Name:	Atul Sharma
Branch:	SY Data Science
Batch:	D4
UID:	2021700060
Subject:	Computer Communications and Networks
Experiment No.	1
Date:	04-02-2023

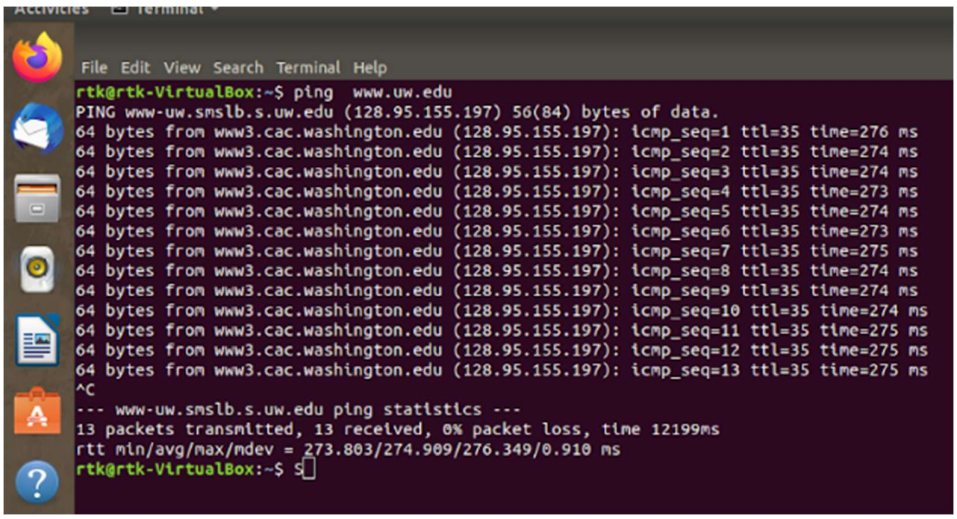
Aim:	**Experiment with ping to find the round trip times to a variety of destinations.**

Round Trip Time (RTT) is **the length time it takes for a data packet to be sent to a destination plus the time it takes for an acknowledgment of that packet to be received back at the origin**.

The RTT between a network and server can be determined by using the ping command.

PING (Packet Internet Groper)

This command is used to check the network connectivity between host and server/host. This command takes as input the IP address or the URL and sends a data packet to the specified address with the message “PING” and get a response from the server/host this time is recorded which is called latency. Fast ping low latency means faster connection.



Ping www.uw.edu

```
rtk@rtk-VirtualBox:~$ ping www.cornell.edu
PING part-0020.t-0009.fdv2-t-msedge.net (13.107.238.48) 56(84) bytes of data.
64 bytes from 13.107.238.48 (13.107.238.48): icmp_seq=1 ttl=108 time=9.45 ms
64 bytes from 13.107.238.48 (13.107.238.48): icmp_seq=2 ttl=108 time=10.3 ms
64 bytes from 13.107.238.48 (13.107.238.48): icmp_seq=3 ttl=108 time=9.88 ms
64 bytes from 13.107.238.48 (13.107.238.48): icmp_seq=4 ttl=108 time=9.59 ms
64 bytes from 13.107.238.48 (13.107.238.48): icmp_seq=5 ttl=108 time=9.02 ms
64 bytes from 13.107.238.48 (13.107.238.48): icmp_seq=6 ttl=108 time=10.6 ms
64 bytes from 13.107.238.48 (13.107.238.48): icmp_seq=7 ttl=108 time=9.21 ms
64 bytes from 13.107.238.48 (13.107.238.48): icmp_seq=8 ttl=108 time=9.08 ms
64 bytes from 13.107.238.48 (13.107.238.48): icmp_seq=9 ttl=108 time=9.87 ms
^C
--- part-0020.t-0009.fdv2-t-msedge.net ping statistics ---
9 packets transmitted, 9 received, 0% packet loss, time 8010ms
rtt min/avg/max/mdev = 9.028/9.681/10.626/0.541 ms
```

RTT for www.cornell.edu :

```
rtk@rtk-VirtualBox:~$ ping www.uchicago.edu
PING part-0020.t-0009.fdv2-t-msedge.net (13.107.237.48) 56(84) bytes of data.
64 bytes from 13.107.237.48 (13.107.237.48): icmp_seq=1 ttl=108 time=8.07 ms
64 bytes from 13.107.237.48 (13.107.237.48): icmp_seq=2 ttl=108 time=56.2 ms
64 bytes from 13.107.237.48 (13.107.237.48): icmp_seq=3 ttl=108 time=7.41 ms
64 bytes from 13.107.237.48 (13.107.237.48): icmp_seq=4 ttl=108 time=15.1 ms
64 bytes from 13.107.237.48 (13.107.237.48): icmp_seq=5 ttl=108 time=67.3 ms
64 bytes from 13.107.237.48 (13.107.237.48): icmp_seq=6 ttl=108 time=7.19 ms
64 bytes from 13.107.237.48 (13.107.237.48): icmp_seq=7 ttl=108 time=6.90 ms
64 bytes from 13.107.237.48 (13.107.237.48): icmp_seq=8 ttl=108 time=7.89 ms
^C
--- part-0020.t-0009.fdv2-t-msedge.net ping statistics ---
8 packets transmitted, 8 received, 0% packet loss, time 7010ms
rtt min/avg/max/mdev = 6.905/22.027/67.332/23.269 ms
```

RTT for www.uchicago.edu :

```
rtk@rtk-VirtualBox:~$ ping www.ox.ac.uk
PING www.ox.ac.uk (151.101.194.216) 56(84) bytes of data.
64 bytes from 151.101.194.216 (151.101.194.216): icmp_seq=1 ttl=52 time=26.7 ms
64 bytes from 151.101.194.216 (151.101.194.216): icmp_seq=2 ttl=52 time=27.2 ms
64 bytes from 151.101.194.216 (151.101.194.216): icmp_seq=3 ttl=52 time=26.4 ms
64 bytes from 151.101.194.216 (151.101.194.216): icmp_seq=4 ttl=52 time=26.4 ms
64 bytes from 151.101.194.216 (151.101.194.216): icmp_seq=5 ttl=52 time=27.9 ms
64 bytes from 151.101.194.216 (151.101.194.216): icmp_seq=6 ttl=52 time=69.4 ms
^C
--- www.ox.ac.uk ping statistics ---
```

RTT for www.ox.ac.uk :

Factors that influences RTT:

There are certain factors that can bring huge changes in the value of RTT. These are enlisted below:

1. Distance,
2. Transmission medium
3. Network hops
4. Traffic levels
5. Server response time

Comparing www.uchicago.edu and www.cornell.edu:

- The physical distance does affect Round Trip Time more the distance more is the RTT . Here the distance between the user

and Cornell is less than that of Chicago and so the RTT of Chicago is more than that of Cornell.

- Traffic levels are high for Chicago therefore the RTT is more than that of Cornell. So if the traffic levels are high then the RTT is more.
- RTT of Cornell is less therefore the server response time is less for Cornell than that of Chicago. If the server response time is more then the RTT is more.

Aim : Use traceroute to trace the route from your lab computer to math.hws.edu and to www.hws.edu.

traceroute

This command in Linux prints the route that a packet takes to reach the host. This command is useful when you want to know about the route and about all the hops that a packet takes. Below image depicts how traceroute command is used to reach the Google(172.217.26.206) host from the local machine and it also prints detail about all the hops that it visits in between.

Example:-

```
prabhakar@Inspiron-3542:~$ traceroute google.com
traceroute to google.com (172.217.26.206), 30 hops max, 60 byte pa
 1  192.168.43.45 (192.168.43.45)  2.014 ms  2.313 ms  2.588 ms
 2  * * *
 3  10.45.1.230 (10.45.1.230)  75.449 ms  115.244 ms  115.224 ms
 4  10.45.8.178 (10.45.8.178)  93.856 ms  115.138 ms  93.822 ms
 5  10.45.8.187 (10.45.8.187)  115.116 ms  115.106 ms  115.070 ms
 6  * * *
 7  218.248.235.141 (218.248.235.141)  120.589 ms  108.033 ms  106
 8  218.248.235.142 (218.248.235.142)  114.489 ms * *
 9  72.14.211.114 (72.14.211.114)  98.076 ms  93.232 ms  93.781 ms
10  108.170.253.113 (108.170.253.113)  98.688 ms  91.388 ms 108.17
11  74.125.253.69 (74.125.253.69)  95.120 ms 72.14.237.165 (72.14.
12  maa03s23-in-f14.1e100.net (172.217.26.206)  101.794 ms  97.987
prabhakar@Inspiron-3542:~$
```

Traceroute from computer to math.hws.edu :

```
traceroute to math.hws.edu (64.89.144.237), 30 hops max, 60 byte packets
 1  _gateway (10.0.2.2)  0.252 ms  0.365 ms  0.356 ms
 2  _gateway (10.0.2.2)  5.126 ms  4.875 ms  5.109 ms
```

Traceroute from computer to www.hws.edu

```
traceroute to www.hws.edu (209.43.55.179), 30 hops max, 60 byte packets
 1  _gateway (10.0.2.2)  0.425 ms  0.403 ms  0.395 ms
 2  _gateway (10.0.2.2)  3.834 ms  3.541 ms  3.815 ms
```

The each packet of www.hws.edu takes more time than that of math.hws.edu.

The maximum number of hops is 30 of 60 byte packets by default and can be specified using the parameter. It can be increased by using -h switch if necessary. The TTL is 30 means the maximum hops can be 30 till that hops it should reach the destination or else they are dropped. TTL prevents a data packet from travelling endlessly around the internet , if data packet are misconfigured then they can run endlessly.

Sometime the result come as * * at that time the program did not receive any response from the router at that top.

traceroute to www.hws.edu

```
traceroute to www.hws.edu (209.43.55.179), 30 hops max, 60 byte packets
 1  _gateway (10.0.2.2)  0.315 ms  0.297 ms  0.290 ms
 2  _gateway (10.0.2.2)  3.019 ms * *
```

```
traceroute to math.hws.edu (64.89.144.237), 30 hops max, 60 byte packets
 1  _gateway (10.0.2.2)  0.281 ms  0.261 ms  0.238 ms
 2  _gateway (10.0.2.2)  3.321 ms * *
```

traceroute www.amazon.in

```
students@celab5-11:~$ traceroute www.amazon.in
traceroute to www.amazon.in (108.158.58.206), 30 hops max, 60 byte packets
 1  172.16.30.1 (172.16.30.1)  0.258 ms  0.908 ms  0.901 ms
 2  125.99.120.241 (125.99.120.241)  8.730 ms  8.199 ms  8.707 ms
 3  192.168.210.29 (192.168.210.29)  1.562 ms  1.625 ms  1.663 ms
 4  192.168.44.57 (192.168.44.57)  4.252 ms  4.370 ms  4.218 ms
 5  192.168.27.34 (192.168.27.34)  4.600 ms  4.576 ms  4.573 ms
 6  125.99.55.254 (125.99.55.254)  4.164 ms  4.264 ms  4.203 ms
 7  125.99.55.253 (125.99.55.253)  4.827 ms  5.298 ms  5.258 ms
 8  * * *
 9  10.240.254.120 (10.240.254.120)  3.805 ms  3.690 ms  3.580 ms
10  * * *
11  * * *
12  125.99.55.163 (125.99.55.163)  4.482 ms  4.146 ms  4.373 ms
13  99.83.67.218 (99.83.67.218)  8.088 ms  8.001 ms  3.081 ms
14  * * *
15  * * *
16  * * *
17  * * *
18  * * *
19  * * *
20  15.230.203.8 (15.230.203.8)  4.053 ms 15.230.203.9 (15.230.203.9)  3.098 ms  4.098 ms
21  * * *
22  * * *
23  * * *
24  * * *
25  * * *
26  * * *
27  * * *
28  * * *
29  * * *
30  * * *
```

traceroute spit.ac.in