Network and System Administration Lab

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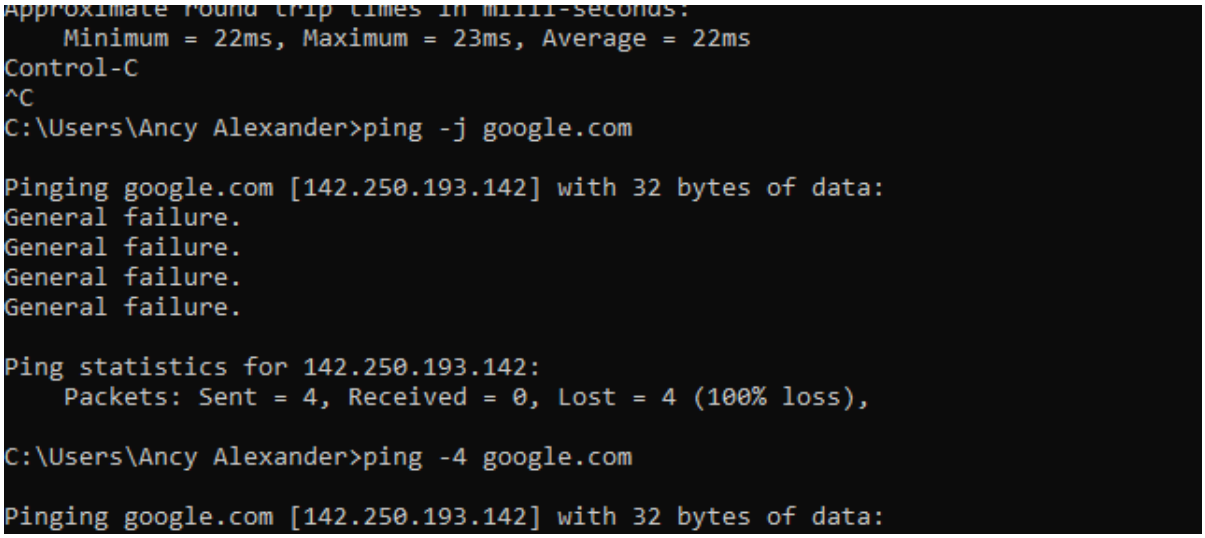
1.Try out these network commands in Window as well as in Linux and perform at least 4 options with each command: ping route traceroute, nslookup,Ip Config, NetStat .

Windows

- Ping

```
C:\Users\Ancy Alexander>ping google.com

Pinging google.com [142.250.193.142] with 32 bytes of data:
Reply from 142.250.193.142: bytes=32 time=31ms TTL=119
Reply from 142.250.193.142: bytes=32 time=41ms TTL=119
Reply from 142.250.193.142: bytes=32 time=40ms TTL=119
Reply from 142.250.193.142: bytes=32 time=47ms TTL=119

Ping statistics for 142.250.193.142:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 31ms, Maximum = 47ms, Average = 39ms

C:\Users\Ancy Alexander>ping -a google.com

Pinging google.com [142.250.193.142] with 32 bytes of data:
Reply from 142.250.193.142: bytes=32 time=23ms TTL=119
Reply from 142.250.193.142: bytes=32 time=23ms TTL=119
Reply from 142.250.193.142: bytes=32 time=23ms TTL=119
Reply from 142.250.193.142: bytes=32 time=22ms TTL=119

Ping statistics for 142.250.193.142:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 22ms, Maximum = 23ms, Average = 22ms

C:\Users\Ancy Alexander>ping -t google.com

Pinging google.com [142.250.193.142] with 32 bytes of data:
Reply from 142.250.193.142: bytes=32 time=22ms TTL=119
Reply from 142.250.193.142: bytes=32 time=22ms TTL=119
Reply from 142.250.193.142: bytes=32 time=23ms TTL=119
Reply from 142.250.193.142: bytes=32 time=23ms TTL=119
Reply from 142.250.193.142: bytes=32 time=22ms TTL=119
Reply from 142.250.193.142: bytes=32 time=22ms TTL=119
Reply from 142.250.193.142: bytes=32 time=22ms TTL=119
Reply from 142.250.193.142: bytes=32 time=22ms TTL=119
Reply from 142.250.193.142: bytes=32 time=23ms TTL=119
Reply from 142.250.193.142: bytes=32 time=22ms TTL=119
Reply from 142.250.193.142: bytes=32 time=23ms TTL=119
Reply from 142.250.193.142: bytes=32 time=23ms TTL=119
```


Approximate round trip times in milli-seconds:
Minimum = 22ms, Maximum = 23ms, Average = 22ms
Control-C
^C
C:\Users\Ancy Alexander>ping -j google.com
Pinging google.com [142.250.193.142] with 32 bytes of data:
General failure.
General failure.
General failure.
General failure.
Ping statistics for 142.250.193.142:
Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),
C:\Users\Ancy Alexander>ping -4 google.com
Pinging google.com [142.250.193.142] with 32 bytes of data:

- Route

Command Prompt

```
C:\Users\Ancy Alexander>route  print
===========================================================================
Interface List
 10...0a 00 27 00 00 0a ......VirtualBox Host-Only Ethernet Adapter
  7...52 5b c2 b6 5d b7 ......Microsoft Wi-Fi Direct Virtual Adapter #7
  3...62 5b c2 b6 5d b7 ......Microsoft Wi-Fi Direct Virtual Adapter #8
  9...50 5b c2 b6 5d b7 ......Qualcomm Atheros QCA9377 Wireless Network 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      192.168.1.6     50
        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       192.168.1.6    306
      192.168.1.6  255.255.255.255         On-link       192.168.1.6    306
    192.168.1.255  255.255.255.255         On-link       192.168.1.6    306
     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       192.168.1.6    306
  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       192.168.1.6    306
===========================================================================
Persistent Routes:
  None

IPv6 Route Table
===========================================================================
Active Routes:
 If Metric Network Destination      Gateway
  1    331 ::1/128                  On-link
 10    281 fe80::/64                On-link
  9    306 fe80::/64                On-link
  9    306 fe80::2c6e:6ec:fc63:6150/128
                                    On-link
```

```
  None

C:\Users\Ancy Alexander>route  print -4
===========================================================================
Interface List
 10...0a 00 27 00 00 0a ......VirtualBox Host-Only Ethernet Adapter
  7...52 5b c2 b6 5d b7 ......Microsoft Wi-Fi Direct Virtual Adapter #7
  3...62 5b c2 b6 5d b7 ......Microsoft Wi-Fi Direct Virtual Adapter #8
  9...50 5b c2 b6 5d b7 ......Qualcomm Atheros QCA9377 Wireless Network 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      192.168.1.6     50
        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       192.168.1.6    306
      192.168.1.6  255.255.255.255         On-link       192.168.1.6    306
    192.168.1.255  255.255.255.255         On-link       192.168.1.6    306
     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       192.168.1.6    306
  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       192.168.1.6    306
===========================================================================
Persistent Routes:
  None
  None

C:\Users\Ancy Alexander>route  print -6
===========================================================================
Interface List
 10...0a 00 27 00 00 0a ......VirtualBox Host-Only Ethernet Adapter
  7...52 5b c2 b6 5d b7 ......Microsoft Wi-Fi Direct Virtual Adapter #7
  3...62 5b c2 b6 5d b7 ......Microsoft Wi-Fi Direct Virtual Adapter #8
  9...50 5b c2 b6 5d b7 ......Qualcomm Atheros QCA9377 Wireless Network Adapter
  1...........................Software Loopback Interface 1
===========================================================================

IPv6 Route Table
===========================================================================
Active Routes:
 If Metric Network Destination      Gateway
  1    331 ::1/128                  On-link
 10    281 fe80::/64                On-link
  9    306 fe80::/64                On-link
  9    306 fe80::2c6e:6ec:fc63:6150/128
                                    On-link
 10    281 fe80::ccde:e978:30f0:b852/128
                                    On-link
  1    331 ff00::/8                 On-link
 10    281 ff00::/8                 On-link
  9    306 ff00::/8                 On-link
===========================================================================
Persistent Routes:
  None

C:\Users\Ancy Alexander>
```

```
C:\Users\Ancy Alexander>route  print *157
===========================================================================
Interface List
 10...0a 00 27 00 00 0a ......VirtualBox Host-Only Ethernet Adapter
  7...52 5b c2 b6 5d b7 ......Microsoft Wi-Fi Direct Virtual Adapter #7
  3...62 5b c2 b6 5d b7 ......Microsoft Wi-Fi Direct Virtual Adapter #8
  9...50 5b c2 b6 5d b7 ......Qualcomm Atheros QCA9377 Wireless Network 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\Ancy Alexander>
```

- Tracert

```
C:\Users\Ancy Alexander>tracert 192.168.1.1

Tracing route to EARTH-1010.bbrouter [192.168.1.1]
over a maximum of 30 hops:

  1     4 ms     4 ms     3 ms  EARTH-1010.bbrouter [192.168.1.1]

Trace complete.
```

```
C:\Users\Ancy Alexander>tracert 22.110.0.1

Tracing route to 22.110.0.1 over a maximum of 30 hops

  1     4 ms     7 ms     7 ms  EARTH-1010.bbrouter [192.168.1.1]
  2    15 ms    16 ms    21 ms  100.86.96.1
  3    21 ms    22 ms    21 ms  nsg-static-241.228.72.182.airtel.in [182.72.228.241]
  4   217 ms   217 ms   217 ms  116.119.52.163
  5   235 ms   302 ms   237 ms  ve951.core2.nyc6.he.net [184.105.64.178]
  6   247 ms   248 ms   248 ms  100ge13-1.core1.nyc4.he.net [184.105.64.177]
  7   244 ms   244 ms   244 ms  100ge16-1.core1.ash1.he.net [184.105.223.165]
  8   251 ms   252 ms   250 ms  100ge5-1.core2.ash1.he.net [72.52.92.226]
  9     *        *        *     Request timed out.
 10     *        *        *     Request timed out.
 11     *        *        *     Request timed out.
 12     *        *        *     Request timed out.
 13     *        *        *     Request timed out.
 14     *        *        *     Request timed out.
 15     *        *        *     Request timed out.
 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\Ancy Alexander>tracert google.com

Tracing route to google.com [142.250.193.142]
over a maximum of 30 hops:

  1     4 ms     3 ms     4 ms  EARTH-1010.bbrouter [192.168.1.1]
  2     9 ms     8 ms     9 ms  100.86.96.1
  3    34 ms    23 ms    24 ms  10.1.6.18
  4    24 ms    23 ms    23 ms  72.14.212.92
  5    24 ms    23 ms    23 ms  216.239.54.67
  6    23 ms    22 ms    22 ms  142.251.55.225
  7    22 ms    23 ms    22 ms  maa05s25-in-f14.1e100.net [142.250.193.142]

Trace complete.
```

```
C:\Users\Ancy Alexander>tracert www.facebook.com

Tracing route to star-mini.c10r.facebook.com [157.240.192.35]
over a maximum of 30 hops:

  1     3 ms     4 ms     4 ms  EARTH-1010.bbrouter [192.168.1.1]
  2     8 ms     6 ms     6 ms  100.86.96.1
  3    23 ms    24 ms    26 ms  10.1.6.18
  4    23 ms    23 ms    23 ms  as32934.maa.extreme-ix.net [45.120.251.139]
  5    23 ms    25 ms    24 ms  po102.psw01.maa2.tfbnw.net [129.134.34.151]
  6    22 ms    22 ms    23 ms  173.252.67.235
  7    23 ms    22 ms    22 ms  edge-star-mini-shv-02-maa2.facebook.com [157.240.192.35]

Trace complete.
```

- Nslookup

```
C:\Users\Ancy Alexander>nslookup
Default Server:  EARTH-1010.bbrouter
Address:  192.168.1.1

> exit

C:\Users\Ancy Alexander>
```

```
C:\Users\Ancy Alexander>nslookup google.com
Server:  EARTH-1010.bbrouter
Address:  192.168.1.1

Non-authoritative answer:
Name:    google.com
Addresses:  2404:6800:4007:820::200e
          142.250.193.142
```

```
C:\Users\Ancy Alexander>nslookup -q=MX google.com
Server:  EARTH-1010.bbrouter
Address:  192.168.1.1

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

C:\Users\Ancy Alexander>
```

```
C:\Users\Ancy Alexander>nslookup -type=ns google.com
Server:  EARTH-1010.bbrouter
Address:  192.168.1.1

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

- Ipconfig

```
C:\Users\Ancy Alexander>ipconfig

Windows IP Configuration


Ethernet adapter VirtualBox Host-Only Network:

   Connection-specific DNS Suffix  . :
   Link-local IPv6 Address . . . . . : fe80::ccde:e978:30f0:b852%10
   IPv4 Address. . . . . . . . . . . : 192.168.56.1
   Subnet Mask . . . . . . . . . . . : 255.255.255.0
   Default Gateway . . . . . . . . . :

Wireless LAN adapter Local Area Connection* 15:

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

Wireless LAN adapter Local Area Connection* 16:

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

Wireless LAN adapter Wi-Fi:

   Connection-specific DNS Suffix  . : bbrouter
   Link-local IPv6 Address . . . . . : fe80::2c6e:6ec:fc63:6150%9
   IPv4 Address. . . . . . . . . . . : 192.168.1.6
   Subnet Mask . . . . . . . . . . . : 255.255.255.0
   Default Gateway . . . . . . . . . : 192.168.1.1
```

```
   Default Gateway . . . . . . . . . : 192.168.1.1

C:\Users\Ancy Alexander>ipconfig /allcompartments

Windows IP Configuration


================================================================================
Network Information for Compartment 1 (ACTIVE)
================================================================================

Ethernet adapter VirtualBox Host-Only Network:

   Connection-specific DNS Suffix  . :
   Link-local IPv6 Address . . . . . : fe80::ccde:e978:30f0:b852%10
   IPv4 Address. . . . . . . . . . . : 192.168.56.1
   Subnet Mask . . . . . . . . . . . : 255.255.255.0
   Default Gateway . . . . . . . . . :

Wireless LAN adapter Local Area Connection* 15:

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

Wireless LAN adapter Local Area Connection* 16:

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

Wireless LAN adapter Wi-Fi:

   Connection-specific DNS Suffix  . : bbrouter
   Link-local IPv6 Address . . . . . : fe80::2c6e:6ec:fc63:6150%9
   IPv4 Address. . . . . . . . . . . : 192.168.1.6
   Subnet Mask . . . . . . . . . . . : 255.255.255.0
   Default Gateway . . . . . . . . . : 192.168.1.1
```

```
C:\Users\Ancy Alexander>ipconfig /displaydns

Windows IP Configuration

    1.0.0.127.in-addr.arpa
    ----------------------------------------
    Record Name . . . . . : 1.0.0.127.in-addr.arpa.
    Record Type . . . . . : 12
    Time To Live  . . . . : 245962
    Data Length . . . . . : 8
    Section . . . . . . . : Answer
    PTR Record  . . . . . : localhost


    178.64.105.184.in-addr.arpa
    ----------------------------------------
    Record Name . . . . . : 178.64.105.184.in-addr.arpa
    Record Type . . . . . : 12
    Time To Live  . . . . : 20692
    Data Length . . . . . : 8
    Section . . . . . . . : Answer
    PTR Record  . . . . . : ve951.core2.nyc6.he.net


    177.64.105.184.in-addr.arpa
    ----------------------------------------
    Record Name . . . . . : 177.64.105.184.in-addr.arpa
    Record Type . . . . . : 12
    Time To Live  . . . . : 20287
    Data Length . . . . . : 8
    Section . . . . . . . : Answer
    PTR Record  . . . . . : 100ge13-1.core1.nyc4.he.net


    165.223.105.184.in-addr.arpa
    ----------------------------------------
    Record Name . . . . . : 165.223.105.184.in-addr.arpa
    Record Type . . . . . : 12
    Time To Live  . . . . : 20374
    Data Length . . . . . : 8
    Section . . . . . . . : Answer
```

KAJ

```
C:\Users\Ancy Alexander>ipconfig /release

Windows IP Configuration

No operation can be performed on Local Area Connection* 15 while it has its media disconnected.
No operation can be performed on Local Area Connection* 16 while it has its media disconnected.

Ethernet adapter VirtualBox Host-Only Network:

   Connection-specific DNS Suffix  . :
   Link-local IPv6 Address . . . . . : fe80::ccde:e978:30f0:b852%10
   IPv4 Address. . . . . . . . . . . : 192.168.56.1
   Subnet Mask . . . . . . . . . . . : 255.255.255.0
   Default Gateway . . . . . . . . . :

Wireless LAN adapter Local Area Connection* 15:

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

Wireless LAN adapter Local Area Connection* 16:

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

Wireless LAN adapter Wi-Fi:

   Connection-specific DNS Suffix  . :
   Link-local IPv6 Address . . . . . : fe80::2c6e:6ec:fc63:6150%9
   Default Gateway . . . . . . . . . :
```

- Netstat

```
C:\Users\Ancy Alexander>netstat

Active Connections

  Proto  Local Address          Foreign Address        State
  TCP    192.168.1.6:62291      20.198.162.78:https    ESTABLISHED
  TCP    192.168.1.6:62292      40.119.205.193:https   TIME_WAIT
  TCP    192.168.1.6:62294      maa05s28-in-f1:https   ESTABLISHED
  TCP    192.168.1.6:62295      40.119.205.193:https   TIME_WAIT
  TCP    192.168.1.6:62296      40.119.205.193:https   TIME_WAIT
  TCP    192.168.1.6:62297      40.119.205.193:https   TIME_WAIT
  TCP    192.168.1.6:62300      103.154.36.35:7747     SYN_SENT
  TCP    192.168.1.6:62300      relay-3e92535d:http    ESTABLISHED
^C
```

```
C:\Users\Ancy Alexander>netstat -n 5

Active Connections

  Proto  Local Address          Foreign Address        State
  TCP    192.168.1.6:62291      20.198.162.78:443      ESTABLISHED
  TCP    192.168.1.6:62294      142.250.205.225:443    CLOSE_WAIT
  TCP    192.168.1.6:62300      168.119.147.171:80     ESTABLISHED
  TCP    192.168.1.6:62307      104.115.92.10:443      ESTABLISHED
  TCP    192.168.1.6:62308      20.190.145.141:443     TIME_WAIT
  TCP    192.168.1.6:62310      184.31.215.15:80       TIME_WAIT
  TCP    192.168.1.6:62311      20.44.229.112:443      TIME_WAIT
  TCP    192.168.1.6:62312      20.44.229.112:443      ESTABLISHED

Active Connections

  Proto  Local Address          Foreign Address        State
  TCP    192.168.1.6:62291      20.198.162.78:443      ESTABLISHED
  TCP    192.168.1.6:62294      142.250.205.225:443    CLOSE_WAIT
  TCP    192.168.1.6:62300      168.119.147.171:80     ESTABLISHED
  TCP    192.168.1.6:62307      104.115.92.10:443      ESTABLISHED
  TCP    192.168.1.6:62308      20.190.145.141:443     TIME_WAIT
  TCP    192.168.1.6:62310      184.31.215.15:80       TIME_WAIT
  TCP    192.168.1.6:62311      20.44.229.112:443      TIME_WAIT
  TCP    192.168.1.6:62312      20.44.229.112:443      ESTABLISHED

Active Connections

  Proto  Local Address          Foreign Address        State
```

```
C:\Users\Ancy Alexander>netstat -n

Active Connections

  Proto  Local Address          Foreign Address        State
  TCP    192.168.1.6:62291      20.198.162.78:443      ESTABLISHED
  TCP    192.168.1.6:62294      142.250.205.225:443    ESTABLISHED
  TCP    192.168.1.6:62300      168.119.147.171:80     ESTABLISHED
  TCP    192.168.1.6:62307      104.115.92.10:443      ESTABLISHED
  TCP    192.168.1.6:62308      20.190.145.141:443     ESTABLISHED
  TCP    192.168.1.6:62309      52.182.143.210:443     TIME_WAIT
  TCP    192.168.1.6:62310      184.31.215.15:80       ESTABLISHED
  TCP    192.168.1.6:62311      20.44.229.112:443      ESTABLISHED
```

```
C:\Users\Ancy Alexander>netstat -a

Active Connections

  Proto  Local Address          Foreign Address        State
  TCP    0.0.0.0:80             LAPTOP-91K4TH1P:0      LISTENING
  TCP    0.0.0.0:135            LAPTOP-91K4TH1P:0      LISTENING
  TCP    0.0.0.0:443            LAPTOP-91K4TH1P:0      LISTENING
  TCP    0.0.0.0:445            LAPTOP-91K4TH1P:0      LISTENING
  TCP    0.0.0.0:3306           LAPTOP-91K4TH1P:0      LISTENING
  TCP    0.0.0.0:5040           LAPTOP-91K4TH1P:0      LISTENING
  TCP    0.0.0.0:7070           LAPTOP-91K4TH1P:0      LISTENING
  TCP    0.0.0.0:49664          LAPTOP-91K4TH1P:0      LISTENING
  TCP    0.0.0.0:49665          LAPTOP-91K4TH1P:0      LISTENING
  TCP    0.0.0.0:49666          LAPTOP-91K4TH1P:0      LISTENING
  TCP    0.0.0.0:49667          LAPTOP-91K4TH1P:0      LISTENING
  TCP    0.0.0.0:49668          LAPTOP-91K4TH1P:0      LISTENING
  TCP    0.0.0.0:49675          LAPTOP-91K4TH1P:0      LISTENING
  TCP    0.0.0.0:62300          LAPTOP-91K4TH1P:0      LISTENING
  TCP    192.168.1.6:139        LAPTOP-91K4TH1P:0      LISTENING
  TCP    192.168.1.6:62291      20.198.162.78:https    ESTABLISHED
  TCP    192.168.1.6:62294      maa05s28-in-f1:https   CLOSE_WAIT
  TCP    192.168.1.6:62300      relay-3e92535d:http    ESTABLISHED
  TCP    192.168.1.6:62307      a104-115-92-10:https   ESTABLISHED
  TCP    192.168.1.6:62310      a184-31-215-15:http    TIME_WAIT
  TCP    192.168.1.6:62311      20.44.229.112:https    TIME_WAIT
  TCP    192.168.1.6:62312      20.44.229.112:https    TIME_WAIT
  TCP    192.168.1.6:62313      20.44.229.112:https    ESTABLISHED
  TCP    192.168.56.1:139       LAPTOP-91K4TH1P:0      LISTENING
  TCP    [::]:80                LAPTOP-91K4TH1P:0      LISTENING
  TCP    [::]:135               LAPTOP-91K4TH1P:0      LISTENING
  TCP    [::]:443               LAPTOP-91K4TH1P:0      LISTENING
  TCP    [::]:445               LAPTOP-91K4TH1P:0      LISTENING
  TCP    [::]:3306              LAPTOP-91K4TH1P:0      LISTENING
  TCP    [::]:49664             LAPTOP-91K4TH1P:0      LISTENING
  TCP    [::]:49665             LAPTOP-91K4TH1P:0      LISTENING
```

Linux

- Ping

```
ancya@ancya-VirtualBox:~$ ping google.com
PING google.com (142.250.193.142) 56(84) bytes of data.
64 bytes from maa05s25-in-f14.1e100.net (142.250.193.142): icmp_seq=1 ttl=118 t
ime=25.1 ms
64 bytes from maa05s25-in-f14.1e100.net (142.250.193.142): icmp_seq=2 ttl=118 t
ime=42.2 ms
64 bytes from maa05s25-in-f14.1e100.net (142.250.193.142): icmp_seq=3 ttl=118 t
ime=25.3 ms
64 bytes from maa05s25-in-f14.1e100.net (142.250.193.142): icmp_seq=4 ttl=118 t
ime=23.8 ms
64 bytes from maa05s25-in-f14.1e100.net (142.250.193.142): icmp_seq=5 ttl=118 t
ime=24.6 ms
64 bytes from maa05s25-in-f14.1e100.net (142.250.193.142): icmp_seq=6 ttl=118 t
ime=23.3 ms
64 bytes from maa05s25-in-f14.1e100.net (142.250.193.142): icmp_seq=7 ttl=118 t
ime=24.4 ms
^C
--- google.com ping statistics ---
7 packets transmitted, 7 received, 0% packet loss, time 6010ms
rtt min/avg/max/mdev = 23.311/26.951/42.168/6.244 ms
ancya@ancya-VirtualBox:~$
```

```
PING google.com (142.250.193.142) 56(84) bytes of data.
64 bytes from maa05s25-in-f14.1e100.net (142.250.193.142): icmp_seq=1 ttl=118 t
ime=23.5 ms
64 bytes from maa05s25-in-f14.1e100.net (142.250.193.142): icmp_seq=2 ttl=118 t
ime=24.3 ms
64 bytes from maa05s25-in-f14.1e100.net (142.250.193.142): icmp_seq=3 ttl=118 t
ime=24.6 ms
64 bytes from maa05s25-in-f14.1e100.net (142.250.193.142): icmp_seq=4 ttl=118 t
ime=24.9 ms
64 bytes from maa05s25-in-f14.1e100.net (142.250.193.142): icmp_seq=5 ttl=118 t
ime=24.4 ms
64 bytes from maa05s25-in-f14.1e100.net (142.250.193.142): icmp_seq=6 ttl=118 t
ime=24.1 ms
64 bytes from maa05s25-in-f14.1e100.net (142.250.193.142): icmp_seq=7 ttl=118 t
ime=23.5 ms
64 bytes from maa05s25-in-f14.1e100.net (142.250.193.142): icmp_seq=8 ttl=118 t
ime=23.9 ms
64 bytes from maa05s25-in-f14.1e100.net (142.250.193.142): icmp_seq=9 ttl=118 t
ime=23.7 ms
^C
--- google.com ping statistics ---
9 packets transmitted, 9 received, 0% packet loss, time 8010ms
```

```
ancya@ancya-VirtualBox:~$ ping -V
ping from iputils 20210202
ancya@ancya-VirtualBox:~$
```

```
ancya@ancya-VirtualBox:~$ ping -b google.com
PING google.com (142.250.195.206) 56(84) bytes of data.
64 bytes from maa03s42-in-f14.1e100.net (142.250.195.206): icmp_seq=1 ttl=118 t
ime=24.1 ms
64 bytes from maa03s42-in-f14.1e100.net (142.250.195.206): icmp_seq=2 ttl=118 t
ime=24.4 ms
64 bytes from maa03s42-in-f14.1e100.net (142.250.195.206): icmp_seq=3 ttl=118 t
ime=24.3 ms
64 bytes from maa03s42-in-f14.1e100.net (142.250.195.206): icmp_seq=4 ttl=118 t
ime=24.3 ms
64 bytes from maa03s42-in-f14.1e100.net (142.250.195.206): icmp_seq=5 ttl=118 t
ime=23.5 ms
64 bytes from maa03s42-in-f14.1e100.net (142.250.195.206): icmp_seq=6 ttl=118 t
ime=23.2 ms
64 bytes from maa03s42-in-f14.1e100.net (142.250.195.206): icmp_seq=7 ttl=118 t
ime=32.1 ms
64 bytes from maa03s42-in-f14.1e100.net (142.250.195.206): icmp_seq=8 ttl=118 t
ime=24.2 ms
64 bytes from maa03s42-in-f14.1e100.net (142.250.195.206): icmp_seq=9 ttl=118 t
ime=24.2 ms
^C
--- google.com ping statistics ---
9 packets transmitted, 9 received, 0% packet loss, time 8011ms
rtt min/avg/max/mdev = 23.249/24.941/32.098/2.558 ms
ancya@ancya-VirtualBox:~$
```

- Route

```
ancya@ancya-VirtualBox:~$ route
Kernel IP routing table
Destination     Gateway         Genmask         Flags Metric Ref    Use Iface
default         _gateway        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
ancya@ancya-VirtualBox:~$
```

```
ancya@ancya-VirtualBox:~$ 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
ancya@ancya-VirtualBox:~$
```

```
ancya@ancya-VirtualBox:~$ route -Cn
Kernel IP routing cache
Source          Destination     Gateway         Flags Metric Ref    Use Iface
ancya@ancya-VirtualBox:~$
```

```
ancya@ancya-VirtualBox:~$ ip route
default via 10.0.2.2 dev enp0s3 proto dhcp metric 100
10.0.2.0/24 dev enp0s3 proto kernel scope link src 10.0.2.15 metric 100
169.254.0.0/16 dev enp0s3 scope link metric 1000
ancya@ancya-VirtualBox:~$
```

- Traceroute

```
ancya@ancya-VirtualBox:~$ traceroute google.com
traceroute to google.com (142.250.193.142), 64 hops max
  1   10.0.2.2  0.430ms  0.332ms  0.288ms
  2   *  *  *
  3   *  *  *
  4   *  *  *
  5   *  *  *
  6   *  *  *
  7   *  *  *
  8   *  *  *
  9   *  *  *
 10   *  *  *
 11   *  *  *
 12   *  *  *
 13   *  *  *
 14   *  *  *
 15   *  *  *
 16   *  *  *
 17   *  *  *
 18   *  *  *
 19   *  *  *
 20   *  *  *
 21   *  *  *
 22   *  *  *
 23   *  *  *
```

```
ancya@ancya-VirtualBox:~$ traceroute -V
traceroute (GNU inetutils) 2.0
Copyright (C) 2021 Free Software Foundation, Inc.
License GPLv3+: GNU GPL version 3 or later <https://gnu.org/licenses/gpl.html>.
This is free software: you are free to change and redistribute it.
There is NO WARRANTY, to the extent permitted by law.

Written by Elian Gidoni.
ancya@ancya-VirtualBox:~$
```

```
ancya@ancya-VirtualBox:~$ traceroute --port=PORT
traceroute: invalid port number `PORT'
ancya@ancya-VirtualBox:~$ nslookup google.com
Server:         127.0.0.53
Address:        127.0.0.53#53

Non-authoritative answer:
Name:   google.com
Address: 142.250.195.206
Name:   google.com
Address: 2404:6800:4007:820::200e

ancya@ancya-VirtualBox:~$
```

- NSlookup

```
ancya@ancya-VirtualBox:~$ nslookup -q-MX  google.com
*** Invalid option: q-MX
Server:         127.0.0.53
Address:        127.0.0.53#53

Non-authoritative answer:
Name:   google.com
Address: 142.250.195.238
Name:   google.com
Address: 2404:6800:4007:820::200e
```

```
ancya@ancya-VirtualBox:~$ nslookup -type=soa  google.com
Server:         127.0.0.53
Address:        127.0.0.53#53

Non-authoritative answer:
google.com
        origin = ns1.google.com
        mail addr = dns-admin.google.com
        serial = 396194125
        refresh = 900
        retry = 900
        expire = 1800
        minimum = 60

Authoritative answers can be found from:

ancya@ancya-VirtualBox:~$
```

```
ancya@ancya-VirtualBox:~$ nslookup -type=a  google.com
Server:         127.0.0.53
Address:        127.0.0.53#53

Non-authoritative answer:
Name:   google.com
Address: 142.250.195.238

ancya@ancya-VirtualBox:~$
```

- Ifconfig

```
ancya@ancya-VirtualBox:~$ ifconfig
enp0s3: flags=4163<UP,BROADCAST,RUNNING,MULTICAST>  mtu 1500
        inet 10.0.2.15  netmask 255.255.255.0  broadcast 10.0.2.255
        inet6 fe80::f90c:bb69:56b1:caf5  prefixlen 64  scopeid 0x20<link>
        ether 08:00:27:e0:95:e6  txqueuelen 1000  (Ethernet)
        RX packets 616  bytes 211788 (211.7 KB)
        RX errors 0  dropped 0  overruns 0  frame 0
        TX packets 759  bytes 95622 (95.6 KB)
        TX errors 0  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 397  bytes 40062 (40.0 KB)
        RX errors 0  dropped 0  overruns 0  frame 0
        TX packets 397  bytes 40062 (40.0 KB)
        TX errors 0  dropped 0 overruns 0  carrier 0  collisions 0

ancya@ancya-VirtualBox:~$
```

```
        TX errors 0  dropped 0 overruns 0  carrier 0  collisions 0

ancya@ancya-VirtualBox:~$ ifconfig -a
enp0s3: flags=4163<UP,BROADCAST,RUNNING,MULTICAST>  mtu 1500
        inet 10.0.2.15  netmask 255.255.255.0  broadcast 10.0.2.255
        inet6 fe80::f90c:bb69:56b1:caf5  prefixlen 64  scopeid 0x20<link>
        ether 08:00:27:e0:95:e6  txqueuelen 1000  (Ethernet)
        RX packets 616  bytes 211788 (211.7 KB)
        RX errors 0  dropped 0  overruns 0  frame 0
        TX packets 759  bytes 95622 (95.6 KB)
        TX errors 0  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 397  bytes 40062 (40.0 KB)
        RX errors 0  dropped 0  overruns 0  frame 0
        TX packets 397  bytes 40062 (40.0 KB)
        TX errors 0  dropped 0 overruns 0  carrier 0  collisions 0

ancya@ancya-VirtualBox:~$
```

```
ancya@ancya-VirtualBox:~$ ifconfig -s
Iface      MTU    RX-OK RX-ERR RX-DRP RX-OVR    TX-OK TX-ERR TX-DRP TX-OVR Flg
enp0s3    1500      622      0      0 0           765      0      0      0 BMRU
lo       65536      397      0      0 0           397      0      0      0 LRU
ancya@ancya-VirtualBox:~$
```

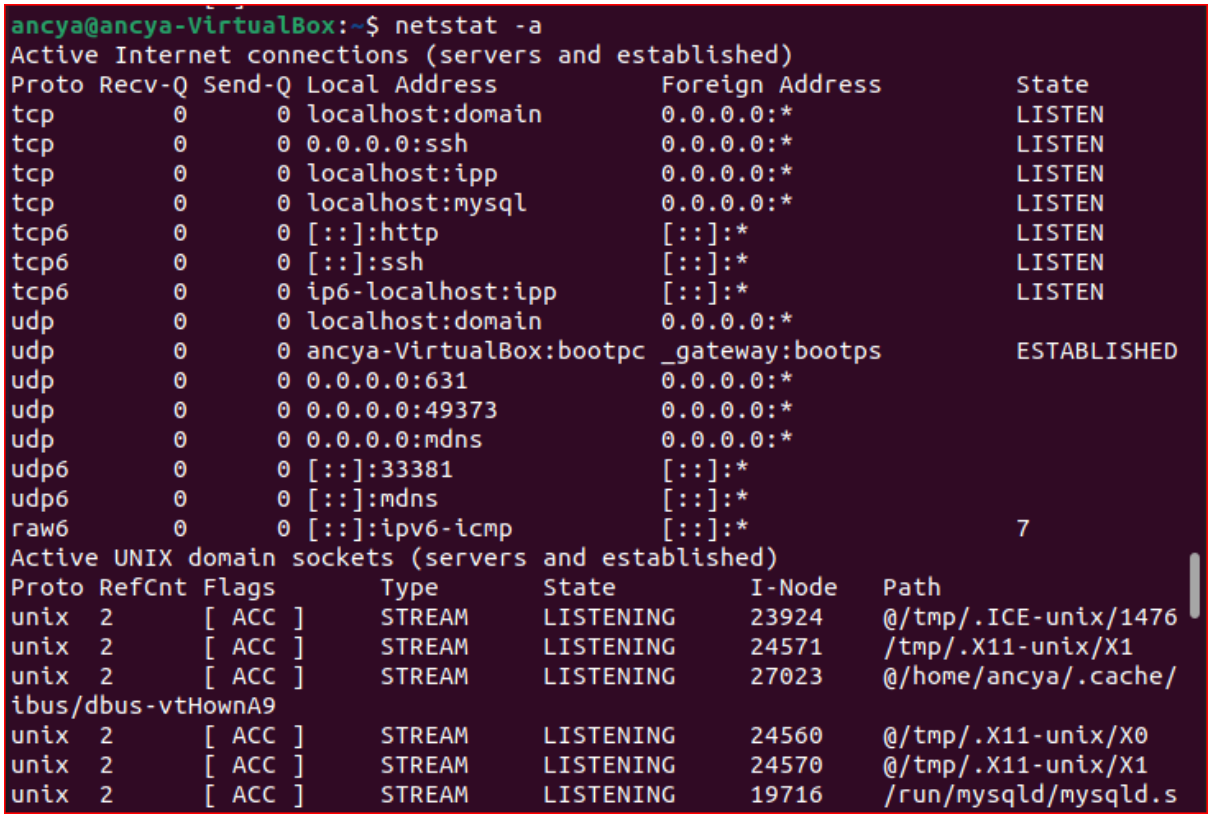
```
ancya@ancya-VirtualBox:~$ ifconfig -v
enp0s3: flags=4163<UP,BROADCAST,RUNNING,MULTICAST>  mtu 1500
        inet 10.0.2.15  netmask 255.255.255.0  broadcast 10.0.2.255
        inet6 fe80::f90c:bb69:56b1:caf5  prefixlen 64  scopeid 0x20<link>
        ether 08:00:27:e0:95:e6  txqueuelen 1000  (Ethernet)
        RX packets 622  bytes 212367 (212.3 KB)
        RX errors 0  dropped 0  overruns 0  frame 0
        TX packets 765  bytes 96106 (96.1 KB)
        TX errors 0  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 397  bytes 40062 (40.0 KB)
        RX errors 0  dropped 0  overruns 0  frame 0
        TX packets 397  bytes 40062 (40.0 KB)
        TX errors 0  dropped 0 overruns 0  carrier 0  collisions 0

ancya@ancya-VirtualBox:~$
```

- Netstat

```
ancya@ancya-VirtualBox:~$ netstat
Active Internet connections (w/o servers)
Proto Recv-Q Send-Q Local Address           Foreign Address         State
udp        0      0 ancya-VirtualBox:bootpc _gateway:bootps         ESTABLISHED
Active UNIX domain sockets (w/o servers)
Proto RefCnt Flags       Type       State         I-Node   Path
unix  2      [ ]         DGRAM                    22583    /run/user/1000/syste
md/notify
unix  3      [ ]         DGRAM                    15447    /run/systemd/notify
unix  2      [ ]         DGRAM                    15461    /run/systemd/journal
/syslog
unix  18     [ ]         DGRAM                    15470    /run/systemd/journal
/dev-log
unix  8      [ ]         DGRAM                    15472    /run/systemd/journal
/socket
unix  3      [ ]         STREAM     CONNECTED     25828
unix  3      [ ]         STREAM     CONNECTED     23823
unix  3      [ ]         STREAM     CONNECTED     22631    /run/systemd/journal
/stdout
unix  3      [ ]         STREAM     CONNECTED     17549
unix  3      [ ]         STREAM     CONNECTED     25739    /run/systemd/journal
/stdout
unix  2      [ ]         DGRAM                    15821
unix  3      [ ]         STREAM     CONNECTED     28881    /run/systemd/journal
/stdout
unix  3      [ ]         STREAM     CONNECTED     25779    /run/user/1000/bus
unix  3      [ ]         STREAM     CONNECTED     27519
unix  3      [ ]         STREAM     CONNECTED     27181
unix  3      [ ]         STREAM     CONNECTED     25861    /run/user/1000/bus
```

```
ancya@ancya-VirtualBox:~$ 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                    22583    /run/user/1000/syste
md/notify
unix  3      [ ]         DGRAM                    15447    /run/systemd/notify
unix  2      [ ]         DGRAM                    15461    /run/systemd/journal
/syslog
unix  18     [ ]         DGRAM                    15470    /run/systemd/journal
/dev-log
unix  8      [ ]         DGRAM                    15472    /run/systemd/journal
/socket
unix  3      [ ]         STREAM     CONNECTED     25828
unix  3      [ ]         STREAM     CONNECTED     23823
unix  3      [ ]         STREAM     CONNECTED     22631    /run/systemd/journal
/stdout
unix  3      [ ]         STREAM     CONNECTED     17549
unix  3      [ ]         STREAM     CONNECTED     25739    /run/systemd/journal
/stdout
unix  2      [ ]         DGRAM                    15821
unix  3      [ ]         STREAM     CONNECTED     28881    /run/systemd/journal
/stdout
unix  3      [ ]         STREAM     CONNECTED     25779    /run/user/1000/bus
unix  3      [ ]         STREAM     CONNECTED     27519
unix  3      [ ]         STREAM     CONNECTED     27181
unix  3      [ ]         STREAM     CONNECTED     25861    /run/user/1000/bus
```

```
ancya@ancya-VirtualBox:~$ netstat -n 5
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                    22583    /run/user/1000/syste
md/notify
unix  3      [ ]         DGRAM                    15447    /run/systemd/notify
unix  2      [ ]         DGRAM                    15461    /run/systemd/journal
/syslog
unix  18     [ ]         DGRAM                    15470    /run/systemd/journal
/dev-log
unix  8      [ ]         DGRAM                    15472    /run/systemd/journal
/socket
unix  3      [ ]         STREAM     CONNECTED     25828
unix  3      [ ]         STREAM     CONNECTED     23823
unix  3      [ ]         STREAM     CONNECTED     22631    /run/systemd/journal
/stdout
unix  3      [ ]         STREAM     CONNECTED     17549
unix  3      [ ]         STREAM     CONNECTED     25739    /run/systemd/journal
/stdout
unix  2      [ ]         DGRAM                    15821
unix  3      [ ]         STREAM     CONNECTED     28881    /run/systemd/journal
/stdout
unix  3      [ ]         STREAM     CONNECTED     25779    /run/user/1000/bus
unix  3      [ ]         STREAM     CONNECTED     27519
unix  3      [ ]         STREAM     CONNECTED     27181
```



```
ancya@ancya-VirtualBox:~$ 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:*               LISTEN
tcp        0      0 0.0.0.0:ssh             0.0.0.0:*               LISTEN
tcp        0      0 localhost:ipp           0.0.0.0:*               LISTEN
tcp        0      0 localhost:mysql         0.0.0.0:*               LISTEN
tcp6       0      0 [::]:http               [::]:*                  LISTEN
tcp6       0      0 [::]:ssh                [::]:*                  LISTEN
tcp6       0      0 ip6-localhost:ipp       [::]:*                  LISTEN
udp        0      0 localhost:domain        0.0.0.0:*
udp        0      0 ancya-VirtualBox:bootpc _gateway:bootps         ESTABLISHED
udp        0      0 0.0.0.0:631             0.0.0.0:*
udp        0      0 0.0.0.0:49373           0.0.0.0:*
udp        0      0 0.0.0.0:mdns            0.0.0.0:*
udp6       0      0 [::]:33381              [::]:*
udp6       0      0 [::]:mdns               [::]:*
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     23924    @/tmp/.ICE-unix/1476
unix  2      [ ACC ]     STREAM     LISTENING     24571    /tmp/.X11-unix/X1
unix  2      [ ACC ]     STREAM     LISTENING     27023    @/home/ancya/.cache/
ibus/dbus-vtHownA9
unix  2      [ ACC ]     STREAM     LISTENING     24560    @/tmp/.X11-unix/X0
unix  2      [ ACC ]     STREAM     LISTENING     24570    @/tmp/.X11-unix/X1
unix  2      [ ACC ]     STREAM     LISTENING     19716    /run/mysqld/mysqld.s
```

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

a). ARP

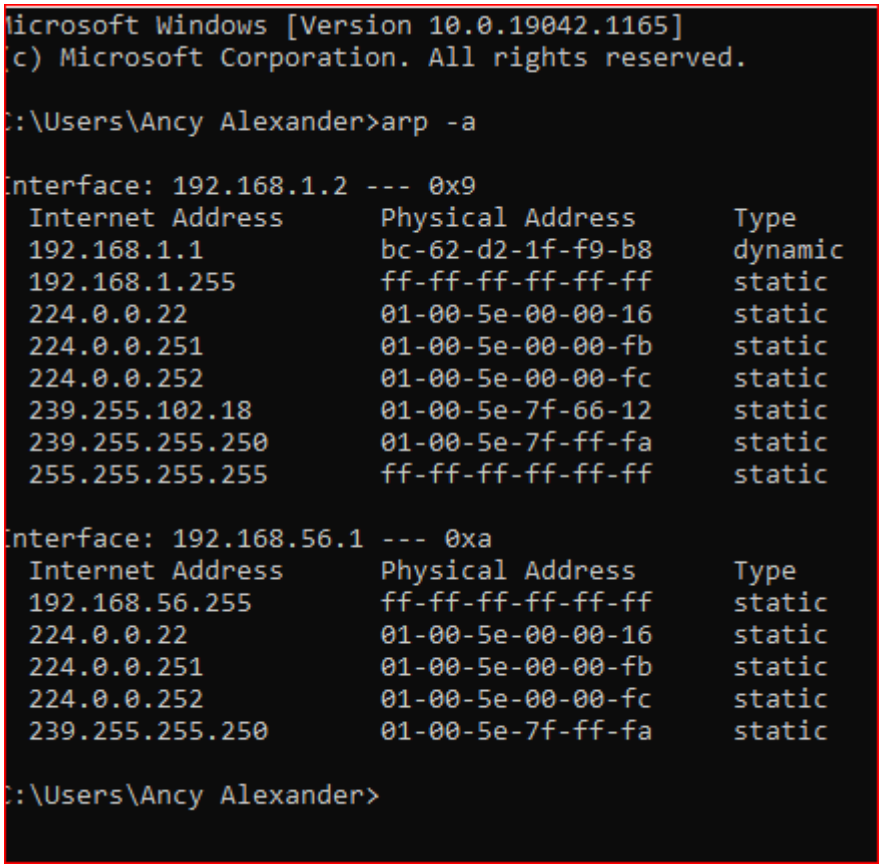
The ARP command corresponds to the Address Resolution Protocol. Although it is easy to think of network communications in terms of IP addressing, packet delivery is ultimately dependent on the Media Access Control (MAC) address of

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

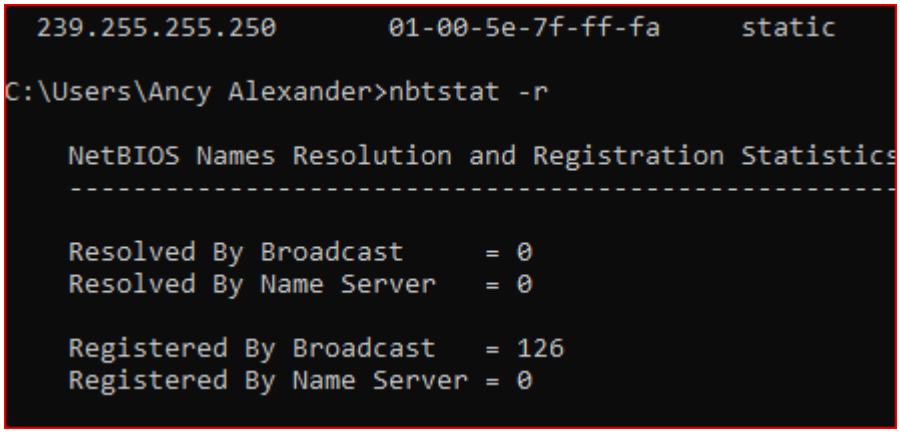
remote host's IP address to the ARP -A command.



b)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

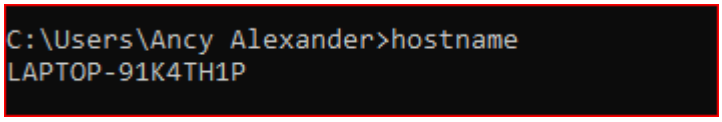
NbtStat -n command for example, shows the NetBIOS names that are in use by a device. The NbtStat -r command shows how many NetBIOS names the device has been able to resolve recently.



c)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.



d) 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 minutes) to gather statistics, and then reports latency and packet loss statistics

that are more detailed than those provided by Ping or Tracert

```
C:\Users\Ancy Alexander>pathping

Usage: pathping [-g host-list] [-h maximum_hops] [-i address] [-n]
                [-p period] [-q num_queries] [-w timeout]
                [-4] [-6] target_name

Options:
    -g host-list     Loose source route along host-list.
    -h maximum_hops  Maximum number of hops to search for target.
    -i address       Use the specified source address.
    -n               Do not resolve addresses to hostnames.
    -p period        Wait period milliseconds between pings.
    -q num_queries   Number of queries per hop.
    -w timeout       Wait timeout milliseconds for each reply.
    -4               Force using IPv4.
    -6               Force using IPv6.
```

e) getmac

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

```
C:\Users\Ancy Alexander>getmac

Physical Address    Transport Name
=================== ============================================================
50-5B-C2-B6-5D-B7   \Device\Tcpip_{4C867780-99C4-4F78-A001-EAFD39DAF611}
0A-00-27-00-00-0A   \Device\Tcpip_{5F7D3C30-5EEB-4B6A-9F65-E5FFFC0EAE2A}

C:\Users\Ancy Alexander>
```