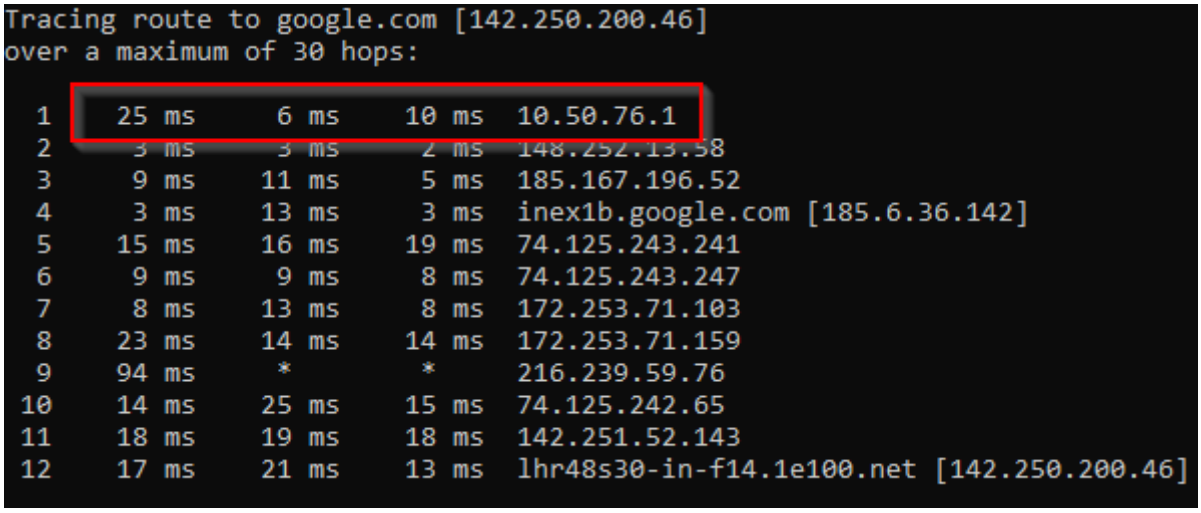
Trace Route

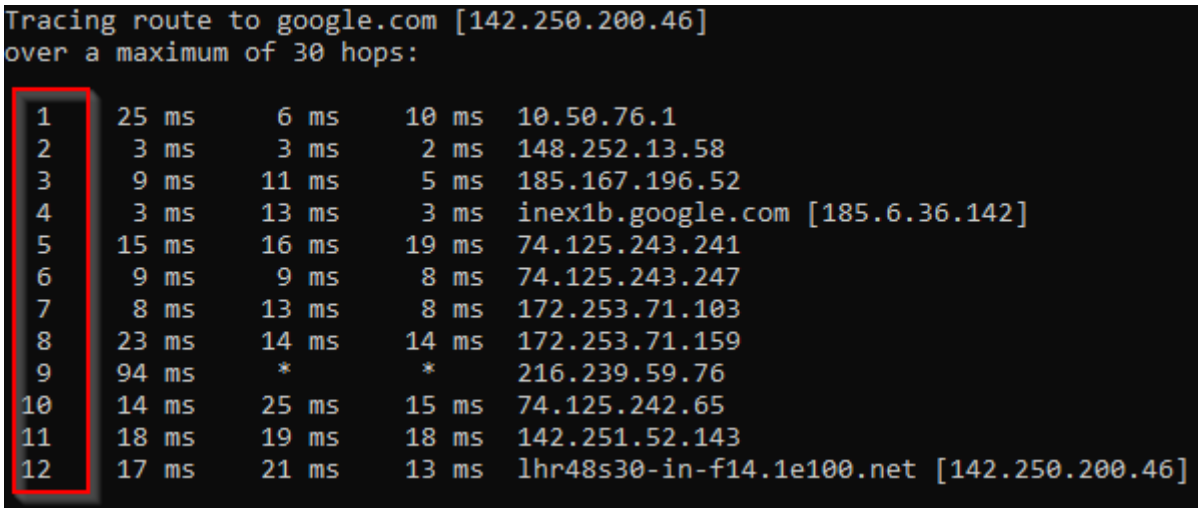
Checks the Route taken by the packet to travel to the destination.
While ping just pings the destination with 4 packets.

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.



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



- 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:

  1     5 ms     2 ms     5 ms  10.50.76.1
  2     2 ms     6 ms     5 ms  148.252.13.58
  3    12 ms    10 ms     4 ms  185.167.196.52
  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
  6     5 ms     8 ms     6 ms  74.125.243.216
  7     8 ms     9 ms     7 ms  172.253.71.103
  8    16 ms    15 ms    16 ms  172.253.71.159
  9   122 ms     *        *     216.239.59.76
 10    16 ms    13 ms    14 ms  74.125.242.65
 11    14 ms    15 ms    20 ms  142.250.215.125
 12    14 ms    16 ms    20 ms  lhr48s27-in-f14.1e100.net [142.250.178.14]

Trace complete.

C:\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.

```
 6    42 ms    35 ms    46 ms  154.11.10.165
 7    36 ms    36 ms    36 ms  219.158.33.249
 8   186 ms   182 ms   178 ms  219.158.30.253
 9   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***.

```
Tracing route to google.com [142.250.178.14]
over a maximum of 30 hops:

  1     5 ms     2 ms     5 ms  10.50.76.1
  2     2 ms     6 ms     5 ms  148.252.13.58
  3    12 ms    10 ms     4 ms  185.167.196.52
  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
  6     5 ms     8 ms     6 ms  74.125.243.216
  7     8 ms     9 ms     7 ms  172.253.71.103
  8    16 ms    15 ms    16 ms  172.253.71.159
  9   122 ms     *        *     216.239.59.76
 10    16 ms    13 ms    14 ms  74.125.242.65
 11    14 ms    15 ms    20 ms  142.250.215.125
 12    14 ms    16 ms    20 ms  lhr48s27-in-f14.1e100.net [142.250.178.14]

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`

'-h' can help us to set the TTL for the data packets.

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.
Reply from 192.168.225.47: Destination host unreachable.
Reply from 192.168.225.47: Destination host unreachable.
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 10.26.76.258
Ping request could not find host 10.26.76.258. Please check the
in.

C:\Users\              >PING 192.168.23.23

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),
```