ASSIGNMENT

SUBJECT: NETWORKING AND SYSTEM ADMINISTRATION LAB

TOPIC: LINUX COMMANDS

SUBMITTED ON:

13-09-2021

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SUBMITTED TO:

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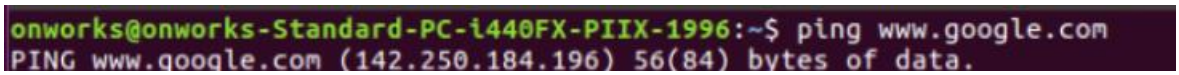
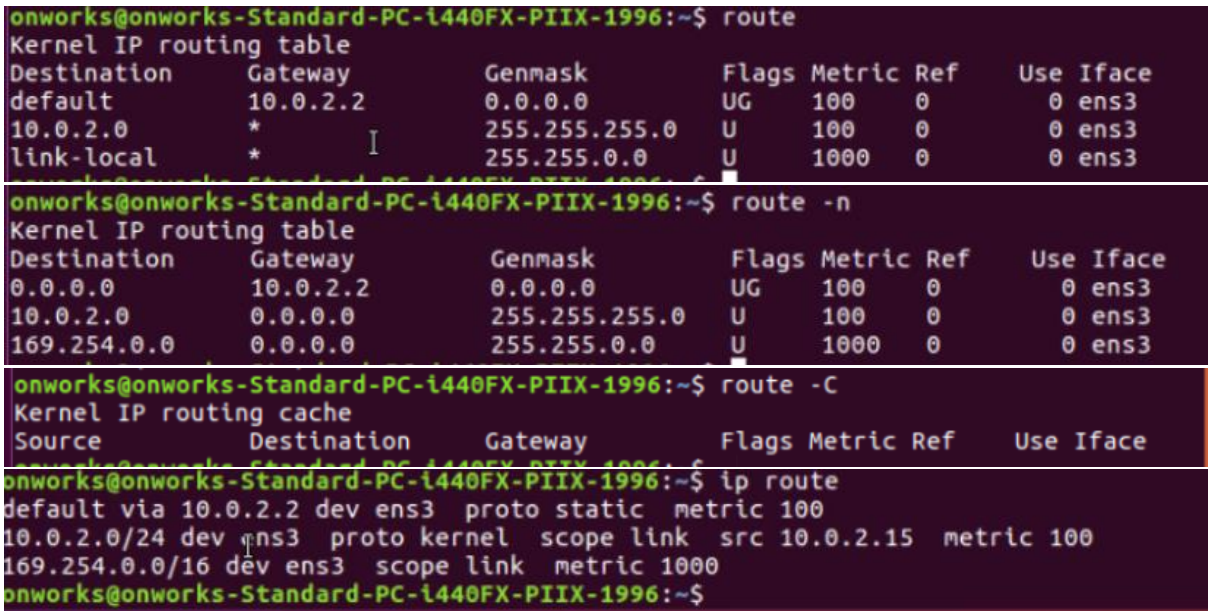
1. Try out these network commands in Window as well as in Linux and perform at least 4 options with each command: ping route traceroute, nslookup,Ip Config, NetStat.

UBUNTU

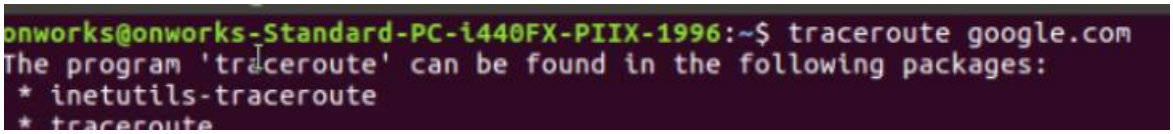
Ping



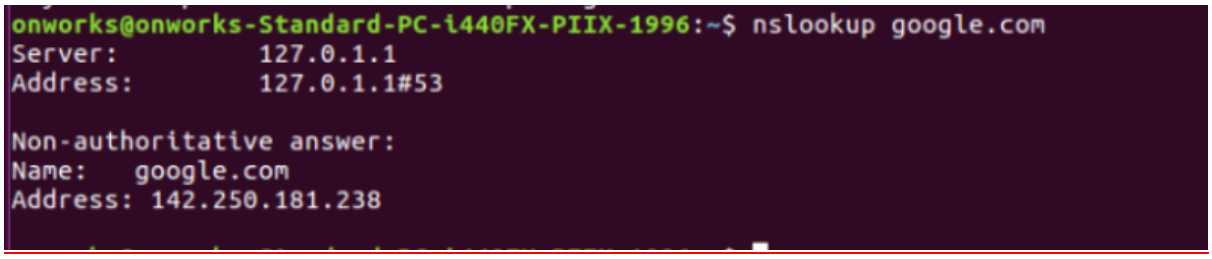
Route



Traceroute



Nslookup



```
onworks@onworks-Standard-PC-i440FX-PIIX-1996:~$ nslookup -q=MX google.com
Server:         127.0.1.1
Address:        127.0.1.1#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:
alt2.aspmx.l.google.com internet address = 142.251.9.26
alt2.aspmx.l.google.com has AAAA address 2a00:1450:4025:c03::1a
aspmx.l.google.com      internet address = 142.250.13.27
aspmx.l.google.com      has AAAA address 2a00:1450:400c:c08::1b
alt4.aspmx.l.google.com internet address = 74.125.200.26
alt4.aspmx.l.google.com has AAAA address 2404:6800:4003:c00::1b
alt1.aspmx.l.google.com internet address = 142.250.153.26
alt1.aspmx.l.google.com has AAAA address 2a00:1450:4013:c16::1b
alt3.aspmx.l.google.com internet address = 142.250.150.27
alt3.aspmx.l.google.com has AAAA address 2a00:1450:4010:c1c::1a
```

```
onworks@onworks-Standard-PC-i440FX-PIIX-1996:~$ nslookup -type=soa facebook.com
Server:         127.0.1.1
Address:        127.0.1.1#53

Non-authoritative answer:
facebook.com
        origin = a.ns.facebook.com
        mail addr = dns.facebook.com
        serial = 1631505598
        refresh = 14400
        retry = 1800
        expire = 604800
        minimum = 300

Authoritative answers can be found from:
```

```
onworks@onworks-Standard-PC-i440FX-PIIX-1996:~$ nslookup -type=a redhat.com
Server:         127.0.1.1
Address:        127.0.1.1#53

Non-authoritative answer:
Name:   redhat.com
Address: 209.132.183.105
```

Ifconfig

```
onworks@onworks-Standard-PC-i440FX-PIIX-1996:~$ ifconfig
ens3      Link encap:Ethernet  HWaddr 52:54:00:12:34:56
          inet addr:10.0.2.15  Bcast:10.0.2.255  Mask:255.255.255.0
          inet6 addr: fe80::ae8:44ad:baf7:10fd/64 Scope:Link
          inet6 addr: fec0::794a:6ae2:1411:54a5/64 Scope:Site
          inet6 addr: fec0::e319:1b8b:5ce5:c3e1/64 Scope:Site
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:195417 errors:175 dropped:0 overruns:0 frame:175
          TX packets:33318 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:290535795 (290.5 MB)  TX bytes:2053250 (2.0 MB)

lo        Link encap:Local Loopback
          inet addr:127.0.0.1  Mask:255.0.0.0
          inet6 addr: ::1/128 Scope:Host
          UP LOOPBACK RUNNING  MTU:65536  Metric:1
          RX packets:312 errors:0 dropped:0 overruns:0 frame:0
          TX packets:312 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:27438 (27.4 KB)  TX bytes:27438 (27.4 KB)

onworks@onworks-Standard-PC-i440FX-PIIX-1996:~$
```

```
onworks@onworks-Standard-PC-i440FX-PIIX-1996:~$ ifconfig -v
ens3      Link encap:Ethernet  HWaddr 52:54:00:12:34:56
          inet addr:10.0.2.15  Bcast:10.0.2.255  Mask:255.255.255.0
          inet6 addr: fe80::ae8:44ad:baf7:10fd/64 Scope:Link
          inet6 addr: fec0::794a:6ae2:1411:54a5/64 Scope:Site
          inet6 addr: fec0::e319:1b8b:5ce5:c3e1/64 Scope:Site
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:195488 errors:189 dropped:0 overruns:0 frame:189
          TX packets:33384 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:290549083 (290.5 MB)  TX bytes:2059442 (2.0 MB)

lo        Link encap:Local Loopback
          inet addr:127.0.0.1  Mask:255.0.0.0
          inet6 addr: ::1/128 Scope:Host
          UP LOOPBACK RUNNING  MTU:65536  Metric:1
          RX packets:336 errors:0 dropped:0 overruns:0 frame:0
          TX packets:336 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:30140 (30.1 KB)  TX bytes:30140 (30.1 KB)
```

```
onworks@onworks-Standard-PC-i440FX-PIIX-1996:~$ ifconfig -s
Iface   MTU Met   RX-OK RX-ERR RX-DRP RX-OVR    TX-OK TX-ERR TX-DRP TX-OVR Flg
ens3       1500 0    195513    189      0 0         33409      0      0      0 B
MRU
lo        65536 0       336      0      0 0           336      0      0      0 L
RU
onworks@onworks-Standard-PC-i440FX-PIIX-1996:~$
```

```
onworks@onworks-Standard-PC-i440FX-PIIX-1996:~$ ifconfig -a
ens3      Link encap:Ethernet  HWaddr 52:54:00:12:34:56
          inet addr:10.0.2.15  Bcast:10.0.2.255  Mask:255.255.255.0
          inet6 addr: fe80::ae8:44ad:baf7:10fd/64 Scope:Link
          inet6 addr: fec0::794a:6ae2:1411:54a5/64 Scope:Site
          inet6 addr: fec0::e319:1b8b:5ce5:c3e1/64 Scope:Site
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:195526 errors:189 dropped:0 overruns:0 frame:189
          TX packets:33422 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:290553243 (290.5 MB)  TX bytes:2062682 (2.0 MB)

lo        Link encap:Local Loopback
          inet addr:127.0.0.1  Mask:255.0.0.0
          inet6 addr: ::1/128 Scope:Host
          UP LOOPBACK RUNNING  MTU:65536  Metric:1
          RX packets:336 errors:0 dropped:0 overruns:0 frame:0
          TX packets:336 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:30140 (30.1 KB)  TX bytes:30140 (30.1 KB)
```

Netstat

```
onworks@onworks-Standard-PC-i440FX-PIIX-1996:~$ 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
unix  15     [ ]         DGRAM                    12787    /run/systemd/journal/
dev-log
unix  2      [ ]         DGRAM                    18518    /run/user/1000/system
d/notify
unix  7      [ ]         DGRAM                    12789    /run/systemd/journal/
socket
unix  2      [ ]         DGRAM                    12803    /run/systemd/journal/
syslog
unix  3      [ ]         DGRAM                    12782    /run/systemd/notify
unix  3      [ ]         STREAM     CONNECTED     22109    @/tmp/dbus-pQQgmRubwm
unix  3      [ ]         STREAM     CONNECTED     20867
unix  3      [ ]         STREAM     CONNECTED     18785
unix  3      [ ]         STREAM     CONNECTED     16880    /var/run/dbus/system_
bus_socket
```

```
onworks@onworks-Standard-PC-i440FX-PIIX-1996:~$ netstat -a
Active Internet connections (servers and established)
Proto Recv-Q Send-Q Local Address           Foreign Address         State
tcp        0      0 localhost:ipp           *:*                     LISTEN
tcp        0      0 onworks-Standard:domain *:*                     LISTEN
tcp6       0      0 ip6-localhost:ipp       [::]:*                  LISTEN
udp        0      0 *:45223                 *:*
udp        0      0 *:mdns                  *:*
udp        0      0 onworks-Standard:domain *:*
udp        0      0 *:bootpc                *:*
udp        0      0 *:45653                 *:*
udp        0      0 *:54916                 *:*
udp6       0      0 [::]:mdns               [::]:*
udp6       0      0 [::]:58737              [::]:*
udp6       0      0 [::]:52190              [::]:*
raw6       0      0 [::]:ipv6-icmp          [::]:*                  7
Active UNIX domain sockets (servers and established)
Proto RefCnt Flags       Type       State         I-Node   Path
```

WINDOWS

Ping

```
C:\Users\HP>ping google.com

Pinging google.com [142.250.182.142] with 32 bytes of data:
Reply from 142.250.182.142: bytes=32 time=118ms TTL=112
Reply from 142.250.182.142: bytes=32 time=49ms TTL=112
Reply from 142.250.182.142: bytes=32 time=161ms TTL=112
Reply from 142.250.182.142: bytes=32 time=67ms TTL=112

Ping statistics for 142.250.182.142:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 49ms, Maximum = 161ms, Average = 98ms

C:\Users\HP>
```

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

Pinging google.com [142.250.182.142] with 32 bytes of data:
Reply from 142.250.182.142: bytes=32 time=52ms TTL=112
Reply from 142.250.182.142: bytes=32 time=158ms TTL=112
Reply from 142.250.182.142: bytes=32 time=100ms TTL=112
Reply from 142.250.182.142: bytes=32 time=163ms TTL=112
Reply from 142.250.182.142: bytes=32 time=78ms TTL=112
Reply from 142.250.182.142: bytes=32 time=62ms TTL=112
```

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

Pinging google.com [142.250.194.46] with 32 bytes of data:
General failure.
General failure.
General failure.
General failure.

Ping statistics for 142.250.194.46:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),

C:\Users\HP>
```

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

Pinging google.com [142.250.182.142] with 32 bytes of data:
Reply from 142.250.182.142: bytes=32 time=63ms TTL=112
Reply from 142.250.182.142: bytes=32 time=47ms TTL=112
Reply from 142.250.182.142: bytes=32 time=80ms TTL=112
Reply from 142.250.182.142: bytes=32 time=58ms TTL=112

Ping statistics for 142.250.182.142:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 47ms, Maximum = 80ms, Average = 62ms
```

Route

```
C:\Users\HP>route print
===========================================================================
Interface List
  6...9c 7b ef 1e 44 ac ......Realtek PCIe GbE Family Controller
  4...0a 00 27 00 00 04 ......VirtualBox Host-Only Ethernet Adapter
 18...82 91 33 99 17 9d ......Microsoft Wi-Fi Direct Virtual Adapter #3
 17...80 91 33 99 17 9d ......Microsoft Wi-Fi Direct Virtual Adapter #4
 20...80 91 33 99 17 9d ......Realtek RTL8723DE 802.11b/g/n PCIe Adapter
  1...........................Software Loopback Interface 1
===========================================================================

IPv4 Route Table
===========================================================================
Active Routes:
Network Destination        Netmask          Gateway       Interface  Metric
          0.0.0.0          0.0.0.0  192.168.101.108  192.168.101.145     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
    192.168.101.0    255.255.255.0         On-link     192.168.101.145    311
  192.168.101.145  255.255.255.255         On-link     192.168.101.145    311
  192.168.101.255  255.255.255.255         On-link     192.168.101.145    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     192.168.101.145    311
```

```
C:\Users\HP>route print -4
===========================================================================
Interface List
  6...9c 7b ef 1e 44 ac ......Realtek PCIe GbE Family Controller
  4...0a 00 27 00 00 04 ......VirtualBox Host-Only Ethernet Adapter
 18...82 91 33 99 17 9d ......Microsoft Wi-Fi Direct Virtual Adapter #3
 17...80 91 33 99 17 9d ......Microsoft Wi-Fi Direct Virtual Adapter #4
 20...80 91 33 99 17 9d ......Realtek RTL8723DE 802.11b/g/n PCIe Adapter
  1...........................Software Loopback Interface 1
===========================================================================

IPv4 Route Table
===========================================================================
Active Routes:
Network Destination        Netmask          Gateway       Interface  Metric
          0.0.0.0          0.0.0.0  192.168.101.108  192.168.101.145     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
    192.168.101.0    255.255.255.0         On-link     192.168.101.145    311
  192.168.101.145  255.255.255.255         On-link     192.168.101.145    311
  192.168.101.255  255.255.255.255         On-link     192.168.101.145    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     192.168.101.145    311
```

```
C:\Users\HP>route print -6
===========================================================================
Interface List
  6...9c 7b ef 1e 44 ac ......Realtek PCIe GbE Family Controller
  4...0a 00 27 00 00 04 ......VirtualBox Host-Only Ethernet Adapter
 18...82 91 33 99 17 9d ......Microsoft Wi-Fi Direct Virtual Adapter #3
 17...80 91 33 99 17 9d ......Microsoft Wi-Fi Direct Virtual Adapter #4
 20...80 91 33 99 17 9d ......Realtek RTL8723DE 802.11b/g/n PCIe Adapter
  1...........................Software Loopback Interface 1
===========================================================================

IPv6 Route Table
===========================================================================
Active Routes:
 If Metric Network Destination      Gateway
  1    331 ::1/128                  On-link
  4    281 fe80::/64                On-link
 20    311 fe80::/64                On-link
 20    311 fe80::cef:d421:ef3c:1157/128
                                    On-link
  4    281 fe80::6d6a:fcfa:143a:e31f/128
                                    On-link
  1    331 ff00::/8                 On-link
  4    281 ff00::/8                 On-link
 20    311 ff00::/8                 On-link
===========================================================================
Persistent Routes:
  None

C:\Users\HP>_
```

Traceroute

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

Tracing route to www.google.com [142.250.194.36]
over a maximum of 30 hops:

  1     2 ms     4 ms     3 ms  192.168.101.108
  2     *        *        *     Request timed out.
  3   131 ms    66 ms    47 ms  56.8.126.49
  4  1103 ms   444 ms    49 ms  172.26.104.197
  5    45 ms    39 ms    37 ms  172.26.104.211
  6    86 ms    58 ms    40 ms  192.168.14.36
  7    49 ms    54 ms    52 ms  192.168.14.37
  8    62 ms    62 ms    55 ms  172.16.21.21
  9    53 ms    60 ms    52 ms  172.16.81.4
 10    53 ms    70 ms    62 ms  172.16.3.91
 11   496 ms   182 ms   659 ms  172.16.3.15
 12   309 ms    61 ms   108 ms  172.16.5.70
 13    70 ms    73 ms    73 ms  108.170.253.105
 14    67 ms    71 ms    94 ms  172.253.73.149
 15    67 ms    53 ms    77 ms  172.253.72.136
 16   103 ms   107 ms   273 ms  172.253.77.14
 17   302 ms   333 ms    92 ms  108.170.251.113
 18   107 ms   105 ms   307 ms  142.251.52.231
 19   623 ms   428 ms   160 ms  del12s02-in-f4.1e100.net [142.250.194.36]

Trace complete.
```

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

Tracing route to 22.110.0.1 over a maximum of 30 hops

  1     2 ms     3 ms     2 ms  192.168.101.108
  2     *        *
```

```
C:\Users\HP>tracert 192.168.1.1

Tracing route to 192.168.1.1 over a maximum of 30 hops

  1     4 ms     3 ms     2 ms  192.168.101.108
  2     *        *        *     Request timed out.
  3    51 ms    55 ms    42 ms  56.8.126.81
```

```
C:\Users\HP>tracert -d www.yahoo.com

Tracing route to new-fp-shed.wg1.b.yahoo.com [202.165.107.50]
over a maximum of 30 hops:

  1     3 ms     3 ms     2 ms  192.168.101.108
  2     *        *        *     Request timed out.
  3    36 ms    51 ms    37 ms  56.8.126.77
  4    59 ms    38 ms    55 ms  172.26.104.197
  5    44 ms    44 ms    39 ms  172.26.104.211
  6    44 ms    60 ms    38 ms  192.168.14.34
  7    44 ms    36 ms    71 ms  192.168.14.33
  8    73 ms    56 ms    59 ms  172.16.3.14
  9    53 ms    52 ms    36 ms  172.16.81.0
 10    59 ms    39 ms    47 ms  172.16.0.159
 11    61 ms    48 ms    46 ms  172.16.3.15
 12    70 ms   106 ms    76 ms  172.16.5.70
 13    91 ms    83 ms   107 ms  103.198.140.15
 14   106 ms   110 ms    98 ms  103.16.102.37
 15   102 ms    90 ms   183 ms  203.84.209.89
 16    84 ms    98 ms   101 ms  106.10.128.9
 17   480 ms   336 ms   227 ms  106.10.131.214
 18    82 ms    99 ms   111 ms  106.10.128.247
 19   133 ms   112 ms   109 ms  202.165.107.50

Trace complete.
```

Nslookup

```
C:\Users\HP>nslookup google.com
Server:  UnKnown
Address:  192.168.101.108

Non-authoritative answer:
Name:    google.com
Addresses:  2404:6800:4002:81f::200e
          142.250.183.238


C:\Users\HP>
```

```
C:\Users\HP>nslookup -q=MX google.com
Server:  UnKnown
Address:  192.168.101.108

Non-authoritative answer:
google.com      MX preference = 50, mail exchanger = alt4.aspmx.l.google.com
google.com      MX preference = 10, mail exchanger = 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:\Users\HP>
```

```
C:\Users\HP>nslookup -type=ns google.com
Server:  UnKnown
Address:  192.168.101.108

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

C:\Users\HP>
```

```
C:\Users\HP>nslookup
Default Server:  UnKnown
Address:  192.168.101.108
```

Ipconfig

```
C:\Users\HP>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* 2 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::6d6a:fcfa:143a:e31f%4
   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  . :
   Link-local IPv6 Address . . . . . : fe80::cef:d421:ef3c:1157%20
```

```
C:\Users\HP>ipcofig
'ipcofig' is not recognized as an internal or external command,
operable program or batch file.

C:\Users\HP>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::6d6a:fcfa:143a:e31f%4
   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  . :
   Link-local IPv6 Address . . . . . : fe80::cef:d421:ef3c:1157%20
   IPv4 Address. . . . . . . . . . . : 192.168.101.145
   Subnet Mask . . . . . . . . . . . : 255.255.255.0
   Default Gateway . . . . . . . . . : 192.168.101.108

C:\Users\HP>
```

Netstat

```
C:\Users\HP>netstat -a

Active Connections

  Proto  Local Address          Foreign Address        State
  TCP    0.0.0.0:80             0:0                    LISTENING
  TCP    0.0.0.0:135            0:0                    LISTENING
  TCP    0.0.0.0:445            0:0                    LISTENING
  TCP    0.0.0.0:2222           0:0                    LISTENING
  TCP    0.0.0.0:2226           0:0                    LISTENING
  TCP    0.0.0.0:2383           0:0                    LISTENING
  TCP    0.0.0.0:5040           0:0                    LISTENING
  TCP    0.0.0.0:7680           0:0                    LISTENING
  TCP    0.0.0.0:49664          0:0                    LISTENING
  TCP    0.0.0.0:49665          0:0                    LISTENING
  TCP    0.0.0.0:49666          0:0                    LISTENING
  TCP    0.0.0.0:49667          0:0                    LISTENING
  TCP    0.0.0.0:49668          0:0                    LISTENING
  TCP    0.0.0.0:49670          0:0                    LISTENING
  TCP    0.0.0.0:49786          0:0                    LISTENING
  TCP    127.0.0.1:1434         0:0                    LISTENING
  TCP    127.0.0.1:2228         0:0                    LISTENING
```

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

Active Connections

  Proto  Local Address          Foreign Address        State
  TCP    127.0.0.1:2226         127.0.0.1:49351        TIME_WAIT
  TCP    127.0.0.1:2226         127.0.0.1:49352        TIME_WAIT
  TCP    127.0.0.1:2226         127.0.0.1:49353        TIME_WAIT
  TCP    127.0.0.1:2226         127.0.0.1:49354        TIME_WAIT
  TCP    127.0.0.1:2226         127.0.0.1:49355        TIME_WAIT
  TCP    127.0.0.1:2226         127.0.0.1:49356        TIME_WAIT
  TCP    127.0.0.1:2226         127.0.0.1:49357        TIME_WAIT
  TCP    127.0.0.1:2226         127.0.0.1:49358        TIME_WAIT
  TCP    127.0.0.1:2226         127.0.0.1:49359        TIME_WAIT
  TCP    127.0.0.1:2226         127.0.0.1:49360        TIME_WAIT
  TCP    127.0.0.1:2226         127.0.0.1:56127        ESTABLISHED
  TCP    127.0.0.1:49353        127.0.0.1:2226         TIME_WAIT
  TCP    127.0.0.1:55428        127.0.0.1:55429        ESTABLISHED
  TCP    127.0.0.1:55429        127.0.0.1:55428        ESTABLISHED
  TCP    127.0.0.1:55430        127.0.0.1:55431        ESTABLISHED
  TCP    127.0.0.1:55431        127.0.0.1:55430        ESTABLISHED
  TCP    127.0.0.1:55432        127.0.0.1:55433        ESTABLISHED
  TCP    127.0.0.1:55433        127.0.0.1:55432        ESTABLISHED
  TCP    127.0.0.1:55434        127.0.0.1:55435        ESTABLISHED
  TCP    127.0.0.1:55435        127.0.0.1:55434        ESTABLISHED
  TCP    127.0.0.1:56127        127.0.0.1:2226         ESTABLISHED
  TCP    192.168.101.145:49350  172.217.167.3:443      TIME_WAIT
  TCP    192.168.101.145:49684  142.250.77.142:443     TIME_WAIT
  TCP    192.168.101.145:50618  172.217.160.142:443    ESTABLISHED
  TCP    192.168.101.145:51163  20.44.229.112:443      ESTABLISHED
  TCP    192.168.101.145:51524  142.250.77.142:443     TIME_WAIT
  TCP    192.168.101.145:52496  142.250.195.238:443    TIME_WAIT
  TCP    192.168.101.145:54492  20.198.162.76:443      ESTABLISHED
  TCP    192.168.101.145:55436  172.217.167.3:443      TIME_WAIT
  TCP    192.168.101.145:55601  172.217.167.3:443      TIME_WAIT
  TCP    192.168.101.145:56126  216.58.200.173:443     ESTABLISHED
  TCP    192.168.101.145:56255  142.250.195.238:443    TIME_WAIT
  TCP    192.168.101.145:57317  172.67.38.66:443       TIME_WAIT
  TCP    192.168.101.145:58020  172.217.167.10:443     ESTABLISHED
  TCP    192.168.101.145:58340  172.217.194.189:443    TIME_WAIT
  TCP    192.168.101.145:60282  172.217.160.229:443    TIME_WAIT
  TCP    192.168.101.145:61901  20.198.162.76:443      ESTABLISHED
```

```
C:\Users\HP>netstat -n

Active Connections

  Proto  Local Address          Foreign Address        State
  TCP    127.0.0.1:55428        127.0.0.1:55429        ESTABLISHED
  TCP    127.0.0.1:55429        127.0.0.1:55428        ESTABLISHED
  TCP    127.0.0.1:55430        127.0.0.1:55431        ESTABLISHED
  TCP    127.0.0.1:55431        127.0.0.1:55430        ESTABLISHED
  TCP    127.0.0.1:55432        127.0.0.1:55433        ESTABLISHED
  TCP    127.0.0.1:55433        127.0.0.1:55432        ESTABLISHED
  TCP    127.0.0.1:55434        127.0.0.1:55435        ESTABLISHED
  TCP    127.0.0.1:55435        127.0.0.1:55434        ESTABLISHED
  TCP    192.168.101.145:50289  74.125.200.188:443     ESTABLISHED
  TCP    192.168.101.145:51691  20.44.229.112:443      TIME_WAIT
  TCP    192.168.101.145:54492  20.198.162.76:443      ESTABLISHED
  TCP    192.168.101.145:54939  142.250.195.238:443    TIME_WAIT
  TCP    192.168.101.145:56787  84.39.152.33:80        LAST_ACK
  TCP    192.168.101.145:57023  142.250.195.238:443    TIME_WAIT
  TCP    192.168.101.145:57317  172.67.38.66:443       ESTABLISHED
  TCP    192.168.101.145:58068  172.217.160.229:443    TIME_WAIT
  TCP    192.168.101.145:58086  142.250.195.238:443    SYN_SENT
  TCP    192.168.101.145:58340  172.217.194.189:443    ESTABLISHED
  TCP    192.168.101.145:59918  142.250.195.238:443    TIME_WAIT
  TCP    192.168.101.145:61901  20.198.162.76:443      ESTABLISHED
  TCP    192.168.101.145:61924  84.39.152.33:80        CLOSE_WAIT
  TCP    192.168.101.145:62324  142.250.77.142:443     TIME_WAIT
  TCP    192.168.101.145:62325  20.44.229.112:443      ESTABLISHED
  TCP    192.168.101.145:62368  142.250.77.142:443     TIME_WAIT
  TCP    192.168.101.145:65301  142.250.77.142:443     TIME_WAIT
```

```
C:\Users\HP>netstat

Active Connections

  Proto  Local Address          Foreign Address        State
  TCP    127.0.0.1:55428        LAPTOP-0K1HGDSE:55429  ESTABLISHED
  TCP    127.0.0.1:55429        LAPTOP-0K1HGDSE:55428  ESTABLISHED
  TCP    127.0.0.1:55430        LAPTOP-0K1HGDSE:55431  ESTABLISHED
  TCP    127.0.0.1:55431        LAPTOP-0K1HGDSE:55430  ESTABLISHED
  TCP    127.0.0.1:55432        LAPTOP-0K1HGDSE:55433  ESTABLISHED
  TCP    127.0.0.1:55433        LAPTOP-0K1HGDSE:55432  ESTABLISHED
  TCP    127.0.0.1:55434        LAPTOP-0K1HGDSE:55435  ESTABLISHED
  TCP    127.0.0.1:55435        LAPTOP-0K1HGDSE:55434  ESTABLISHED
  TCP    192.168.101.145:50289  sa-in-f188:https       ESTABLISHED
  TCP    192.168.101.145:51691  20.44.229.112:https    ESTABLISHED
  TCP    192.168.101.145:52463  maa05s16-in-f14:https  TIME_WAIT
  TCP    192.168.101.145:54014  maa05s16-in-f14:https  TIME_WAIT
```

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

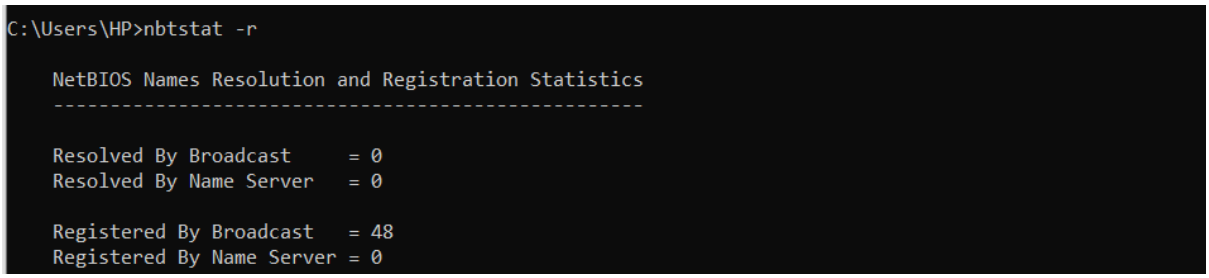
i. ARP

The ARP command corresponds to the Address Resolution Protocol. Although it is easy to think of network communications in terms of IP addressing, packet delivery is ultimately dependent on the Media Access Control (MAC) address of the device's network adapter. This is where the Address Resolution Protocol comes into play. Its job is to map IP addresses to MAC addresses. Windows devices maintain an ARP cache, which contains the results of recent ARP queries. You can see the contents of this cache by using the ARP -A command. If you are having problems communicating with one specific host, you can append the remote host's IP address to the ARP -A command.

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

Interface: 192.168.56.1 --- 0x4
  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
  224.0.1.60            01-00-5e-00-01-3c     static
  239.255.255.250       01-00-5e-7f-ff-fa     static

Interface: 192.168.101.145 --- 0x14
  Internet Address      Physical Address      Type
  192.168.101.108       9e-83-7b-61-76-9b     dynamic
  192.168.101.255       ff-ff-ff-ff-ff-ff     static
  224.0.0.2             01-00-5e-00-00-02     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\HP>
```

ii. NbtStat

As I am sure you probably know, computers that are running a Windows operating system are assigned a computer name. Oftentimes, there is a domain name or a workgroup name that is also assigned to the computer. The computer name is sometimes referred to as the NetBIOS name. Windows uses several different methods to map NetBIOS names to IP addresses, such as broadcast, LMHost lookup, or even using the nearly extinct method of querying a WINS server. Of course, NetBIOS over TCP/IP can occasionally break down. The NbtStat command can help you to diagnose and correct such problems. The NbtStat -n command for example, shows the NetBIOS names that are in use by a device. The NbtStat -r command shows how many NetBIOS names the device has been able to resolve recently.

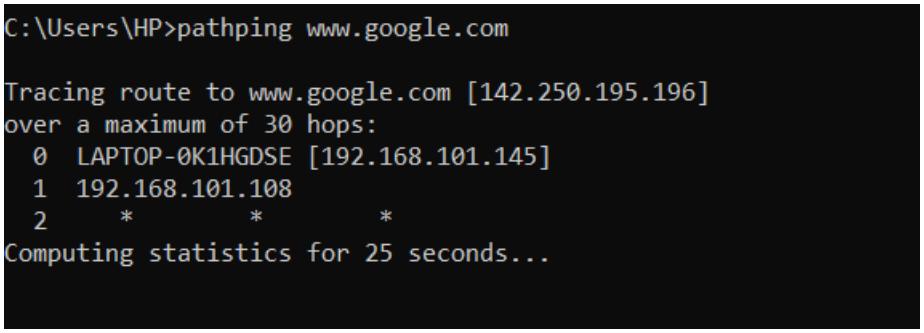


iii. Hostname

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

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