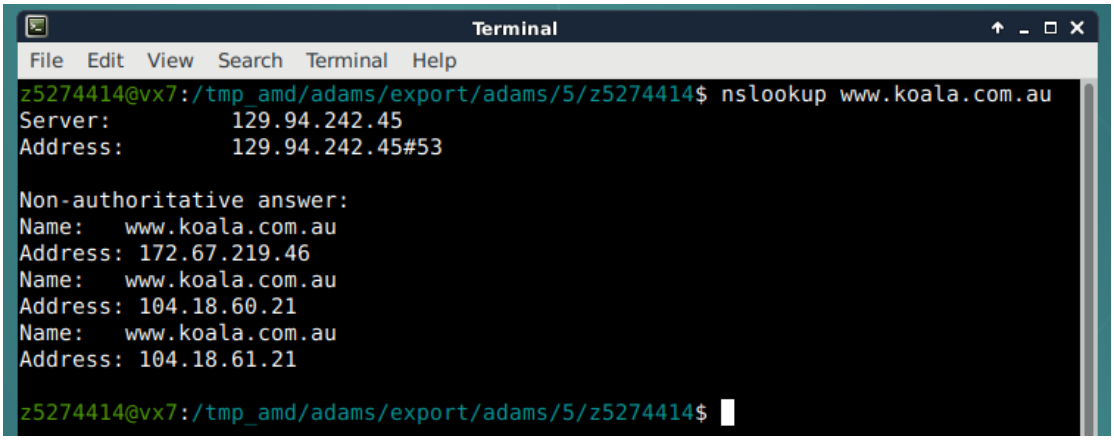
COMP9331 Lab1
Yuxuan Huang z5274414

Exercise 1: nslookup

1. The addresses of the website www.koala.com.au are 172.67.219.46 / 104.18.60.21 / 104.18.61.21

   There are two reasons of having several IP addresses as an output. First, if one IP address goes down, there're still other addresses for users to use. Second, having several IP addresses can prevent traffic from being exchanged via the gateway, speeding things up and reducing the load, and improving user's experience at the same time.



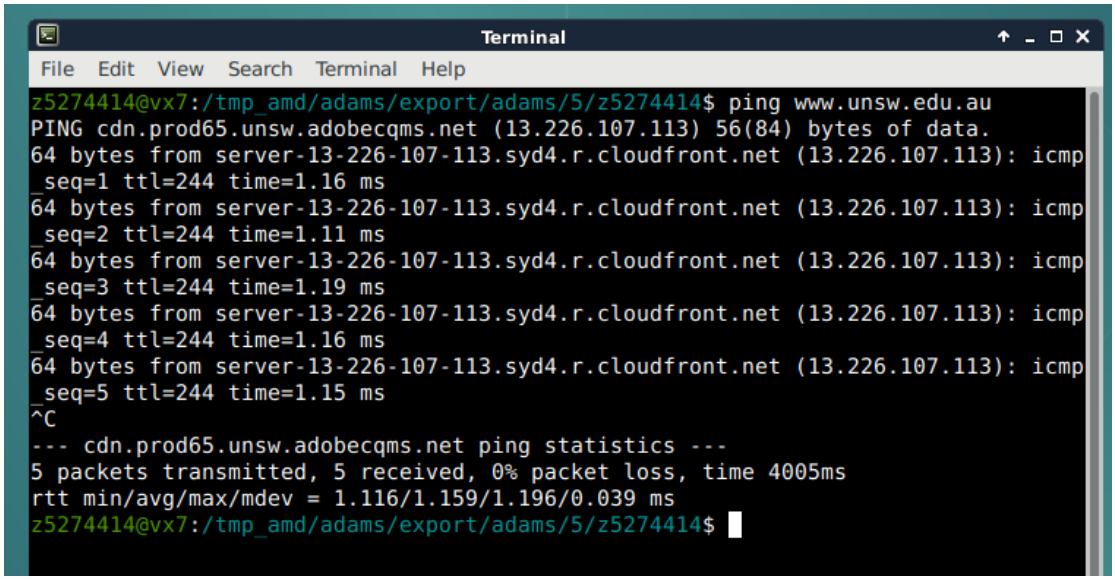
2. The name of the IP address 127.0.0.1 is local host. This address is for the local computer to connect the network interface of itself and it's also called loopback. This means when I call localhost, I am actually call with my own computer. Each computer has the same localhost IP address.

Reference: https://en.wikipedia.org/wiki/Loopback

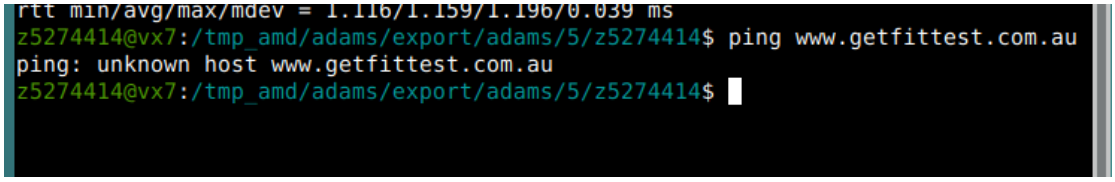
```
z5274414@vx7:/tmp_amd/adams/export/adams/5/z5274414$ nslookup 127.0.0.1
Server:         129.94.242.45
Address:        129.94.242.45#53

1.0.0.127.in-addr.arpa  name = localhost.

z5274414@vx7:/tmp_amd/adams/export/adams/5/z5274414$
```

Exercise 2: Us ping to test host reachability

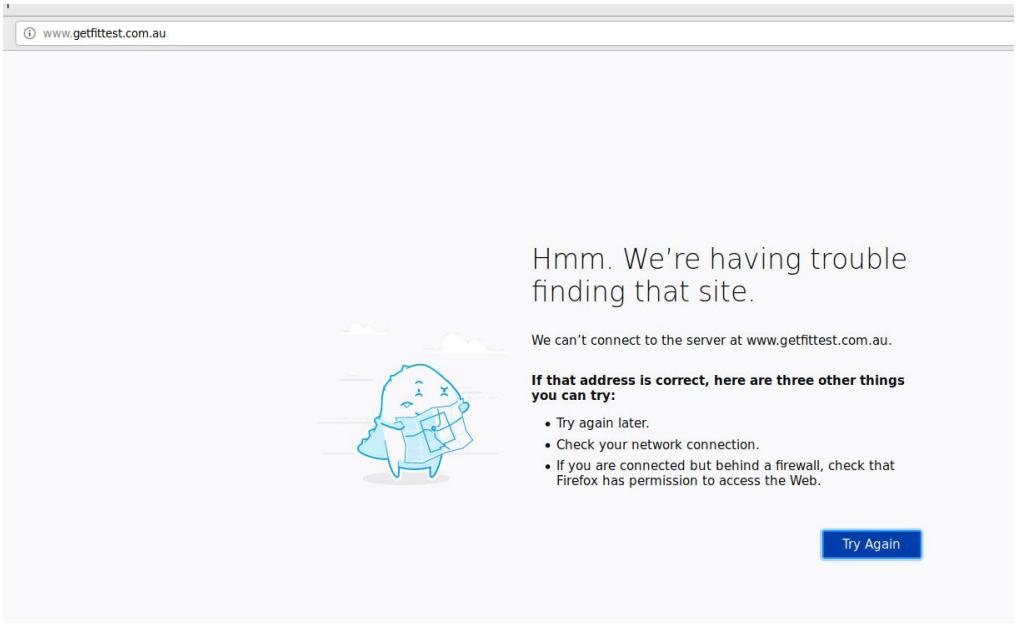
www.unsw.edu.au reachable



www.getfittest.com.au unreachable

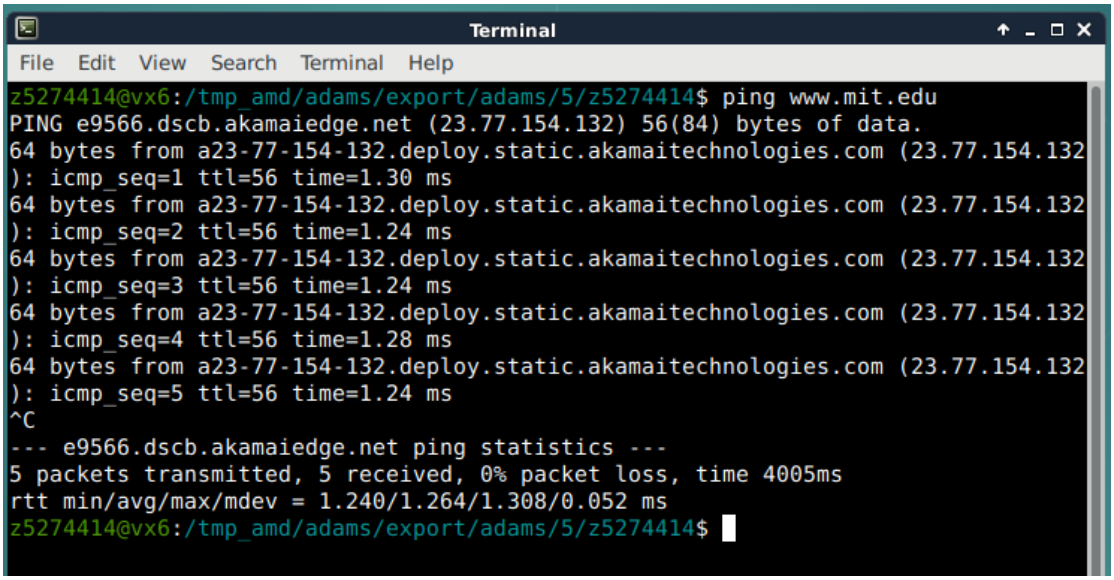


It’s still unreachable from the Web brower.



It’s unreachable both for ping command and web browser. The reason is its unknown host and server can’t be found so we can’t access.

www.mit.edu reachable



www.intel.com.au reachable

```
z5274414@vx6:/tmp_amd/adams/export/adams/5/z5274414$ ping www.intel.com.au
PING e19235.dsca.akamaiedge.net (104.116.196.207) 56(84) bytes of data.
64 bytes from a104-116-196-207.deploy.static.akamaitechnologies.com (104.116.196
.207): icmp_seq=1 ttl=52 time=12.5 ms
64 bytes from a104-116-196-207.deploy.static.akamaitechnologies.com (104.116.196
.207): icmp_seq=2 ttl=52 time=12.8 ms
64 bytes from a104-116-196-207.deploy.static.akamaitechnologies.com (104.116.196
.207): icmp_seq=3 ttl=52 time=12.5 ms
64 bytes from a104-116-196-207.deploy.static.akamaitechnologies.com (104.116.196
.207): icmp_seq=4 ttl=52 time=12.5 ms
64 bytes from a104-116-196-207.deploy.static.akamaitechnologies.com (104.116.196
.207): icmp_seq=5 ttl=52 time=12.5 ms
64 bytes from a104-116-196-207.deploy.static.akamaitechnologies.com (104.116.196
.207): icmp_seq=6 ttl=52 time=12.5 ms
^C
--- e19235.dsca.akamaiedge.net ping statistics ---
6 packets transmitted, 6 received, 0% packet loss, time 5008ms
rtt min/avg/max/mdev = 12.506/12.593/12.844/0.115 ms
z5274414@vx6:/tmp_amd/adams/export/adams/5/z5274414$
```

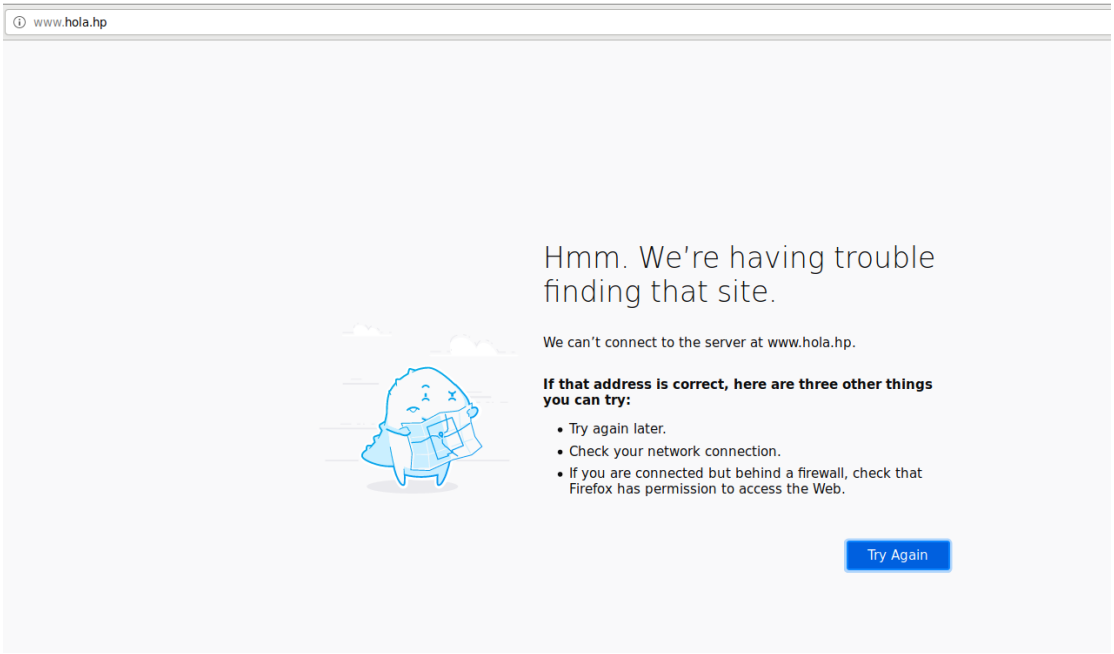
www.tpg.com.au reachable

```
z5274414@vx6:/tmp_amd/adams/export/adams/5/z5274414$ ping www.tpg.com.au
PING www.tpg.com.au (203.26.27.38) 56(84) bytes of data.
64 bytes from www.tpg.com.au (203.26.27.38): icmp_seq=1 ttl=119 time=1.74 ms
64 bytes from www.tpg.com.au (203.26.27.38): icmp_seq=2 ttl=119 time=1.54 ms
64 bytes from www.tpg.com.au (203.26.27.38): icmp_seq=3 ttl=119 time=1.59 ms
64 bytes from www.tpg.com.au (203.26.27.38): icmp_seq=4 ttl=119 time=1.52 ms
64 bytes from www.tpg.com.au (203.26.27.38): icmp_seq=5 ttl=119 time=1.58 ms
64 bytes from www.tpg.com.au (203.26.27.38): icmp_seq=6 ttl=119 time=1.60 ms
^C
--- www.tpg.com.au ping statistics ---
6 packets transmitted, 6 received, 0% packet loss, time 5008ms
rtt min/avg/max/mdev = 1.525/1.600/1.743/0.086 ms
z5274414@vx6:/tmp_amd/adams/export/adams/5/z5274414$
```

www.hola.hp unreachable

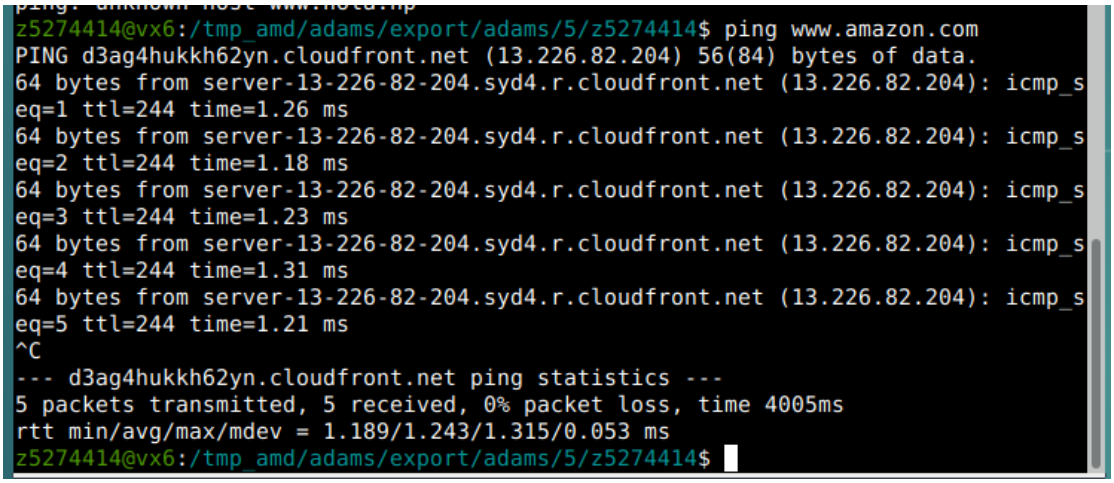
```
z5274414@vx6:/tmp_amd/adams/export/adams/5/z5274414$ ping www.hola.hp
ping: unknown host www.hola.hp
z5274414@vx6:/tmp_amd/adams/export/adams/5/z5274414$
```

It’s still unreachable from the Web browser.



It’s unreachable both for ping command and web browser. The reason is its unknown host and server can’t be found so we can’t access.

www.amazon.com reachable



www.tsinghua.edu.cn reachable

```
z5274414@vx6:/tmp_amd/adams/export/adams/5/z5274414$ ping www.tsinghua.edu.cn
PING www.tsinghua.edu.cn (166.111.4.100) 56(84) bytes of data.
64 bytes from www.tsinghua.edu.cn (166.111.4.100): icmp_seq=1 ttl=42 time=242 ms
64 bytes from www.tsinghua.edu.cn (166.111.4.100): icmp_seq=2 ttl=42 time=242 ms
64 bytes from www.tsinghua.edu.cn (166.111.4.100): icmp_seq=3 ttl=42 time=242 ms
64 bytes from www.tsinghua.edu.cn (166.111.4.100): icmp_seq=4 ttl=42 time=242 ms
64 bytes from www.tsinghua.edu.cn (166.111.4.100): icmp_seq=5 ttl=42 time=242 ms
64 bytes from www.tsinghua.edu.cn (166.111.4.100): icmp_seq=6 ttl=42 time=242 ms
^C
--- www.tsinghua.edu.cn ping statistics ---
6 packets transmitted, 6 received, 0% packet loss, time 5005ms
rtt min/avg/max/mdev = 242.243/242.271/242.331/0.029 ms
```

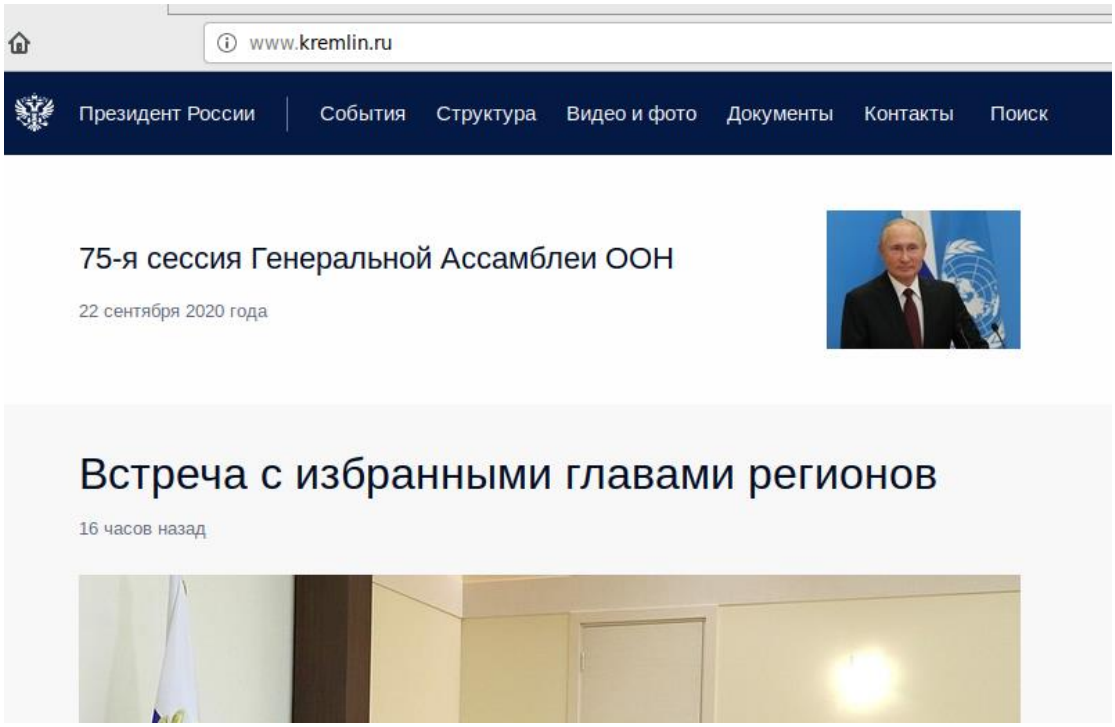
www.kremlin.ru unreachable

Terminal

File Edit View Search Terminal Help

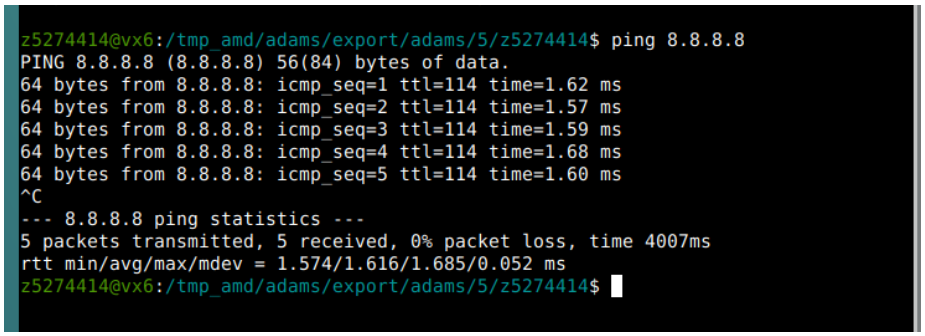
```
z5274414@vx6:/tmp_amd/adams/export/adams/5/z5274414$ ping www.kremlin.ru
PING www.kremlin.ru (95.173.136.72) 56(84) bytes of data.

^C
--- www.kremlin.ru ping statistics ---
15 packets transmitted, 0 received, 100% packet loss, time 14340ms

z5274414@vx6:/tmp_amd/adams/export/adams/5/z5274414$
```

It’s reachable from the Web browser.



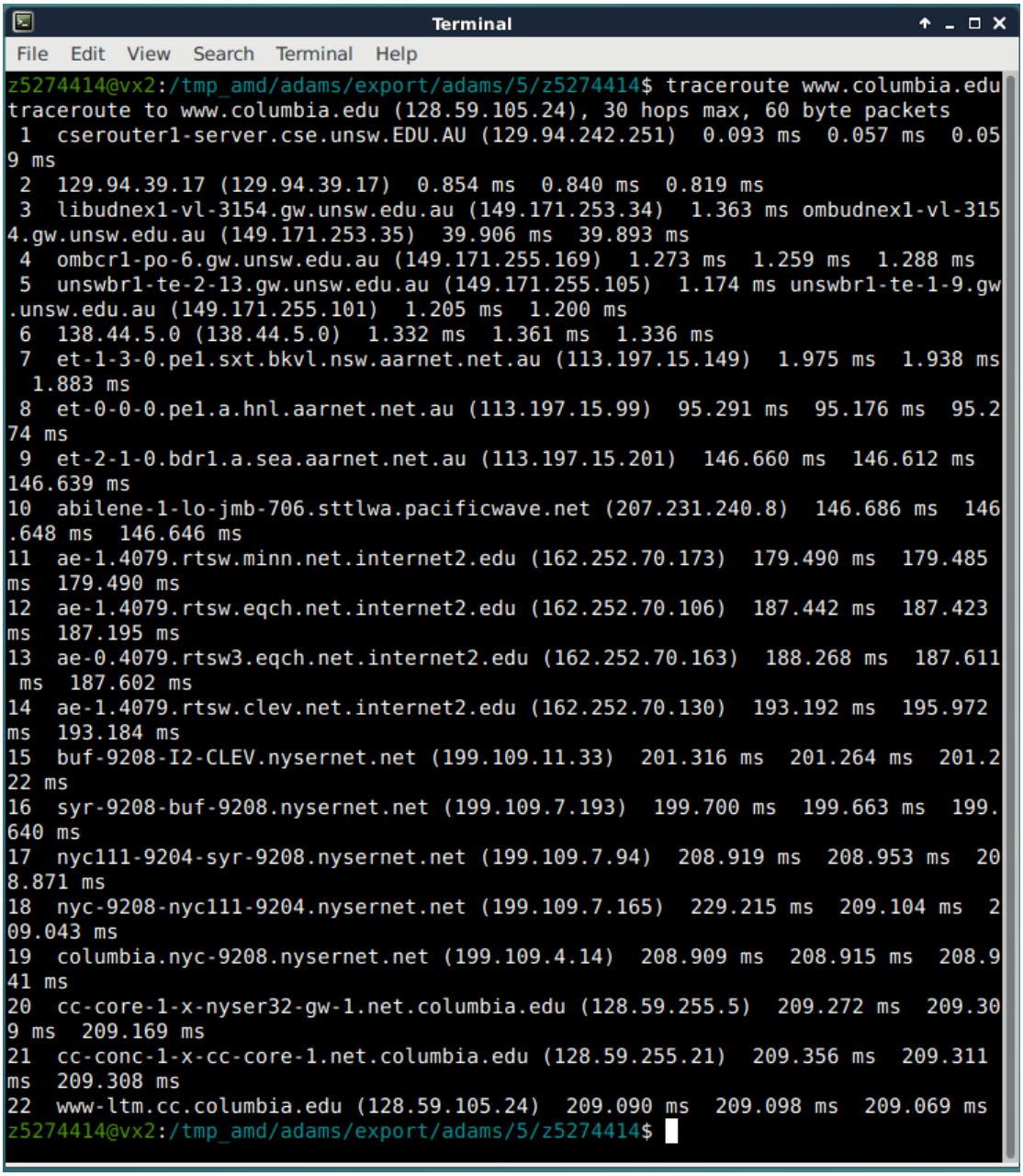
It’s unreachable for ping command because none of packets is received. The reason may be the server blocks the ping command considering the national security or reducing unnecessary network traffic and server load caused by ping.

8.8.8.8 reachable

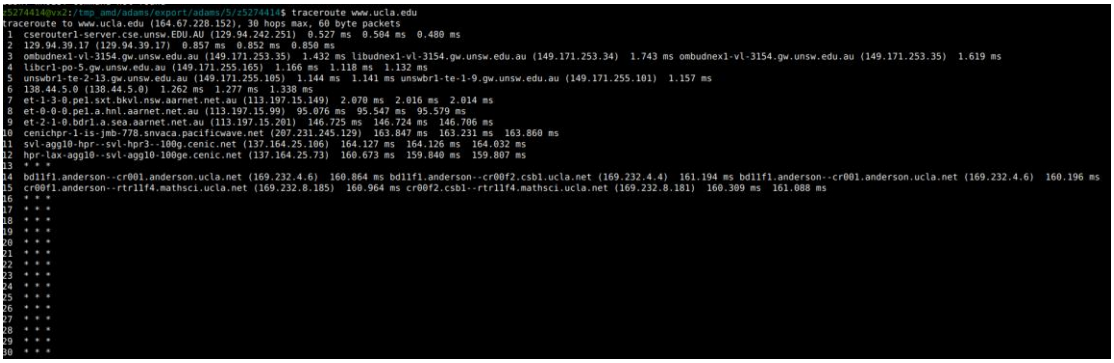


Exercise 3: Use traceroute to understand network topology

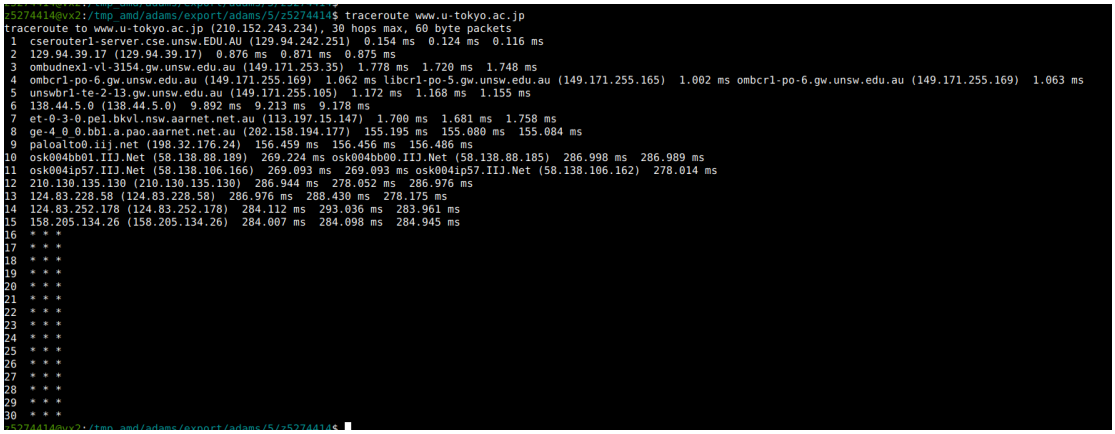
1. There are 22 routers between my workstation and www.columbia.edu.
   There are 5 routers along the path are part of UNSW network.
   Between the 7th and 9th routers, the packets cross the Pacific Ocean. because the time delay between those two routers increases significantly.



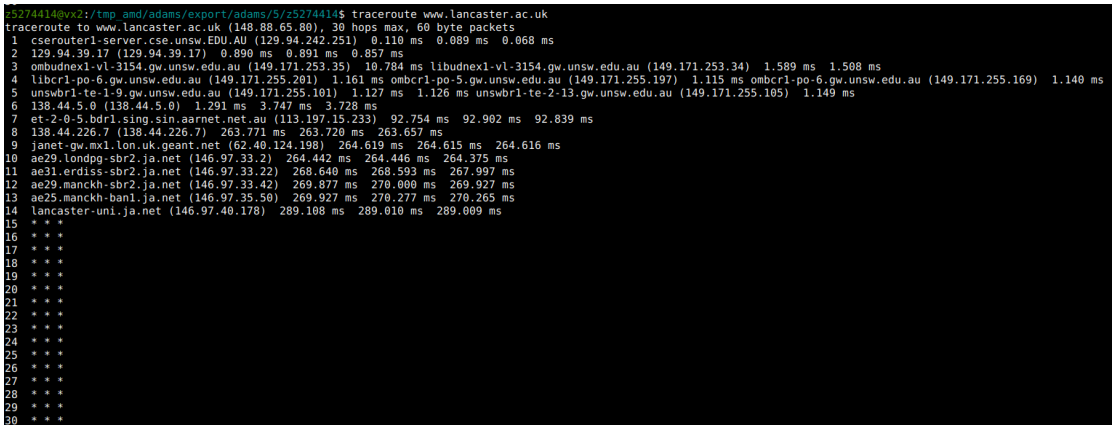
2. www.ucla.edu



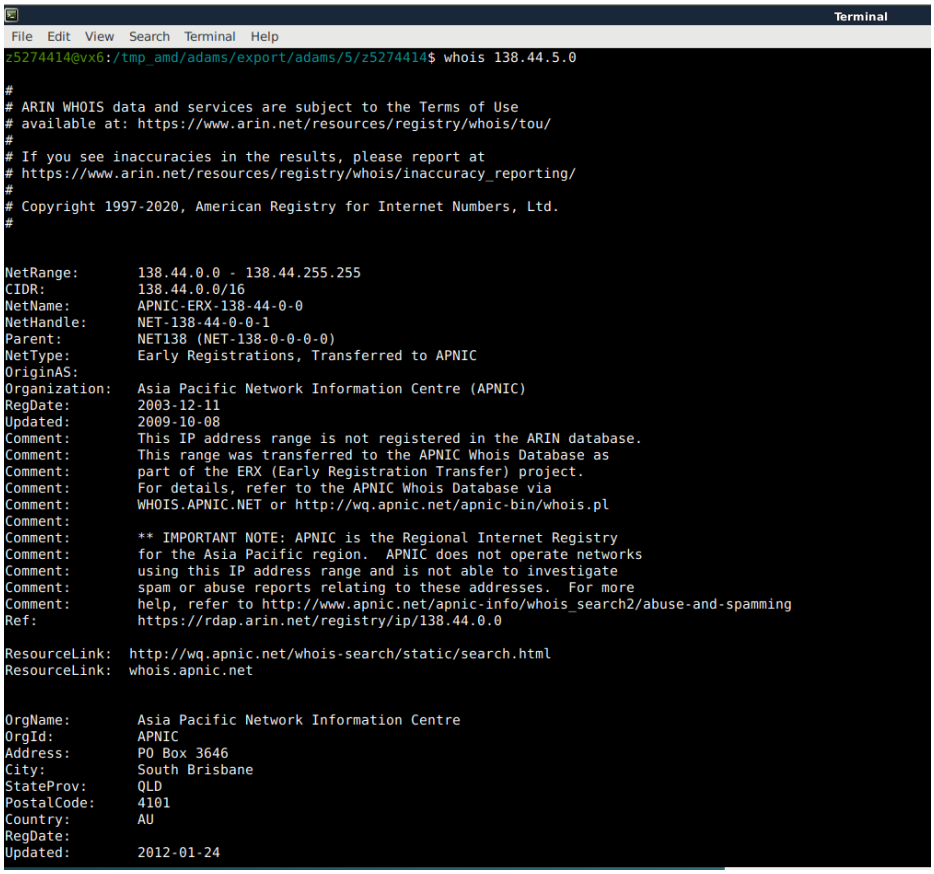
www.u-tokyo.ac.jp

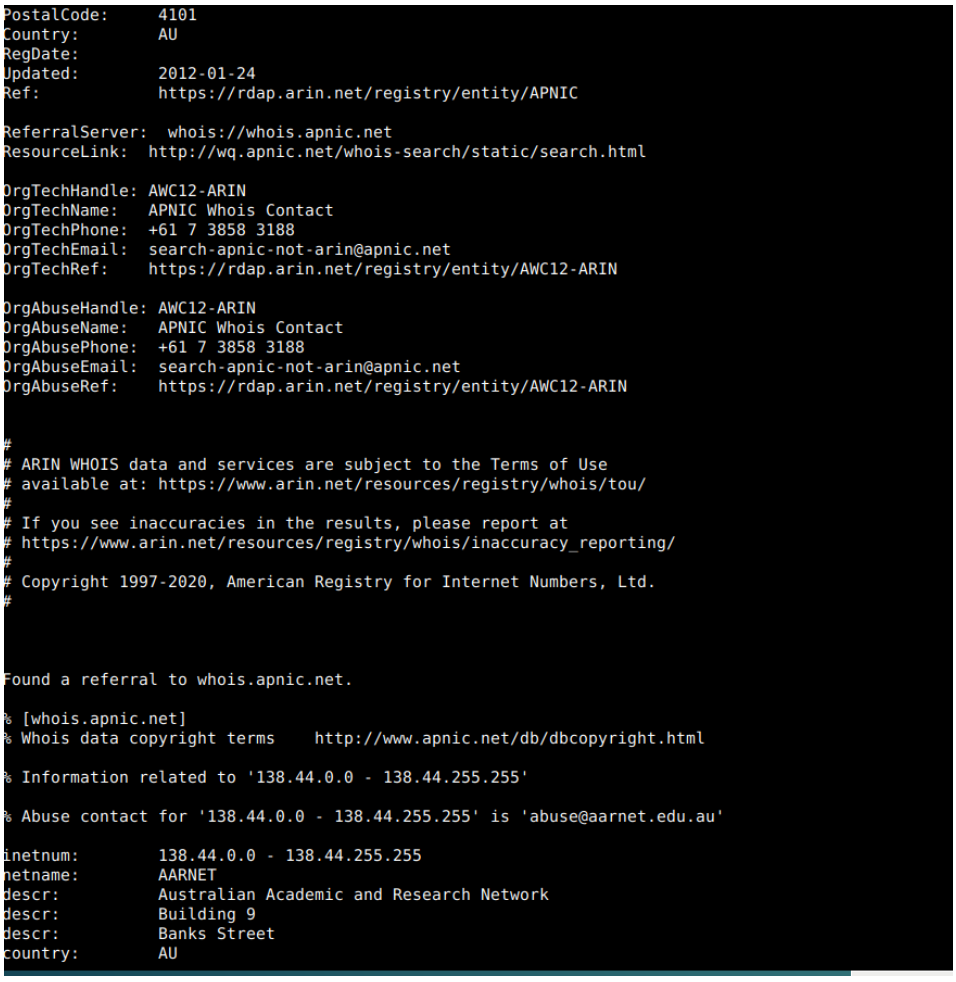


www.lancaster.ac.uk



Because the 6th route 138.44.5.0 is the last common router, so the paths from my machine to these three destinations diverge at 6th route 138.44.5.0.


Terminal
File Edit View Search Terminal Help
z5274414@vx6:/tmp_amd/adams/export/adams/5/z5274414$ whois 138.44.5.0
#
ARIN WHOIS data and services are subject to the Terms of Use
available at: https://www.arin.net/resources/registry/whois/tou/
#
If you see inaccuracies in the results, please report at
https://www.arin.net/resources/registry/whois/inaccuracy_reporting/
#
Copyright 1997-2020, American Registry for Internet Numbers, Ltd.
#
NetRange: 138.44.0.0 - 138.44.255.255
CIDR: 138.44.0.0/16
NetName: APNIC-ERX-138-44-0-0
NetHandle: NET-138-44-0-0-1
Parent: NET138 (NET-138-0-0-0-0)
NetType: Early Registrations, Transferred to APNIC
OriginAS:
Organization: Asia Pacific Network Information Centre (APNIC)
RegDate: 2003-12-11
Updated: 2009-10-08
Comment: This IP address range is not registered in the ARIN database.
Comment: This range was transferred to the APNIC Whois Database as
Comment: part of the ERX (Early Registration Transfer) project.
Comment: For details, refer to the APNIC Whois Database via
Comment: WHOIS.APNIC.NET or http://wq.apnic.net/apnic-bin/whois.pl
Comment:
Comment: ** IMPORTANT NOTE: APNIC is the Regional Internet Registry
Comment: for the Asia Pacific region. APNIC does not operate networks
Comment: using this IP address range and is not able to investigate
Comment: spam or abuse reports relating to these addresses. For more
Comment: help, refer to http://www.apnic.net/apnic-info/whois_search2/abuse-and-spamming
Ref: https://rdap.arin.net/registry/ip/138.44.0.0
ResourceLink: http://wq.apnic.net/whois-search/static/search.html
ResourceLink: whois.apnic.net
OrgName: Asia Pacific Network Information Centre
OrgId: APNIC
Address: PO Box 3646
City: South Brisbane
StateProv: QLD
PostalCode: 4101
Country: AU
RegDate:
Updated: 2012-01-24


PostalCode: 4101
Country: AU
RegDate:
Updated: 2012-01-24
Ref: https://rdap.arin.net/registry/entity/APNIC
ReferralServer: whois://whois.apnic.net
ResourceLink: http://wq.apnic.net/whois-search/static/search.html
OrgTechHandle: AWC12-ARIN
OrgTechName: APNIC Whois Contact
OrgTechPhone: +61 7 3858 3188
OrgTechEmail: search-apnic-not-arin@apnic.net
OrgTechRef: https://rdap.arin.net/registry/entity/AWC12-ARIN
OrgAbuseHandle: AWC12-ARIN
OrgAbuseName: APNIC Whois Contact
OrgAbusePhone: +61 7 3858 3188
OrgAbuseEmail: search-apnic-not-arin@apnic.net
OrgAbuseRef: https://rdap.arin.net/registry/entity/AWC12-ARIN
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https://www.arin.net/resources/registry/whois/inaccuracy_reporting/
#
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#
Found a referral to whois.apnic.net.
% [whois.apnic.net]
% Whois data copyright terms http://www.apnic.net/db/dbcopyright.html
% Information related to '138.44.0.0 - 138.44.255.255'
% Abuse contact for '138.44.0.0 - 138.44.255.255' is 'abuse@aarnet.edu.au'
inetnum: 138.44.0.0 - 138.44.255.255
netname: AARNET
descr: Australian Academic and Research Network
descr: Building 9
descr: Banks Street
country: AU

```
descr:          Australian Academic and Research Network
descr:          Building 9
descr:          Banks Street
country:        AU
org:            ORG-AAAR1-AP
admin-c:        SM6-AP
tech-c:         ANOC-AP
abuse-c:        AA1638-AP
status:         ALLOCATED PORTABLE
remarks:        -+-+-+-+-+-+-+-+-+-+-++-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
remarks:        This object can only be updated by APNIC hostmasters.
remarks:        To update this object, please contact APNIC
remarks:        hostmasters and include your organisation's account
remarks:        name in the subject line.
remarks:        -+-+-+-+-+-+-+-+-+-+-++-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
notify:         irrcontact@aarnet.edu.au
mnt-by:         APNIC-HM
mnt-lower:      MAINT-AARNET-AP
mnt-routes:     MAINT-AARNET-AP
mnt-irt:        IRT-AARNET-AU
last-modified:  2020-06-22T05:22:11Z
source:         APNIC

irt:            IRT-AARNET-AU
address:        AARNet Pty Ltd
address:        26 Dick Perry Avenue
address:        Kensington, Western Australia
address:        Australia
e-mail:         abuse@aarnet.edu.au
abuse-mailbox:  abuse@aarnet.edu.au
admin-c:        SM6-AP
tech-c:         ANOC-AP
auth:           # Filtered
remarks:        abuse@aarnet.edu.au was validated on 2020-06-22
mnt-by:         MAINT-AARNET-AP
last-modified:  2020-06-22T05:21:20Z
source:         APNIC

organisation:   ORG-AAAR1-AP
org-name:       Australian Academic and Research Network
country:        AU
address:        Building 9
address:        Banks Street
phone:          +61-2-6222-3530
fax-no:         +61-2-6222-3535
e-mail:         irrcontact@aarnet.edu.au
mnt-ref:        APNIC-HM
mnt-by:         APNIC-HM
last-modified:  2017-10-09T12:56:36Z
```

```
last-modified:  2017-10-09T12:56:36Z
source:         APNIC

role:           ABUSE AARNETAU
address:        AARNet Pty Ltd
address:        26 Dick Perry Avenue
address:        Kensington, Western Australia
address:        Australia
country:        ZZ
phone:          +000000000
e-mail:         abuse@aarnet.edu.au
admin-c:        SM6-AP
tech-c:         ANOC-AP
nic-hdl:        AA1638-AP
remarks:        Generated from irt object IRT-AARNET-AU
abuse-mailbox:  abuse@aarnet.edu.au
mnt-by:         APNIC-ABUSE
last-modified:  2020-06-22T05:22:10Z
source:         APNIC

role:           AARNet Network Operations Centre
remarks:
address:        AARNet Pty Ltd
address:        GPO Box 1559
address:        Canberra
address:        ACT  2601
country:        AU
phone:          +61 1300 275 662
phone:          +61 2 6222 3555
remarks:
e-mail:         noc@aarnet.edu.au
remarks:
remarks:        Send abuse reports to abuse@aarnet.edu.au
remarks:        Please include timestamps and offset to UTC in logs
remarks:        Peering requests to peering@aarnet.edu.au
remarks:
admin-c:        SM6-AP
tech-c:         BM-AP
nic-hdl:        ANOC-AP
mnt-by:         MAINT-AARNET-AP
last-modified:  2010-06-30T13:16:48Z
source:         APNIC

person:         Steve Maddocks
remarks:        Director Operations
address:        AARNet Pty Ltd
address:        26 Dick Perry Avenue
address:        Kensington
address:        Perth
```

```
address:        26 Dick Perry Avenue
address:        Kensington
address:        Perth
address:        WA  6151
country:        AU
phone:          +61-8-9289-2210
fax-no:         +61-2-6222-7509
e-mail:         steve.maddocks@aarnet.edu.au
nic-hdl:        SM6-AP
mnt-by:         MAINT-AARNET-AP
last-modified:  2011-02-01T08:37:06Z
source:         APNIC

% 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

% This query was served by the APNIC Whois Service version 1.88.15-SNAPSHOT (WHOIS-NODE2)
```

My IP address is 129.94.242.119.

www.ucla.edu	164.67.228.152	7499.0 miles	14 routers
www.u-tokyo.ac.jp	210.152.243.234	4908.7 miles	15 routers
www.lancaster.ac.uk	144.88.65.80	10569.8 miles	14 routers

Thus, the number of hops on each path is not proportional the physical distance.

3. My IP address is 129.94.242.119.

   www.speedtest.com.sg IP is 202.150.221.170

   www.telstra.net IP is 203.50.5.178

From www.speedtest.com.sg to my machine

> Traceroute Result:
>
> ```
> traceroute to 129.94.242.119 (129.94.242.119), 30 hops max, 60 byte packets
>  1  ge2-8.r01.sin01.ne.com.sg (202.150.221.169)  0.152 ms  0.162 ms  0.168 ms
>  2  10.11.34.146 (10.11.34.146)  0.375 ms  0.454 ms  0.522 ms
>  3  aarnet.sgix.sg (103.16.102.67)  209.080 ms  209.044 ms  209.056 ms
>  4  et-7-3-0.pe1.nsw.brwy.aarnet.net.au (113.197.15.232)  214.862 ms  214.886 ms  214.870 ms
>  5  138.44.5.1 (138.44.5.1)  206.758 ms  206.902 ms  206.826 ms
>  6  ombcr1-te-1-5.gw.unsw.edu.au (149.171.255.106)  209.264 ms  209.242 ms  209.232 ms
>  7  libudnex1-po-2.gw.unsw.edu.au (149.171.255.198)  200.894 ms  200.764 ms  200.817 ms
>  8  ufw1-ae-1-3154.gw.unsw.edu.au (149.171.253.36)  209.883 ms  209.917 ms  209.925 ms
>  9  129.94.39.23 (129.94.39.23)  212.450 ms  212.513 ms  212.372 ms
> 10  * * *
> 11  * * *
> 12  * * *
> 13  * * *
> 14  * * *
> 15  * * *
> 16  * * *
> 17  * * *
> 18  * * *
> 19  * * *
> 20  * * *
> 21  * * *
> 22  * * *
> 23  * * *
> 24  * * *
> 25  * * *
> 26  * * *
> 27  * * *
> 28  * * *
> 29  * * *
> 30  * * *
> ```
>
> Traceroute Completed.

From www.telstra.net to my machine

```
 1  gigabitethernet3-3.exi2.melbourne.telstra.net (203.50.77.53)  0.477 ms  0.326 ms  0.242 ms
 2  bundle-ether3-100.win-core10.melbourne.telstra.net (203.50.80.129)  1.864 ms  1.602 ms  2.115 ms
 3  bundle-ether12.ken-core10.sydney.telstra.net (203.50.11.122)  13.236 ms  12.598 ms  13.485 ms
 4  bundle-ether1.ken-edge903.sydney.telstra.net (203.50.11.173)  12.110 ms  12.098 ms  12.109 ms
 5  aar3533567.lnk.telstra.net (139.130.0.78)  20.357 ms  15.096 ms  11.737 ms
 6  et-7-1-0.pe1.brwy.nsw.aarnet.net.au (113.197.15.13)  12.485 ms  15.220 ms  11.859 ms
 7  138.44.5.1 (138.44.5.1)  12.112 ms  11.976 ms  11.987 ms
 8  libcr1-te-1-5.gw.unsw.edu.au (149.171.255.102)  12.109 ms  12.099 ms  11.985 ms
 9  ombudnex1-po-1.gw.unsw.edu.au (149.171.255.202)  12.484 ms
10  ufw1-ae-1-3154.gw.unsw.edu.au (149.171.253.36)  12.732 ms  12.724 ms  12.733 ms
11  129.94.39.23 (129.94.39.23)  12.861 ms  12.851 ms  12.860 ms
```

There are other traceroute sites listed here.

From my machine to www.speedtest.com.sg

```
z5274414@vx6:/tmp_amd/adams/export/adams/5/z5274414$ traceroute www.speedtest.co
m.sg
traceroute to www.speedtest.com.sg (202.150.221.170), 30 hops max, 60 byte packe
ts
 1  cserouter1-server.cse.unsw.EDU.AU (129.94.242.251)  0.107 ms  0.086 ms  0.07
1 ms
 2  129.94.39.17 (129.94.39.17)  0.798 ms  0.806 ms  0.842 ms
 3  ombudnex1-vl-3154.gw.unsw.edu.au (149.171.253.35)  1.414 ms libudnex1-vl-315
4.gw.unsw.edu.au (149.171.253.34)  1.517 ms  1.527 ms
 4  libcr1-po-5.gw.unsw.edu.au (149.171.255.165)  1.109 ms ombcr1-po-6.gw.unsw.e
du.au (149.171.255.169)  1.113 ms  1.119 ms
 5  unswbr1-te-1-9.gw.unsw.edu.au (149.171.255.101)  1.133 ms  1.151 ms  1.161 m
s
 6  138.44.5.0 (138.44.5.0)  1.291 ms  1.328 ms  1.276 ms
 7  et-0-3-0.pe1.alxd.nsw.aarnet.net.au (113.197.15.153)  1.961 ms  1.642 ms  1.
690 ms
 8  xe-0-2-7.bdr1.a.lax.aarnet.net.au (202.158.194.173)  147.624 ms  147.556 ms
 147.560 ms
 9  singtel.as7473.any2ix.coresite.com (206.72.210.63)  147.712 ms  147.719 ms
147.631 ms
10  203.208.151.181 (203.208.151.181)  316.342 ms 203.208.171.117 (203.208.171.1
17)  147.911 ms 203.208.172.165 (203.208.172.165)  330.181 ms
11  203.208.172.145 (203.208.172.145)  246.067 ms  246.026 ms 203.208.151.233 (2
03.208.151.233)  233.580 ms
12  * * 203.208.158.17 (203.208.158.17)  321.924 ms
13  203.208.158.185 (203.208.158.185)  317.314 ms 202-150-221-170.rev.ne.com.sg
(202.150.221.170)  213.184 ms  205.156 ms
z5274414@vx6:/tmp_amd/adams/export/adams/5/z5274414$
```

From my machine to www.telstra.net

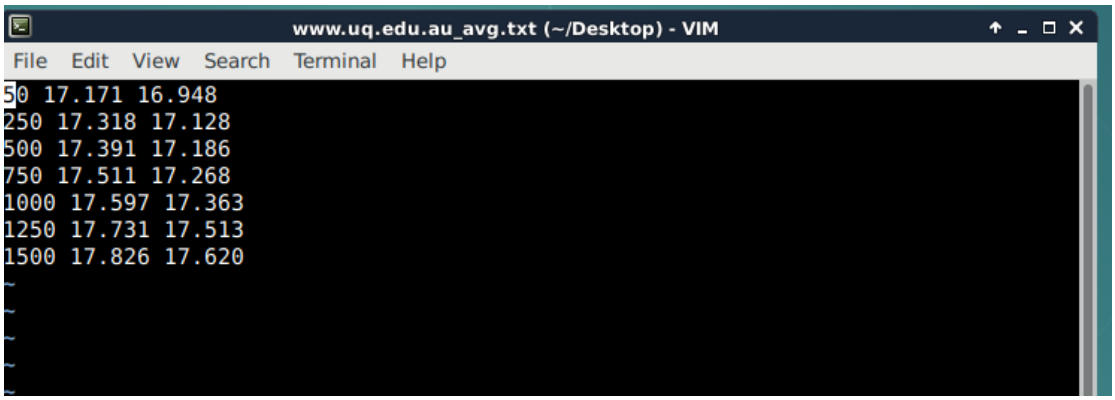
```
Terminal
File  Edit  View  Search  Terminal  Help
z5274414@vx6:/tmp_amd/adams/export/adams/5/z5274414$ traceroute www.telstra.net
traceroute to www.telstra.net (203.50.5.178), 30 hops max, 60 byte packets
 1  cserouter1-server.cse.unsw.EDU.AU (129.94.242.251)  0.145 ms  0.129 ms  0.11
3 ms
 2  129.94.39.17 (129.94.39.17)  0.863 ms  0.867 ms  0.875 ms
 3  ombudnex1-vl-3154.gw.unsw.edu.au (149.171.253.35)  1.456 ms libudnex1-vl-315
4.gw.unsw.edu.au (149.171.253.34)  1.592 ms  1.620 ms
 4  ombcr1-po-5.gw.unsw.edu.au (149.171.255.197)  1.076 ms  1.120 ms  1.126 ms
 5  unswbr1-te-1-9.gw.unsw.edu.au (149.171.255.101)  7.976 ms unswbr1-te-2-13.gw
.unsw.edu.au (149.171.255.105)  7.977 ms unswbr1-te-1-9.gw.unsw.edu.au (149.171.
255.101)  7.992 ms
 6  138.44.5.0 (138.44.5.0)  1.636 ms  1.271 ms  1.223 ms
 7  et-1-1-0.pe1.rsby.nsw.aarnet.net.au (113.197.15.12)  1.566 ms  1.607 ms  1.6
57 ms
 8  xe-0-0-3.bdr1.rsby.nsw.aarnet.net.au (113.197.15.31)  1.424 ms  1.387 ms  1.
393 ms
 9  HundredGigE0-1-0-4.ken-edge903.sydney.telstra.net (139.130.0.77)  2.177 ms
2.434 ms  2.204 ms
10  bundle-ether17.ken-core10.sydney.telstra.net (203.50.11.172)  3.659 ms  2.49
8 ms bundle-ether2.chw-edge903.sydney.telstra.net (203.50.11.175)  2.500 ms
11  bundle-ether10.win-core10.melbourne.telstra.net (203.50.11.123)  14.837 ms b
undle-ether17.chw-core10.sydney.telstra.net (203.50.11.176)  3.210 ms bundle-eth
er10.win-core10.melbourne.telstra.net (203.50.11.123)  14.037 ms
12  bundle-ether8.exi-core10.melbourne.telstra.net (203.50.11.125)  14.318 ms 20
3.50.6.40 (203.50.6.40)  15.120 ms bundle-ether8.exi-core10.melbourne.telstra.ne
t (203.50.11.125)  14.195 ms
13  bundle-ether2.exi-ncprouter101.melbourne.telstra.net (203.50.11.209)  15.117
 ms  16.805 ms  16.742 ms
14  www.telstra.net (203.50.5.178)  14.214 ms  14.192 ms  14.242 ms
z5274414@vx6:/tmp_amd/adams/export/adams/5/z5274414$
```

The reverse path doesn't go through the same routers as the forward path, but there are some routers are similar. For example, 5th router (138.44.5.1) from speedtest and 6th router (138.44.5.0) to speedtest. 8th router (149.171.253.36) and 3rd router (149.171.253.35) to speedtest. These similar routers' last number is different. One reason may be the router have a group of IP addresses to receive and send packets, also it needs to lots of users, so each time the router address may be different.

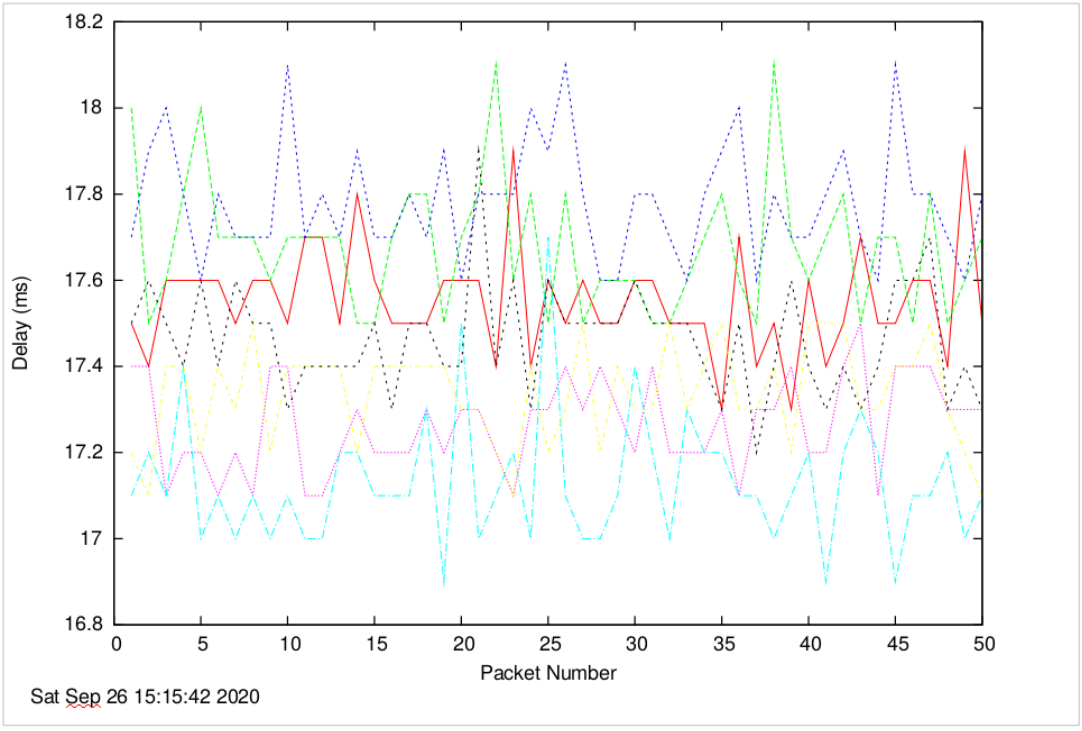
Exercise 4: Use ping to gain insights into network performance

www.uq.edu.au

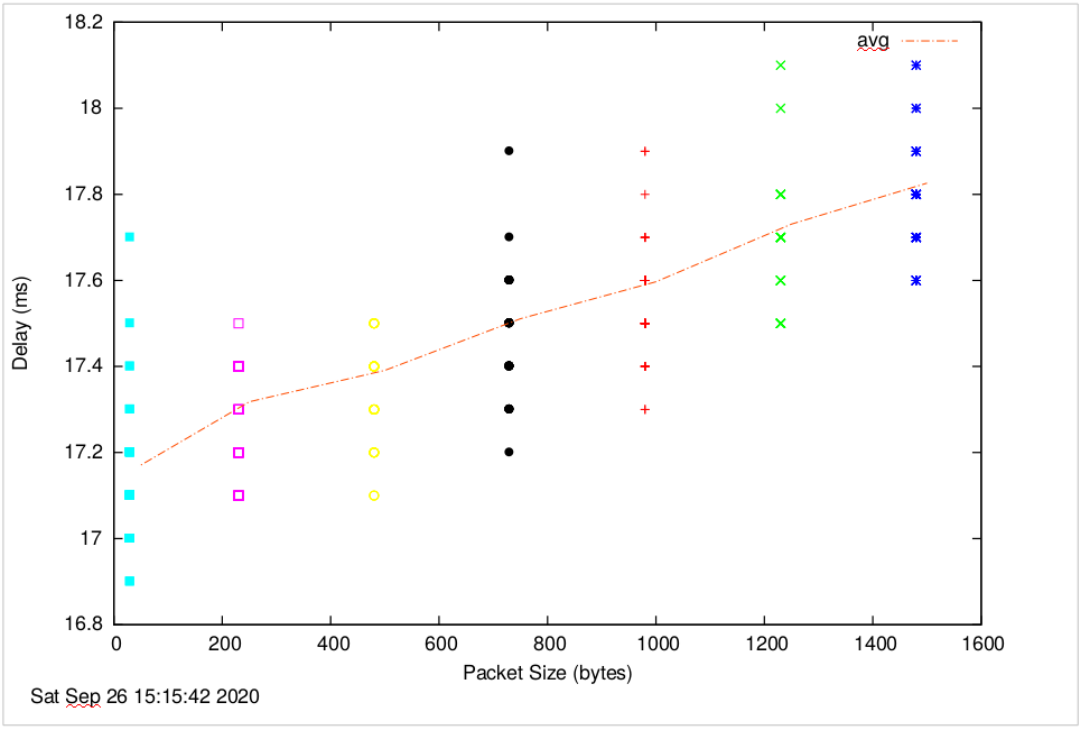
text



delay

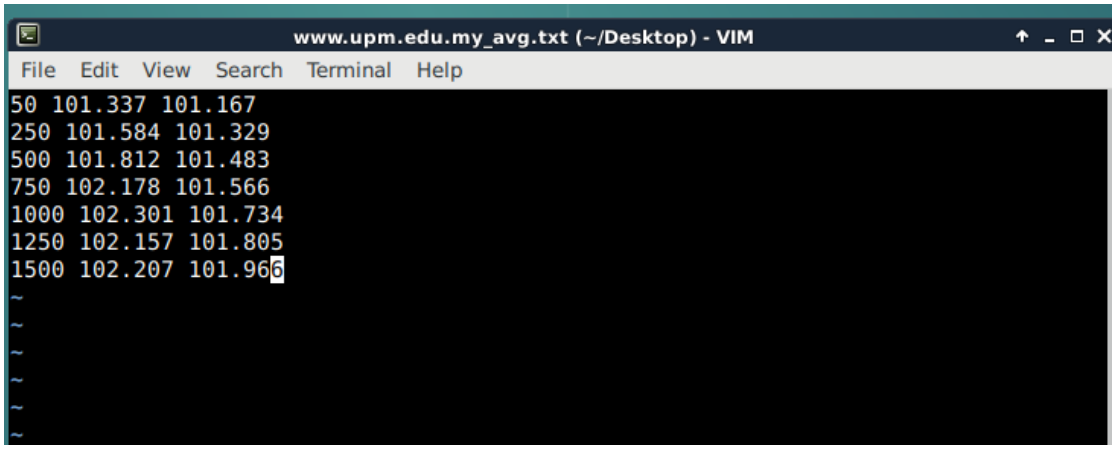


scatter

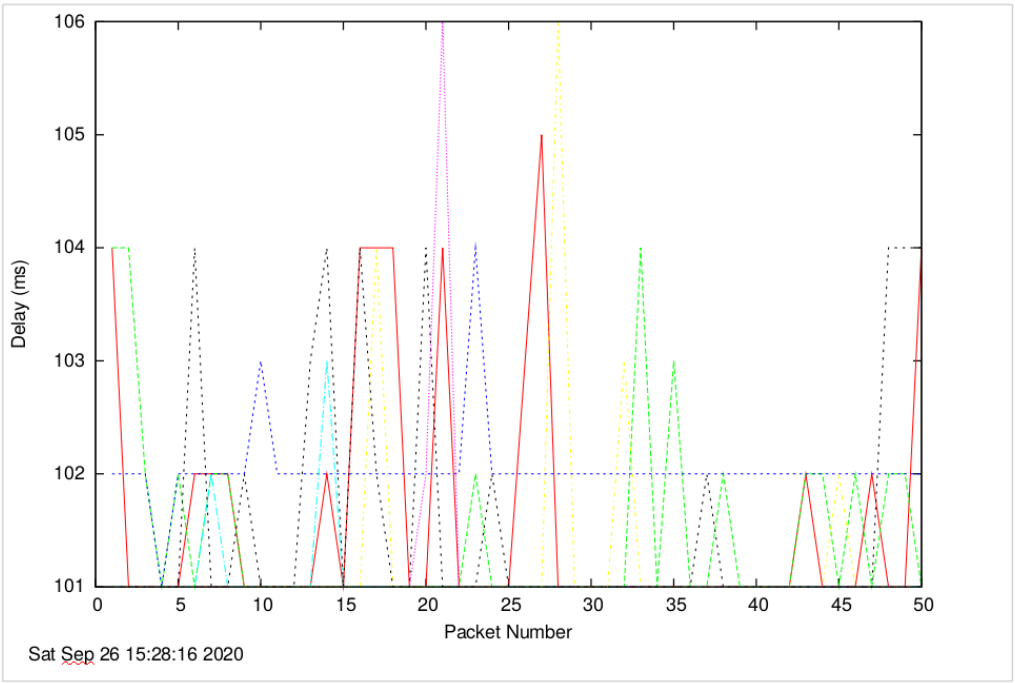


www.upm.edu.my

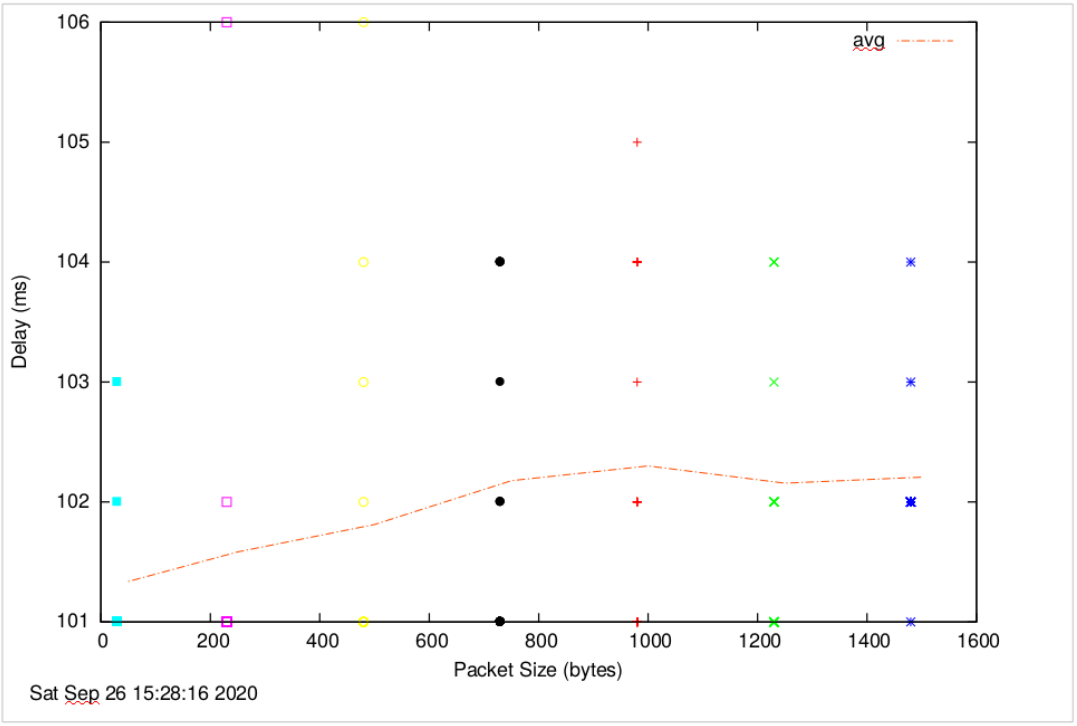
text



delay

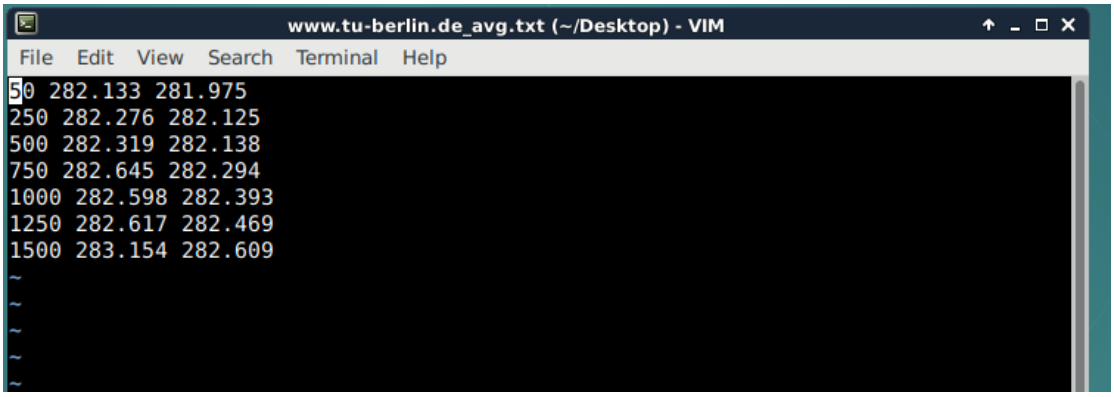


scatter

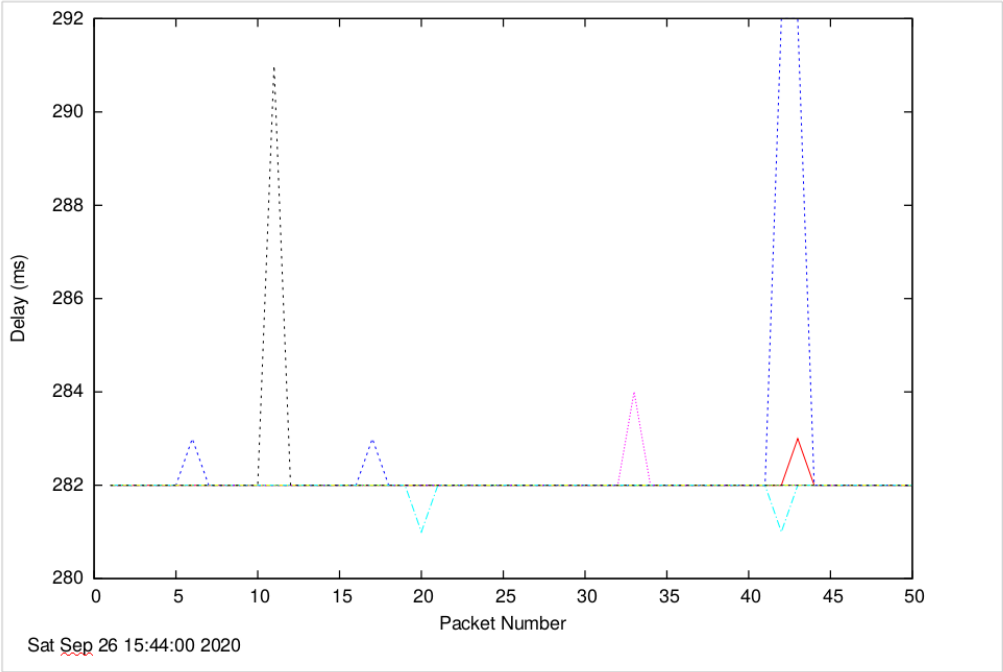


www.tu-berlin.de

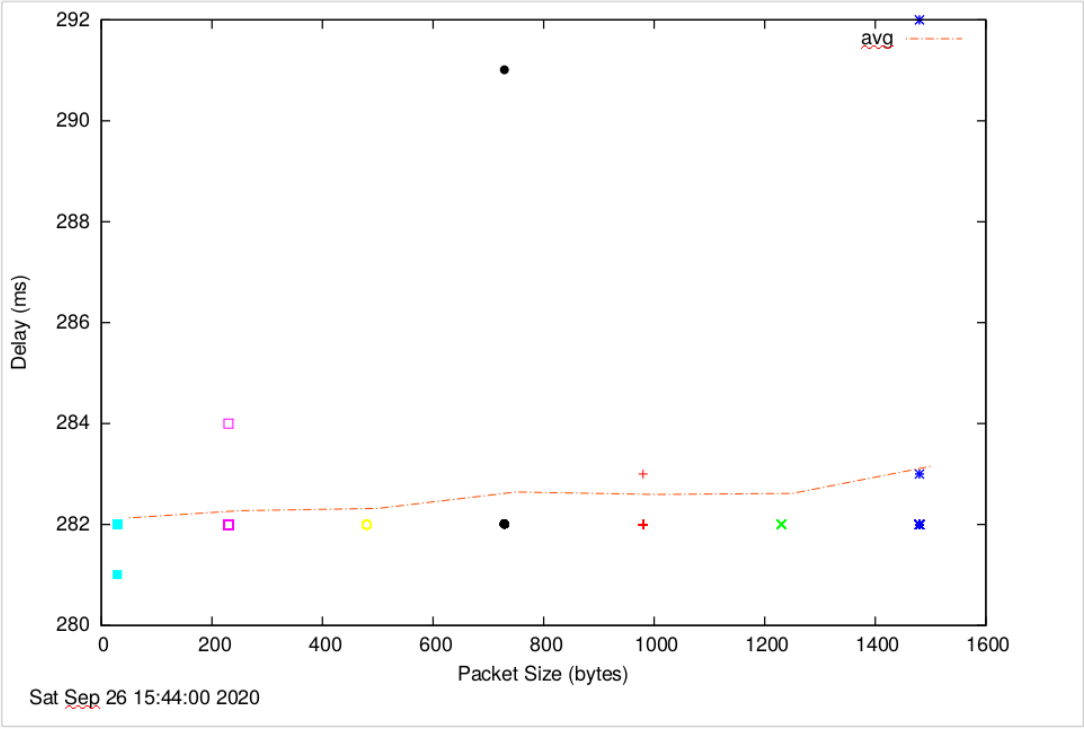
text



delay

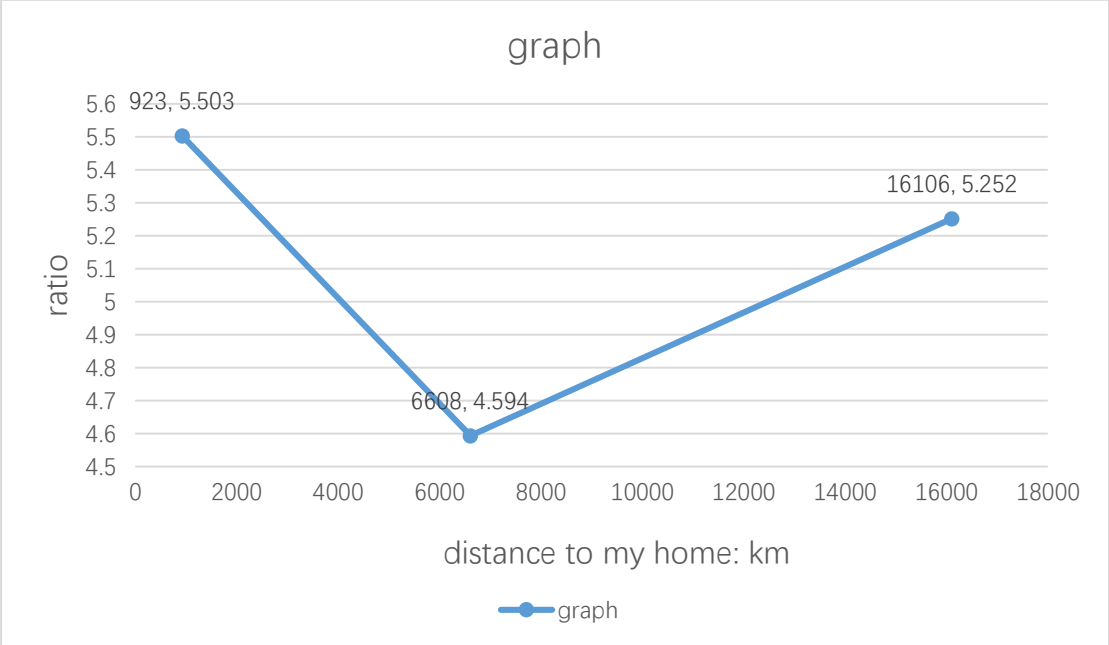


scatter



1.

	Distance(km)	T(ms)	RTT(ms)	Ratio
UQ	923	3.08	16.948	5.503
UPM	6608	22.02	101.167	4.594
TU-Berlin	16106	53.69	281.975	5.252



The reasons why the y-axis values are greater than 2 are that

First, the propagation speed is slower than that of light in the fiber, and there is propagation delay during this process.

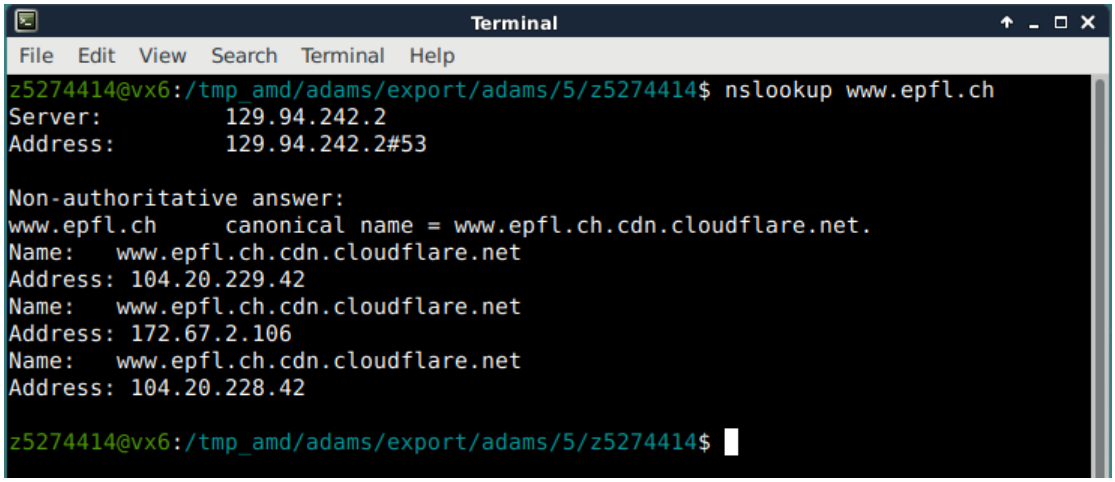
Second, the physical distance is not the actual cable distance, because that physical distance is made by google map which is straight length, and the real distance is longer than that.

Third, the RTT delay may also happen during this process, all the time which includes double delay, so it’s greater than 2.

2. The delay to the destinations varies over time, because delay is related to several factors, like propagation, transmission, processing delay, queuing delay. Although the delay has no relation with packet number or physical distance, the delay may be influenced by queuing and variability of processing.

3. No, it's not in Switzerland. It's hosted in San Francisco, USA.

Firstly, I use nslookup to check its IP address. (104.20.229.42)



Secondly, I use whois 104.20.229.42 to check its hosted location, and it said in San Francisco, USA.

```
z5274414@vx6:/tmp_amd/adams/export/adams/5/z5274414$ whois 104.20.229.42

#
# ARIN WHOIS data and services are subject to the Terms of Use
# available at: https://www.arin.net/resources/registry/whois/tou/
#
# If you see inaccuracies in the results, please report at
# https://www.arin.net/resources/registry/whois/inaccuracy_reporting/
#
# Copyright 1997-2020, American Registry for Internet Numbers, Ltd.
#


NetRange:       104.16.0.0 - 104.31.255.255
CIDR:           104.16.0.0/12
NetName:        CLOUDFLARENET
NetHandle:      NET-104-16-0-0-1
Parent:         NET104 (NET-104-0-0-0-0)
NetType:        Direct Assignment
OriginAS:       AS13335
Organization:   Cloudflare, Inc. (CLOUD14)
RegDate:        2014-03-28
Updated:        2017-02-17
Comment:        All Cloudflare abuse reporting can be done via https://www.cloudflare.com/abuse
Ref:            https://rdap.arin.net/registry/ip/104.16.0.0



OrgName:        Cloudflare, Inc.
OrgId:          CLOUD14
Address:        101 Townsend Street
City:           San Francisco
StateProv:      CA
PostalCode:     94107
Country:        US
RegDate:        2010-07-09
Updated:        2019-09-25
Ref:            https://rdap.arin.net/registry/entity/CLOUD14
```

4. Transmission delay and processing delay depend on the packet size and propagation delay and queuing delay don’t depend on the packet size.