21CY681 - INTERNET PROTOCOL LAB - I

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Assignment Topic

Basic Network Administration and Troubleshooting UsingWindows Command Line Utilities

AIM

To perform troubleshooting in the network using basic Windows command-lineutilities

TOOLS REQUIRED

- Windows Server 2012 and Windows 10VMs
- Administrator privileges to run the tools

PROCEDURE

Login to Windows 10 VM and disable the network adapter:

Go to Control Panel then to Network and Internet then to Network and Sharing Center and click Change adapter setting.

Select and right-click the Ethernet adapter and click Disable from the context Menu.

It will disable Ethernet adapter.

TASK 1

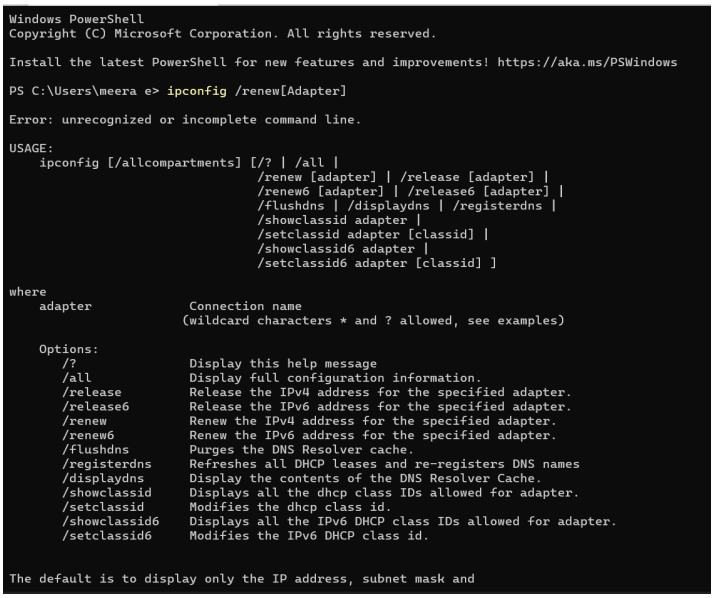
Verifying IP Configuration Settings

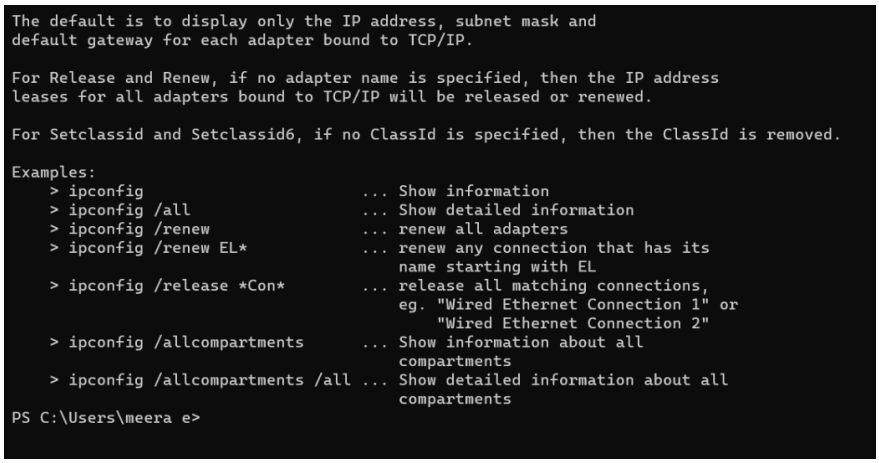
- Launch **Windows server 2012** VM and login to the local administratoraccount.
- Open a command prompt in Admin mode by right-clicking on the **Start** iconand then click on **Command Prompt (Admin)** from the context menu.
- The command prompt appears on the screen.
- Using different ipconfig parameters to perform various networktroubleshooting activities.

a) ipconfig – Display IPV4 address, IPV6 address, subnet mask and default gateway for all adapters.

b) ipconfig/all – It list out all the IP Configuration details of your machine.

c) ipconfig /renew [Adapter] - Renews DHCP configuration for all adapters.





d) ipconfig /release [Adapter] - Sends a DHCP RELEASE message to the DHCP server to release the current DHCP configuration and discard the IP address configuration for either all adapters or for a specified adapter.

```
PS C:\Users\meera e> ipconfig /release[Adapter]

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.
```

```
                       (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.
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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.

For Setclassid and Setclassid6, if no ClassId is specified, then the ClassId is removed.

Examples:
    > ipconfig                       ... Show information
    > ipconfig /all                  ... Show detailed information
    > ipconfig /renew                ... renew all adapters
    > ipconfig /renew EL*            ... renew any connection that has its
                                         name starting with EL
    > ipconfig /release *Con*        ... release all matching connections,
                                         eg. "Wired Ethernet Connection 1" or
                                             "Wired Ethernet Connection 2"
    > ipconfig /allcompartments      ... Show information about all
                                         compartments
    > ipconfig /allcompartments /all ... Show detailed information about all
                                         compartments
PS C:\Users\meera e>
```

e) ipconfig /flushdns ---->Flushes and resets the contents of the DNS client resolver cache.

```
Windows PowerShell
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Install the latest PowerShell for new features and improvements! https://aka.ms/PSWindows

PS C:\Users\meera e> ipconfig /flushdns

Windows IP Configuration

Successfully flushed the DNS Resolver Cache.
PS C:\Users\meera e>
```
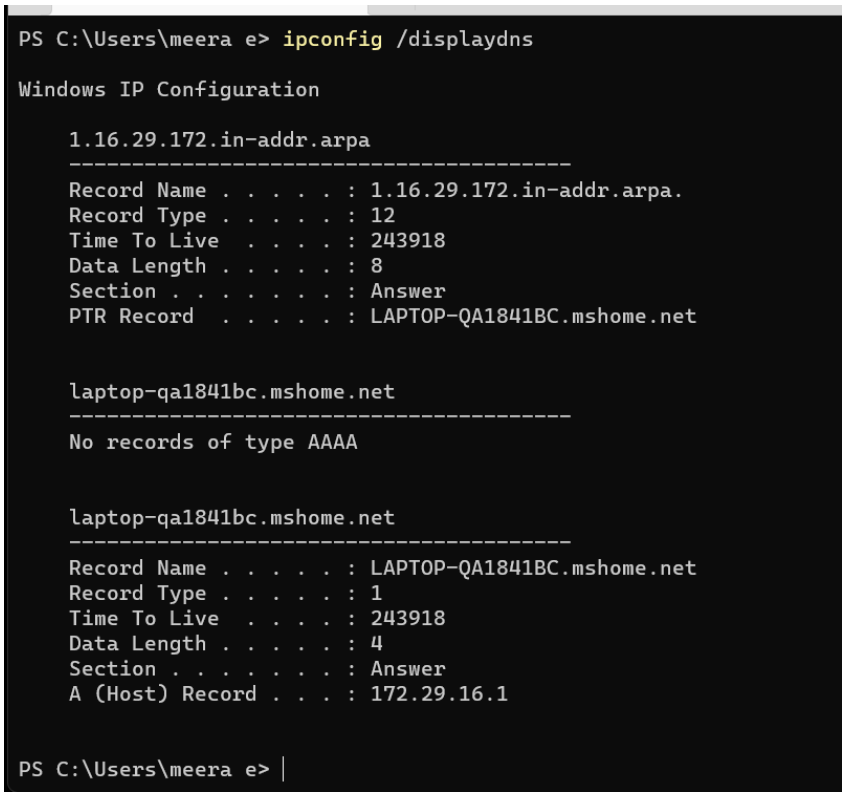
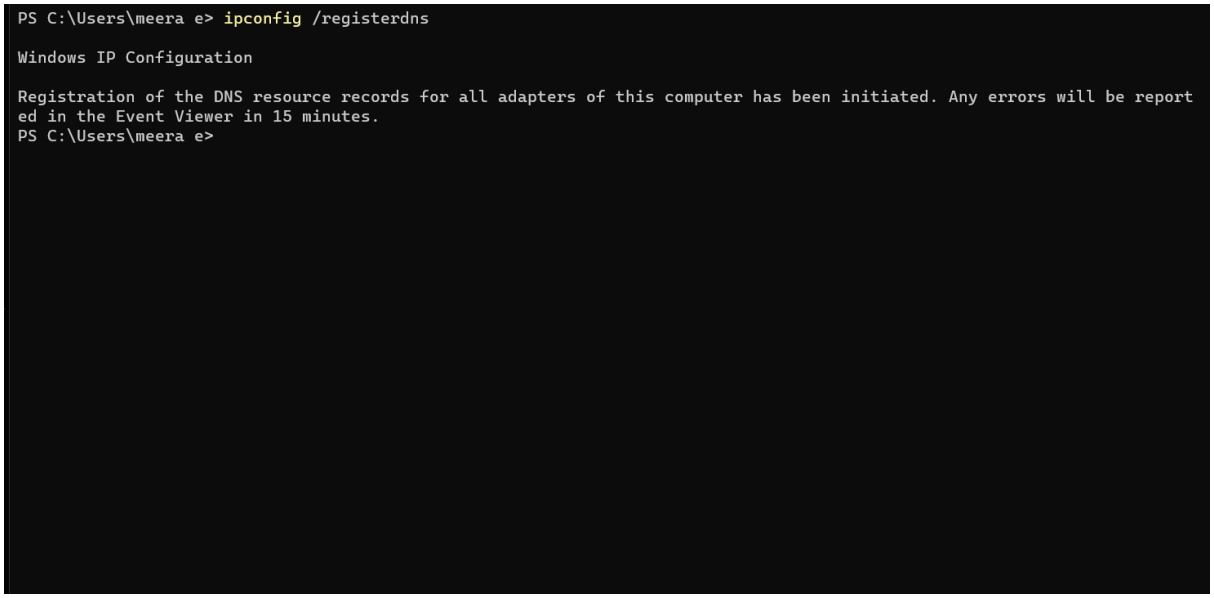

f) ipconfig /displaydns - Displays the contents of the DNS client resolver cache , which includes both entries preloaded from the local Hosts file and any recently obtained resource records for name queries resolved by the computer.

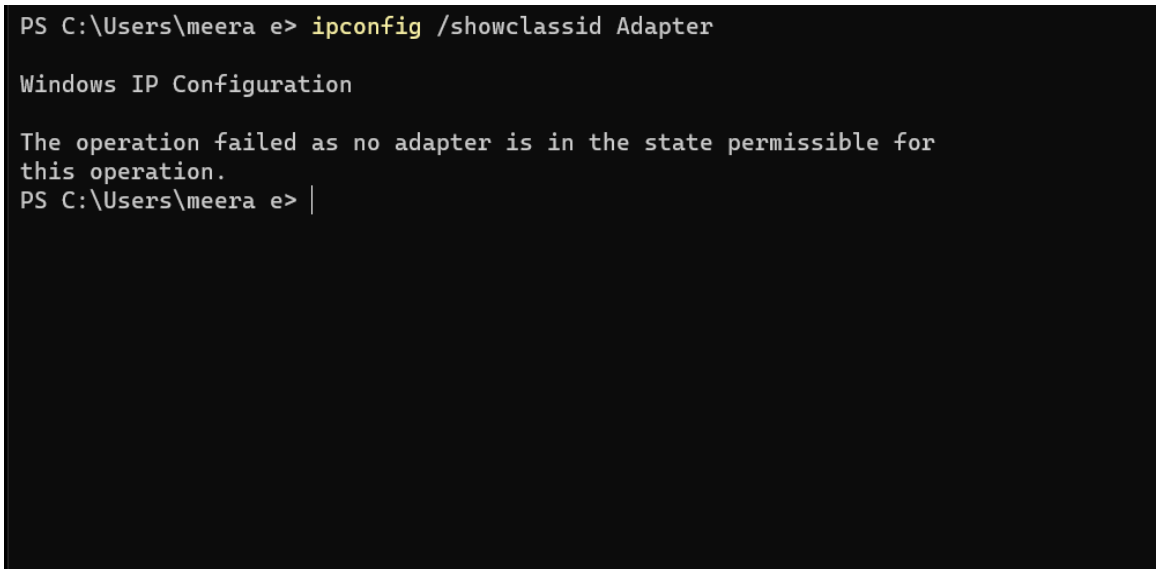


g) ipconfig /registerdns ---->Initiates manual dynamic registration for the DNS

names and IP addresses that are configured at a computer.



h) ipconfig /showclassid Adapter - Displays the DHCP class ID for a specified adapter.



i) ipconfig /setclassid Adapter[ClassID] - Configures the DHCP class ID for a specified adapter.

j) ipconfig /? - Displays help at the command prompt.

```
C:\WINDOWS\system32>ipconfig/?

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
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       /release         Release the IPv4 address for the specified adapter.
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       /showclassid     Displays all the dhcp class IDs allowed for adapter.
       /setclassid      Modifies the dhcp class id.
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       /setclassid6     Modifies the IPv6 DHCP class id.
```

```
       /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.
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                                        eg. "Wired Ethernet Connection 1" or
                                            "Wired Ethernet Connection 2"
    > ipconfig /allcompartments     ... Show information about all
                                        compartments
    > ipconfig /allcompartments /all ... Show detailed information about all
                                        compartments
PS C:\Users\meera e>
```

TASK 2

Checking IP level Connectivity Using Ping command

Type **ping** followed by the IP address of the Windows 10 machine

```
Windows PowerShell
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Install the latest PowerShell for new features and improvements! https://aka.ms/PSWindows

PS C:\Users\meera e> ping 10.10.10.10

Pinging 10.10.10.10 with 32 bytes of data:
Reply from 202.88.230.169: TTL expired in transit.
Reply from 202.88.230.169: TTL expired in transit.
Reply from 202.88.230.169: TTL expired in transit.
Reply from 202.88.230.169: TTL expired in transit.

Ping statistics for 10.10.10.10:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
PS C:\Users\meera e>
```
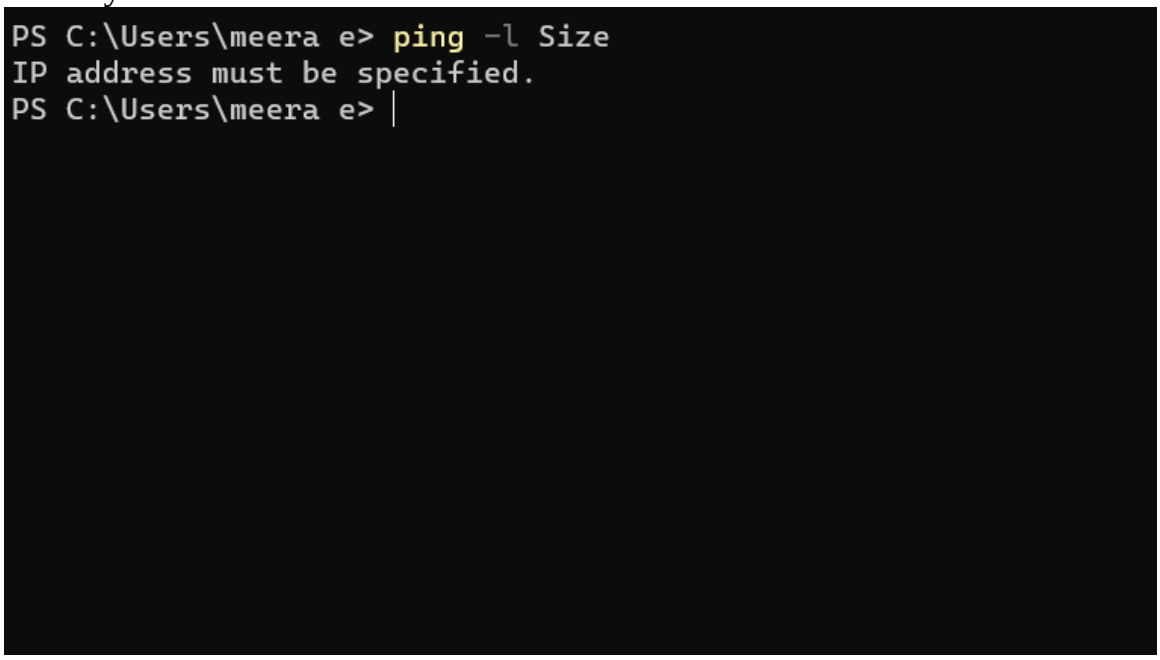

ping -n count : Determine the number of echo request to send. The default is 4 request.

```
PS C:\Users\meera e> ping -n Count
Bad value for option -n, valid range is from 1 to 4294967295.
PS C:\Users\meera e>
```

Ping -w Timecount :- Enables you to adjust the time-out. The default is 1000.

```
PS C:\Users\meera e> ping -w Timecount
IP address must be specified.
PS C:\Users\meera e>
```

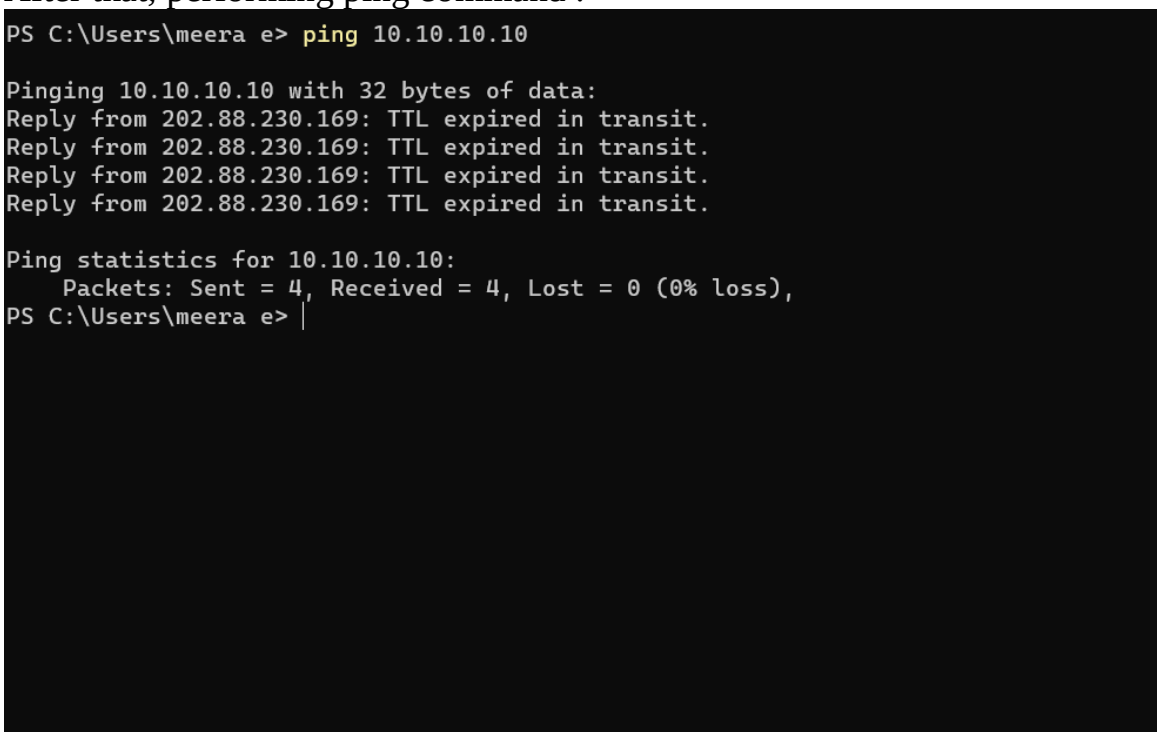
Ping -l size – Enables you to adjust the size of the ping packet. The default size is 32 bytes.



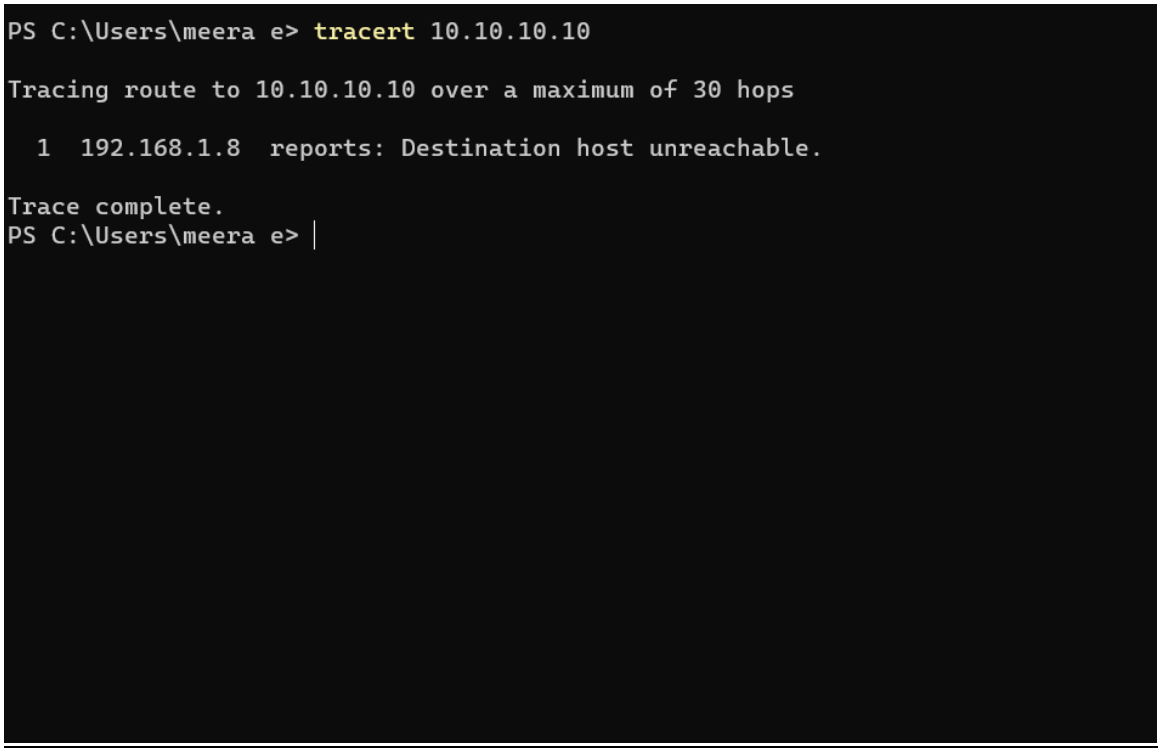
Ping -f – sets the Do Not fragment bit on the ping packet. By default, the ping ping .

Now enable ethernet which have been enabled in the adapter setting.

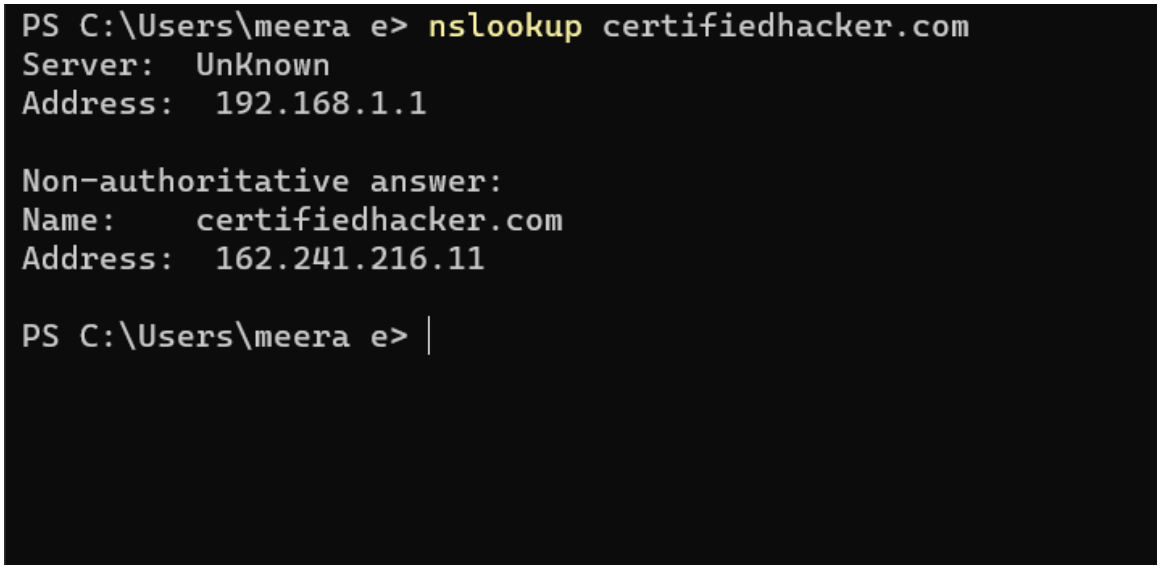
After that, performing ping command .



Tracert 10.10.10.10 – is useful for troubleshooting large networks where several paths can lead to same point or where many intermediate components are involved.



Nslookup certifiedhacker . com – Nslookup stands for name server look up. It used to query a DNS server to obtain its domain name and associated IP address.



Nslookup -type =A certifiedhacker.com – we can also use the nslookup command with type parameters to get non-authoritative name server information as shown as screenshot given below.

```
PS C:\Users\meera e> nslookup -type=A certifiedhacker.com
Server:  UnKnown
Address:  192.168.1.1

Non-authoritative answer:
Name:    certifiedhacker.com
Address:  162.241.216.11

PS C:\Users\meera e>
```

Nslookup -type =soa certifiedhacker.com – for getting authoritative ns information.

```
PS C:\Users\meera e> nslookup -type=soa certifiedhacker.com
Server:  UnKnown
Address:  192.168.1.1

DNS request timed out.
    timeout was 2 seconds.
Non-authoritative answer:
certifiedhacker.com
        primary name server = ns1.bluehost.com
        responsible mail addr = dnsadmin.box5331.bluehost.com
        serial  = 2018011205
        refresh = 86400 (1 day)
        retry   = 7200 (2 hours)
        expire  = 3600000 (41 days 16 hours)
        default TTL = 300 (5 mins)
PS C:\Users\meera e>
```

Netstat -stands for network statistics . Displays active TCP connections, ports on which the computer is listening.

```
PS C:\Users\meera e> netstat

Active Connections

  Proto  Local Address          Foreign Address        State
  TCP    127.0.0.1:59607        LAPTOP-QA1841BC:59609  ESTABLISHED
  TCP    127.0.0.1:59609        LAPTOP-QA1841BC:59607  ESTABLISHED
  TCP    192.168.1.8:49417      20.198.119.143:https   ESTABLISHED
  TCP    192.168.1.8:55649      192.168.1.6:8009       ESTABLISHED
  TCP    192.168.1.8:55650      192.168.1.2:8009       ESTABLISHED
  TCP    192.168.1.8:55651      192.168.1.7:8009       ESTABLISHED
  TCP    192.168.1.8:55725      52.109.56.86:https     ESTABLISHED
  TCP    192.168.1.8:55726      13.107.42.254:https    ESTABLISHED
  TCP    192.168.1.8:55727      a-0001:https           ESTABLISHED
  TCP    192.168.1.8:55728      131.253.33.254:https   ESTABLISHED
PS C:\Users\meera e>
```

Netstat -a – Displays all active TCP connections and the TCP and UDP ports on which the computer is listening.

```
S C:\Users\meera e> netstat -a

ctive Connections

 Proto  Local Address          Foreign Address        State
 TCP    0.0.0.0:135            LAPTOP-QA1841BC:0      LISTENING
 TCP    0.0.0.0:445            LAPTOP-QA1841BC:0      LISTENING
 TCP    0.0.0.0:5040           LAPTOP-QA1841BC:0      LISTENING
 TCP    0.0.0.0:5357           LAPTOP-QA1841BC:0      LISTENING
 TCP    0.0.0.0:6646           LAPTOP-QA1841BC:0      LISTENING
 TCP    0.0.0.0:49664          LAPTOP-QA1841BC:0      LISTENING
 TCP    0.0.0.0:49665          LAPTOP-QA1841BC:0      LISTENING
 TCP    0.0.0.0:49666          LAPTOP-QA1841BC:0      LISTENING
 TCP    0.0.0.0:49667          LAPTOP-QA1841BC:0      LISTENING
 TCP    0.0.0.0:49668          LAPTOP-QA1841BC:0      LISTENING
 TCP    0.0.0.0:49670          LAPTOP-QA1841BC:0      LISTENING
 TCP    0.0.0.0:63947          LAPTOP-QA1841BC:0      LISTENING
 TCP    127.0.0.1:2015         LAPTOP-QA1841BC:0      LISTENING
 TCP    127.0.0.1:59607        LAPTOP-QA1841BC:0      LISTENING
 TCP    127.0.0.1:59607        LAPTOP-QA1841BC:59609  ESTABLISHED
 TCP    127.0.0.1:59609        LAPTOP-QA1841BC:59607  ESTABLISHED
 TCP    172.29.16.1:139        LAPTOP-QA1841BC:0      LISTENING
 TCP    192.168.1.8:139        LAPTOP-QA1841BC:0      LISTENING
 TCP    192.168.1.8:49417      20.198.119.143:https   ESTABLISHED
 TCP    192.168.1.8:55649      192.168.1.6:8009       ESTABLISHED
 TCP    192.168.1.8:55650      192.168.1.2:8009       ESTABLISHED
 TCP    192.168.1.8:55651      192.168.1.7:8009       ESTABLISHED
 TCP    192.168.1.8:55725      52.109.56.86:https     TIME_WAIT
 TCP    192.168.1.8:55727      a-0001:https           ESTABLISHED
 TCP    192.168.1.8:55729      219:https              ESTABLISHED
 TCP    192.168.1.8:55730      51.11.192.48:https     ESTABLISHED
 TCP    192.168.56.1:139       LAPTOP-QA1841BC:0      LISTENING
 TCP    [::]:135               LAPTOP-QA1841BC:0      LISTENING
 TCP    [::]:445               LAPTOP-QA1841BC:0      LISTENING
 TCP    [::]:5357              LAPTOP-QA1841BC:0      LISTENING
 TCP    [::]:49664             LAPTOP-QA1841BC:0      LISTENING
 TCP    [::]:49665             LAPTOP-QA1841BC:0      LISTENING
 TCP    [::]:49666             LAPTOP-QA1841BC:0      LISTENING
 TCP    [::]:49667             LAPTOP-QA1841BC:0      LISTENING
 TCP    [::]:49668             LAPTOP-QA1841BC:0      LISTENING
```

```
TCP    0.0.0.0:49670          LAPTOP-QA1841BC:0      LISTENING
TCP    0.0.0.0:63947          LAPTOP-QA1841BC:0      LISTENING
TCP    127.0.0.1:2015         LAPTOP-QA1841BC:0      LISTENING
TCP    127.0.0.1:59607        LAPTOP-QA1841BC:0      LISTENING
TCP    127.0.0.1:59607        LAPTOP-QA1841BC:59609  ESTABLISHED
TCP    127.0.0.1:59609        LAPTOP-QA1841BC:59607  ESTABLISHED
TCP    172.29.16.1:139        LAPTOP-QA1841BC:0      LISTENING
TCP    192.168.1.8:139        LAPTOP-QA1841BC:0      LISTENING
TCP    192.168.1.8:49417      20.198.119.143:https   ESTABLISHED
TCP    192.168.1.8:55649      192.168.1.6:8009       ESTABLISHED
TCP    192.168.1.8:55650      192.168.1.2:8009       ESTABLISHED
TCP    192.168.1.8:55651      192.168.1.7:8009       ESTABLISHED
TCP    192.168.1.8:55725      52.109.56.86:https     TIME_WAIT
TCP    192.168.1.8:55727      a-0001:https           ESTABLISHED
TCP    192.168.1.8:55729      219:https              ESTABLISHED
TCP    192.168.1.8:55730      51.11.192.48:https     ESTABLISHED
TCP    192.168.56.1:139       LAPTOP-QA1841BC:0      LISTENING
TCP    [::]:135               LAPTOP-QA1841BC:0      LISTENING
TCP    [::]:445               LAPTOP-QA1841BC:0      LISTENING
TCP    [::]:5357              LAPTOP-QA1841BC:0      LISTENING
TCP    [::]:49664             LAPTOP-QA1841BC:0      LISTENING
TCP    [::]:49665             LAPTOP-QA1841BC:0      LISTENING
TCP    [::]:49666             LAPTOP-QA1841BC:0      LISTENING
TCP    [::]:49667             LAPTOP-QA1841BC:0      LISTENING
TCP    [::]:49668             LAPTOP-QA1841BC:0      LISTENING
TCP    [::]:49670             LAPTOP-QA1841BC:0      LISTENING
TCP    [::]:63947             LAPTOP-QA1841BC:0      LISTENING
TCP    [::1]:49669            LAPTOP-QA1841BC:0      LISTENING
UDP    0.0.0.0:53             *:*
UDP    0.0.0.0:123            *:*
UDP    0.0.0.0:500            *:*
UDP    0.0.0.0:3702           *:*
UDP    0.0.0.0:3702           *:*
UDP    0.0.0.0:3702           *:*
UDP    0.0.0.0:3702           *:*
UDP    0.0.0.0:4500           *:*
UDP    0.0.0.0:5050           *:*
UDP    0.0.0.0:5353           *:*
UDP    0.0.0.0:5353           *:*
UDP    0.0.0.0:5353           *:*
```

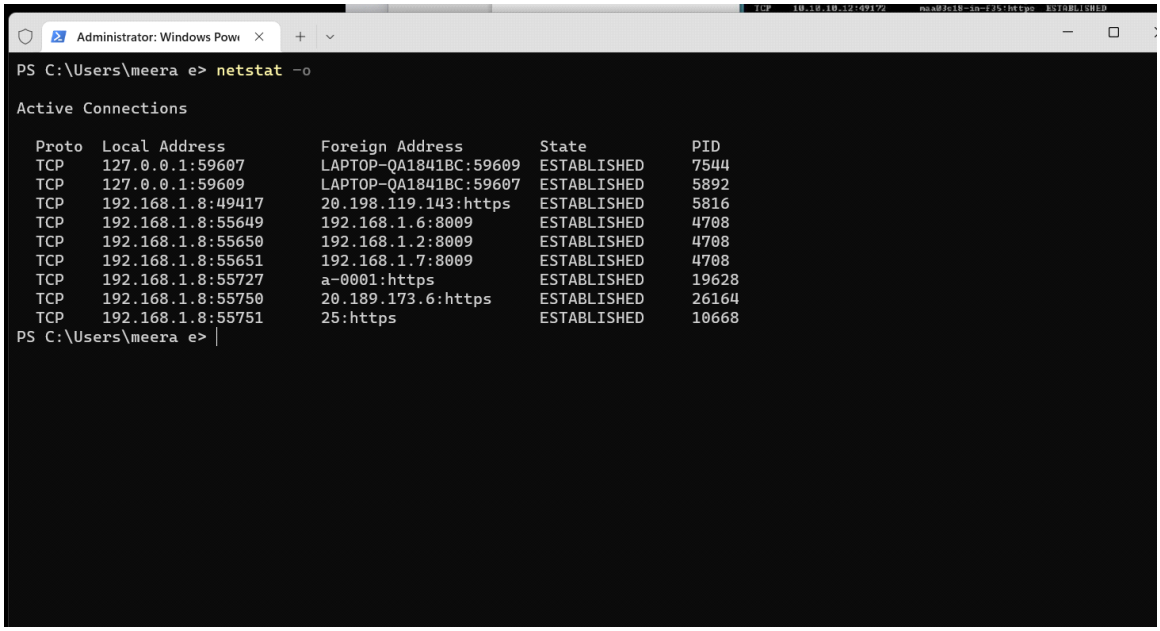
```
UDP    0.0.0.0:53             *:*
UDP    0.0.0.0:123            *:*
UDP    0.0.0.0:500            *:*
UDP    0.0.0.0:3702           *:*
UDP    0.0.0.0:3702           *:*
UDP    0.0.0.0:3702           *:*
UDP    0.0.0.0:3702           *:*
UDP    0.0.0.0:4500           *:*
UDP    0.0.0.0:5050           *:*
UDP    0.0.0.0:5353           *:*
UDP    0.0.0.0:5353           *:*
UDP    0.0.0.0:5353           *:*
UDP    0.0.0.0:5353           *:*
UDP    0.0.0.0:5353           *:*
UDP    0.0.0.0:5353           *:*
UDP    0.0.0.0:5353           *:*
UDP    0.0.0.0:5355           *:*
UDP    0.0.0.0:6646           *:*
UDP    0.0.0.0:49360          *:*
UDP    0.0.0.0:49361          *:*
UDP    0.0.0.0:50615          *:*
UDP    0.0.0.0:54093          *:*
UDP    0.0.0.0:62063          *:*
UDP    127.0.0.1:1900         *:*
UDP    127.0.0.1:56635        *:*
UDP    127.0.0.1:61149        127.0.0.1:61149
UDP    127.0.0.1:64845        127.0.0.1:64845
UDP    172.29.16.1:137        *:*
UDP    172.29.16.1:138        *:*
UDP    172.29.16.1:1900       *:*
UDP    172.29.16.1:56636      *:*
UDP    192.168.1.8:137        *:*
UDP    192.168.1.8:138        *:*
UDP    192.168.1.8:1900       *:*
UDP    192.168.1.8:56634      *:*
UDP    192.168.56.1:137       *:*
UDP    192.168.56.1:138       *:*
UDP    192.168.56.1:1900      *:*
UDP    192.168.56.1:56633     *:*
UDP    [::]:123               *:*
```

```
  UDP    127.0.0.1:61149        127.0.0.1:61149
  UDP    127.0.0.1:64845        127.0.0.1:64845
  UDP    172.29.16.1:137        *:*
  UDP    172.29.16.1:138        *:*
  UDP    172.29.16.1:1900       *:*
  UDP    172.29.16.1:56636      *:*
  UDP    192.168.1.8:137        *:*
  UDP    192.168.1.8:138        *:*
  UDP    192.168.1.8:1900       *:*
  UDP    192.168.1.8:56634      *:*
  UDP    192.168.56.1:137       *:*
  UDP    192.168.56.1:138       *:*
  UDP    192.168.56.1:1900      *:*
  UDP    192.168.56.1:56633     *:*
  UDP    [::]:123               *:*
  UDP    [::]:500               *:*
  UDP    [::]:3702              *:*
  UDP    [::]:3702              *:*
  UDP    [::]:3702              *:*
  UDP    [::]:3702              *:*
  UDP    [::]:4500              *:*
  UDP    [::]:5353              *:*
  UDP    [::]:5353              *:*
  UDP    [::]:5353              *:*
  UDP    [::]:5353              *:*
  UDP    [::]:5355              *:*
  UDP    [::]:49362             *:*
  UDP    [::]:50616             *:*
  UDP    [::]:54094             *:*
  UDP    [::]:62063             *:*
  UDP    [::1]:1900             *:*
  UDP    [::1]:56631            *:*
  UDP    [fe80::1090:1a02:eeb3:a6e0%60]:1900  *:*
  UDP    [fe80::1090:1a02:eeb3:a6e0%60]:56632  *:*
  UDP    [fe80::e464:c9d8:ed1:faf6%12]:1900  *:*
  UDP    [fe80::e464:c9d8:ed1:faf6%12]:56629  *:*
  UDP    [fe80::fc28:15b4:2f33:d195%15]:1900  *:*
  UDP    [fe80::fc28:15b4:2f33:d195%15]:56630  *:*
PS C:\Users\meera e>
```

Netstat -e – Displays ethernet statistics, such as number of bytes and packets sent and received. This parameter can be combined with -s

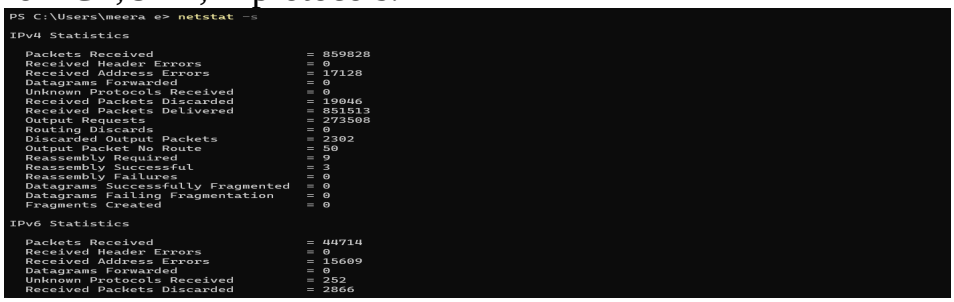
```
PS C:\Users\meera e> netstat -e
Interface Statistics

                           Received            Sent

Bytes                     101291832        15588734
Unicast packets              242408           93808
Non-unicast packets           24848           27668
Discards                          0               0
Errors                            0               0
Unknown protocols                 0
PS C:\Users\meera e>
```

Netstat -o – displays active TCP connections and includes the process for each connection.



Netstat -p shows connections for protocol specified by protocol.

netstat -s – displays statistic by protocol. By default, statistic are shown forTCP,UDP,IP protocols.



```
  Received Packets Delivered         = 31635
  Output Requests                    = 4907
  Routing Discards                   = 0
  Discarded Output Packets           = 2
  Output Packet No Route             = 0
  Reassembly Required                = 0
  Reassembly Successful              = 0
  Reassembly Failures                = 0
  Datagrams Successfully Fragmented  = 0
  Datagrams Failing Fragmentation    = 0
  Fragments Created                  = 0

ICMPv4 Statistics

                          Received    Sent
  Messages                2547        869
  Errors                  0           0
  Destination Unreachable 2428        698
  Time Exceeded           117         0
  Parameter Problems      0           0
  Source Quenches         0           0
  Redirects               0           0
  Echo Replies            0           0
  Echos                   0           171
  Timestamps              0           0
  Timestamp Replies       0           0
  Address Masks           0           0
  Address Mask Replies    0           0
  Router Solicitations    0           0
  Router Advertisements   2           0
```

```
ICMPv6 Statistics

                          Received    Sent
  Messages                7886        377
  Errors                  0           0
  Destination Unreachable 1           1
  Packet Too Big          0           0
  Time Exceeded           0           0
  Parameter Problems      0           0
  Echos                   0           0
  Echo Replies            0           0
  MLD Queries             5888        0
  MLD Reports             1294        0
  MLD Dones               252         0
  Router Solicitations    0           205
  Router Advertisements   149         0
  Neighbor Solicitations  8           94
  Neighbor Advertisements 294         77
  Redirects               0           0
  Router Renumberings     0           0

TCP Statistics for IPv4

  Active Opens                        = 2268
  Passive Opens                       = 104
  Failed Connection Attempts          = 110
  Reset Connections                   = 407
  Current Connections                 = 7
  Segments Received                   = 742943
  Segments Sent                       = 254701
  Current Connections                 = 7
  Segments Received                   = 742943
  Segments Sent                       = 254701
  Segments Retransmitted              = 1572

TCP Statistics for IPv6

  Active Opens                        = 33
  Passive Opens                       = 11
  Failed Connection Attempts          = 52
  Reset Connections                   = 0
  Current Connections                 = 0
  Segments Received                   = 275
  Segments Sent                       = 231
  Segments Retransmitted              = 44

UDP Statistics for IPv4

  Datagrams Received    = 77325
  No Ports              = 3839
  Receive Errors        = 0
  Datagrams Sent        = 14431

UDP Statistics for IPv6

  Datagrams Received    = 22753
  No Ports              = 17
  Receive Errors        = 0
  Datagrams Sent        = 2425
PS C:\Users\meera e>
```

Netstat -r – Display content of ip routing table

```
PS C:\Users\meera e> netstat -r
===========================================================================
Interface List
 21...a8 b1 3b 13 e0 75 ......Realtek Gaming GbE Family Controller
 19...00 ff c6 1d e6 c3 ......ExpressVPN TAP Adapter
 17...........................ExpressVPN Wintun Driver
 12...0a 00 27 00 00 0c ......VirtualBox Host-Only Ethernet Adapter
  3...52 c2 e8 4a b1 21 ......Microsoft Wi-Fi Direct Virtual Adapter
 10...d2 c2 e8 4a b1 21 ......Microsoft Wi-Fi Direct Virtual Adapter #2
 15...50 c2 e8 4a b1 21 ......Realtek RTL8852AE WiFi 6 802.11ax PCIe Adapter
  1...........................Software Loopback Interface 1
 60...00 15 5d 85 87 51 ......Hyper-V Virtual Ethernet Adapter
===========================================================================

IPv4 Route Table
===========================================================================
Active Routes:
Network Destination        Netmask          Gateway       Interface  Metric
          0.0.0.0          0.0.0.0      192.168.1.1      192.168.1.8     50
        127.0.0.0        255.0.0.0         On-link         127.0.0.1    331
        127.0.0.1  255.255.255.255         On-link         127.0.0.1    331
  127.255.255.255  255.255.255.255         On-link         127.0.0.1    331
      172.29.16.0    255.255.240.0         On-link       172.29.16.1   5256
      172.29.16.1  255.255.255.255         On-link       172.29.16.1   5256
    172.29.31.255  255.255.255.255         On-link       172.29.16.1   5256
      192.168.1.0    255.255.255.0         On-link       192.168.1.8    306
      192.168.1.8  255.255.255.255         On-link       192.168.1.8    306
    192.168.1.255  255.255.255.255         On-link       192.168.1.8    306
     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
```

Administrator: Windows Powe

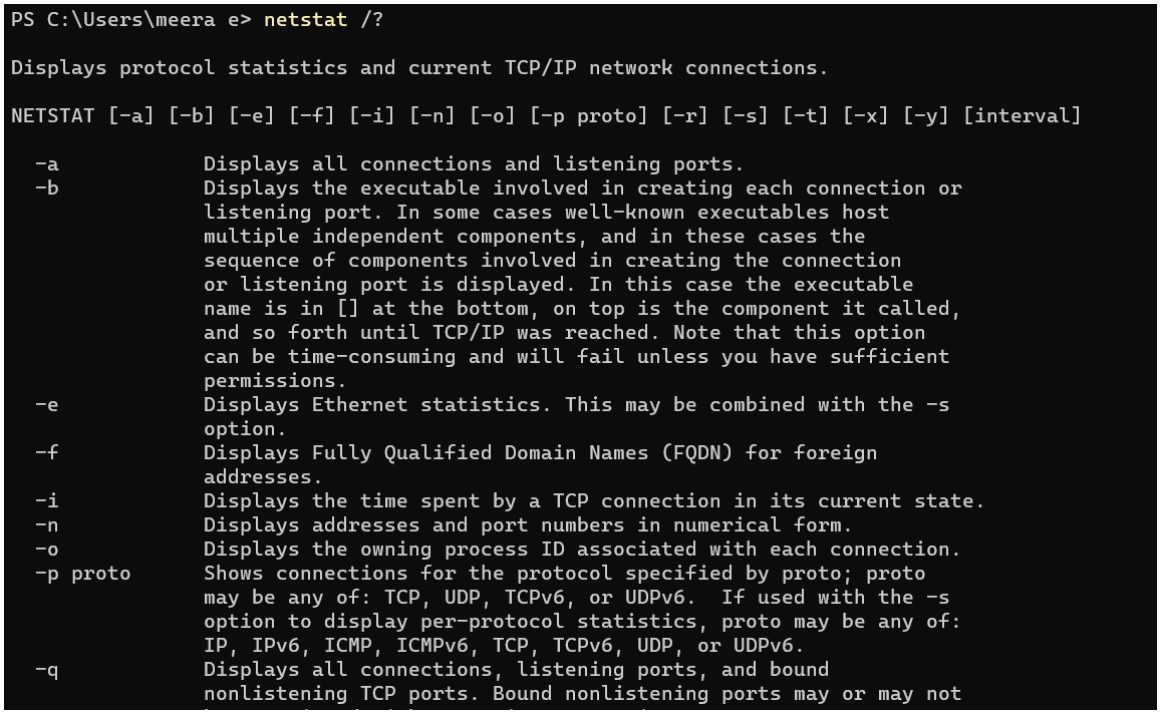
```
       224.0.0.0        240.0.0.0         On-link         127.0.0.1    331
       224.0.0.0        240.0.0.0         On-link      192.168.56.1    281
       224.0.0.0        240.0.0.0         On-link       172.29.16.1   5256
       224.0.0.0        240.0.0.0         On-link       192.168.1.8    306
  255.255.255.255  255.255.255.255         On-link         127.0.0.1    331
  255.255.255.255  255.255.255.255         On-link      192.168.56.1    281
  255.255.255.255  255.255.255.255         On-link       172.29.16.1   5256
  255.255.255.255  255.255.255.255         On-link       192.168.1.8    306
===========================================================================
Persistent Routes:
  None

IPv6 Route Table
===========================================================================
Active Routes:
 If Metric Network Destination      Gateway
 15    306 ::/0                     fe80::1
  1    331 ::1/128                  On-link
 12    281 fe80::/64                On-link
 60   5256 fe80::/64                On-link
 15    306 fe80::/64                On-link
 60   5256 fe80::1090:1a02:eeb3:a6e0/128
                                    On-link
 12    281 fe80::e464:c9d8:ed1:faf6/128
                                    On-link
 15    306 fe80::fc28:15b4:2f33:d195/128
                                    On-link
  1    331 ff00::/8                 On-link
 12    281 ff00::/8                 On-link
 60   5256 ff00::/8                 On-link
```

```
  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       172.29.16.1   5256
  255.255.255.255  255.255.255.255         On-link       192.168.1.8    306
===========================================================================
Persistent Routes:
  None

IPv6 Route Table
===========================================================================
Active Routes:
 If Metric Network Destination      Gateway
 15    306 ::/0                     fe80::1
  1    331 ::1/128                  On-link
 12    281 fe80::/64                On-link
 60   5256 fe80::/64                On-link
 15    306 fe80::/64                On-link
 60   5256 fe80::1090:1a02:eeb3:a6e0/128
                                    On-link
 12    281 fe80::e464:c9d8:ed1:faf6/128
                                    On-link
 15    306 fe80::fc28:15b4:2f33:d195/128
                                    On-link
  1    331 ff00::/8                 On-link
 12    281 ff00::/8                 On-link
 60   5256 ff00::/8                 On-link
 15    306 ff00::/8                 On-link
===========================================================================
Persistent Routes:
  None
PS C:\Users\meera e>
```

Netstat -interval – Redisplay the selected information every interval seconds

```
PS C:\Users\meera e> netstat Interval

Displays protocol statistics and current TCP/IP network connections.

NETSTAT [-a] [-b] [-e] [-f] [-i] [-n] [-o] [-p proto] [-r] [-s] [-t] [-x] [-y] [interval]

  -a            Displays all connections and listening ports.
  -b            Displays the executable involved in creating each connection or
                listening port. In some cases well-known executables host
                multiple independent components, and in these cases the
                sequence of components involved in creating the connection
                or listening port is displayed. In this case the executable
                name is in [] at the bottom, on top is the component it called,
                and so forth until TCP/IP was reached. Note that this option
                can be time-consuming and will fail unless you have sufficient
                permissions.
  -e            Displays Ethernet statistics. This may be combined with the -s
                option.
  -f            Displays Fully Qualified Domain Names (FQDN) for foreign
                addresses.
  -i            Displays the time spent by a TCP connection in its current state.
  -n            Displays addresses and port numbers in numerical form.
  -o            Displays the owning process ID associated with each connection.
  -p proto      Shows connections for the protocol specified by proto; proto
                may be any of: TCP, UDP, TCPv6, or UDPv6.  If used with the -s
                option to display per-protocol statistics, proto may be any of:
                IP, IPv6, ICMP, ICMPv6, TCP, TCPv6, UDP, or UDPv6.
  -q            Displays all connections, listening ports, and bound
                nonlistening TCP ports. Bound nonlistening ports may or may not
            permissions.
-e          Displays Ethernet statistics. This may be combined with the -s
            option.
-f          Displays Fully Qualified Domain Names (FQDN) for foreign
            addresses.
-i          Displays the time spent by a TCP connection in its current state.
-n          Displays addresses and port numbers in numerical form.
-o          Displays the owning process ID associated with each connection.
-p proto    Shows connections for the protocol specified by proto; proto
            may be any of: TCP, UDP, TCPv6, or UDPv6.  If used with the -s
            option to display per-protocol statistics, proto may be any of:
            IP, IPv6, ICMP, ICMPv6, TCP, TCPv6, UDP, or UDPv6.
-q          Displays all connections, listening ports, and bound
            nonlistening TCP ports. Bound nonlistening ports may or may not
            be associated with an active connection.
-r          Displays the routing table.
-s          Displays per-protocol statistics.  By default, statistics are
            shown for IP, IPv6, ICMP, ICMPv6, TCP, TCPv6, UDP, and UDPv6;
            the -p option may be used to specify a subset of the default.
-t          Displays the current connection offload state.
-x          Displays NetworkDirect connections, listeners, and shared
            endpoints.
-y          Displays the TCP connection template for all connections.
            Cannot be combined with the other options.
interval    Redisplays selected statistics, pausing interval seconds
            between each display.  Press CTRL+C to stop redisplaying
            statistics.  If omitted, netstat will print the current
            configuration information once.

S C:\Users\meera e>
```

netstat /? – Displays help the command prompt



RESULT:

Studied and performed basic network administration and troubleshooting usingWindows command line utilities.