NETWORK AND SYSTEM ADMINISTRATION LAB ASSIGNMENT 5

TOPIC: – Try out some Network Commands in both Windows and Linux

Submitted By:
Anilect Jose
Roll no: 17
S2 RMCA A

Submitted To:
Rini Kurian

Submitted on:
13-09-2021

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


```
Administrator: Command Prompt

Microsoft Windows [Version 10.0.19043.1202]
(c) Microsoft Corporation. All rights reserved.

C:\Windows\system32>ping google.com

Pinging google.com [142.250.196.78] with 32 bytes of data:
Reply from 142.250.196.78: bytes=32 time=45ms TTL=119
Reply from 142.250.196.78: bytes=32 time=45ms TTL=119
Reply from 142.250.196.78: bytes=32 time=47ms TTL=119
Reply from 142.250.196.78: bytes=32 time=20ms TTL=119

Ping statistics for 142.250.196.78:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 20ms, Maximum = 47ms, Average = 39ms

C:\Windows\system32>ping -a google.com

Pinging google.com [142.250.196.78] with 32 bytes of data:
Reply from 142.250.196.78: bytes=32 time=37ms TTL=119
Reply from 142.250.196.78: bytes=32 time=21ms TTL=119
Reply from 142.250.196.78: bytes=32 time=20ms TTL=119
Reply from 142.250.196.78: bytes=32 time=31ms TTL=119

Ping statistics for 142.250.196.78:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 20ms, Maximum = 37ms, Average = 27ms
```

```
C:\Windows\system32>ping -t google.com

Pinging google.com [142.250.196.78] with 32 bytes of data:
Reply from 142.250.196.78: bytes=32 time=34ms TTL=119
Reply from 142.250.196.78: bytes=32 time=21ms TTL=119
Reply from 142.250.196.78: bytes=32 time=23ms TTL=119
Reply from 142.250.196.78: bytes=32 time=24ms TTL=119
Reply from 142.250.196.78: bytes=32 time=29ms TTL=119
Reply from 142.250.196.78: bytes=32 time=33ms TTL=119
Reply from 142.250.196.78: bytes=32 time=41ms TTL=119

Ping statistics for 142.250.196.78:
    Packets: Sent = 7, Received = 7, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 21ms, Maximum = 41ms, Average = 29ms
```

```
C:\Windows\system32>ping -j google.com

Pinging google.com [142.250.196.78] with 32 bytes of data:
General failure.
General failure.
General failure.
General failure.

Ping statistics for 142.250.196.78:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),

C:\Windows\system32>ping -4 google.com

Pinging google.com [142.250.196.78] with 32 bytes of data:
Reply from 142.250.196.78: bytes=32 time=25ms TTL=119
Reply from 142.250.196.78: bytes=32 time=20ms TTL=119
Reply from 142.250.196.78: bytes=32 time=20ms TTL=119
Reply from 142.250.196.78: bytes=32 time=21ms TTL=119

Ping statistics for 142.250.196.78:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 20ms, Maximum = 25ms, Average = 21ms
```

- Route

```
 Administrator: Command Prompt
    Minimum = 20ms, Maximum = 25ms, Average = 21ms

C:\Windows\system32>route print
===========================================================================
Interface List
  2...0a 00 27 00 00 02 ......VirtualBox Host-Only Ethernet Adapter
 25...1a 47 3d e9 62 5d ......Microsoft Wi-Fi Direct Virtual Adapter #5
 19...2a 47 3d e9 62 5d ......Microsoft Wi-Fi Direct Virtual Adapter #6
 23...18 47 3d e9 62 5d ......Qualcomm QCA61x4A 802.11ac Wireless Adapter
 10...18 47 3d e9 62 5e ......Bluetooth Device (Personal Area Network) #2
  1...........................Software Loopback Interface 1
===========================================================================

IPv4 Route Table
===========================================================================
Active Routes:
Network Destination        Netmask          Gateway       Interface  Metric
          0.0.0.0          0.0.0.0      192.168.1.1     192.168.1.2     40
        127.0.0.0        255.0.0.0         On-link         127.0.0.1    331
        127.0.0.1  255.255.255.255         On-link         127.0.0.1    331
  127.255.255.255  255.255.255.255         On-link         127.0.0.1    331
      192.168.1.0    255.255.255.0         On-link       192.168.1.2    296
      192.168.1.2  255.255.255.255         On-link       192.168.1.2    296
    192.168.1.255  255.255.255.255         On-link       192.168.1.2    296
     192.168.56.0    255.255.255.0         On-link      192.168.56.1    281
     192.168.56.1  255.255.255.255         On-link      192.168.56.1    281
   192.168.56.255  255.255.255.255         On-link      192.168.56.1    281
        224.0.0.0        240.0.0.0         On-link         127.0.0.1    331
        224.0.0.0        240.0.0.0         On-link      192.168.56.1    281
        224.0.0.0        240.0.0.0         On-link       192.168.1.2    296
  255.255.255.255  255.255.255.255         On-link         127.0.0.1    331
  255.255.255.255  255.255.255.255         On-link      192.168.56.1    281
  255.255.255.255  255.255.255.255         On-link       192.168.1.2    296
===========================================================================
Persistent Routes:
  None
```

```
IPv6 Route Table
===========================================================================
Active Routes:
 If Metric Network Destination      Gateway
  1    331 ::1/128                  On-link
  2    281 fe80::/64                On-link
 23    296 fe80::/64                On-link
 23    296 fe80::3967:1de3:1924:1daf/128
                                    On-link
  2    281 fe80::e866:65b:18f5:53de/128
                                    On-link
  1    331 ff00::/8                 On-link
  2    281 ff00::/8                 On-link
 23    296 ff00::/8                 On-link
===========================================================================
Persistent Routes:
  None
```

```
C:\Windows\system32>route print -4
===========================================================================
Interface List
  2...0a 00 27 00 00 02 ......VirtualBox Host-Only Ethernet Adapter
 25...1a 47 3d e9 62 5d ......Microsoft Wi-Fi Direct Virtual Adapter #5
 19...2a 47 3d e9 62 5d ......Microsoft Wi-Fi Direct Virtual Adapter #6
 23...18 47 3d e9 62 5d ......Qualcomm QCA61x4A 802.11ac Wireless Adapter
 10...18 47 3d e9 62 5e ......Bluetooth Device (Personal Area Network) #2
  1...........................Software Loopback Interface 1
===========================================================================

IPv4 Route Table
===========================================================================
Active Routes:
Network Destination        Netmask          Gateway       Interface  Metric
          0.0.0.0          0.0.0.0      192.168.1.1    192.168.1.2     40
        127.0.0.0        255.0.0.0         On-link        127.0.0.1    331
        127.0.0.1  255.255.255.255         On-link        127.0.0.1    331
  127.255.255.255  255.255.255.255         On-link        127.0.0.1    331
      192.168.1.0    255.255.255.0         On-link      192.168.1.2    296
      192.168.1.2  255.255.255.255         On-link      192.168.1.2    296
    192.168.1.255  255.255.255.255         On-link      192.168.1.2    296
     192.168.56.0    255.255.255.0         On-link     192.168.56.1    281
     192.168.56.1  255.255.255.255         On-link     192.168.56.1    281
   192.168.56.255  255.255.255.255         On-link     192.168.56.1    281
        224.0.0.0        240.0.0.0         On-link        127.0.0.1    331
        224.0.0.0        240.0.0.0         On-link     192.168.56.1    281
        224.0.0.0        240.0.0.0         On-link      192.168.1.2    296
  255.255.255.255  255.255.255.255         On-link        127.0.0.1    331
  255.255.255.255  255.255.255.255         On-link     192.168.56.1    281
  255.255.255.255  255.255.255.255         On-link      192.168.1.2    296
===========================================================================
Persistent Routes:
  None
```

```
C:\Windows\system32>route print -6
===========================================================================
Interface List
  2...0a 00 27 00 00 02 ......VirtualBox Host-Only Ethernet Adapter
 25...1a 47 3d e9 62 5d ......Microsoft Wi-Fi Direct Virtual Adapter #5
 19...2a 47 3d e9 62 5d ......Microsoft Wi-Fi Direct Virtual Adapter #6
 23...18 47 3d e9 62 5d ......Qualcomm QCA61x4A 802.11ac Wireless Adapter
 10...18 47 3d e9 62 5e ......Bluetooth Device (Personal Area Network) #2
  1...........................Software Loopback Interface 1
===========================================================================

IPv6 Route Table
===========================================================================
Active Routes:
 If Metric Network Destination      Gateway
  1    331 ::1/128                  On-link
  2    281 fe80::/64                On-link
 23    296 fe80::/64                On-link
 23    296 fe80::3967:1de3:1924:1daf/128
                                    On-link
  2    281 fe80::e866:65b:18f5:53de/128
                                    On-link
  1    331 ff00::/8                 On-link
  2    281 ff00::/8                 On-link
 23    296 ff00::/8                 On-link
===========================================================================
Persistent Routes:
  None
```

```
C:\Windows\system32>route print *153
===========================================================================
Interface List
  2...0a 00 27 00 00 02 ......VirtualBox Host-Only Ethernet Adapter
 25...1a 47 3d e9 62 5d ......Microsoft Wi-Fi Direct Virtual Adapter #5
 19...2a 47 3d e9 62 5d ......Microsoft Wi-Fi Direct Virtual Adapter #6
 23...18 47 3d e9 62 5d ......Qualcomm QCA61x4A 802.11ac Wireless Adapter
 10...18 47 3d e9 62 5e ......Bluetooth Device (Personal Area Network) #2
  1...........................Software Loopback Interface 1
===========================================================================

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

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

- Tracert

```
C:\Windows\system32>tracert 192.168.1.2

Tracing route to KAJ [192.168.1.2]
over a maximum of 30 hops:

  1     <1 ms     <1 ms     <1 ms  KAJ [192.168.1.2]

Trace complete.

C:\Windows\system32>tracert 192.168.1.1

Tracing route to 192.168.1.1 over a maximum of 30 hops

  1      8 ms      2 ms      2 ms  192.168.1.1

Trace complete.
```

```
C:\Windows\system32>tracert 22.110.0.1

Tracing route to 22.110.0.1 over a maximum of 30 hops

  1    18 ms     2 ms     2 ms  192.168.1.1
  2    22 ms     6 ms     5 ms  100.76.0.1
  3    66 ms    79 ms    80 ms  125.23.238.89
  4   249 ms   258 ms   250 ms  116.119.52.163
  5   242 ms   232 ms   257 ms  10gigabitethernet1-2.core1.nyc6.he.net [198.32.160.61]
  6   234 ms   240 ms   254 ms  100ge13-1.core1.nyc4.he.net [184.105.64.177]
  7   265 ms   255 ms   252 ms  100ge16-1.core1.ash1.he.net [184.105.223.165]
  8   223 ms   227 ms   238 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:\Windows\system32>tracert google.com

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

  1     6 ms     2 ms     2 ms  192.168.1.1
  2     5 ms     6 ms     5 ms  100.76.0.1
  3    39 ms    21 ms    20 ms  10.1.3.10
  4    22 ms    31 ms    20 ms  72.14.205.178
  5    33 ms    25 ms    54 ms  216.239.54.75
  6    21 ms    37 ms    23 ms  142.251.55.227
  7    21 ms    21 ms    36 ms  maa05s25-in-f14.1e100.net [142.250.193.142]

Trace complete.
```

```
C:\Windows\system32>tracert -d www.linkedin.com

Tracing route to l-0005.l-msedge.net [13.107.42.14]
over a maximum of 30 hops:

  1     4 ms     3 ms     3 ms  192.168.1.1
  2     5 ms     6 ms     6 ms  100.76.0.1
  3    21 ms    45 ms    21 ms  10.1.3.14
  4    20 ms    22 ms    43 ms  104.44.6.123
  5    28 ms    34 ms    21 ms  104.44.41.233
  6    21 ms    30 ms    29 ms  104.44.22.123
  7    45 ms    24 ms    56 ms  104.44.18.159
  8    62 ms    29 ms    49 ms  104.44.23.248
  9    21 ms    38 ms    22 ms  104.44.234.36
 10    23 ms    20 ms    37 ms  13.104.182.49
 11     *        *        *     Request timed out.
 12     *        *        *     Request timed out.
 13     *        *        *     Request timed out.
 14    63 ms    30 ms     *     13.107.42.14
 15    21 ms    51 ms    21 ms  13.107.42.14

Trace complete.
```

- Nslookup

```
C:\Windows\system32>nslookup
Default Server:  UnKnown
Address:  103.140.17.242

> exit

C:\Windows\system32>nslookup google.com
Server:  UnKnown
Address:  103.140.17.242

Non-authoritative answer:
Name:    google.com
Addresses:  2404:6800:4007:82b::200e
            142.250.196.78


C:\Windows\system32>nslookup -q=MX google.com
Server:  UnKnown
Address:  103.140.17.242

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

C:\Windows\system32>nslookup -type=ns google.com
Server:  UnKnown
Address:  103.140.17.242

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

- Ipconfig

```
C:\Windows\system32>ipconfig

Windows IP Configuration


Ethernet adapter VirtualBox Host-Only Network:

   Connection-specific DNS Suffix  . :
   Link-local IPv6 Address . . . . . : fe80::e866:65b:18f5:53de%2
   IPv4 Address. . . . . . . . . . . : 192.168.56.1
   Subnet Mask . . . . . . . . . . . : 255.255.255.0
   Default Gateway . . . . . . . . . :

Wireless LAN adapter Local Area Connection* 13:

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

Wireless LAN adapter Local Area Connection* 14:

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

Wireless LAN adapter Wi-Fi:

   Connection-specific DNS Suffix  . :
   Link-local IPv6 Address . . . . . : fe80::3967:1de3:1924:1daf%23
   IPv4 Address. . . . . . . . . . . : 192.168.1.2
   Subnet Mask . . . . . . . . . . . : 255.255.255.0
   Default Gateway . . . . . . . . . : 192.168.1.1

Ethernet adapter Bluetooth Network Connection 2:

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

```
C:\Windows\system32>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::e866:65b:18f5:53de%2
   IPv4 Address. . . . . . . . . . . : 192.168.56.1
   Subnet Mask . . . . . . . . . . . : 255.255.255.0
   Default Gateway . . . . . . . . . :

Wireless LAN adapter Local Area Connection* 13:

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

Wireless LAN adapter Local Area Connection* 14:

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

Wireless LAN adapter Wi-Fi:

   Connection-specific DNS Suffix  . :
   Link-local IPv6 Address . . . . . : fe80::3967:1de3:1924:1daf%23
   IPv4 Address. . . . . . . . . . . : 192.168.1.2
   Subnet Mask . . . . . . . . . . . : 255.255.255.0
   Default Gateway . . . . . . . . . : 192.168.1.1

Ethernet adapter Bluetooth Network Connection 2:

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

```
C:\Windows\system32>ipconfig/displaydns

Windows IP Configuration

    www.wondershare.com
    ----------------------------------------
    No records of type AAAA


    www.wondershare.com
    ----------------------------------------
    Record Name . . . . . : www.wondershare.com
    Record Type . . . . . : 1
    Time To Live  . . . . : 483101
    Data Length . . . . . : 4
    Section . . . . . . . : Answer
    A (Host) Record . . . : 127.0.0.1


    cbs.wondershare.com
    ----------------------------------------
    No records of type AAAA


    cbs.wondershare.com
    ----------------------------------------
    Record Name . . . . . : cbs.wondershare.com
    Record Type . . . . . : 1
    Time To Live  . . . . : 483101
    Data Length . . . . . : 4
    Section . . . . . . . : Answer
    A (Host) Record . . . : 127.0.0.1


    tracker.openbittorrent.com
    ----------------------------------------
    Record Name . . . . . : tracker.openbittorrent.com
    Record Type . . . . . : 1
    Time To Live  . . . . : 389
    Data Length . . . . . : 4
    Section . . . . . . . : Answer
    A (Host) Record . . . : 45.154.253.5


    Record Name . . . . . : tracker.openbittorrent.com
    Record Type . . . . . : 1
    Time To Live  . . . . : 389
    Data Length . . . . . : 4
```

```
C:\Windows\system32>ipconfig/release

Windows IP Configuration

No operation can be performed on Local Area Connection* 13 while it has its media disconnected.
No operation can be performed on Local Area Connection* 14 while it has its media disconnected.
No operation can be performed on Bluetooth Network Connection 2 while it has its media disconnected.

Ethernet adapter VirtualBox Host-Only Network:

   Connection-specific DNS Suffix  . :
   Link-local IPv6 Address . . . . . : fe80::e866:65b:18f5:53de%2
   IPv4 Address. . . . . . . . . . . : 192.168.56.1
   Subnet Mask . . . . . . . . . . . : 255.255.255.0
   Default Gateway . . . . . . . . . :

Wireless LAN adapter Local Area Connection* 13:

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

Wireless LAN adapter Local Area Connection* 14:

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

Wireless LAN adapter Wi-Fi:

   Connection-specific DNS Suffix  . :
   Link-local IPv6 Address . . . . . : fe80::3967:1de3:1924:1daf%23
   Default Gateway . . . . . . . . . :

Ethernet adapter Bluetooth Network Connection 2:

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

C:\Windows\system32>
```

- Netstat

```
C:\Windows\system32>netstat

Active Connections

  Proto  Local Address          Foreign Address        State
  TCP    127.0.0.1:19575        platform:50181         TIME_WAIT
  TCP    127.0.0.1:19575        platform:51946         TIME_WAIT
  TCP    127.0.0.1:19575        platform:53545         TIME_WAIT
  TCP    127.0.0.1:19575        platform:54604         TIME_WAIT
  TCP    127.0.0.1:19575        platform:55679         TIME_WAIT
  TCP    127.0.0.1:19575        platform:55970         TIME_WAIT
  TCP    127.0.0.1:19575        platform:57517         TIME_WAIT
  TCP    127.0.0.1:19575        platform:61464         TIME_WAIT
  TCP    127.0.0.1:19575        platform:61848         TIME_WAIT
  TCP    127.0.0.1:49376        platform:49377         ESTABLISHED
  TCP    127.0.0.1:49377        platform:49376         ESTABLISHED
  TCP    127.0.0.1:49670        platform:49671         ESTABLISHED
  TCP    127.0.0.1:49671        platform:49670         ESTABLISHED
  TCP    127.0.0.1:49672        platform:49673         ESTABLISHED
  TCP    127.0.0.1:49673        platform:49672         ESTABLISHED
  TCP    127.0.0.1:57118        platform:63736         ESTABLISHED
  TCP    127.0.0.1:58630        platform:58631         ESTABLISHED
  TCP    127.0.0.1:58631        platform:58630         ESTABLISHED
  TCP    127.0.0.1:62788        platform:62789         ESTABLISHED
  TCP    127.0.0.1:62789        platform:62788         ESTABLISHED
  TCP    127.0.0.1:63736        platform:57118         ESTABLISHED
```

```
C:\Windows\system32>netstat -n

Active Connections

  Proto  Local Address          Foreign Address        State
  TCP    127.0.0.1:19575        127.0.0.1:49321        TIME_WAIT
  TCP    127.0.0.1:19575        127.0.0.1:54740        TIME_WAIT
  TCP    127.0.0.1:19575        127.0.0.1:55939        TIME_WAIT
  TCP    127.0.0.1:19575        127.0.0.1:60557        TIME_WAIT
  TCP    127.0.0.1:19575        127.0.0.1:60870        TIME_WAIT
  TCP    127.0.0.1:19575        127.0.0.1:63199        TIME_WAIT
  TCP    127.0.0.1:49376        127.0.0.1:49377        ESTABLISHED
  TCP    127.0.0.1:49377        127.0.0.1:49376        ESTABLISHED
  TCP    127.0.0.1:49665        127.0.0.1:55846        ESTABLISHED
  TCP    127.0.0.1:49670        127.0.0.1:49671        ESTABLISHED
  TCP    127.0.0.1:49671        127.0.0.1:49670        ESTABLISHED
  TCP    127.0.0.1:49672        127.0.0.1:49673        ESTABLISHED
  TCP    127.0.0.1:49673        127.0.0.1:49672        ESTABLISHED
  TCP    127.0.0.1:55846        127.0.0.1:49665        ESTABLISHED
  TCP    127.0.0.1:57118        127.0.0.1:63736        ESTABLISHED
  TCP    127.0.0.1:58630        127.0.0.1:58631        ESTABLISHED
  TCP    127.0.0.1:58631        127.0.0.1:58630        ESTABLISHED
  TCP    127.0.0.1:62788        127.0.0.1:62789        ESTABLISHED
  TCP    127.0.0.1:62789        127.0.0.1:62788        ESTABLISHED
  TCP    127.0.0.1:63736        127.0.0.1:57118        ESTABLISHED
  TCP    127.0.0.1:63738        127.0.0.1:63739        ESTABLISHED
  TCP    127.0.0.1:63739        127.0.0.1:63738        ESTABLISHED
  TCP    127.0.0.1:63743        127.0.0.1:63755        ESTABLISHED
  TCP    127.0.0.1:63755        127.0.0.1:63743        ESTABLISHED
  TCP    127.0.0.1:64322        127.0.0.1:64323        ESTABLISHED


C:\Windows\system32>netstat -n 5

Active Connections

  Proto  Local Address          Foreign Address        State
  TCP    127.0.0.1:19575        127.0.0.1:50233        TIME_WAIT
  TCP    127.0.0.1:19575        127.0.0.1:52594        TIME_WAIT
  TCP    127.0.0.1:19575        127.0.0.1:54740        TIME_WAIT
  TCP    127.0.0.1:19575        127.0.0.1:55939        TIME_WAIT
  TCP    127.0.0.1:19575        127.0.0.1:58174        TIME_WAIT
  TCP    127.0.0.1:19575        127.0.0.1:60557        TIME_WAIT
  TCP    127.0.0.1:19575        127.0.0.1:60576        TIME_WAIT
  TCP    127.0.0.1:19575        127.0.0.1:64364        TIME_WAIT
  TCP    127.0.0.1:49376        127.0.0.1:49377        ESTABLISHED
  TCP    127.0.0.1:49377        127.0.0.1:49376        ESTABLISHED
  TCP    127.0.0.1:49665        127.0.0.1:55846        ESTABLISHED
  TCP    127.0.0.1:49670        127.0.0.1:49671        ESTABLISHED
  TCP    127.0.0.1:49671        127.0.0.1:49670        ESTABLISHED
  TCP    127.0.0.1:49672        127.0.0.1:49673        ESTABLISHED
  TCP    127.0.0.1:49673        127.0.0.1:49672        ESTABLISHED
  TCP    127.0.0.1:55846        127.0.0.1:49665        ESTABLISHED
  TCP    127.0.0.1:57118        127.0.0.1:63736        ESTABLISHED
  TCP    127.0.0.1:58630        127.0.0.1:58631        ESTABLISHED
  TCP    127.0.0.1:58631        127.0.0.1:58630        ESTABLISHED
  TCP    127.0.0.1:62788        127.0.0.1:62789        ESTABLISHED
  TCP    127.0.0.1:62789        127.0.0.1:62788        ESTABLISHED
  TCP    127.0.0.1:63736        127.0.0.1:57118        ESTABLISHED
  TCP    127.0.0.1:63738        127.0.0.1:63739        ESTABLISHED
  TCP    127.0.0.1:63739        127.0.0.1:63738        ESTABLISHED
  TCP    127.0.0.1:63743        127.0.0.1:63755        ESTABLISHED
  TCP    127.0.0.1:63755        127.0.0.1:63743        ESTABLISHED
  TCP    127.0.0.1:64322        127.0.0.1:64323        ESTABLISHED
  TCP    127.0.0.1:64323        127.0.0.1:64322        ESTABLISHED
  TCP    127.0.0.1:64324        127.0.0.1:64325        ESTABLISHED
  TCP    127.0.0.1:64325        127.0.0.1:64324        ESTABLISHED
  TCP    127.0.0.1:64326        127.0.0.1:64327        ESTABLISHED
  TCP    127.0.0.1:64327        127.0.0.1:64326        ESTABLISHED
  TCP    127.0.0.1:64335        127.0.0.1:64337        ESTABLISHED
  TCP    127.0.0.1:64336        127.0.0.1:64338        ESTABLISHED
  TCP    127.0.0.1:64337        127.0.0.1:64335        ESTABLISHED
  TCP    127.0.0.1:64338        127.0.0.1:64336        ESTABLISHED
  TCP    127.0.0.1:64339        127.0.0.1:64340        ESTABLISHED
```

```
C:\Windows\system32>netstat -a

Active Connections

  Proto  Local Address          Foreign Address        State
  TCP    0.0.0.0:135            KAJ:0                  LISTENING
  TCP    0.0.0.0:445            KAJ:0                  LISTENING
  TCP    0.0.0.0:3306           KAJ:0                  LISTENING
  TCP    0.0.0.0:5040           KAJ:0                  LISTENING
  TCP    0.0.0.0:5357           KAJ:0                  LISTENING
  TCP    0.0.0.0:5700           KAJ:0                  LISTENING
  TCP    0.0.0.0:6646           KAJ:0                  LISTENING
  TCP    0.0.0.0:6881           KAJ:0                  LISTENING
  TCP    0.0.0.0:7070           KAJ:0                  LISTENING
  TCP    0.0.0.0:19575          KAJ:0                  LISTENING
  TCP    0.0.0.0:19576          KAJ:0                  LISTENING
  TCP    0.0.0.0:19577          KAJ:0                  LISTENING
  TCP    0.0.0.0:33060          KAJ:0                  LISTENING
  TCP    0.0.0.0:49664          KAJ:0                  LISTENING
  TCP    0.0.0.0:49665          KAJ:0                  LISTENING
  TCP    0.0.0.0:49666          KAJ:0                  LISTENING
  TCP    0.0.0.0:49667          KAJ:0                  LISTENING
  TCP    0.0.0.0:49668          KAJ:0                  LISTENING
  TCP    0.0.0.0:49674          KAJ:0                  LISTENING
  TCP    127.0.0.1:1001         KAJ:0                  LISTENING
  TCP    127.0.0.1:8884         KAJ:0                  LISTENING
  TCP    127.0.0.1:9012         KAJ:0                  LISTENING
  TCP    127.0.0.1:19575        platform:50968         TIME_WAIT
  TCP    127.0.0.1:19575        platform:51233         TIME_WAIT
  TCP    127.0.0.1:19575        platform:51555         TIME_WAIT
  TCP    127.0.0.1:19575        platform:54936         TIME_WAIT
  TCP    127.0.0.1:19575        platform:57818         TIME_WAIT
  TCP    127.0.0.1:19575        platform:64050         TIME_WAIT
  TCP    127.0.0.1:27017        KAJ:0                  LISTENING
  TCP    127.0.0.1:49376        platform:49377         ESTABLISHED
  TCP    127.0.0.1:49377        platform:49376         ESTABLISHED
  TCP    127.0.0.1:49665        platform:64119         ESTABLISHED
  TCP    127.0.0.1:49670        platform:49671         ESTABLISHED
  TCP    127.0.0.1:49671        platform:49670         ESTABLISHED
  TCP    127.0.0.1:49672        platform:49673         ESTABLISHED
  TCP    127.0.0.1:49673        platform:49672         ESTABLISHED
  TCP    127.0.0.1:49710        KAJ:0                  LISTENING
  TCP    127.0.0.1:53659        KAJ:0                  LISTENING
  TCP    127.0.0.1:57118        platform:63736         ESTABLISHED
  TCP    127.0.0.1:58630        platform:58631         ESTABLISHED
  TCP    127.0.0.1:58631        platform:58630         ESTABLISHED
  TCP    127.0.0.1:62788        platform:62789         ESTABLISHED
```

Linux

- Ping

```
ani@KAJ:~$ ping google.com
PING google.com (142.250.196.78) 56(84) bytes of data.
64 bytes from maa03s46-in-f14.1e100.net (142.250.196.78): icmp_seq=1 ttl=119 time=91.1 ms
64 bytes from maa03s46-in-f14.1e100.net (142.250.196.78): icmp_seq=2 ttl=119 time=35.6 ms
64 bytes from maa03s46-in-f14.1e100.net (142.250.196.78): icmp_seq=3 ttl=119 time=49.3 ms
64 bytes from maa03s46-in-f14.1e100.net (142.250.196.78): icmp_seq=4 ttl=119 time=48.7 ms
64 bytes from maa03s46-in-f14.1e100.net (142.250.196.78): icmp_seq=5 ttl=119 time=21.1 ms
^C
--- google.com ping statistics ---
5 packets transmitted, 5 received, 0% packet loss, time 4003ms
rtt min/avg/max/mdev = 21.138/49.154/91.064/23.351 ms
ani@KAJ:~$ ping -a google.com
PING google.com (142.250.196.78) 56(84) bytes of data.
64 bytes from maa03s46-in-f14.1e100.net (142.250.196.78): icmp_seq=1 ttl=119 time=186 ms
64 bytes from maa03s46-in-f14.1e100.net (142.250.196.78): icmp_seq=2 ttl=119 time=45.5 ms
64 bytes from maa03s46-in-f14.1e100.net (142.250.196.78): icmp_seq=3 ttl=119 time=49.2 ms
64 bytes from maa03s46-in-f14.1e100.net (142.250.196.78): icmp_seq=4 ttl=119 time=20.5 ms
64 bytes from maa03s46-in-f14.1e100.net (142.250.196.78): icmp_seq=5 ttl=119 time=36.0 ms
^C
--- google.com ping statistics ---
5 packets transmitted, 5 received, 0% packet loss, time 4004ms
rtt min/avg/max/mdev = 20.522/67.409/185.728/59.985 ms
ani@KAJ:~$ ping -V
ping from iputils s20190709
ani@KAJ:~$ ping -b google.com
PING google.com (142.250.193.110) 56(84) bytes of data.
64 bytes from maa05s24-in-f14.1e100.net (142.250.193.110): icmp_seq=1 ttl=119 time=177 ms
64 bytes from maa05s24-in-f14.1e100.net (142.250.193.110): icmp_seq=2 ttl=119 time=65.0 ms
64 bytes from maa05s24-in-f14.1e100.net (142.250.193.110): icmp_seq=3 ttl=119 time=47.9 ms
64 bytes from maa05s24-in-f14.1e100.net (142.250.193.110): icmp_seq=4 ttl=119 time=22.8 ms
64 bytes from maa05s24-in-f14.1e100.net (142.250.193.110): icmp_seq=5 ttl=119 time=34.4 ms
^C
--- google.com ping statistics ---
5 packets transmitted, 5 received, 0% packet loss, time 4002ms
rtt min/avg/max/mdev = 22.802/69.497/177.345/55.728 ms
ani@KAJ:~$
```

- Route

```
ani@KAJ:~$ route
Kernel IP routing table
Destination      Gateway        Genmask          Flags Metric Ref    Use Iface
192.168.56.0     0.0.0.0        255.255.255.0    U     256    0        0 eth1
192.168.56.1     0.0.0.0        255.255.255.255  U     256    0        0 eth1
192.168.56.255   0.0.0.0        255.255.255.255  U     256    0        0 eth1
224.0.0.0        0.0.0.0        240.0.0.0        U     256    0        0 eth1
255.255.255.255  0.0.0.0        255.255.255.255  U     256    0        0 eth1
127.0.0.0        0.0.0.0        255.0.0.0        U     256    0        0 lo
127.0.0.1        0.0.0.0        255.255.255.255  U     256    0        0 lo
127.255.255.255  0.0.0.0        255.255.255.255  U     256    0        0 lo
224.0.0.0        0.0.0.0        240.0.0.0        U     256    0        0 lo
255.255.255.255  0.0.0.0        255.255.255.255  U     256    0        0 lo
0.0.0.0          192.168.1.1    255.255.255.255  U     0      0        0 wifi0
192.168.1.0      0.0.0.0        255.255.255.0    U     256    0        0 wifi0
192.168.1.2      0.0.0.0        255.255.255.255  U     256    0        0 wifi0
192.168.1.255    0.0.0.0        255.255.255.255  U     256    0        0 wifi0
224.0.0.0        0.0.0.0        240.0.0.0        U     256    0        0 wifi0
255.255.255.255  0.0.0.0        255.255.255.255  U     256    0        0 wifi0
ani@KAJ:~$ route -n
```

```
ani@KAJ:~$ route -n
Kernel IP routing table
Destination     Gateway         Genmask         Flags Metric Ref    Use Iface
192.168.56.0    0.0.0.0         255.255.255.0   U     256    0        0 eth1
192.168.56.1    0.0.0.0         255.255.255.255 U     256    0        0 eth1
192.168.56.255  0.0.0.0         255.255.255.255 U     256    0        0 eth1
224.0.0.0       0.0.0.0         240.0.0.0       U     256    0        0 eth1
255.255.255.255 0.0.0.0         255.255.255.255 U     256    0        0 eth1
127.0.0.0       0.0.0.0         255.0.0.0       U     256    0        0 lo
127.0.0.1       0.0.0.0         255.255.255.255 U     256    0        0 lo
127.255.255.255 0.0.0.0         255.255.255.255 U     256    0        0 lo
224.0.0.0       0.0.0.0         240.0.0.0       U     256    0        0 lo
255.255.255.255 0.0.0.0         255.255.255.255 U     256    0        0 lo
0.0.0.0         192.168.1.1     255.255.255.255 U     0      0        0 wifi0
192.168.1.0     0.0.0.0         255.255.255.0   U     256    0        0 wifi0
192.168.1.2     0.0.0.0         255.255.255.255 U     256    0        0 wifi0
192.168.1.255   0.0.0.0         255.255.255.255 U     256    0        0 wifi0
224.0.0.0       0.0.0.0         240.0.0.0       U     256    0        0 wifi0
255.255.255.255 0.0.0.0         255.255.255.255 U     256    0        0 wifi0
ani@KAJ:~$ route -Cn
/proc/net/rt_cache: No such file or directory
INET (IPv4) not configured in this system.
ani@KAJ:~$ ip route
none 224.0.0.0/4 dev eth0 proto unspec metric 256
none 255.255.255.255 dev eth0 proto unspec metric 256
none 192.168.56.0/24 dev eth1 proto unspec metric 256
none 192.168.56.1 dev eth1 proto unspec metric 256
none 192.168.56.255 dev eth1 proto unspec metric 256
none 224.0.0.0/4 dev eth1 proto unspec metric 256
none 255.255.255.255 dev eth1 proto unspec metric 256
none 127.0.0.0/8 dev lo proto unspec metric 256
none 127.0.0.1 dev lo proto unspec metric 256
none 127.255.255.255 dev lo proto unspec metric 256
none 224.0.0.0/4 dev lo proto unspec metric 256
none 255.255.255.255 dev lo proto unspec metric 256
none default via 192.168.1.1 dev wifi0 proto unspec metric 0
none 192.168.1.0/24 dev wifi0 proto unspec metric 256
none 192.168.1.2 dev wifi0 proto unspec metric 256
none 192.168.1.255 dev wifi0 proto unspec metric 256
none 224.0.0.0/4 dev wifi0 proto unspec metric 256
none 255.255.255.255 dev wifi0 proto unspec metric 256
none 224.0.0.0/4 dev wifi1 proto unspec metric 256
none 255.255.255.255 dev wifi1 proto unspec metric 256
none 224.0.0.0/4 dev wifi2 proto unspec metric 256
none 255.255.255.255 dev wifi2 proto unspec metric 256
ani@KAJ:~$
```

- Traceroute

```
ani@KAJ:~$ traceroute google.com
traceroute to google.com (142.250.196.78), 30 hops max, 60 byte packets
 1  * * *
 2  * * *
 3  * * *
 4  * * *
 5  * * *
 6  * * *
 7  * * *
 8  * * *
 9  * * *
10  * * *
11  * * *
12  * * *
13  * * *
14  * * *
15  * * *
16  * * *
17  * * *
18  * * *
19  * * *
20  * * *
21  * * *
22  * * *
23  * * *
24  * * *
25  * * *
26  * * *
27  * * *
28  * * *
29  * * *
30  * * *
ani@KAJ:~$
```

```
ani@KAJ:~$ traceroute -4 google.com
traceroute to google.com (172.217.160.142), 30 hops max, 60 byte packets
 1  * * *
 2  * * *
 3  * * *
 4  * * *
 5  * * *
 6  * * *
 7  * * *
 8  * * *
 9  * * *
10  * * *
11  * * *
12  * * *
13  * * *
14  * * *
15  * * *
16  * * *
17  * * *
18  * * *
19  * * *
20  * * *
21  * * *
22  * * *
23  * * *
24  * * *
25  * * *
26  * * *
27  * * *
28  * * *
29  * * *
30  * * *
ani@KAJ:~$ traceroute -6 google.com
traceroute to google.com (2404:6800:4007:82b::200e), 30 hops max, 80 byte packets
connect: Invalid argument
ani@KAJ:~$ traceroute -6 google.com
traceroute to google.com (2404:6800:4007:82b::200e), 30 hops max, 80 byte packets
connect: Invalid argument
ani@KAJ:~$
```

- NSlookup

```
ani@KAJ:~$ nslookup google.com
Server:         103.140.17.242
Address:        103.140.17.242#53

Non-authoritative answer:
Name:    google.com
Address: 142.250.193.142
Name:    google.com
Address: 2404:6800:4007:82b::200e

ani@KAJ:~$ nslookup -q-MX google.com
*** Invalid option: q-MX
Server:         103.140.17.242
Address:        103.140.17.242#53

Non-authoritative answer:
Name:    google.com
Address: 142.250.193.142
Name:    google.com
Address: 2404:6800:4007:82b::200e
```

```
ani@KAJ:~$ nslookup -type=soa google.com
Server:         103.140.17.242
Address:        103.140.17.242#53

Non-authoritative answer:
google.com
        origin = ns1.google.com
        mail addr = dns-admin.google.com
        serial = 396090275
        refresh = 900
        retry = 900
        expire = 1800
        minimum = 60

Authoritative answers can be found from:

ani@KAJ:~$ nslookup -type=a google.com
Server:         103.140.17.242
Address:        103.140.17.242#53

Non-authoritative answer:
Name:   google.com
Address: 142.250.193.142

ani@KAJ:~$
```

- Ifconfig

```
ani@KAJ: ~                                                                    —    □

ani@KAJ:~$ ifconfig
eth1: flags=4163<UP,BROADCAST,RUNNING,MULTICAST>  mtu 1500
        inet 192.168.56.1  netmask 255.255.255.0  broadcast 192.168.56.255
        inet6 fe80::e866:65b:18f5:53de  prefixlen 64  scopeid 0xfd<compat,link,site,host>
        ether 0a:00:27:00:00:02  (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 1500
        inet 127.0.0.1  netmask 255.0.0.0
        inet6 ::1  prefixlen 128  scopeid 0xfe<compat,link,site,host>
        loop  (Local Loopback)
        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

wifi0: flags=4163<UP,BROADCAST,RUNNING,MULTICAST>  mtu 1500
        inet 192.168.1.2  netmask 255.255.255.0  broadcast 192.168.1.255
        inet6 fe80::3967:1de3:1924:1daf  prefixlen 64  scopeid 0xfd<compat,link,site,host>
        ether 18:47:3d:e9:62:5d  (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

ani@KAJ:~$ ifconfig -a
```

```
ani@KAJ:~$ ifconfig -a
eth0: flags=64<RUNNING>  mtu 1500
        inet 169.254.213.84  netmask 255.255.0.0
        inet6 fe80::39eb:2543:9d3c:d554  prefixlen 64  scopeid 0xfd<compat,link,site,host>
        ether 18:47:3d:e9:62:5e  (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

eth1: flags=4163<UP,BROADCAST,RUNNING,MULTICAST>  mtu 1500
        inet 192.168.56.1  netmask 255.255.255.0  broadcast 192.168.56.255
        inet6 fe80::e866:65b:18f5:53de  prefixlen 64  scopeid 0xfd<compat,link,site,host>
        ether 0a:00:27:00:00:02  (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 1500
```

```
ani@KAJ:~$ ifconfig -s
Iface    MTU    RX-OK RX-ERR RX-DRP RX-OVR    TX-OK TX-ERR TX-DRP TX-OVR Flg
eth1     1500       0      0      0 0             0      0      0      0 BMRU
lo       1500       0      0      0 0             0      0      0      0 LRU
wifi0    1500       0      0      0 0             0      0      0      0 BMRU
ani@KAJ:~$ ifconfig -v
eth1: flags=4163<UP,BROADCAST,RUNNING,MULTICAST>  mtu 1500
        inet 192.168.56.1  netmask 255.255.255.0  broadcast 192.168.56.255
        inet6 fe80::e866:65b:18f5:53de  prefixlen 64  scopeid 0xfd<compat,link,site,host>
        ether 0a:00:27:00:00:02  (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 1500
        inet 127.0.0.1  netmask 255.0.0.0
        inet6 ::1  prefixlen 128  scopeid 0xfe<compat,link,site,host>
        loop  (Local Loopback)
        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

wifi0: flags=4163<UP,BROADCAST,RUNNING,MULTICAST>  mtu 1500
        inet 192.168.1.2  netmask 255.255.255.0  broadcast 192.168.1.255
        inet6 fe80::3967:1de3:1924:1daf  prefixlen 64  scopeid 0xfd<compat,link,site,host>
        ether 18:47:3d:e9:62:5d  (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

ani@KAJ:~$
```

- Netstat

```
ani@KAJ:~$ netstat
Active Internet connections (w/o servers)
Proto Recv-Q Send-Q Local Address           Foreign Address         State
Active UNIX domain sockets (w/o servers)
Proto RefCnt Flags       Type       State         I-Node   Path
ani@KAJ:~$ netstat -n
Active Internet connections (w/o servers)
Proto Recv-Q Send-Q Local Address           Foreign Address         State
Active UNIX domain sockets (w/o servers)
Proto RefCnt Flags       Type       State         I-Node   Path
ani@KAJ:~$ netstat -n 5
Active Internet connections (w/o servers)
Proto Recv-Q Send-Q Local Address           Foreign Address         State
Active UNIX domain sockets (w/o servers)
Proto RefCnt Flags       Type       State         I-Node   Path
ani@KAJ:~$ netstat -a
Active Internet connections (servers and established)
Proto Recv-Q Send-Q Local Address           Foreign Address         State
Active UNIX domain sockets (servers and established)
Proto RefCnt Flags       Type       State         I-Node   Path
ani@KAJ:~$
```

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.

```
C:\Users\Admin>arp -a

Interface: 192.168.56.1 --- 0x2
  Internet Address        Physical Address        Type
  192.168.56.255          ff-ff-ff-ff-ff-ff       static
  224.0.0.22              01-00-5e-00-00-16        static
  224.0.0.251             01-00-5e-00-00-fb        static
  224.0.0.252             01-00-5e-00-00-fc        static
  239.192.152.143         01-00-5e-40-98-8f        static
  239.255.255.250         01-00-5e-7f-ff-fa        static

Interface: 192.168.1.2 --- 0x17
  Internet Address        Physical Address        Type
  192.168.1.1             14-a7-2b-4a-69-c2        dynamic
  192.168.1.5             30-84-54-38-bf-1f        dynamic
  192.168.1.255           ff-ff-ff-ff-ff-ff        static
  224.0.0.22              01-00-5e-00-00-16        static
  239.255.255.250         01-00-5e-7f-ff-fa        static
```

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:\Users\Admin>nbtstat -r

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

    Resolved By Broadcast     = 0
    Resolved By Name Server   = 0

    Registered By Broadcast   = 99
    Registered By Name Server = 0
```

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.

```
C:\Users\Admin>hostname
KAJ
```

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 packet loss statistics that are more detailed than those provided by Ping or Tracert.

```
C:\Users\Admin>pathping www.google.com

Tracing route to www.google.com [2404:6800:4007:828::2004]
over a maximum of 30 hops:
  0  KAJ [2409:4073:118:cc8b:7de7:2bbb:dc74:3211]
  1     *      fe80::1075:8dff:febe:d0f1
  2     *         *         *
Computing statistics for 25 seconds...
            Source to Here   This Node/Link
Hop  RTT    Lost/Sent = Pct  Lost/Sent = Pct  Address
  0                                            KAJ [2409:4073:118:cc8b:7de7:2bbb:dc74:3211]
                                0/ 100 =  0%   |
  1    4ms    0/ 100 =  0%     0/ 100 =  0%  fe80::1075:8dff:febe:d0f1

Trace complete.
```

e) getmac

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

```
C:\Users\Admin>getmac

Physical Address      Transport Name
===================   ===========================================================
18-47-3D-E9-62-5D     \Device\Tcpip_{E246FA29-6751-4D42-9394-7835D0BE7087}
0A-00-27-00-00-02     \Device\Tcpip_{03466B3A-4067-427F-AB65-C5159998A27D}
```

F) Dig

Linux dig command stands for Domain Information Groper. This command is used in DNS lookup to query the DNS name server. It is also used to troubleshoot DNS related issues. It is mainly used to verify DNS mappings, MX Records, host addresses, and all other DNS records for a better understanding of the DNS topography.

This command is an improvised version of nslookup command.

```
ani@KAJ:~$ dig google.com

; <<>> DiG 9.16.1-Ubuntu <<>> google.com
;; global options: +cmd
;; Got answer:
;; ->>HEADER<<- opcode: QUERY, status: NOERROR, id: 6399
;; flags: qr rd ra; QUERY: 1, ANSWER: 1, AUTHORITY: 0, ADDITIONAL: 1

;; OPT PSEUDOSECTION:
; EDNS: version: 0, flags:; udp: 1280
;; QUESTION SECTION:
;google.com.                    IN      A

;; ANSWER SECTION:
google.com.             107     IN      A       142.250.67.46

;; Query time: 39 msec
;; SERVER: 192.168.43.1#53(192.168.43.1)
;; WHEN: Mon Sep 13 11:05:49 IST 2021
;; MSG SIZE  rcvd: 55
```

g)iwconfig

Linux iwconfig is used to configure the wireless network interface. It is used to set and view the basic WI-FI details like SSID and encryption. To know more about this command, refer to the man page.

```
ani@KAJ:~$ iwconfig
eth0      no wireless extensions.

lo        no wireless extensions.

wifi0     no wireless extensions.

wifi1     no wireless extensions.

wifi2     no wireless extensions.
```

h)whois

Linux whois command is used to fetch all the information related to a website. You can get all the information about a website including the registration and the owner information.

```
ani@KAJ: ~
ani@KAJ:~$ whois google.com
   Domain Name: GOOGLE.COM
   Registry Domain ID: 2138514_DOMAIN_COM-VRSN
   Registrar WHOIS Server: whois.markmonitor.com
   Registrar URL: http://www.markmonitor.com
   Updated Date: 2019-09-09T15:39:04Z
   Creation Date: 1997-09-15T04:00:00Z
   Registry Expiry Date: 2028-09-14T04:00:00Z
   Registrar: MarkMonitor Inc.
   Registrar IANA ID: 292
   Registrar Abuse Contact Email: abusecomplaints@markmonitor.com
   Registrar Abuse Contact Phone: +1.2083895740
   Domain Status: clientDeleteProhibited https://icann.org/epp#clientDeleteProhibited
   Domain Status: clientTransferProhibited https://icann.org/epp#clientTransferProhibited
   Domain Status: clientUpdateProhibited https://icann.org/epp#clientUpdateProhibited
   Domain Status: serverDeleteProhibited https://icann.org/epp#serverDeleteProhibited
   Domain Status: serverTransferProhibited https://icann.org/epp#serverTransferProhibited
   Domain Status: serverUpdateProhibited https://icann.org/epp#serverUpdateProhibited
   Name Server: NS1.GOOGLE.COM
   Name Server: NS2.GOOGLE.COM
   Name Server: NS3.GOOGLE.COM
   Name Server: NS4.GOOGLE.COM
   DNSSEC: unsigned
   URL of the ICANN Whois Inaccuracy Complaint Form: https://www.icann.org/wicf/
>>> Last update of whois database: 2021-09-13T05:46:50Z <<<

For more information on Whois status codes, please visit https://icann.org/epp

NOTICE: The expiration date displayed in this record is the date the
registrar's sponsorship of the domain name registration in the registry is
currently set to expire. This date does not necessarily reflect the expiration
date of the domain name registrant's agreement with the sponsoring
registrar.  Users may consult the sponsoring registrar's Whois database to
view the registrar's reported date of expiration for this registration.

TERMS OF USE: You are not authorized to access or query our Whois
database through the use of electronic processes that are high-volume and
automated except as reasonably necessary to register domain names or
modify existing registrations; the Data in VeriSign Global Registry
Services' ("VeriSign") Whois database is provided by VeriSign for
information purposes only, and to assist persons in obtaining information
about or related to a domain name registration record. VeriSign does not
guarantee its accuracy. By submitting a Whois query, you agree to abide
by the following terms of use: You agree that you may use this Data only
for lawful purposes and that under no circumstances will you use this Data
to: (1) allow, enable, or otherwise support the transmission of mass
unsolicited, commercial advertising or solicitations via e-mail, telephone,
or facsimile; or (2) enable high volume, automated, electronic processes
that apply to VeriSign (or its computer systems). The compilation,
repackaging, dissemination or other use of this Data is expressly
```