

Lab 1 - CSE 3111 Computer Networking Lab

PING: checks if a host is reachable and shows latency + packet loss.

```
student@student-Veriton-N4660G:~$ ping google.com
PING google.com (142.250.193.142) 56(84) bytes of data:
64 bytes from tzdelb-at-ln-f14.1e100.net (142.250.193.142): icmp_seq=1 ttl=113 time=34.1 ms
64 bytes from tzdelb-at-ln-f14.1e100.net (142.250.193.142): icmp_seq=2 ttl=113 time=34.2 ms
64 bytes from tzdelb-at-ln-f14.1e100.net (142.250.193.142): icmp_seq=3 ttl=113 time=34.0 ms
64 bytes from tzdelb-at-ln-f14.1e100.net (142.250.193.142): icmp_seq=4 ttl=113 time=34.1 ms
64 bytes from tzdelb-at-ln-f14.1e100.net (142.250.193.142): icmp_seq=5 ttl=113 time=34.3 ms
64 bytes from tzdelb-at-ln-f14.1e100.net (142.250.193.142): icmp_seq=6 ttl=113 time=34.1 ms
64 bytes from tzdelb-at-ln-f14.1e100.net (142.250.193.142): icmp_seq=10
^C
--- google.com ping statistics ---
165 packets transmitted, 165 received, 0% packet loss, time 164190ms
rtt min/avg/max/mdev = 33.875/34.203/36.077/0.270 ms
student@student-Veriton-N4660G:~$
```

- PING google.com (142.250.193.142) → resolved IP of Google.
- 64 bytes from ... time=34.1 ms → reply received in ~34 ms.
- icmp_seq → sequence number of the packet.
- ttl=113 → time-to-live (hops left before packet is dropped).
- 165 transmitted, 165 received, 0% loss → no packet loss.
- rtt min/avg/max/mdev → round-trip time stats (latency).

```
student@student-Veriton-N4660G:~$ traceroute google.com
traceroute to google.com (142.250.182.46), 30 hops max, 60 byte packets
 1 * * *
 2 10.33.32.1 (10.33.32.1) 0.074 ms 0.088 ms 0.076 ms
 3 103.221.253.97 (103.221.253.97) 1.465 ms 1.493 ms 2.271 ms
 4 10.252.0.205 (10.252.0.205) 0.380 ms 0.291 ms 0.277 ms
 5 100.100.1.45 (100.100.1.45) 1.150 ms 1.220 ms 1.254 ms
 6 100.100.0.33 (100.100.0.33) 0.975 ms 0.974 ms 1.052 ms
 7 100.211.162.109 (100.211.162.109) 1.436 ms 1.697 ms 1.708 ms
 8 123.49.8.41 (123.49.8.41) 1.741 ms 1.969 ms 1.977 ms
 9 123.49.13.89 (123.49.13.89) 8.262 ms 8.233 ms 8.825 ms
10 142.251.195.122 (142.251.195.122) 34.221 ms 34.120 ms 34.233 ms
11 * * *
12 142.251.52.206 (142.251.52.206) 34.410 ms 172.253.50.156 (172.253.50.156) 35.068 ms 172.253.07.06 (172.253.07.06) 34.041 ms
13 142.251.76.169 (142.251.76.169) 34.917 ms 142.251.76.171 (142.251.76.171) 34.549 ms 192.178.02.238 (192.178.02.238) 34.635 ms
14 192.178.03.215 (192.178.03.215) 34.570 ms tzdelb-az-ln-f14.1e100.net (142.250.182.46) 35.780 ms 192.178.03.225 (192.178.03.225) 35.609 ms
```

TRACEROUTE:

Hop 1:

* * *

*** * * *: This means

that no response was received from the first hop. This could happen due to a firewall or a router

configured to block ICMP packets, which are used by traceroute.

Hop 2:

10.33.32.1 (10.33.32.1) 0.074 ms 0.088 ms 0.076 ms

10.33.32.1: This is likely the first router in your local network or an intermediate gateway. The three response times (0.074 ms, 0.088 ms, 0.076 ms) show the RTT for each of the three

packets sent. These are very low, indicating that the hop is very close to you (probably within your local network or ISP infrastructure).

Ifconfig: used for displaying current network configuration information, setting up an ip address, netmask, or broadcast address to a network interface, creating an alias for the network interface, setting up hardware address, and enabling or disabling network interfaces.

```
student@student-Veriton-N4660G:~$ ifconfig
enp1s8: flags=4163<UP,BROADCAST,RUNNING,MULTICAST> mtu 1500
    inet 10.0.2.255 netmask 255.255.255.0 broadcast 10.0.2.255
    inet6 fe80::a733:4f1b:c477: prefixlen 64 scopeid 0x20<link>
    ether 0c:00:0e:1d:04:00 txqueuelen 1000 (Ethernet)
    RX packets 48540 bytes 5122062 (5.1 MB)
    RX errors 0 dropped 0 overruns 0 frame 0
    TX packets 10734 bytes 5636308 (5.6 MB)
    TX errors 1 dropped 0 overruns 0 carrier 0 collisions 0

lo: flags=73<UP,LOOPBACK,RUNNING> mtu 65536
    inet 127.0.0.1 netmask 255.0.0.0
    inet6 ::1 prefixlen 128 scopeid 0x10<host>
    loop txqueuelen 1000 (local loopback)
    RX packets 2284 bytes 238017 (238.0 KB)
    RX errors 0 dropped 0 overruns 0 frame 0
    TX packets 2284 bytes 238017 (238.0 KB)
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0

vlg1s8: flags=4099<UP,BROADCAST,MULTICAST> mtu 1180
    ether 0c:00:0e:1d:04:00 txqueuelen 1000 (Ethernet)
    RX packets 0 bytes 0 (0.0 B)
    RX errors 0 dropped 0 overruns 0 frame 0
    TX packets 0 bytes 0 (0.0 B)
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0
```

ARP: Displays and modifies address resolution, we can add and delete

```
student@student-Veriton-N4660G:~$ more /etc/hosts
127.0.0.1        localhost
127.0.1.1        student-Veriton-N4660G
```

RARP:

Client broadcasts its MAC address and requests an IP address, and the server responds with the corresponding IP address

```
student@student-Veriton-N4660G:~$ nslookup google.com
Server:          127.0.0.53
Address:         127.0.0.53#53

Non-authoritative answer:
Name:   google.com
Address: 142.250.193.142
Name:   google.com
Address: 2404:6800:4002:819::200e
```

Nslookup : tool for querying the Domain Name System (DNS) to obtain domain name or IP address mapping or any other specific DNS record, we can also reverse DNS look-up by providing the IP

```
student@student-Veriton-N4660G:~$ nslookup 127.0.0.53
53.0.0.127.in-addr.arpa name = localhost.
```

address as an argument to nslookup.

Netstat: allows users to display network-related information and diagnose various networking issues.

```
student@student-Veriton-N4660G:~$ netstat -a
Active Internet connections (servers and established)
Proto Recv-Q Send-Q Local Address           Foreign Address         State
tcp        0      0 localhost:ipp            0.0.0.0:*               LISTEN
tcp        0      0 localhost:domain         0.0.0.0:*               LISTEN
tcp        0      0 student-Veriton-N:34472  0.128.128.34.bc.g:https ESTABLISHED
tcp        0      0 student-Veriton-N:43988  tzdela-au-in-f3.1:https ESTABLISHED

Active UNIX domain sockets (servers and established)
Proto RefCnt Flags               Type               State         I-Node      Path
unix    3      [ ]               SEQPACKET         CONNECTED     43034
unix    3      [ ]               STREAM            CONNECTED     13949
unix    2      [ ]               STREAM            CONNECTED     15489
unix    3      [ ]               STREAM            CONNECTED     49154
unix    3      [ ]               STREAM            CONNECTED     5050
unix    3      [ ]               STREAM            CONNECTED     54434
unix    3      [ ]               STREAM            CONNECTED     18783
unix    3      [ ]               STREAM            CONNECTED     16952
unix    3      [ ]               STREAM            CONNECTED     17667
unix    3      [ ]               SEQPACKET         CONNECTED     24214
unix    3      [ ]               STREAM            CONNECTED     13948
unix    2      [ ]               DGRAM             CONNECTED     17654
unix    3      [ ]               STREAM            CONNECTED     13877      /run/dbus/system_bus_socket
```