NETWORKING & SYSTEM ADMINISTRATION LAB

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Aim:

Introduction to command line tools for networking IPv4 networking, network commands: ping route traceroute, nslookup, ip.

Procedure:

Ipconfig

"Ipconfig" often comes up as the most-used networking command on Windows. Not only is it useful for the information it provides, but you can combine it with a couple of switches to execute certain tasks.

```
C:\WINDOWS\System32>ipconfig

Windows IP Configuration


Ethernet adapter Ethernet:

   Connection-specific DNS Suffix  . :
   Link-local IPv6 Address . . . . . : fe80::30ae:2407:38c4:773%4
   IPv4 Address. . . . . . . . . . . : 192.168.6.66
   Subnet Mask . . . . . . . . . . . : 255.255.255.0
   Default Gateway . . . . . . . . . : 192.168.6.100

Tunnel adapter Teredo Tunneling Pseudo-Interface:

   Connection-specific DNS Suffix  . :
   IPv6 Address. . . . . . . . . . . : 2001:0:2851:fcb0:1cb9:12f3:8a3e:b01e
   Link-local IPv6 Address . . . . . : fe80::1cb9:12f3:8a3e:b01e%9
   Default Gateway . . . . . . . . . : ::
```

```
Windows IP Configuration

   Host Name . . . . . . . . . . . . : S66
   Primary Dns Suffix  . . . . . . . : mca.com
   Node Type . . . . . . . . . . . . : Hybrid
   IP Routing Enabled. . . . . . . . : No
   WINS Proxy Enabled. . . . . . . . : No
   DNS Suffix Search List. . . . . . : mca.com

Ethernet adapter Ethernet:

   Connection-specific DNS Suffix  . :
   Description . . . . . . . . . . . : Realtek PCIe GBE Family Controller
   Physical Address. . . . . . . . . : 1C-87-2C-71-89-3E
   DHCP Enabled. . . . . . . . . . . : No
   Autoconfiguration Enabled . . . . : Yes
   Link-local IPv6 Address . . . . . : fe80::30ae:2407:38c4:773%4(Preferred)
   IPv4 Address. . . . . . . . . . . : 192.168.6.66(Preferred)
   Subnet Mask . . . . . . . . . . . : 255.255.255.0
   Default Gateway . . . . . . . . . : 192.168.6.100
   DHCPv6 IAID . . . . . . . . . . . : 102532908
   DHCPv6 Client DUID. . . . . . . . : 00-01-00-01-25-4B-EE-CF-1C-87-2C-71-89-3E
   DNS Servers . . . . . . . . . . . : 192.168.6.254
                                       8.8.8.8
   NetBIOS over Tcpip. . . . . . . . : Enabled

Tunnel adapter Teredo Tunneling Pseudo-Interface:

   Connection-specific DNS Suffix  . :
   Description . . . . . . . . . . . : Microsoft Teredo Tunneling Adapter
   Physical Address. . . . . . . . . : 00-00-00-00-00-00-00-E0
   DHCP Enabled. . . . . . . . . . . : No
   Autoconfiguration Enabled . . . . : Yes
   IPv6 Address. . . . . . . . . . . : 2001:0:2851:fcb0:1cb9:12f3:8a3e:b01e(Preferred)
   Link-local IPv6 Address . . . . . : fe80::1cb9:12f3:8a3e:b01e%9(Preferred)
   Default Gateway . . . . . . . . . : ::
   DHCPv6 IAID . . . . . . . . . . . : 167772160
   DHCPv6 Client DUID. . . . . . . . : 00-01-00-01-25-4B-EE-CF-1C-87-2C-71-89-3E
   NetBIOS over Tcpip. . . . . . . . : Disabled
```

Nslookup

"Nslookup" stands for Name Server Lookup. It packs a lot of power, but most users won't need that power. For regular folks like you and me, its main use is finding out the IP address behind a certain domain name.

```
C:\WINDOWS\System32>nslookup
Default Server:  UnKnown
Address:  192.168.6.254

> www.google.com
Server:  UnKnown
Address:  192.168.6.254

Non-authoritative answer:
Name:    www.google.com
Addresses:  2404:6800:4007:826::2004
          142.250.195.164

> www.amazon.com
Server:  UnKnown
Address:  192.168.6.254

Non-authoritative answer:
Name:    d3ag4hukkh62yn.cloudfront.net
Address:  52.84.12.185
Aliases:  www.amazon.com
          tp.47cf2c8c9-frontier.amazon.com
```

Ping

"Ping" is one of the most basic yet useful network commands to utilize in the command prompt application. It tells you whether your computer can reach some destination IP address or domain name, and if it can, how longit takes data to travel there and back again.

```
C:\WINDOWS\System32>ping 142.250.195.164

Pinging 142.250.195.164 with 32 bytes of data:
Reply from 142.250.195.164: bytes=32 time=20ms TTL=59
Reply from 142.250.195.164: bytes=32 time=20ms TTL=59
Reply from 142.250.195.164: bytes=32 time=20ms TTL=59
Reply from 142.250.195.164: bytes=32 time=20ms TTL=59

Ping statistics for 142.250.195.164:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 20ms, Maximum = 20ms, Average = 20ms
```

Tracert

"Tracert" stands for Trace Route. And much like "ping," it sends out a data packet as a way to troubleshoot any network issues you might have, but it instead tracks the route of the packet as it hops from server to server.

```
C:\WINDOWS\System32>tracert 142.250.195.164

Tracing route to maa03s41-in-f4.1e100.net [142.250.195.164]
over a maximum of 30 hops:

  1    <1 ms    <1 ms    <1 ms  192.168.6.100
  2     2 ms     3 ms     1 ms  172.24.9.34
  3     *        *        *     Request timed out.
  4     *        *        *     Request timed out.
  5    17 ms    17 ms    17 ms  72.14.218.250
  6    18 ms    18 ms    17 ms  216.239.43.133
  7    15 ms    15 ms    15 ms  142.251.55.91
  8    20 ms    20 ms    20 ms  maa03s41-in-f4.1e100.net [142.250.195.164]

Trace complete.
```

Netstat

"Netstat" is a tool for network statistics, diagnostics, and analysis. It's powerful and complex but can be simple enough if you ignore the advanced aspects that you don't need to know about (assuming you aren't managing a massive business or campus network, for example).

The -f option clears the routing tables of all gateway entries. If you use the -f option in conjunction with one of the commands, the tables are cleared before you run the command.

By default, routes are not preserved when you restart the system. Use the -p option with the add command to make a route persistent. Use the -p option with the print command to view the list of registered persistent routes.

```
C:\WINDOWS\System32>netstat

Active Connections

  Proto  Local Address          Foreign Address        State
  TCP    192.168.6.66:7680      S26:1177               ESTABLISHED
  TCP    192.168.6.66:7680      S52:2371               ESTABLISHED
  TCP    192.168.6.66:7680      STDRJUBYMATHEW:55692   ESTABLISHED
  TCP    192.168.6.66:25090     20.198.162.76:https    ESTABLISHED
  TCP    192.168.6.66:25116     si-in-f188:5228        ESTABLISHED
  TCP    192.168.6.66:25155     si-in-f188:5228        ESTABLISHED
  TCP    192.168.6.66:25272     a184-86-248-178:https  CLOSE_WAIT
  TCP    192.168.6.66:25273     a184-86-248-178:https  CLOSE_WAIT
  TCP    192.168.6.66:25274     a104-85-134-163:https  ESTABLISHED
  TCP    192.168.6.66:25275     49.44.194.16:https     CLOSE_WAIT
  TCP    192.168.6.66:25279     49.44.194.16:https     CLOSE_WAIT
  TCP    192.168.6.66:25282     a104-85-134-163:https  ESTABLISHED
  TCP    192.168.6.66:25283     maa05s23-in-f10:https  ESTABLISHED
  TCP    192.168.6.66:25286     52.137.110.235:https   ESTABLISHED
  TCP    192.168.6.66:25287     s3:https               CLOSE_WAIT
  TCP    192.168.6.66:25288     s3:https               CLOSE_WAIT
  TCP    192.168.6.66:25289     maa05s26-in-f14:https  ESTABLISHED
  TCP    192.168.6.66:25292     S22:ms-do              ESTABLISHED
  TCP    [2001:0:2851:fcb0:1cb9:12f3:8a3e:b01e]:25182  [2001:0:2851:fcb0:387d:96d7:985e:9cf9]:ms-do  ESTABLISHED
  TCP    [2001:0:2851:fcb0:1cb9:12f3:8a3e:b01e]:25293  [2001:0:2851:fcb0:2b:3856:8a3e:b01e]:ms-do  SYN_SENT
  TCP    [2001:0:2851:fcb0:1cb9:12f3:8a3e:b01e]:25294  [2001:0:2851:fcb0:184c:383e:f174:159d]:ms-do  SYN_SENT

C:\WINDOWS\System32>
```

Route print

You can use the route command to view, add and delete routes on a Microsoft Windows NT server that runs Cisco ICM. You can use these options with the route command

```
C:\WINDOWS\System32>route print
===========================================================================
Interface List
  4...1c 87 2c 71 89 3e ......Realtek PCIe GBE Family Controller
  1...........................Software Loopback Interface 1
  9...00 00 00 00 00 00 00 e0 Microsoft Teredo Tunneling Adapter
===========================================================================

IPv4 Route Table
===========================================================================
Active Routes:
Network Destination        Netmask          Gateway       Interface  Metric
          0.0.0.0          0.0.0.0    192.168.6.100     192.168.6.66    281
        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
      192.168.6.0    255.255.255.0         On-link      192.168.6.66    281
     192.168.6.66  255.255.255.255         On-link      192.168.6.66    281
    192.168.6.255  255.255.255.255         On-link      192.168.6.66    281
        224.0.0.0        240.0.0.0         On-link         127.0.0.1    331
        224.0.0.0        240.0.0.0         On-link      192.168.6.66    281
  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      192.168.6.66    281
===========================================================================
Persistent Routes:
  Network Address          Netmask  Gateway Address  Metric
          0.0.0.0          0.0.0.0    192.168.6.100  Default
===========================================================================

IPv6 Route Table
===========================================================================
Active Routes:
 If Metric Network Destination      Gateway
  9    331 ::/0                     On-link
  1    331 ::1/128                  On-link
  9    331 2001::/32                On-link
  9    331 2001:0:2851:fcb0:1cb9:12f3:8a3e:b01e/128
                                    On-link
  4    281 fe80::/64                On-link
  9    331 fe80::/64                On-link
  9    331 fe80::1cb9:12f3:8a3e:b01e/128
                                    On-link
  4    281 fe80::30ae:2407:38c4:773/128
```