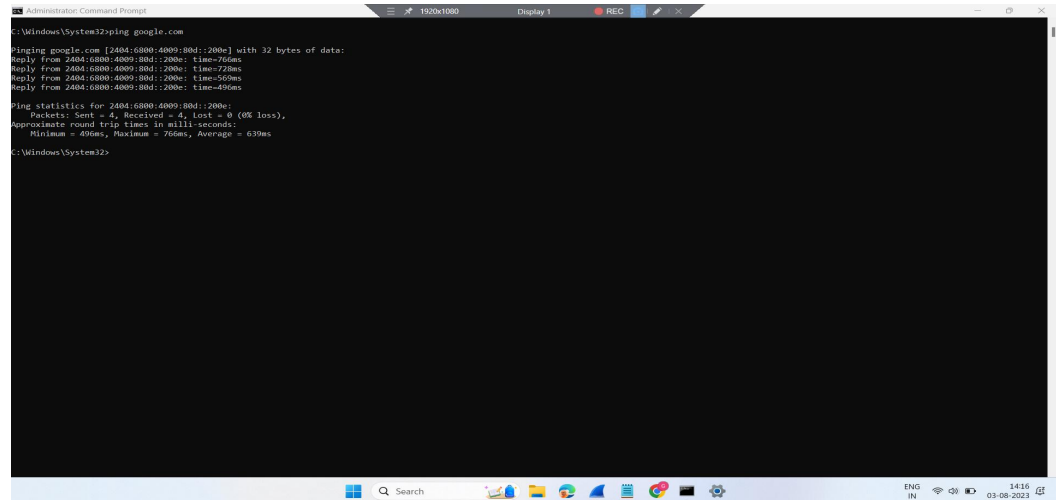


CN LAB ASSIGNMENT : 1

PANCHAL GUNGUN PARESH
U21CS052

1. PING

- to test the reachability of a host on an Internet Protocol (IP) network.



```
C:\Windows\System32>ping google.com

Pinging google.com [2404:6800:4009:80d::200e] with 32 bytes of data:
Reply from 2404:6800:4009:80d::200e: time=766ms
Reply from 2404:6800:4009:80d::200e: time=723ms
Reply from 2404:6800:4009:80d::200e: time=569ms
Reply from 2404:6800:4009:80d::200e: time=451ms

Ping statistics for 2404:6800:4009:80d::200e:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 451ms, Maximum = 766ms, Average = 639ms

C:\Windows\System32>
```

2. NETSTAT

- NetStat is a networking utility that can be used to display all active network connections and their status.

```
Administrator: Command Prompt
C:\Windows\System32\netstat -an

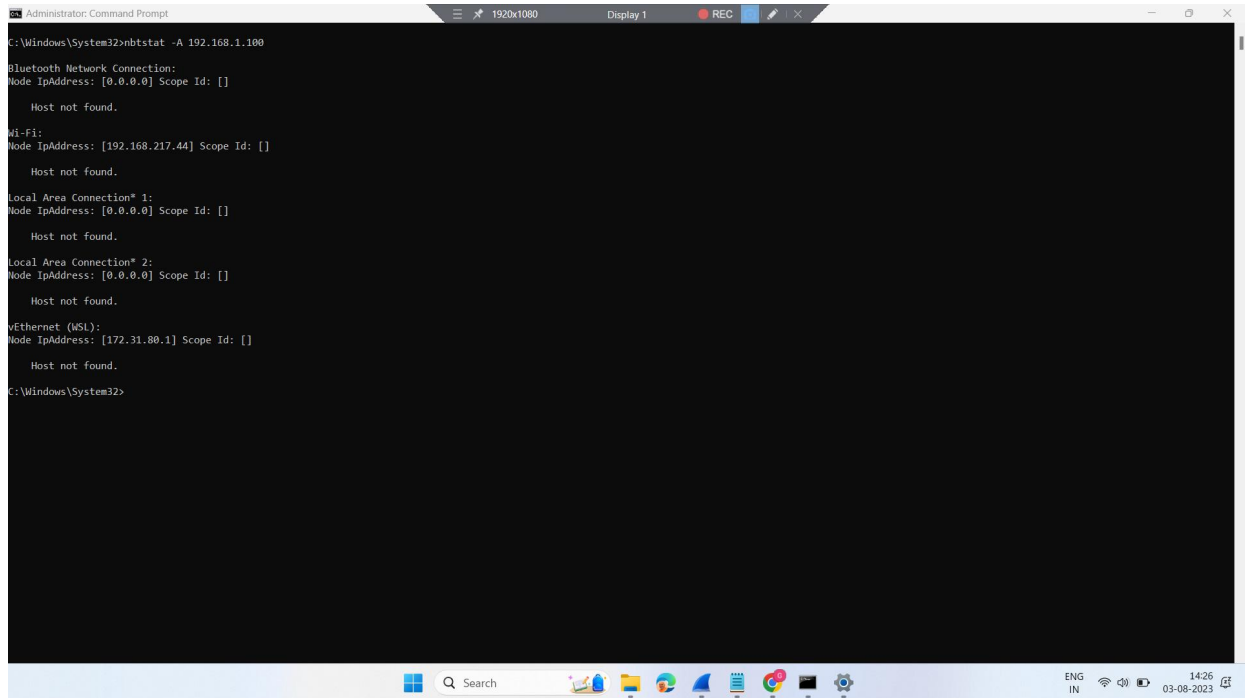
Active Connections

Proto Local Address Foreign Address State
TCP 127.0.0.1:49604 GUNGUN:49605 ESTABLISHED
TCP 127.0.0.1:49605 GUNGUN:49604 ESTABLISHED
TCP 127.0.0.1:49606 GUNGUN:49607 ESTABLISHED
TCP 127.0.0.1:49607 GUNGUN:49606 ESTABLISHED
TCP 127.0.0.1:60231 GUNGUN:60232 ESTABLISHED
TCP 127.0.0.1:60232 GUNGUN:60231 ESTABLISHED
TCP 127.0.0.1:60233 GUNGUN:60234 ESTABLISHED
TCP 127.0.0.1:60234 GUNGUN:60233 ESTABLISHED
TCP 127.0.0.1:60237 GUNGUN:60238 ESTABLISHED
TCP 127.0.0.1:60238 GUNGUN:60237 ESTABLISHED
TCP 127.0.0.1:60240 GUNGUN:60241 ESTABLISHED
TCP 127.0.0.1:60241 GUNGUN:60240 ESTABLISHED
TCP 127.0.0.1:60242 GUNGUN:60243 ESTABLISHED
TCP 127.0.0.1:60243 GUNGUN:60242 ESTABLISHED
TCP 192.168.217.44:60179 relay-9e5f9510:http TIME_WAIT
TCP 192.168.217.44:60515 152.195.38.76:http CLOSE_WAIT
TCP 192.168.217.44:60518 52.98.57.114:https ESTABLISHED
TCP 192.168.217.44:60526 52.98.57.114:https ESTABLISHED
TCP 192.168.217.44:60526 52.98.57.114:https ESTABLISHED
TCP 192.168.217.44:60817 117.18.232.200:https CLOSE_WAIT
TCP 192.168.217.44:60848 623-48-214-225:https CLOSE_WAIT
TCP 192.168.217.44:60848 192.168.217.76:domain TIME_WAIT
TCP 192.168.217.44:60845 192.168.217.76:domain TIME_WAIT
TCP 192.168.217.44:60847 ec2-35-85-84-216:https TIME_WAIT
TCP 192.168.217.44:60850 192.168.217.76:domain TIME_WAIT
TCP 192.168.217.44:60951 192.168.217.76:domain TIME_WAIT
TCP 192.168.217.44:60954 192.168.217.76:domain TIME_WAIT
TCP 192.168.217.44:60955 192.168.217.76:domain TIME_WAIT
TCP 192.168.217.44:60956 192.168.217.76:domain TIME_WAIT
TCP 192.168.217.44:60962 192.168.217.76:domain TIME_WAIT
TCP 192.168.217.44:60963 192.168.217.76:domain TIME_WAIT
TCP 192.168.217.44:60964 192.168.217.76:domain TIME_WAIT
TCP 192.168.217.44:60965 192.168.217.76:domain TIME_WAIT
TCP 192.168.217.44:60966 192.168.217.76:domain TIME_WAIT
TCP 192.168.217.44:60968 192.168.217.76:domain TIME_WAIT
TCP 192.168.217.44:60969 192.168.217.76:domain TIME_WAIT
TCP 192.168.217.44:60970 192.168.217.76:domain TIME_WAIT
TCP 192.168.217.44:60971 192.168.217.76:domain TIME_WAIT
TCP 192.168.217.44:60972 192.168.217.76:domain TIME_WAIT
TCP 192.168.217.44:60973 192.168.217.76:domain TIME_WAIT
TCP 192.168.217.44:60974 192.168.217.76:domain TIME_WAIT
TCP 192.168.217.44:60975 192.168.217.76:domain TIME_WAIT
TCP 192.168.217.44:60976 192.168.217.76:domain TIME_WAIT
TCP 192.168.217.44:60977 192.168.217.76:domain TIME_WAIT
```

```
Select Administrator: Command Prompt
TCP 192.168.217.44:60977 192.168.217.76:domain TIME_WAIT
TCP 192.168.217.44:60978 192.168.217.76:domain TIME_WAIT
TCP 192.168.217.44:60979 192.168.217.76:domain TIME_WAIT
TCP [::1]:1521 GUNGUN:15072 ESTABLISHED
TCP [::1]:15072 GUNGUN:1521 ESTABLISHED
TCP [2409:40c1:10bf:926a:50d6:f19a:5b4:b7ff]:49482 [64:ff9b::14c6:70be]:https ESTABLISHED
TCP [2409:40c1:10bf:926a:50d6:f19a:5b4:b7ff]:59918 [2066:4700:3033::0815:5922]:https ESTABLISHED
TCP [2409:40c1:10bf:926a:50d6:f19a:5b4:b7ff]:60212 [64:ff9b::14c6:778f]:https ESTABLISHED
TCP [2409:40c1:10bf:926a:50d6:f19a:5b4:b7ff]:60253 [64:ff9b::14c6:778f]:https ESTABLISHED
TCP [2409:40c1:10bf:926a:50d6:f19a:5b4:b7ff]:60320 [64:ff9b::1762:68d3]:8883 ESTABLISHED
TCP [2409:40c1:10bf:926a:50d6:f19a:5b4:b7ff]:60572 sl-in-f188:5228 ESTABLISHED
TCP [2409:40c1:10bf:926a:50d6:f19a:5b4:b7ff]:60832 623-203-79-63:https CLOSE_WAIT
TCP [2409:40c1:10bf:926a:50d6:f19a:5b4:b7ff]:60867 [2606:4700:8ca1:a18:cd7:542:72a1:ef17]:https ESTABLISHED
TCP [2409:40c1:10bf:926a:50d6:f19a:5b4:b7ff]:60868 [2606:4700:8ca1:a18:cd7:542:72a1:ef17]:https TIME_WAIT
TCP [2409:40c1:10bf:926a:50d6:f19a:5b4:b7ff]:60870 [2606:4700:8d71:a18:cd7:53c:72a1:ef17]:https ESTABLISHED
TCP [2409:40c1:10bf:926a:50d6:f19a:5b4:b7ff]:60871 [2606:4700:8d71:a18:cd7:53c:72a1:ef17]:https TIME_WAIT
TCP [2409:40c1:10bf:926a:50d6:f19a:5b4:b7ff]:60873 249:https TIME_WAIT
TCP [2409:40c1:10bf:926a:50d6:f19a:5b4:b7ff]:60875 bom07s35-in-x0a:https TIME_WAIT
TCP [2409:40c1:10bf:926a:50d6:f19a:5b4:b7ff]:60876 bom07s35-in-x0a:https TIME_WAIT
TCP [2409:40c1:10bf:926a:50d6:f19a:5b4:b7ff]:60881 bom07s24-in-x08:https TIME_WAIT
TCP [2409:40c1:10bf:926a:50d6:f19a:5b4:b7ff]:60884 [2606:4700:8d71:a18:cd7:542:72a1:ef17]:https ESTABLISHED
TCP [2409:40c1:10bf:926a:50d6:f19a:5b4:b7ff]:60885 [2606:4700:8d71:a18:cd7:542:72a1:ef17]:https ESTABLISHED
TCP [2409:40c1:10bf:926a:50d6:f19a:5b4:b7ff]:60896 server-108-158-80-9:https TIME_WAIT
TCP [2409:40c1:10bf:926a:50d6:f19a:5b4:b7ff]:60895 [2606:4700:8d79:1843:66d7:542:ce15:da8e]:https ESTABLISHED
TCP [2409:40c1:10bf:926a:50d6:f19a:5b4:b7ff]:60896 [2606:4700:8d79:1843:66d7:542:ce15:da8e]:https TIME_WAIT
TCP [2409:40c1:10bf:926a:50d6:f19a:5b4:b7ff]:60897 bom12s19-in-x01:https TIME_WAIT
TCP [2409:40c1:10bf:926a:50d6:f19a:5b4:b7ff]:60900 bom12s19-in-x01:https TIME_WAIT
TCP [2409:40c1:10bf:926a:50d6:f19a:5b4:b7ff]:60902 [2600:9000:237c:da00:17:f683:14d0:21]:https TIME_WAIT
TCP [2409:40c1:10bf:926a:50d6:f19a:5b4:b7ff]:60903 [2600:9000:237c:da00:17:f683:14d0:21]:https TIME_WAIT
TCP [2409:40c1:10bf:926a:50d6:f19a:5b4:b7ff]:60904 [2600:9000:237a:9600:3:760:2800:21]:https ESTABLISHED
TCP [2409:40c1:10bf:926a:50d6:f19a:5b4:b7ff]:60905 [2600:9000:237c:da00:17:f683:14d0:21]:https ESTABLISHED
TCP [2409:40c1:10bf:926a:50d6:f19a:5b4:b7ff]:60906 bom07s32-in-x0e:https TIME_WAIT
TCP [2409:40c1:10bf:926a:50d6:f19a:5b4:b7ff]:60909 bom07s32-in-x0e:https TIME_WAIT
TCP [2409:40c1:10bf:926a:50d6:f19a:5b4:b7ff]:60914 227:https TIME_WAIT
TCP [2409:40c1:10bf:926a:50d6:f19a:5b4:b7ff]:60915 227:https TIME_WAIT
TCP [2409:40c1:10bf:926a:50d6:f19a:5b4:b7ff]:60919 server-108-158-41-126:https ESTABLISHED
TCP [2409:40c1:10bf:926a:50d6:f19a:5b4:b7ff]:60921 server-108-158-41-126:https TIME_WAIT
TCP [2409:40c1:10bf:926a:50d6:f19a:5b4:b7ff]:60926 134:https TIME_WAIT
TCP [2409:40c1:10bf:926a:50d6:f19a:5b4:b7ff]:60928 [64:ff9b::c01c:9344]:https TIME_WAIT
TCP [2409:40c1:10bf:926a:50d6:f19a:5b4:b7ff]:60929 134:https TIME_WAIT
TCP [2409:40c1:10bf:926a:50d6:f19a:5b4:b7ff]:60942 [2606:4700:8d79:1843:66d7:53c:ce15:da8e]:https ESTABLISHED
TCP [2409:40c1:10bf:926a:50d6:f19a:5b4:b7ff]:60948 [2606:4700:8d79:1843:66d7:542:ce15:da8e]:https ESTABLISHED
TCP [2409:40c1:10bf:926a:50d6:f19a:5b4:b7ff]:60959 [2606:4700:8d79:1843:66d7:541:ce15:da8e]:https ESTABLISHED
TCP [2409:40c1:10bf:926a:50d6:f19a:5b4:b7ff]:61004 ec2-18-214-46-74:https CLOSE_WAIT
TCP [2409:40c1:10bf:926a:50d6:f19a:5b4:b7ff]:61005 ec2-3-228-99-23:https CLOSE_WAIT
TCP [2409:40c1:10bf:926a:50d6:f19a:5b4:b7ff]:61012 ec2-3-210-35-143:https ESTABLISHED
TCP [2409:40c1:10bf:926a:50d6:f19a:5b4:b7ff]:61014 431674:https ESTABLISHED
```

3. NbtStat

- NbtStat is a networking utility in Windows that helps users troubleshoot NetBIOS over TCP/IP problems



The screenshot shows a Windows Command Prompt window titled "Administrator: Command Prompt". The command executed is `C:\Windows\System32>nbtstat -A 192.168.1.100`. The output displays information for four network interfaces: Bluetooth Network Connection, Wi-Fi, Local Area Connection* 1, and Local Area Connection* 2. For each interface, it shows the Node IP address and Scope ID, followed by the message "Host not found." The Ethernet (N/L) interface is also listed with its Node IP address and Scope ID, and the message "Host not found." The command prompt window is overlaid on a Windows 10 desktop with a taskbar at the bottom showing various application icons and system tray information including language (ENG), time (14:26), and date (03-08-2023).

```
C:\Windows\System32>nbtstat -A 192.168.1.100

Bluetooth Network Connection:
Node IpAddress: [0.0.0.0] Scope Id: []

    Host not found.

Wi-Fi:
Node IpAddress: [192.168.217.44] Scope Id: []

    Host not found.

Local Area Connection* 1:
Node IpAddress: [0.0.0.0] Scope Id: []

    Host not found.

Local Area Connection* 2:
Node IpAddress: [0.0.0.0] Scope Id: []

    Host not found.

Ethernet (N/L):
Node IpAddress: [172.31.80.1] Scope Id: []

    Host not found.

C:\Windows\System32>
```

4. Ip Config

- IP Config is a command-line tool that is used to display the current IP address configuration of a Windows machine

```
Administrator: Command Prompt
C:\Windows\System32\ipconfig

Windows IP Configuration

Wireless LAN adapter Local Area Connection* 1:

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

Wireless LAN adapter Local Area Connection* 2:

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

Wireless LAN adapter Wi-Fi:

    Connection-specific DNS Suffix  . :
    IPv6 Address. . . . . : 2409:40c1:10bf:926a:f8e:f9c:d994:efba
    Temporary IPv6 Address. . . . . : 2409:40c1:10bf:926a:5046:f19a:5bf4:b7ff
    Link-local IPv6 Address . . . . . : fe80::e021:e416:19f4:3113%5
    IPv4 Address. . . . . : 192.168.217.44
    Subnet Mask . . . . . : 255.255.255.0
    Default Gateway . . . . . : fe80::640a:bfff:fe19:6042%15
                                192.168.217.76

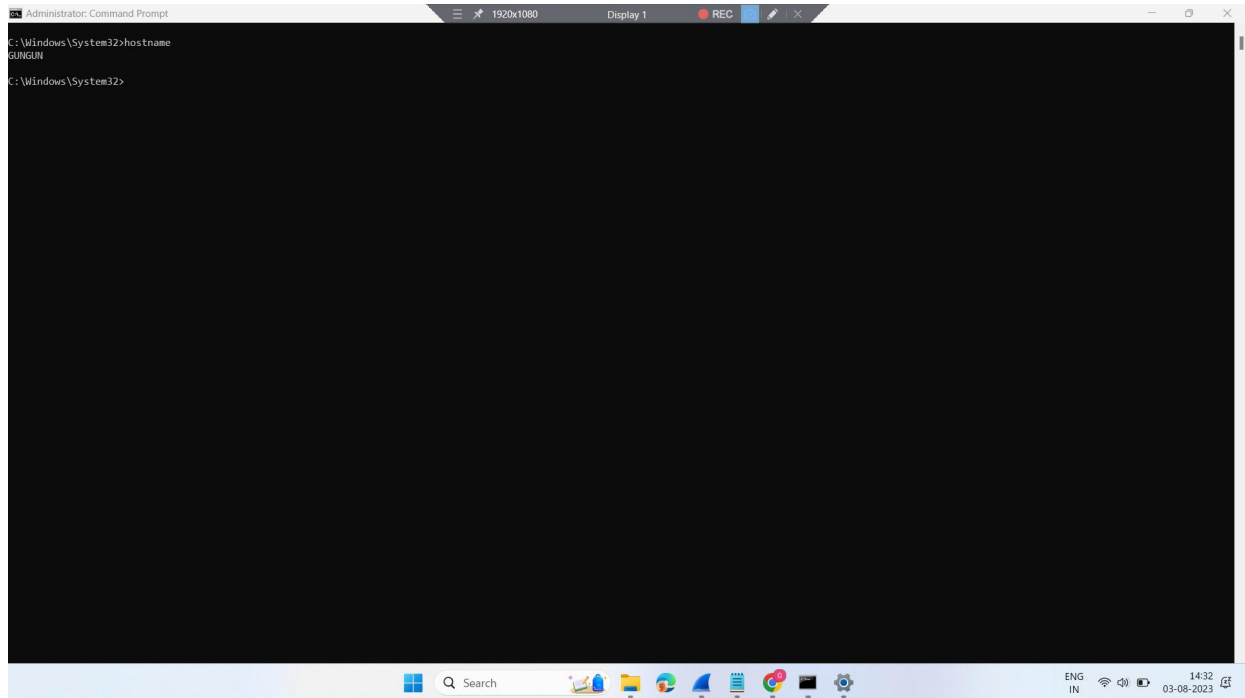
Ethernet adapter vEthernet (WSL):

    Connection-specific DNS Suffix  . :
    Link-local IPv6 Address . . . . . : fe80::20af:c623:ba43:96e2%48
    IPv4 Address. . . . . : 172.31.80.1
    Subnet Mask . . . . . : 255.255.240.0
    Default Gateway . . . . . :

C:\Windows\System32>
```

5. Hostname

- give you the name of your computer



6. ARP

- The Address Resolution Protocol, or ARP, is a networking utility used for mapping network addresses to physical addresses.
- **ARP** is essential for networking communications, as it allows devices on a network to communicate with each other by translating IP addresses into physical addresses.

```
Administrator: Command Prompt
1920x1080 Display 1 REC
C:\Windows\System32>arp -a

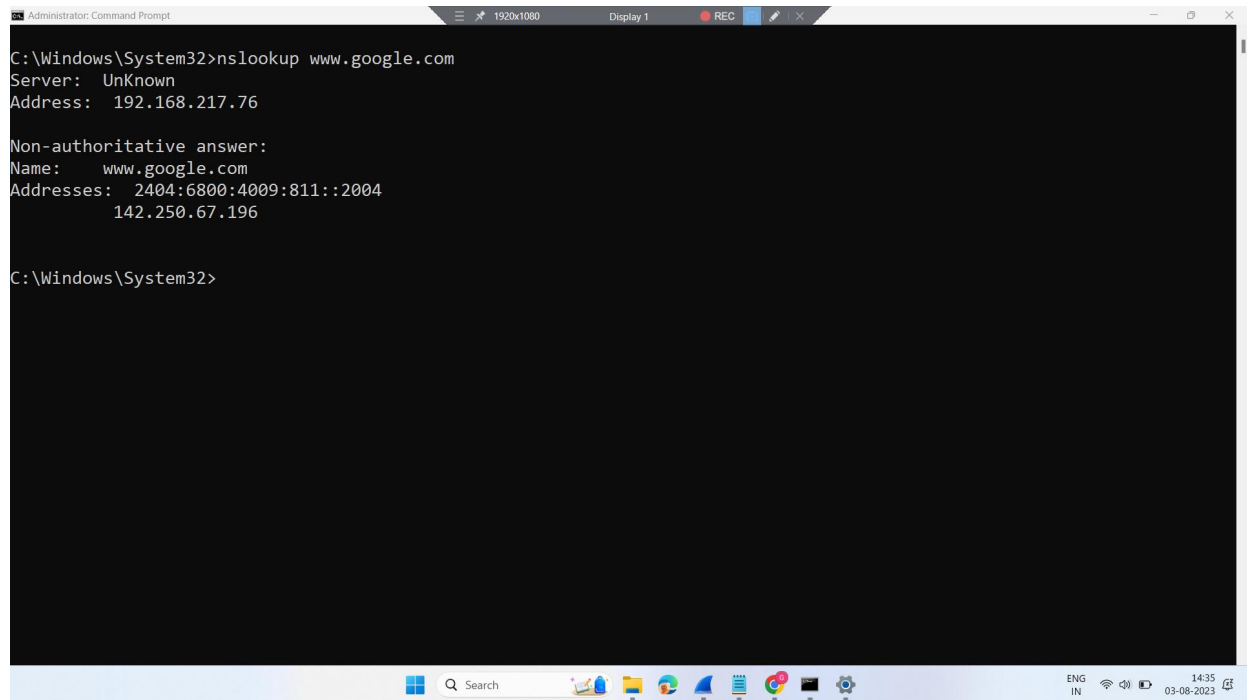
Interface: 192.168.217.44 --- 0xf
Internet Address      Physical Address      Type
192.168.217.76        66-0a-bd-19-60-42    dynamic
192.168.217.255       ff-ff-ff-ff-ff-ff    static
224.0.0.22            01-00-5e-00-00-16    static
224.0.0.251           01-00-5e-00-00-fb    static
224.0.0.252           01-00-5e-00-00-fc    static
239.255.255.250       01-00-5e-7f-ff-fa    static
255.255.255.255       ff-ff-ff-ff-ff-ff    static

Interface: 172.31.80.1 --- 0x30
Internet Address      Physical Address      Type
172.31.95.255         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

C:\Windows\System32>
```

7. Nslookup

- **Nslookup** is a command-line networking tool used for querying Domain Name System (DNS) to obtain domain name or IP address mapping, or other DNS records. Nslookup has two modes: interactive and non-interactive.
- The Windows version of Nslookup is available as part of the Microsoft networking tools. To use Nslookup on Windows, open the Command Prompt and type “nslookup” followed by the domain name or IP address you want to query.



```
Administrator: Command Prompt
1920x1080
Display 1
REC
C:\Windows\System32>nslookup www.google.com
Server: UnKnown
Address: 192.168.217.76

Non-authoritative answer:
Name: www.google.com
Addresses: 2404:6800:4009:811::2004
          142.250.67.196

C:\Windows\System32>
```

8. Tracert

- The **tracert** command is a Command Prompt command that displays the network packets being sent and received, as well as the number of hops required for them to reach their destination.
- A traceroute is another name for this command. It gives a lot of information about how a packet gets from the source to the designated destination.

```
Administrator: Command Prompt
1920x1080 Display 1 REC
C:\Windows\System32>tracert www.example.com

Tracing route to www.example.com [2606:2800:220:1:248:1893:25c8:1946]
over a maximum of 30 hops:

  1  122 ms  225 ms  214 ms  2409:40c1:10bf:926a::92
  2  306 ms  273 ms  261 ms  2405:200:5210:2:3924:0:3:65
  3  248 ms  262 ms  379 ms  2405:200:5210:2:3925::ff08
  4  97 ms  186 ms  278 ms  2405:200:801:2d00::245
  5  *        *        *        Request timed out.
  6  *        *        *        Request timed out.
  7  78 ms  92 ms  88 ms  2405:200:801:200::31b
  8  *        79 ms  *        2403:1a80:0:901:103:198:140:176
  9  *        *        *        Request timed out.
 10 457 ms  507 ms  306 ms  ae-21.a02.nycmny17.us.bb.gin.ntt.net [2001:418:0:5000::c08]
 11 455 ms  481 ms  557 ms  ce-0-3-0.a02.nycmny17.us.ce.gin.ntt.net [2001:418:0:5000::471]
 12 474 ms  505 ms  839 ms  ae-65.core1.nyb.edgecastcdn.net [2606:2800:4262:f::6]
 13 459 ms  442 ms  247 ms  2606:2800:220:1:248:1893:25c8:1946

Trace complete.

C:\Windows\System32>
```

9. PingPath

- It is very similar to the Tracert
- Tracert + Ping = PingPath

```
Administrator: Command Prompt
1920x1080 Display 1 REC
C:\Windows\System32>ping -r 3 www.google.com

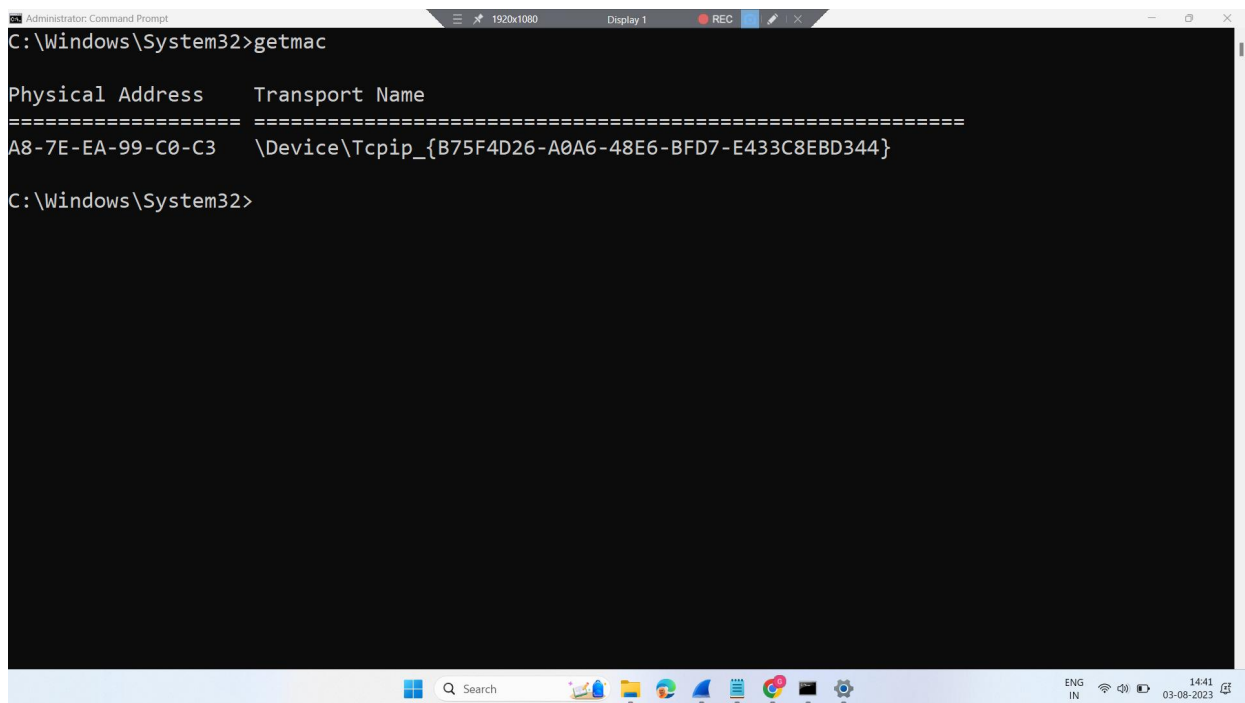
Pinging www.google.com [142.250.183.196] with 32 bytes of data:
Reply from 142.250.183.196: bytes=32 time=292ms TTL=113
Reply from 142.250.183.196: bytes=32 time=54ms TTL=113
Reply from 142.250.183.196: bytes=32 time=42ms TTL=113
Reply from 142.250.183.196: bytes=32 time=58ms TTL=113

Ping statistics for 142.250.183.196:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 42ms, Maximum = 292ms, Average = 111ms

C:\Windows\System32>
```


10. GetMac

- The MAC address is a unique identifier for every network capable device on the internet.
- The number is assigned during the manufacturing process and is stored in the device's hardware



```
Administrator: Command Prompt
C:\Windows\System32>getmac

Physical Address    Transport Name
=====
A8-7E-EA-99-C0-C3  \Device\Tcpip_{B75F4D26-A0A6-48E6-BFD7-E433C8EBD344}

C:\Windows\System32>
```

The screenshot shows a Windows Command Prompt window titled "Administrator: Command Prompt". The command "getmac" has been executed, resulting in a table with two columns: "Physical Address" and "Transport Name". The Physical Address is "A8-7E-EA-99-C0-C3" and the Transport Name is "\Device\Tcpip_{B75F4D26-A0A6-48E6-BFD7-E433C8EBD344}". The prompt is currently at "C:\Windows\System32>".

11. Route

- This command can be used to view and modify the network routing table.
- The route command can also be used to add or remove static routes from the routing table.

```
Administrator: Command Prompt
1920x1080 Display 1 REC
C:\Windows\System32>route print
=====
Interface List
 4...a8 7e ea 99 c0 c4 .....Microsoft Wi-Fi Direct Virtual Adapter
10...aa 7e ea 99 c0 c3 .....Microsoft Wi-Fi Direct Virtual Adapter #2
15...a8 7e ea 99 c0 c3 .....Intel(R) Wireless-AC 9462
 1.....Software Loopback Interface 1
48...00 15 5d 21 b6 88 .....Hyper-V Virtual Ethernet Adapter
=====

IPv4 Route Table
=====
Active Routes:
Network Destination    Netmask          Gateway          Interface        Metric
0.0.0.0                0.0.0.0          192.168.217.76   192.168.217.44   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
172.31.80.0            255.255.240.0    On-link          172.31.80.1      5256
172.31.80.1            255.255.255.255  On-link          172.31.80.1      5256
172.31.95.255          255.255.255.255  On-link          172.31.80.1      5256
192.168.217.0          255.255.255.0    On-link          192.168.217.44   311
192.168.217.44         255.255.255.255  On-link          192.168.217.44   311
```

12. Netsh

- It provides a wide range of functionalities related to networking, including IP address configuration, DNS settings, firewall configuration, interface settings, and more

```
Administrator: Command Prompt
1920x1080
Display 1
REC

C:\Windows\System32>netsh interface ip show config

Configuration for interface "Local Area Connection* 1"
  DHCP enabled: Yes
  InterfaceMetric: 25
  DNS servers configured through DHCP: None
  Register with which suffix: Primary only
  WINS servers configured through DHCP: None

Configuration for interface "Local Area Connection* 2"
  DHCP enabled: No
  InterfaceMetric: 25
  Statically Configured DNS Servers: None
  Register with which suffix: Primary only
  Statically Configured WINS Servers: None

Configuration for interface "Wi-Fi"
  DHCP enabled: Yes
  IP Address: 192.168.217.44
  Subnet Prefix: 192.168.217.0/24 (mask 255.255.255.0)
  Default Gateway: 192.168.217.76
  Gateway Metric: 0
  InterfaceMetric: 55
  DNS servers configured through DHCP: 192.168.217.76
  Register with which suffix: Primary only
  WINS servers configured through DHCP: None

Configuration for interface "Loopback Pseudo-Interface 1"
  DHCP enabled: No
  IP Address: 127.0.0.1
  Subnet Prefix: 127.0.0.0/8 (mask 255.0.0.0)
  InterfaceMetric: 75
  Statically Configured DNS Servers: None
```