Trace Route

Checks the Route taken by the packet to travel to the destination.

While ping just pings the destination with 4 packets.

Trace Route pings every router between the **Sender** and the **Receiver**.

Sends 3 packets to every router and each router sends back those packets to the sender and tells
the sender information about the router.

```
Tracing route to google.com [142.250.200.46]
over a maximum of 30 hops:
       25 ms
                  6 ms
                           10 ms
                                  10.50.76.1
  1
  2
                                  148.252.13.58
                             ms
        9 ms
                            5
                                  185.167.196.52
  3
                 11 ms
                             ms
                                  inex1b.google.com [185.6.36.142]
  4
        3 ms
                 13 ms
                            3 ms
  5
       15 ms
                                  74.125.243.241
                 16 ms
                          19 ms
  6
                                  74.125.243.247
        9 ms
                 9 ms
                           8 ms
        8 ms
                 13 ms
                           8 ms
                                  172.253.71.103
  8
       23 ms
                 14 ms
                          14 ms
                                  172.253.71.159
  9
       94 ms
                                  216.239.59.76
 10
       14 ms
                 25 ms
                          15 ms
                                  74.125.242.65
 11
       18 ms
                 19 ms
                          18 ms
                                  142.251.52.143
 12
                                  lhr48s30-in-f14.1e100.net [142.250.200.46]
       17 ms
                 21 ms
                          13 ms
```

The ms in the images tells the round trip time taken by each data packet.

```
Tracing route to google.com [142.250.200.46]
over a maximum of 30 hops:
       25 ms
                  6 ms
                           10 ms
                                  10.50.76.1
 2
                                  148.252.13.58
        3 ms
                  3 ms
                           2 ms
 3
        9 ms
                 11 ms
                                  185.167.196.52
                           5 ms
 4
        3 ms
                 13 ms
                           3 ms
                                  inex1b.google.com [185.6.36.142]
 5
       15 ms
                 16 ms
                          19 ms
                                  74.125.243.241
 6
        9 ms
                 9 ms
                           8 ms
                                  74.125.243.247
 7
                                  172.253.71.103
        8
          ms
                 13 ms
                           8 ms
 8
       23
          ms
                 14
                    ms
                          14
                             ms
                                  172.253.71.159
 9
                                  216.239.59.76
       94
          ms
10
       14 ms
                 25 ms
                          15 ms
                                  74.125.242.65
11
       18 ms
                 19 ms
                                  142.251.52.143
                          18 ms
       17 ms
                 21 ms
                          13 ms
                                  lhr48s30-in-f14.1e100.net [142.250.200.46]
```

- Shows the total number of HOPS.
- First HOP is the default gateway

```
Tracing route to google.com [142.250.178.14]
over a maximum of 30 hops:
       5 ms
                2 ms
                         5 ms
                               10.50.76.1
                         5 ms
                               148.252.13.58
       2 ms
                6 ms
      12 ms
               10 ms
                         4 ms
                               185.167.196.52
 4
                         7 ms
                               inex1b.google.com [185.6.36.142]
       4 ms
                8 ms
       6 ms
                4 ms
                         8 ms
                               216.239.43.3
       5 ms
                8 ms
                         6 ms 74.125.243.216
                         7 ms
       8 ms
                9 ms
                               172.253.71.103
 8
      16 ms
               15 ms
                        16 ms
                               172.253.71.159
                               216.239.59.76
 9
     122 ms
10
      16 ms
               13 ms
                        14 ms
                               74.125.242.65
      14 ms
               15 ms
                               142.250.215.125
11
                        20 ms
      14 ms
               16 ms
                               lhr48s27-in-f14.1e100.net [142.250.178.14]
12
                        20 ms
race complete.
:\Users\shakt>^T^T_
        C:\WINDOWS\system32\cmd.exe
       Microsoft Windows [Version 10.0.19041.1415]
       (c) Microsoft Corporation. All rights reserved.
      C:\Users\shakt>ping google.com
       Pinging google.com [142.250.178.14] with 32 bytes of data:
       Reply from 142.250.178.14: bytes=32 time=21ms TTL=119
       Reply from 142.250.178.14: bytes=32 time=17ms TTL=119
       Reply from 142.250.178.14: bytes=32 time=13ms TTL=119
       Reply from 142.250.178.14: bytes=32 time=16ms TTL=119
       Ping statistics for 142.250.178.14:
           Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
       Approximate round trip times in milli-seconds:
          Minimum = 13ms, Maximum = 21ms, Average = 16ms
       C:\Users\shakt>_
```

• The average time of ping and the average time of final hop would be same.

A slow PING can tell us there is a problem with the internet, but Trace Route would tell us where the problem lies.

Sudden changes in the packet trip time dont indicate a problem with the router, rather it indicates that the routers are placed thousands of miles apart.

```
42 ms
                                     154-11-10-165
                             46 ms
                 35 ms
6
                                     219.158.33.249
219.158.30.253
7
                 36 ms
      36 ms
                             36 ms
8
    186 ms
                           178 ms
                182 ms
    180 ms
                180 ms
                           177 ms
                                     219.158.19.193
```

An '*' can indicate that the router is not setup to send replies but it can also indicate that the router is facing issues in replying or transferring packets.

```
3 20 ms 30 ms 30 ms 210.55.205.123
4 * * * Request timed out.
5 30 ms 30 ms 40 ms 202.50.245.197
```

High round trip time in one of the packets out of the three sent would signify that something strange happened to that data packet during the transmission. This can help in isolating *FALSE ISSUES*.

```
[racing route to google.com [142.250.178.14]
over a maximum of 30 hops:
        5 ms
                          5 ms
                                 10.50.76.1
 1
                 2 ms
                          5 ms
                                 148.252.13.58
 2
        2 ms
                 6 ms
 3
      12 ms
                10 ms
                                 185.167.196.52
                          4 ms
 4
       4 ms
                 8 ms
                          7 ms
                                 inex1b.google.com [185.6.36.142]
 5
       6 ms
                4 ms
                          8 ms
                                 216.239.43.3
       5 ms
                                 74.125.243.216
 6
                8 ms
                          6 ms
 7
       8 ms
                 9 ms
                          7 ms
                                 172.253.71.103
 8
      16 ms
                15 ms
                         16 ms
                                 172.253.71.159
 9
                                 216.239.59.76
     122 ms
10
                13 ms
      16 ms
                         14 ms
                                74.125.242.65
11
      14 ms
                15 ms
                         20 ms
                                 142.250.215.125
                         20 ms lhr48s27-in-f14.1e100.net [142.250.178.14]
12
      14 ms
                16 ms
Trace complete.
```

From above we see that TTL "Time To Live" for the data packets is 30 hops. THis means if the data packet is not reaching the destination in 30 hops the data packet would be dropped

```
tracert -h 5 google.com
```

TTL would help in not allowing the data packet to keep endlessly travelling to the destination. The maximum TTL you can set is 255.

PING

 Unreachable - Means the system is not able to connect to the internet and the router is sending an Unreachable reply

```
Pinging 192.168.225.45 with 32 bytes of data:
Reply from 192.168.225.47: Destination host unreachable.
Ping statistics for 192.168.225.45:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
```

• Request timed out - Host is down or its blocking Ping request.

```
C:\Users\
Ping request could not find host 10.26.76.258. Please check the in.

C:\Users\
Pinging 192 168 23 23 with 32 bytes of data:

Request timed out.
Request timed out.
Request timed out.
Request timed out.
Ping statistics for 192.168.23.23:

Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),
```

^{&#}x27;-h' can help us to set the TTL for the data packets.