Networking & System Administration Lab

ASSIGNMENT 6: LAB EXCERCISE

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RMCA-B Sem-II

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\Vimal Thomson>ping google.com

Pinging google.com [142.250.182.46] with 32 bytes of data:
Reply from 142.250.182.46: bytes=32 time=29ms TTL=115
Reply from 142.250.182.46: bytes=32 time=28ms TTL=115
Reply from 142.250.182.46: bytes=32 time=50ms TTL=115
Reply from 142.250.182.46: bytes=32 time=39ms TTL=115

Ping statistics for 142.250.182.46:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 28ms, Maximum = 50ms, Average = 36ms
```

```
C:\Users\Vimal Thomson>ping -a google.com

Pinging google.com [142.250.182.46] with 32 bytes of data:
Reply from 142.250.182.46: bytes=32 time=43ms TTL=115
Reply from 142.250.182.46: bytes=32 time=40ms TTL=115
Reply from 142.250.182.46: bytes=32 time=149ms TTL=115
Reply from 142.250.182.46: bytes=32 time=91ms TTL=115

Ping statistics for 142.250.182.46:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 40ms, Maximum = 149ms, Average = 80ms

C:\Users\Vimal Thomson>
```

```
C:\Users\Vimal Thomson>ping -t google.com

Pinging google.com [142.250.182.46] with 32 bytes of data:
Reply from 142.250.182.46: bytes=32 time=164ms TTL=115
Reply from 142.250.182.46: bytes=32 time=62ms TTL=115
Reply from 142.250.182.46: bytes=32 time=218ms TTL=115
Reply from 142.250.182.46: bytes=32 time=79ms TTL=115
Reply from 142.250.182.46: bytes=32 time=82ms TTL=115
Reply from 142.250.182.46: bytes=32 time=41ms TTL=115
Reply from 142.250.182.46: bytes=32 time=49ms TTL=115
Reply from 142.250.182.46: bytes=32 time=56ms TTL=115
Reply from 142.250.182.46: bytes=32 time=45ms TTL=115
Reply from 142.250.182.46: bytes=32 time=63ms TTL=115
Reply from 142.250.182.46: bytes=32 time=44ms TTL=115
Reply from 142.250.182.46: bytes=32 time=188ms TTL=115
Reply from 142.250.182.46: bytes=32 time=83ms TTL=115

Ping statistics for 142.250.182.46:
    Packets: Sent = 13, Received = 13, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 41ms, Maximum = 218ms, Average = 90ms
Control-C
^C
```

```
C:\Users\Vimal Thomson>ping -j google.com

Pinging google.com [142.250.182.46] with 32 bytes of data:
General failure.
General failure.
General failure.
General failure.

Ping statistics for 142.250.182.46:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),
```

```
C:\Users\Vimal Thomson>ping -4 google.com

Pinging google.com [142.250.182.46] with 32 bytes of data:
Reply from 142.250.182.46: bytes=32 time=87ms TTL=115
Reply from 142.250.182.46: bytes=32 time=49ms TTL=115
Reply from 142.250.182.46: bytes=32 time=256ms TTL=115
Reply from 142.250.182.46: bytes=32 time=77ms TTL=115

Ping statistics for 142.250.182.46:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 49ms, Maximum = 256ms, Average = 117ms
```

Route:

```
C:\Users\Vimal Thomson>route print
===========================================================================
Interface List
  4...38 f3 ab b7 e6 34 ......Realtek PCIe GbE Family Controller
 17...92 0f 0c a3 cb 05 ......Microsoft Wi-Fi Direct Virtual Adapter
  6...d2 0f 0c a3 cb 05 ......Microsoft Wi-Fi Direct Virtual Adapter #2
  2...90 0f 0c a3 cb 05 ......Realtek 8822CE Wireless LAN 802.11ac PCI-E NIC
  1...........................Software Loopback Interface 1
===========================================================================

IPv4 Route Table
===========================================================================
Active Routes:
Network Destination        Netmask          Gateway       Interface  Metric
          0.0.0.0          0.0.0.0     192.168.43.1    192.168.43.30     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
     192.168.43.0    255.255.255.0         On-link    192.168.43.30    306
    192.168.43.30  255.255.255.255         On-link    192.168.43.30    306
   192.168.43.255  255.255.255.255         On-link    192.168.43.30    306
        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    192.168.43.30    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    192.168.43.30    306
===========================================================================
Persistent Routes:
  None

IPv6 Route Table
===========================================================================
Active Routes:
 If Metric Network Destination      Gateway
  1    331 ::1/128                  On-link
  2    306 fe80::/64                On-link
  2    306 fe80::1d21:697e:17bd:94ce/128
                                    On-link
  1    331 ff00::/8                 On-link
  2    306 ff00::/8                 On-link
===========================================================================
Persistent Routes:
  None
```

```
C:\Users\Vimal Thomson>route print -4
===========================================================================
Interface List
  4...38 f3 ab b7 e6 34 ......Realtek PCIe GbE Family Controller
 17...92 0f 0c a3 cb 05 ......Microsoft Wi-Fi Direct Virtual Adapter
  6...d2 0f 0c a3 cb 05 ......Microsoft Wi-Fi Direct Virtual Adapter #2
  2...90 0f 0c a3 cb 05 ......Realtek 8822CE Wireless LAN 802.11ac PCI-E NIC
  1...........................Software Loopback Interface 1
===========================================================================

IPv4 Route Table
===========================================================================
Active Routes:
Network Destination        Netmask          Gateway       Interface  Metric
          0.0.0.0          0.0.0.0     192.168.43.1   192.168.43.30     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
     192.168.43.0    255.255.255.0         On-link     192.168.43.30    306
    192.168.43.30  255.255.255.255         On-link     192.168.43.30    306
   192.168.43.255  255.255.255.255         On-link     192.168.43.30    306
        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     192.168.43.30    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     192.168.43.30    306
===========================================================================
Persistent Routes:
  None
```

```
C:\Users\Vimal Thomson>route print -6
===========================================================================
Interface List
  4...38 f3 ab b7 e6 34 ......Realtek PCIe GbE Family Controller
 17...92 0f 0c a3 cb 05 ......Microsoft Wi-Fi Direct Virtual Adapter
  6...d2 0f 0c a3 cb 05 ......Microsoft Wi-Fi Direct Virtual Adapter #2
  2...90 0f 0c a3 cb 05 ......Realtek 8822CE Wireless LAN 802.11ac PCI-E NIC
  1...........................Software Loopback Interface 1
===========================================================================

IPv6 Route Table
===========================================================================
Active Routes:
 If Metric Network Destination      Gateway
  1    331 ::1/128                  On-link
  2    306 fe80::/64                On-link
  2    306 fe80::1d21:697e:17bd:94ce/128
                                    On-link
  1    331 ff00::/8                 On-link
  2    306 ff00::/8                 On-link
===========================================================================
Persistent Routes:
  None
```

```
C:\Users\Vimal Thomson>route print *157
===========================================================================
Interface List
  4...38 f3 ab b7 e6 34 ......Realtek PCIe GbE Family Controller
 17...92 0f 0c a3 cb 05 ......Microsoft Wi-Fi Direct Virtual Adapter
  6...d2 0f 0c a3 cb 05 ......Microsoft Wi-Fi Direct Virtual Adapter #2
  2...90 0f 0c a3 cb 05 ......Realtek 8822CE Wireless LAN 802.11ac PCI-E NIC
  1...........................Software Loopback Interface 1
===========================================================================

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

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

Traceroute:

```
C:\Users\Vimal Thomson>tracert 192.168.1.1

Tracing route to RTK_GW.bbrouter [192.168.1.1]
over a maximum of 30 hops:

  1    25 ms     4 ms      3 ms  192.168.43.1
  2    80 ms    26 ms     63 ms  RTK_GW.bbrouter [192.168.1.1]

Trace complete.

C:\Users\Vimal Thomson>
```

```
C:\Users\Vimal Thomson>tracert www.google.com

Tracing route to www.google.com [142.250.196.68]
over a maximum of 30 hops:

  1     3 ms     3 ms     3 ms  192.168.43.1
  2    34 ms     8 ms     6 ms  RTK_GW.bbrouter [192.168.1.1]
  3    12 ms    10 ms    46 ms  117.222.160.1
  4    60 ms    66 ms    35 ms  static.ill.218.248.113.138/24.bsnl.in [218.248.113.138]
  5     *        *        *     Request timed out.
  6     *        *        *     Request timed out.
  7    49 ms    89 ms    87 ms  72.14.205.109
  8    83 ms   113 ms   150 ms  108.170.253.113
  9    99 ms    44 ms   160 ms  142.250.236.157
 10    49 ms    53 ms    77 ms  maa03s46-in-f4.1e100.net [142.250.196.68]

Trace complete.

C:\Users\Vimal Thomson>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    21 ms     4 ms     3 ms  192.168.43.1
  2     7 ms     6 ms     7 ms  192.168.1.1
  3    30 ms    63 ms    83 ms  117.222.160.1
  4    69 ms    30 ms    81 ms  218.248.120.170
  5     *        *       43 ms  117.216.207.220
  6    14 ms    35 ms    13 ms  117.216.207.221
  7    57 ms    36 ms    52 ms  203.101.76.113
  8   149 ms   110 ms    92 ms  116.119.42.9
  9   124 ms    89 ms    87 ms  27.111.228.131
 10    81 ms    78 ms    86 ms  203.84.209.77
 11    79 ms    84 ms    78 ms  106.10.128.7
 12    87 ms    86 ms    84 ms  106.10.131.217
 13    62 ms    85 ms    87 ms  106.10.128.247
 14    73 ms    63 ms    92 ms  202.165.107.50

Trace complete.
```

```
C:\Users\Vimal Thomson>tracert 22.110.0.1

Tracing route to 22.110.0.1 over a maximum of 30 hops

  1     40 ms      4 ms      3 ms  192.168.43.1
  2     45 ms     26 ms     61 ms  RTK_GW.bbrouter [192.168.1.1]
  3     30 ms     60 ms     67 ms  117.222.160.1
  4     41 ms     64 ms     82 ms  static.ill.218.248.113.14/24.bsnl.in [218.248.113.14]
  5      *         *         *     Request timed out.
  6      *        35 ms     32 ms  117.216.207.221
  7     73 ms     70 ms    102 ms  203.101.76.113
  8    362 ms    408 ms    329 ms  182.79.222.237
  9    336 ms    405 ms    407 ms  ve951.core2.nyc6.he.net [184.105.64.178]
 10    394 ms    355 ms    283 ms  100ge13-1.core1.nyc4.he.net [184.105.64.177]
 11    462 ms    344 ms    290 ms  100ge16-1.core1.ash1.he.net [184.105.223.165]
 12    283 ms    408 ms    329 ms  100ge5-1.core2.ash1.he.net [72.52.92.226]
 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.
```

Nslookup:

```
C:\Users\Vimal Thomson>nslookup
Default Server:  UnKnown
Address:  192.168.43.1
```

```
C:\Users\Vimal Thomson>nslookup google.com
Server:  UnKnown
Address:  192.168.43.1

Non-authoritative answer:
Name:     google.com
Addresses:  2404:6800:4007:81a::200e
          142.250.182.46
```

```
C:\Users\Vimal Thomson>nslookup -q=MX google.com
Server:  UnKnown
Address:  192.168.43.1

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

alt1.aspmx.l.google.com internet address = 173.194.202.27
alt1.aspmx.l.google.com AAAA IPv6 address = 2607:f8b0:400e:c00::1a
alt2.aspmx.l.google.com internet address = 142.250.141.27
alt2.aspmx.l.google.com AAAA IPv6 address = 2607:f8b0:4023:c0b::1b
alt3.aspmx.l.google.com internet address = 142.250.115.27
alt3.aspmx.l.google.com AAAA IPv6 address = 2607:f8b0:4023:1004::1b
alt4.aspmx.l.google.com internet address = 64.233.171.27
alt4.aspmx.l.google.com AAAA IPv6 address = 2607:f8b0:4003:c15::1b
aspmx.l.google.com       internet address = 172.217.194.27
aspmx.l.google.com       AAAA IPv6 address = 2404:6800:4003:c03::1b

C:\Users\Vimal Thomson>
```

```
C:\Users\Vimal Thomson>nslookup -type=ns google.com
Server:  UnKnown
Address:  192.168.43.1

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

ns2.google.com  internet address = 216.239.34.10
ns2.google.com  AAAA IPv6 address = 2001:4860:4802:34::a
ns3.google.com  internet address = 216.239.36.10
ns3.google.com  AAAA IPv6 address = 2001:4860:4802:36::a
ns1.google.com  internet address = 216.239.32.10
ns1.google.com  AAAA IPv6 address = 2001:4860:4802:32::a
ns4.google.com  internet address = 216.239.38.10
ns4.google.com  AAAA IPv6 address = 2001:4860:4802:38::a
```

Ip Config:

```
C:\Users\Vimal Thomson>ipconfig

Windows IP Configuration


Ethernet adapter Ethernet:

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

Wireless LAN adapter Local Area Connection* 1:

   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 Wi-Fi:

   Connection-specific DNS Suffix  . :
   Link-local IPv6 Address . . . . . : fe80::1d21:697e:17bd:94ce%2
   IPv4 Address. . . . . . . . . . . : 192.168.43.30
   Subnet Mask . . . . . . . . . . . : 255.255.255.0
   Default Gateway . . . . . . . . . : 192.168.43.1
```

```
C:\Users\Vimal Thomson>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* 1 while it has its media disconnected.

Ethernet adapter Ethernet:

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

Wireless LAN adapter Local Area Connection* 1:

   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 Wi-Fi:

   Connection-specific DNS Suffix  . :
   Link-local IPv6 Address . . . . . : fe80::1d21:697e:17bd:94ce%2
   Default Gateway . . . . . . . . . :
```

```
C:\Users\Vimal Thomson>ipconfig /displaydns

Windows IP Configuration

    bid.g.doubleclick.net
    ----------------------------------------
    Record Name . . . . . : bid.g.doubleclick.net
    Record Type . . . . . : 5
    Time To Live  . . . . : 21
    Data Length . . . . . : 8
    Section . . . . . . . : Answer
    CNAME Record  . . . . : ads-bid.l.doubleclick.net


    Record Name . . . . . : ads-bid.l.doubleclick.net
    Record Type . . . . . : 1
    Time To Live  . . . . : 21
    Data Length . . . . . : 4
    Section . . . . . . . : Answer
    A (Host) Record . . . : 142.251.10.157


    Record Name . . . . . : ads-bid.l.doubleclick.net
    Record Type . . . . . : 1
    Time To Live  . . . . : 21
    Data Length . . . . . : 4
    Section . . . . . . . : Answer
    A (Host) Record . . . : 142.251.10.156


    Record Name . . . . . : ads-bid.l.doubleclick.net
    Record Type . . . . . : 1
    Time To Live  . . . . : 21
    Data Length . . . . . : 4
    Section . . . . . . . : Answer
    A (Host) Record . . . : 172.217.194.156
```

```
C:\Users\Vimal Thomson>ipconfig /showclassid

Error: unrecognized or incomplete command line.

USAGE:
    ipconfig [/allcompartments] [/? | /all |
                                 /renew [adapter] | /release [adapter] |
                                 /renew6 [adapter] | /release6 [adapter] |
                                 /flushdns | /displaydns | /registerdns |
                                 /showclassid adapter |
                                 /setclassid adapter [classid] |
                                 /showclassid6 adapter |
                                 /setclassid6 adapter [classid] ]

where
    adapter             Connection name
                        (wildcard characters * and ? allowed, see examples)

    Options:
        /?              Display this help message
        /all            Display full configuration information.
        /release        Release the IPv4 address for the specified adapter.
        /release6       Release the IPv6 address for the specified adapter.
        /renew          Renew the IPv4 address for the specified adapter.
        /renew6         Renew the IPv6 address for the specified adapter.
        /flushdns       Purges the DNS Resolver cache.
        /registerdns    Refreshes all DHCP leases and re-registers DNS names
        /displaydns     Display the contents of the DNS Resolver Cache.
        /showclassid    Displays all the dhcp class IDs allowed for adapter.
        /setclassid     Modifies the dhcp class id.
        /showclassid6   Displays all the IPv6 DHCP class IDs allowed for adapter.
        /setclassid6    Modifies the IPv6 DHCP class id.
```

NetStat:

```
C:\Users\Vimal Thomson>netstat

Active Connections

  Proto  Local Address          Foreign Address        State
  TCP    192.168.43.30:49185    18.66.139.14:https     TIME_WAIT
  TCP    192.168.43.30:49260    server-13-33-179-59:https  ESTABLISHED
  TCP    192.168.43.30:49282    146.20.132.64:https     ESTABLISHED
  TCP    192.168.43.30:49540    104.16.92.60:https      ESTABLISHED
  TCP    192.168.43.30:49918    a104-114-67-50:https    ESTABLISHED
  TCP    192.168.43.30:50199    ec2-52-205-167-202:https  ESTABLISHED
  TCP    192.168.43.30:50281    104.18.188.55:https     ESTABLISHED
  TCP    192.168.43.30:50450    26:https                ESTABLISHED
  TCP    192.168.43.30:50548    103.231.98.196:https    ESTABLISHED
  TCP    192.168.43.30:50721    maa05s20-in-f1:https    TIME_WAIT
  TCP    192.168.43.30:50722    whatsapp-cdn-shv-01-maa2:https  TIME_WAIT
  TCP    192.168.43.30:51071    a23-34-24-47:https      ESTABLISHED
  TCP    192.168.43.30:51123    52.46.133.124:https     ESTABLISHED
  TCP    192.168.43.30:51442    ec2-52-209-141-213:https  ESTABLISHED
  TCP    192.168.43.30:51457    216.46.185.183:https    TIME_WAIT
  TCP    192.168.43.30:51516    114:https               ESTABLISHED
  TCP    192.168.43.30:51720    ec2-13-228-251-204:https  ESTABLISHED
  TCP    192.168.43.30:51775    ec2-34-206-120-37:https  TIME_WAIT
  TCP    192.168.43.30:51836    151.101.158.49:https    ESTABLISHED
```

```
C:\Users\Vimal Thomson>netstat -n

Active Connections

  Proto  Local Address          Foreign Address        State
  TCP    192.168.43.30:49260    13.33.179.59:443       ESTABLISHED
  TCP    192.168.43.30:49414    104.244.36.20:443      ESTABLISHED
  TCP    192.168.43.30:49540    104.16.92.60:443       ESTABLISHED
  TCP    192.168.43.30:49918    104.114.67.50:443      ESTABLISHED
  TCP    192.168.43.30:50281    104.18.188.55:443      ESTABLISHED
  TCP    192.168.43.30:50450    35.227.202.26:443      ESTABLISHED
  TCP    192.168.43.30:50548    103.231.98.196:443     ESTABLISHED
  TCP    192.168.43.30:50631    104.244.36.20:443      ESTABLISHED
  TCP    192.168.43.30:51071    23.34.24.47:443        ESTABLISHED
  TCP    192.168.43.30:51123    52.46.133.124:443      TIME_WAIT
  TCP    192.168.43.30:51836    151.101.158.49:443     ESTABLISHED
  TCP    192.168.43.30:52091    52.95.123.167:443      ESTABLISHED
  TCP    192.168.43.30:52216    104.114.67.50:443      ESTABLISHED
  TCP    192.168.43.30:52834    52.223.2.229:443       TIME_WAIT
  TCP    192.168.43.30:52871    52.46.129.238:443      ESTABLISHED
  TCP    192.168.43.30:52926    35.227.248.159:443     ESTABLISHED
  TCP    192.168.43.30:53264    34.120.155.137:443     ESTABLISHED
  TCP    192.168.43.30:53612    151.101.157.44:443     ESTABLISHED


C:\Users\Vimal Thomson>netstat -n 5

Active Connections

  Proto  Local Address          Foreign Address        State
  TCP    192.168.43.30:49260    13.33.179.59:443       ESTABLISHED
  TCP    192.168.43.30:49540    104.16.92.60:443       ESTABLISHED
  TCP    192.168.43.30:49918    104.114.67.50:443      ESTABLISHED
  TCP    192.168.43.30:50281    104.18.188.55:443      ESTABLISHED
  TCP    192.168.43.30:50300    104.244.36.20:443      ESTABLISHED
  TCP    192.168.43.30:50450    35.227.202.26:443      ESTABLISHED
  TCP    192.168.43.30:50548    103.231.98.196:443     ESTABLISHED
  TCP    192.168.43.30:50631    104.244.36.20:443      CLOSING
  TCP    192.168.43.30:50968    161.69.226.70:443      ESTABLISHED
  TCP    192.168.43.30:51071    23.34.24.47:443        ESTABLISHED
  TCP    192.168.43.30:51123    52.46.133.124:443      TIME_WAIT
  TCP    192.168.43.30:51211    151.101.157.253:443    ESTABLISHED
  TCP    192.168.43.30:51348    151.101.157.108:443    ESTABLISHED
  TCP    192.168.43.30:51836    151.101.158.49:443     ESTABLISHED
  TCP    192.168.43.30:52091    52.95.123.167:443      ESTABLISHED
  TCP    192.168.43.30:52153    218.248.112.60:443     SYN_SENT
  TCP    192.168.43.30:52216    104.114.67.50:443      ESTABLISHED
  TCP    192.168.43.30:52530    35.172.127.48:443      ESTABLISHED
  TCP    192.168.43.30:52834    52.223.2.229:443       TIME_WAIT
  TCP    192.168.43.30:52871    52.46.129.238:443      ESTABLISHED
  TCP    192.168.43.30:52926    35.227.248.159:443     ESTABLISHED
  TCP    192.168.43.30:53034    34.194.161.83:443      ESTABLISHED
  TCP    192.168.43.30:53264    34.120.155.137:443     ESTABLISHED
  TCP    192.168.43.30:53612    151.101.157.44:443     ESTABLISHED
  TCP    192.168.43.30:53870    13.33.145.67:443       TIME_WAIT
  TCP    192.168.43.30:53925    35.211.149.16:443      ESTABLISHED
```

```
C:\Users\Vimal Thomson>netstat -a

Active Connections

  Proto  Local Address          Foreign Address        State
  TCP    0.0.0.0:135            LAPTOP-0SOSJJH6:0       LISTENING
  TCP    0.0.0.0:445            LAPTOP-0SOSJJH6:0       LISTENING
  TCP    0.0.0.0:5040           LAPTOP-0SOSJJH6:0       LISTENING
  TCP    0.0.0.0:49664          LAPTOP-0SOSJJH6:0       LISTENING
  TCP    0.0.0.0:49665          LAPTOP-0SOSJJH6:0       LISTENING
  TCP    0.0.0.0:49666          LAPTOP-0SOSJJH6:0       LISTENING
  TCP    0.0.0.0:49667          LAPTOP-0SOSJJH6:0       LISTENING
  TCP    0.0.0.0:49668          LAPTOP-0SOSJJH6:0       LISTENING
  TCP    0.0.0.0:49673          LAPTOP-0SOSJJH6:0       LISTENING
  TCP    127.0.0.1:27017        LAPTOP-0SOSJJH6:0       LISTENING
  TCP    192.168.43.30:139      LAPTOP-0SOSJJH6:0       LISTENING
  TCP    192.168.43.30:49184    ec2-54-205-54-107:https  TIME_WAIT
  TCP    192.168.43.30:49608    whatsapp-cdn-shv-01-maa2:https  CLOSE_WAIT
  TCP    192.168.43.30:49609    20.190.146.38:https    ESTABLISHED
  TCP    192.168.43.30:50255    ec2-13-251-82-178:https  ESTABLISHED
  TCP    192.168.43.30:50465    te1-0:https            ESTABLISHED
  TCP    192.168.43.30:50796    593:https              ESTABLISHED
  TCP    192.168.43.30:51201    139.45.197.253:https   ESTABLISHED
^C
C:\Users\Vimal Thomson>
```

UBUNTU

Ping

```
vimalthomson@vimal-thomson:~$ ping www.google.com
PING www.google.com (142.250.196.36) 56(84) bytes of data.
64 bytes from maa03s45-in-f4.1e100.net (142.250.196.36): icmp_seq=1 ttl=116 time=263 ms
64 bytes from maa03s45-in-f4.1e100.net (142.250.196.36): icmp_seq=2 ttl=116 time=82.4 ms
64 bytes from maa03s45-in-f4.1e100.net (142.250.196.36): icmp_seq=3 ttl=116 time=105 ms
64 bytes from maa03s45-in-f4.1e100.net (142.250.196.36): icmp_seq=4 ttl=116 time=127 ms
^C
--- www.google.com ping statistics ---
4 packets transmitted, 4 received, 0% packet loss, time 3003ms
rtt min/avg/max/mdev = 82.372/144.366/262.932/70.277 ms
```

```
vimalthomson@vimal-thomson:~$ ping -a google.com
PING google.com (142.250.182.14) 56(84) bytes of data.
64 bytes from maa05s18-in-f14.1e100.net (142.250.182.14): icmp_seq=1 ttl=116 time=298 ms
64 bytes from maa05s18-in-f14.1e100.net (142.250.182.14): icmp_seq=2 ttl=116 time=528 ms
64 bytes from maa05s18-in-f14.1e100.net (142.250.182.14): icmp_seq=3 ttl=116 time=141 ms
64 bytes from maa05s18-in-f14.1e100.net (142.250.182.14): icmp_seq=4 ttl=116 time=157 ms
64 bytes from maa05s18-in-f14.1e100.net (142.250.182.14): icmp_seq=5 ttl=116 time=399 ms
64 bytes from maa05s18-in-f14.1e100.net (142.250.182.14): icmp_seq=6 ttl=116 time=223 ms
^C
--- google.com ping statistics ---
6 packets transmitted, 6 received, 0% packet loss, time 5002ms
rtt min/avg/max/mdev = 141.193/290.981/527.541/137.138 ms
```

```
vimalthomson@vimal-thomson:~$ ping -V google.com
ping from iputils s20190709
```

```
vimalthomson@vimal-thomson:~$ ping -b google.com
PING google.com (142.250.182.14) 56(84) bytes of data.
64 bytes from maa05s18-in-f14.1e100.net (142.250.182.14): icmp_seq=1 ttl=116 time=194 ms
64 bytes from maa05s18-in-f14.1e100.net (142.250.182.14): icmp_seq=2 ttl=116 time=225 ms
64 bytes from maa05s18-in-f14.1e100.net (142.250.182.14): icmp_seq=3 ttl=116 time=241 ms
64 bytes from maa05s18-in-f14.1e100.net (142.250.182.14): icmp_seq=4 ttl=116 time=262 ms
64 bytes from maa05s18-in-f14.1e100.net (142.250.182.14): icmp_seq=5 ttl=116 time=80.3 ms
64 bytes from maa05s18-in-f14.1e100.net (142.250.182.14): icmp_seq=6 ttl=116 time=120 ms
64 bytes from maa05s18-in-f14.1e100.net (142.250.182.14): icmp_seq=7 ttl=116 time=132 ms
64 bytes from maa05s18-in-f14.1e100.net (142.250.182.14): icmp_seq=8 ttl=116 time=152 ms
64 bytes from maa05s18-in-f14.1e100.net (142.250.182.14): icmp_seq=9 ttl=116 time=281 ms
64 bytes from maa05s18-in-f14.1e100.net (142.250.182.14): icmp_seq=10 ttl=116 time=205 ms
^C
--- google.com ping statistics ---
10 packets transmitted, 10 received, 0% packet loss, time 9012ms
rtt min/avg/max/mdev = 80.326/189.219/280.515/62.629 ms
```

Route

```
vimalthomson@vimal-thomson:~$ route
Kernel IP routing table
Destination     Gateway         Genmask         Flags Metric Ref    Use Iface
default         _gateway        0.0.0.0         UG    600    0        0 wlo1
link-local      0.0.0.0         255.255.0.0     U     1000   0        0 wlo1
192.168.43.0    0.0.0.0         255.255.255.0   U     600    0        0 wlo1
```

```
vimalthomson@vimal-thomson:~$ route -n
Kernel IP routing table
Destination     Gateway         Genmask         Flags Metric Ref    Use Iface
0.0.0.0         192.168.43.1    0.0.0.0         UG    600    0        0 wlo1
169.254.0.0     0.0.0.0         255.255.0.0     U     1000   0        0 wlo1
192.168.43.0    0.0.0.0         255.255.255.0   U     600    0        0 wlo1
```

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

```
vimalthomson@vimal-thomson:~$ ip route
default via 192.168.43.1 dev wlo1 proto dhcp metric 600
169.254.0.0/16 dev wlo1 scope link metric 1000
192.168.43.0/24 dev wlo1 proto_kernel scope link src 192.168.43.30 metric 600
```

Traceroute

```
vimalthomson@vimal-thomson:~$ traceroute google.com
traceroute to google.com (142.250.182.14), 30 hops max, 60 byte packets
 1  * _gateway (192.168.43.1)  10.475 ms  10.487 ms
 2  RTK_GW.bbrouter (192.168.1.1)  236.207 ms  236.212 ms  236.200 ms
 3  117.222.160.1 (117.222.160.1)  240.229 ms  240.233 ms  240.223 ms
 4  218.248.113.14 (218.248.113.14)  236.143 ms 218.248.113.142 (218.248.113.142)  236.130 ms 218.248.113.14 (218.248.113.14)  236.119 ms
 5  117.216.207.214 (117.216.207.214)  240.171 ms  240.153 ms  240.133 ms
 6  * * *
 7  72.14.218.250 (72.14.218.250)  89.417 ms * 72.14.205.109 (72.14.205.109)  357.992 ms
 8  74.125.242.145 (74.125.242.145)  452.409 ms 10.252.190.62 (10.252.190.62)  452.390 ms 74.125.242.145 (74.125.242.145)  452.382 ms
 9  142.251.55.217 (142.251.55.217)  452.374 ms  452.361 ms  452.341 ms
10  maa05s18-in-f14.1e100.net (142.250.182.14)  447.994 ms  452.292 ms 108.170.253.104 (108.170.253.104)  447.974 ms
```

```
vimalthomson@vimal-thomson:~$ traceroute -4 google.com
traceroute to google.com (142.250.182.14), 30 hops max, 60 byte packets
 1  _gateway (192.168.43.1)  8.003 ms  7.974 ms  7.962 ms
 2  RTK_GW.bbrouter (192.168.1.1)  246.726 ms  246.712 ms  246.700 ms
 3  117.222.160.1 (117.222.160.1)  246.610 ms  246.646 ms  246.636 ms
 4  218.248.113.138 (218.248.113.138)  250.264 ms  250.254 ms 218.248.113.142 (218.248.113.142)  250.214 ms
 5  * * *
 6  * * *
 7  72.14.205.109 (72.14.205.109)  234.385 ms  196.324 ms 72.14.218.250 (72.14.218.250)  196.296 ms
 8  * 74.125.242.145 (74.125.242.145)  200.217 ms 10.23.216.62 (10.23.216.62)  196.239 ms
 9  142.251.55.219 (142.251.55.219)  412.614 ms 142.251.55.238 (142.251.55.238)  196.213 ms 142.251.55.219 (142.251.55.219)  211.221 ms
10  maa05s18-in-f14.1e100.net (142.250.182.14)  211.153 ms  211.130 ms  214.702 ms
```

```
vimalthomson@vimal-thomson:~$ traceroute -6 google.com
traceroute to google.com (2404:6800:4007:819::200e), 30 hops max, 80 byte packets
connect: Network is unreachable
```

```
vimalthomson@vimal-thomson:~$ traceroute -d google.com
traceroute to google.com (142.250.182.14), 30 hops max, 60 byte packets
setsockopt SO_DEBUG: Permission denied
```

Nslookup

```
vimalthomson@vimal-thomson:~$ nslookup google.com
Server:         127.0.0.53
Address:        127.0.0.53#53

Non-authoritative answer:
Name:   google.com
Address: 142.250.182.14
Name:   google.com
Address: 2404:6800:4007:819::200e
```

```
vimalthomson@vimal-thomson:~$ nslookup -q=MX google.com
Server:         127.0.0.53
Address:        127.0.0.53#53

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

Authoritative answers can be found from:
```

```
vimalthomson@vimal-thomson:~$ nslookup -type=soa redhat.com
Server:         127.0.0.53
Address:        127.0.0.53#53

Non-authoritative answer:
redhat.com
        origin = a1-68.akam.net
        mail addr = noc.redhat.com
        serial = 2021091002
        refresh = 300
        retry = 180
        expire = 604800
        minimum = 14400

Authoritative answers can be found from:
```

```
vimalthomson@vimal-thomson:~$ nslookup -type=a google.com
Server:         127.0.0.53
Address:        127.0.0.53#53

Non-authoritative answer:
Name:   google.com
Address: 142.250.182.14
```

Ifconfig

```
vimalthomson@vimal-thomson:~$ ifconfig -v
enp2s0: flags=4099<UP,BROADCAST,MULTICAST>  mtu 1500
        ether 38:f3:ab:b7:e6:34  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

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 11900  bytes 1076603 (1.0 MB)
        RX errors 0  dropped 0  overruns 0  frame 0
        TX packets 11900  bytes 1076603 (1.0 MB)
        TX errors 0  dropped 0 overruns 0  carrier 0  collisions 0

wlo1: flags=4163<UP,BROADCAST,RUNNING,MULTICAST>  mtu 1500
        inet 192.168.43.30  netmask 255.255.255.0  broadcast 192.168.43.255
        inet6 fe80::5dbb:f21c:3ca8:23a1  prefixlen 64  scopeid 0x20<link>
        ether 90:0f:0c:a3:cb:05  txqueuelen 1000  (Ethernet)
        RX packets 37636  bytes 27244146 (27.2 MB)
        RX errors 0  dropped 0  overruns 0  frame 0
        TX packets 37473  bytes 6463782 (6.4 MB)
        TX errors 0  dropped 0 overruns 0  carrier 0  collisions 0
```

```
vimalthomson@vimal-thomson:~$ ifconfig
enp2s0: flags=4099<UP,BROADCAST,MULTICAST>  mtu 1500
        ether 38:f3:ab:b7:e6:34  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

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 10812  bytes 960826 (960.8 KB)
        RX errors 0  dropped 0  overruns 0  frame 0
        TX packets 10812  bytes 960826 (960.8 KB)
        TX errors 0  dropped 0 overruns 0  carrier 0  collisions 0

wlo1: flags=4163<UP,BROADCAST,RUNNING,MULTICAST>  mtu 1500
        inet 192.168.43.30  netmask 255.255.255.0  broadcast 192.168.43.255
        inet6 fe80::5dbb:f21c:3ca8:23a1  prefixlen 64  scopeid 0x20<link>
        ether 90:0f:0c:a3:cb:05  txqueuelen 1000  (Ethernet)
        RX packets 32122  bytes 23740186 (23.7 MB)
        RX errors 0  dropped 0  overruns 0  frame 0
        TX packets 31869  bytes 5332697 (5.3 MB)
        TX errors 0  dropped 0 overruns 0  carrier 0  collisions 0
```

```
vimalthomson@vimal-thomson:~$ ifconfig -s
Iface    MTU    RX-OK RX-ERR RX-DRP RX-OVR    TX-OK TX-ERR TX-DRP TX-OVR Flg
enp2s0   1500       0      0      0 0             0      0      0      0 BMU
lo      65536   11668      0      0 0         11668      0      0      0 LRU
wlo1     1500   36667      0      0 0         36570      0      0      0 BMRU
```

```
vimalthomson@vimal-thomson:~$ ifconfig -a
enp2s0: flags=4099<UP,BROADCAST,MULTICAST>  mtu 1500
        ether 38:f3:ab:b7:e6:34  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

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 11654  bytes 1050406 (1.0 MB)
        RX errors 0  dropped 0  overruns 0  frame 0
        TX packets 11654  bytes 1050406 (1.0 MB)
        TX errors 0  dropped 0 overruns 0  carrier 0  collisions 0

wlo1: flags=4163<UP,BROADCAST,RUNNING,MULTICAST>  mtu 1500
        inet 192.168.43.30  netmask 255.255.255.0  broadcast 192.168.43.255
        inet6 fe80::5dbb:f21c:3ca8:23a1  prefixlen 64  scopeid 0x20<link>
        ether 90:0f:0c:a3:cb:05  txqueuelen 1000  (Ethernet)
        RX packets 36531  bytes 26708455 (26.7 MB)
        RX errors 0  dropped 0  overruns 0  frame 0
        TX packets 36410  bytes 6223162 (6.2 MB)
        TX errors 0  dropped 0 overruns 0  carrier 0  collisions 0
```

Netstat

```
vimalthomson@vimal-thomson:~$ netstat
Active Internet connections (w/o servers)
Proto Recv-Q Send-Q Local Address           Foreign Address         State
tcp        0      0 vimal-thomson:41726     maa03s38-in-f2.1e:https ESTABLISHED
tcp        0      0 vimal-thomson:52064     104.16.19.94:https      ESTABLISHED
tcp        1     32 vimal-thomson:33228     72.34.250.78:https      CLOSING
tcp        0      0 vimal-thomson:42934     ec2-13-228-38-195:https ESTABLISHED
tcp        0      0 vimal-thomson:41814     69.173.144.138:https    TIME_WAIT
tcp        0      0 vimal-thomson:38996     maa05s20-in-f1.1e:https ESTABLISHED
tcp        0      0 vimal-thomson:41946     ip22.67-202-105.s:https ESTABLISHED
tcp        0      0 vimal-thomson:49176     maa05s16-in-f14.1:https ESTABLISHED
tcp        0      0 vimal-thomson:49502     a104-114-94-38.de:https ESTABLISHED
tcp        0      0 vimal-thomson:36562     ec2-44-229-115-17:https ESTABLISHED
tcp        0      0 vimal-thomson:44908     193.122.174.27:https    ESTABLISHED
tcp        0      0 vimal-thomson:56220     ec2-54-241-83-91.:https ESTABLISHED
tcp        0      0 vimal-thomson:57414     218.64.98.34.bc.g:https ESTABLISHED
tcp        0      0 vimal-thomson:49600     maa05s12-in-f1.1e:https ESTABLISHED
tcp        0      0 vimal-thomson:56568     maa05s26-in-f14.1:https ESTABLISHED
tcp        0      0 vimal-thomson:57748     ip-185-184-8-65.r:https ESTABLISHED
```

```
vimalthomson@vimal-thomson:~$ netstat -n
Active Internet connections (w/o servers)
Proto Recv-Q Send-Q Local Address           Foreign Address         State
tcp        0      0 192.168.43.30:41726     142.250.195.66:443      TIME_WAIT
tcp        0      0 192.168.43.30:52064     104.16.19.94:443        TIME_WAIT
tcp        0      0 192.168.43.30:42934     13.228.38.195:443       TIME_WAIT
tcp        0      0 192.168.43.30:38996     142.250.182.65:443      ESTABLISHED
tcp        0      0 192.168.43.30:41946     67.202.105.22:443       TIME_WAIT
tcp        0      0 192.168.43.30:49176     142.250.77.142:443      TIME_WAIT
tcp        0      0 192.168.43.30:49502     104.114.94.38:443       ESTABLISHED
tcp        0      0 192.168.43.30:36562     44.229.115.174:443      ESTABLISHED
tcp        0      0 192.168.43.30:44908     193.122.174.27:443      TIME_WAIT
tcp        0      0 192.168.43.30:56220     54.241.83.91:443        TIME_WAIT
tcp        0      0 192.168.43.30:57414     34.98.64.218:443        ESTABLISHED
tcp        0      0 192.168.43.30:49600     142.250.67.33:443       ESTABLISHED
tcp        0      0 192.168.43.30:56568     142.250.193.174:443     TIME_WAIT
tcp        0      0 192.168.43.30:57748     185.184.8.65:443        TIME_WAIT
tcp        0      0 192.168.43.30:41290     142.250.76.66:443       TIME_WAIT
tcp        0      0 192.168.43.30:51748     142.250.71.34:443       TIME_WAIT
tcp        0      0 192.168.43.30:59846     142.250.196.6:443       TIME_WAIT
tcp        0      0 192.168.43.30:54500     103.231.98.195:443      TIME_WAIT
tcp        0      0 192.168.43.30:48250     104.114.94.38:443       ESTABLISHED
tcp        1     32 192.168.43.30:34142     20.36.164.126:443       CLOSING
tcp        0      0 192.168.43.30:47316     142.250.182.98:443      TIME_WAIT
tcp        0      0 192.168.43.30:47252     142.250.195.162:443     ESTABLISHED
tcp        0      1 192.168.43.30:47796     104.114.107.195:443     FIN_WAIT1
tcp        0      0 192.168.43.30:48270     103.231.98.193:443      ESTABLISHED
tcp        0      0 192.168.43.30:41228     142.250.76.66:443       ESTABLISHED
tcp        0      0 192.168.43.30:41516     142.250.195.66:443      ESTABLISHED
tcp        0      0 192.168.43.30:44144     47.241.6.33:443         TIME_WAIT
tcp        0      0 192.168.43.30:35520     142.250.77.162:443      ESTABLISHED
```

```
vimalthomson@vimal-thomson:~$ 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 localhost:ipp           0.0.0.0:*               LISTEN
tcp        0      0 localhost:mysql         0.0.0.0:*               LISTEN
tcp        0      0 0.0.0.0:sunrpc          0.0.0.0:*               LISTEN
tcp        0      0 vimal-thomson:38996     maa05s20-in-f1.1e:https TIME_WAIT
tcp        0      0 vimal-thomson:49502     a104-114-94-38.de:https ESTABLISHED
tcp        0      0 vimal-thomson:36562     ec2-44-229-115-17:https ESTABLISHED
tcp        0      0 vimal-thomson:49600     maa05s12-in-f1.1e:https TIME_WAIT
tcp        0      0 vimal-thomson:48250     a104-114-94-38.de:https ESTABLISHED
tcp        0      0 vimal-thomson:47252     maa03s41-in-f2.1e:https TIME_WAIT
tcp        0      0 vimal-thomson:41228     maa05s14-in-f2.1e:https TIME_WAIT
tcp        0      0 vimal-thomson:41516     maa03s38-in-f2.1e:https TIME_WAIT
tcp        0      0 vimal-thomson:35520     maa05s17-in-f2.1e:https TIME_WAIT
tcp        0      0 vimal-thomson:35902     maa05s25-in-f13.1:https TIME_WAIT
tcp        0      0 vimal-thomson:45656     ec2-18-203-227-77:https TIME_WAIT
tcp        0      0 vimal-thomson:53236     maa03s46-in-f4.1e:https TIME_WAIT
tcp        0      0 vimal-thomson:47258     maa05s21-in-f2.1e:https TIME_WAIT
tcp6       0      0 [::]:http               [::]:*                  LISTEN
tcp6       0      0 ip6-localhost:ipp       [::]:*                  LISTEN
tcp6       0      0 [::]:sunrpc             [::]:*                  LISTEN
udp        0      0 0.0.0.0:49073           0.0.0.0:*
udp        0      0 localhost:domain        0.0.0.0:*
udp        0      0 vimal-thomson:bootpc     _gateway:bootps        ESTABLISHED
udp        0      0 0.0.0.0:sunrpc          0.0.0.0:*
udp        0      0 0.0.0.0:631             0.0.0.0:*
udp        0      0 0.0.0.0:mdns            0.0.0.0:*
udp6       0      0 [::]:44355              [::]:*
udp6       0      0 [::]:sunrpc             [::]:*
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     36424    @/tmp/.ICE-unix/1556
unix  2      [ ACC ]     STREAM     LISTENING     45216    @/tmp/dbus-zUX41LSHpa
```

```
vimalthomson@vimal-thomson:~$ netstat -n 5
Active Internet connections (w/o servers)
Proto Recv-Q Send-Q Local Address           Foreign Address         State
tcp        0      0 192.168.43.30:38996     142.250.182.65:443      TIME_WAIT
tcp        0      0 192.168.43.30:41946     67.202.105.22:443       TIME_WAIT
tcp        0      0 192.168.43.30:49176     142.250.77.142:443      TIME_WAIT
tcp        0      0 192.168.43.30:49502     104.114.94.38:443       ESTABLISHED
tcp        0      0 192.168.43.30:36562     44.229.115.174:443      ESTABLISHED
tcp        0      0 192.168.43.30:44908     193.122.174.27:443      TIME_WAIT
tcp        0      0 192.168.43.30:56220     54.241.83.91:443        TIME_WAIT
tcp        0      0 192.168.43.30:57414     34.98.64.218:443        TIME_WAIT
tcp        0      0 192.168.43.30:49600     142.250.67.33:443       TIME_WAIT
tcp        0      0 192.168.43.30:48250     104.114.94.38:443       ESTABLISHED
tcp        0      0 192.168.43.30:47252     142.250.195.162:443     TIME_WAIT
tcp        0      1 192.168.43.30:47796     104.114.107.195:443     FIN_WAIT1
tcp        0      0 192.168.43.30:48270     103.231.98.193:443      TIME_WAIT
tcp        0      0 192.168.43.30:41228     142.250.76.66:443       TIME_WAIT
tcp        0      0 192.168.43.30:41516     142.250.195.66:443      TIME_WAIT
tcp        0      0 192.168.43.30:44144     47.241.6.33:443         TIME_WAIT
tcp        0      0 192.168.43.30:35520     142.250.77.162:443      TIME_WAIT
tcp        0      0 192.168.43.30:51512     103.231.98.194:443      TIME_WAIT
tcp        0      0 192.168.43.30:41270     104.16.68.69:443        TIME_WAIT
tcp        0      0 192.168.43.30:34524     13.227.227.202:443      TIME_WAIT
tcp        0      0 192.168.43.30:35902     142.250.193.141:443     TIME_WAIT
tcp        0      0 192.168.43.30:45656     18.203.227.77:443       TIME_WAIT
tcp        0      0 192.168.43.30:41786     52.1.239.227:443        TIME_WAIT
tcp        0      0 192.168.43.30:53236     142.250.196.68:443      TIME_WAIT
tcp        0      0 192.168.43.30:45572     13.114.203.146:443      TIME_WAIT
tcp        0      0 192.168.43.30:47258     142.250.182.98:443      TIME_WAIT
udp        0      0 192.168.43.30:68        192.168.43.1:67         ESTABLISHED
Active UNIX domain sockets (w/o servers)
```

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.

```
C:\Users\Vimal Thomson>arp -a

Interface: 192.168.43.30 --- 0x2
  Internet Address      Physical Address      Type
  192.168.43.1          0a-94-f0-cb-3f-0f     dynamic
  192.168.43.255        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
```

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.

```
C:\Users\Vimal Thomson>nbtstat -r

    NetBIOS Names Resolution and Registration Statistics
    ----------------------------------------------------

    Resolved By Broadcast     = 0
    Resolved By Name Server   = 0

    Registered By Broadcast   = 3
    Registered By Name Server = 0
```

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.

```
C:\Users\Vimal Thomson>hostname
LAPTOP-0SOSJJH6
```

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.

```
C:\Users\Vimal Thomson>pathping www.google.com

Tracing route to www.google.com [142.250.196.36]
over a maximum of 30 hops:
  0  LAPTOP-0SOSJJH6 [192.168.43.30]
  1  192.168.43.1
  2  RTK_GW.bbrouter [192.168.1.1]
  3  117.222.160.1
  4      *        *        *
Computing statistics for 75 seconds...
```

v. getmac Command

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

```
C:\Users\Vimal Thomson>getmac

Physical Address    Transport Name
=================== =========================================================
38-F3-AB-B7-E6-34   Media disconnected
90-0F-0C-A3-CB-05   \Device\Tcpip_{05947E02-80A7-4193-93E1-D3A45A8D19BC}
```