Networking & System Administration Lab

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

Windows **,Ping**


```
C:\Program Files (x86)>ping -a google.com

Pinging google.com [2404:6800:4007:825::200e] with 32 bytes of data:
Reply from 2404:6800:4007:825::200e: time=44ms
Reply from 2404:6800:4007:825::200e: time=71ms
Reply from 2404:6800:4007:825::200e: time=75ms
Reply from 2404:6800:4007:825::200e: time=85ms

Ping statistics for 2404:6800:4007:825::200e:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 44ms, Maximum = 85ms, Average = 68ms

C:\Program Files (x86)>ping -t google.com

Pinging google.com [2404:6800:4007:825::200e] with 32 bytes of data:
Reply from 2404:6800:4007:825::200e: time=70ms
Reply from 2404:6800:4007:825::200e: time=69ms
Reply from 2404:6800:4007:825::200e: time=78ms
Reply from 2404:6800:4007:825::200e: time=68ms
Reply from 2404:6800:4007:825::200e: time=81ms
Reply from 2404:6800:4007:825::200e: time=47ms
Reply from 2404:6800:4007:825::200e: time=74ms
Reply from 2404:6800:4007:825::200e: time=72ms
Reply from 2404:6800:4007:825::200e: time=64ms
Reply from 2404:6800:4007:825::200e: time=82ms
Reply from 2404:6800:4007:825::200e: time=81ms
```

```
C:\Program Files (x86)>ping -j google.com

Pinging google.com [142.250.182.174] with 32 bytes of data:
General failure.
General failure.
General failure.
General failure.

Ping statistics for 142.250.182.174:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),

C:\Program Files (x86)>ping -4 google.com

Pinging google.com [142.250.182.174] with 32 bytes of data:
Reply from 142.250.182.174: bytes=32 time=107ms TTL=111
Reply from 142.250.182.174: bytes=32 time=102ms TTL=111
Reply from 142.250.182.174: bytes=32 time=100ms TTL=111
Reply from 142.250.182.174: bytes=32 time=114ms TTL=111

Ping statistics for 142.250.182.174:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 100ms, Maximum = 114ms, Average = 105ms

C:\Program Files (x86)>
```

Route

```
C:\Program Files (x86)>route print
===========================================================================
Interface List
 13...f8 b4 6a 70 c1 47 ......Realtek Gaming GbE Family Controller
  8...0a 00 27 00 00 08 ......VirtualBox Host-Only Ethernet Adapter
  7...d4 d2 52 a7 c6 47 ......Microsoft Wi-Fi Direct Virtual Adapter
 11...d6 d2 52 a7 c6 46 ......Microsoft Wi-Fi Direct Virtual Adapter #2
 18...d4 d2 52 a7 c6 46 ......Intel(R) Wireless-AC 9560 160MHz
 15...d4 d2 52 a7 c6 4a ......Bluetooth Device (Personal Area Network)
  1...........................Software Loopback Interface 1
===========================================================================

IPv4 Route Table
===========================================================================
Active Routes:
Network Destination        Netmask          Gateway       Interface  Metric
          0.0.0.0          0.0.0.0   192.168.132.13  192.168.132.171     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
     192.168.56.0    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
    192.168.132.0    255.255.255.0         On-link   192.168.132.171    306
  192.168.132.171  255.255.255.255         On-link   192.168.132.171    306
  192.168.132.255  255.255.255.255         On-link   192.168.132.171    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      192.168.56.1    281
        224.0.0.0        240.0.0.0         On-link   192.168.132.171    306
  255.255.255.255  255.255.255.255         On-link         127.0.0.1    331
  255.255.255.255  255.255.255.255         On-link      192.168.56.1    281
  255.255.255.255  255.255.255.255         On-link   192.168.132.171    306
===========================================================================
Persistent Routes:
  None

IPv6 Route Table
===========================================================================
Active Routes:
 If Metric Network Destination      Gateway
 18     66 ::/0                     fe80::b864:16ff:fe33:f09f
  1    331 ::1/128                  On-link
 18     66 2409:4073:2083:3395::/64 On-link
 18    306 2409:4073:2083:3395:1df3:d43c:ed7a:6aac/128
                                    On-link
 18    306 2409:4073:2083:3395:9081:c95d:fb2:c05c/128
                                    On-link
  8    281 fe80::/64                On-link
```

```
C:\Program Files (x86)>route print -4
===========================================================================
Interface List
 13...f8 b4 6a 70 c1 47 ......Realtek Gaming GbE Family Controller
  8...0a 00 27 00 00 08 ......VirtualBox Host-Only Ethernet Adapter
  7...d4 d2 52 a7 c6 47 ......Microsoft Wi-Fi Direct Virtual Adapter
 11...d6 d2 52 a7 c6 46 ......Microsoft Wi-Fi Direct Virtual Adapter #2
 18...d4 d2 52 a7 c6 46 ......Intel(R) Wireless-AC 9560 160MHz
 15...d4 d2 52 a7 c6 4a ......Bluetooth Device (Personal Area Network)
  1...........................Software Loopback Interface 1
===========================================================================

IPv4 Route Table
===========================================================================
Active Routes:
Network Destination        Netmask          Gateway       Interface  Metric
          0.0.0.0          0.0.0.0    192.168.132.13   192.168.132.171     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
     192.168.56.0    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
    192.168.132.0    255.255.255.0         On-link   192.168.132.171    306
  192.168.132.171  255.255.255.255         On-link   192.168.132.171    306
  192.168.132.255  255.255.255.255         On-link   192.168.132.171    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      192.168.56.1    281
        224.0.0.0        240.0.0.0         On-link   192.168.132.171    306
  255.255.255.255  255.255.255.255         On-link         127.0.0.1    331
  255.255.255.255  255.255.255.255         On-link      192.168.56.1    281
  255.255.255.255  255.255.255.255         On-link   192.168.132.171    306
===========================================================================
Persistent Routes:
  None

C:\Program Files (x86)>
```

```
C:\Program Files (x86)>route print -6
===========================================================================
Interface List
 13...f8 b4 6a 70 c1 47 ......Realtek Gaming GbE Family Controller
  8...0a 00 27 00 00 08 ......VirtualBox Host-Only Ethernet Adapter
  7...d4 d2 52 a7 c6 47 ......Microsoft Wi-Fi Direct Virtual Adapter
 11...d6 d2 52 a7 c6 46 ......Microsoft Wi-Fi Direct Virtual Adapter #2
 18...d4 d2 52 a7 c6 46 ......Intel(R) Wireless-AC 9560 160MHz
 15...d4 d2 52 a7 c6 4a ......Bluetooth Device (Personal Area Network)
  1...........................Software Loopback Interface 1
===========================================================================

IPv6 Route Table
===========================================================================
Active Routes:
 If Metric Network Destination      Gateway
 18     66 ::/0                     fe80::b864:16ff:fe33:f09f
  1    331 ::1/128                  On-link
 18     66 2409:4073:2083:3395::/64 On-link
 18    306 2409:4073:2083:3395:1df3:d43c:ed7a:6aac/128
                                    On-link
 18    306 2409:4073:2083:3395:9081:c95d:fb2:c05c/128
                                    On-link
  8    281 fe80::/64                On-link
 18    306 fe80::/64                On-link
  8    281 fe80::8c34:4a4b:ba8a:750e/128
                                    On-link
 18    306 fe80::9081:c95d:fb2:c05c/128
                                    On-link
  1    331 ff00::/8                 On-link
  8    281 ff00::/8                 On-link
 18    306 ff00::/8                 On-link
===========================================================================
Persistent Routes:
  None

C:\Program Files (x86)>
```

```
C:\Program Files (x86)>route print *157
===========================================================================
Interface List
 13...f8 b4 6a 70 c1 47 ......Realtek Gaming GbE Family Controller
  8...0a 00 27 00 00 08 ......VirtualBox Host-Only Ethernet Adapter
  7...d4 d2 52 a7 c6 47 ......Microsoft Wi-Fi Direct Virtual Adapter
 11...d6 d2 52 a7 c6 46 ......Microsoft Wi-Fi Direct Virtual Adapter #2
 18...d4 d2 52 a7 c6 46 ......Intel(R) Wireless-AC 9560 160MHz
 15...d4 d2 52 a7 c6 4a ......Bluetooth Device (Personal Area Network)
  1...........................Software Loopback Interface 1
===========================================================================

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

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

C:\Program Files (x86)>
```

Tracert

```
C:\Program Files (x86)>tracert 192.168.1.1

Tracing route to 192.168.1.1 over a maximum of 30 hops

  1     2 ms     2 ms     1 ms  192.168.132.13
  2     *        *        *     Request timed out.
  3    89 ms    63 ms    67 ms  10.72.238.163
  4    75 ms    56 ms    73 ms  192.168.35.236
  5    88 ms    76 ms    60 ms  192.168.35.241
  6    67 ms    63 ms    53 ms  172.26.76.6
  7    72 ms    76 ms    72 ms  172.26.76.19
  8    93 ms    92 ms   142 ms  192.168.64.6
  9     *        *        *     Request timed out.
 10     *        *        *     Request timed out.
 11     *       ^C
C:\Program Files (x86)>tracert www.google.com

Tracing route to www.google.com [2404:6800:4002:81f::2004]
over a maximum of 30 hops:

  1     3 ms     3 ms     2 ms  2409:4073:2083:3395::db
  2     *        *        *     Request timed out.
  3   547 ms   472 ms   478 ms  2405:200:366:a161:4::ff03
  4   454 ms    94 ms    54 ms  2405:200:801:3500::1e4
  5    84 ms    80 ms    97 ms  2405:200:801:3500::1e3
  6   163 ms    82 ms   421 ms  2405:200:801:3500::1eb
  7     *        *        *     Request timed out.
  8    81 ms    84 ms    66 ms  2001:4860:1:1::8f2
  9   119 ms   117 ms   122 ms  2404:6800:813d::1
 10     *        *        *     Request timed out.
 11   784 ms   397 ms   101 ms  2001:4860:0:133f::9
 12   172 ms   115 ms   177 ms  2001:4860::9:4001:ddce
 13   198 ms   111 ms   128 ms  2001:4860:0:11dd::1
 14   122 ms   110 ms   111 ms  2001:4860:0:1::53a9
 15   138 ms   123 ms   103 ms  del12s02-in-x04.1e100.net [2404:6800:4002:81f::2004]

Trace complete.

C:\Program Files (x86)>
```

```
C:\Program Files (x86)>tracert -d www.yahoo.com

Tracing route to new-fp-shed.wg1.b.yahoo.com [2406:2000:e4:1605::9001]
over a maximum of 30 hops:

  1     2 ms     2 ms     1 ms  2409:4073:2083:3395::db
  2     *        *        *     Request timed out.
  3    78 ms    76 ms    64 ms  2405:200:366:a161:4::ff03
  4    84 ms    66 ms    56 ms  2405:200:801:3500::1e0
  5   174 ms   117 ms   105 ms  2405:200:801:3500::1e1
  6  1302 ms  3570 ms   948 ms  2405:200:801:3500::1ef
  7     *        *        *     Request timed out.
  8     *        *        *     Request timed out.
  9     *        *        *     Request timed out.
 10   132 ms   152 ms   137 ms  2406:2000:f015:7::1
 11    99 ms   121 ms   118 ms  2406:2000:e4:fe00::1
 12   136 ms   123 ms   115 ms  2406:2000:e4:fa18::1
 13   167 ms   147 ms   125 ms  2406:2000:e4:e208::1
 14   118 ms   106 ms   110 ms  2406:2000:e4:1605::9001

Trace complete.
```

```
C:\Program Files (x86)>tracert 22.110.0.1

Tracing route to 22.110.0.1 over a maximum of 30 hops

  1     3 ms     1 ms     4 ms  192.168.132.13
  2     *        *        *     Request timed out.
  3    83 ms    84 ms    78 ms  10.72.238.99
  4    90 ms   130 ms    63 ms  192.168.35.236
  5   130 ms    80 ms    83 ms  192.168.35.239
  6    50 ms    62 ms    74 ms  172.26.76.6
  7   171 ms   117 ms   157 ms  172.26.76.19
  8    73 ms    61 ms    79 ms  192.168.64.4
  9   247 ms   144 ms   165 ms  192.168.64.7
 10   950 ms   171 ms   641 ms  172.31.2.73
 11   120 ms    87 ms   100 ms  103.198.140.176
 12   344 ms   324 ms   182 ms  103.198.140.106
 13   280 ms   316 ms   318 ms  103.198.140.29
 14   355 ms   359 ms   213 ms  103.198.140.106
 15   246 ms   483 ms   315 ms  hurricane.mrs.franceix.net [37.49.232.13]
 16   239 ms   304 ms   417 ms  port-channel1.core2.mrs1.he.net [184.104.197.42]
 17   303 ms   322 ms   220 ms  ve952.core1.bio1.he.net [184.104.196.78]
 18   513 ms   523 ms   322 ms  100ge0-30.core1.orf2.he.net [184.105.64.122]
 19   428 ms   318 ms   612 ms  100ge15-1.core2.ash1.he.net [184.105.64.121]
 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:\Program Files (x86)>nslookup
Default Server:  UnKnown
Address:  192.168.132.13

>
>
C:\Program Files (x86)>nslookup google.com
Server:  UnKnown
Address:  192.168.132.13

Non-authoritative answer:
Name:     google.com
Addresses:  2404:6800:4007:817::200e
          142.250.194.238


C:\Program Files (x86)>nslookup -q=MX google.com
Server:  UnKnown
Address:  192.168.132.13

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

C:\Program Files (x86)>
```

```
C:\Program Files (x86)>nslookup -type=ns google.com
Server:  UnKnown
Address:  192.168.132.13

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

C:\Program Files (x86)>
```

Ipconfig

```
C:\Program Files (x86)>Ipconfig

Windows IP Configuration


Ethernet adapter Ethernet:

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

Ethernet adapter VirtualBox Host-Only Network:

   Connection-specific DNS Suffix  . :
   Link-local IPv6 Address . . . . . : fe80::8c34:4a4b:ba8a:750e%8
   IPv4 Address. . . . . . . . . . . : 192.168.56.1
   Subnet Mask . . . . . . . . . . . : 255.255.255.0
   Default Gateway . . . . . . . . . :

Wireless LAN adapter Local Area Connection* 1:

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

Wireless LAN adapter Local Area Connection* 10:

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

Wireless LAN adapter Wi-Fi:

   Connection-specific DNS Suffix  . :
   IPv6 Address. . . . . . . . . . . : 2409:4073:2083:3395:9081:c95d:fb2:c05c
   Temporary IPv6 Address. . . . . . : 2409:4073:2083:3395:1df3:d43c:ed7a:6aac
   Link-local IPv6 Address . . . . . : fe80::9081:c95d:fb2:c05c%18
   IPv4 Address. . . . . . . . . . . : 192.168.132.171
   Subnet Mask . . . . . . . . . . . : 255.255.255.0
   Default Gateway . . . . . . . . . : fe80::b864:16ff:fe33:f09f%18
                                       192.168.132.13
```

```
C:\Program Files (x86)>ipconfig /allcompartments

Windows IP Configuration


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

Ethernet adapter Ethernet:

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

Ethernet adapter VirtualBox Host-Only Network:

   Connection-specific DNS Suffix  . :
   Link-local IPv6 Address . . . . . : fe80::8c34:4a4b:ba8a:750e%8
   IPv4 Address. . . . . . . . . . . : 192.168.56.1
   Subnet Mask . . . . . . . . . . . : 255.255.255.0
   Default Gateway . . . . . . . . . :

Wireless LAN adapter Local Area Connection* 1:

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

Wireless LAN adapter Local Area Connection* 10:

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

Wireless LAN adapter Wi-Fi:

   Connection-specific DNS Suffix  . :
   IPv6 Address. . . . . . . . . . . : 2409:4073:2083:3395:9081:c95d:fb2:c05c
   Temporary IPv6 Address. . . . . . : 2409:4073:2083:3395:1df3:d43c:ed7a:6aac
   Link-local IPv6 Address . . . . . : fe80::9081:c95d:fb2:c05c%18
   IPv4 Address. . . . . . . . . . . : 192.168.132.171
   Subnet Mask . . . . . . . . . . . : 255.255.255.0
   Default Gateway . . . . . . . . . : fe80::b864:16ff:fe33:f09f%18
                                       192.168.132.13

Ethernet adapter Bluetooth Network Connection:

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

```
C:\Program Files (x86)>ipconfig /displaydns

Windows IP Configuration

    www.google.com.320051564110649.windows-display-service.com
    ----------------------------------------
    Record Name . . . . . : www.google.com.320051564110649.windows-display-service.com
    Record Type . . . . . : 5
    Time To Live  . . . . : 6591
    Data Length . . . . . : 8
    Section . . . . . . . : Answer
    CNAME Record  . . . . : windows-display-service.com


    Record Name . . . . . : windows-display-service.com
    Record Type . . . . . : 1
    Time To Live  . . . . : 6591
    Data Length . . . . . : 4
    Section . . . . . . . : Answer
    A (Host) Record . . . : 151.106.15.12


    1.0.0.127.in-addr.arpa
    ----------------------------------------
    Record Name . . . . . : 1.0.0.127.in-addr.arpa.
    Record Type . . . . . : 12
    Time To Live  . . . . : 289929
    Data Length . . . . . : 8
    Section . . . . . . . : Answer
    PTR Record  . . . . . : localhost
```

```
C:\Program Files (x86)>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.
No operation can be performed on Local Area Connection* 10 while it has its media disconnected.
No operation can be performed on Bluetooth Network Connection while it has its media disconnected.

Ethernet adapter Ethernet:

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

Ethernet adapter VirtualBox Host-Only Network:

   Connection-specific DNS Suffix  . :
   Link-local IPv6 Address . . . . . : fe80::8c34:4a4b:ba8a:750e%8
   IPv4 Address. . . . . . . . . . . : 192.168.56.1
   Subnet Mask . . . . . . . . . . . : 255.255.255.0
   Default Gateway . . . . . . . . . :

Wireless LAN adapter Local Area Connection* 1:

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

Wireless LAN adapter Local Area Connection* 10:

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

Wireless LAN adapter Wi-Fi:

   Connection-specific DNS Suffix  . :
   IPv6 Address. . . . . . . . . . . : 2409:4073:2083:3395:9081:c95d:fb2:c05c
   Temporary IPv6 Address. . . . . . : 2409:4073:2083:3395:1df3:d43c:ed7a:6aac
   Link-local IPv6 Address . . . . . : fe80::9081:c95d:fb2:c05c%18
   Default Gateway . . . . . . . . . : fe80::b864:16ff:fe33:f09f%18

Ethernet adapter Bluetooth Network Connection:

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

Netstat

```
C:\Program Files (x86)>netstat

Active Connections

  Proto  Local Address          Foreign Address        State
  TCP    192.168.132.171:50409  bam-6:https            ESTABLISHED
  TCP    192.168.132.171:53431  ec2-34-237-73-95:https ESTABLISHED
  TCP    192.168.132.171:53432  40.126.18.33:https     ESTABLISHED
  TCP    192.168.132.171:53434  52.230.225.67:https    TIME_WAIT
  TCP    192.168.132.171:53436  52.154.209.26:https    TIME_WAIT
  TCP    192.168.132.171:53437  52.184.201.245:https   TIME_WAIT
  TCP    192.168.132.171:53438  20.98.247.134:https    TIME_WAIT
  TCP    192.168.132.171:53439  52.154.209.26:https    TIME_WAIT
  TCP    192.168.132.171:53440  20.98.247.134:https    TIME_WAIT
  TCP    192.168.132.171:53441  40.91.76.181:https     TIME_WAIT
  TCP    192.168.132.171:55219  20.44.229.112:https    TIME_WAIT
  TCP    192.168.132.171:56291  203.17.244.53:https    TIME_WAIT
  TCP    192.168.132.171:56292  52.140.118.28:https    ESTABLISHED
  TCP    192.168.132.171:56293  203.17.244.53:6568     TIME_WAIT
  TCP    192.168.132.171:56294  1drv:https             ESTABLISHED
  TCP    192.168.132.171:56297  40.126.18.33:https     ESTABLISHED
  TCP    192.168.132.171:56299  40.119.249.228:https   ESTABLISHED
  TCP    192.168.132.171:56301  203.17.244.53:http     TIME_WAIT
  TCP    192.168.132.171:56304  117.18.237.29:http     ESTABLISHED
^C
C:\Program Files (x86)>netstat -n

Active Connections

  Proto  Local Address          Foreign Address        State
  TCP    192.168.132.171:50409  162.247.242.18:443     ESTABLISHED
  TCP    192.168.132.171:53431  34.237.73.95:443       ESTABLISHED
  TCP    192.168.132.171:53432  40.126.18.33:443       TIME_WAIT
  TCP    192.168.132.171:53434  52.230.225.67:443      TIME_WAIT
  TCP    192.168.132.171:53436  52.154.209.26:443      TIME_WAIT
  TCP    192.168.132.171:53437  52.184.201.245:443     TIME_WAIT
  TCP    192.168.132.171:53438  20.98.247.134:443      TIME_WAIT
  TCP    192.168.132.171:53439  52.154.209.26:443      TIME_WAIT
  TCP    192.168.132.171:53440  20.98.247.134:443      TIME_WAIT
  TCP    192.168.132.171:53441  40.91.76.181:443       TIME_WAIT
  TCP    192.168.132.171:55963  23.214.238.13:443      ESTABLISHED
  TCP    192.168.132.171:56292  52.140.118.28:443      TIME_WAIT
  TCP    192.168.132.171:56297  40.126.18.33:443       TIME_WAIT
  TCP    192.168.132.171:56299  40.119.249.228:443     TIME_WAIT
```

```
C:\Program Files (x86)>netstat -n 5

Active Connections

  Proto  Local Address          Foreign Address        State
  TCP    192.168.132.171:49756  52.35.205.184:443      ESTABLISHED
  TCP    192.168.132.171:50409  162.247.242.18:443     ESTABLISHED
  TCP    192.168.132.171:53431  34.237.73.95:443       ESTABLISHED
  TCP    192.168.132.171:53432  40.126.18.33:443       TIME_WAIT
  TCP    192.168.132.171:55963  23.214.238.13:443      ESTABLISHED
  TCP    192.168.132.171:56292  52.140.118.28:443      TIME_WAIT
  TCP    192.168.132.171:56297  40.126.18.33:443       TIME_WAIT
  TCP    192.168.132.171:56299  40.119.249.228:443     TIME_WAIT
  TCP    192.168.132.171:56906  202.61.254.211:4444    ESTABLISHED
  TCP    192.168.132.171:58818  20.44.229.112:443      ESTABLISHED
  TCP    192.168.132.171:60825  203.17.244.53:80       ESTABLISHED
  TCP    192.168.132.171:61319  34.237.73.95:443       ESTABLISHED
  TCP    192.168.132.171:61327  40.126.18.33:443       TIME_WAIT
  TCP    192.168.132.171:62927  162.247.242.18:443     TIME_WAIT
  TCP    192.168.132.171:62960  20.198.162.78:443      ESTABLISHED
  TCP    192.168.132.171:62961  20.198.162.78:443      ESTABLISHED
  TCP    [2409:4073:2083:3395:1df3:d43c:ed7a:6aac]:53221  [2404:6800:4003:c04::bc]:5228  ESTABLISHED
  TCP    [2409:4073:2083:3395:1df3:d43c:ed7a:6aac]:60611  [2405:200:1630:4ba::57]:443  CLOSE_WAIT
  TCP    [2409:4073:2083:3395:1df3:d43c:ed7a:6aac]:61680  [2001:4c28:3000:622:107:167:110:216]:443  ESTABLISHED
  TCP    [2409:4073:2083:3395:1df3:d43c:ed7a:6aac]:64403  [2001:4c28:3000:622:107:167:110:216]:443  CLOSE_WAIT
  TCP    [2409:4073:2083:3395:1df3:d43c:ed7a:6aac]:64702  [2a03:2880:f237:1d1:face:b00c:0:167]:443  ESTABLISHED

Active Connections

  Proto  Local Address          Foreign Address        State
  TCP    192.168.132.171:49756  52.35.205.184:443      ESTABLISHED
```

```
  TCP    ^C
C:\Program Files (x86)>netstat -a

Active Connections

  Proto  Local Address          Foreign Address        State
  TCP    0.0.0.0:135            R3DSkull:0             LISTENING
  TCP    0.0.0.0:445            R3DSkull:0             LISTENING
  TCP    0.0.0.0:808            R3DSkull:0             LISTENING
  TCP    0.0.0.0:5040           R3DSkull:0             LISTENING
  TCP    0.0.0.0:7070           R3DSkull:0             LISTENING
  TCP    0.0.0.0:7680           R3DSkull:0             LISTENING
  TCP    0.0.0.0:49664          R3DSkull:0             LISTENING
  TCP    0.0.0.0:49665          R3DSkull:0             LISTENING
  TCP    0.0.0.0:49666          R3DSkull:0             LISTENING
  TCP    0.0.0.0:49667          R3DSkull:0             LISTENING
  TCP    0.0.0.0:49668          R3DSkull:0             LISTENING
  TCP    0.0.0.0:49670          R3DSkull:0             LISTENING
  TCP    0.0.0.0:49671          R3DSkull:0             LISTENING
  TCP    127.0.0.1:4370         R3DSkull:0             LISTENING
  TCP    127.0.0.1:4380         R3DSkull:0             LISTENING
  TCP    127.0.0.1:5939         R3DSkull:0             LISTENING
  TCP    127.0.0.1:9222         R3DSkull:0             LISTENING
  TCP    192.168.56.1:139       R3DSkull:0             LISTENING
  TCP    192.168.132.171:139    R3DSkull:0             LISTENING
  TCP    192.168.132.171:49756  ec2-52-35-205-184:https  ESTABLISHED
  TCP    192.168.132.171:50409  bam-6:https            ESTABLISHED
  TCP    192.168.132.171:53431  ec2-34-237-73-95:https  ESTABLISHED
  TCP    192.168.132.171:55123  a-0003:https           ESTABLISHED
  TCP    192.168.132.171:55963  a23-214-238-13:https   ESTABLISHED
  TCP    192.168.132.171:56906  v220210418865148907:4444  ESTABLISHED
```

Linux

Ping

```
jeena@jeena-VirtualBox:~$ ping google.com
PING google.com (142.250.77.110) 56(84) bytes of data.
64 bytes from maa05s15-in-f14.1e100.net (142.250.77.110): icmp_seq=1 ttl=110 time=1091 ms
64 bytes from maa05s15-in-f14.1e100.net (142.250.77.110): icmp_seq=3 ttl=110 time=490 ms
64 bytes from maa05s15-in-f14.1e100.net (142.250.77.110): icmp_seq=4 ttl=110 time=291 ms
64 bytes from maa05s15-in-f14.1e100.net (142.250.77.110): icmp_seq=5 ttl=110 time=797 ms
64 bytes from maa05s15-in-f14.1e100.net (142.250.77.110): icmp_seq=6 ttl=110 time=394 ms
64 bytes from maa05s15-in-f14.1e100.net (142.250.77.110): icmp_seq=7 ttl=110 time=646 ms
64 bytes from maa05s15-in-f14.1e100.net (142.250.77.110): icmp_seq=8 ttl=110 time=1373 ms
64 bytes from maa05s15-in-f14.1e100.net (142.250.77.110): icmp_seq=13 ttl=110 time=1165 ms
64 bytes from maa05s15-in-f14.1e100.net (142.250.77.110): icmp_seq=14 ttl=110 time=1282 ms
64 bytes from maa05s15-in-f14.1e100.net (142.250.77.110): icmp_seq=15 ttl=110 time=1153 ms
64 bytes from maa05s15-in-f14.1e100.net (142.250.77.110): icmp_seq=16 ttl=110 time=1192 ms
64 bytes from maa05s15-in-f14.1e100.net (142.250.77.110): icmp_seq=17 ttl=110 time=785 ms
64 bytes from maa05s15-in-f14.1e100.net (142.250.77.110): icmp_seq=18 ttl=110 time=568 ms
64 bytes from maa05s15-in-f14.1e100.net (142.250.77.110): icmp_seq=19 ttl=110 time=757 ms
64 bytes from maa05s15-in-f14.1e100.net (142.250.77.110): icmp_seq=20 ttl=110 time=757 ms
64 bytes from maa05s15-in-f14.1e100.net (142.250.77.110): icmp_seq=23 ttl=110 time=1566 ms
64 bytes from maa05s15-in-f14.1e100.net (142.250.77.110): icmp_seq=27 ttl=110 time=1155 ms
64 bytes from maa05s15-in-f14.1e100.net (142.250.77.110): icmp_seq=30 ttl=110 time=1476 ms
64 bytes from maa05s15-in-f14.1e100.net (142.250.77.110): icmp_seq=32 ttl=110 time=1405 ms
64 bytes from maa05s15-in-f14.1e100.net (142.250.77.110): icmp_seq=34 ttl=110 time=1031 ms
64 bytes from maa05s15-in-f14.1e100.net (142.250.77.110): icmp_seq=35 ttl=110 time=1347 ms
64 bytes from maa05s15-in-f14.1e100.net (142.250.77.110): icmp_seq=36 ttl=110 time=704 ms
64 bytes from maa05s15-in-f14.1e100.net (142.250.77.110): icmp_seq=38 ttl=110 time=1439 ms
64 bytes from maa05s15-in-f14.1e100.net (142.250.77.110): icmp_seq=40 ttl=110 time=1315 ms
64 bytes from maa05s15-in-f14.1e100.net (142.250.77.110): icmp_seq=41 ttl=110 time=1448 ms
64 bytes from maa05s15-in-f14.1e100.net (142.250.77.110): icmp_seq=42 ttl=110 time=1485 ms
64 bytes from maa05s15-in-f14.1e100.net (142.250.77.110): icmp_seq=43 ttl=110 time=1498 ms
64 bytes from maa05s15-in-f14.1e100.net (142.250.77.110): icmp_seq=44 ttl=110 time=1239 ms
64 bytes from maa05s15-in-f14.1e100.net (142.250.77.110): icmp_seq=45 ttl=110 time=1447 ms
64 bytes from maa05s15-in-f14.1e100.net (142.250.77.110): icmp_seq=46 ttl=110 time=1123 ms
64 bytes from maa05s15-in-f14.1e100.net (142.250.77.110): icmp_seq=47 ttl=110 time=1206 ms
64 bytes from maa05s15-in-f14.1e100.net (142.250.77.110): icmp_seq=48 ttl=110 time=1299 ms
64 bytes from maa05s15-in-f14.1e100.net (142.250.77.110): icmp_seq=49 ttl=110 time=971 ms
64 bytes from maa05s15-in-f14.1e100.net (142.250.77.110): icmp_seq=50 ttl=110 time=446 ms
64 bytes from maa05s15-in-f14.1e100.net (142.250.77.110): icmp_seq=51 ttl=110 time=133 ms
64 bytes from maa05s15-in-f14.1e100.net (142.250.77.110): icmp_seq=52 ttl=110 time=276 ms
64 bytes from maa05s15-in-f14.1e100.net (142.250.77.110): icmp_seq=53 ttl=110 time=1159 ms
64 bytes from maa05s15-in-f14.1e100.net (142.250.77.110): icmp_seq=54 ttl=110 time=1355 ms
64 bytes from maa05s15-in-f14.1e100.net (142.250.77.110): icmp_seq=55 ttl=110 time=1353 ms
64 bytes from maa05s15-in-f14.1e100.net (142.250.77.110): icmp_seq=56 ttl=110 time=556 ms
```

```
rtt min/avg/max/mdev = 92.891/1045.863/1572.221/413.334 ms, pipe 2
jeena@jeena-VirtualBox:~$ ping -a google.com
PING google.com (142.250.195.142) 56(84) bytes of data.
64 bytes from maa03s40-in-f14.1e100.net (142.250.195.142): icmp_seq=1 ttl=111 time=77.4 ms
64 bytes from maa03s40-in-f14.1e100.net (142.250.195.142): icmp_seq=2 ttl=111 time=84.4 ms
64 bytes from maa03s40-in-f14.1e100.net (142.250.195.142): icmp_seq=3 ttl=111 time=72.2 ms
64 bytes from maa03s40-in-f14.1e100.net (142.250.195.142): icmp_seq=4 ttl=111 time=76.7 ms
64 bytes from maa03s40-in-f14.1e100.net (142.250.195.142): icmp_seq=5 ttl=111 time=82.9 ms
64 bytes from maa03s40-in-f14.1e100.net (142.250.195.142): icmp_seq=6 ttl=111 time=76.6 ms
64 bytes from maa03s40-in-f14.1e100.net (142.250.195.142): icmp_seq=7 ttl=111 time=75.1 ms
64 bytes from maa03s40-in-f14.1e100.net (142.250.195.142): icmp_seq=8 ttl=111 time=65.4 ms
64 bytes from maa03s40-in-f14.1e100.net (142.250.195.142): icmp_seq=9 ttl=111 time=77.0 ms
64 bytes from maa03s40-in-f14.1e100.net (142.250.195.142): icmp_seq=10 ttl=111 time=84.9 ms
64 bytes from maa03s40-in-f14.1e100.net (142.250.195.142): icmp_seq=11 ttl=111 time=65.6 ms
64 bytes from maa03s40-in-f14.1e100.net (142.250.195.142): icmp_seq=12 ttl=111 time=66.0 ms
64 bytes from maa03s40-in-f14.1e100.net (142.250.195.142): icmp_seq=13 ttl=111 time=72.0 ms
64 bytes from maa03s40-in-f14.1e100.net (142.250.195.142): icmp_seq=14 ttl=111 time=67.0 ms
64 bytes from maa03s40-in-f14.1e100.net (142.250.195.142): icmp_seq=15 ttl=111 time=79.2 ms
64 bytes from maa03s40-in-f14.1e100.net (142.250.195.142): icmp_seq=16 ttl=111 time=71.8 ms
64 bytes from maa03s40-in-f14.1e100.net (142.250.195.142): icmp_seq=17 ttl=111 time=80.9 ms
64 bytes from maa03s40-in-f14.1e100.net (142.250.195.142): icmp_seq=18 ttl=111 time=184 ms
64 bytes from maa03s40-in-f14.1e100.net (142.250.195.142): icmp_seq=19 ttl=111 time=105 ms
64 bytes from maa03s40-in-f14.1e100.net (142.250.195.142): icmp_seq=20 ttl=111 time=216 ms
64 bytes from maa03s40-in-f14.1e100.net (142.250.195.142): icmp_seq=21 ttl=111 time=118 ms
64 bytes from maa03s40-in-f14.1e100.net (142.250.195.142): icmp_seq=22 ttl=111 time=101 ms
```

```
rtt min/avg/max/mdev = 47.250/155.728/910.225/184.005 ms
jeena@jeena-VirtualBox:~$ ping -V
ping from iputils s20190709
jeena@jeena-VirtualBox:~$ ping -b google.com
PING google.com (142.250.195.142) 56(84) bytes of data.
64 bytes from maa03s40-in-f14.1e100.net (142.250.195.142): icmp_seq=1 ttl=111 time=83.8 ms
64 bytes from maa03s40-in-f14.1e100.net (142.250.195.142): icmp_seq=2 ttl=111 time=126 ms
64 bytes from maa03s40-in-f14.1e100.net (142.250.195.142): icmp_seq=3 ttl=111 time=54.2 ms
64 bytes from maa03s40-in-f14.1e100.net (142.250.195.142): icmp_seq=4 ttl=111 time=334 ms
64 bytes from maa03s40-in-f14.1e100.net (142.250.195.142): icmp_seq=5 ttl=111 time=111 ms
64 bytes from maa03s40-in-f14.1e100.net (142.250.195.142): icmp_seq=6 ttl=111 time=111 ms
64 bytes from maa03s40-in-f14.1e100.net (142.250.195.142): icmp_seq=7 ttl=111 time=67.6 ms
64 bytes from maa03s40-in-f14.1e100.net (142.250.195.142): icmp_seq=8 ttl=111 time=63.7 ms
64 bytes from maa03s40-in-f14.1e100.net (142.250.195.142): icmp_seq=9 ttl=111 time=88.4 ms
64 bytes from maa03s40-in-f14.1e100.net (142.250.195.142): icmp_seq=10 ttl=111 time=89.9 ms
64 bytes from maa03s40-in-f14.1e100.net (142.250.195.142): icmp_seq=11 ttl=111 time=74.4 ms
64 bytes from maa03s40-in-f14.1e100.net (142.250.195.142): icmp_seq=12 ttl=111 time=71.5 ms
64 bytes from maa03s40-in-f14.1e100.net (142.250.195.142): icmp_seq=13 ttl=111 time=83.3 ms
64 bytes from maa03s40-in-f14.1e100.net (142.250.195.142): icmp_seq=14 ttl=111 time=234 ms
64 bytes from maa03s40-in-f14.1e100.net (142.250.195.142): icmp_seq=15 ttl=111 time=268 ms
64 bytes from maa03s40-in-f14.1e100.net (142.250.195.142): icmp_seq=16 ttl=111 time=198 ms
```

Route

```
jeena@jeena-VirtualBox:~$ route

Command 'route' not found, but can be installed with:

sudo apt install net-tools

jeena@jeena-VirtualBox:~$
```

```
jeena@jeena-VirtualBox:~$ route -n

Command 'route' not found, but can be installed with:

sudo apt install net-tools

jeena@jeena-VirtualBox:~$ route -Cn

Command 'route' not found, but can be installed with:

sudo apt install net-tools

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

Traceroute

```
jeena@jeena-VirtualBox:~$ traceroute google.com

Command 'traceroute' not found, but can be installed with:

sudo apt install inetutils-traceroute  # version 2:1.9.4-11ubuntu0.1, or
sudo apt install traceroute            # version 1:2.1.0-2

jeena@jeena-VirtualBox:~$ traceroute -4 google.com

Command 'traceroute' not found, but can be installed with:

sudo apt install inetutils-traceroute  # version 2:1.9.4-11ubuntu0.1, or
sudo apt install traceroute            # version 1:2.1.0-2

jeena@jeena-VirtualBox:~$
```

Nslookup

```
sudo apt install traceroute          # version 1.2.1.0-2

jeena@jeena-VirtualBox:~$ nslookup google.com
Server:          127.0.0.53
Address:         127.0.0.53#53

Non-authoritative answer:
Name:    google.com
Address: 142.250.194.238
Name:    google.com
Address: 2404:6800:4002:825::200e

jeena@jeena-VirtualBox:~$
```

```
jeena@jeena-VirtualBox:~$ 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 = 40 alt3.aspmx.l.google.com.
google.com      mail exchanger = 30 alt2.aspmx.l.google.com.
google.com      mail exchanger = 10 aspmx.l.google.com.
google.com      mail exchanger = 50 alt4.aspmx.l.google.com.

Authoritative answers can be found from:

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

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

Authoritative answers can be found from:

jeena@jeena-VirtualBox:~$
```

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

Non-authoritative answer:
Name:    google.com
Address: 142.250.194.238

jeena@jeena-VirtualBox:~$
```

Ifconfig

```
jeena@jeena-VirtualBox:~$ ifconfig

Command 'ifconfig' not found, but can be installed with:

sudo apt install net-tools

jeena@jeena-VirtualBox:~$ ifconfig -a

Command 'ifconfig' not found, but can be installed with:

sudo apt install net-tools

jeena@jeena-VirtualBox:~$
```

```
jeena@jeena-VirtualBox:~$ ifconfig -s

Command 'ifconfig' not found, but can be installed with:

sudo apt install net-tools

jeena@jeena-VirtualBox:~$ ifconfig -v
```

Netstat

```
jeena@jeena-VirtualBox:~$ netstat

Command 'netstat' not found, but can be installed with:

sudo apt install net-tools
```

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\jeena>arp -a

Interface: 192.168.56.1 --- 0x8
  Internet Address      Physical Address      Type
  192.168.56.255        ff-ff-ff-ff-ff-ff     static
  224.0.0.22            01-00-5e-00-00-16     static
  224.0.0.251           01-00-5e-00-00-fb     static
  224.0.0.252           01-00-5e-00-00-fc     static
  239.255.255.250       01-00-5e-7f-ff-fa     static
  255.255.255.255       ff-ff-ff-ff-ff-ff     static

Interface: 192.168.132.171 --- 0x12
  Internet Address      Physical Address      Type
  192.168.132.13        ba-64-16-33-f0-9f     dynamic
  192.168.132.255       ff-ff-ff-ff-ff-ff     static
  224.0.0.22            01-00-5e-00-00-16     static
  224.0.0.251           01-00-5e-00-00-fb     static
  224.0.0.252           01-00-5e-00-00-fc     static
  239.255.255.250       01-00-5e-7f-ff-fa     static
  255.255.255.255       ff-ff-ff-ff-ff-ff     static

C:\Users\jeena>
```

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\jeena>nbtstat -r

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

    Resolved By Broadcast     = 0
    Resolved By Name Server   = 0

    Registered By Broadcast   = 69
    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\jeena>hostname
R3DSkull
```

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\jeena>pathping www.google.com

Tracing route to www.google.com [2404:6800:4007:820::2004]
over a maximum of 30 hops:
  0  R3DSkull [2409:4073:2083:3395:1df3:d43c:ed7a:6aac]
  1  2409:4073:2083:3395::db
  2     *        *        *
Computing statistics for 25 seconds...
            Source to Here   This Node/Link
Hop  RTT    Lost/Sent = Pct  Lost/Sent = Pct  Address
  0                                            R3DSkull [2409:4073:2083:3395:1df3:d43c:ed7a:6aac]
                               0/ 100 =  0%   |
  1    4ms     0/ 100 =  0%    0/ 100 =  0%  2409:4073:2083:3395::db

Trace complete.
```

e) getmac

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

```
C:\Users\jeena>getmac

Physical Address    Transport Name
================    ===================================================
0A-00-27-00-00-08   \Device\Tcpip_{3558F07A-E38C-41BA-B510-9E5F08B897E5}
D4-D2-52-A7-C6-46   \Device\Tcpip_{C3B719B1-1DDB-4922-BF2B-76A9C2D194D3}
F8-B4-6A-70-C1-47   Media disconnected
D4-D2-52-A7-C6-4A   Media disconnected
```