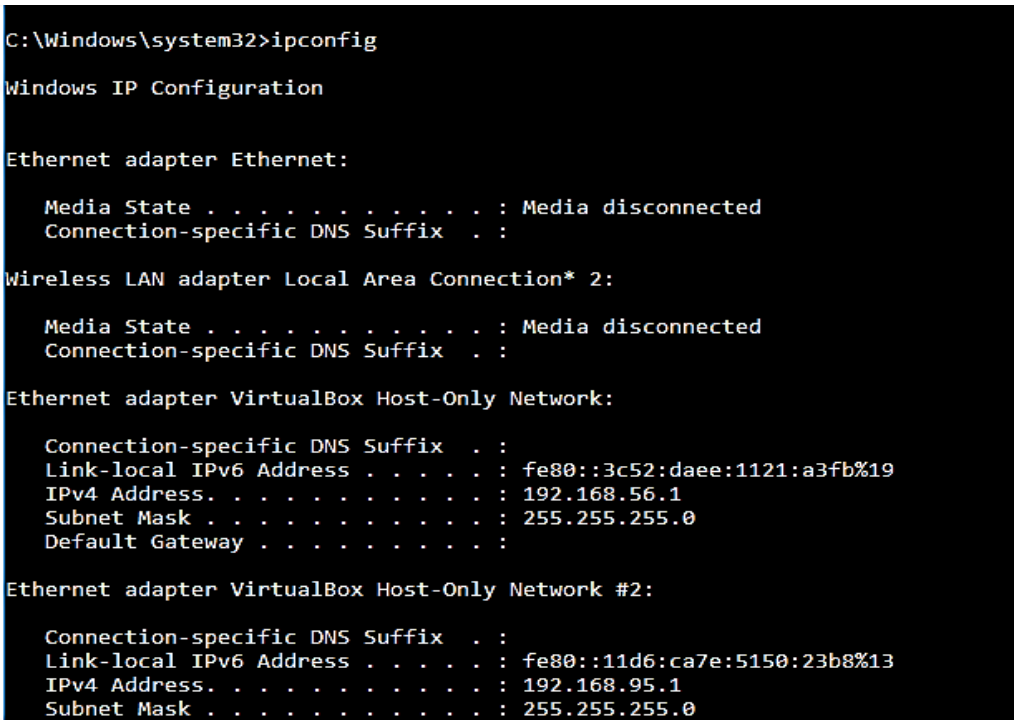
Practical 10 Study of Network Commands in Windows and Linux.

- Ipconfig :- Ipconfig is a Console Command which can be issued to the Command Line Interpreter (or command prompt) to display the network settings currently assigned to any or all network adapters in the machine.
    - This command can be utilised to verify a network connection as well as to verify your network settings.



- Netstat :- Displays active TCP connections, ports on which the computer is listening, Ethernet statistics, the IP routing table, IPv4 statistics (for the IP, ICMP, TCP, and UDP protocols), and IPv6 statistics (for the IPv6, ICMPv6, TCP over IPv6, and UDP over IPv6 protocols).
    - Used without parameters, netstat displays active TCP connections.

```
C:\Windows\system32>netstat

Active Connections

  Proto  Local Address          Foreign Address        State
  TCP    127.0.0.1:2014         DESKTOP-89Q07DQ:2015   ESTABLISHED
  TCP    127.0.0.1:2015         DESKTOP-89Q07DQ:2014   ESTABLISHED
  TCP    127.0.0.1:2016         DESKTOP-89Q07DQ:2017   ESTABLISHED
  TCP    127.0.0.1:2017         DESKTOP-89Q07DQ:2016   ESTABLISHED
  TCP    127.0.0.1:2018         DESKTOP-89Q07DQ:2019   ESTABLISHED
  TCP    127.0.0.1:2019         DESKTOP-89Q07DQ:2018   ESTABLISHED
  TCP    127.0.0.1:3193         DESKTOP-89Q07DQ:3194   ESTABLISHED
  TCP    127.0.0.1:3194         DESKTOP-89Q07DQ:3193   ESTABLISHED
  TCP    127.0.0.1:3218         DESKTOP-89Q07DQ:3219   ESTABLISHED
  TCP    127.0.0.1:3219         DESKTOP-89Q07DQ:3218   ESTABLISHED
  TCP    192.168.0.103:1694     52.230.84.217:https    ESTABLISHED
  TCP    192.168.0.103:1798     sc-in-f125:5222        ESTABLISHED
  TCP    192.168.0.103:1802     bom07s01-in-f138:https  CLOSE_WAIT
  TCP    192.168.0.103:1803     bom07s01-in-f138:https  CLOSE_WAIT
  TCP    192.168.0.103:2065     kul01s09-in-f74:https  CLOSE_WAIT
  TCP    192.168.0.103:2066     kul01s09-in-f74:https  CLOSE_WAIT
  TCP    192.168.0.103:2067     kul01s09-in-f74:https  CLOSE_WAIT
```

- Tracert :- The tracert command is used to visually see a network packet being sent and received and the amount of hops required for that packet to get to its destination.

```
C:\Windows\system32>tracert -j
A target name or address must be specified.

Usage: tracert [-d] [-h maximum_hops] [-j host-list] [-w timeout]
               [-R] [-S srcaddr] [-4] [-6] target_name

Options:
    -d                 Do not resolve addresses to hostnames.
    -h maximum_hops    Maximum number of hops to search for target.
    -j host-list       Loose source route along host-list (IPv4-only).
    -w timeout         Wait timeout milliseconds for each reply.
    -R                 Trace round-trip path (IPv6-only).
    -S srcaddr         Source address to use (IPv6-only).
    -4                 Force using IPv4.
    -6                 Force using IPv6.

C:\Windows\system32>tracert -h www.google.com
Bad value for option -h.

C:\Windows\system32>tracert -4 www.google.com

Tracing route to www.google.com [216.58.196.68]
over a maximum of 30 hops:

  1     3 ms     1 ms     1 ms  192.168.0.1
  2     4 ms     3 ms     2 ms  10.100.0.1
  3     5 ms     7 ms     4 ms  10.222.222.9
  4     8 ms     4 ms     4 ms  10.111.12.1
  5    43 ms    36 ms    36 ms  182.237.10.21
  6    32 ms    32 ms    31 ms  108.170.248.161
  7    32 ms    32 ms    33 ms  209.85.255.207
  8    33 ms    33 ms    32 ms  bom05s11-in-f4.1e100.net [216.58.196.68]

Trace complete.
```

- Ping :- Helps in determining TCP/IP Networks IP address as well as determine issues with the network and assists in resolving them.

```
C:\Windows\system32>ping www.google.com

Pinging www.google.com [172.217.166.164] with 32 bytes of data:
Reply from 172.217.166.164: bytes=32 time=31ms TTL=56
Reply from 172.217.166.164: bytes=32 time=31ms TTL=56
Reply from 172.217.166.164: bytes=32 time=31ms TTL=56
Reply from 172.217.166.164: bytes=32 time=31ms TTL=56

Ping statistics for 172.217.166.164:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 31ms, Maximum = 31ms, Average = 31ms
```

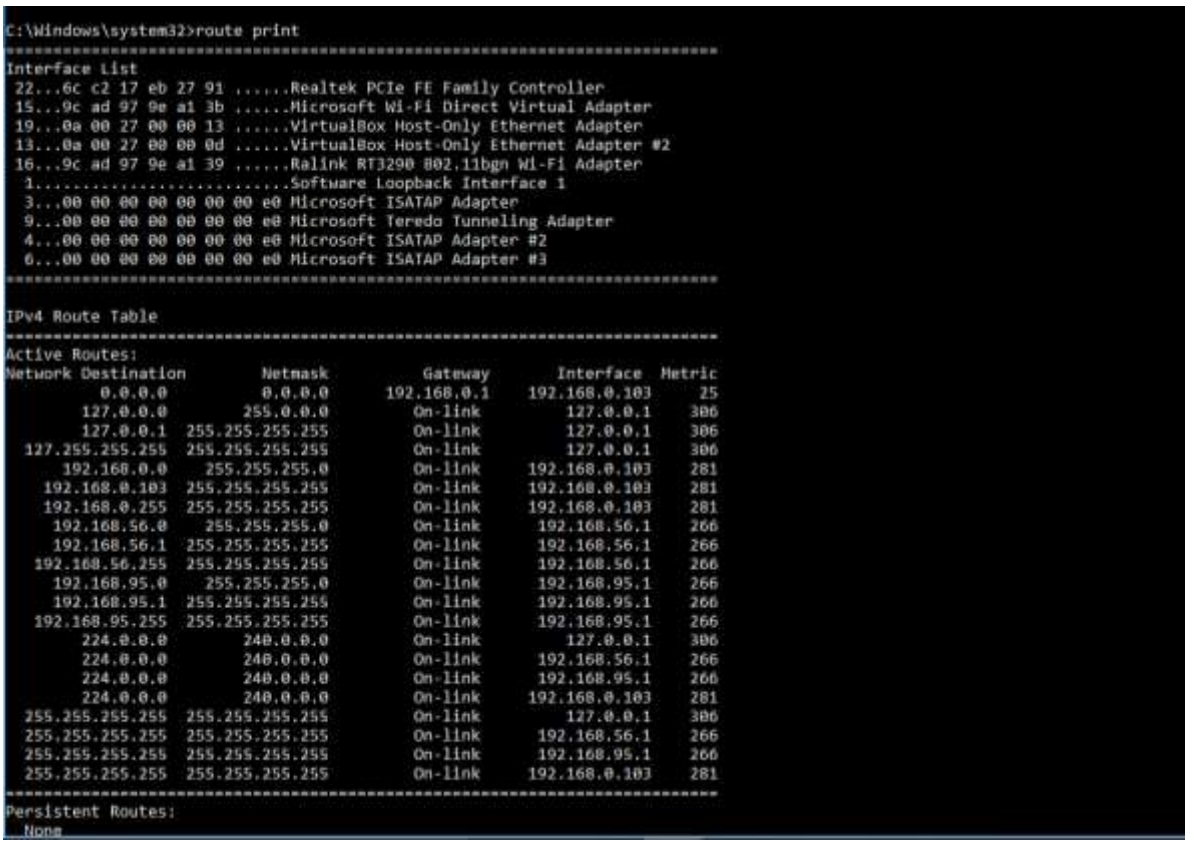
- Pathping :- Provides information about network latency and network loss at intermediate hops between a source and destination.
    - Pathping sends multiple Echo Request messages to each router between a source and destination over a period of time and then computes results based on the packets returned from each router.

```
C:\Windows\system32>pathping www.google.com

Tracing route to www.google.com [172.217.166.164]
over a maximum of 30 hops:
  0  DESKTOP-89Q07DQ [192.168.0.103]
  1  192.168.0.1
  2  10.100.0.1
  3  10.222.222.9
  4  10.111.12.1
  5  182.237.10.21
  6  108.170.248.209
  7  216.239.57.189
  8  bom07s20-in-f4.1e100.net [172.217.166.164]

Computing statistics for 200 seconds...
            Source to Here   This Node/Link
Hop  RTT    Lost/Sent = Pct  Lost/Sent = Pct  Address
  0                                           DESKTOP-89Q07DQ [192.168.0.103]
                                0/ 100 =  0%   |
  1    2ms     0/ 100 =  0%     0/ 100 =  0%  192.168.0.1
                                0/ 100 =  0%   |
  2  ---     100/ 100 =100%   100/ 100 =100%  10.100.0.1
                                0/ 100 =  0%   |
  3    6ms     1/ 100 =  1%     1/ 100 =  1%  10.222.222.9
                                0/ 100 =  0%   |
  4    6ms     0/ 100 =  0%     0/ 100 =  0%  10.111.12.1
                                0/ 100 =  0%   |
  5   32ms     0/ 100 =  0%     0/ 100 =  0%  182.237.10.21
                                0/ 100 =  0%   |
  6   32ms     0/ 100 =  0%     0/ 100 =  0%  108.170.248.209
                                0/ 100 =  0%   |
  7  ---     100/ 100 =100%   100/ 100 =100%  216.239.57.189
                                0/ 100 =  0%   |
  8   34ms     0/ 100 =  0%     0/ 100 =  0%  bom07s20-in-f4.1e100.net [172.217.166.164]

Trace complete.
```

- telnet :- Telnet is software that allows users to remotely access another computer such as a server, network device, or other computer.
    - With telnet users can connect to a device or computer, manage a network device, setup a device, transfer files, etc.

- ftp :- FTP is short for File Transfer Protocol, this page contains additional information about the FTP command and help using that command in Unix and MS-DOS (Windows).

- Route :- The function and syntax of the Windows ROUTE command is similar to the UNIX or Linux route command. Use the command to manually configure the routes in the routing table.



```
C:\Windows\system32>route print
===========================================================================
Interface List
 22...6c c2 17 eb 27 91 ......Realtek PCIe FE Family Controller
 15...9c ad 97 9e a1 3b ......Microsoft Wi-Fi Direct Virtual Adapter
 19...0a 00 27 00 00 13 ......VirtualBox Host-Only Ethernet Adapter
 13...0a 00 27 00 00 0d ......VirtualBox Host-Only Ethernet Adapter #2
 16...9c ad 97 9e a1 39 ......Ralink RT3290 802.11bgn Wi-Fi Adapter
  1...........................Software Loopback Interface 1
  3...00 00 00 00 00 00 00 e0 Microsoft ISATAP Adapter
  9...00 00 00 00 00 00 00 e0 Microsoft Teredo Tunneling Adapter
  4...00 00 00 00 00 00 00 e0 Microsoft ISATAP Adapter #2
  6...00 00 00 00 00 00 00 e0 Microsoft ISATAP Adapter #3
===========================================================================

IPv4 Route Table
===========================================================================
Active Routes:
Network Destination        Netmask          Gateway       Interface  Metric
          0.0.0.0          0.0.0.0      192.168.0.1    192.168.0.103     25
        127.0.0.0        255.0.0.0         On-link         127.0.0.1    306
        127.0.0.1  255.255.255.255         On-link         127.0.0.1    306
  127.255.255.255  255.255.255.255         On-link         127.0.0.1    306
      192.168.0.0    255.255.255.0         On-link     192.168.0.103    281
    192.168.0.103  255.255.255.255         On-link     192.168.0.103    281
    192.168.0.255  255.255.255.255         On-link     192.168.0.103    281
     192.168.56.0    255.255.255.0         On-link      192.168.56.1    266
     192.168.56.1  255.255.255.255         On-link      192.168.56.1    266
   192.168.56.255  255.255.255.255         On-link      192.168.56.1    266
     192.168.95.0    255.255.255.0         On-link      192.168.95.1    266
     192.168.95.1  255.255.255.255         On-link      192.168.95.1    266
   192.168.95.255  255.255.255.255         On-link      192.168.95.1    266
        224.0.0.0        240.0.0.0         On-link         127.0.0.1    306
        224.0.0.0        240.0.0.0         On-link      192.168.56.1    266
        224.0.0.0        240.0.0.0         On-link      192.168.95.1    266
        224.0.0.0        240.0.0.0         On-link     192.168.0.103    281
  255.255.255.255  255.255.255.255         On-link         127.0.0.1    306
  255.255.255.255  255.255.255.255         On-link      192.168.56.1    266
  255.255.255.255  255.255.255.255         On-link      192.168.95.1    266
  255.255.255.255  255.255.255.255         On-link     192.168.0.103    281
===========================================================================
Persistent Routes:
  None
```

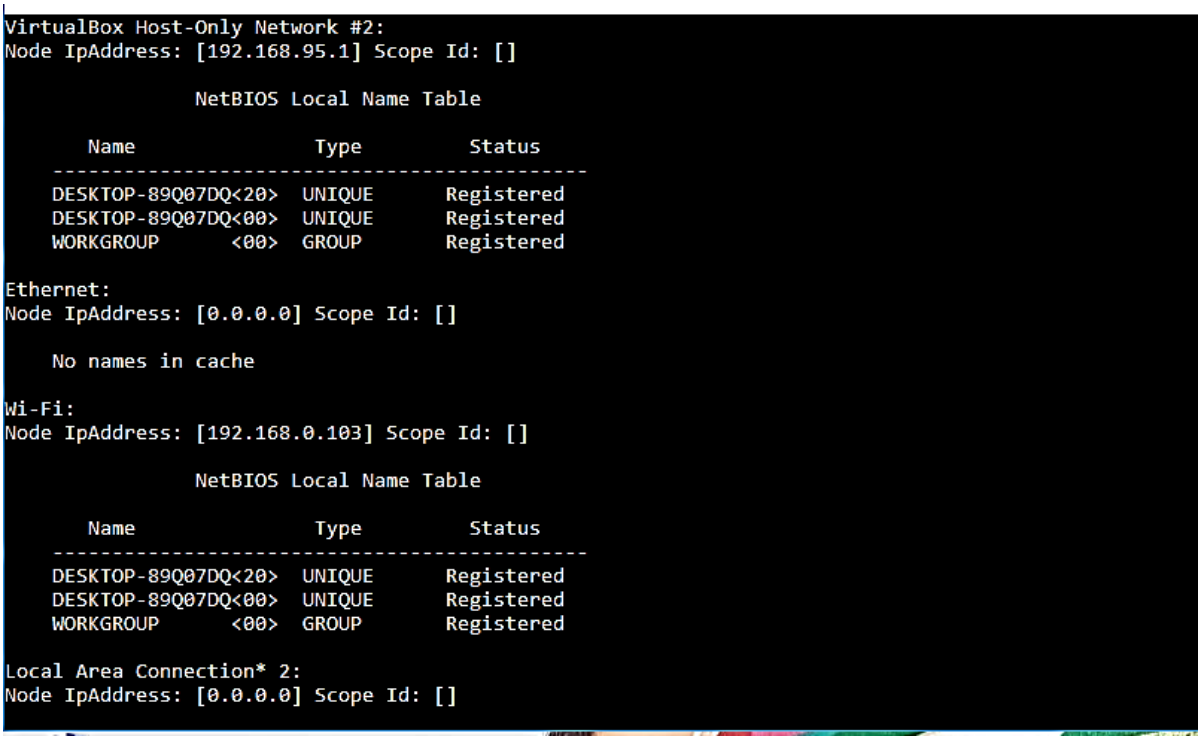
- Arp :- Displays, adds, and removes arp information from network devices.

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

Interface: 192.168.95.1 --- 0xd
  Internet Address      Physical Address      Type
  192.168.95.255        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

Interface: 192.168.0.103 --- 0x10
  Internet Address      Physical Address      Type
  192.168.0.1           c8-3a-35-5d-29-b0     dynamic
  192.168.0.255         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
  224.0.0.253           01-00-5e-00-00-fd     static
  239.255.255.250       01-00-5e-7f-ff-fa     static
  255.255.255.255       ff-ff-ff-ff-ff-ff     static

Interface: 192.168.56.1 --- 0x13
  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
```

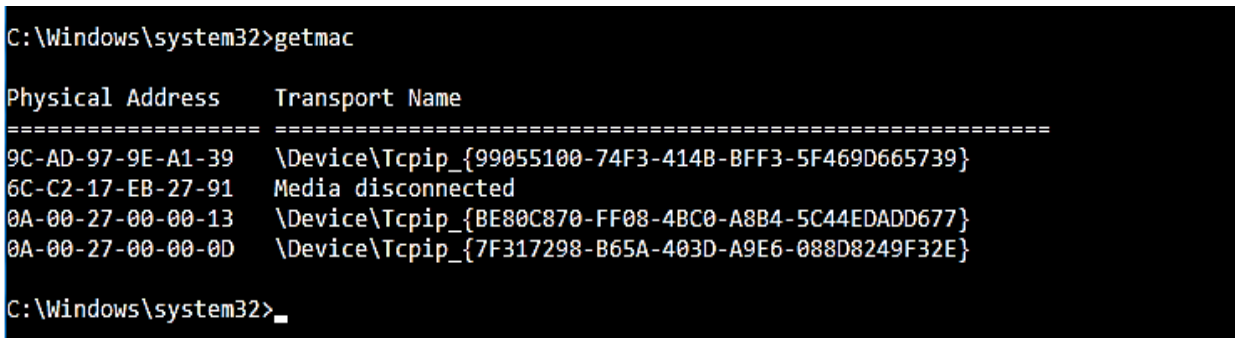
- Nslookup :- Displays information that you can use to diagnose Domain Name System (DNS) infrastructure.

```
C:\Windows\system32>nslookup
Default Server:  google-public-dns-a.google.com
Address:  8.8.8.8

>
>
> quit

C:\Windows\system32>
```

- Nbtstat :- MS-DOS utility that displays protocol statistics and current TCP/IP connections using NBT.



- Getmac :- DOS command used to show both local and remote MAC addresses.
  - When run with no parameters (ie. getmac) it displays MAC addresses for the local system.
  - When run with the /s parameter (eg. getmac /s \\foo) it displays MAC addresses for the remote computer. When the /v parameter is used, it also displays the associated connection name and network adapter name.



ipconfig
Ipconfig is a Console Command which can be issued to the Command Line Interpreter (or command prompt) to display the network settings currently assigned to any or all network adapters in the machine. This command can

be utilised to verify a network connection as well as to verify your network settings

netstat
Displays active TCP connections, ports on which the computer is listening, Ethernet statistics, the IP routing table, IPv4 statistics (for the IP, ICMP, TCP, and UDP protocols), and IPv6 statistics (for the IPv6, ICMPv6, TCP over IPv6, and UDP over IPv6 protocols). Used without parameters, netstat displays active TCP connections.

tracert
The tracert command is used to visually see a network packet being sent and received and the amount of hops required for that packet to get to its destination.

ping
Helps in determining TCP/IP Networks IP address as well as determine issues with the network and assists in resolving them.

pathping
Provides information about network latency and network loss at intermediate hops between a source and destination. Pathping sends multiple Echo Request messages to each router between a source and destination over a period of time and then computes results based on the packets returned from each router.

telnet
Telnet is software that allows users to remotely access another computer such as a server, network device, or other computer. With telnet users can connect to a device or computer, manage a network device, setup a device, transfer files, etc.

ftp
FTP is short for File Transfer Protocol, this page contains additional information about the FTP command and help using that command in Unix and MS-DOS (Windows).

route
The function and syntax of the Windows ROUTE command is similar to the UNIX or Linux route command. Use the command to manually configure the routes in the routing table.

arp
Displays, adds, and removes arp information from network devices.

nslookup
Displays information that you can use to diagnose Domain Name System (DNS) infrastructure. Before using this tool, you should be familiar with how DNS works. The Nslookup command-line tool is available only if you have installed the TCP/IP protocol.

nbtstat
MS-DOS utility that displays protocol statistics and current TCP/IP connections using NBT.

getmac

DOS command used to show both local and remote MAC addresses. When run with no parameters (ie. getmac) it displays MAC addresses for the local system. When run with the /s parameter (eg. getmac /s \\foo) it displays MAC addresses for the remote computer. When the /v parameter is used, it also displays the associated connection name and network adapter name.

Ifconfig

ifconfig utility is used to configure network interface parameters.Mostly we use this command to check the IP address assigned to the system.

dig

dig (Domain Information Groper) is a flexible tool for interrogating DNS name servers.

telnet

telnet connect destination host:port via a telnet protocol if connection establishes means connectivity between two hosts is working fine.
nslookup is a program to query Internet domain name servers.

netstat

Netstat command allows you a simple way to review each of your network connections andopen sockets.

scp

scp allows you to secure copy files to and from another host in the network.

w

w prints a summary of the current activity on the system, including what each user is doing, and their processes.

nmap

nmap is a one of the powerful commands, which checks the opened port on the server.

Enable/Disable Network Interface

You can enable or disable the network interface by using ifup/ifdown commands with ethernet interface parameter.