SE IT S13

Roll no:-63

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Assignment 1-Basic Networking Commands

1>what is ping command

what is ping A ping is a basic Internet command that allows a user to test and verify whether a given

destination IP address exists and can accept requests in computer network administration.

Ping is also used for diagnosis to confirm that the computer the user tries to reach is operational.

Ping can be used with any operating system (OS) that supports networking, including the majority of embedded

network administration software. A ping is a basic Internet command that allows a user to test and verify whether

a given destination IP address exists and can accept requests in computer network administration.

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Ping can be used with any operating system (OS) that supports networking, including the majority of embedded network

administration software.

2>How many ping commands ?

18

```
C:\Users\lab1002>ping

Usage: ping [-t] [-a] [-n count] [-l size] [-f] [-i TTL] [-v TOS]
           [-r count] [-s count] [[-j host-list] | [-k host-list]]
           [-w timeout] [-R] [-S srcaddr] [-c compartment] [-p]
           [-4] [-6] target_name

Options:
    -t             Ping the specified host until stopped.
                   To see statistics and continue - type Control-Break;
                   To stop - type Control-C.
    -a             Resolve addresses to hostnames.
    -n count       Number of echo requests to send.
    -l size        Send buffer size.
    -f             Set Don't Fragment flag in packet (IPv4-only).
    -i TTL         Time To Live.
    -v TOS         Type Of Service (IPv4-only. This setting has been deprecated
                   and has no effect on the type of service field in the IP
                   Header).
    -r count       Record route for count hops (IPv4-only).
    -s count       Timestamp for count hops (IPv4-only).
    -j host-list   Loose source route along host-list (IPv4-only).
    -k host-list   Strict source route along host-list (IPv4-only).
    -w timeout     Timeout in milliseconds to wait for each reply.
    -R             Use routing header to test reverse route also (IPv6-only).
                   Per RFC 5095 the use of this routing header has been
                   deprecated. Some systems may drop echo requests if
                   this header is used.
    -S srcaddr     Source address to use.
    -c compartment Routing compartment identifier.
    -p             Ping a Hyper-V Network Virtualization provider address.
    -4             Force using IPv4.
    -6             Force using IPv6.
```

3>ping commands

1) /t Specifies ping continue sending echo Request messages to the destination until interrupted. To interrupt and display statistics, press CTRL+ENTER. To interrupt and quit this command, press CTRL+C.

```
C:\Users\lab1002>ping www.google.com -t

Pinging www.google.com [142.250.77.68] with 32 bytes of data:
Reply from 142.250.77.68: bytes=32 time=2ms TTL=118
Reply from 142.250.77.68: bytes=32 time=2ms TTL=118
Reply from 142.250.77.68: bytes=32 time=31ms TTL=118
Reply from 142.250.77.68: bytes=32 time=76ms TTL=118
Reply from 142.250.77.68: bytes=32 time=59ms TTL=118
Reply from 142.250.77.68: bytes=32 time=3ms TTL=118

Ping statistics for 142.250.77.68:
    Packets: Sent = 6, Received = 6, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 2ms, Maximum = 76ms, Average = 28ms
Control-C
^C
C:\Users\lab1002>
```

2) /a Specifies reverse name resolution be performed on the destination IP address. If this operation is successful, ping displays the corresponding host name.

```
C:\Users\lab1002>ping www.google.com -a

Pinging www.google.com [142.250.77.68] with 32 bytes of data:
Reply from 142.250.77.68: bytes=32 time=1ms TTL=118
Reply from 142.250.77.68: bytes=32 time=2ms TTL=118
Reply from 142.250.77.68: bytes=32 time=9ms TTL=118
Reply from 142.250.77.68: bytes=32 time=14ms TTL=118

Ping statistics for 142.250.77.68:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 1ms, Maximum = 14ms, Average = 6ms
```

3) /n <count> Specifies the number of echo Request messages be sent. The default is 4.

```
C:\Users\lab1002>ping www.google.com -n 4

Pinging www.google.com [142.250.77.68] with 32 bytes of data:
Reply from 142.250.77.68: bytes=32 time=44ms TTL=118
Reply from 142.250.77.68: bytes=32 time=60ms TTL=118
Reply from 142.250.77.68: bytes=32 time=52ms TTL=118
Reply from 142.250.77.68: bytes=32 time=5ms TTL=118

Ping statistics for 142.250.77.68:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 5ms, Maximum = 60ms, Average = 40ms
```

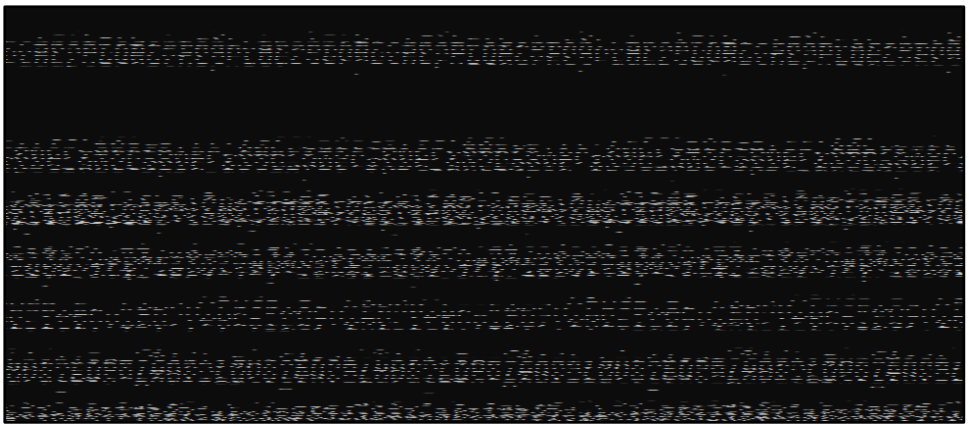
4) /l <size> Specifies the length, in bytes, of the Data field in the echo Request messages. The default is 32. The maximum size is 65,500.

```
C:\Users\lab1002>ping www.google.com -l 120

Pinging www.google.com [142.250.77.68] with 120 bytes of data:
Reply from 142.250.77.68: bytes=120 time=13ms TTL=118
Reply from 142.250.77.68: bytes=120 time=3ms TTL=118
Reply from 142.250.77.68: bytes=120 time=2ms TTL=118
Reply from 142.250.77.68: bytes=120 time=18ms TTL=118

Ping statistics for 142.250.77.68:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 2ms, Maximum = 18ms, Average = 9ms
```

5) /f Specifies that echo Request messages are sent with the Do not Fragment flag in the IP header set to 1 (available on IPv4 only). The echo Request message can't be fragmented by routers in the path to the destination. This parameter is useful for troubleshooting path Maximum Transmission Unit (PMTU) problems.

```
C:\Users\lab1002>ping www.google.com -f

Pinging www.google.com [142.250.77.68] with 32 bytes of data:
Reply from 142.250.77.68: bytes=32 time=71ms TTL=118
Reply from 142.250.77.68: bytes=32 time=42ms TTL=118
Reply from 142.250.77.68: bytes=32 time=28ms TTL=118
Reply from 142.250.77.68: bytes=32 time=77ms TTL=118

Ping statistics for 142.250.77.68:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 28ms, Maximum = 77ms, Average = 54ms
```

6) /i <TTL> Specifies the value of the Time To Live (TTL) field in the IP header for echo Request messages sent. The default is the default TTL value for the host. The maximum TTL is 255.



7) /v <TOS>Specifies the value of the Type Of Service (TOS) field in the IP header for echo Request messages sent (available on IPv4 only). The default is 0. TOS is specified as a decimal value from 0 through 255.

8) /r <count> Specifies the Record Route option in the IP header is used to record the path taken by the echo Request message and corresponding echo Reply message (available on IPv4 only). Each hop in the path uses an entry in the Record Route option. If possible, specify a count equal to or greater than the number of hops between the source and destination. The count must be a minimum of 1 and a maximum of 9.

9) /s <count> Specifies that the Internet timestamp option in the IP header is used to record the time of arrival for the echo Request message and corresponding echo Reply message for each hop. The count must be a minimum of 1 and a maximum of 4. This parameter is required for link-local destination addresses.

10) /j <hostlist> Specifies the echo Request messages use the Loose Source Route option in the IP header with the set of intermediate destinations specified in hostlist (available on IPv4 only). With loose source routing, successive intermediate destinations can be separated by one or multiple routers. The maximum number of addresses or names in the host list is 9. The host list is a series of IP addresses (in dotted decimal notation) separated by spaces.

11) /k <hostlist> Specifies the echo Request messages use the Strict Source Route option in the IP header with the set of intermediate destinations specified in hostlist (available on IPv4 only). With strict source routing, the next intermediate destination must be directly reachable (it must be a neighbor on an interface of the router). The maximum number of addresses or names in the host list is 9. The host list is a series of IP addresses (in dotted decimal notation) separated by spaces.

12) /w <timeout> Specifies the amount of time, in milliseconds, to wait for the echo Reply message corresponding to a given echo Request message. If the echo Reply message isn't received within the time-out, the "Request timed out" error message is displayed. The default time-out is 4000 (4 seconds).

13) /R Specifies the round-trip path is traced (available on IPv6 only).

14) /S <Srcaddr>

Specifies the source address to use (available on IPv6 only).

15) /4 Specifies IPv4 used to ping. This parameter isn't required to identify the target host with an IPv4 address. It's only required to identify the target host by name.

16) /6 Specifies IPv6 used to ping. This parameter isn't required to identify the target host with an IPv6 address. It's only required to identify the target host by name.

<targetname> Specifies the host name or IP address of the destination.

17) /? Displays help at the command prompt.

Tracerourte

What is traceroute?

Traceroute is a widely used command-line utility available in almost all operating systems. It shows you the complete route to a destination address. It also shows the time is taken (or delays) between intermediate routers

Traceroute commands

1) -d Enables socket level debugging.

2)-f flow Sets the flow label field in IPv6 packet header. The default value is 0.

3)-w WaitTime Sets the time (in seconds) to wait for a response to a probe. The default is 3 seconds.

```
C:\Users\lab1002>tracert -w 5 google.com

Tracing route to google.com [142.250.77.46]
over a maximum of 30 hops:

  1    <1 ms    <1 ms    <1 ms  192.168.0.1
  2    74 ms    68 ms    79 ms  1.0/25.212.203.fxwirelesssol.com [203.212.25.1]
  3    65 ms    65 ms    61 ms  1.0/24.212.203.fxwirelesssol.com [203.212.24.53]
  4     *       82 ms    71 ms  10.10.226.153
  5    13 ms    11 ms    11 ms  72.14.196.213
  6    59 ms     *       54 ms  192.178.111.151
  7    86 ms    82 ms    74 ms  142.250.238.201
  8    57 ms    58 ms    69 ms  bom07s26-in-f14.1e100.net [142.250.77.46]

Trace complete.
```

4)-4 Forces Tracert to use IPv4 for the trace.

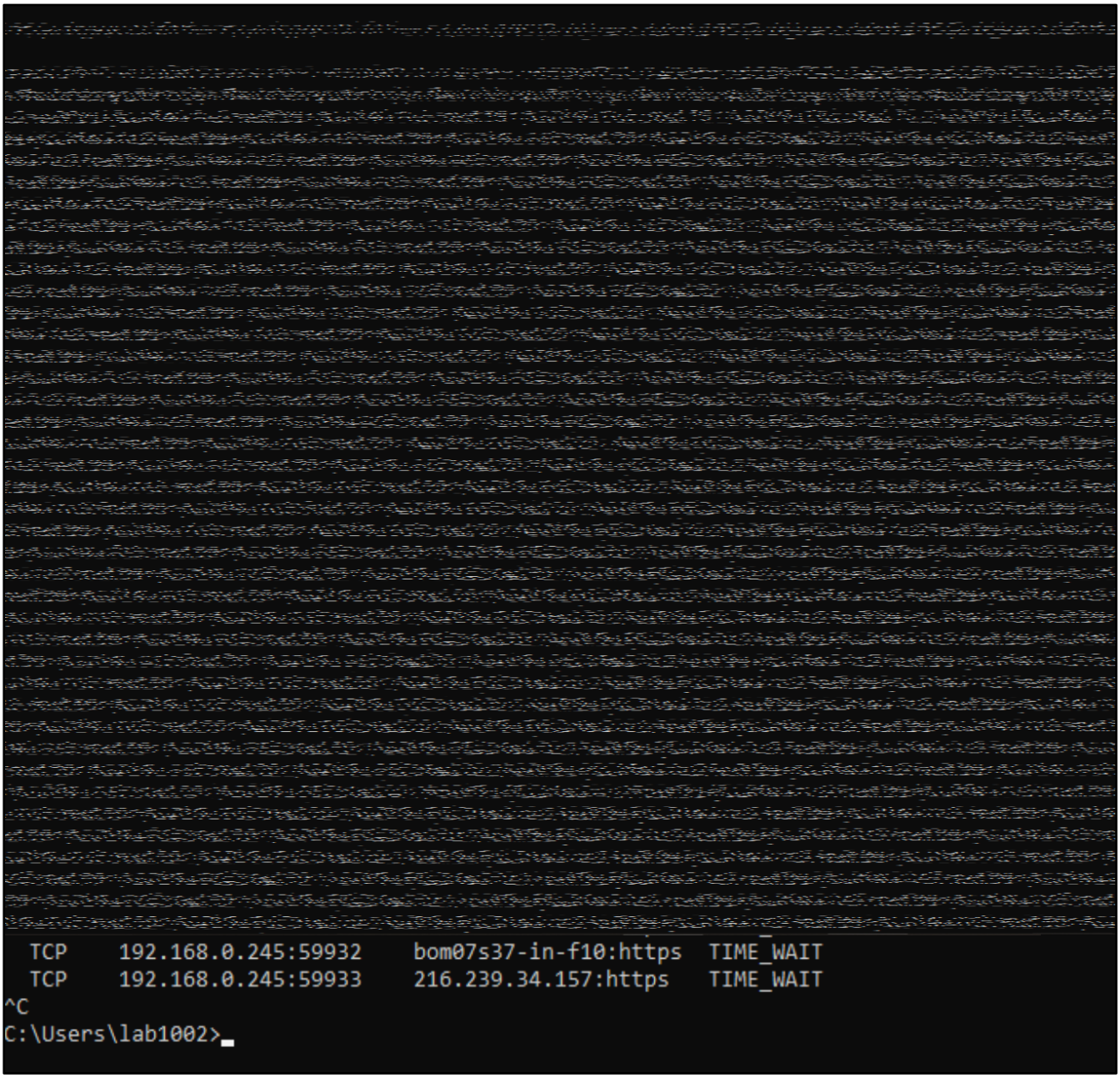
```
C:\Users\lab1002>tracert -4  google.com

Tracing route to google.com [142.250.77.46]
over a maximum of 30 hops:

  1    <1 ms    <1 ms    <1 ms  192.168.0.1
  2    17 ms    19 ms    23 ms  1.0/25.212.203.fxwirelesssol.com [203.212.25.1]
  3    60 ms    76 ms    86 ms  1.0/24.212.203.fxwirelesssol.com [203.212.24.53]
  4     *        *        *     Request timed out.
  5    89 ms    55 ms    88 ms  72.14.196.213
  6    28 ms    37 ms    49 ms  192.178.111.151
  7    31 ms    36 ms    42 ms  142.250.238.201
  8    14 ms    16 ms    14 ms  bom07s26-in-f14.1e100.net [142.250.77.46]

Trace complete.
```

5) -h <max_hops> Sets the maximum number of hops to trace before terminating.

```
C:\Users\lab1002>tracert -h 6 www.google.com

Tracing route to www.google.com [142.250.182.228]
over a maximum of 6 hops:

  1    <1 ms    <1 ms    <1 ms  192.168.0.1
  2    20 ms    12 ms     5 ms  1.0/25.212.203.fxwirelesssol.com [203.212.25.1]
  3    27 ms    22 ms    17 ms  1.0/24.212.203.fxwirelesssol.com [203.212.24.53]
  4     *       28 ms    24 ms  10.10.226.153
  5    67 ms    69 ms    62 ms  72.14.196.213
  6    37 ms    46 ms    49 ms  192.178.84.175

Trace complete.
```

NETSAT

The netstat command generates displays that show network status and protocol statistics. You can display the status of TCP and UDP endpoints in table format, routing table information, and interface information. Netstat displays various types of network data depending on the command line option selected. These displays are the most useful for system administration

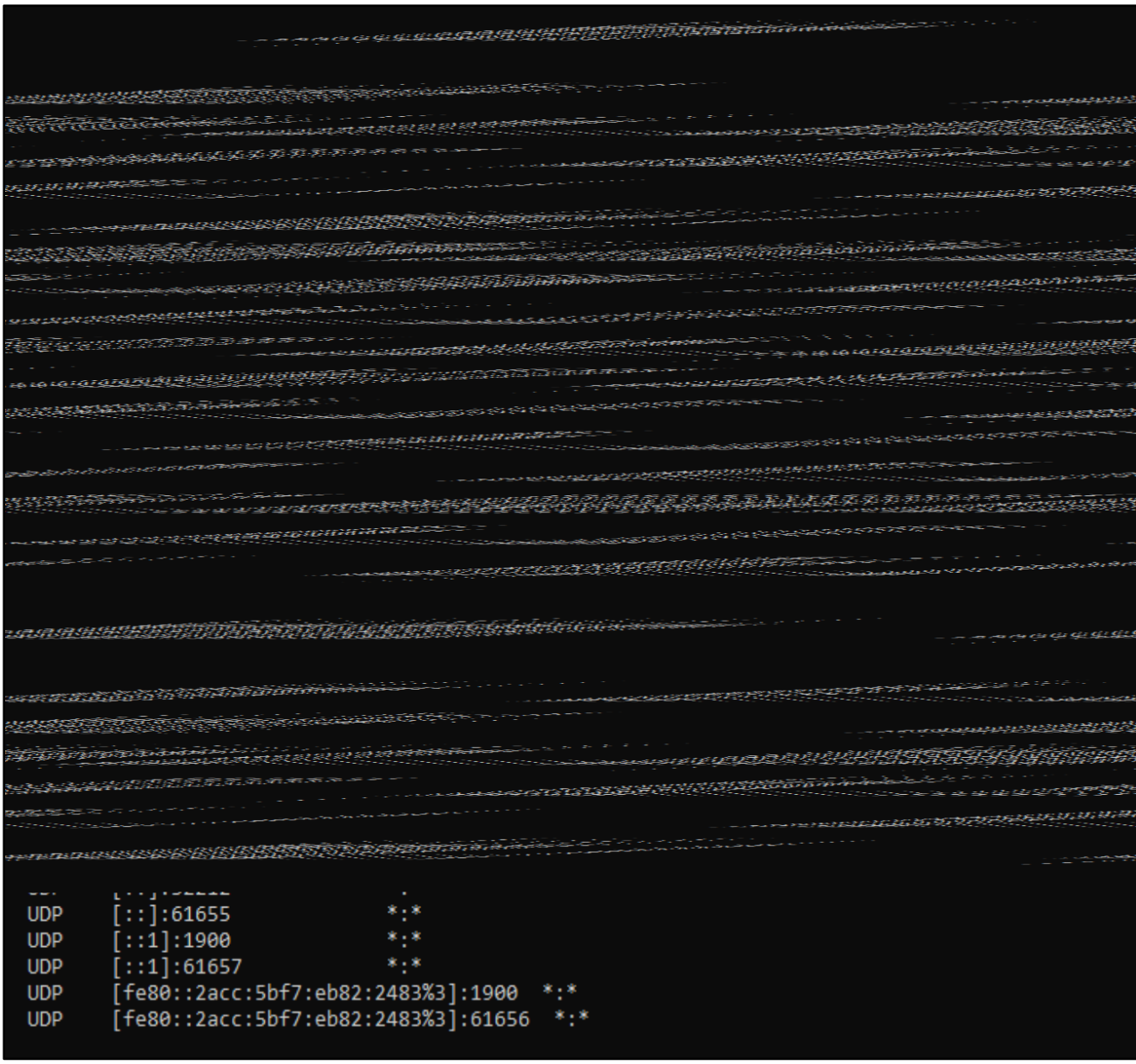


1)-a -all : Show both listening and non-listening sockets. With the —interfaces option, show interfaces that are not up.

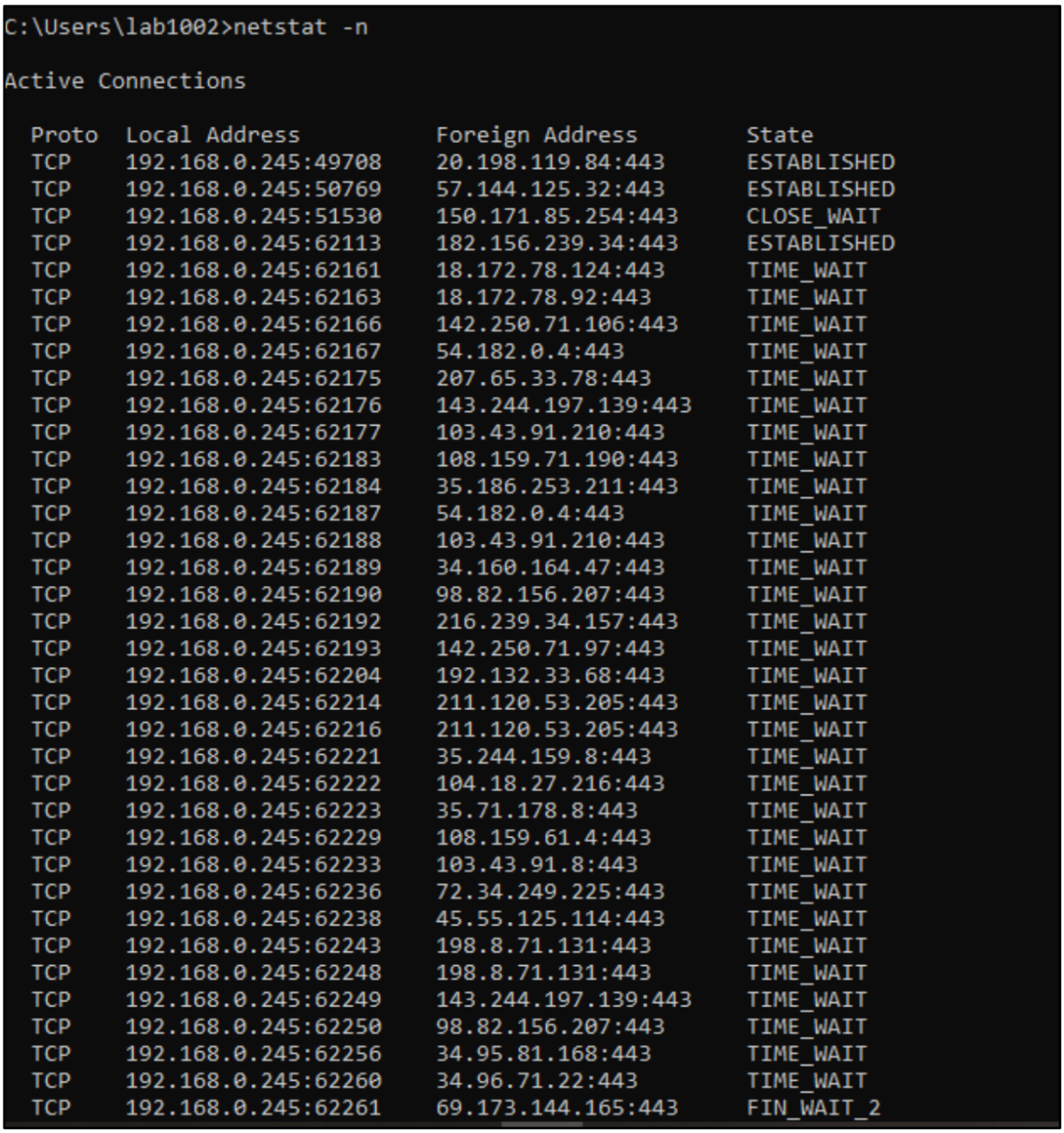
```
C:\Users\lab1002>netstat -a

Active Connections

  Proto  Local Address          Foreign Address        State
  TCP    0.0.0.0:135            DESKTOP-2NTBKKM:0      LISTENING
  TCP    0.0.0.0:445            DESKTOP-2NTBKKM:0      LISTENING
  TCP    0.0.0.0:2869           DESKTOP-2NTBKKM:0      LISTENING
  TCP    0.0.0.0:5040           DESKTOP-2NTBKKM:0      LISTENING
  TCP    0.0.0.0:5357           DESKTOP-2NTBKKM:0      LISTENING
  TCP    0.0.0.0:7680           DESKTOP-2NTBKKM:0      LISTENING
  TCP    0.0.0.0:49664          DESKTOP-2NTBKKM:0      LISTENING
  TCP    0.0.0.0:49665          DESKTOP-2NTBKKM:0      LISTENING
  TCP    0.0.0.0:49666          DESKTOP-2NTBKKM:0      LISTENING
  TCP    0.0.0.0:49667          DESKTOP-2NTBKKM:0      LISTENING
  TCP    0.0.0.0:49668          DESKTOP-2NTBKKM:0      LISTENING
  TCP    0.0.0.0:49693          DESKTOP-2NTBKKM:0      LISTENING
  TCP    192.168.0.245:139      DESKTOP-2NTBKKM:0      LISTENING
  TCP    192.168.0.245:49708    20.198.119.84:https    ESTABLISHED
  TCP    192.168.0.245:50769    whatsapp-cdn-shv-03-bom2:https  ESTABLISHED
  TCP    192.168.0.245:51530    150.171.85.254:https   CLOSE_WAIT
  TCP    192.168.0.245:51547    151.101.38.172:http    ESTABLISHED
  TCP    192.168.0.245:60152    yi-in-f94:https        TIME_WAIT
  TCP    192.168.0.245:60154    yi-in-f94:https        TIME_WAIT
  TCP    192.168.0.245:60225    52.231.230.148:https   TIME_WAIT
  TCP    192.168.0.245:60230    13.69.239.74:https     TIME_WAIT
  TCP    192.168.0.245:60283    147:http               TIME_WAIT
  TCP    192.168.0.245:60289    151.101.38.172:http    TIME_WAIT
  TCP    192.168.0.245:60290    151.101.38.172:http    TIME_WAIT
  TCP    192.168.0.245:60432    bom07s31-in-f10:https  TIME_WAIT
  TCP    192.168.0.245:60437    bom07s36-in-f14:https  TIME_WAIT
  TCP    192.168.0.245:60462    216.239.34.157:https   TIME_WAIT
  TCP    192.168.0.245:60467    216.239.34.157:https   TIME_WAIT
  TCP    192.168.0.245:60533    192.168.0.1:ssdp       TIME_WAIT
  TCP    192.168.0.245:60565    DESKTOP-3VKAP1G:wsd    TIME_WAIT
  TCP    192.168.0.245:60579    192.168.0.1:ssdp       TIME_WAIT
  TCP    192.168.0.245:60598    216.239.34.157:https   TIME_WAIT
  TCP    192.168.0.245:60669    server-18-172-78-124:https  TIME_WAIT
  TCP    192.168.0.245:60682    server-18-172-78-92:https  TIME_WAIT
  TCP    192.168.0.245:60689    192.168.0.1:ssdp       TIME_WAIT
  TCP    192.168.0.245:60691    server-54-182-0-4:https  TIME_WAIT
  TCP    192.168.0.245:60695    server-18-172-64-31:https  TIME_WAIT
```

2) -at This command specifically lists all TCP ports, giving you information about the TCP connections your system is engaged in.

```
C:\Users\lab1002>netstat -at

Active Connections

  Proto  Local Address          Foreign Address        State           Offload State

  TCP    0.0.0.0:135            DESKTOP-2NTBKKM:0      LISTENING       InHost
  TCP    0.0.0.0:445            DESKTOP-2NTBKKM:0      LISTENING       InHost
  TCP    0.0.0.0:2869           DESKTOP-2NTBKKM:0      LISTENING       InHost
  TCP    0.0.0.0:5040           DESKTOP-2NTBKKM:0      LISTENING       InHost
  TCP    0.0.0.0:5357           DESKTOP-2NTBKKM:0      LISTENING       InHost
  TCP    0.0.0.0:7680           DESKTOP-2NTBKKM:0      LISTENING       InHost
  TCP    0.0.0.0:49664          DESKTOP-2NTBKKM:0      LISTENING       InHost
  TCP    0.0.0.0:49665          DESKTOP-2NTBKKM:0      LISTENING       InHost
  TCP    0.0.0.0:49666          DESKTOP-2NTBKKM:0      LISTENING       InHost
  TCP    0.0.0.0:49667          DESKTOP-2NTBKKM:0      LISTENING       InHost
  TCP    0.0.0.0:49668          DESKTOP-2NTBKKM:0      LISTENING       InHost
  TCP    0.0.0.0:49693          DESKTOP-2NTBKKM:0      LISTENING       InHost
  TCP    192.168.0.245:139      DESKTOP-2NTBKKM:0      LISTENING       InHost
  TCP    192.168.0.245:49708    20.198.119.84:https    ESTABLISHED     InHost
  TCP    192.168.0.245:50769    whatsapp-cdn-shv-03-bom2:https  ESTABLISHED     InHost
  TCP    192.168.0.245:51530    150.171.85.254:https   CLOSE_WAIT      InHost
  TCP    192.168.0.245:51547    151.101.38.172:http    ESTABLISHED     InHost
  TCP    192.168.0.245:61128    192.168.0.1:ssdp       TIME_WAIT       InHost
  TCP    192.168.0.245:61169    DESKTOP-0C10ATK:wsd    TIME_WAIT       InHost
  TCP    192.168.0.245:61385    143.244.197.139:https  TIME_WAIT       InHost
  TCP    192.168.0.245:61386    595:https              TIME_WAIT       InHost
  TCP    192.168.0.245:61391    67.199.150.87:https    TIME_WAIT       InHost
  TCP    192.168.0.245:61392    server-108-158-56-18:https  TIME_WAIT       InHost
  TCP    192.168.0.245:61405    198.134.116.48:https   TIME_WAIT       InHost
  TCP    192.168.0.245:61406    198.134.116.48:https   TIME_WAIT       InHost
  TCP    192.168.0.245:61407    174.137.133.49:https   TIME_WAIT       InHost
  TCP    192.168.0.245:61410    bom12s07-in-f6:https   TIME_WAIT       InHost
  TCP    192.168.0.245:61411    174.137.133.49:https   TIME_WAIT       InHost
  TCP    192.168.0.245:61414    198.134.116.48:https   TIME_WAIT       InHost
  TCP    192.168.0.245:61415    174.137.133.49:https   TIME_WAIT       InHost
  TCP    192.168.0.245:61420    174.137.133.49:https   TIME_WAIT       InHost
  TCP    192.168.0.245:61436    192.168.0.1:ssdp       TIME_WAIT       InHost
  TCP    192.168.0.245:61564    192.168.0.1:ssdp       TIME_WAIT       InHost
  TCP    192.168.0.245:61649    192.168.0.1:ssdp       TIME_WAIT       InHost
  TCP    192.168.0.245:61706    192.168.0.1:ssdp       TIME_WAIT       InHost
  TCP    192.168.0.245:61812    a23-193-114-56:https   ESTABLISHED     InHost
  TCP    192.168.0.245:61817    ec2-100-27-79-243:https  ESTABLISHED     InHost
```

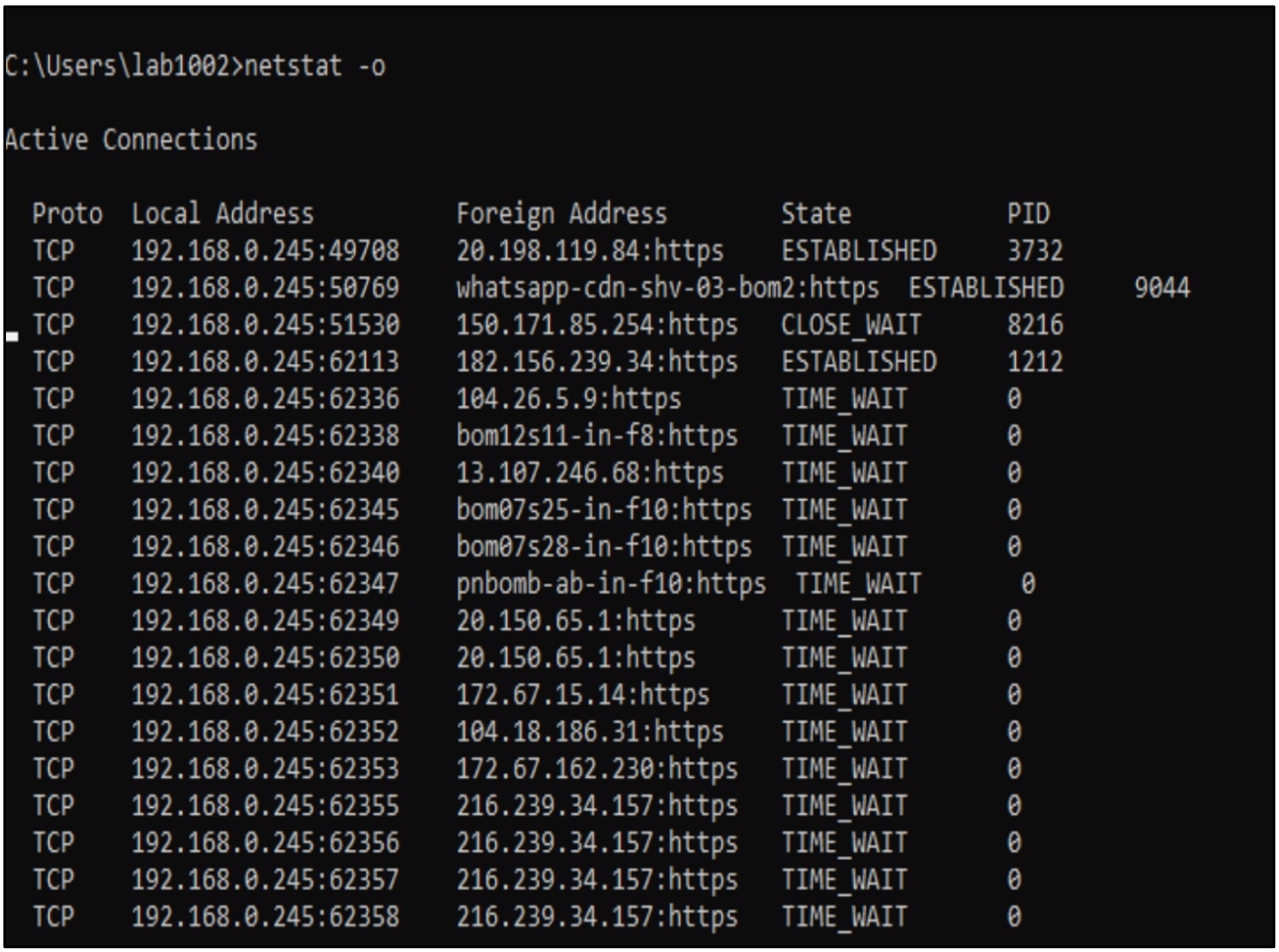


3)-n Displays active TCP connections, however, addresses and port numbers are expressed numerically and no attempt is made to determine names.



```
C:\Users\lab1002>netstat -n

Active Connections

  Proto  Local Address          Foreign Address        State
  TCP    192.168.0.245:49708    20.198.119.84:443      ESTABLISHED
  TCP    192.168.0.245:50769    57.144.125.32:443      ESTABLISHED
  TCP    192.168.0.245:51530    150.171.85.254:443     CLOSE_WAIT
  TCP    192.168.0.245:62113    182.156.239.34:443     ESTABLISHED
  TCP    192.168.0.245:62161    18.172.78.124:443      TIME_WAIT
  TCP    192.168.0.245:62163    18.172.78.92:443       TIME_WAIT
  TCP    192.168.0.245:62166    142.250.71.106:443     TIME_WAIT
  TCP    192.168.0.245:62167    54.182.0.4:443         TIME_WAIT
  TCP    192.168.0.245:62175    207.65.33.78:443       TIME_WAIT
  TCP    192.168.0.245:62176    143.244.197.139:443    TIME_WAIT
  TCP    192.168.0.245:62177    103.43.91.210:443      TIME_WAIT
  TCP    192.168.0.245:62183    108.159.71.190:443     TIME_WAIT
  TCP    192.168.0.245:62184    35.186.253.211:443     TIME_WAIT
  TCP    192.168.0.245:62187    54.182.0.4:443         TIME_WAIT
  TCP    192.168.0.245:62188    103.43.91.210:443      TIME_WAIT
  TCP    192.168.0.245:62189    34.160.164.47:443      TIME_WAIT
  TCP    192.168.0.245:62190    98.82.156.207:443      TIME_WAIT
  TCP    192.168.0.245:62192    216.239.34.157:443     TIME_WAIT
  TCP    192.168.0.245:62193    142.250.71.97:443      TIME_WAIT
  TCP    192.168.0.245:62204    192.132.33.68:443      TIME_WAIT
  TCP    192.168.0.245:62214    211.120.53.205:443     TIME_WAIT
  TCP    192.168.0.245:62216    211.120.53.205:443     TIME_WAIT
  TCP    192.168.0.245:62221    35.244.159.8:443       TIME_WAIT
  TCP    192.168.0.245:62222    104.18.27.216:443      TIME_WAIT
  TCP    192.168.0.245:62223    35.71.178.8:443        TIME_WAIT
  TCP    192.168.0.245:62229    108.159.61.4:443       TIME_WAIT
  TCP    192.168.0.245:62233    103.43.91.8:443        TIME_WAIT
  TCP    192.168.0.245:62236    72.34.249.225:443      TIME_WAIT
  TCP    192.168.0.245:62238    45.55.125.114:443      TIME_WAIT
  TCP    192.168.0.245:62243    198.8.71.131:443       TIME_WAIT
  TCP    192.168.0.245:62248    198.8.71.131:443       TIME_WAIT
  TCP    192.168.0.245:62249    143.244.197.139:443    TIME_WAIT
  TCP    192.168.0.245:62250    98.82.156.207:443      TIME_WAIT
  TCP    192.168.0.245:62256    34.95.81.168:443       TIME_WAIT
  TCP    192.168.0.245:62260    34.96.71.22:443        TIME_WAIT
  TCP    192.168.0.245:62261    69.173.144.165:443     FIN_WAIT_2
```

4)-o Displays active TCP connections and includes the process ID (PID) for each connection. You can find the application based on the PID on the Processes tab in Windows Task Manager. This parameter can be combined with -a, -n, and -p.



```
C:\Users\lab1002>netstat -o

Active Connections

  Proto  Local Address          Foreign Address        State           PID
  TCP    192.168.0.245:49708    20.198.119.84:https    ESTABLISHED     3732
  TCP    192.168.0.245:50769    whatsapp-cdn-shv-03-bom2:https  ESTABLISHED     9044
  TCP    192.168.0.245:51530    150.171.85.254:https   CLOSE_WAIT      8216
  TCP    192.168.0.245:62113    182.156.239.34:https   ESTABLISHED     1212
  TCP    192.168.0.245:62336    104.26.5.9:https       TIME_WAIT       0
  TCP    192.168.0.245:62338    bom12s11-in-f8:https   TIME_WAIT       0
  TCP    192.168.0.245:62340    13.107.246.68:https    TIME_WAIT       0
  TCP    192.168.0.245:62345    bom07s25-in-f10:https  TIME_WAIT       0
  TCP    192.168.0.245:62346    bom07s28-in-f10:https  TIME_WAIT       0
  TCP    192.168.0.245:62347    pnbomb-ab-in-f10:https  TIME_WAIT       0
  TCP    192.168.0.245:62349    20.150.65.1:https      TIME_WAIT       0
  TCP    192.168.0.245:62350    20.150.65.1:https      TIME_WAIT       0
  TCP    192.168.0.245:62351    172.67.15.14:https     TIME_WAIT       0
  TCP    192.168.0.245:62352    104.18.186.31:https    TIME_WAIT       0
  TCP    192.168.0.245:62353    172.67.162.230:https   TIME_WAIT       0
  TCP    192.168.0.245:62355    216.239.34.157:https   TIME_WAIT       0
  TCP    192.168.0.245:62356    216.239.34.157:https   TIME_WAIT       0
  TCP    192.168.0.245:62357    216.239.34.157:https   TIME_WAIT       0
  TCP    192.168.0.245:62358    216.239.34.157:https   TIME_WAIT       0
```

5)- p connections for the protocol specified by Protocol. In this case, the Protocol can be tcp, udp, tcpv6, or udpv6. If this parameter is used with -s to display statistics by protocol, Protocol can be tcp, udp, icmp, ip, tcpv6, udpv6, icmpv6, or ipv6.

```
C:\Users\lab1002>netstat -s -p

IPv4 Statistics

  Packets Received                   = 337895
  Received Header Errors             = 0
  Received Address Errors            = 596
  Datagrams Forwarded                = 0
  Unknown Protocols Received         = 1
  Received Packets Discarded         = 1760
  Received Packets Delivered         = 336178
  Output Requests                    = 236910
  Routing Discards                   = 0
  Discarded Output Packets           = 0
  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

IPv6 Statistics

  Packets Received                   = 6592
  Received Header Errors             = 0
  Received Address Errors            = 8
  Datagrams Forwarded                = 0
  Unknown Protocols Received         = 0
  Received Packets Discarded         = 77
  Received Packets Delivered         = 6742
  Output Requests                    = 1740
  Routing Discards                   = 0
  Discarded Output Packets           = 0
  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
```

```
                           Received    Sent
  Messages                 259         297
  Errors                   0           0
  Destination Unreachable  159         139
  Time Exceeded            91          0
  Parameter Problems       0           0
  Source Quenches          0           0
  Redirects                0           0
  Echo Replies             9           0
  Echos                    0           158
  Timestamps               0           0
  Timestamp Replies        0           0
  Address Masks            0           0
  Address Mask Replies     0           0
  Router Solicitations     0           0
  Router Advertisements    0           0

ICMPv6 Statistics

                           Received    Sent
  Messages                 236         64
  Errors                   0           0
  Destination Unreachable  36          1
  Packet Too Big           0           0
  Time Exceeded            0           0
  Parameter Problems       0           0
  Echos                    0           0
  Echo Replies             0           0
  MLD Queries              0           0
  MLD Reports              0           0
  MLD Dones                0           0
  Router Solicitations     0           3
  Router Advertisements    0           0
  Neighbor Solicitations   21          38
  Neighbor Advertisements  179         22
  Redirects                0           0
  Router Renumberings      0           0

TCP Statistics for IPv4

  Active Opens                        = 12597
  Passive Opens                       = 67
  Failed Connection Attempts          = 87
```

6)-r Displays the contents of the IP routing table. This is equivalent to the route print command.

```
C:\Users\lab1002>netstat -r
===========================================================================
Interface List
 13...e0 9d 31 e5 94 08 ......Intel(R) Dual Band Wireless-AC 3168
 17...e0 9d 31 e5 94 09 ......Microsoft Wi-Fi Direct Virtual Adapter
  4...e2 9d 31 e5 94 08 ......Microsoft Wi-Fi Direct Virtual Adapter #2
  3...18 60 24 90 01 77 ......Realtek PCIe GbE Family Controller
 18...e0 9d 31 e5 94 0c ......Bluetooth Device (Personal Area Network)
  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    192.168.0.245     35
        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     192.168.0.245    291
    192.168.0.245  255.255.255.255         On-link     192.168.0.245    291
    192.168.0.255  255.255.255.255         On-link     192.168.0.245    291
        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     192.168.0.245    291
  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     192.168.0.245    291
===========================================================================
Persistent Routes:
  None

IPv6 Route Table
===========================================================================
Active Routes:
 If Metric Network Destination      Gateway
  1    331 ::1/128                  On-link
  3    291 fe80::/64                On-link
  3    291 fe80::2acc:5bf7:eb82:2483/128
                                    On-link
  1    331 ff00::/8                 On-link
  3    291 ff00::/8                 On-link
===========================================================================
Persistent Routes:
  None
```

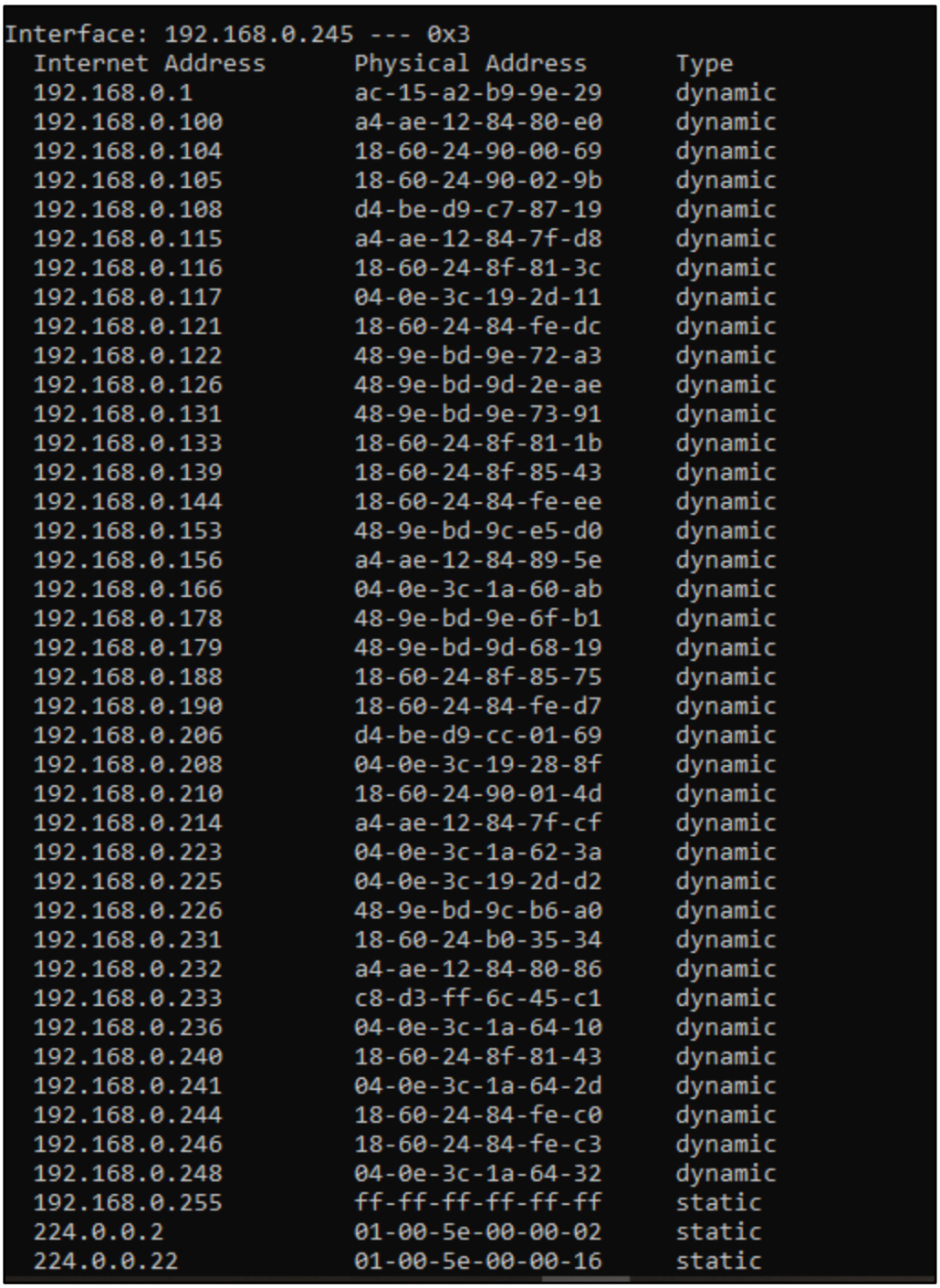
CURL

Curl is a software project consisting of the libcurl library and the curl command-line tool that supports FTP, FTPS, HTTP, HTTPS, and many other network protocols. Curl is pre-installed in many operating systems, and developers use it extensively to transfer data and make API requests. This guide explains how to use curl and make requests with the tool

```
C:\Users\lab1002>curl google.com
<HTML><HEAD><meta http-equiv="content-type" content="text/html;charset=utf-8">
<TITLE>301 Moved</TITLE></HEAD><BODY>
<H1>301 Moved</H1>
The document has moved
<A HREF="http://www.google.com/">here</A>.
</BODY></HTML>
```

ARP

1)-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.



```
Interface: 192.168.0.245 --- 0x3
  Internet Address      Physical Address      Type
  192.168.0.1           ac-15-a2-b9-9e-29     dynamic
  192.168.0.100         a4-ae-12-84-80-e0     dynamic
  192.168.0.104         18-60-24-90-00-69     dynamic
  192.168.0.105         18-60-24-90-02-9b     dynamic
  192.168.0.108         d4-be-d9-c7-87-19     dynamic
  192.168.0.115         a4-ae-12-84-7f-d8     dynamic
  192.168.0.116         18-60-24-8f-81-3c     dynamic
  192.168.0.117         04-0e-3c-19-2d-11     dynamic
  192.168.0.121         18-60-24-84-fe-dc     dynamic
  192.168.0.122         48-9e-bd-9e-72-a3     dynamic
  192.168.0.126         48-9e-bd-9d-2e-ae     dynamic
  192.168.0.131         48-9e-bd-9e-73-91     dynamic
  192.168.0.133         18-60-24-8f-81-1b     dynamic
  192.168.0.139         18-60-24-8f-85-43     dynamic
  192.168.0.144         18-60-24-84-fe-ee     dynamic
  192.168.0.153         48-9e-bd-9c-e5-d0     dynamic
  192.168.0.156         a4-ae-12-84-89-5e     dynamic
  192.168.0.166         04-0e-3c-1a-60-ab     dynamic
  192.168.0.178         48-9e-bd-9e-6f-b1     dynamic
  192.168.0.179         48-9e-bd-9d-68-19     dynamic
  192.168.0.188         18-60-24-8f-85-75     dynamic
  192.168.0.190         18-60-24-84-fe-d7     dynamic
  192.168.0.206         d4-be-d9-cc-01-69     dynamic
  192.168.0.208         04-0e-3c-19-28-8f     dynamic
  192.168.0.210         18-60-24-90-01-4d     dynamic
  192.168.0.214         a4-ae-12-84-7f-cf     dynamic
  192.168.0.223         04-0e-3c-1a-62-3a     dynamic
  192.168.0.225         04-0e-3c-19-2d-d2     dynamic
  192.168.0.226         48-9e-bd-9c-b6-a0     dynamic
  192.168.0.231         18-60-24-b0-35-34     dynamic
  192.168.0.232         a4-ae-12-84-80-86     dynamic
  192.168.0.233         c8-d3-ff-6c-45-c1     dynamic
  192.168.0.236         04-0e-3c-1a-64-10     dynamic
  192.168.0.240         18-60-24-8f-81-43     dynamic
  192.168.0.241         04-0e-3c-1a-64-2d     dynamic
  192.168.0.244         18-60-24-84-fe-c0     dynamic
  192.168.0.246         18-60-24-84-fe-c3     dynamic
  192.168.0.248         04-0e-3c-1a-64-32     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
```

2)-g

```
C:\Users\lab1002>arp -g

Interface: 192.168.0.245 --- 0x3
  Internet Address      Physical Address      Type
  192.168.0.1           ac-15-a2-b9-9e-29     dynamic
  192.168.0.100         a4-ae-12-84-80-e0     dynamic
  192.168.0.104         18-60-24-90-00-69     dynamic
  192.168.0.105         18-60-24-90-02-9b     dynamic
  192.168.0.108         d4-be-d9-c7-87-19     dynamic
  192.168.0.115         a4-ae-12-84-7f-d8     dynamic
  192.168.0.116         18-60-24-8f-81-3c     dynamic
  192.168.0.117         04-0e-3c-19-2d-11     dynamic
  192.168.0.121         18-60-24-84-fe-dc     dynamic
  192.168.0.122         48-9e-bd-9e-72-a3     dynamic
  192.168.0.126         48-9e-bd-9d-2e-ae     dynamic
  192.168.0.131         48-9e-bd-9e-73-91     dynamic
  192.168.0.133         18-60-24-8f-81-1b     dynamic
  192.168.0.139         18-60-24-8f-85-43     dynamic
  192.168.0.144         18-60-24-84-fe-ee     dynamic
  192.168.0.153         48-9e-bd-9c-e5-d0     dynamic
  192.168.0.156         a4-ae-12-84-89-5e     dynamic
  192.168.0.166         04-0e-3c-1a-60-ab     dynamic
  192.168.0.178         48-9e-bd-9e-6f-b1     dynamic
  192.168.0.179         48-9e-bd-9d-68-19     dynamic
  192.168.0.188         18-60-24-8f-85-75     dynamic
  192.168.0.190         18-60-24-84-fe-d7     dynamic
  192.168.0.206         d4-be-d9-cc-01-69     dynamic
  192.168.0.208         04-0e-3c-19-28-8f     dynamic
  192.168.0.210         18-60-24-90-01-4d     dynamic
  192.168.0.214         a4-ae-12-84-7f-cf     dynamic
  192.168.0.223         04-0e-3c-1a-62-3a     dynamic
  192.168.0.225         04-0e-3c-19-2d-d2     dynamic
  192.168.0.226         48-9e-bd-9c-b6-a0     dynamic
  192.168.0.231         18-60-24-b0-35-34     dynamic
  192.168.0.232         a4-ae-12-84-80-86     dynamic
  192.168.0.233         c8-d3-ff-6c-45-c1     dynamic
  192.168.0.236         04-0e-3c-1a-64-10     dynamic
  192.168.0.240         18-60-24-8f-81-43     dynamic
  192.168.0.241         04-0e-3c-1a-64-2d     dynamic
  192.168.0.244         18-60-24-84-fe-c0     dynamic
  192.168.0.246         18-60-24-84-fe-c3     dynamic
  192.168.0.248         04-0e-3c-1a-64-32     dynamic
```

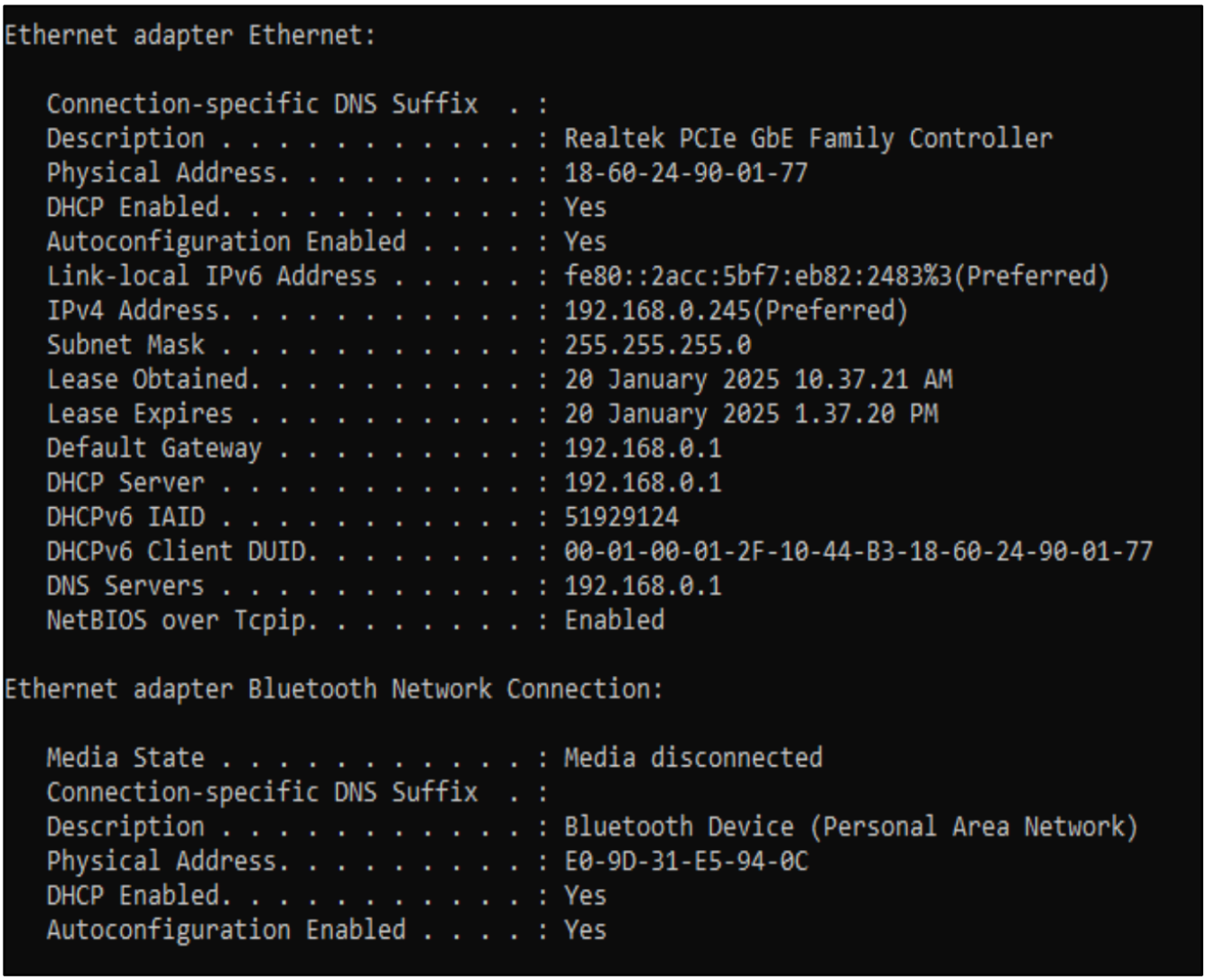
IPCONFIG

The ipconfig command is used to display information about your network configuration and refresh DHCP and DNS Settings. By default, the ipconfig command displays your IP Address, Subnet Mask, and default gateway. But with the correct parameters, you can get a lot more information out of it.

```
C:\Users\lab1002>ipconfig

Windows IP Configuration


Wireless LAN adapter WiFi:

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

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  . :

Ethernet adapter Ethernet:

   Connection-specific DNS Suffix  . :
   Link-local IPv6 Address . . . . . : fe80::2acc:5bf7:eb82:2483%3
   IPv4 Address. . . . . . . . . . . : 192.168.0.245
   Subnet Mask . . . . . . . . . . . : 255.255.255.0
   Default Gateway . . . . . . . . . : 192.168.0.1

Ethernet adapter Bluetooth Network Connection:

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

1)/all Displays the full TCP/IP configuration for all adapters. Adapters can represent physical interfaces, such as installed network adapters, or logical interfaces, such as dial-up connections.

```
C:\Users\lab1002>ipconfig /all

Windows IP Configuration

   Host Name . . . . . . . . . . . . : DESKTOP-2NTBKKM
   Primary Dns Suffix  . . . . . . . :
   Node Type . . . . . . . . . . . . : Hybrid
   IP Routing Enabled. . . . . . . . : No
   WINS Proxy Enabled. . . . . . . . : No

Wireless LAN adapter WiFi:

   Media State . . . . . . . . . . . : Media disconnected
   Connection-specific DNS Suffix  . :
   Description . . . . . . . . . . . : Intel(R) Dual Band Wireless-AC 3168
   Physical Address. . . . . . . . . : E0-9D-31-E5-94-08
   DHCP Enabled. . . . . . . . . . . : Yes
   Autoconfiguration Enabled . . . . : Yes

Wireless LAN adapter Local Area Connection* 1:

   Media State . . . . . . . . . . . : Media disconnected
   Connection-specific DNS Suffix  . :
   Description . . . . . . . . . . . : Microsoft Wi-Fi Direct Virtual Adapter
   Physical Address. . . . . . . . . : E0-9D-31-E5-94-09
   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. . . . . . . . . : E2-9D-31-E5-94-08
   DHCP Enabled. . . . . . . . . . . : Yes
   Autoconfiguration Enabled . . . . : Yes

Ethernet adapter Ethernet:

   Connection-specific DNS Suffix  . :
   Description . . . . . . . . . . . : Realtek PCIe GbE Family Controller
   Physical Address. . . . . . . . . : 18-60-24-90-01-77
```



2)/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. The DNS Client service uses this information to resolve frequently queried names quickly, before querying its configured DNS servers.

```
C:\Users\lab1002>ipconfig /displaydns

Windows IP Configuration

    32.125.144.57.in-addr.arpa
    ----------------------------------------
    Record Name . . . . . : 32.125.144.57.in-addr.arpa
    Record Type . . . . . : 12
    Time To Live  . . . . : 181
    Data Length . . . . . : 8
    Section . . . . . . . : Answer
    PTR Record  . . . . . : whatsapp-cdn-shv-03-bom2.fbcdn.net


    78.70.250.142.in-addr.arpa
    ----------------------------------------
    Record Name . . . . . : 78.70.250.142.in-addr.arpa
    Record Type . . . . . : 12
    Time To Live  . . . . : 81462
    Data Length . . . . . : 8
    Section . . . . . . . : Answer
    PTR Record  . . . . . : pnbomb-ab-in-f14.1e100.net


    1.25.212.203.in-addr.arpa
    ----------------------------------------
    Record Name . . . . . : 1.25.212.203.in-addr.arpa
    Record Type . . . . . : 12
    Time To Live  . . . . : 79863
    Data Length . . . . . : 8
    Section . . . . . . . : Answer
    PTR Record  . . . . . : 1.0/25.212.203.fxwirelesssol.com


    19.90.43.103.in-addr.arpa
    ----------------------------------------
    Record Name . . . . . : 19.90.43.103.in-addr.arpa
    Record Type . . . . . : 12
    Time To Live  . . . . : 1858
    Data Length . . . . . : 8
    Section . . . . . . . : Answer
    PTR Record  . . . . . : 595.bm-nginx-loadbalancer.mgmt.sin3.adnexus.net
```

3)/flushdns

Flushes and resets the contents of the DNS client resolver cache. During DNS

troubleshooting, you can use this procedure to discard negative cache entries from the cache, as well as any other entries that have been added dynamically.

```
C:\Users\lab1002>ipconfig /flushdns

Windows IP Configuration

Successfully flushed the DNS Resolver Cache.
```

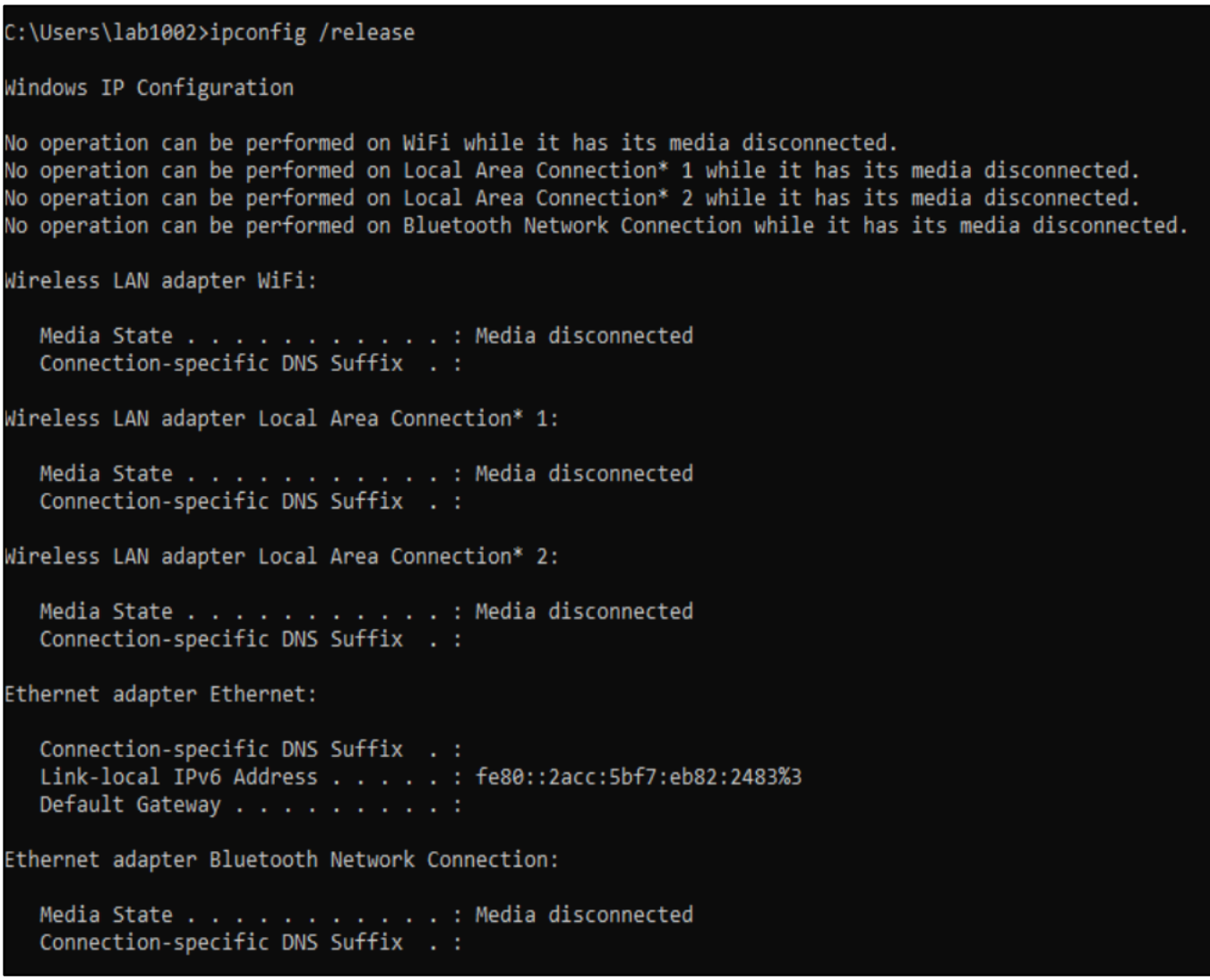
4)/registerdns

Initiates manual dynamic registration for the DNS names and IP addresses that are configured at a computer. You can use this parameter to troubleshoot a failed DNS name registration or resolve a dynamic update problem between a client and the DNS server without rebooting the client computer. The DNS settings in the advanced properties of the TCP/IP protocol determine which names are registered in DNS.

```
C:\Users\lab1002>ipconfig /registerdns
The requested operation requires elevation.
```

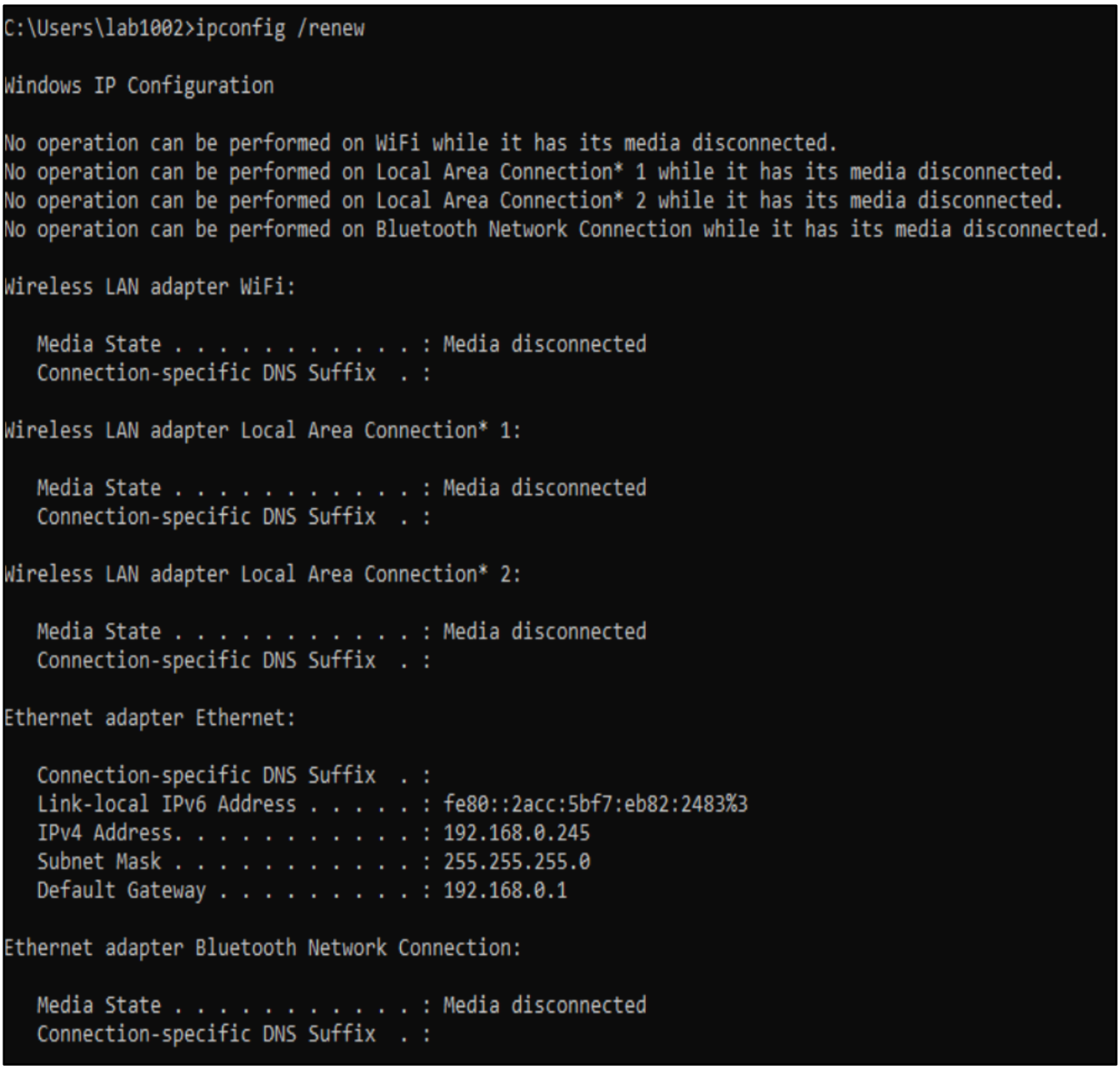
5)/release

Sends a DHCPRELEASE message to the DHCP server to release the current DHCP configuration and discard the IP address configuration for either all adapters (if an adapter is not specified) or for a specific adapter if the adapter parameter is included. This parameter disables TCP/IP for adapters configured to obtain an IP address automatically. To specify an adapter name, type the adapter name that appears when you use ipconfig without parameters.



6)/renew

Renews DHCP configuration for all adapters (if an adapter is not specified) or for a specific adapter if the adapter parameter is included. This parameter is available only on computers with adapters that are configured to obtain an IP address automatically. To specify an adapter name, type the adapter name that appears when you use ipconfig without parameters.



NSLOOKUP

Nslookup (stands for Name Server Lookup) is a useful command for getting information from the DNS server. It is a network administration tool for querying the Domain Name System (DNS) to obtain domain name or IP address mapping or any other specific DNS record. It is also used to troubleshoot DNS-related problems.

1)nslookup followed by the domain name will display the A Record (IP Address) of the domain. Use this command to find the address record for a

domain. It queries domain name servers and gets the details.

```
C:\Users\lab1002>nslookup google.com
Server:  UnKnown
Address:  192.168.0.1

Non-authoritative answer:
Name:    google.com
Addresses:  2404:6800:4009:81c::200e
          142.250.77.46
```

2) You can also do the reverse DNS look-up by providing the IP Address as an argument to nslookup.

```
C:\Users\lab1002>nslookup 142.250.77.46
Server:  UnKnown
Address:  192.168.0.1

Name:    bom07s26-in-f14.1e100.net
Address:  142.250.77.46
```

3)Lookup for any record We can also view all the available DNS records using the -type=any option.

```
C:\Users\lab1002>nslookup -type=any google.com
Server:  UnKnown
Address:  192.168.0.1

Non-authoritative answer:
google.com      internet address = 142.250.77.46
google.com      AAAA IPv6 address = 2404:6800:4009:81c::200e
google.com
        primary name server = ns1.google.com
        responsible mail addr = dns-admin.google.com
        serial  = 717200457
        refresh = 900 (15 mins)
        retry   = 900 (15 mins)
        expire  = 1800 (30 mins)
        default TTL = 60 (1 min)
google.com      nameserver = ns1.google.com
google.com      nameserver = ns4.google.com
google.com      nameserver = ns3.google.com
google.com      nameserver = ns2.google.com
```

4)Lookup for a soa record SOA record (start of authority), provides the authoritative information about the domain, the e-mail address of the domain admin, the domain serial number

```
C:\Users\lab1002>nslookup -type=soa google.com
Server:  UnKnown
Address:  192.168.0.1

Non-authoritative answer:
google.com
        primary name server = ns1.google.com
        responsible mail addr = dns-admin.google.com
        serial  = 717200457
        refresh = 900 (15 mins)
        retry   = 900 (15 mins)
        expire  = 1800 (30 mins)
        default TTL = 60 (1 min)

google.com      nameserver = ns3.google.com
google.com      nameserver = ns2.google.com
google.com      nameserver = ns4.google.com
google.com      nameserver = ns1.google.com
ns4.google.com  internet address = 216.239.38.10
ns4.google.com  AAAA IPv6 address = 2001:4860:4802:38::a
ns1.google.com  internet address = 216.239.32.10
ns1.google.com  AAAA IPv6 address = 2001:4860:4802:32::a
ns3.google.com  internet address = 216.239.36.10
ns3.google.com  AAAA IPv6 address = 2001:4860:4802:36::a
ns2.google.com  internet address = 216.239.34.10
ns2.google.com  AAAA IPv6 address = 2001:4860:4802:34::a
```

5) Lookup for an ns record. NS (Name Server) record maps a domain name to a list of DNS servers authoritative for that domain. It will output the name serves which are associated with the given domain.

```
C:\Users\lab1002>nslookup -type=ns google.com
Server:  UnKnown
Address:  192.168.0.1

Non-authoritative answer:
google.com      nameserver = ns1.google.com
google.com      nameserver = ns4.google.com
google.com      nameserver = ns3.google.com
google.com      nameserver = ns2.google.com

ns3.google.com  internet address = 216.239.36.10
ns3.google.com  AAAA IPv6 address = 2001:4860:4802:36::a
ns2.google.com  internet address = 216.239.34.10
ns2.google.com  AAAA IPv6 address = 2001:4860:4802:34::a
ns1.google.com  internet address = 216.239.32.10
ns1.google.com  AAAA IPv6 address = 2001:4860:4802:32::a
ns4.google.com  internet address = 216.239.38.10
ns4.google.com  AAAA IPv6 address = 2001:4860:4802:38::a
```

6)Lookup for a record. We can also view all the available DNS records for a particular record using the -type=a option

```
C:\Users\lab1002>nslookup -type=a google.com
Server:  UnKnown
Address:  192.168.0.1

Non-authoritative answer:
Name:    google.com
Address:  142.250.77.46
```

ROUTE

Description. The route command allows you to make manual entries into the network routing tables. The route command distinguishes between routes to hosts and routes to networks by interpreting the network address of the Destination variable, which can be specified either by symbolic name or numeric address.

1)

```
C:\Users\lab1002>route print -4
===========================================================================
Interface List
 13...e0 9d 31 e5 94 08 ......Intel(R) Dual Band Wireless-AC 3168
 17...e0 9d 31 e5 94 09 ......Microsoft Wi-Fi Direct Virtual Adapter
  4...e2 9d 31 e5 94 08 ......Microsoft Wi-Fi Direct Virtual Adapter #2
  3...18 60 24 90 01 77 ......Realtek PCIe GbE Family Controller
 18...e0 9d 31 e5 94 0c ......Bluetooth Device (Personal Area Network)
  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    192.168.0.245     35
        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     192.168.0.245    291
    192.168.0.245  255.255.255.255         On-link     192.168.0.245    291
    192.168.0.255  255.255.255.255         On-link     192.168.0.245    291
        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     192.168.0.245    291
  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     192.168.0.245    291
===========================================================================
Persistent Routes:
  None
```

2)

```
C:\Users\lab1002>route print -6
===========================================================================
Interface List
 13...e0 9d 31 e5 94 08 ......Intel(R) Dual Band Wireless-AC 3168
 17...e0 9d 31 e5 94 09 ......Microsoft Wi-Fi Direct Virtual Adapter
  4...e2 9d 31 e5 94 08 ......Microsoft Wi-Fi Direct Virtual Adapter #2
  3...18 60 24 90 01 77 ......Realtek PCIe GbE Family Controller
 18...e0 9d 31 e5 94 0c ......Bluetooth Device (Personal Area Network)
  1...........................Software Loopback Interface 1
===========================================================================

IPv6 Route Table
===========================================================================
Active Routes:
 If Metric Network Destination      Gateway
  1    331 ::1/128                  On-link
  3    291 fe80::/64                On-link
  3    291 fe80::2acc:5bf7:eb82:2483/128
                                    On-link
  1    331 ff00::/8                 On-link
  3    291 ff00::/8                 On-link
===========================================================================
Persistent Routes:
  None
```