Lab 1 by John Dao z5258962

Exercise 1: nslookup

1.
The ip addresses of the website "www.koala.com.au" are **172.67.219.46**, **104.18.60.21** and **104.18.61.21**
The main reason for having multiple IP addresses is in the use case of a round-robin DNS server which allows for load distribution and balancing.

2.
The name of the ip address is localhost and is the ip address that represents the working computer itself, by itself. In other cases where communication is required for other computers is needed, another ip address is utilised.

Exercise 2: Use ping to test host reachability

Some of the given hosts are not reachable. Below, they are sorted by error.

<u>Unknown host:</u>
In this case, the given hostname could not be identified via ping which indicates that the given hostname does not exist.
- www.getfittest.com.au (Valid hostname that does not point to anything as of current)
- www.hola.hp (invalid hostname that will never exist)

<u>TimeOut:</u>
In this case, the given hostname exists however, is not reachable due via ping to variety of reasons which may be, but are not limited to, availability, ping time, security.

- www.kremlin.ru (in this case, it would be good to assume that this due to security reasons)

All other urls were successfully pinged.

Exercise 3: Use traceroute to understand network topology

1.
There are a total of 21 routers between my own workstation and www.columbia.edu.
There are 5 seperate routers from the assumed unsw network spanning from router 3 and 7.

It could be assumed that the connection passed the pacific ocean from router with ip 193.251.248.35 to router with ip 130.117.15.233. It seems that the signal was carried by cogent via their hostnames "opentransit" (sender) and "cogentco.com" (receiver).

2.
The three traceroutes diverge after are carried by the vocus network to their respective international carriers.
The vocus network seems to be a networking system mainly operating within australia and some international countries. Their head office is in melbourne and their ABN is 96 084 115 499.

In this case vocus has transferred the connection respectively to:

- he.net for www.ucla.edu (hurricane electric internet services?)
- hkix.net for www.u-tokyo.ac.jp (Hong kong internet exchange?)
- flagtel.com for www.lancaster.ac.uk (hostname for Looking glass transit?)

The number of hops is not proportional to the physical distance due to the fact that hops may go in varying directions to get to a certain destination (the other way around the earth, going to an exchange near the intended destination, etc)

3.
The Ip addresses of the two networks are:

- http://www.speedtest.com.sg/tr.php 202.150.221.170
- https://www.telstra.net/cgi-bin/trace 203.50.5.178

After running the trace in both directions, the paths taken in comparison are understandably different when compared.

When comparing the two directions, a resemblance can be made with the networks used (in my case, **telstra and vocus**) and router names (with ips beginning with 114 and 203) used to travel between the two destinations, however, the IP of these routers are completely different which could be explained through the ISP's use of varying measures to determine the actual route.

Exercise 4: Use ping to gain insights into network performance

1.

Website	Location (City)	Displacement (km)	Time (s)	min_rtt(ms)	Ratio
www.uq.edu.au	Brisbane (St Lucia)	738.27	0.0024609	16.951	6.88813
www.upm.edu.my	Serdang	6,609.34	0.0220311	101.200	4.59374
www.tu-berlin.de	Berlin	16,108.28	0.0536943	281.931	5.25067

There could be a variety of reasons why the ratio would be greater than two

1. Delays due to high traffic in routers
2. Poor condition/maintenance of cable to/from destination/origin
3. Discrepancy between the displacement of the origin and the distance of cable to the destination in that the distance of cable will always be greater than the displacement between the origin and the destination.

2.

Delays to destinations will always vary overtime due to the fact that factors affecting travel time will always fluctuate. This includes

- Fluctuation in packet size in pinging increasing the amount needed to be transmitted, increasing delays
- Fluctuations in network quality/speed during the ping request.

3.

Yes it is located in Switzerland. www.epfl.ch currently has an ip address of 128.178.222.108 which is located in switzerland, near Lausanne (via yougetsignal.com).

4.

- Propagation delay is the "length of time taken for a signal to reach its destination" (1). Thus it **is not** affected by packet size
- Transmission delay is the "amount of time taken to push all the packet's bits into the wire" (1). Thus it **is** affected by packet size
- Processing delay is "the time it takes routers to process packet header" (1). Thus it **is** affected by packet size.

- Queuing delay is “the time a job waits in a queue until it can be executed” (1). Thus it **is not** affected by packet size.

(1) Via Wikipedia

References

Wikipedia (1)

1. https://en.wikipedia.org/wiki/Propagation_delay
2. https://en.wikipedia.org/wiki/Transmission_delay
3. https://en.wikipedia.org/wiki/Processing_delay
4. https://en.wikipedia.org/wiki/Queuing_delay