NETWORKING & SYSTEM ADMINISTRATION LAB

ASSIGNMENT - 6

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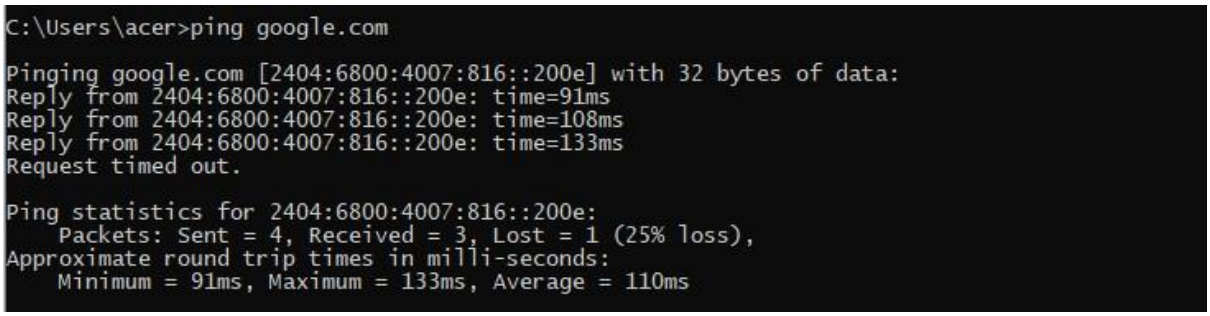
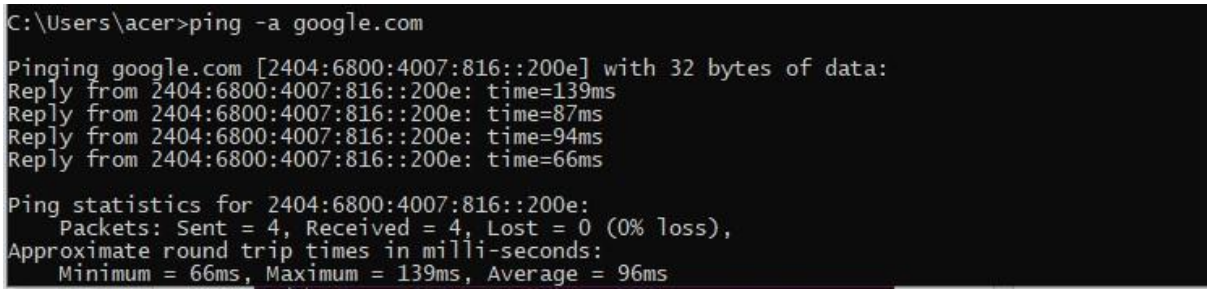
1. Try out these network commands in Window as well as in Linux and perform at least 4 options with each command: ping, route, traceroute, nslookup, Ip Config, NetStat .

WINDOWS

Ping:





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

Pinging google.com [2404:6800:4007:816::200e] with 32 bytes of data:
Reply from 2404:6800:4007:816::200e: time=95ms
Reply from 2404:6800:4007:816::200e: time=80ms
Reply from 2404:6800:4007:816::200e: time=59ms
Reply from 2404:6800:4007:816::200e: time=82ms
Reply from 2404:6800:4007:816::200e: time=90ms
Reply from 2404:6800:4007:816::200e: time=54ms
Reply from 2404:6800:4007:816::200e: time=88ms
Reply from 2404:6800:4007:816::200e: time=161ms
Reply from 2404:6800:4007:816::200e: time=99ms
Reply from 2404:6800:4007:816::200e: time=73ms
Reply from 2404:6800:4007:816::200e: time=81ms
Reply from 2404:6800:4007:816::200e: time=61ms
Reply from 2404:6800:4007:816::200e: time=52ms
Reply from 2404:6800:4007:816::200e: time=75ms
Reply from 2404:6800:4007:816::200e: time=68ms
Reply from 2404:6800:4007:816::200e: time=57ms
Reply from 2404:6800:4007:816::200e: time=77ms
Reply from 2404:6800:4007:816::200e: time=73ms
Reply from 2404:6800:4007:816::200e: time=73ms
Reply from 2404:6800:4007:816::200e: time=53ms
Reply from 2404:6800:4007:816::200e: time=72ms
Reply from 2404:6800:4007:816::200e: time=64ms
Reply from 2404:6800:4007:816::200e: time=91ms
Reply from 2404:6800:4007:816::200e: time=72ms
Reply from 2404:6800:4007:816::200e: time=65ms
Reply from 2404:6800:4007:816::200e: time=58ms

Ping statistics for 2404:6800:4007:816::200e:
    Packets: Sent = 26, Received = 26, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 52ms, Maximum = 161ms, Average = 75ms
Control-C
^C
```

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

Pinging google.com [142.250.195.14] with 32 bytes of data:
General failure.
General failure.
General failure.
General failure.

Ping statistics for 142.250.195.14:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),
```

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

Pinging google.com [142.250.195.14] with 32 bytes of data:
Reply from 142.250.195.14: bytes=32 time=901ms TTL=111
Reply from 142.250.195.14: bytes=32 time=144ms TTL=111
Reply from 142.250.195.14: bytes=32 time=157ms TTL=111
Reply from 142.250.195.14: bytes=32 time=711ms TTL=111

Ping statistics for 142.250.195.14:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 144ms, Maximum = 901ms, Average = 478ms
```

Route

```
C:\Users\acer>route print
===========================================================================
Interface List
 24...98 29 a6 42 e0 55 ......Realtek PCIe GBE Family Controller
 12...0a 00 27 00 00 0c ......VirtualBox Host-Only Ethernet Adapter
 22...ea 2a 44 d5 87 e5 ......Microsoft Wi-Fi Direct Virtual Adapter
 17...fa 2a 44 d5 87 e5 ......Microsoft Wi-Fi Direct Virtual Adapter #2
  7...e8 2a 44 d5 87 e5 ......Qualcomm Atheros QCA9377 Wireless Network Adapter
 15...e8 2a 44 d5 87 e6 ......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  192.168.108.237  192.168.108.151     55
        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
   192.168.108.0    255.255.255.0         On-link   192.168.108.151    311
  192.168.108.151  255.255.255.255         On-link   192.168.108.151    311
  192.168.108.255  255.255.255.255         On-link   192.168.108.151    311
        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   192.168.108.151    311
  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   192.168.108.151    311
===========================================================================
Persistent Routes:
  None
```

```
C:\Users\acer>route print -4
===========================================================================
Interface List
 24...98 29 a6 42 e0 55 ......Realtek PCIe GBE Family Controller
 12...0a 00 27 00 00 0c ......VirtualBox Host-Only Ethernet Adapter
 22...ea 2a 44 d5 87 e5 ......Microsoft Wi-Fi Direct Virtual Adapter
 17...fa 2a 44 d5 87 e5 ......Microsoft Wi-Fi Direct Virtual Adapter #2
  7...e8 2a 44 d5 87 e5 ......Qualcomm Atheros QCA9377 Wireless Network Adapter
 15...e8 2a 44 d5 87 e6 ......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  192.168.108.237  192.168.108.151     55
        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
   192.168.108.0    255.255.255.0         On-link   192.168.108.151    311
  192.168.108.151  255.255.255.255         On-link   192.168.108.151    311
  192.168.108.255  255.255.255.255         On-link   192.168.108.151    311
        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   192.168.108.151    311
  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   192.168.108.151    311
===========================================================================
Persistent Routes:
  None
```

```
C:\Users\acer>route -6

Manipulates network routing tables.

ROUTE [-f] [-p] [-4|-6] command [destination]
                  [MASK netmask]  [gateway] [METRIC metric]  [IF interface]

  -f           Clears the routing tables of all gateway entries.  If this is
               used in conjunction with one of the commands, the tables are
               cleared prior to running the command.

  -p           When used with the ADD command, makes a route persistent across
               boots of the system. By default, routes are not preserved
               when the system is restarted. Ignored for all other commands,
               which always affect the appropriate persistent routes.

  -4           Force using IPv4.

  -6           Force using IPv6.

  command      One of these:
                 PRINT     Prints  a route
                 ADD       Adds    a route
                 DELETE    Deletes a route
                 CHANGE    Modifies an existing route
  destination  Specifies the host.
  MASK         Specifies that the next parameter is the 'netmask' value.
  netmask      Specifies a subnet mask value for this route entry.
               If not specified, it defaults to 255.255.255.255.
  gateway      Specifies gateway.
  interface    the interface number for the specified route.
  METRIC       specifies the metric, ie. cost for the destination.

All symbolic names used for destination are looked up in the network database
file NETWORKS. The symbolic names for gateway are looked up in the host name
database file HOSTS.

If the command is PRINT or DELETE. Destination or gateway can be a wildcard,
(wildcard is specified as a star '*'), or the gateway argument may be omitted.
```

```
C:\Users\acer>route print *157
===========================================================================
Interface List
 24...98 29 a6 42 e0 55 ......Realtek PCIe GBE Family Controller
 12...0a 00 27 00 00 0c ......VirtualBox Host-Only Ethernet Adapter
 22...ea 2a 44 d5 87 e5 ......Microsoft Wi-Fi Direct Virtual Adapter
 17...fa 2a 44 d5 87 e5 ......Microsoft Wi-Fi Direct Virtual Adapter #2
  7...e8 2a 44 d5 87 e5 ......Qualcomm Atheros QCA9377 Wireless Network Adapter
 15...e8 2a 44 d5 87 e6 ......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:\Users\acer>tracert 192.168.1.1

Tracing route to 192.168.1.1 over a maximum of 30 hops

  1     6 ms     4 ms     3 ms  192.168.108.237
  2     *        *        *     Request timed out.
  3   104 ms    97 ms    95 ms  56.8.63.77
  4   127 ms    97 ms    69 ms  192.168.35.238
  5    60 ms    51 ms    61 ms  192.168.35.237
  6    63 ms    58 ms    56 ms  172.26.76.4
  7    55 ms    53 ms    58 ms  ^C
```

```
C:\Users\acer>tracert www.google.com

Tracing route to www.google.com [2404:6800:4007:827::2004]
over a maximum of 30 hops:

  1     5 ms     4 ms     3 ms  2409:4073:2e9d:d01a::d
  2     *        *        *     Request timed out.
  3    96 ms   100 ms    95 ms  2405:200:366:eeee:20::20
  4   200 ms    53 ms    75 ms  2405:200:801:3500::1e2
  5   107 ms    76 ms    77 ms  2405:200:801:3500::1e3
  6   110 ms    78 ms    74 ms  2405:200:801:3500::1e9
  7     *     ^C
```

```
C:\Users\acer>tracert -d www.google.com

Tracing route to www.google.com [2404:6800:4007:827::2004]
over a maximum of 30 hops:

  1     3 ms     3 ms     3 ms  2409:4073:2e9d:d01a::d
  2     *        *        *     Request timed out.
  3    58 ms    76 ms    73 ms  2405:200:366:eeee:20::20
  4    98 ms    75 ms    74 ms  2405:200:801:3500::1e2
  5   102 ms   118 ms    72 ms  2405:200:801:3500::1e3
  6    67 ms    62 ms    64 ms  2405:200:801:3500::1e9
  7     *        *     ^C
```

```
C:\Users\acer>tracert 22.110.0.1

Tracing route to 22.110.0.1 over a maximum of 30 hops

  1     6 ms     4 ms     3 ms  192.168.108.237
  2     *        *        *     Request timed out.
  3    59 ms    82 ms    85 ms  56.8.63.73
  4    66 ms    54 ms    40 ms  192.168.35.240
  5   273 ms    55 ms   140 ms  ^C
```

Nslookup

```
C:\Users\acer>nslookup
Default Server:  UnKnown
Address:  192.168.108.237
```

```
C:\Users\acer>nslookup
Default Server:  UnKnown
Address:  192.168.108.237
```

```
C:\Users\acer>nslookup -g=MX google.com
*** Invalid option: g=MX
Server:  UnKnown
Address:  192.168.108.237

Non-authoritative answer:
Name:    google.com
Addresses:  2404:6800:4002:820::200e
          142.250.183.238
```

Ipconfig

```
C:\Users\acer>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::6d69:a328:564:62f9%12
   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* 2:

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

Wireless LAN adapter Wi-Fi:

   Connection-specific DNS Suffix  . :
   IPv6 Address. . . . . . . . . . . : 2409:4073:2e9d:d01a:d477:e710:5db1:9a52
   Temporary IPv6 Address. . . . . . : 2409:4073:2e9d:d01a:cee:ad8c:6152:3a71
   Link-local IPv6 Address . . . . . : fe80::d477:e710:5db1:9a52%7
   IPv4 Address. . . . . . . . . . . : 192.168.108.151
   Subnet Mask . . . . . . . . . . . : 255.255.255.0
   Default Gateway . . . . . . . . . : fe80::e42e:13ff:fec7:367c%7
                                       192.168.108.237

Ethernet adapter Bluetooth Network Connection:

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

```
C:\Users\acer>ipconfig /displaying

Error: unrecognized or incomplete command line.

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

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

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


The default is to display only the IP address, subnet mask and
default gateway for each adapter bound to TCP/IP.
```

```
C:\Users\acer>ipconfig /displaying

Error: unrecognized or incomplete command line.

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

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

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


The default is to display only the IP address, subnet mask and
default gateway for each adapter bound to TCP/IP.

For Release and Renew, if no adapter name is specified, then the IP address
leases for all adapters bound to TCP/IP will be released or renewed.
```

NetSat

```
C:\Users\acer>netstat

Active Connections

  Proto  Local Address          Foreign Address        State
  TCP    127.0.0.1:50869        DESKTOP-SHTJPRU:50870  ESTABLISHED
  TCP    127.0.0.1:50870        DESKTOP-SHTJPRU:50869  ESTABLISHED
  TCP    127.0.0.1:55518        DESKTOP-SHTJPRU:55519  ESTABLISHED
  TCP    127.0.0.1:55519        DESKTOP-SHTJPRU:55518  ESTABLISHED
  TCP    127.0.0.1:57195        DESKTOP-SHTJPRU:57196  ESTABLISHED
  TCP    127.0.0.1:57196        DESKTOP-SHTJPRU:57195  ESTABLISHED
  TCP    127.0.0.1:59716        DESKTOP-SHTJPRU:59717  ESTABLISHED
  TCP    127.0.0.1:59717        DESKTOP-SHTJPRU:59716  ESTABLISHED
  TCP    192.168.108.151:49526  20.44.229.112:https    TIME_WAIT
  TCP    192.168.108.151:51026  17:http                TIME_WAIT
^C
```

```
^C
C:\Users\acer>netstat -n

Active Connections

  Proto  Local Address          Foreign Address        State
  TCP    127.0.0.1:50869        127.0.0.1:50870        ESTABLISHED
  TCP    127.0.0.1:50870        127.0.0.1:50869        ESTABLISHED
  TCP    127.0.0.1:55518        127.0.0.1:55519        ESTABLISHED
  TCP    127.0.0.1:55519        127.0.0.1:55518        ESTABLISHED
  TCP    127.0.0.1:57195        127.0.0.1:57196        ESTABLISHED
  TCP    127.0.0.1:57196        127.0.0.1:57195        ESTABLISHED
  TCP    127.0.0.1:59716        127.0.0.1:59717        ESTABLISHED
  TCP    127.0.0.1:59717        127.0.0.1:59716        ESTABLISHED
  TCP    192.168.108.151:49526  20.44.229.112:443      TIME_WAIT
  TCP    192.168.108.151:51026  35.232.111.17:80       TIME_WAIT
  TCP    192.168.108.151:51027  20.44.229.112:443      TIME_WAIT
  TCP    192.168.108.151:51028  34.98.122.109:443      ESTABLISHED
  TCP    192.168.108.151:51029  20.44.229.112:443      ESTABLISHED
  TCP    192.168.108.151:52519  34.98.122.109:443      ESTABLISHED
  TCP    192.168.108.151:52525  34.98.122.109:443      ESTABLISHED
  TCP    192.168.108.151:56802  117.18.232.200:443     CLOSE_WAIT
  TCP    192.168.108.151:56805  184.84.176.64:443      CLOSE_WAIT
  TCP    192.168.108.151:58322  20.197.71.89:443       ESTABLISHED
  TCP    [2409:4073:2e9d:d01a:cee:ad8c:6152:3a71]:51025  [2404:6800:4003:c00::bc]:5228  ESTABLISHED
```

```
C:\Users\acer>netstat -n 5

Active Connections

  Proto  Local Address          Foreign Address        State
  TCP    127.0.0.1:50869        127.0.0.1:50870        ESTABLISHED
  TCP    127.0.0.1:50870        127.0.0.1:50869        ESTABLISHED
  TCP    127.0.0.1:55518        127.0.0.1:55519        ESTABLISHED
  TCP    127.0.0.1:55519        127.0.0.1:55518        ESTABLISHED
  TCP    127.0.0.1:57195        127.0.0.1:57196        ESTABLISHED
  TCP    127.0.0.1:57196        127.0.0.1:57195        ESTABLISHED
  TCP    127.0.0.1:59716        127.0.0.1:59717        ESTABLISHED
  TCP    127.0.0.1:59717        127.0.0.1:59716        ESTABLISHED
  TCP    192.168.108.151:51027  20.44.229.112:443      TIME_WAIT
  TCP    192.168.108.151:51028  34.98.122.109:443      ESTABLISHED
  TCP    192.168.108.151:51029  20.44.229.112:443      ESTABLISHED
  TCP    192.168.108.151:52519  34.98.122.109:443      ESTABLISHED
  TCP    192.168.108.151:52525  34.98.122.109:443      ESTABLISHED
  TCP    192.168.108.151:56802  117.18.232.200:443     CLOSE_WAIT
  TCP    192.168.108.151:56805  184.84.176.64:443      CLOSE_WAIT
  TCP    192.168.108.151:58322  20.197.71.89:443       ESTABLISHED
  TCP    [2409:4073:2e9d:d01a:cee:ad8c:6152:3a71]:51025  [2404:6800:4003:c00::bc]:5228  ESTABLISHED
^C
```

```
^C
C:\Users\acer>netstat -a

Active Connections

  Proto  Local Address          Foreign Address        State
  TCP    0.0.0.0:135            DESKTOP-SHTJPRU:0      LISTENING
  TCP    0.0.0.0:445            DESKTOP-SHTJPRU:0      LISTENING
  TCP    0.0.0.0:808            DESKTOP-SHTJPRU:0      LISTENING
  TCP    0.0.0.0:2869           DESKTOP-SHTJPRU:0      LISTENING
  TCP    0.0.0.0:5040           DESKTOP-SHTJPRU:0      LISTENING
  TCP    0.0.0.0:28252          DESKTOP-SHTJPRU:0      LISTENING
  TCP    0.0.0.0:49664          DESKTOP-SHTJPRU:0      LISTENING
  TCP    0.0.0.0:49665          DESKTOP-SHTJPRU:0      LISTENING
  TCP    0.0.0.0:49666          DESKTOP-SHTJPRU:0      LISTENING
  TCP    0.0.0.0:49667          DESKTOP-SHTJPRU:0      LISTENING
  TCP    0.0.0.0:49676          DESKTOP-SHTJPRU:0      LISTENING
  TCP    0.0.0.0:49704          DESKTOP-SHTJPRU:0      LISTENING
  TCP    127.0.0.1:50869        DESKTOP-SHTJPRU:50870  ESTABLISHED
  TCP    127.0.0.1:50870        DESKTOP-SHTJPRU:50869  ESTABLISHED
  TCP    127.0.0.1:55518        DESKTOP-SHTJPRU:55519  ESTABLISHED
  TCP    127.0.0.1:55519        DESKTOP-SHTJPRU:55518  ESTABLISHED
  TCP    127.0.0.1:57195        DESKTOP-SHTJPRU:57196  ESTABLISHED
  TCP    127.0.0.1:57196        DESKTOP-SHTJPRU:57195  ESTABLISHED
  TCP    127.0.0.1:59716        DESKTOP-SHTJPRU:59717  ESTABLISHED
  TCP    127.0.0.1:59717        DESKTOP-SHTJPRU:59716  ESTABLISHED
  TCP    192.168.56.1:139       DESKTOP-SHTJPRU:0      LISTENING
  TCP    192.168.108.151:139    DESKTOP-SHTJPRU:0      LISTENING
^C
```

UBUNTU

Ping

```
swathy@swathy-VirtualBox:~/Desktop$ ping www.google.com
PING www.google.com (142.250.193.4) 56(84) bytes of data.
64 bytes from del11s14-in-f4.1e100.net (142.250.193.4): icmp_seq=1 ttl=110 time
=105 ms
64 bytes from del11s14-in-f4.1e100.net (142.250.193.4): icmp_seq=2 ttl=110 time
=131 ms
64 bytes from del11s14-in-f4.1e100.net (142.250.193.4): icmp_seq=3 ttl=110 time
=131 ms
64 bytes from del11s14-in-f4.1e100.net (142.250.193.4): icmp_seq=4 ttl=110 time
=129 ms
64 bytes from del11s14-in-f4.1e100.net (142.250.193.4): icmp_seq=5 ttl=110 time
=136 ms
64 bytes from del11s14-in-f4.1e100.net (142.250.193.4): icmp_seq=6 ttl=110 time
=124 ms
64 bytes from del11s14-in-f4.1e100.net (142.250.193.4): icmp_seq=7 ttl=110 time
=124 ms
64 bytes from del11s14-in-f4.1e100.net (142.250.193.4): icmp_seq=8 ttl=110 time
=105 ms
64 bytes from del11s14-in-f4.1e100.net (142.250.193.4): icmp_seq=9 ttl=110 time
=103 ms
^C
--- www.google.com ping statistics ---
9 packets transmitted, 9 received, 0% packet loss, time 8017ms
rtt min/avg/max/mdev = 103.194/120.834/135.635/12.017 ms
```

```
swathy@swathy-VirtualBox:~/Desktop$ ping -a 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 ti
me=68.2 ms
64 bytes from maa05s15-in-f14.1e100.net (142.250.77.110): icmp_seq=2 ttl=110 ti
me=67.3 ms
64 bytes from maa05s15-in-f14.1e100.net (142.250.77.110): icmp_seq=3 ttl=110 ti
me=95.1 ms
^C
--- google.com ping statistics ---
3 packets transmitted, 3 received, 0% packet loss, time 2005ms
rtt min/avg/max/mdev = 67.261/76.859/95.095/12.900 ms
```

```
swathy@swathy-VirtualBox:~/Desktop$ ping -V google.com
ping from iputils 20210202
```

```
swathy@swathy-VirtualBox:~/Desktop$ ping -b 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 ti
me=84.5 ms
64 bytes from maa05s15-in-f14.1e100.net (142.250.77.110): icmp_seq=2 ttl=110 ti
me=112 ms
64 bytes from maa05s15-in-f14.1e100.net (142.250.77.110): icmp_seq=3 ttl=110 ti
me=81.6 ms
^C
--- google.com ping statistics ---
3 packets transmitted, 3 received, 0% packet loss, time 2000ms
rtt min/avg/max/mdev = 81.558/92.624/111.842/13.640 ms
```

Route

```
swathy@swathy-VirtualBox:~/Desktop$ route
Kernel IP routing table
Destination     Gateway         Genmask         Flags Metric Ref    Use Iface
default         _gateway        0.0.0.0         UG    100    0        0 enp0s3
10.0.2.0        0.0.0.0         255.255.255.0   U     100    0        0 enp0s3
link-local      0.0.0.0         255.255.0.0     U     1000   0        0 enp0s3
```

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

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

```
swathy@swathy-VirtualBox:~/Desktop$ 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
```

Traceroute

```
swathy@swathy-VirtualBox:~/Desktop$ traceroute google.com
traceroute to google.com (142.250.194.78), 64 hops max
  1   10.0.2.2  0.374ms  0.347ms  0.424ms
  2   *  *  *
  3   *  *  *
  4   *  *  *
  5   *  *  *
  6   *  *  *
  7   *  *  *
  8   *  *  *
  9   *  *  *
```

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

Written by Elian Gidoni
```

Nslookup

```
swathy@swathy-VirtualBox:~/Desktop$ nslookup google.com
Server:         127.0.0.53
Address:        127.0.0.53#53

Non-authoritative answer:
Name:   google.com
Address: 142.250.183.238
Name:   google.com
Address: 2404:6800:4007:817::200e
```

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

```
swathy@swathy-VirtualBox:~/Desktop$ nslookup  -type=soa redhat.com
Server:         127.0.0.53
Address:        127.0.0.53#53

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

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

Non-authoritative answer:
Name:   google.com
Address: 142.250.77.142
```

Ifconfig

```
swathy@swathy-VirtualBox:~/Desktop$ ifconfig -v
enp0s3: flags=4163<UP,BROADCAST,RUNNING,MULTICAST>  mtu 1500
        inet 10.0.2.15  netmask 255.255.255.0  broadcast 10.0.2.255
        inet6 fe80::11b7:5552:7848:59d6  prefixlen 64  scopeid 0x20<link>
        ether 08:00:27:9d:53:44  txqueuelen 1000  (Ethernet)
        RX packets 855  bytes 657641 (657.6 KB)
        RX errors 0  dropped 0  overruns 0  frame 0
        TX packets 875  bytes 87098 (87.0 KB)
        TX errors 0  dropped 0 overruns 0  carrier 0  collisions 0

lo: flags=73<UP,LOOPBACK,RUNNING>  mtu 65536
        inet 127.0.0.1  netmask 255.0.0.0
        inet6 ::1  prefixlen 128  scopeid 0x10<host>
        loop  txqueuelen 1000  (Local Loopback)
        RX packets 443  bytes 40775 (40.7 KB)
        RX errors 0  dropped 0  overruns 0  frame 0
        TX packets 443  bytes 40775 (40.7 KB)
        TX errors 0  dropped 0 overruns 0  carrier 0  collisions 0
```

```
swathy@swathy-VirtualBox:~/Desktop$ ifconfig
enp0s3: flags=4163<UP,BROADCAST,RUNNING,MULTICAST>  mtu 1500
        inet 10.0.2.15  netmask 255.255.255.0  broadcast 10.0.2.255
        inet6 fe80::11b7:5552:7848:59d6  prefixlen 64  scopeid 0x20<link>
        ether 08:00:27:9d:53:44  txqueuelen 1000  (Ethernet)
        RX packets 855  bytes 657641 (657.6 KB)
        RX errors 0  dropped 0  overruns 0  frame 0
        TX packets 875  bytes 87098 (87.0 KB)
        TX errors 0  dropped 0 overruns 0  carrier 0  collisions 0

lo: flags=73<UP,LOOPBACK,RUNNING>  mtu 65536
        inet 127.0.0.1  netmask 255.0.0.0
        inet6 ::1  prefixlen 128  scopeid 0x10<host>
        loop  txqueuelen 1000  (Local Loopback)
        RX packets 443  bytes 40775 (40.7 KB)
        RX errors 0  dropped 0  overruns 0  frame 0
        TX packets 443  bytes 40775 (40.7 KB)
        TX errors 0  dropped 0 overruns 0  carrier 0  collisions 0
```

```
swathy@swathy-VirtualBox:~/Desktop$ ifconfig -s
Iface      MTU    RX-OK RX-ERR RX-DRP RX-OVR    TX-OK TX-ERR TX-DRP TX-OVR Flg
enp0s3    1500      855      0      0 0           875      0      0      0 BMRU
lo       65536      443      0      0 0           443      0      0      0 LRU
```

```
swathy@swathy-VirtualBox:~/Desktop$ ifconfig -a
enp0s3: flags=4163<UP,BROADCAST,RUNNING,MULTICAST>  mtu 1500
        inet 10.0.2.15  netmask 255.255.255.0  broadcast 10.0.2.255
        inet6 fe80::11b7:5552:7848:59d6  prefixlen 64  scopeid 0x20<link>
        ether 08:00:27:9d:53:44  txqueuelen 1000  (Ethernet)
        RX packets 855  bytes 657641 (657.6 KB)
        RX errors 0  dropped 0  overruns 0  frame 0
        TX packets 875  bytes 87098 (87.0 KB)
        TX errors 0  dropped 0 overruns 0  carrier 0  collisions 0

lo: flags=73<UP,LOOPBACK,RUNNING>  mtu 65536
        inet 127.0.0.1  netmask 255.0.0.0
        inet6 ::1  prefixlen 128  scopeid 0x10<host>
        loop  txqueuelen 1000  (Local Loopback)
        RX packets 443  bytes 40775 (40.7 KB)
        RX errors 0  dropped 0  overruns 0  frame 0
        TX packets 443  bytes 40775 (40.7 KB)
        TX errors 0  dropped 0 overruns 0  carrier 0  collisions 0
```

Netstat

```
swathy@swathy-VirtualBox:~/Desktop$ netstat
Active Internet connections (w/o servers)
Proto Recv-Q Send-Q Local Address           Foreign Address         State
udp        0      0 swathy-VirtualBo:bootpc _gateway:bootps         ESTABLISHED
Active UNIX domain sockets (w/o servers)
Proto RefCnt Flags       Type       State         I-Node   Path
unix  2      [ ]         DGRAM                    19419    /run/user/1000/syste
md/notify
unix  3      [ ]         DGRAM                    15463    /run/systemd/notify
unix  2      [ ]         DGRAM                    15477    /run/systemd/journal
/syslog
unix  17     [ ]         DGRAM                    15486    /run/systemd/journal
/dev-log
unix  8      [ ]         DGRAM                    15488    /run/systemd/journal
/socket
unix  3      [ ]         STREAM     CONNECTED     20518    /run/dbus/system_bus
_socket
unix  3      [ ]         STREAM     CONNECTED     18661    /run/dbus/system_bus
_socket
unix  2      [ ]         DGRAM                    15593
unix  3      [ ]         STREAM     CONNECTED     20457    /run/systemd/journal
/stdout
unix  3      [ ]         STREAM     CONNECTED     17582
unix  3      [ ]         STREAM     CONNECTED     17465
unix  3      [ ]         STREAM     CONNECTED     21961    /run/user/1000/bus
unix  3      [ ]         STREAM     CONNECTED     20465    /run/systemd/journal
```

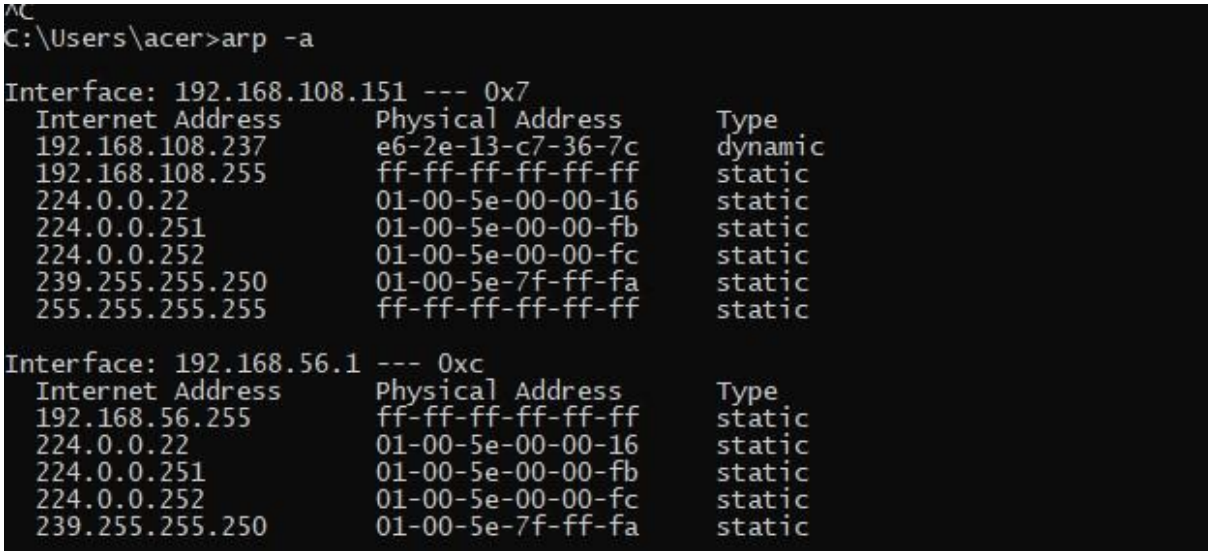
```
swathy@swathy-VirtualBox:~/Desktop$ netstat -a
Active Internet connections (servers and established)
Proto Recv-Q Send-Q Local Address           Foreign Address         State
tcp        0      0 localhost:mysql         0.0.0.0:*               LISTEN
tcp        0      0 localhost:domain        0.0.0.0:*               LISTEN
tcp        0      0 localhost:ipp           0.0.0.0:*               LISTEN
tcp6       0      0 [::]:http               [::]:*                  LISTEN
tcp6       0      0 ip6-localhost:ipp       [::]:*                  LISTEN
udp        0      0 0.0.0.0:mdns            0.0.0.0:*
udp        0      0 0.0.0.0:631             0.0.0.0:*
udp        0      0 0.0.0.0:39623           0.0.0.0:*
udp        0      0 localhost:domain        0.0.0.0:*
udp        0      0 swathy-VirtualBo:bootpc _gateway:bootps         ESTABLISHED
udp6       0      0 [::]:mdns               [::]:*
udp6       0      0 [::]:60782              [::]:*
raw6       0      0 [::]:ipv6-icmp          [::]:*                  7
Active UNIX domain sockets (servers and established)
Proto RefCnt Flags       Type       State         I-Node   Path
unix  2      [ ACC ]     STREAM     LISTENING     19570    @/tmp/dbus-S8RgEAxO
unix  2      [ ACC ]     STREAM     LISTENING     20479    @/tmp/.ICE-unix/1071
unix  2      [ ACC ]     STREAM     LISTENING     19411    /run/mysqld/mysqld.s
ock
unix  2      [ ACC ]     STREAM     LISTENING     20856    @/tmp/.X11-unix/X0
unix  2      [ ACC ]     STREAM     LISTENING     22260    @/home/swathy/.cache
/ibus/dbus-4JLAFVsN
```

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

i. ARP

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

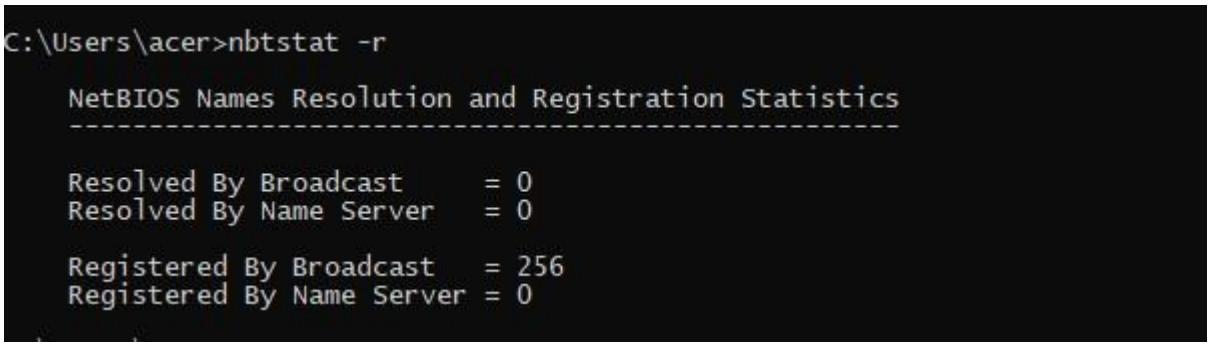
Windows devices maintain an ARP cache, which contains the results of recent ARP queries. You can see the contents of this cache by using the ARP -A command. If you are having problems communicating with one specific host, you can append the remote host's IP address to the ARP -A command.



ii. NbtStat

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.

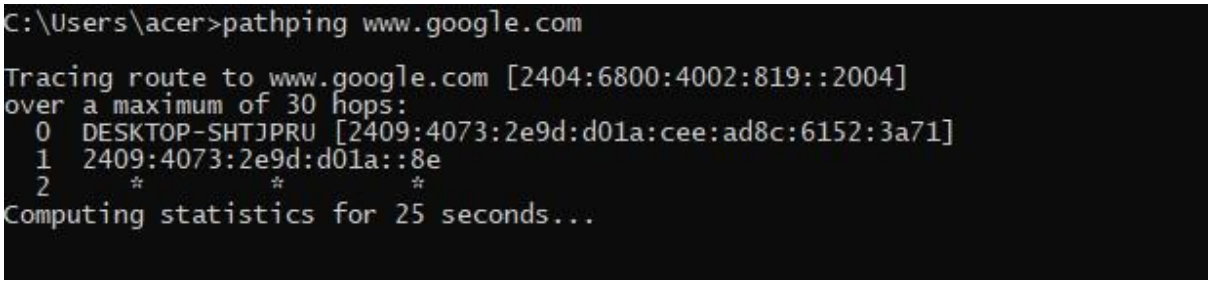


iii. Hostname

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

iv. PathPing Earlier,

I talked about the Ping utility and the Tracert utility, and the similarities between them. As you might have guessed, the PathPing tool is a utility that combines the best aspects of Tracert and Ping. Entering the PathPing command followed by a host name initiates what looks like a somewhat standard Tracert process. Once this process completes however, the tool takes 300 seconds (five minutes) to gather statistics, and then reports latency and packet loss statistics that are more detailed than those provided by Ping or Tracert.



v. getmac

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