

20MCA136 - Networking & System Administration Lab

Exercise - 6

Submitted by:-

Abhishek Scariya M B

Roll no.1

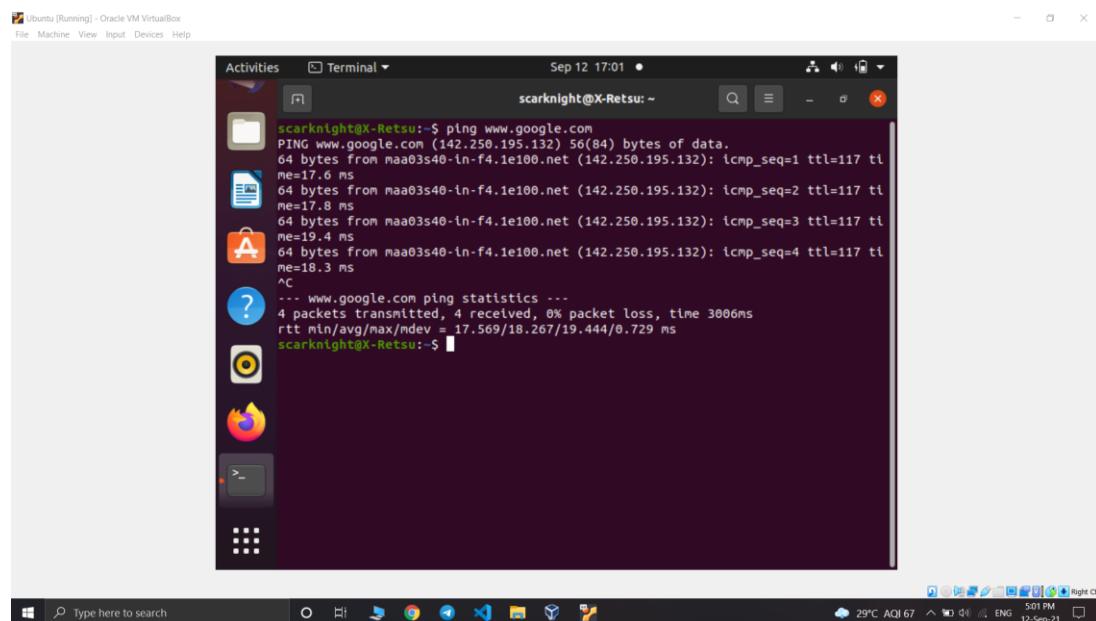
RMCA S2-A

(1.) Try out these network commands in Window as well as in Linux and perform at least 4 options with each command:

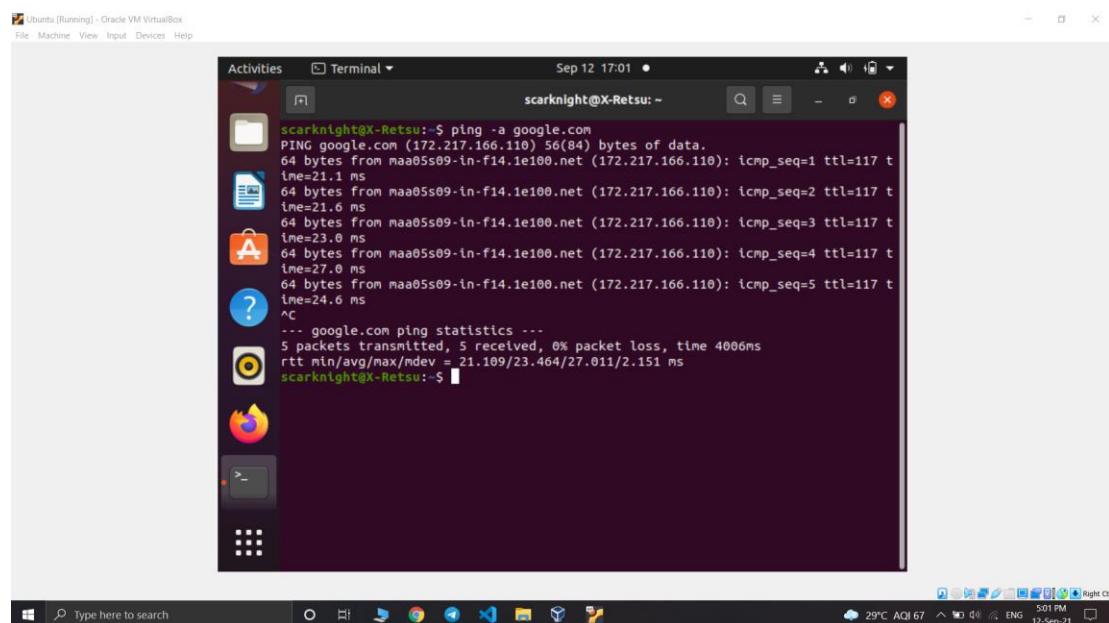
ping route traceroute, nslookup, Ip Config, NetStat

UBUNTU

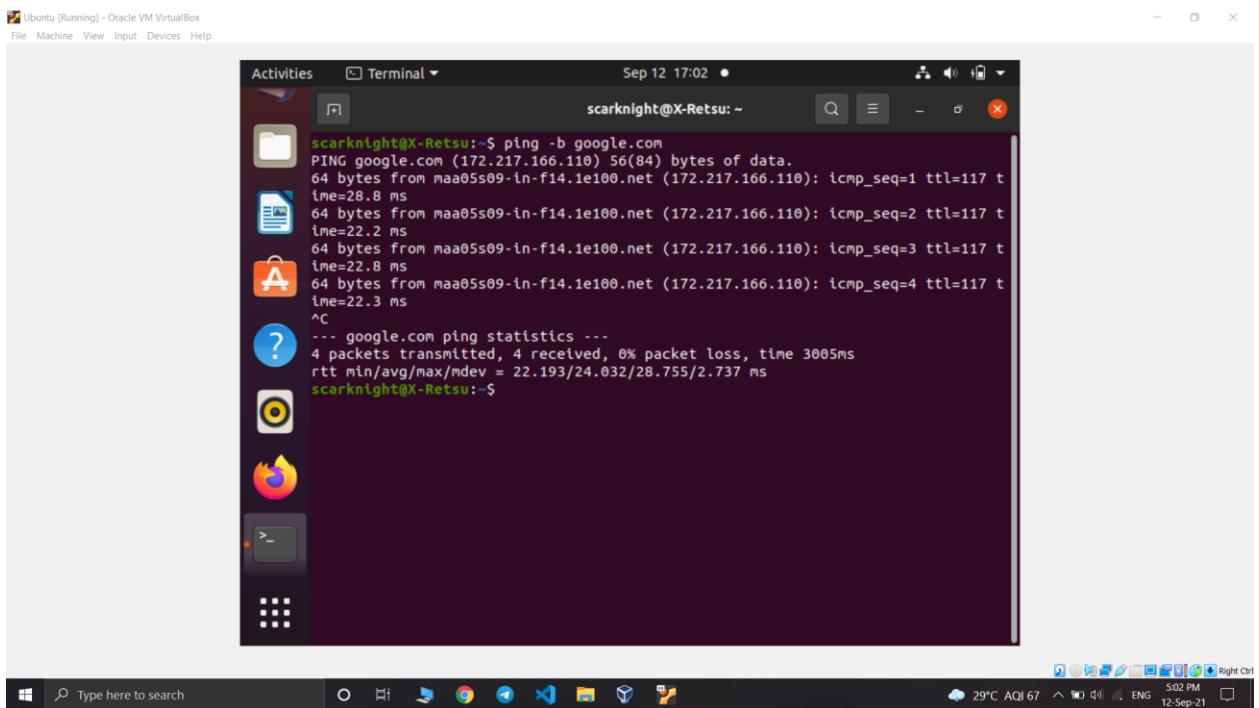
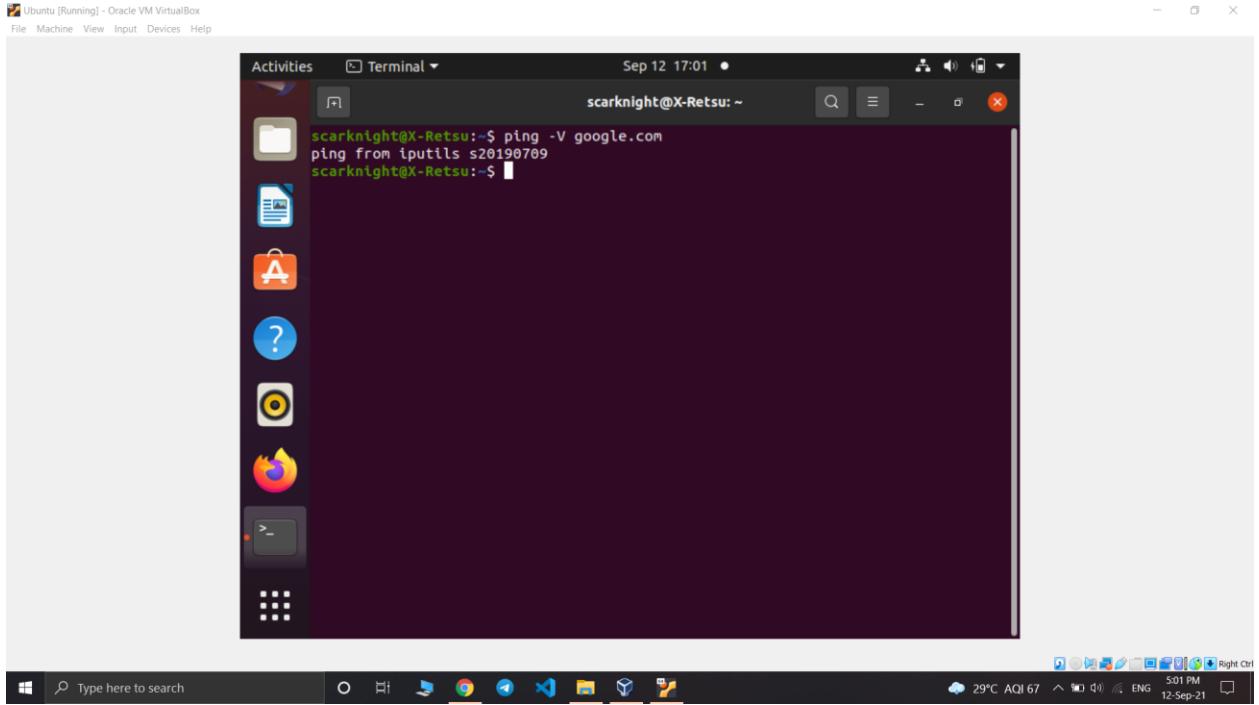
Ping



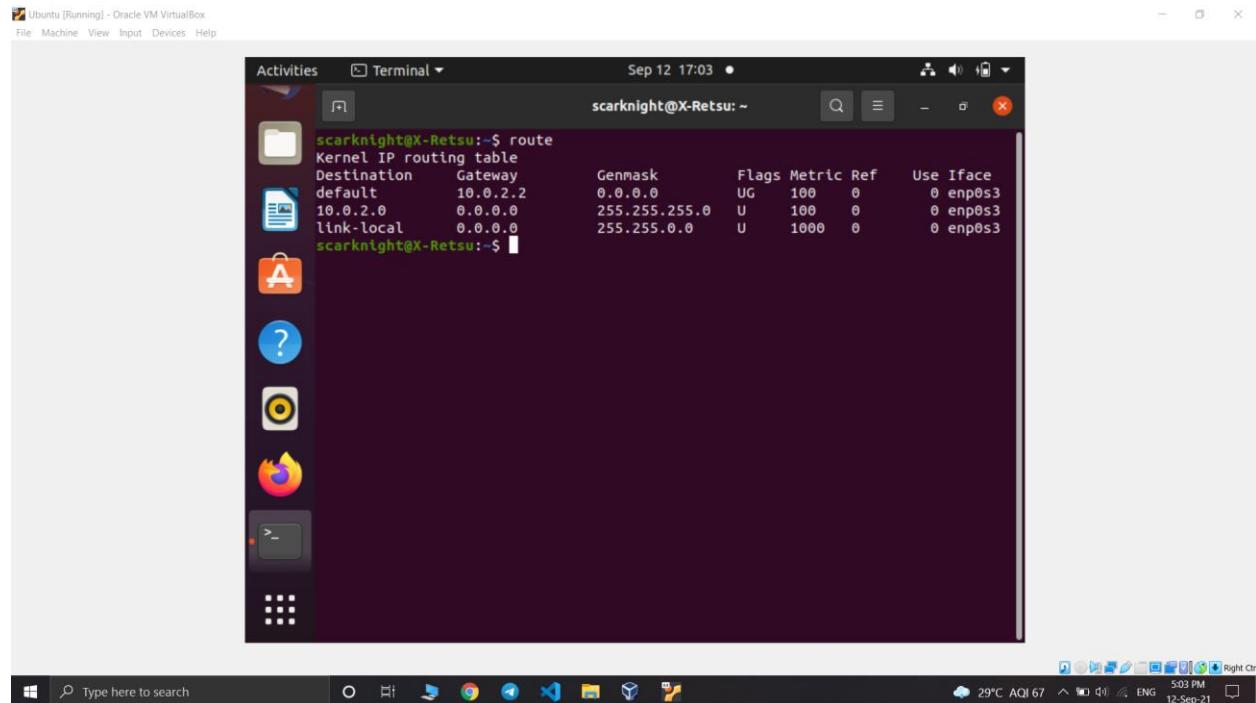
```
scarknight@X-Retsu:~$ ping www.google.com
PING www.google.com (142.250.195.132) 56(84) bytes of data.
64 bytes from maa03s40-in-f4.1e100.net (142.250.195.132): icmp_seq=1 ttl=117 time=17.6 ms
64 bytes from maa03s40-in-f4.1e100.net (142.250.195.132): icmp_seq=2 ttl=117 time=17.8 ms
64 bytes from maa03s40-in-f4.1e100.net (142.250.195.132): icmp_seq=3 ttl=117 time=19.4 ms
64 bytes from maa03s40-in-f4.1e100.net (142.250.195.132): icmp_seq=4 ttl=117 time=18.3 ms
^C
--- www.google.com ping statistics ---
4 packets transmitted, 4 received, 0% packet loss, time 3006ms
rtt min/avg/max/mdev = 17.569/18.267/19.444/0.729 ms
scarknight@X-Retsu:~$
```



```
scarknight@X-Retsu:~$ ping -a google.com
PING google.com (172.217.166.110) 56(84) bytes of data.
64 bytes from maa05s09-in-f14.1e100.net (172.217.166.110): icmp_seq=1 ttl=117 time=21.1 ms
64 bytes from maa05s09-in-f14.1e100.net (172.217.166.110): icmp_seq=2 ttl=117 time=21.6 ms
64 bytes from maa05s09-in-f14.1e100.net (172.217.166.110): icmp_seq=3 ttl=117 time=23.0 ms
64 bytes from maa05s09-in-f14.1e100.net (172.217.166.110): icmp_seq=4 ttl=117 time=27.0 ms
64 bytes from maa05s09-in-f14.1e100.net (172.217.166.110): icmp_seq=5 ttl=117 time=24.6 ms
^C
--- google.com ping statistics ---
5 packets transmitted, 5 received, 0% packet loss, time 4006ms
rtt min/avg/max/mdev = 21.109/23.464/27.011/2.151 ms
scarknight@X-Retsu:~$
```



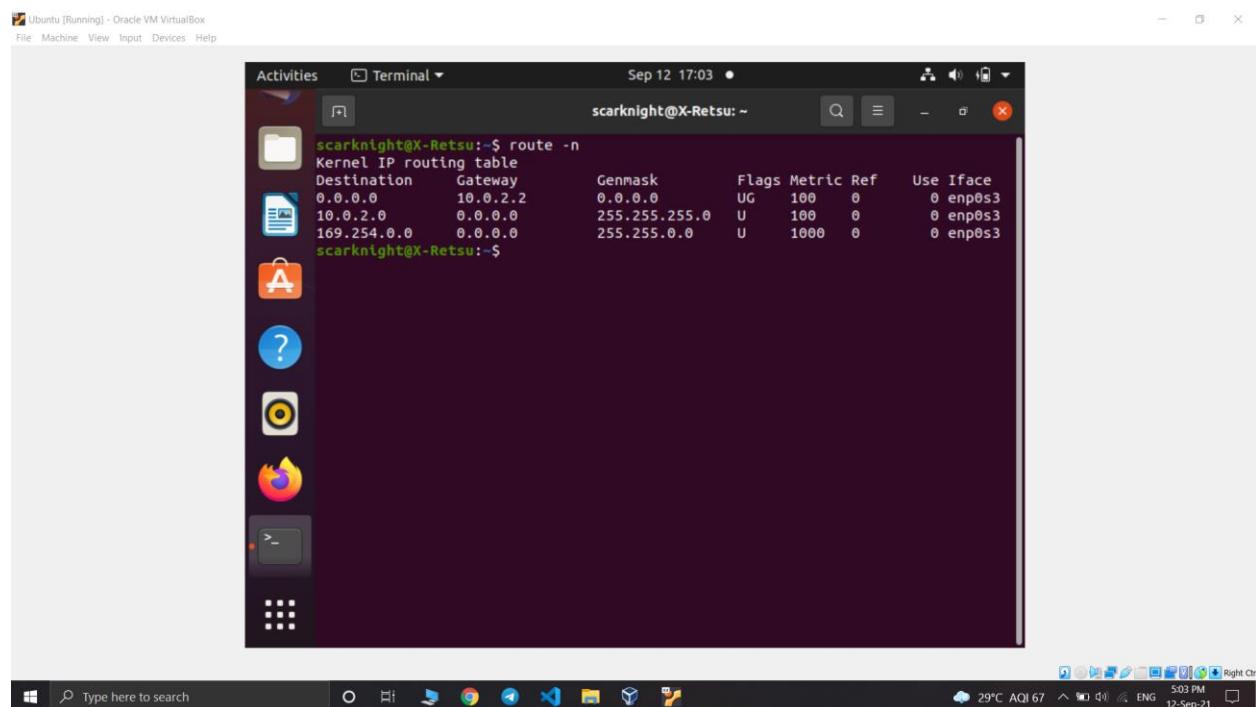
Route



Ubuntu [Running] - Oracle VM VirtualBox
File Machine View Input Devices Help

Activities Terminal Sep 12 17:03 scarknight@X-Retsu: ~

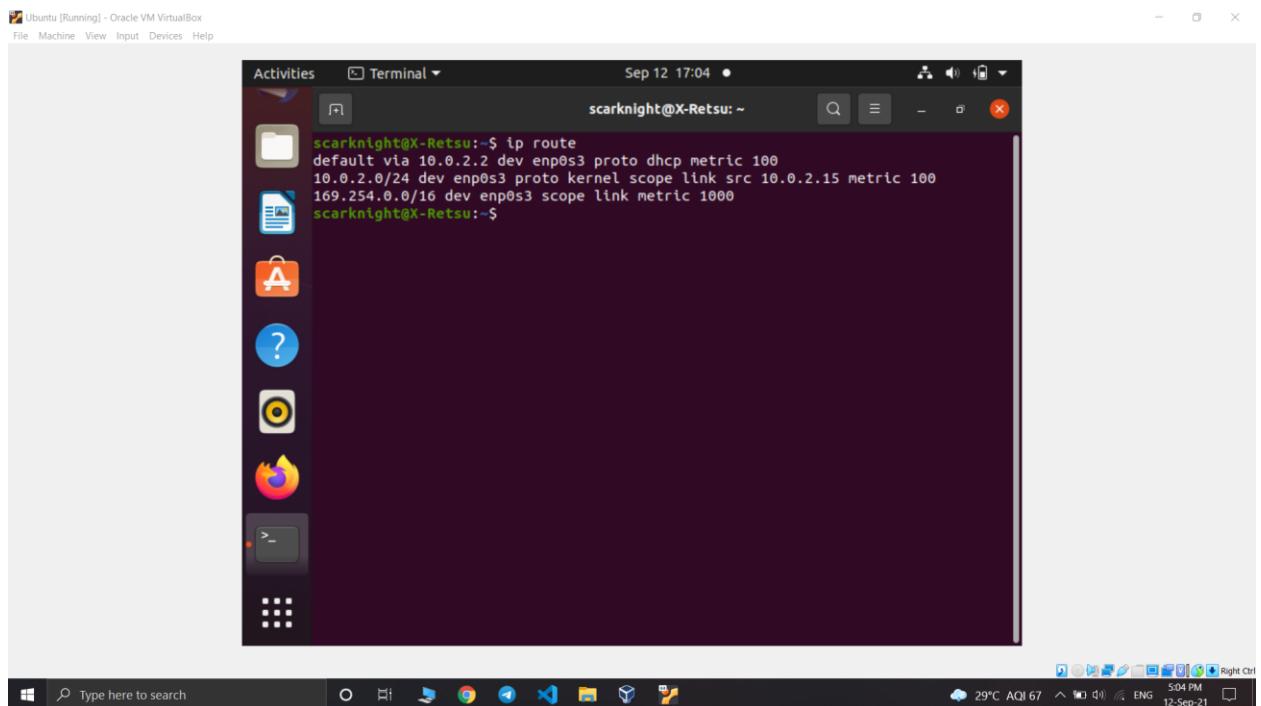
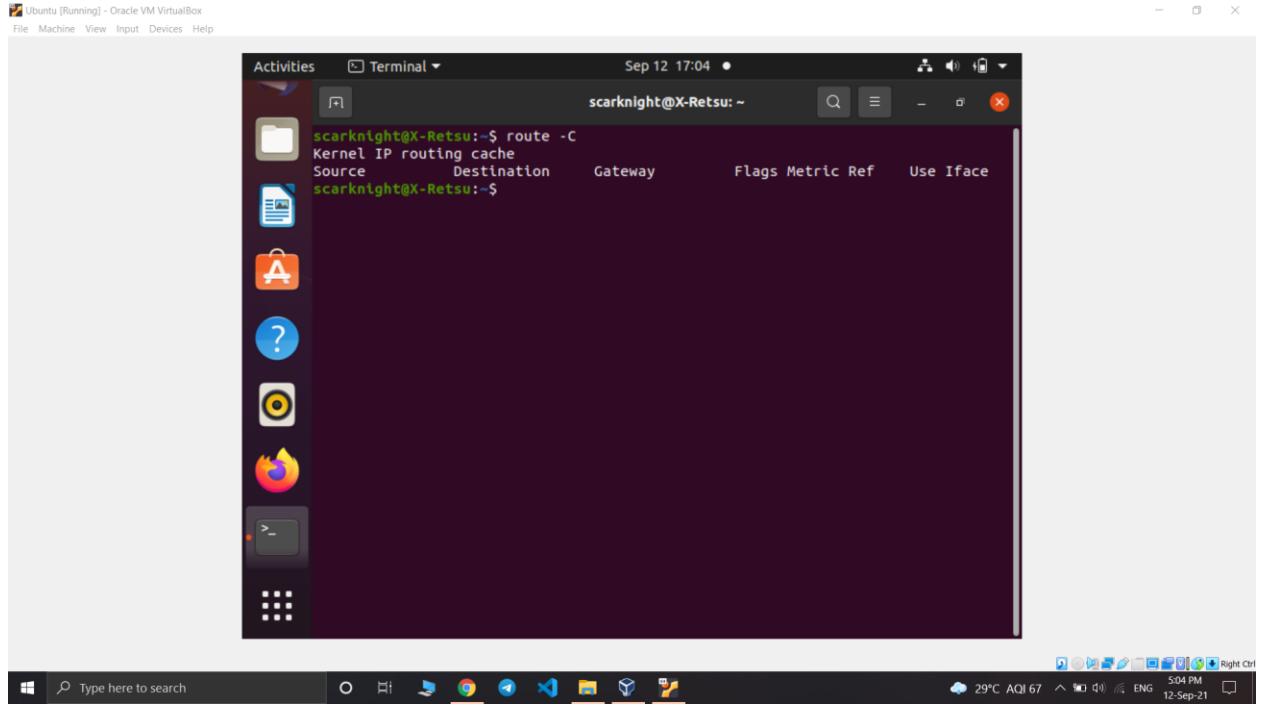
```
scarknight@X-Retsu:~$ route
Kernel IP routing table
Destination     Gateway         Genmask         Flags Metric Ref    Use Iface
default         10.0.2.2        0.0.0.0         UG    100    0        0 enp0s3
10.0.2.0        0.0.0.0         255.255.255.0 U     100    0        0 enp0s3
link-local      0.0.0.0         255.255.0.0   U     1000   0        0 enp0s3
scarknight@X-Retsu:~$
```



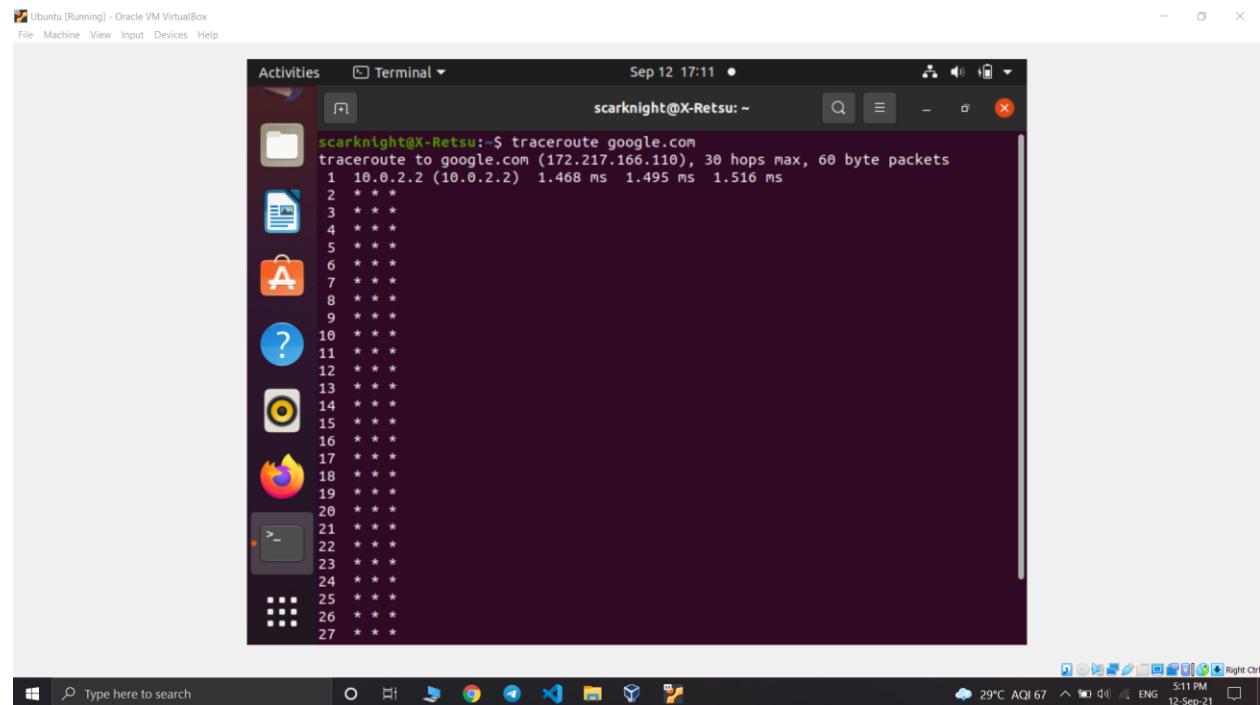
Ubuntu [Running] - Oracle VM VirtualBox
File Machine View Input Devices Help

Activities Terminal Sep 12 17:03 scarknight@X-Retsu: ~

```
scarknight@X-Retsu:~$ route -n
Kernel IP routing table
Destination     Gateway         Genmask         Flags Metric Ref    Use Iface
0.0.0.0         10.0.2.2        0.0.0.0         UG    100    0        0 enp0s3
10.0.2.0        0.0.0.0         255.255.255.0 U     100    0        0 enp0s3
169.254.0.0     0.0.0.0         255.255.0.0   U     1000   0        0 enp0s3
scarknight@X-Retsu:~$
```

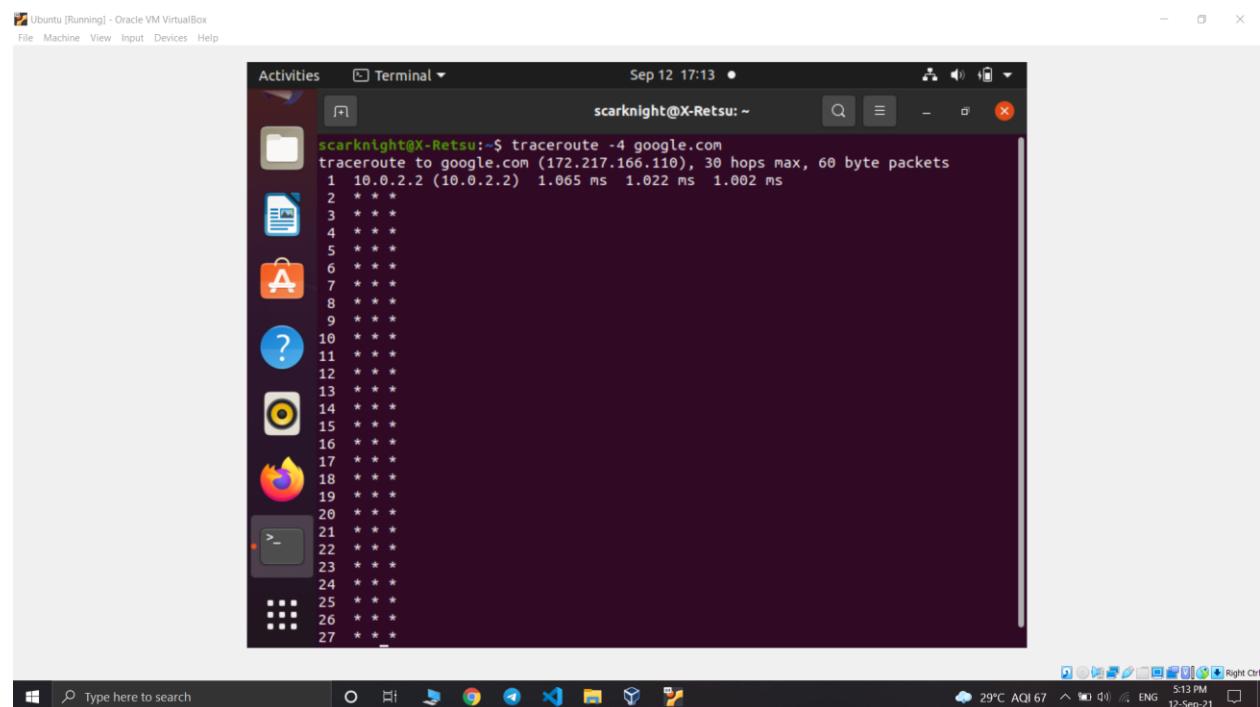


Traceroute



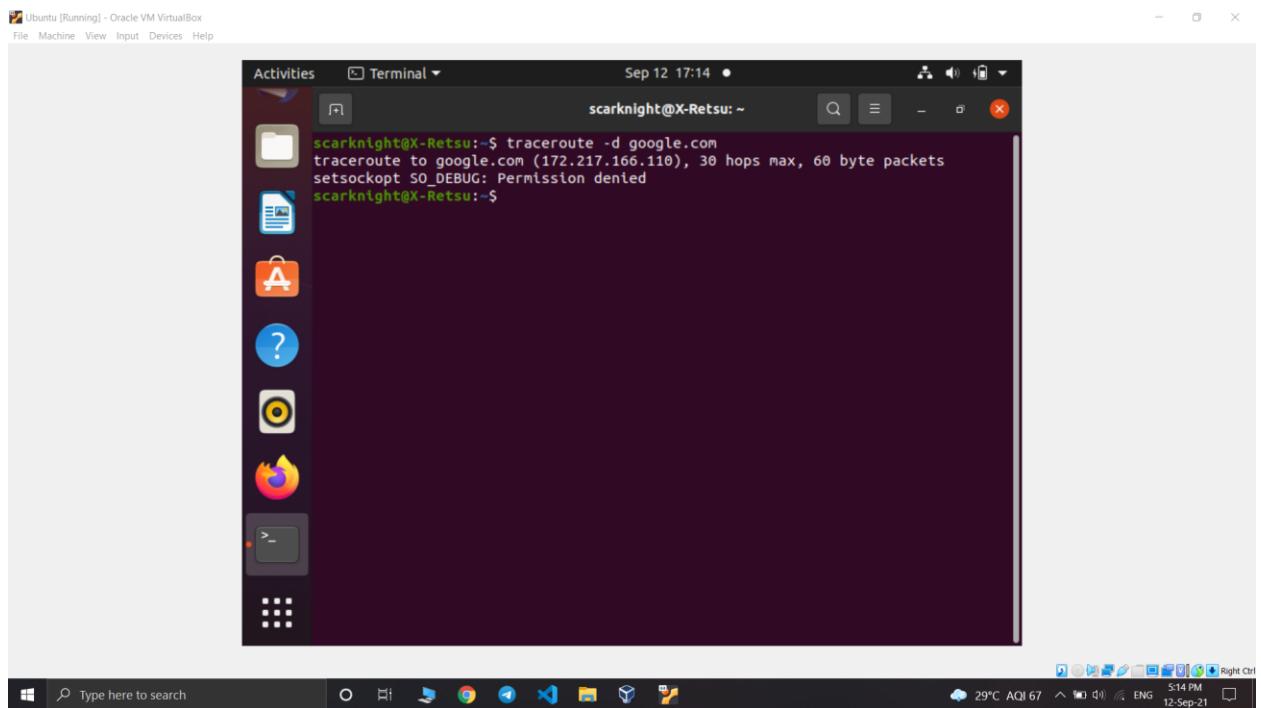
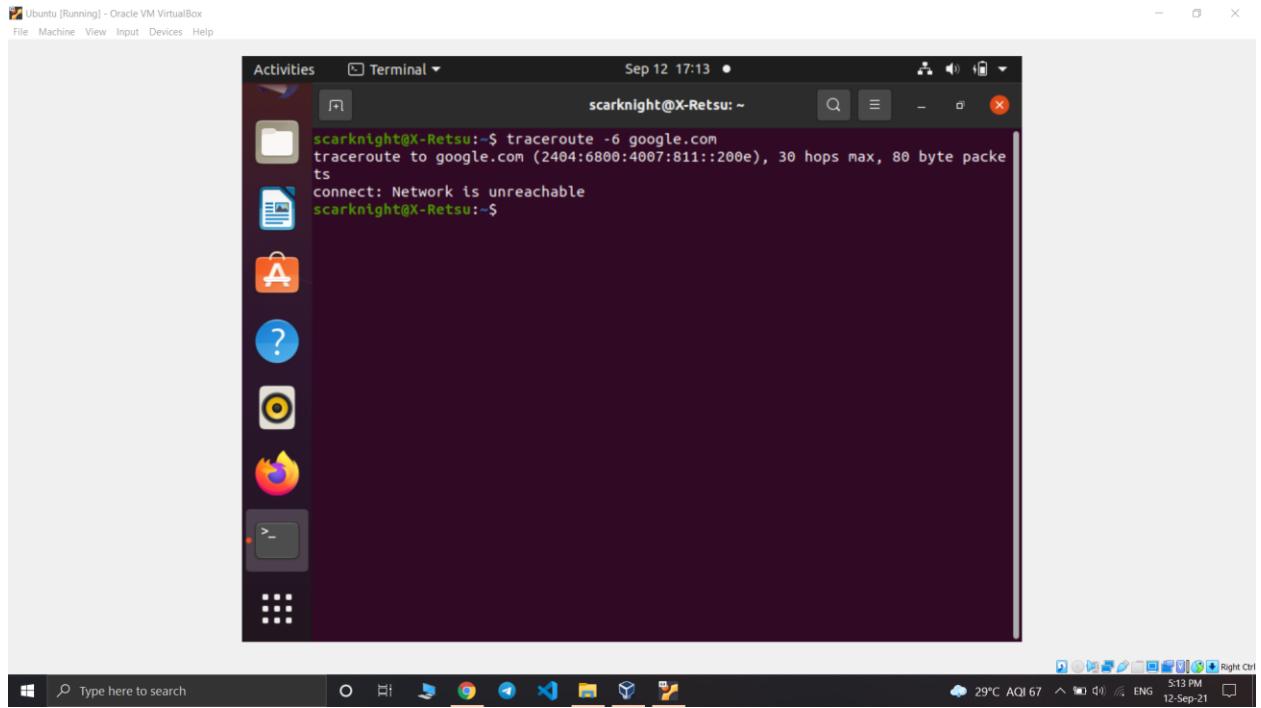
```
scarknight@X-Retsu:~$ traceroute google.com
traceroute to google.com (172.217.166.110), 30 hops max, 60 byte packets
1 10.0.2.2 (10.0.2.2) 1.468 ms 1.495 ms 1.516 ms
2 * * *
3 * * *
4 * * *
5 * * *
6 * * *
7 * * *
8 * * *
9 * * *
10 * * *
11 * * *
12 * * *
13 * * *
14 * * *
15 * * *
16 * * *
17 * * *
18 * * *
19 * * *
20 * * *
21 * * *
22 * * *
23 * * *
24 * * *
25 * * *
26 * * *
27 * * *
```

```
scarknight@X-Retsu:~$ traceroute -4 google.com
traceroute to google.com (172.217.166.110), 30 hops max, 60 byte packets
1 10.0.2.2 (10.0.2.2) 1.065 ms 1.022 ms 1.002 ms
2 * * *
3 * * *
4 * * *
5 * * *
6 * * *
7 * * *
8 * * *
9 * * *
10 * * *
11 * * *
12 * * *
13 * * *
14 * * *
15 * * *
16 * * *
17 * * *
18 * * *
19 * * *
20 * * *
21 * * *
22 * * *
23 * * *
24 * * *
25 * * *
26 * * *
27 * * *
```

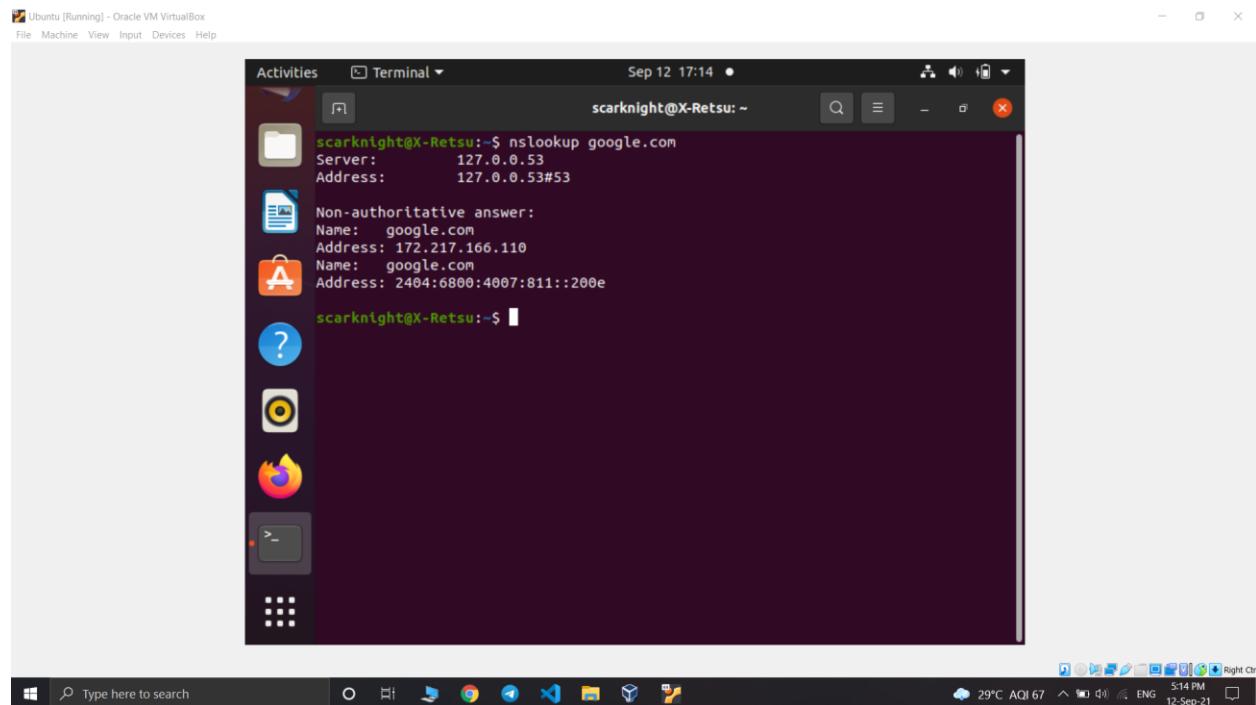


```
scarknight@X-Retsu:~$ traceroute google.com
traceroute to google.com (172.217.166.110), 30 hops max, 60 byte packets
1 10.0.2.2 (10.0.2.2) 1.468 ms 1.495 ms 1.516 ms
2 * * *
3 * * *
4 * * *
5 * * *
6 * * *
7 * * *
8 * * *
9 * * *
10 * * *
11 * * *
12 * * *
13 * * *
14 * * *
15 * * *
16 * * *
17 * * *
18 * * *
19 * * *
20 * * *
21 * * *
22 * * *
23 * * *
24 * * *
25 * * *
26 * * *
27 * * *
```

```
scarknight@X-Retsu:~$ traceroute -4 google.com
traceroute to google.com (172.217.166.110), 30 hops max, 60 byte packets
1 10.0.2.2 (10.0.2.2) 1.065 ms 1.022 ms 1.002 ms
2 * * *
3 * * *
4 * * *
5 * * *
6 * * *
7 * * *
8 * * *
9 * * *
10 * * *
11 * * *
12 * * *
13 * * *
14 * * *
15 * * *
16 * * *
17 * * *
18 * * *
19 * * *
20 * * *
21 * * *
22 * * *
23 * * *
24 * * *
25 * * *
26 * * *
27 * * *
```

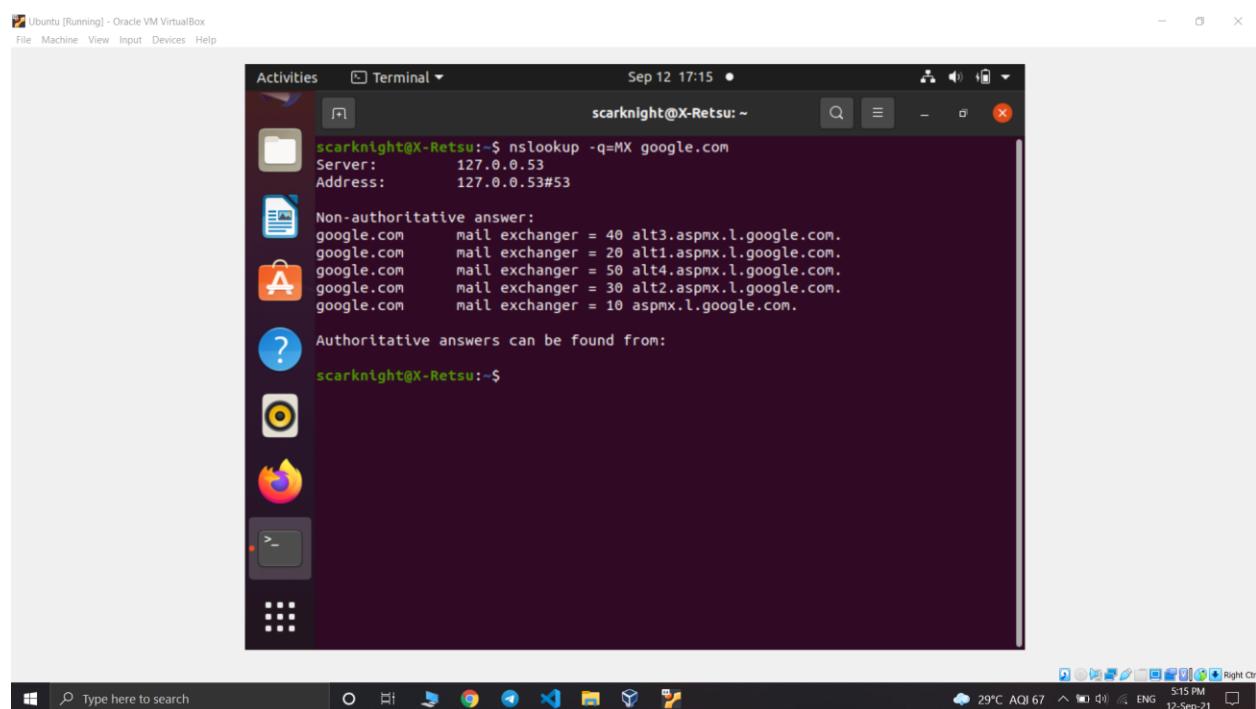


Nslookup



```
Ubuntu [Running] - Oracle VM VirtualBox
File Machine View Input Devices Help
Activities Terminal Sep 12 17:14 • scarknight@X-Retsu: ~
scarknight@X-Retsu:~$ nslookup google.com
Server: 127.0.0.53
Address: 127.0.0.53#53

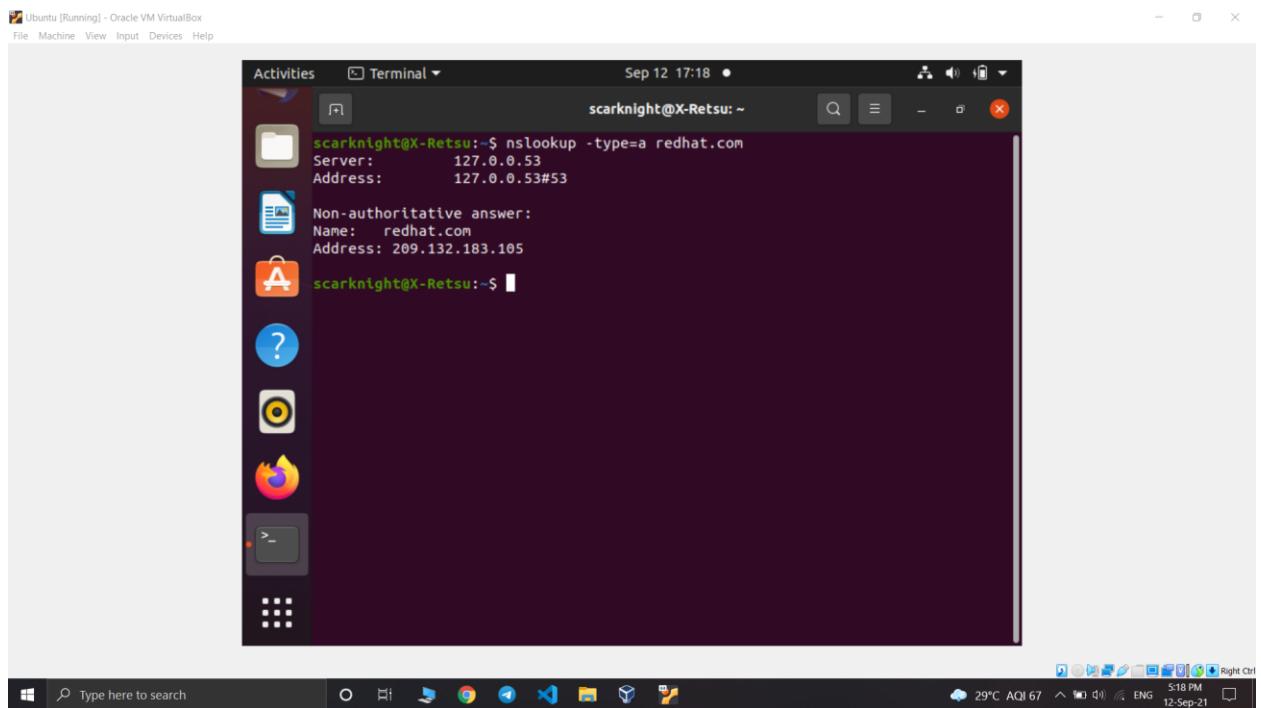
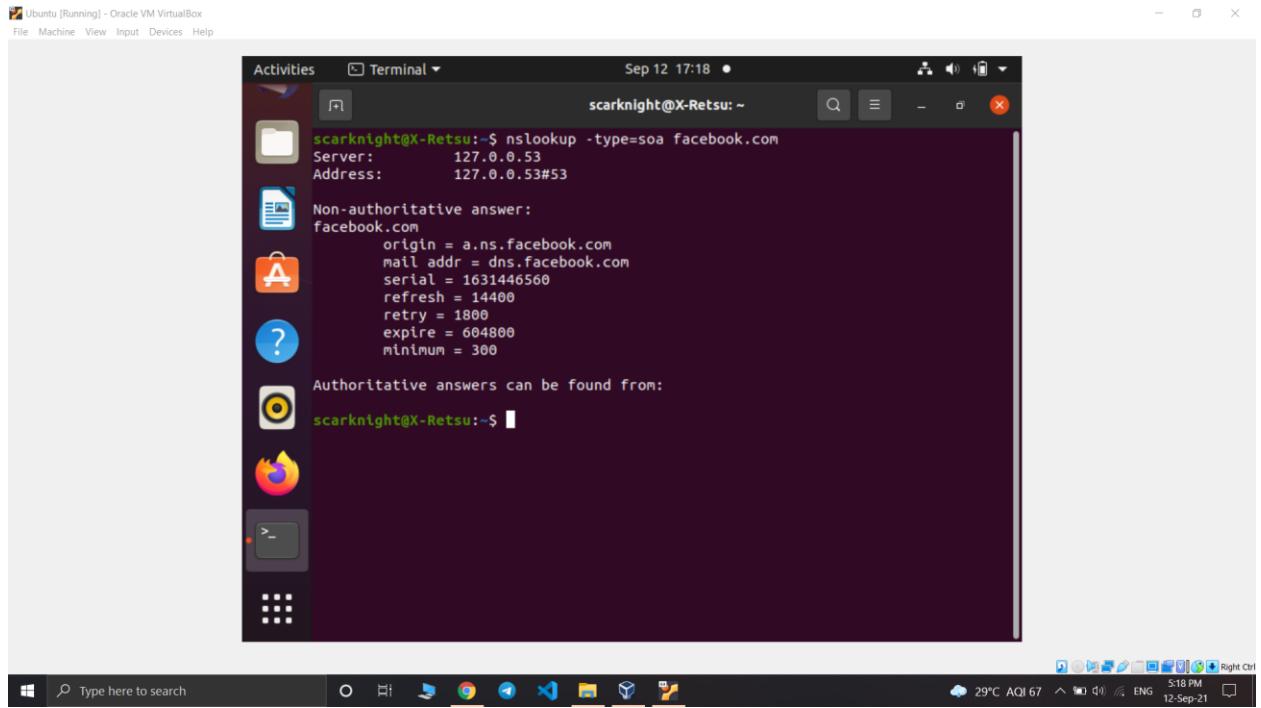
Non-authoritative answer:
Name: google.com
Address: 172.217.166.110
Name: google.com
Address: 2404:6800:4007:811::200e
scarknight@X-Retsu:~$
```



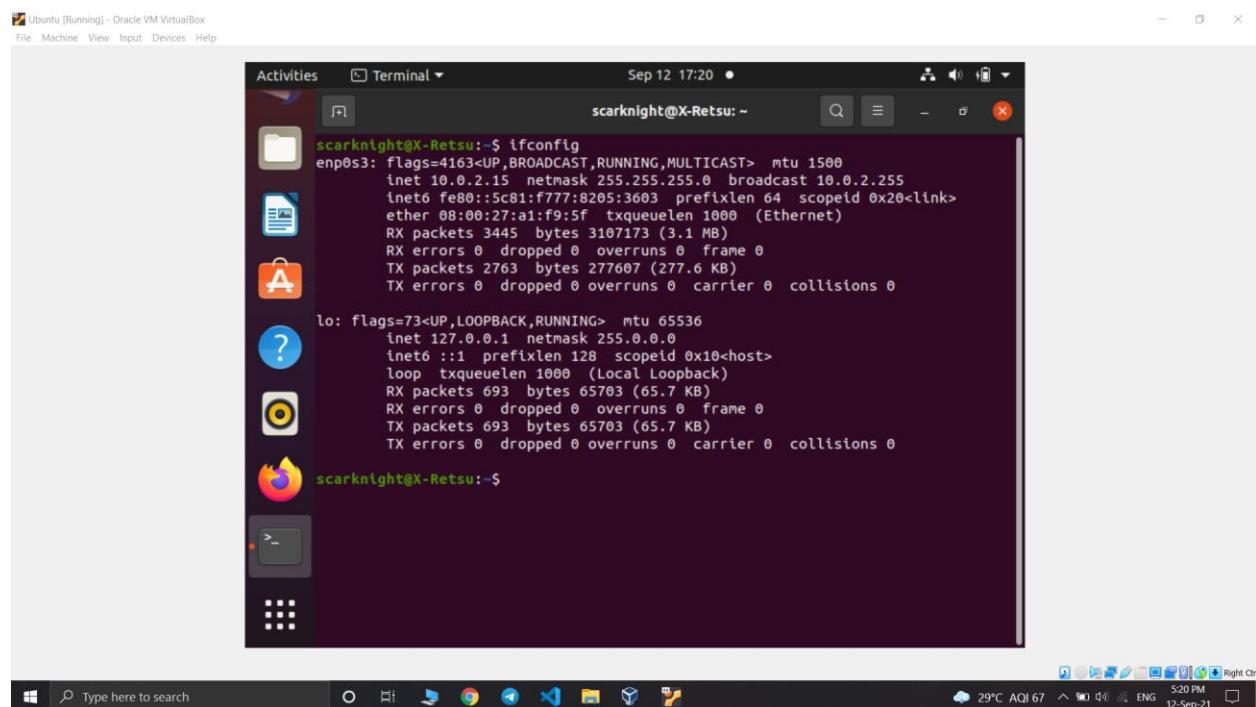
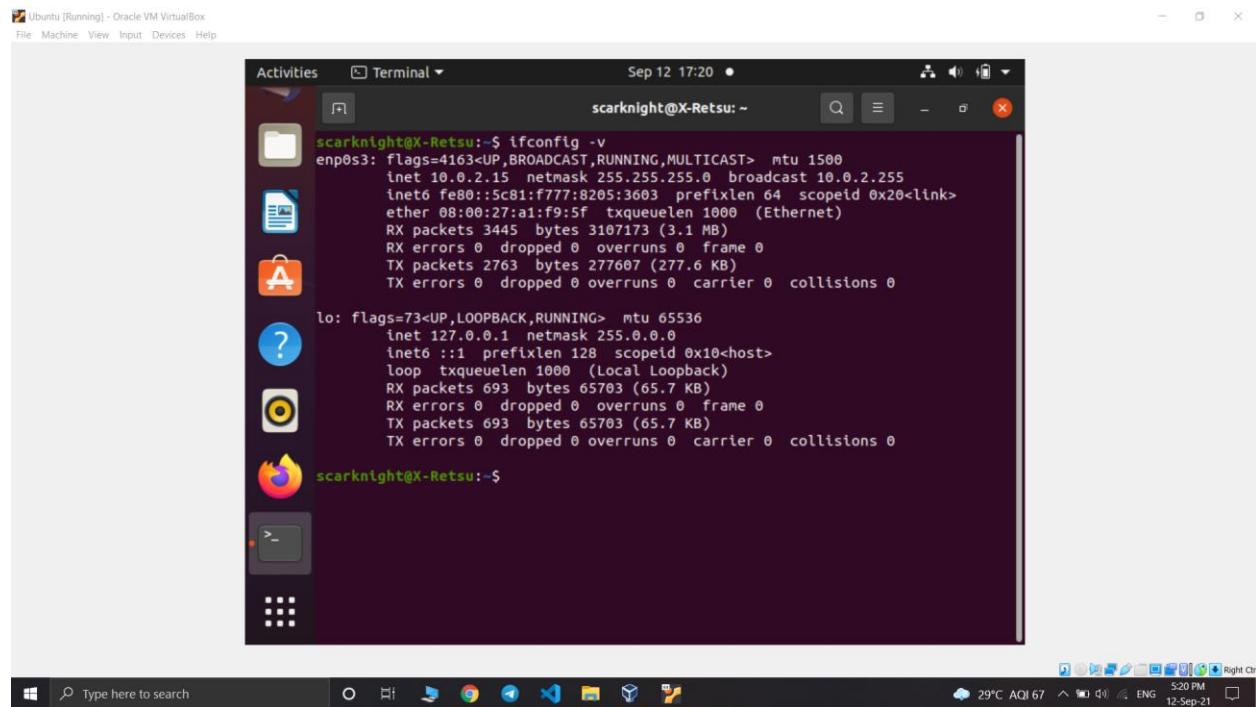
```
Ubuntu [Running] - Oracle VM VirtualBox
File Machine View Input Devices Help
Activities Terminal Sep 12 17:15 • scarknight@X-Retsu: ~
scarknight@X-Retsu:~$ nslookup -q=MX google.com
Server: 127.0.0.53
Address: 127.0.0.53#53

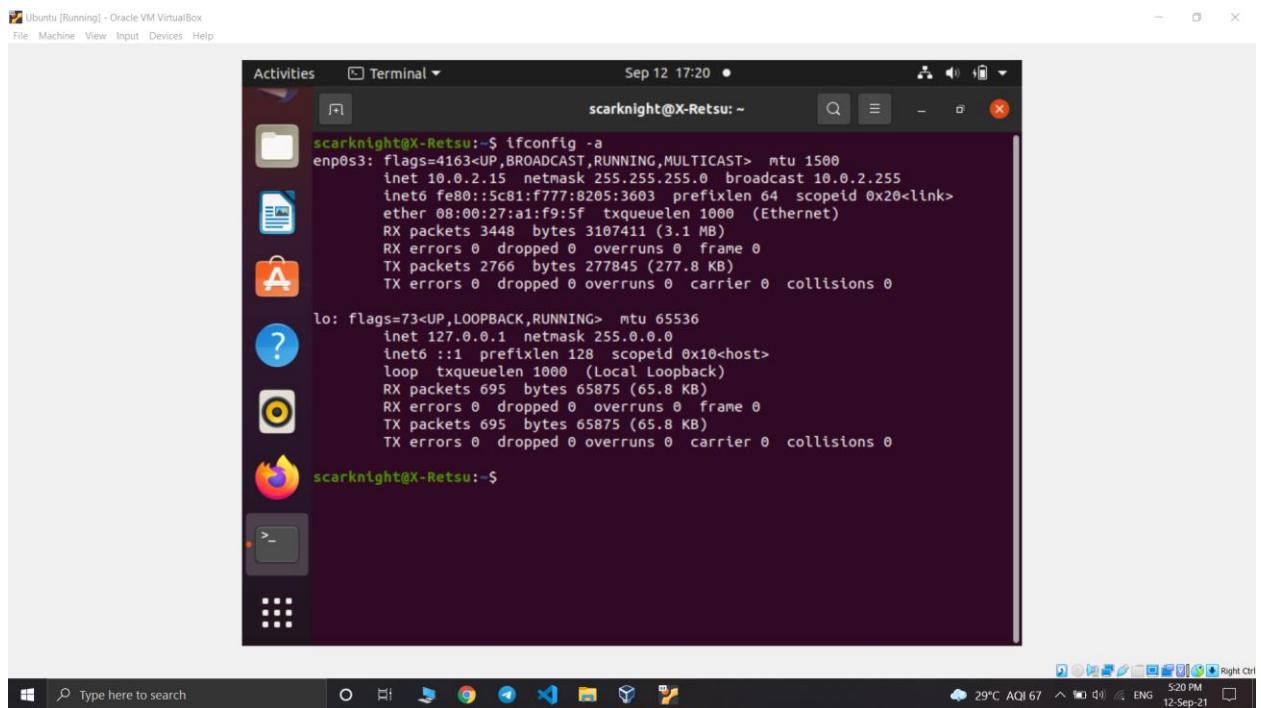
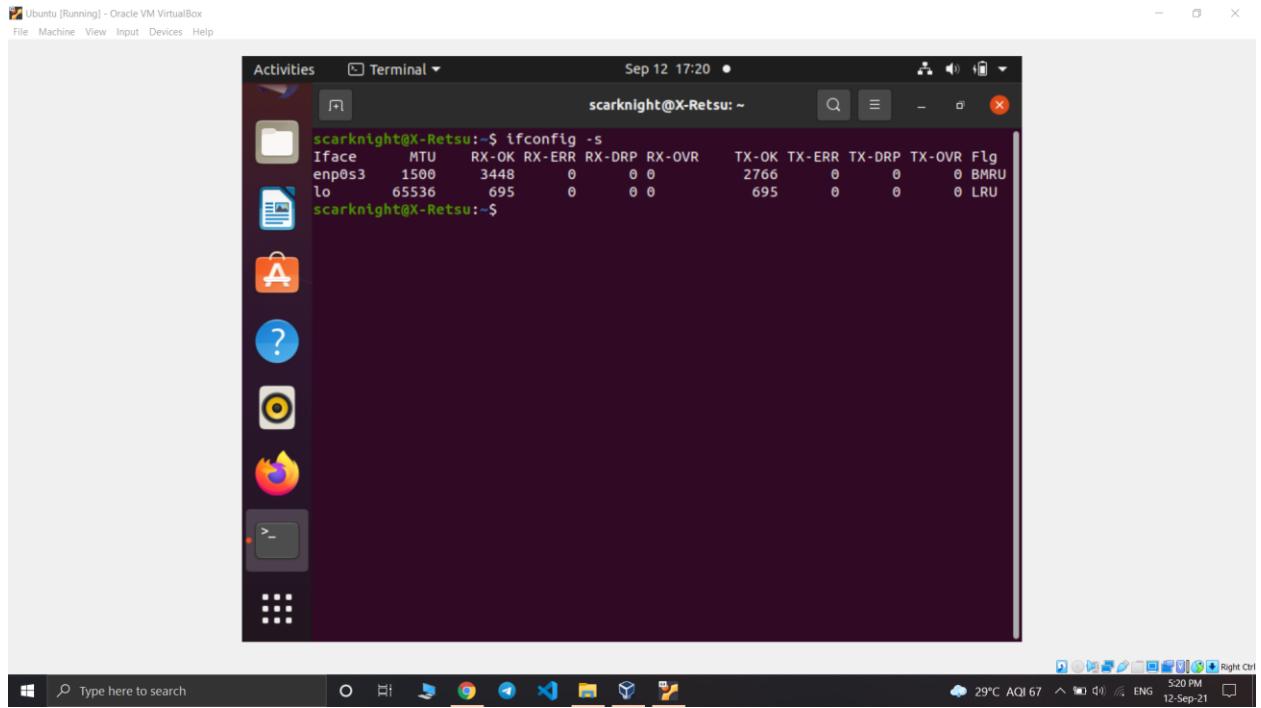
Non-authoritative answer:
google.com mail exchanger = 40 alt3.aspmx.l.google.com.
google.com mail exchanger = 20 alt1.aspmx.l.google.com.
google.com mail exchanger = 50 alt4.aspmx.l.google.com.
google.com mail exchanger = 30 alt2.aspmx.l.google.com.
google.com mail exchanger = 10 aspmx.l.google.com.

Authoritative answers can be found from:
scarknight@X-Retsu:~$
```



ifconfig





Netstat

Ubuntu [Running] - Oracle VM VirtualBox
File Machine View Input Devices Help

Activities Terminal Sep 12 17:21 scarknight@X-Retsu: ~

```
scarknight@X-Retsu:~$ netstat
Active Internet connections (w/o servers)
Proto Recv-Q Send-Q Local Address           Foreign Address     State
udp        0      0 10.0.2.15:bootpc          10.0.2.2:bootps    ESTABLISHED

Active UNIX domain sockets (w/o servers)
Proto RefCnt Flags       Type      State         I-Node Path
unix  2          [ ]   DGRAM    ESTABLISHED  32467  /run/user/1000/systemd
unix  2          [ ]   DGRAM    ESTABLISHED  15184  /run/systemd/journal
unix  15         [ ]   DGRAM    ESTABLISHED  15194  /run/systemd/journal
unix  8          [ ]   DGRAM    ESTABLISHED  15198  /run/systemd/journal
unix  _socket
unix  3          [ ]   DGRAM    ESTABLISHED  15170  /run/systemd/notify
unix  3          [ ]   STREAM   CONNECTED   36976  /run/dbus/system_bus
unix  3          [ ]   STREAM   CONNECTED   31808  /run/systemd/journal
unix  3          [ ]   STREAM   CONNECTED   37387
unix  3          [ ]   STREAM   CONNECTED   32724
unix  3          [ ]   STREAM   CONNECTED   36972
unix  3          [ ]   STREAM   CONNECTED   31805  /run/systemd/journal
unix  3          [ ]   STREAM   CONNECTED   23645  /run/systemd/journal
unix  3          [ ]   STREAM   CONNECTED   36352  /run/systemd/journal
unix  3          [ ]   STREAM   CONNECTED   32727
unix  3          [ ]   STREAM   CONNECTED   36974
unix  3          [ ]   STREAM   CONNECTED   31804
```

Type here to search 29°C AQI 67 5:21 PM 12-Sep-21 Right Ctrl

Ubuntu [Running] - Oracle VM VirtualBox
File Machine View Input Devices Help

Activities Terminal Sep 12 17:22 scarknight@X-Retsu: ~

```
scarknight@X-Retsu:~$ netstat -n
Active Internet connections (w/o servers)
Proto Recv-Q Send-Q Local Address           Foreign Address     State
udp        0      0 10.0.2.15:68          10.0.2.2:67    ESTABLISHED

Active UNIX domain sockets (w/o servers)
Proto RefCnt Flags       Type      State         I-Node Path
unix  2          [ ]   DGRAM    ESTABLISHED  32467  /run/user/1000/systemd
unix  2          [ ]   DGRAM    ESTABLISHED  15184  /run/systemd/journal
unix  15         [ ]   DGRAM    ESTABLISHED  15194  /run/systemd/journal
unix  8          [ ]   DGRAM    ESTABLISHED  15198  /run/systemd/journal
unix  _socket
unix  3          [ ]   DGRAM    ESTABLISHED  15170  /run/systemd/notify
unix  3          [ ]   STREAM   CONNECTED   36976  /run/dbus/system_bus
unix  3          [ ]   STREAM   CONNECTED   31808  /run/systemd/journal
unix  3          [ ]   STREAM   CONNECTED   37387
unix  3          [ ]   STREAM   CONNECTED   32724
unix  3          [ ]   STREAM   CONNECTED   36972
unix  3          [ ]   STREAM   CONNECTED   31805  /run/systemd/journal
unix  3          [ ]   STREAM   CONNECTED   23645  /run/systemd/journal
unix  3          [ ]   STREAM   CONNECTED   36352  /run/systemd/journal
unix  3          [ ]   STREAM   CONNECTED   32727
unix  3          [ ]   STREAM   CONNECTED   36974
unix  3          [ ]   STREAM   CONNECTED   31804
```

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Ubuntu [Running] - Oracle VM VirtualBox

File Machine View Input Devices Help

Activities Terminal Sep 12 17:22 scarknight@X-Retsu: ~

```
scarknight@X-Retsu:~$ netstat -a
Active Internet connections (servers and established)
Proto Recv-Q Send-Q Local Address           Foreign Address         State
tcp     0      0 localhost:domain          0.0.0.0:*
tcp     0      0 localhost:ipp             0.0.0.0:*
tcp     0      0 localhost:mysql            0.0.0.0:*
tcp6    0      0 ip6-localhost:ipp        [:]:*
udp     0      0 0.0.0.0:mdns             0.0.0.0:*
udp     0      0 localhost:domain          0.0.0.0:*
udp     0      0 10.0.2.15:bootpc          10.0.2.2:bootps       ESTABLISHED
udp     0      0 0.0.0.0:35046            0.0.0.0:*
udp     0      0 0.0.0.0:631              0.0.0.0:*
udp6    0      0 [:]:mdns                [:]:*
udp6    0      0 [:]:34152               [:]:*
raw6   0      0 [:]:ipv6-icmp            [:]:*                7
Active UNIX domain sockets (servers and established)
Proto RefCnt Flags     Type      State      I-Node  Path
unix  2      [ ACC ]   STREAM    LISTENING  34722  @/tmp/.ICE-unix/1610
unix  2      [ ACC ]   SEQPACKET LISTENING  15200  /run/udev/control
unix  2      [ ACC ]   STREAM    LISTENING  15173  /run/systemd/private
unix  2      [ ]        DGRAM     LISTENING  32467  /run/user/1000/systemd
md/notify
unix  2      [ ACC ]   STREAM    LISTENING  15175  /run/systemd/userdb/
io.systemd.DynamicUser
unix  2      [ ACC ]   STREAM    LISTENING  32470  /run/user/1000/systemd
md/private
unix  2      [ ACC ]   STREAM    LISTENING  32504  /run/user/1000/bus
unix  2      [ ]        DGRAM     LISTENING  15184  /run/systemd/journal
/syslog
```

Type here to search

29°C AQI 67 5:22 PM ENG 12-Sep-21 Right Ctrl

Ubuntu [Running] - Oracle VM VirtualBox

File Machine View Input Devices Help

Activities Terminal Sep 12 17:22 scarknight@X-Retsu: ~

```
scarknight@X-Retsu:~$ netstat -nS
Active Internet connections (w/o servers)
Proto Recv-Q Send-Q Local Address           Foreign Address         State
udp     0      0 10.0.2.15:68              10.0.2.2:67          ESTABLISHED
Active UNIX domain sockets (w/o servers)
Proto RefCnt Flags     Type      State      I-Node  Path
unix  2      [ ]        DGRAM     LISTENING  32467  /run/user/1000/systemd
md/notify
unix  2      [ ]        DGRAM     LISTENING  15184  /run/systemd/journal
/syslog
unix 15     [ ]        DGRAM     LISTENING  15194  /run/systemd/journal
/dev-log
unix  8      [ ]        DGRAM     LISTENING  15198  /run/systemd/journal
/socket
unix  3      [ ]        DGRAM     CONNECTED  15170  /run/systemd/notify
unix  3      [ ]        STREAM    CONNECTED  36976  /
unix  3      [ ]        STREAM    CONNECTED  31808  /run/dbus/system_bus_socket
unix  3      [ ]        STREAM    CONNECTED  37387  /
unix  3      [ ]        STREAM    CONNECTED  32724  /
unix  3      [ ]        STREAM    CONNECTED  36972  /
unix  3      [ ]        STREAM    CONNECTED  31805  /run/systemd/journal
/stdout
unix  3      [ ]        STREAM    CONNECTED  23645  /
unix  3      [ ]        STREAM    CONNECTED  36352  /run/systemd/journal
/stdout
unix  3      [ ]        STREAM    CONNECTED  32727  /
unix  3      [ ]        STREAM    CONNECTED  36974  /
unix  3      [ ]        STREAM    CONNECTED  31804  /
```

Type here to search

29°C AQI 67 5:22 PM ENG 12-Sep-21 Right Ctrl

WINDOWS

Ping

```
Command Prompt
C:\Users\HP>ping google.com

Pinging google.com [172.217.166.118] with 32 bytes of data:
Reply from 172.217.166.118: bytes=32 time=20ms TTL=118
Reply from 172.217.166.118: bytes=32 time=20ms TTL=118
Reply from 172.217.166.118: bytes=32 time=21ms TTL=118
Reply from 172.217.166.118: bytes=32 time=551ms TTL=118

Ping statistics for 172.217.166.118:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 20ms, Maximum = 551ms, Average = 153ms

C:\Users\HP>
```

```
Command Prompt
C:\Users\HP>ping -a google.com

Pinging google.com [172.217.166.118] with 32 bytes of data:
Reply from 172.217.166.118: bytes=32 time=21ms TTL=118
Reply from 172.217.166.118: bytes=32 time=20ms TTL=118
Reply from 172.217.166.118: bytes=32 time=20ms TTL=118
Reply from 172.217.166.118: bytes=32 time=20ms TTL=118

Ping statistics for 172.217.166.118:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 20ms, Maximum = 21ms, Average = 20ms

C:\Users\HP>
```

```
C:\ Command Prompt
C:\Users\HP>ping -j google.com

Pinging google.com [172.217.166.110] with 32 bytes of data:
General failure.
General failure.
General failure.
General failure.

Ping statistics for 172.217.166.110:
  Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),
C:\Users\HP>
```

Route

```
Microsoft Windows [Version 10.0.19043.1110]
(c) Microsoft Corporation. All rights reserved.

C:\Users\HP>route print
=====
Interface List
17...48 ba 4e ab cf d8 ....Realtek PCIe GBE Family Controller
18...0a 00 27 00 00 12 ....VirtualBox Host-Only Ethernet Adapter
15...00 ff 6c 30 b9 7e ....TAP-Windows Adapter V9
12...d6 6a 6a 1f 66 93 ....Microsoft Wi-Fi Direct Virtual Adapter #2
5...04 6a 6a 1f 66 93 ....Microsoft Wi-Fi Direct Virtual Adapter #3
4...04 6a 6a 1f 66 93 ....Realtek RTL8723DE 802.11b/g/n PCIe Adapter
1.....Software Loopback Interface 1
=====

IPv4 Route Table
=====
Active Routes:
Network Destination      Netmask        Gateway       Interface Metric
          0.0.0.0          0.0.0.0   192.168.1.1    192.168.1.2      55
        127.0.0.0          255.0.0.0   On-link        127.0.0.1      331
       127.0.0.1          255.255.255   On-link        127.0.0.1      331
  127.255.255.255          255.255.255   On-link        127.0.0.1      331
 192.168.1.0          255.255.255.0   On-link      192.168.1.2      311
 192.168.1.2          255.255.255.0   On-link      192.168.1.2      311
 192.168.1.255         255.255.255.255  On-link     192.168.1.255      311
 192.168.56.0          255.255.255.0   On-link      192.168.56.1      281
 192.168.56.1          255.255.255.255  On-link     192.168.56.1      281
 192.168.56.255         255.255.255.255  On-link     192.168.56.1      281
 224.0.0.0            240.0.0.0        On-link        127.0.0.1      331
 224.0.0.0            240.0.0.0        On-link      192.168.56.1      281
 224.0.0.0            240.0.0.0        On-link      192.168.1.2      311
 255.255.255.255         255.255.255.255  On-link     192.168.56.1      281
 255.255.255.255         255.255.255.255  On-link     192.168.56.1      281
 255.255.255.255         255.255.255.255  On-link     192.168.1.2      311
=====
Persistent Routes:
  None

IPv6 Route Table
=====
```

```
Microsoft Windows [Version 10.0.19043.1110]
(c) Microsoft Corporation. All rights reserved.

C:\Users\HP>route print
=====
Interface List
127.0.0.0          255.0.0.0   On-link        127.0.0.1      331
 127.0.0.1          255.255.255.255  On-link        127.0.0.1      331
 127.255.255.255         255.255.255.255  On-link        127.0.0.1      331
 192.168.1.0          255.255.255.0   On-link      192.168.1.2      311
 192.168.1.2          255.255.255.0   On-link      192.168.1.2      311
 192.168.1.255         255.255.255.255  On-link     192.168.1.255      311
 192.168.56.0          255.255.255.0   On-link      192.168.56.1      281
 192.168.56.1          255.255.255.255  On-link     192.168.56.1      281
 192.168.56.255         255.255.255.255  On-link     192.168.56.1      281
 224.0.0.0            240.0.0.0        On-link        127.0.0.1      331
 224.0.0.0            240.0.0.0        On-link      192.168.56.1      281
 224.0.0.0            240.0.0.0        On-link      192.168.1.2      311
 255.255.255.255         255.255.255.255  On-link     192.168.56.1      281
 255.255.255.255         255.255.255.255  On-link     192.168.56.1      281
 255.255.255.255         255.255.255.255  On-link     192.168.1.2      311
=====
Persistent Routes:
  None

IPv6 Route Table
=====
Active Routes:
  If Metric Network Destination      Gateway
  4    311 ::/0                  fe80::1
  1    331 ::1/128               On-link
 18    281 fe80::/64              On-link
  4    311 fe80::/64              On-link
  4    311 fe80::5f9:db9f:6f92:c940/128
                                On-link
 18    281 fe80::a857:abdb:11db:cb9/128
                                On-link
  1    331 ff00::/8               On-link
 18    281 ff00::/8               On-link
  4    311 ff00::/8               On-link
=====
Persistent Routes:
  None

C:\Users\HP>
```

```
Command Prompt
C:\Users\HP>route print -4
=====
Interface List
17...48 ba 4e ab cf d8 ....Realtek PCIe GBE Family Controller
18...0a 00 27 00 00 12 ....VirtualBox Host-Only Ethernet Adapter
15...00 ff 6c 30 b9 7e ....TAP-Windows Adapter V9
12...06 6a 6a 1f 66 93 ....Microsoft Wi-Fi Direct Virtual Adapter #2
5...04 6a 6a 1f 66 93 ....Microsoft Wi-Fi Direct Virtual Adapter #3
4...d4 6a 6a 1f 66 93 ....Realtek RTL8723DE 802.11b/g/n PCIe Adapter
1....Software Loopback Interface 1
=====

IPv4 Route Table
=====
Active Routes:
Network Destination     Netmask      Gateway       Interface Metric
          0.0.0.0         0.0.0.0   192.168.1.1    192.168.1.2      60
        127.0.0.1         255.0.0.0   On-link        127.0.0.1      331
       127.0.0.1         255.255.255.255 On-link        127.0.0.1      331
 127.255.255.255 255.255.255.255 On-link        127.0.0.1      331
 192.168.1.0         255.255.255.255 On-link      192.168.1.2      316
 192.168.1.2         255.255.255.255 On-link      192.168.1.2      316
 192.168.1.255 255.255.255.255 On-link      192.168.1.2      316
 192.168.56.0         255.255.255.0 On-link      192.168.56.1      281
 192.168.56.1         255.255.255.255 On-link      192.168.56.1      281
 192.168.56.255 255.255.255.255 On-link      192.168.56.1      281
 224.0.0.0           248.0.0.0     On-link        127.0.0.1      331
 224.0.0.0           248.0.0.0     On-link      192.168.56.1      281
 224.0.0.0           248.0.0.0     On-link      192.168.1.2      316
 255.255.255.255 255.255.255.255 On-link        127.0.0.1      331
 255.255.255.255 255.255.255.255 On-link      192.168.56.1      281
 255.255.255.255 255.255.255.255 On-link      192.168.1.2      316
=====
Persistent Routes:
  None
C:\Users\HP>
```

```
Command Prompt
C:\Users\HP>route print -6
=====
Interface List
17...48 ba 4e ab cf d8 ....Realtek PCIe GBE Family Controller
18...0a 00 27 00 00 12 ....VirtualBox Host-Only Ethernet Adapter
15...00 ff 6c 30 b9 7e ....TAP-Windows Adapter V9
12...06 6a 6a 1f 66 93 ....Microsoft Wi-Fi Direct Virtual Adapter #2
5...04 6a 6a 1f 66 93 ....Microsoft Wi-Fi Direct Virtual Adapter #3
4...d4 6a 6a 1f 66 93 ....Realtek RTL8723DE 802.11b/g/n PCIe Adapter
1....Software Loopback Interface 1
=====

IPv6 Route Table
=====
Active Routes:
  If Metric Network Destination      Gateway
  4    316 ::/0                      fe80::1
  1    331 ::1/128                  On-link
 18    281 fe80::/64                On-link
  4    316 fe80::/64                On-link
  4    316 fe80::5f9:db9f:6f92:c940/128
                                         On-link
 18    281 fe80::a857:abdb:11db:cbb9/128
                                         On-link
  1    331 ff00::/8                  On-link
 18    281 ff00::/8                  On-link
  4    316 ff00::/8                  On-link
=====
Persistent Routes:
  None
C:\Users\HP>
```

```
Command Prompt
C:\Users\HP>route print *157
=====
Interface List
17...48 ba 4e ab cf d8 ....Realtek PCIe GBE Family Controller
18...0a 00 27 00 00 12 ....VirtualBox Host-Only Ethernet Adapter
15...00 ff 6c 30 b9 7e ....TAP-Windows Adapter V9
12...d6 6a 6a 1f 66 93 ....Microsoft Wi-Fi Direct Virtual Adapter #2
5...d4 6a 6a 1f 66 93 ....Microsoft Wi-Fi Direct Virtual Adapter #3
4...d4 6a 6a 1f 66 93 ....Realtek RTL8723DE 802.11b/g/n PCIe Adapter
1....Software Loopback Interface 1
=====

IPv4 Route Table
=====
Active Routes:
  None
Persistent Routes:
  None

IPv6 Route Table
=====
Active Routes:
  None
Persistent Routes:
  None

C:\Users\HP>
```

Traceroute

```
Command Prompt
C:\Users\HP>tracert 192.168.1.1
Tracing route to csp1.zte.com.cn [192.168.1.1]
over a maximum of 30 hops:
  1     2 ms     2 ms     2 ms  csp3.zte.com.cn [192.168.1.1]
Trace complete.

C:\Users\HP>
```

```
Command Prompt
C:\Users\HP>tracert www.google.com
Tracing route to www.google.com [142.250.195.100]
over a maximum of 30 hops:
 1 * * * Request timed out.
 2 6 ms 7 ms 5 ms 1.105.92.111.asianet.co.in [111.92.105.1]
 3 * * Request timed out.
 4 19 ms 19 ms 19 ms 130.230.88.202.asianet.co.in [202.88.230.130]
 5 17 ms 18 ms 18 ms 77.252.88.202.asianet.co.in [202.88.252.77]
 6 18 ms 19 ms 18 ms 216.239.47.9
 7 20 ms 18 ms 18 ms 142.251.55.71
 8 25 ms 17 ms 16 ms maa03s39-in-f4.1e100.net [142.250.195.100]

Trace complete.

C:\Users\HP>
```

```
Command Prompt
C:\Users\HP>tracert -d www.yahoo.com
Tracing route to new-fp-shed.wg1.b.yahoo.com [202.165.107.50]
over a maximum of 30 hops:
 1 * * * Request timed out.
 2 6 ms 6 ms 6 ms 111.92.105.1
 3 * * Request timed out.
 4 11 ms 7 ms 7 ms 14.142.20.225
 5 23 ms 22 ms 24 ms 172.19.249.170
 6 25 ms 27 ms 24 ms 180.87.36.9
 7 58 ms 64 ms 57 ms 180.87.36.13
 8 56 ms 56 ms 56 ms 180.87.96.21
 9 58 ms 57 ms 58 ms 180.87.96.130
10 724 ms 58 ms 58 ms 202.126.129.125
11 59 ms 62 ms 58 ms 203.84.289.87
12 57 ms 57 ms 57 ms 106.10.128.3
13 56 ms 57 ms 56 ms 106.10.131.215
14 57 ms 59 ms 57 ms 106.10.128.247
15 56 ms 55 ms 56 ms 202.165.107.50

Trace complete.

C:\Users\HP>
```

```
Command Prompt
C:\Users\HP>tracert 22.110.0.1
Tracing route to 22.110.0.1 over a maximum of 30 hops
 1  *          *          *      Request timed out.
 2  57 ms   198 ms   6 ms  1.105.92.111.asianet.co.in [111.92.105.1]
 3  *          *          *      Request timed out.
 4  6 ms    8 ms    7 ms  14.142.20.213.static-ernakulam.tcl.net.in [14.142.20.213]
 5  131 ms   33 ms   32 ms  172.28.176.254 [172.28.176.254]
 6  32 ms   32 ms   35 ms  ix-ae-1-100.tcore2.mlv-mumbai.as6453.net [180.87.39.25]
 7  133 ms   138 ms   134 ms  if-ae-2-2.tcore1.mlv-mumbai.as6453.net [180.87.38.1]
 8  169 ms   148 ms   137 ms  if-ae-5-2.tcore1.wyn-marseille.as6453.net [80.231.217.29]
 9  146 ms   199 ms   198 ms  if-ae-8-1600.tcore1.pye-paris.as6453.net [80.231.217.6]
10  183 ms   302 ms   302 ms  80.231.154.29
11  350 ms   302 ms   484 ms  prs-bb1-link.ip.twelve99.net [62.115.125.170]
12  275 ms   301 ms   301 ms  ash-bb2-link.ip.twelve99.net [62.115.112.242]
13  238 ms   238 ms   231 ms  ash-b1-link.ip.twelve99.net [62.115.143.121]
14  228 ms   227 ms   227 ms  hurricane-ic124167-ash-bb1.ip.twelve99-cust.net [213.248.98.94]
15  229 ms   229 ms   229 ms  100ge5-1.core2.ash1.he.net [72.52.92.226]
16  *          *          *      Request timed out.
17  *          *          *      Request timed out.
18  *          *          *      Request timed out.
19  *          *          *      Request timed out.
20  *          *          *      Request timed out.
21  *          *          *      Request timed out.
22  *          *          *      Request timed out.
23  *          *          *      Request timed out.
24  *          *          *      Request timed out.
25  *          *          *      Request timed out.
26  *          *          *      Request timed out.
27  *          *          *      Request timed out.
28  *          *          *      Request timed out.
29  *          *          *      Request timed out.
30  *          *          *      Request timed out.

Trace complete.

C:\Users\HP>
```

Nslookup

```
Command Prompt - nslookup
C:\Users\HP>nslookup
Default Server: cspl.zte.com.cn
Address: fe80::1

>
```

```
Command Prompt
C:\Users\HP>nslookup google.com
Server:  csp3.zte.com.cn
Address:  fe80::1

Non-authoritative answer:
Name:    google.com
Addresses:  2404:6800:4007:811::200e
          172.217.166.110

C:\Users\HP>
```

```
Command Prompt
C:\Users\HP>nslookup -q=MX google.com
Server:  csp1.zte.com.cn
Address:  fe80::1

Non-authoritative answer:
google.com      MX preference = 20, mail exchanger = alt1.aspmx.l.google.com
google.com      MX preference = 48, mail exchanger = alt3.aspmx.l.google.com
google.com      MX preference = 50, mail exchanger = alt4.aspmx.l.google.com
google.com      MX preference = 10, mail exchanger = aspmx.l.google.com
google.com      MX preference = 30, mail exchanger = alt2.aspmx.l.google.com

C:\Users\HP>
```

```
Command Prompt
C:\Users\HP>nslookup -type=ns google.com
Server: csp3.zte.com.cn
Address: fe80::1

Non-authoritative answer:
google.com      nameserver = ns4.google.com
google.com      nameserver = ns3.google.com
google.com      nameserver = ns1.google.com
google.com      nameserver = ns2.google.com

C:\Users\HP>
```

Ipconfig

```
Command Prompt
C:\Users\HP>ipconfig

Windows IP Configuration

Ethernet adapter Ethernet:
  Media State . . . . . : Media disconnected
  Connection-specific DNS Suffix . :

Ethernet adapter Ethernet 4:
  Connection-specific DNS Suffix . :
  Link-local IPv6 Address . . . . . : fe80::a857:abdb:11db:cbb9%18
  IPv4 Address . . . . . : 192.168.56.1
  Subnet Mask . . . . . : 255.255.255.0
  Default Gateway . . . . . :

Unknown adapter Local Area Connection:
  Media State . . . . . : Media disconnected
  Connection-specific DNS Suffix . :

Wireless LAN adapter Local Area Connection* 2:
  Media State . . . . . : Media disconnected
  Connection-specific DNS Suffix . :

Wireless LAN adapter Local Area Connection* 4:
  Media State . . . . . : Media disconnected
  Connection-specific DNS Suffix . :

Wireless LAN adapter Wi-Fi:
  Connection-specific DNS Suffix . :
  Link-local IPv6 Address . . . . . : fe80::5f9:db9f:6f92:c940%4
  IPv4 Address . . . . . : 192.168.1.2
  Subnet Mask . . . . . : 255.255.255.0
  Default Gateway . . . . . : fe80::1%4
                                192.168.1.1
```

```
Command Prompt  
C:\Users\HP>ipconfig /release  
  
Windows IP Configuration  
  
No operation can be performed on Ethernet while it has its media disconnected.  
No operation can be performed on Local Area Connection while it has its media disconnected.  
No operation can be performed on Local Area Connection* 2 while it has its media disconnected.  
No operation can be performed on Local Area Connection* 4 while it has its media disconnected.  
  
Ethernet adapter Ethernet:  
  
    Media State . . . . . : Media disconnected  
    Connection-specific DNS Suffix . .  
  
Ethernet adapter Ethernet 4:  
  
    Connection-specific DNS Suffix . .  
    Link-local IPv6 Address . . . . . : fe80::a857:abdb:11db:cbb9%18  
    IPv4 Address . . . . . : 192.168.56.1  
    Subnet Mask . . . . . : 255.255.255.0  
    Default Gateway . . . . . :  
  
Unknown adapter Local Area Connection:  
  
    Media State . . . . . : Media disconnected  
    Connection-specific DNS Suffix . .  
  
Wireless LAN adapter Local Area Connection* 2:  
  
    Media State . . . . . : Media disconnected  
    Connection-specific DNS Suffix . .  
  
Wireless LAN adapter Local Area Connection* 4:  
  
    Media State . . . . . : Media disconnected  
    Connection-specific DNS Suffix . .  
  
Wireless LAN adapter Wi-Fi:  
  
    Connection-specific DNS Suffix . .  
    Link-local IPv6 Address . . . . . : fe80::5f9:db9f:6f92:c940%4  
    Default Gateway . . . . . : fe80::1%4
```

```
Command Prompt

C:\Users\HP>ipconfig /displaydns

Windows IP Configuration

scinstallcheck.mcafee.com
-----
No records of type AAAA

scinstallcheck.mcafee.com
-----
Record Name . . . . . : scinstallcheck.mcafee.com
Record Type . . . . . : 1
Time To Live . . . . . : 0
Data Length . . . . . : 4
Section . . . . . : Answer
A (Host) Record . . . . . : 0.0.0.1

1.173.168.192.in-addr.arpa
-----
Record Name . . . . . : 1.173.168.192.in-addr.arpa.
Record Type . . . . . : 12
Time To Live . . . . . : 0
Data Length . . . . . : 8
Section . . . . . : Answer
PTR Record . . . . . : X-Retsu.mshome.net

1.0.0.127.in-addr.arpa
-----
Record Name . . . . . : 1.0.0.127.in-addr.arpa.
Record Type . . . . . : 12
Time To Live . . . . . : 0
Data Length . . . . . : 8
Section . . . . . : Answer
PTR Record . . . . . : localhost

chat-pa.clients6.google.com
-----
Record Name . . . . . : chat-pa.clients6.google.com
```

```
Command Prompt  
C:\Users\HP>ipconfig /renew  
  
Windows IP Configuration  
  
No operation can be performed on Ethernet while it has its media disconnected.  
No operation can be performed on Local Area Connection while it has its media disconnected.  
No operation can be performed on Local Area Connection* 2 while it has its media disconnected.  
No operation can be performed on Local Area Connection* 4 while it has its media disconnected.  
  
Ethernet adapter Ethernet:  
  
    Media State . . . . . : Media disconnected  
    Connection-specific DNS Suffix . :  
  
Ethernet adapter Ethernet 4:  
  
    Connection-specific DNS Suffix . :  
    Link-local IPv6 Address . . . . : fe80::a857:abdb:11db:cbb9%18  
    IPv4 Address . . . . . : 192.168.56.1  
    Subnet Mask . . . . . : 255.255.255.0  
    Default Gateway . . . . . :  
  
Unknown adapter Local Area Connection:  
  
    Media State . . . . . : Media disconnected  
    Connection-specific DNS Suffix . :  
  
Wireless LAN adapter Local Area Connection* 2:  
  
    Media State . . . . . : Media disconnected  
    Connection-specific DNS Suffix . :  
  
Wireless LAN adapter Local Area Connection* 4:  
  
    Media State . . . . . : Media disconnected  
    Connection-specific DNS Suffix . :  
  
Wireless LAN adapter Wi-Fi:  
  
    Connection-specific DNS Suffix . :  
    Link-local IPv6 Address . . . . : fe80::5f9:db9f:6f92:c948%4  
    IPv4 Address . . . . . : 192.168.1.2
```

Netstat

```
Command Prompt
C:\Users\HP>netstat
Active Connections

 Proto Local Address          Foreign Address      State
 TCP   192.168.1.2:51291       sa-in-f188:5228    ESTABLISHED
 TCP   192.168.1.2:51751       maa03s45-in-f10:https ESTABLISHED
 TCP   192.168.1.2:51753       91.108.56.174:https ESTABLISHED
 TCP   192.168.1.2:57912       11:http           TIME_WAIT
 TCP   192.168.1.2:57915       11:http           TIME_WAIT
 TCP   192.168.1.2:58350       maa03s43-in-f3:https ESTABLISHED
 TCP   192.168.1.2:60000       20.197.71.89:https ESTABLISHED
 TCP   192.168.1.2:61625       maa03s45-in-f10:https ESTABLISHED
 TCP   192.168.1.2:61822       maa03s43-in-f3:https ESTABLISHED
 TCP   192.168.56.1:1521        192.63020        ESTABLISHED
 TCP   192.168.56.1:63020       192:1521         ESTABLISHED

C:\Users\HP>
```

```
Command Prompt
C:\Users\HP>netstat -n
Active Connections

 Proto Local Address          Foreign Address        State
 TCP   192.168.1.2:51291      74.125.200.188:5228 ESTABLISHED
 TCP   192.168.1.2:51753      91.108.56.174:443  ESTABLISHED
 TCP   192.168.1.2:58358      142.250.195.227:443 ESTABLISHED
 TCP   192.168.1.2:60000      20.197.71.89:443  ESTABLISHED
 TCP   192.168.1.2:61625      142.250.196.42:443 ESTABLISHED
 TCP   192.168.1.2:61822      142.250.195.227:443 ESTABLISHED
 TCP   192.168.56.1:1521      192.168.56.1:63020 ESTABLISHED
 TCP   192.168.56.1:63020     192.168.56.1:1521 ESTABLISHED

C:\Users\HP>
```

```
Command Prompt - netstat -n 5
C:\Users\HP>netstat -n 5
Active Connections

 Proto Local Address          Foreign Address        State
 TCP   192.168.1.2:51291      74.125.200.188:5228 ESTABLISHED
 TCP   192.168.1.2:51753      91.108.56.174:443  ESTABLISHED
 TCP   192.168.1.2:58358      142.250.195.227:443 ESTABLISHED
 TCP   192.168.1.2:60000      20.197.71.89:443  ESTABLISHED
 TCP   192.168.1.2:61625      142.250.196.42:443 ESTABLISHED
 TCP   192.168.1.2:61822      142.250.195.227:443 ESTABLISHED
 TCP   192.168.56.1:1521      192.168.56.1:63020 ESTABLISHED
 TCP   192.168.56.1:63020     192.168.56.1:1521 ESTABLISHED

Active Connections

 Proto Local Address          Foreign Address        State
 TCP   192.168.1.2:51291      74.125.200.188:5228 ESTABLISHED
 TCP   192.168.1.2:51753      91.108.56.174:443  ESTABLISHED
 TCP   192.168.1.2:58358      142.250.195.227:443 ESTABLISHED
 TCP   192.168.1.2:60000      20.197.71.89:443  ESTABLISHED
 TCP   192.168.1.2:61625      142.250.196.42:443 ESTABLISHED
 TCP   192.168.1.2:61822      142.250.195.227:443 ESTABLISHED
 TCP   192.168.56.1:1521      192.168.56.1:63020 ESTABLISHED
 TCP   192.168.56.1:63020     192.168.56.1:1521 ESTABLISHED

Active Connections

 Proto Local Address          Foreign Address        State
 TCP   192.168.1.2:51291      74.125.200.188:5228 ESTABLISHED
 TCP   192.168.1.2:51753      91.108.56.174:443  ESTABLISHED
 TCP   192.168.1.2:58358      142.250.195.227:443 ESTABLISHED
 TCP   192.168.1.2:60000      20.197.71.89:443  ESTABLISHED
 TCP   192.168.1.2:61625      142.250.196.42:443 ESTABLISHED
 TCP   192.168.1.2:61822      142.250.195.227:443 ESTABLISHED
 TCP   192.168.56.1:1521      192.168.56.1:63020 ESTABLISHED
 TCP   192.168.56.1:63020     192.168.56.1:1521 ESTABLISHED

Active Connections
```

```
Command Prompt
C:\Users\HP>netstat -a
Active Connections

  Proto  Local Address        Foreign Address      State
  TCP    0.0.0.0:135          X-Retsu:0           LISTENING
  TCP    0.0.0.0:445          X-Retsu:0           LISTENING
  TCP    0.0.0.0:1521         X-Retsu:0           LISTENING
  TCP    0.0.0.0:5840         X-Retsu:0           LISTENING
  TCP    0.0.0.0:49664         X-Retsu:0           LISTENING
  TCP    0.0.0.0:49665         X-Retsu:0           LISTENING
  TCP    0.0.0.0:49666         X-Retsu:0           LISTENING
  TCP    0.0.0.0:49667         X-Retsu:0           LISTENING
  TCP    0.0.0.0:49668         X-Retsu:0           LISTENING
  TCP    0.0.0.0:49672         X-Retsu:0           LISTENING
  TCP    0.0.0.0:49677         X-Retsu:0           LISTENING
  TCP    127.0.0.1:8080        X-Retsu:0           LISTENING
  TCP    127.0.0.1:49670        X-Retsu:0           LISTENING
  TCP    192.168.1.2:139        X-Retsu:0           LISTENING
  TCP    192.168.1.2:51291       sa-in-f188:5228   ESTABLISHED
  TCP    192.168.1.2:51753       91.108.56.174:https ESTABLISHED
  TCP    192.168.1.2:58358       maa03s43-in-f3:https CLOSE_WAIT
  TCP    192.168.1.2:58000       20.197.71.89:https ESTABLISHED
  TCP    192.168.1.2:61625       maa03s45-in-f10:https TIME_WAIT
  TCP    192.168.1.2:61822       maa03s43-in-f3:https CLOSE_WAIT
  TCP    192.168.56.1:139        X-Retsu:0           LISTENING
  TCP    192.168.56.1:1521       192.63020          ESTABLISHED
  TCP    192.168.56.1:63020       192.1521          ESTABLISHED
  TCP    [::]:135              X-Retsu:0           LISTENING
  TCP    [::]:445              X-Retsu:0           LISTENING
  TCP    [::]:49664             X-Retsu:0           LISTENING
  TCP    [::]:49665             X-Retsu:0           LISTENING
  TCP    [::]:49666             X-Retsu:0           LISTENING
  TCP    [::]:49667             X-Retsu:0           LISTENING
  TCP    [::]:49668             X-Retsu:0           LISTENING
  TCP    [::]:49677             X-Retsu:0           LISTENING
  TCP    [::]:49669             X-Retsu:0           LISTENING
  UDP    0.0.0.0:5850            *:*
  UDP    0.0.0.0:5353            *:*
  UDP    0.0.0.0:5353            *:*
  UDP    0.0.0.0:5353            *:*
  UDP    0.0.0.0:5353            *:*
```

(2.) Identify and perform 5 more network commands and it's working.

i. ARP

The ARP command corresponds to the Address Resolution Protocol. Although it is easy to think of network communications in terms of IP addressing, packet delivery is ultimately dependent on the Media Access Control (MAC) address of the device's network adapter. This is where the Address Resolution Protocol comes into play. Its job is to map IP addresses to MAC addresses.

Windows devices maintain an ARP cache, which contains the results of recent ARP queries. You can see the contents of this cache by using the ARP -A command. If you are having problems communicating with one specific host, you can append the remote host's IP address to the ARP -A command.

```
Command Prompt
C:\Users\HP>arp -a

Interface: 192.168.1.2 --- 0x4
Internet Address      Physical Address      Type
192.168.1.1            e4-47-b3-97-18-88    dynamic
192.168.1.255          ff-ff-ff-ff-ff-ff    static
224.0.0.22              01-00-5e-00-00-16    static
224.0.0.251             01-00-5e-00-00-fb    static
224.0.0.252             01-00-5e-00-00-fc    static
239.255.255.250         01-00-5e-7f-ff-fa    static
255.255.255.255         ff-ff-ff-ff-ff-ff    static

Interface: 192.168.56.1 --- 0x12
Internet Address      Physical Address      Type
192.168.56.255         ff-ff-ff-ff-ff-ff    static
224.0.0.22              01-00-5e-00-00-16    static
224.0.0.251             01-00-5e-00-00-fb    static
224.0.0.252             01-00-5e-00-00-fc    static
239.255.255.250         01-00-5e-7f-ff-fa    static
255.255.255.255         ff-ff-ff-ff-ff-ff    static

C:\Users\HP>
```

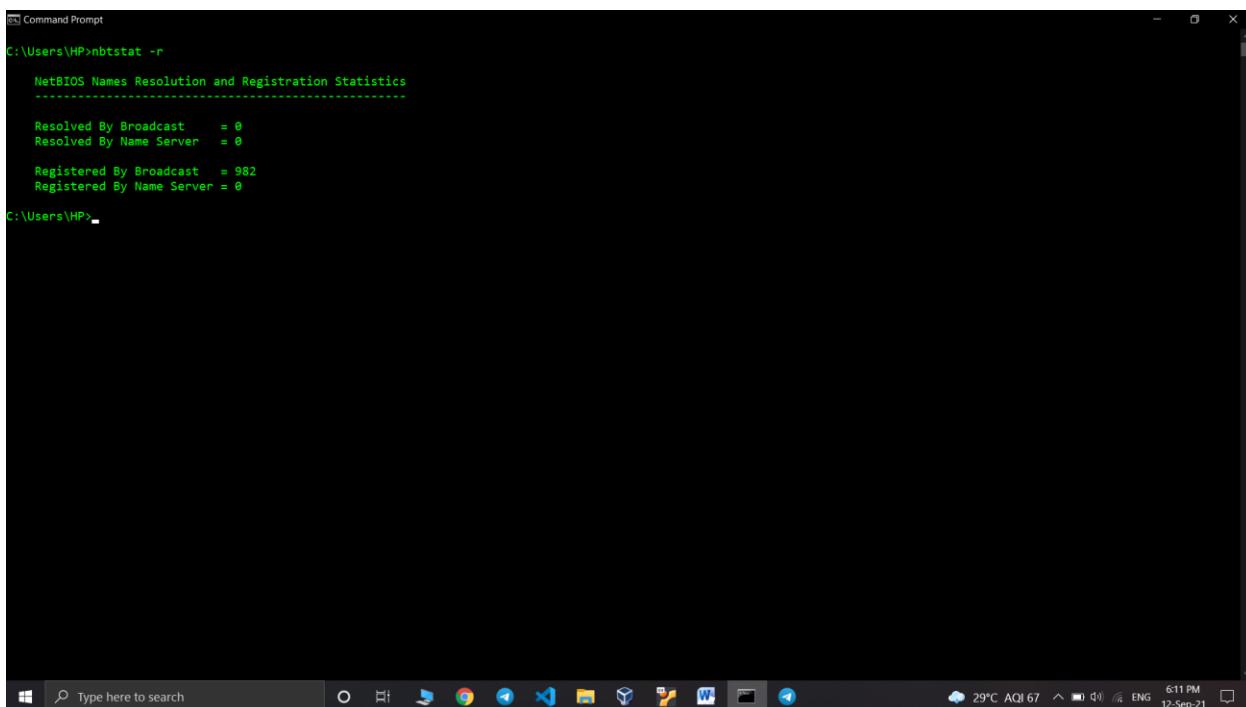
ii. NbtStat

As I am sure you probably know, computers that are running a Windows operating system are assigned a computer name. Oftentimes, there is a domain name or a workgroup name that is also assigned to the computer. The computer name is sometimes referred to as the NetBIOS name.

Windows uses several different methods to map NetBIOS names to IP addresses, such as broadcast, LMHost lookup, or even using the nearly extinct method of querying a WINS server.

Of course, NetBIOS over TCP/IP can occasionally break down. The NbtStat command can help you to diagnose and correct such problems. The NbtStat -n command for example, shows the NetBIOS names that are in use by a device.

The NbtStat -r command shows how many NetBIOS names the device has been able to resolve recently.



```
Command Prompt
C:\Users\HP>nbtstat -r
NetBIOS Names Resolution and Registration Statistics
-----
Resolved By Broadcast      = 0
Resolved By Name Server   = 0
Registered By Broadcast   = 982
Registered By Name Server = 0
C:\Users\HP>
```

The screenshot shows a Windows Command Prompt window titled "Command Prompt". The command "nbtstat -r" is entered at the prompt. The output displays NetBIOS Names Resolution and Registration Statistics. It shows that there have been 982 registrations by broadcast and 0 registrations by name server. There have been 0 resolutions by broadcast and 0 resolutions by name server. The taskbar at the bottom of the screen shows various pinned icons and the system tray with the date and time (12-Sep-21) and battery status.

iii. Hostname

The previously discussed NbtStat command can provide you with the host name that has been assigned to a Windows device, if you know which switch to use with the command. However, if you're just looking for a fast and easy way of verifying a computer's name, then try using the Hostname command.

Typing Hostname at the command prompt returns the local computer name.

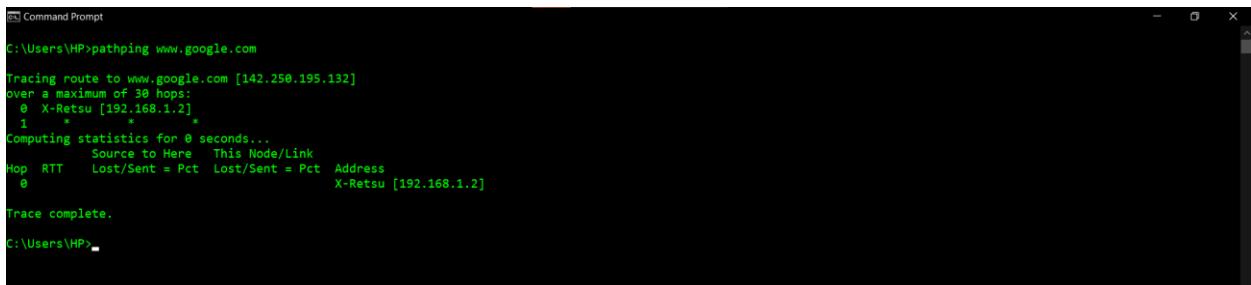


```
Command Prompt
C:\Users\HP>hostname
X-Retsu
C:\Users\HP>
```

iv. PathPing

Earlier, I talked about the Ping utility and the Tracert utility, and the similarities between them. As you might have guessed, the PathPing tool is a utility that combines the best aspects of Tracert and Ping.

Entering the PathPing command followed by a host name initiates what looks like a somewhat standard Tracert process. Once this process completes however, the tool takes 300 seconds (five minutes) to gather statistics, and then reports latency and packet loss statistics that are more detailed than those provided by Ping or Tracert.

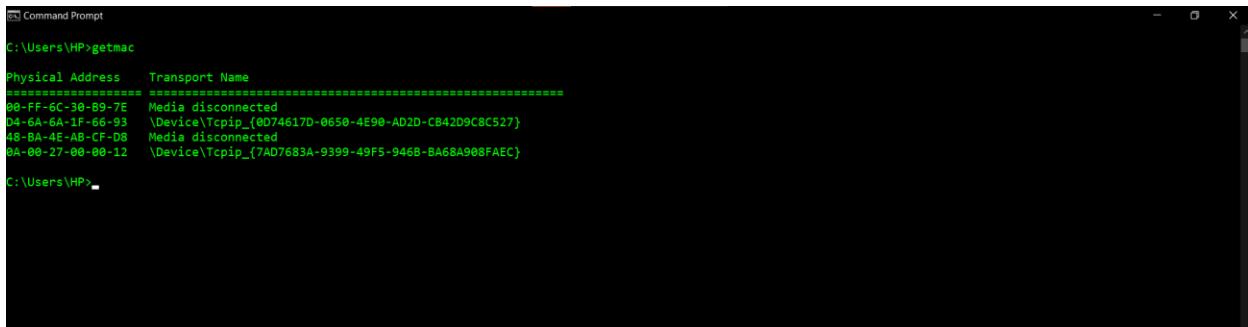


```
Command Prompt
C:\Users\HP>pathping www.google.com
Tracing route to www.google.com [142.250.195.132]
over a maximum of 38 hops:
  0  X-Retsu [192.168.1.2]
  1  *          *
Computing statistics for 0 seconds...
      Source to Here  This Node/Link
Hop  RTT    Lost/Sent = Pct  Lost/Sent = Pct  Address
  0          X-Retsu [192.168.1.2]

Trace complete.
C:\Users\HP>
```

v. getmac

Another very simple command that shows the MAC address of your network interfaces.



The screenshot shows a Windows Command Prompt window titled "Command Prompt". The command "getmac" is entered at the prompt. The output displays the physical MAC addresses and their corresponding transport names for three network interfaces. The first interface has a disconnected status and is associated with a specific GUID. The second interface is also disconnected and has a different GUID. The third interface is connected and has a standard MAC address.

Physical Address	Transport Name
00-FF-0C-3B-89-7E	Media disconnected \Device\Tcpip_{0D746170-0650-4E90-AD2D-CB42D9C8C527}
04-6A-6A-1F-66-93	Media disconnected
48-BA-4E-AB-CF-D8	\Device\Tcpip_{7AD7683A-9399-49F5-946B-BA68A908FAEC}
0A-00-27-00-00-12	