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## INTERNET PROTOCOL LAB – I

### Basic Network Administration and Troubleshooting Using Windows Command Line Utilities

#### AIM:

To demonstrate the use of basic windows command line utilities to perform troubleshooting in the network.

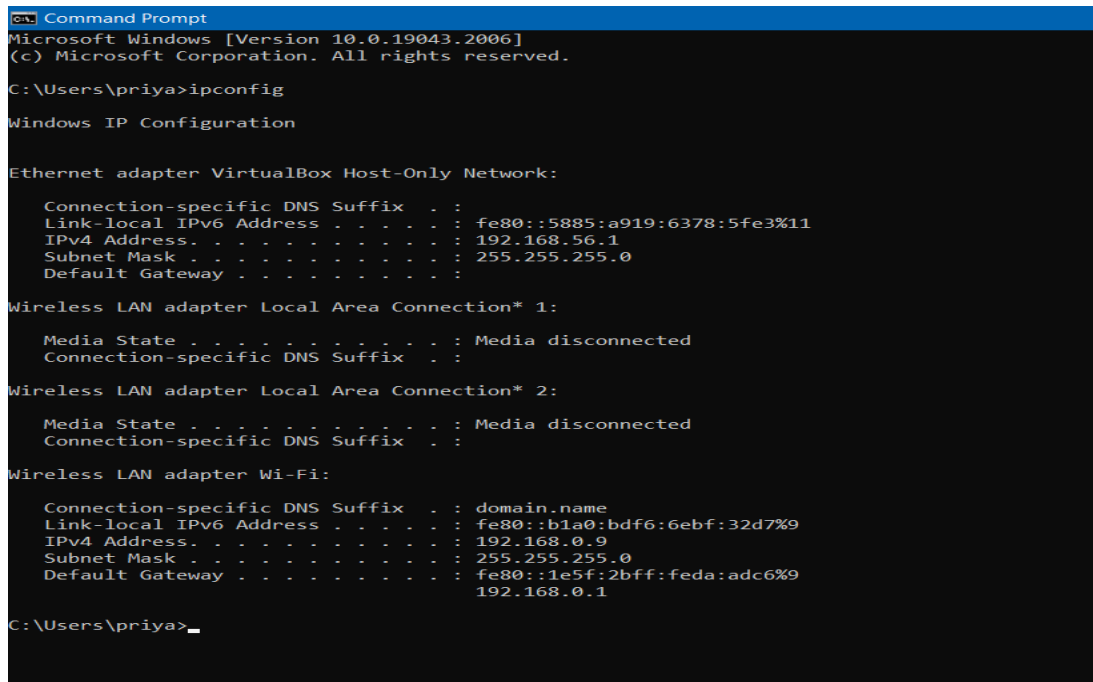
#### TOOLS REQUIRED:

Windows Command prompt.

#### PROCEDURE:

The commands such as ipconfig, ping, tracert, nslookup, arp, netstat which allows the user to administer, diagnose, monitor and repair the network connections are implemented in the windows command prompt as follows.

**1.ipconfig** – This command displays the ip address information of the system.



```
Command Prompt
Microsoft Windows [Version 10.0.19043.2006]
(c) Microsoft Corporation. All rights reserved.

C:\Users\priya>ipconfig

Windows IP Configuration

Ethernet adapter VirtualBox Host-Only Network:

    Connection-specific DNS Suffix  . : 
    Link-local IPv6 Address . . . . . : fe80::5885:a919:6378:5fe3%11
    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  . : domain.name
    Link-local IPv6 Address . . . . . : fe80::b1a0:bdf6:6ebf:32d7%9
    IPv4 Address. . . . . : 192.168.0.9
    Subnet Mask . . . . . : 255.255.255.0
    Default Gateway . . . . . : fe80::1e5f:2bff:feda:adc6%9
                                192.168.0.1

C:\Users\priya>
```

This command supports several other command options. They are,

**ipconfig /all** – This command displays all the ip configuration for all the adapters.

```
Command Prompt
C:\Users\priya>ipconfig /all

Windows IP Configuration

Host Name . . . . . : Priya
Primary Dns Suffix . . . . . :
Node Type . . . . . : Hybrid
IP Routing Enabled. . . . . : No
WINS Proxy Enabled. . . . . : No
DNS Suffix Search List. . . . . : domain.name

Ethernet adapter VirtualBox Host-Only Network:

Connection-specific DNS Suffix . . : VirtualBox Host-Only Ethernet Adapter
Description . . . . . : VirtualBox Host-Only Ethernet Adapter
Physical Address. . . . . : 0A-00-27-00-00-0B
DHCP Enabled. . . . . : No
Autoconfiguration Enabled . . . . : Yes
Link-local IPv6 Address . . . . . : fe80::5885:a919:6378:5fe3%11(Preferred)
IPv4 Address. . . . . : 192.168.56.1(Preferred)
Subnet Mask . . . . . : 255.255.255.0
Default Gateway . . . . . :
DHCPv6 IAID . . . . . : 604635175
DHCPv6 Client DUID. . . . . : 00-01-00-01-28-2C-BB-B9-28-39-26-63-33-5B
DNS Servers . . . . . : fec0:0:0:ffff::1%1
                       : fec0:0:0:ffff::2%1
                       : fec0:0:0:ffff::3%1
NetBIOS over Tcpip. . . . . : Enabled

Wireless LAN adapter Local Area Connection* 1:

Media State . . . . . : Media disconnected
Connection-specific DNS Suffix . :
Description . . . . . : Microsoft Wi-Fi Direct Virtual Adapter
Physical Address. . . . . : 2A-39-26-8A-45-22
DHCP Enabled. . . . . : Yes
Autoconfiguration Enabled . . . . : Yes

Wireless LAN adapter Local Area Connection* 2:

Media State . . . . . : Media disconnected
Connection-specific DNS Suffix . :
Description . . . . . : Microsoft Wi-Fi Direct Virtual Adapter #2
Physical Address. . . . . : AA-39-26-8E-47-23
DHCP Enabled. . . . . : Yes
Autoconfiguration Enabled . . . . : Yes

Wireless LAN adapter Wi-Fi:
```

**ipconfig /displaydns** – This command displays the contents of the local DNS cache that is stored in the system. It keeps the record of the website the user has visited before which makes browsing faster.

```
Command Prompt
C:\Users\priya>ipconfig /displaydns

Windows IP Configuration

safebrowsing.googleapis.com
-----
Record Name . . . . . : safebrowsing.googleapis.com
Record Type . . . . . : 1
Time To Live . . . . . : 192
Data Length . . . . . : 4
Section . . . . . : Answer
A (Host) Record . . . . : 142.250.196.170

www.gstatic.com
-----
Record Name . . . . . : www.gstatic.com
Record Type . . . . . : 1
Time To Live . . . . . : 193
Data Length . . . . . : 4
Section . . . . . : Answer
A (Host) Record . . . . : 142.250.77.131

lh6.googleusercontent.com
-----
Record Name . . . . . : lh6.googleusercontent.com
Record Type . . . . . : 5
Time To Live . . . . . : 268
Data Length . . . . . : 8
Section . . . . . : Answer
CNAME Record . . . . . : googlehosted.1.googleusercontent.com

Record Name . . . . . : googlehosted.1.googleusercontent.com
Record Type . . . . . : 1
Time To Live . . . . . : 268
Data Length . . . . . : 4
Section . . . . . : Answer
A (Host) Record . . . . : 142.250.77.129

play.google.com
-----
Record Name . . . . . : play.google.com
Record Type . . . . . : 1
Time To Live . . . . . : 191
Data Length . . . . . : 4
Section . . . . . : Answer
```

```
Command Prompt

fonts.gstatic.com
-----
Record Name . . . . . : fonts.gstatic.com
Record Type . . . . . : 1
Time To Live . . . . . : 49
Data Length . . . . . : 4
Section . . . . . : Answer
A (Host) Record . . . . : 142.250.196.163

yt3.ggpht.com
-----
Record Name . . . . . : yt3.ggpht.com
Record Type . . . . . : 5
Time To Live . . . . . : 262
Data Length . . . . . : 8
Section . . . . . : Answer
CNAME Record . . . . . : photos-ugc.l.googleusercontent.com

Record Name . . . . . : photos-ugc.l.googleusercontent.com
Record Type . . . . . : 1
Time To Live . . . . . : 262
Data Length . . . . . : 4
Section . . . . . : Answer
A (Host) Record . . . . : 142.250.182.65

googleads.g.doubleclick.net
-----
Record Name . . . . . : googleads.g.doubleclick.net
Record Type . . . . . : 1
Time To Live . . . . . : 269
Data Length . . . . . : 4
Section . . . . . : Answer
A (Host) Record . . . . : 142.250.182.34

www.google.co.in
-----
Record Name . . . . . : www.google.co.in
Record Type . . . . . : 1
Time To Live . . . . . : 139
Data Length . . . . . : 4
Section . . . . . : Answer
A (Host) Record . . . . : 142.250.196.163
```

**ipconfig /flushdns** – This command will flush/clears all the ip address or the records from the system's DNS cache.

```
C:\Users\priya>ipconfig /flushdns

Windows IP Configuration

Successfully flushed the DNS Resolver Cache.

C:\Users\priya>ipconfig /displaydns

Windows IP Configuration

C:\Users\priya>
```

**ipconfig /release** – This command sends a DHCPRELEASE 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.

```
C:\Users\priya>ipconfig /release

Windows IP Configuration

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 VirtualBox Host-Only Network:

    Connection-specific DNS Suffix . . : 
    Link-local IPv6 Address . . . . . : fe80::5885:a919:6378:5fe3%11
    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::b1a0:bdf6:6ebf:32d7%9
    Default Gateway . . . . . : fe80::1e5f:2bff:feda:adc6%9
```

**ipconfig /renew** – This command renews DHCP configuration for all adapters.

[illegible]

**ipconfig /?** – This command displays help at the command prompt.

```

C:\Users\priya>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
    /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.

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
                           release all matching connections,
                           eg. "Wired Ethernet Connection 1" or
                           "Wired Ethernet Connection 2"
> ipconfig /release *Con*

```

**2. ping** – This command checks the IP level connectivity to another system by sending request messages. If the reply messages are not received, then we should check the connectivity.

```
C:\Users\priya>ping 192.168.0.9

Pinging 192.168.0.9 with 32 bytes of data:
Reply from 192.168.0.9: bytes=32 time<1ms TTL=128
Reply from 192.168.0.9: bytes=32 time<1ms TTL=128
Reply from 192.168.0.9: bytes=32 time<1ms TTL=128
Reply from 192.168.0.9: bytes=32 time<1ms TTL=128

Ping statistics for 192.168.0.9:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 0ms, Average = 0ms

C:\Users\priya>ping 10.10.10.10

Pinging 10.10.10.10 with 32 bytes of data:
Request timed out.
Request timed out.
Request timed out.
Request timed out.

Ping statistics for 10.10.10.10:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),

C:\Users\priya>ping whatsapp.com

Pinging whatsapp.com [157.240.23.53] with 32 bytes of data:
Reply from 157.240.23.53: bytes=32 time=43ms TTL=57
Reply from 157.240.23.53: bytes=32 time=53ms TTL=57
Reply from 157.240.23.53: bytes=32 time=6ms TTL=57
Reply from 157.240.23.53: bytes=32 time=13ms TTL=57

Ping statistics for 157.240.23.53:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 6ms, Maximum = 53ms, Average = 28ms

C:\Users\priya>
```

Here we can see that pinging ip 10.10.10.10 gave the output of ‘Request timed out’. This means that the target system did not reply within the given time.

**3. tracert** – This command is used to trace the path that an ip packet takes to its destination. It shows the number of hops required to reach the destination.

```
C:\Users\priya>tracert 192.168.0.9

Tracing route to Priya.domain.name [192.168.0.9]
over a maximum of 30 hops:

  1  <1 ms    <1 ms    <1 ms    Priya.domain.name [192.168.0.9]

Trace complete.

C:\Users\priya>tracert google.com

Tracing route to google.com [142.250.195.206]
over a maximum of 30 hops:

  1  4 ms     4 ms     4 ms     192.168.0.1
  2  7 ms     6 ms     82 ms    10.213.0.1
  3  *        *        *        Request timed out.
  4  *        *        *        Request timed out.
  5  7 ms     6 ms     30 ms    72.14.242.244
  6  8 ms     10 ms    8 ms     216.239.43.137
  7  7 ms     6 ms     637 ms   142.251.49.219
  8  7 ms     6 ms     49 ms    maa03s42-in-f14.1e100.net [142.250.195.206]

Trace complete.

C:\Users\priya>
```

**4. nslookup** – This command stands for name server lookup. It helps to find the corresponding ip address of a domain specified with the command. This command with type parameter can be used to get non-authoritative and authoritative name server information.

**nslookup -type=A domain name** – gives the non-authoritative name server information. i.e. these servers do not contain original source files of domain. They have cache file for the domains used previously.

**nslookup -type=soa domain name** – gives the authoritative name server information. i.e. The primary name server which holds the actual DNS records for a respective domain/address.

```

C:\Users\priya>nslookup microsoft.com
Server: 183.82.243.66.actcorp.in
Address: 183.82.243.66

Non-authoritative answer:
Name: com.domain.name
Addresses: 195.201.199.239
          95.216.36.80
          95.216.67.149
Aliases: microsoft.com.domain.name

C:\Users\priya>nslookup -type=A microsoft.com
Server: 183.82.243.66.actcorp.in
Address: 183.82.243.66

Non-authoritative answer:
Name: com.domain.name
Addresses: 95.216.67.149
          195.201.199.239
          95.216.36.80
Aliases: microsoft.com.domain.name

C:\Users\priya>nslookup -type=soa microsoft.com
Server: 183.82.243.66.actcorp.in
Address: 183.82.243.66

Non-authoritative answer:
microsoft.com.domain.name canonical name = com.domain.name
com.domain.name
primary name server = ns.gransy.com
responsible mail addr = root.gransy.com
serial = 2663129713
refresh = 86400 (1 day)
retry = 900 (15 mins)
expire = 1209600 (14 days)
default TTL = 1800 (30 mins)

C:\Users\priya>

```

**5. netstat** – This command stands for Network statistics. It displays the network status and protocol statistics like TCP connections, routing tables, tcp ports, udp ports, pid and program names.

```

C:\Users\priya>netstat
Active Connections

Proto Local Address           Foreign Address         State
TCP    192.168.0.9:55750       52.163.231.110:https    ESTABLISHED
TCP    192.168.0.9:55752       13.76.153.29:https     ESTABLISHED
TCP    192.168.0.9:55754       20.198.119.143:https    ESTABLISHED
TCP    192.168.0.9:55761       20.198.119.143:https    ESTABLISHED
TCP    192.168.0.9:55825       20.185.212.106:https    ESTABLISHED
TCP    192.168.0.9:55826       20.185.212.106:https    ESTABLISHED
TCP    192.168.0.9:55827       20.185.212.106:https    ESTABLISHED
TCP    192.168.0.9:55828       20.185.212.106:https    ESTABLISHED
TCP    192.168.0.9:56518       sl-in-f188:5228        ESTABLISHED
TCP    192.168.0.9:56559       whatsapp-cdn-shv-02-maa2:https ESTABLISHED
TCP    192.168.0.9:56616       trn06s03-in-f3:https   TIME_WAIT
TCP    192.168.0.9:56635       52.168.112.66:https     TIME_WAIT
TCP    192.168.0.9:56640       server-18-161-214-20:https ESTABLISHED
TCP    192.168.0.9:56641       a-0001:https            ESTABLISHED
TCP    192.168.0.9:56642       a-0001:https            ESTABLISHED
TCP    192.168.0.9:56643       52.98.56.210:https      ESTABLISHED
TCP    192.168.0.9:56644       a-0001:https            ESTABLISHED
TCP    192.168.0.9:56645       13.107.4.254:https      ESTABLISHED
TCP    192.168.0.9:56646       152.199.43.62:https     ESTABLISHED
TCP    192.168.0.9:56647       13.107.213.58:https     ESTABLISHED
TCP    192.168.0.9:56648       204.79.197.222:https    ESTABLISHED
TCP    192.168.0.9:56649       1drv:https              ESTABLISHED
TCP    192.168.0.9:56650       broadband:https         ESTABLISHED
TCP    192.168.0.9:56651       104.208.16.88:https     ESTABLISHED
TCP    192.168.0.9:56652       20.189.173.12:https     ESTABLISHED
TCP    192.168.0.9:56653       52.109.124.115:https    TIME_WAIT

```

**netstat -e** – This command displays the ethernet statistics such as the number of bytes and information about the packets sent and received.

**netstat -s** – This command displays the statistics by protocol such as TCP, IP, UDP, ICMP protocols.

```

C:\Users\priya>netstat -e
Interface Statistics

            Received            Sent
Bytes      363327083            79679278
Unicast packets      456624            290710
Non-unicast packets      7            6272
Discards      0            0
Errors      0            0
Unknown protocols      0            0

C:\Users\priya>netstat -s
IPv4 Statistics

Packets Received      = 1539354
Received Header Errors      = 0
Received Address Errors      = 289
Datagrams Forwarded      = 0
Unknown Protocols Received      = 13
Received Packets Discarded      = 27600
Received Packets Delivered      = 1588272
Output Requests      = 965359
Routing Discards      = 0
Discarded Output Packets      = 2100
Output Packet No Route      = 517
Reassembly Required      = 0
Reassembly Successful      = 0
Reassembly Failures      = 0
Datagrams Successfully Fragmented      = 0
Datagrams Failing Fragmentation      = 0
Fragments Created      = 0

IPv6 Statistics

Packets Received      = 5816321
Received Header Errors      = 0
Received Address Errors      = 106
Datagrams Forwarded      = 0
Unknown Protocols Received      = 0
Received Packets Discarded      = 4109
Received Packets Delivered      = 5830062
Output Requests      = 1257222
Routing Discards      = 0
Discarded Output Packets      = 705
Output Packet No Route      = 44
Reassembly Required      = 11
Reassembly Successful      = 0
Reassembly Failures      = 11

```

**netstat -n** – This command displays active TCP connections with address and port numbers.

```

C:\Users\priya>netstat -n

Active Connections

Proto Local Address          Foreign Address         State
TCP   192.168.0.9:55750       52.163.231.110:443     ESTABLISHED
TCP   192.168.0.9:55752       13.76.153.29:443      ESTABLISHED
TCP   192.168.0.9:55754       20.198.119.143:443     ESTABLISHED
TCP   192.168.0.9:55761       20.198.119.143:443     ESTABLISHED
TCP   192.168.0.9:55825       20.185.212.106:443     ESTABLISHED
TCP   192.168.0.9:55826       20.185.212.106:443     ESTABLISHED
TCP   192.168.0.9:55827       20.185.212.106:443     ESTABLISHED
TCP   192.168.0.9:55828       20.185.212.106:443     ESTABLISHED
TCP   192.168.0.9:56518       172.253.118.188:5228   ESTABLISHED
TCP   192.168.0.9:56559       157.240.192.52:443     ESTABLISHED
TCP   192.168.0.9:56646       152.199.43.62:443      CLOSE_WAIT
TCP   192.168.0.9:56654       108.159.10.83:443      ESTABLISHED
TCP   192.168.0.9:56655       20.189.173.12:443      ESTABLISHED

```

**netstat -o** – This command displays active TCP connections with PID [ Process ID ] for each connection.

```

C:\Users\priya>netstat -o

Active Connections

Proto Local Address          Foreign Address         State      PID
TCP   192.168.0.9:55750       52.163.231.110:https    ESTABLISHED 6272
TCP   192.168.0.9:55752       13.76.153.29:https      ESTABLISHED 28508
TCP   192.168.0.9:55754       20.198.119.143:https     ESTABLISHED 9352
TCP   192.168.0.9:55761       20.198.119.143:https     ESTABLISHED 4888
TCP   192.168.0.9:55825       20.185.212.106:https     ESTABLISHED 18588
TCP   192.168.0.9:55826       20.185.212.106:https     ESTABLISHED 18588
TCP   192.168.0.9:55827       20.185.212.106:https     ESTABLISHED 23188
TCP   192.168.0.9:55828       20.185.212.106:https     ESTABLISHED 23188
TCP   192.168.0.9:56518       sl-in-f188:5228         ESTABLISHED 21324
TCP   192.168.0.9:56559       whatsapp-cdn-shv-02-maa2:https ESTABLISHED 21324
TCP   192.168.0.9:56646       152.199.43.62:https      CLOSE_WAIT 27700
TCP   192.168.0.9:56654       server-108-159-10-83:https ESTABLISHED 21324
TCP   192.168.0.9:56655       20.189.173.12:https      ESTABLISHED 21580

```

**netstat -r** – This command displays the contents of the ip routing table.

```

C:\Users\priya>netstat -r
=====
Interface List
11...0a 00 27 00 00 0b .....VirtualBox Host-Only Ethernet Adapter
8...2a 39 26 8a 45 22 .....Microsoft Wi-Fi Direct Virtual Adapter
17...aa 39 26 8e 47 23 .....Microsoft Wi-Fi Direct Virtual Adapter #2
9...28 39 26 63 33 5b .....Realtek 8821CE Wireless LAN 802.11ac PCI-E NIC
1.....Software Loopback Interface 1
=====

IPv4 Route Table
=====
Active Routes:
Network Destination        Netmask          Gateway          Interface        Metric
0.0.0.0                    0.0.0.0          192.168.0.1      192.168.0.9       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
192.168.0.0                 255.255.255.0    On-link          192.168.0.9       306
192.168.0.9                 255.255.255.255  On-link          192.168.0.9       306
192.168.0.255               255.255.255.255  On-link          192.168.0.9       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
192.168.56.255              255.255.255.255  On-link          192.168.56.1      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          192.168.56.1      281
224.0.0.0                   240.0.0.0        On-link          192.168.0.9       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          192.168.0.9       306
=====

Persistent Routes:
None

IPv6 Route Table
=====
Active Routes:
If Metric Network Destination      Gateway
9 306 ::/0 fe80::1e5f:2bff:feda:adc6
1 331 ::1/128 On-link
11 281 fe80::/64 On-link
9 306 fe80::/64 On-link
11 281 fe80::5885:a919:6378:5fe3/128 On-link
9 306 fe80::b1a0:bdf6:6ebf:32d7/128 On-link
1 331 ff00::/8 On-link
11 281 ff00::/8 On-link

```

**6. arp -a** – This command displays the ARP cache. It helps in mapping the ip address with the respective MAC address.

```

C:\Users\priya>arp

Displays and modifies the IP-to-Physical address translation tables used by
address resolution protocol (ARP).

ARP -s inet_addr eth_addr [if_addr]
ARP -d inet_addr [if_addr]
ARP -a [inet_addr] [-N if_addr] [-v]

-a          Displays current ARP entries by interrogating the current
            protocol data. If inet_addr is specified, the IP and Physical
            addresses for only the specified computer are displayed. If
            more than one network interface uses ARP, entries for each ARP
            table are displayed.

-g          Same as -a.

-v          Displays current ARP entries in verbose mode. All invalid
            entries and entries on the loop-back interface will be shown.

inet_addr  Specifies an internet address.

-N if_addr Displays the ARP entries for the network interface specified
            by if_addr.

-d          Deletes the host specified by inet_addr. inet_addr may be
            wildcarded with * to delete all hosts.

-s          Adds the host and associates the Internet address inet_addr
            with the Physical address eth_addr. The Physical address is
            given as 6 hexadecimal bytes separated by hyphens. The entry
            is permanent.

eth_addr   Specifies a physical address.

if_addr    If present, this specifies the Internet address of the
            interface whose address translation table should be modified.
            If not present, the first applicable interface will be used.

Example:
> arp -s 157.55.85.212 00-aa-00-62-c6-09 .... Adds a static entry.
> arp -a          .... Displays the arp table.

```

```

C:\Users\priya>arp -a

Interface: 192.168.0.9 --- 0x9
Internet Address      Physical Address      Type
192.168.0.1           1c-5f-2b-da-ad-c6    dynamic
192.168.0.3           08-84-9d-9a-ce-29    dynamic
192.168.0.255          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

Interface: 192.168.56.1 --- 0xb
Internet Address      Physical Address      Type
192.168.56.255        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
224.0.0.250           01-00-5e-00-00-fa    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
239.255.255.251       01-00-5e-7f-ff-fb    static

```



**7. Gpresult** – This command displays the resultant set of policy information for a target user and computer.

```
Command Prompt
C:\Users\priya>Gpresult

GPRESULT [/S system [/U username [/P [password]]]] [/SCOPE scope]
[/USER targetusername] [/R | /V | /Z]

Description:
  This command line tool displays the Resultant Set of Policy (RSOP)
  information for a target user and computer.

Parameter List:
  /S      system          Specifies the remote system to connect to.
  /U      [domain\]user   Specifies the user context under which the
                        command should run.
  /P      [password]      Specifies the password for the given user
                        context. Prompts for input if omitted.
  /SCOPE  scope           Specifies whether the user or the
                        computer settings need to be displayed.
                        Valid values: "USER", "COMPUTER".
  /USER   [domain\]user   Specifies the user name for which the
                        RSOP data is to be displayed.
  /R                               Displays RSOP summary data.
  /V                               Specifies that verbose information should
                        be displayed. Verbose information provides
                        additional detailed settings that have
                        been applied with a precedence of 1.
  /Z                               Specifies that the super-verbose
                        information should be displayed. Super-
                        verbose information provides additional
                        detailed settings that have been applied
                        with a precedence of 1 and higher. This
                        allows you to see if a setting was set in
                        multiple places. See the Group Policy
                        online help topic for more information.
  /?                               Displays this help message.

Examples:
  GPRESULT /R
  GPRESULT /USER targetusername /V
  GPRESULT /S system /USER targetusername /SCOPE COMPUTER /Z
  GPRESULT /S system /U username /P password /SCOPE USER /V

C:\Users\priya>
```

**8. set U** – This command shows which user is logged on.

**9. set L** – This command shows the logon server.

```
C:\Users\priya>set U
USERDOMAIN=PRIYA
USERDOMAIN_ROAMINGPROFILE=PRIYA
USERNAME=priya
USERPROFILE=C:\Users\priya

C:\Users\priya>set L
LOCALAPPDATA=C:\Users\priya\AppData\Local
LOGONSERVER=\\PRIYA

C:\Users\priya>
```

## RESULT:

Hence, the commands that are used to troubleshoot the network are executed and analyzed successfully.