



**Date: 13/06/2024**

### **Lab Practical #01:**

Study of basic networking commands and IP configuration.

### **Practical Assignment #01:**

1. Perform and explain various networking commands listed below:
  - i. ipconfig
  - ii. ping
  - iii. getmac
  - iv. systeminfo
  - v. traceroute / tracert
  - vi. netstat
  - vii. nslookup
  - viii. hostname
  - ix. pathping
  - x. arp

#### **1. ipconfig**

##### **Description:**

ipconfig is a command-line utility in Windows operating systems used to display and manage the network configuration of a computer. It provides details about the IP address, subnet mask, default gateway, and other network information for each network adapter. Additionally, it allows users to release and renew DHCP-assigned IP addresses and manage DNS settings.

No.	Option	Description
1	/all	Display full configuration information.
2	/renew	Renew the IPv4 address for the specified adapter.
3	/release	Release the IPv4 address for the specified adapter.
4	/displaydns	Display the contents of the DNS Resolver Cache.
5	/flushdns	Purges the DNS Resolver cache.

##### **Implementation:**



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➤ ipconfig

```
Select Command Prompt

C:\Users\i>ipconfig

Windows IP Configuration

Ethernet adapter Ethernet:

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

Ethernet adapter VirtualBox Host-Only Network:

    Connection-specific DNS Suffix  . :
    Link-Local IPv6 Address . . . . . : fe80::9a9b:912a:eb3f:1333%5
    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 Wi-Fi:

    Connection-specific DNS Suffix  . :
    Link-Local IPv6 Address . . . . . : fe80::e5e0:642a:7caf:825b%2
    IPv4 Address. . . . . : 192.168.12.213
    Subnet Mask . . . . . : 255.255.255.0
    Default Gateway . . . . . : 192.168.12.1

C:\Users\i>
```

➤ ipconfig /all

```
Command Prompt

C:\Users\i>ipconfig /all

Windows IP Configuration

Host Name . . . . . : DESKTOP-8583IKB
Primary Dns Suffix . . . . . :
Node Type . . . . . : Mixed
IP Routing Enabled. . . . . : No
WINS Proxy Enabled. . . . . : No

Ethernet adapter Ethernet:

    Media State . . . . . : Media disconnected
    Connection-specific DNS Suffix  . :
    Description . . . . . : Realtek PCIe FE Family Controller
    Physical Address. . . . . : 74-E6-E2-46-36-58
    DHCP Enabled. . . . . : Yes
    Autoconfiguration Enabled . . . . : Yes

Ethernet adapter VirtualBox Host-Only Network:

    Connection-specific DNS Suffix  . :
    Description . . . . . : VirtualBox Host-Only Ethernet Adapter
    Physical Address. . . . . : 0A-00-27-00-00-05
    DHCP Enabled. . . . . : No
    Autoconfiguration Enabled . . . . : Yes
    Link-Local IPv6 Address . . . . . : fe80::9a9b:912a:eb3f:1333%5(Preferred)
    IPv4 Address. . . . . : 192.168.56.1(Preferred)
    Subnet Mask . . . . . : 255.255.255.0
    Default Gateway . . . . . :
    DHCPv6 IAID . . . . . : 785298471
    DHCPv6 Client DUID. . . . . : 00-01-00-01-22-23-C5-1E-74-E6-E2-46-36-58
    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. . . . . : 2E-33-7A-F7-F1-39
    DHCP Enabled. . . . . : Yes
    Autoconfiguration Enabled . . . . : Yes
```

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➤ ipconfig /release

```
Command Prompt
C:\Users\i>ipconfig /release "Wi-Fi"

Windows IP Configuration

Ethernet adapter Ethernet:

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

Ethernet adapter VirtualBox Host-Only Network:

    Connection-specific DNS Suffix  . :
    Link-local IPv6 Address . . . . . : fe80::9a9b:912a:eb3f:1333%5
    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  . :
    IPv6 Address. . . . . : 2409:4080:dec7:26f:309d:7389:4b04:b0a
    Temporary IPv6 Address. . . . . : 2409:4080:dec7:26f:2c1b:e6e9:87b0:d20c
    Link-local IPv6 Address . . . . . : fe80::e5e0:642a:7caf:825b%2
    Default Gateway . . . . . : fe80::54dc:b4ff:fed3:d649%2

C:\Users\i>
```

➤ ipconfig /renew

```
Command Prompt
C:\Users\i>ipconfig /renew "Wi-Fi"

Windows IP Configuration

Ethernet adapter Ethernet:

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

Ethernet adapter VirtualBox Host-Only Network:

    Connection-specific DNS Suffix  . :
    Link-local IPv6 Address . . . . . : fe80::9a9b:912a:eb3f:1333%5
    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  . :
    IPv6 Address. . . . . : 2409:4080:dec7:26f:309d:7389:4b04:b0a
    Temporary IPv6 Address. . . . . : 2409:4080:dec7:26f:2c1b:e6e9:87b0:d20c
    Link-local IPv6 Address . . . . . : fe80::e5e0:642a:7caf:825b%2
    IPv4 Address. . . . . : 192.168.204.250
    Subnet Mask . . . . . : 255.255.255.0
    Default Gateway . . . . . : fe80::54dc:b4ff:fed3:d649%2
                               192.168.204.159

C:\Users\i>
```



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➤ ipconfig /displaydns

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

Windows IP Configuration

1.0.0.127.in-addr.arpa
-----
Record Name . . . . . : 1.0.0.127.in-addr.arpa.
Record Type . . . . . : 12
Time To Live . . . . . : 551402
Data Length . . . . . : 8
Section . . . . . : Answer
PTR Record . . . . . : localhost

localhost
-----
Record Name . . . . . : localhost
Record Type . . . . . : 28
Time To Live . . . . . : 1200
Data Length . . . . . : 16
Section . . . . . : Question
AAAA Record . . . . . : ::1

localhost
-----
Record Name . . . . . : localhost
Record Type . . . . . : 1
Time To Live . . . . . : 1200
Data Length . . . . . : 4
Section . . . . . : Question
A (Host) Record . . . . : 127.0.0.1

C:\Users\i>
```

➤ ipconfig /flushdns

```
Select Command Prompt
C:\Users\i>ipconfig /flushdns

Windows IP Configuration

Successfully flushed the DNS Resolver Cache.

C:\Users\i>
```



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## 2. ping

### Description:

The ping command is a network utility used to test the reachability of a host on an IP network. It also measures the round-trip time for messages sent from the originating host to a destination computer. This command is useful for diagnosing network connectivity issues.

No.	Option	Description
1	-t	Ping the specified host until stopped. To see statistics and continue - type Control-Break. To stop - type Control-C.
2	-n count	Number of echo requests to send.
3	-l size	Send buffer size.
4	-4	Force using IPv4.
5	-i TTL	Time To Live.

### Implementation:

➤ ping www.google.com

```
Select Command Prompt
Microsoft Windows [Version 10.0.19045.4291]
(c) Microsoft Corporation. All rights reserved.

C:\Users\i>ping www.google.com

Pinging www.google.com [2404:6800:4009:82a::2004] with 32 bytes of data:
Reply from 2404:6800:4009:82a::2004: time=115ms
Reply from 2404:6800:4009:82a::2004: time=74ms
Reply from 2404:6800:4009:82a::2004: time=117ms
Reply from 2404:6800:4009:82a::2004: time=92ms

Ping statistics for 2404:6800:4009:82a::2004:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 74ms, Maximum = 117ms, Average = 99ms

C:\Users\i>
```



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➤ ping [www.google.com](http://www.google.com) -t

```
Select Command Prompt
C:\Users\i>ping www.google.com -t

Pinging www.google.com [2404:6800:4009:82a::2004] with 32 bytes of data:
Reply from 2404:6800:4009:82a::2004: time=870ms
Reply from 2404:6800:4009:82a::2004: time=798ms
Reply from 2404:6800:4009:82a::2004: time=732ms
Reply from 2404:6800:4009:82a::2004: time=990ms
Reply from 2404:6800:4009:82a::2004: time=626ms
Reply from 2404:6800:4009:82a::2004: time=644ms
Reply from 2404:6800:4009:82a::2004: time=830ms
Reply from 2404:6800:4009:82a::2004: time=769ms
Reply from 2404:6800:4009:82a::2004: time=1006ms
Reply from 2404:6800:4009:82a::2004: time=253ms
Reply from 2404:6800:4009:82a::2004: time=178ms
Reply from 2404:6800:4009:82a::2004: time=67ms
Reply from 2404:6800:4009:82a::2004: time=93ms
Reply from 2404:6800:4009:82a::2004: time=108ms
Reply from 2404:6800:4009:82a::2004: time=214ms
Reply from 2404:6800:4009:82a::2004: time=262ms
Reply from 2404:6800:4009:82a::2004: time=268ms
Reply from 2404:6800:4009:82a::2004: time=239ms
Reply from 2404:6800:4009:82a::2004: time=1005ms
Reply from 2404:6800:4009:82a::2004: time=674ms
Reply from 2404:6800:4009:82a::2004: time=594ms
Reply from 2404:6800:4009:82a::2004: time=501ms
Reply from 2404:6800:4009:82a::2004: time=1072ms
Reply from 2404:6800:4009:82a::2004: time=668ms

Ping statistics for 2404:6800:4009:82a::2004:
    Packets: Sent = 24, Received = 24, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 67ms, Maximum = 1072ms, Average = 560ms
Control-C
^C
C:\Users\i>
```

➤ ping [www.google.com](http://www.google.com) -n 10

```
Select Command Prompt
C:\Users\i>ping www.google.com -n 10

Pinging www.google.com [2404:6800:4009:82a::2004] with 32 bytes of data:
Reply from 2404:6800:4009:82a::2004: time=142ms
Reply from 2404:6800:4009:82a::2004: time=79ms
Reply from 2404:6800:4009:82a::2004: time=1249ms
Reply from 2404:6800:4009:82a::2004: time=207ms
Reply from 2404:6800:4009:82a::2004: time=142ms
Reply from 2404:6800:4009:82a::2004: time=108ms
Reply from 2404:6800:4009:82a::2004: time=96ms
Reply from 2404:6800:4009:82a::2004: time=151ms
Reply from 2404:6800:4009:82a::2004: time=200ms
Reply from 2404:6800:4009:82a::2004: time=201ms

Ping statistics for 2404:6800:4009:82a::2004:
    Packets: Sent = 10, Received = 10, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 79ms, Maximum = 1249ms, Average = 257ms
C:\Users\i>
```



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➤ ping [www.google.com](http://www.google.com) -l 1000

```
Command Prompt
C:\Users\i>ping www.google.com -l 1000

Pinging www.google.com [2404:6800:4009:827::2004] with 1000 bytes of data:
Reply from 2404:6800:4009:827::2004: time=844ms
Reply from 2404:6800:4009:827::2004: time=130ms
Reply from 2404:6800:4009:827::2004: time=124ms
Reply from 2404:6800:4009:827::2004: time=136ms

Ping statistics for 2404:6800:4009:827::2004:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 124ms, Maximum = 844ms, Average = 308ms

C:\Users\i>
```

➤ ping [www.google.com](http://www.google.com) -4

```
Command Prompt
C:\Users\i>ping www.google.com -4

Pinging www.google.com [142.250.192.4] with 32 bytes of data:
Reply from 142.250.192.4: bytes=32 time=68ms TTL=54
Reply from 142.250.192.4: bytes=32 time=57ms TTL=54
Reply from 142.250.192.4: bytes=32 time=87ms TTL=54
Reply from 142.250.192.4: bytes=32 time=87ms TTL=54

Ping statistics for 142.250.192.4:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 57ms, Maximum = 87ms, Average = 74ms

C:\Users\i>
```

➤ ping -i 4 [www.google.com](http://www.google.com)

```
Command Prompt
C:\Users\i>ping -i 4 www.google.com

Pinging www.google.com [2404:6800:4009:827::2004] with 32 bytes of data:
Reply from 2404:6800:4009:827::2004: TTL expired in transit.
Reply from 2404:6800:4009:827::2004: TTL expired in transit.
Reply from 2404:6800:4009:827::2004: TTL expired in transit.
Reply from 2404:6800:4009:827::2004: TTL expired in transit.

Ping statistics for 2404:6800:4009:827::2004:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),

C:\Users\i>
```

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### 3. getmac

#### Description:

The getmac command is a command-line utility in Windows operating systems that displays the MAC addresses for network adapters on the system. The MAC address, or Media Access Control address, is a unique identifier assigned to network interfaces for communications at the data link layer of a network segment.

No.	Option	Description
1	/S system	Specifies the remote system to connect to.
2	/U [domain\]user	Specifies the user context under which the command should execute.
3	/V	Specifies that verbose output is displayed.
4	/FO format	Specifies the format in which the output is to be displayed. Valid values: "TABLE", "LIST", "CSV".
5	/NH	Specifies that the "Column Header" should not be displayed in the output. Valid only for TABLE and CSV formats.

#### Implementation:

➤ getmac

```

C:\Users\i>getmac

Physical Address      Transport Name
=====
74-E6-E2-46-36-58    Media disconnected
2C-33-7A-F7-F1-39    \Device\NPF{0134B6F2-3C30-41CE-A536-B0AAA0B9DD21}
0A-00-27-00-00-05    \Device\NPF{2869F44D-AA1B-4915-8B00-7D9D61D6B283}

C:\Users\i>

```

➤ getmac /FO TABLE

```

C:\Users\i>getmac /FO TABLE

Physical Address      Transport Name
=====
74-E6-E2-46-36-58    \Device\NPF{DAC633D5-8A98-42B8-B678-927F03F8F244}
2C-33-7A-F7-F1-39    Media disconnected
2E-33-7A-F7-F9-39    \Device\NPF{1EB77F20-4859-4C2B-9E65-462798A34EF7}
0A-00-27-00-00-05    \Device\NPF{2869F44D-AA1B-4915-8B00-7D9D61D6B283}

C:\Users\i>

```





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➤ getmac /FO LIST

```
Command Prompt
C:\Users\i>getmac /FO LIST

Physical Address: 74-E6-E2-46-36-58
Transport Name: \Device\Tcpip_{DAC633D5-8A98-42B8-B678-927F03F8F244}

Physical Address: 2C-33-7A-F7-F1-39
Transport Name: Media disconnected

Physical Address: 2E-33-7A-F7-F9-39
Transport Name: \Device\Tcpip_{1EB77F20-4859-4C2B-9E65-462798A34EF7}

Physical Address: 0A-00-27-00-00-05
Transport Name: \Device\Tcpip_{2869F44D-AA1B-4915-8B00-7D9D61D6B283}

C:\Users\i>
```

➤ getmac /FO CSV

```
Command Prompt
C:\Users\i>getmac /FO CSV
"Physical Address","Transport Name"
"74-E6-E2-46-36-58","\\Device\Tcpip_{DAC633D5-8A98-42B8-B678-927F03F8F244}"
"2C-33-7A-F7-F1-39","Media disconnected"
"2E-33-7A-F7-F9-39","\\Device\Tcpip_{1EB77F20-4859-4C2B-9E65-462798A34EF7}"
"0A-00-27-00-00-05","\\Device\Tcpip_{2869F44D-AA1B-4915-8B00-7D9D61D6B283}"

C:\Users\i>
```

➤ getmac /FO CSV /NH

```
Command Prompt
C:\Users\i>getmac /FO CSV /NH
74-E6-E2-46-36-58,\\Device\Tcpip_{DAC633D5-8A98-42B8-B678-927F03F8F244}
2C-33-7A-F7-F1-39,Media disconnected
2E-33-7A-F7-F9-39,\\Device\Tcpip_{1EB77F20-4859-4C2B-9E65-462798A34EF7}
0A-00-27-00-00-05,\\Device\Tcpip_{2869F44D-AA1B-4915-8B00-7D9D61D6B283}

C:\Users\i>
```

➤ getmac /v

```
Command Prompt
C:\Users\i>getmac /v

Connection Name Network Adapter Physical Address Transport Name
=====
Ethernet Realtek PCIe FE 74-E6-E2-46-36-58 Media disconnected
Wi-Fi Dell Wireless 1 2C-33-7A-F7-F1-39 \Device\Tcpip_{0134B6F2-3C30-41CE-A536-B0AAA0B9DD21}
Local Area Conn Microsoft Wi-Fi 2E-33-7A-F7-F9-39 Media disconnected
VirtualBox Host VirtualBox Host 0A-00-27-00-00-05 \Device\Tcpip_{2869F44D-AA1B-4915-8B00-7D9D61D6B283}

C:\Users\i>
```



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#### **4. systeminfo**

##### **Description:**

`systeminfo` is a command-line utility in Microsoft Windows that provides detailed information about the system's configuration. It gathers and displays various parameters related to the operating system, hardware, and software environment

No.	Option	Description
1	/S system	Specifies the remote system to connect to.
2	/U [domain\]user	Specifies the user context under which the command should execute.
3	/P [password]	Specifies the password for the given user context. Prompts for input if omitted.
4	/FO format	Specifies the format in which the output is to be displayed. Valid values: "TABLE", "LIST", "CSV".
5	/NH	Specifies that the "Column Header" should not be displayed in the output. Valid only for "TABLE" and "CSV" formats.

##### **Implementation:**



# DARSHAN INSTITUTE OF ENGINEERING & TECHNOLOGY

## Semester 5<sup>th</sup> | Practical Assignment | Computer Networks (2301CS501)

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➤ systeminfo

```
Command Prompt
C:\Users\i>systeminfo

Host Name:                DESKTOP-8583IKB
OS Name:                  Microsoft Windows 10 Home Single Language
OS Version:               10.0.19045 N/A Build 19045
OS Manufacturer:         Microsoft Corporation
OS Configuration:        Standalone Workstation
OS Build Type:             Multiprocessor Free
Registered Owner:         Windows User
Registered Organization:
Product ID:                00327-60000-00000-AA502
Original Install Date:     12-04-2021, 19:38:56
System Boot Time:         15-06-2024, 22:01:44
System Manufacturer:      Dell Inc.
System Model:              Inspiron 3543
System Type:               x64-based PC
Processor(s):              1 Processor(s) Installed.
                          [01]: Intel64 Family 6 Model 61 Stepping 4 GenuineIntel ~2000 Mhz
BIOS Version:              Dell Inc. A01, 04-11-2014
Windows Directory:        C:\WINDOWS
System Directory:          C:\WINDOWS\system32
Boot Device:               \Device\HarddiskVolume2
System Locale:              en-us;English (United States)
Input Locale:               00004009
Time Zone:                 (UTC+05:30) Chennai, Kolkata, Mumbai, New Delhi
Total Physical Memory:     8,107 MB
Available Physical Memory: 3,434 MB
Virtual Memory: Max Size:  13,483 MB
Virtual Memory: Available: 6,558 MB
Virtual Memory: In Use:    6,925 MB
Page File Location(s):     C:\pagefile.sys
Domain:                    WORKGROUP
Logon Server:               \\DESKTOP-8583IKB
Hotfix(s):                 26 Hotfix(s) Installed.
                          [01]: KB5034466
                          [02]: KB5027122
                          [03]: KB4562830
                          [04]: KB4577586
                          [05]: KB4580325
                          [06]: KB5003791
                          [07]: KB5011048
                          [08]: KB5012170
                          [09]: KB5015684
                          [06]: KB5003791
                          [07]: KB5011048
                          [08]: KB5012170
                          [09]: KB5015684
                          [10]: KB5033052
                          [11]: KB5036892
                          [12]: KB5007273
                          [13]: KB5011352
                          [14]: KB5011651
                          [15]: KB5014032
                          [16]: KB5014035
                          [17]: KB5014671
                          [18]: KB5015895
                          [19]: KB5016705
                          [20]: KB5018506
                          [21]: KB5020372
                          [22]: KB5022924
                          [23]: KB5023794
                          [24]: KB5026879
                          [25]: KB5037018
                          [26]: KB5005699
Network Card(s):          3 NIC(s) Installed.
                          [01]: Realtek PCIe FE Family Controller
                              Connection Name: Ethernet
                              Status: Media disconnected
                          [02]: Dell Wireless 1704 802.11b/g/n (2.4GHz)
                              Connection Name: Wi-Fi
                              DHCP Enabled: Yes
                              DHCP Server: 192.168.142.170
                              IP address(es)
                              [01]: 192.168.142.250
                              [02]: fe80::e5a0:642a:7caf:825b
                              [03]: 2409:4080:deb2:751:3135:6f3d:befb:33d9
                              [04]: 2409:4080:deb2:751:68ac:45db:5891:9ce0
                          [03]: VirtualBox Host-Only Ethernet Adapter
                              Connection Name: VirtualBox Host-Only Network
                              DHCP Enabled: No
                              IP address(es)
                              [01]: 192.168.56.1
                              [02]: fe80::9a9b:912a:eb3f:1333
Hyper-V Requirements:     VM Monitor Mode Extensions: Yes
                          Virtualization Enabled In Firmware: Yes
                          Second Level Address Translation: Yes
                          Data Execution Prevention Available: Yes
```



➤ `systeminfo /FH TABLE`

➤ `systeminfo /FO CSV`

➤ systeminfo /NH

```
C:\Users\i>systeminfo /FO CSV /MH
"DESKTOP-85831KB","Microsoft Windows 10 Home Single Language","10.0.19045 N/A Build 19045","Microsoft Corporation","Standalone Workstation","Multiprocessor Free","Windows 10 Home Single Language","en-us","00327-60000-00000-A5A92","12-04-2021, 19:38:56","19-06-2024, 11:53:29"," Dell Inc.", "Inspiron 3543", "x64-based PC", "[0]: Processor(s) Installed, [01]: Intel64 Family 6 Model 61 Stepping 4 GenuineIntel ~2081 Mhz, [2]: Axi Intel A01, [4]: 14.00.0000, [5]: 14.00.0000, [6]: 14.00.0000, [7]: 14.00.0000, [8]: 14.00.0000, [9]: 14.00.0000, [10]: 14.00.0000, [11]: 14.00.0000, [12]: 14.00.0000, [13]: 14.00.0000, [14]: 14.00.0000, [15]: 14.00.0000, [16]: 14.00.0000, [17]: 14.00.0000, [18]: 14.00.0000, [19]: 14.00.0000, [20]: 14.00.0000, [21]: 14.00.0000, [22]: 14.00.0000, [23]: 14.00.0000, [24]: 14.00.0000, [25]: 14.00.0000, [26]: 14.00.0000, [27]: 14.00.0000, [28]: 14.00.0000, [29]: 14.00.0000, [30]: 14.00.0000, [31]: 14.00.0000, [32]: 14.00.0000, [33]: 14.00.0000, [34]: 14.00.0000, [35]: 14.00.0000, [36]: 14.00.0000, [37]: 14.00.0000, [38]: 14.00.0000, [39]: 14.00.0000, [40]: 14.00.0000, [41]: 14.00.0000, [42]: 14.00.0000, [43]: 14.00.0000, [44]: 14.00.0000, [45]: 14.00.0000, [46]: 14.00.0000, [47]: 14.00.0000, [48]: 14.00.0000, [49]: 14.00.0000, [50]: 14.00.0000, [51]: 14.00.0000, [52]: 14.00.0000, [53]: 14.00.0000, [54]: 14.00.0000, [55]: 14.00.0000, [56]: 14.00.0000, [57]: 14.00.0000, [58]: 14.00.0000, [59]: 14.00.0000, [60]: 14.00.0000, [61]: 14.00.0000, [62]: 14.00.0000, [63]: 14.00.0000, [64]: 14.00.0000, [65]: 14.00.0000, [66]: 14.00.0000, [67]: 14.00.0000, [68]: 14.00.0000, [69]: 14.00.0000, [70]: 14.00.0000, [71]: 14.00.0000, [72]: 14.00.0000, [73]: 14.00.0000, [74]: 14.00.0000, [75]: 14.00.0000, [76]: 14.00.0000, [77]: 14.00.0000, [78]: 14.00.0000, [79]: 14.00.0000, [80]: 14.00.0000, [81]: 14.00.0000, [82]: 14.00.0000, [83]: 14.00.0000, [84]: 14.00.0000, [85]: 14.00.0000, [86]: 14.00.0000, [87]: 14.00.0000, [88]: 14.00.0000, [89]: 14.00.0000, [90]: 14.00.0000, [91]: 14.00.0000, [92]: 14.00.0000, [93]: 14.00.0000, [94]: 14.00.0000, [95]: 14.00.0000, [96]: 14.00.0000, [97]: 14.00.0000, [98]: 14.00.0000, [99]: 14.00.0000, [100]: 14.00.0000, [101]: 14.00.0000, [102]: 14.00.0000, [103]: 14.00.0000, [104]: 14.00.0000, [105]: 14.00.0000, [106]: 14.00.0000, [107]: 14.00.0000, [108]: 14.00.0000, [109]: 14.00.0000, [110]: 14.00.0000, [111]: 14.00.0000, [112]: 14.00.0000, [113]: 14.00.0000, [114]: 14.00.0000, [115]: 14.00.0000, [116]: 14.00.0000, [117]: 14.00.0000, [118]: 14.00.0000, [119]: 14.00.0000, [120]: 14.00.0000, [121]: 14.00.0000, [122]: 14.00.0000, [123]: 14.00.0000, [124]: 14.00.0000, [125]: 14.00.0000, [126]: 14.00.0000, [127]: 14.00.0000, [128]: 14.00.0000, [129]: 14.00.0000, [130]: 14.00.0000, [131]: 14.00.0000, [132]: 14.00.0000, [133]: 14.00.0000, [134]: 14.00.0000, [135]: 14.00.0000, [136]: 14.00.0000, [137]: 14.00.0000, [138]: 14.00.0000, [139]: 14.00.0000, [140]: 14.00.0000, [141]: 14.00.0000, [142]: 14.00.0000, [143]: 14.00.0000, [144]: 14.00.0000, [145]: 14.00.0000, [146]: 14.00.0000, [147]: 14.00.0000, [148]: 14.00.0000, [149]: 14.00.0000, [150]: 14.00.0000, [151]: 14.00.0000, [152]: 14.00.0000, [153]: 14.00.0000, [154]: 14.00.0000, [155]: 14.00.0000, [156]: 14.00.0000, [157]: 14.00.0000, [158]: 14.00.0000, [159]: 14.00.0000, [160]: 14.00.0000, [161]: 14.00.0000, [162]: 14.00.0000, [163]: 14.00.0000, [164]: 14.00.0000, [165]: 14.00.0000, [166]: 14.00.0000, [167]: 14.00.0000, [168]: 14.00.0000, [169]: 14.00.0000, [170]: 14.00.0000, [171]: 14.00.0000, [172]: 14.00.0000, [173]: 14.00.0000, [174]: 14.00.0000, [175]: 14.00.0000, [176]: 14.00.0000, [177]: 14.00.0000, [178]: 14.00.0000, [179]: 14.00.0000, [180]: 14.00.0000, [181]: 14.00.0000, [182]: 14.00.0000, [183]: 14.00.0000, [184]: 14.00.0000, [185]: 14.00.0000, [186]: 14.00.0000, [187]: 14.00.0000, [188]: 14.00.0000, [189]: 14.00.0000, [190]: 14.00.0000, [191]: 14.00.0000, [192]: 14.00.0000, [193]: 14.00.0000, [194]: 14.00.0000, [195]: 14.00.0000, [196]: 14.00.0000, [197]: 14.00.0000, [198]: 14.00.0000, [199]: 14.00.0000, [200]: 14.00.0000, [201]: 14.00.0000, [202]: 14.00.0000, [203]: 14.00.0000, [204]: 14.00.0000, [205]: 14.00.0000, [206]: 14.00.0000, [207]: 14.00.0000, [208]: 14.00.0000, [209]: 14.00.0000, [210]: 14.00.0000, [211]: 14.00.0000, [212]: 14.00.0000, [213]: 14.00.0000, [214]: 14.00.0000, [215]: 14.00.0000, [216]: 14.00.0000, [217]: 14.00.0000, [218]: 14.00.0000, [219]: 14.00.0000, [220]: 14.00.0000, [221]: 14.00.0000, [222]: 14.00.0000, [223]: 14.00.0000, [224]: 14.00.0000, [225]: 14.00.0000, [226]: 14.00.0000, [227]: 14.00.0000, [228]: 14.00.0000, [229]: 14.00.0000, [230]: 14.00.0000, [231]: 14.00.0000, [232]: 14.00.0000, [233]: 14.00.0000, [234]: 14.00.0000, [235]: 14.00.0000, [236]: 14.00.0000, [237]: 14.00.0000, [238]: 14.
```

Date: 13/06/2024

## 5. traceroute/tracert

### Description:

The tracert command (short for "trace route") is a network diagnostic tool available in Windows operating systems. It is used to determine the path packets take from your computer to a destination host. This command helps in identifying where in the network the issues are occurring, such as delays or failures in data transmission.

No.	Option	Description
1	-d	Do not resolve addresses to hostnames.
2	-h maximum_hops	Maximum number of hops to search for target.
3	-w timeout	Wait timeout milliseconds for each reply.
4.	-S srcaddr	Source address to use (IPv6-only).
5	-4	Force using IPv4.

### Implementation:

➤ tracert www.google.com

```

C:\Users\i>tracert www.google.com

Tracing route to www.google.com [2404:6800:4009:82a::2004]
over a maximum of 30 hops:

  1  2 ms    3 ms    2 ms    2409:4080:deb2:751::95
  2  *        *        *        Request timed out.
  3  59 ms   49 ms   46 ms   2405:200:325:eeee:20::30
  4  37 ms   48 ms   48 ms   2405:200:801:2e00::54
  5  *        *        *        Request timed out.
  6  *        *        *        Request timed out.
  7  118 ms  142 ms  163 ms  2001:4860:1:1::2218
  8  95 ms   83 ms   75 ms   2001:4860:1:1::2218
  9  109 ms  85 ms   96 ms   2404:6800:8040::1
 10  88 ms   95 ms  101 ms  2001:4860:0:1::15e
 11  122 ms  74 ms   82 ms  2001:4860:0:1::78b6
 12  88 ms   75 ms   74 ms  2001:4860::9:4001:67bd
 13  104 ms  94 ms   77 ms  2001:4860:0:1::876b
 14  106 ms  88 ms   82 ms  2001:4860:0:1::161
 15  104 ms  96 ms   97 ms  bom12s17-in-x04.1e100.net [2404:6800:4009:82a::2004]

Trace complete.

C:\Users\i>

```



Date: 13/06/2024

➤ `tracert -d www.google.com`

```
CS Command Prompt
C:\Users\i>tracert -d www.google.com

Tracing route to www.google.com [2404:6800:4009:82a::2004]
over a maximum of 30 hops:

  1    4 ms    3 ms    2 ms  2409:4080:deb2:751::95
  2    *      *      *      Request timed out.
  3   756 ms   60 ms   29 ms  2405:200:325:eeee:20::30
  4    45 ms   41 ms   34 ms  2405:200:801:2e00::54
  5    *      *      *      Request timed out.
  6    *      *      *      Request timed out.
  7    90 ms   76 ms   74 ms  2001:4860:1:1::2218
  8   101 ms   89 ms   91 ms  2001:4860:1:1::2218
  9   100 ms   89 ms   756 ms 2404:6800:812b::1
 10   695 ms   162 ms  146 ms 2001:4860:0:1::53a4
 11   137 ms   97 ms   82 ms 2001:4860:0:1::77dc
 12   135 ms   98 ms   101 ms 2001:4860::9:4002:d931
 13   113 ms   85 ms   178 ms 2001:4860:0:1::876b
 14    88 ms   97 ms   100 ms 2001:4860:0:1::161
 15   121 ms   83 ms   86 ms 2404:6800:4009:82a::2004

Trace complete.

C:\Users\i>
```

➤ `tracert -h 3 www.google.com`

```
CS Command Prompt
C:\Users\i>tracert -h 3 www.google.com

Tracing route to www.google.com [2404:6800:4009:82a::2004]
over a maximum of 3 hops:

  1    5 ms    3 ms    3 ms  2409:4080:deb2:751::95
  2    *      *      *      Request timed out.
  3   553 ms   94 ms   47 ms  2405:200:325:eeee:20::30

Trace complete.

C:\Users\i>
```



Date: 13/06/2024

➤ `tracert -w 3000 www.google.com`

```
Command Prompt
C:\Users\i>tracert -w 3000 www.google.com

Tracing route to www.google.com [2404:6800:4009:82a::2004]
over a maximum of 30 hops:

  1   5 ms     4 ms     2 ms    2409:4080:deb2:751::95
  2   *         *         *        Request timed out.
  3   59 ms    29 ms    42 ms    2405:200:325:eeee:20::30
  4   125 ms   150 ms   227 ms   2405:200:801:2e00::54
  5   *         *         *        Request timed out.
  6   *         *         *        Request timed out.
  7   124 ms   83 ms    71 ms    2001:4860:1:1::2218
  8   91 ms    75 ms    88 ms    2001:4860:1:1::2218
  9   85 ms    80 ms    73 ms    2404:6800:8040::1
 10  111 ms    77 ms    75 ms    2001:4860:0:1::15e
 11  103 ms    79 ms    77 ms    2001:4860:0:1::78b6
 12  104 ms    93 ms    96 ms    2001:4860::9:4001:67bd
 13  123 ms    91 ms    92 ms    2001:4860::9:4001:7734
 14  114 ms    91 ms    85 ms    2001:4860:0:1::8769
 15  120 ms    88 ms    85 ms    2001:4860:0:1::161
 16   97 ms    105 ms   100 ms   bom12s17-in-x04.1e100.net [2404:6800:4009:82a::2004]

Trace complete.

C:\Users\i>
```

➤ `tracert -S 2001:0db8:85a3:0000:0000:8a2e:0370:7334 ipv6.google.com`

```
Command Prompt
C:\Users\i>tracert -S 2001:0db8:85a3:0000:0000:8a2e:0370:7334 ipv6.google.com

Tracing route to ipv6.l.google.com [2404:6800:4009:822::200e]
over a maximum of 30 hops:

  1  Transmit error: code 1214.

Trace complete.

C:\Users\i>
```



Date: 13/06/2024

➤ `tracert -4 www.google.com`

```
Command Prompt
C:\Users\i>tracert -4 www.google.com

Tracing route to www.google.com [142.250.192.4]
over a maximum of 30 hops:

  1    3 ms    2 ms    3 ms  192.168.142.170
  2    6 ms    6 ms    6 ms  192.0.0.1
  3    *        *        *    Request timed out.
  4    *        *        *    Request timed out.
  5    *        *        *    Request timed out.
  6    *        *        *    Request timed out.
  7    *        *        *    Request timed out.
  8    *        *        *    Request timed out.
  9    *        *        *    Request timed out.
 10   *        *        *    Request timed out.
 11   *        *        *    Request timed out.
 12   *        *        *    Request timed out.
 13   64 ms   76 ms   76 ms  bom12s14-in-f4.1e100.net [142.250.192.4]

Trace complete.

C:\Users\i>
```



Date: 13/06/2024

## 6. netstat

### Description:

The netstat command is a network utility that displays network connections, routing tables, interface statistics, masquerade connections, and multicast memberships. It is available in various operating systems including Windows, Linux, and macOS. The command is useful for network troubleshooting and performance monitoring.

No.	Option	Description
1	-a	Displays all connections and listening ports.
2	-e	Displays Ethernet statistics. This may be combined with the -s option.
3	-f	Displays Fully Qualified Domain Names (FQDN) for foreign addresses.
4	-o	Displays the owning process ID associated with each connection
5	-r	Displays the routing table.

### Implementation:

```

C:\Users\i>netstat

Active Connections

Proto Local Address           Foreign Address         State
TCP    127.0.0.1:49677          DESKTOP-8583IKB:49678  ESTABLISHED
TCP    127.0.0.1:49678          DESKTOP-8583IKB:49677  ESTABLISHED
TCP    127.0.0.1:49679          DESKTOP-8583IKB:49680  ESTABLISHED
TCP    127.0.0.1:49680          DESKTOP-8583IKB:49679  ESTABLISHED
TCP    192.168.142.250:49228    a23-63-110-88:https    CLOSE_WAIT
TCP    [2409:4080:deb2:751:3135:6f3d:befb:33d9]:49152 [64:ff9b::98c3:264c]:http CLOSE_WAIT
TCP    [2409:4080:deb2:751:3135:6f3d:befb:33d9]:49221 whatsapp-cdn6-shv-01-pnq1:https CLOSE_WAIT
TCP    [2409:4080:deb2:751:3135:6f3d:befb:33d9]:49222 whatsapp-cdn6-shv-01-pnq1:https CLOSE_WAIT
TCP    [2409:4080:deb2:751:3135:6f3d:befb:33d9]:49223 whatsapp-cdn6-shv-01-bom1:https CLOSE_WAIT
TCP    [2409:4080:deb2:751:3135:6f3d:befb:33d9]:49224 whatsapp-cdn6-shv-01-bom1:https CLOSE_WAIT
TCP    [2409:4080:deb2:751:3135:6f3d:befb:33d9]:49225 [2405:200:1630:b57:face:b00c:3333:7020]:https CLOSE_WAIT
TCP    [2409:4080:deb2:751:3135:6f3d:befb:33d9]:49231 [2405:200:1602::312c:7689]:https CLOSE_WAIT
TCP    [2409:4080:deb2:751:3135:6f3d:befb:33d9]:49237 [2405:200:1602::312c:8244]:https CLOSE_WAIT
TCP    [2409:4080:deb2:751:3135:6f3d:befb:33d9]:49242 [2606:2800:147:120f:30c:1ba0:fc6:265a]:https CLOSE_WAIT
TCP    [2409:4080:deb2:751:3135:6f3d:befb:33d9]:49243 [2620:1ec:bdf::72]:https CLOSE_WAIT
TCP    [2409:4080:deb2:751:3135:6f3d:befb:33d9]:49246 g2600-140f-d800-01ae-0000-0000-0000-21cc:http TIME_WAIT
TCP    [2409:4080:deb2:751:3135:6f3d:befb:33d9]:65369 [2603:1040:a06:6::2]:https ESTABLISHED
TCP    [2409:4080:deb2:751:3135:6f3d:befb:33d9]:65472 [2603:1040:a06:6::2]:https ESTABLISHED
TCP    [2409:4080:deb2:751:3135:6f3d:befb:33d9]:65488 sg-in-f188:5228 ESTABLISHED
TCP    [2409:4080:deb2:751:3135:6f3d:befb:33d9]:65534 [2405:200:1630:90::57]:https CLOSE_WAIT

C:\Users\i>

```



# DARSHAN INSTITUTE OF ENGINEERING & TECHNOLOGY

## Semester 5<sup>th</sup> | Practical Assignment | Computer Networks (2301CS501)

Date: 13/06/2024

➤ netstat -a

```
CS Command Prompt
C:\Users\i\netstat -a

Active Connections

Proto Local Address           Foreign Address         State
TCP    0.0.0.0:135              DESKTOP-8583IKB:0      LISTENING
TCP    0.0.0.0:445              DESKTOP-8583IKB:0      LISTENING
TCP    0.0.0.0:5040             DESKTOP-8583IKB:0      LISTENING
TCP    0.0.0.0:8080             DESKTOP-8583IKB:0      LISTENING
TCP    0.0.0.0:33060            DESKTOP-8583IKB:0      LISTENING
TCP    0.0.0.0:49664            DESKTOP-8583IKB:0      LISTENING
TCP    0.0.0.0:49665            DESKTOP-8583IKB:0      LISTENING
TCP    0.0.0.0:49666            DESKTOP-8583IKB:0      LISTENING
TCP    0.0.0.0:49667            DESKTOP-8583IKB:0      LISTENING
TCP    0.0.0.0:49668            DESKTOP-8583IKB:0      LISTENING
TCP    0.0.0.0:49676            DESKTOP-8583IKB:0      LISTENING
TCP    127.0.0.1:1434           DESKTOP-8583IKB:0      LISTENING
TCP    127.0.0.1:23402          DESKTOP-8583IKB:0      LISTENING
TCP    127.0.0.1:27017          DESKTOP-8583IKB:0      LISTENING
TCP    127.0.0.1:49677          DESKTOP-8583IKB:49678  ESTABLISHED
TCP    127.0.0.1:49678          DESKTOP-8583IKB:49677  ESTABLISHED
TCP    127.0.0.1:49679          DESKTOP-8583IKB:49680  ESTABLISHED
TCP    127.0.0.1:49680          DESKTOP-8583IKB:49679  ESTABLISHED
TCP    127.0.0.1:58880          DESKTOP-8583IKB:0      LISTENING
TCP    192.168.56.1:139         DESKTOP-8583IKB:0      LISTENING
TCP    192.168.142.250:139      DESKTOP-8583IKB:0      LISTENING
TCP    192.168.142.250:49228    a23-63-110-88:https    CLOSE_WAIT
TCP    [::]:135                 DESKTOP-8583IKB:0      LISTENING
TCP    [::]:445                  DESKTOP-8583IKB:0      LISTENING
TCP    [::]:8080                 DESKTOP-8583IKB:0      LISTENING
TCP    [::]:33060                DESKTOP-8583IKB:0      LISTENING
TCP    [::]:49664                DESKTOP-8583IKB:0      LISTENING
TCP    [::]:49665                DESKTOP-8583IKB:0      LISTENING
TCP    [::]:49666                DESKTOP-8583IKB:0      LISTENING
TCP    [::]:49667                DESKTOP-8583IKB:0      LISTENING
TCP    [::]:49668                DESKTOP-8583IKB:0      LISTENING
TCP    [::]:49676                DESKTOP-8583IKB:0      LISTENING
TCP    [::]:1434                 DESKTOP-8583IKB:0      LISTENING
TCP    [::]:49669                DESKTOP-8583IKB:0      LISTENING
TCP    [::]:58880                DESKTOP-8583IKB:0      LISTENING
TCP    [2409:4080:deb2:751:3135:6f3d:befb:33d9]:49152 [64:ff9b::98c3:264c]:http CLOSE_WAIT
```

```
CS Select Command Prompt

TCP    [2409:4080:deb2:751:3135:6f3d:befb:33d9]:49231 [2405:200:1602:312c:7689]:https CLOSE_WAIT
TCP    [2409:4080:deb2:751:3135:6f3d:befb:33d9]:49237 [2405:200:1602:312c:8244]:https CLOSE_WAIT
TCP    [2409:4080:deb2:751:3135:6f3d:befb:33d9]:49242 [2606:2800:147:120f:30c:1ba0:fc6:265a]:https CLOSE_WAIT
TCP    [2409:4080:deb2:751:3135:6f3d:befb:33d9]:49243 [2620:1ec:bdf:172]:https CLOSE_WAIT
TCP    [2409:4080:deb2:751:3135:6f3d:befb:33d9]:49247 whatsapp-chatd-edge-shv-01-pnq1:http TIME_WAIT
TCP    [2409:4080:deb2:751:3135:6f3d:befb:33d9]:49248 whatsapp-cdn6-shv-01-bom1:https ESTABLISHED
TCP    [2409:4080:deb2:751:3135:6f3d:befb:33d9]:49249 whatsapp-cdn6-shv-01-bom1:https ESTABLISHED
TCP    [2409:4080:deb2:751:3135:6f3d:befb:33d9]:49250 whatsapp-cdn6-shv-01-pnq1:https ESTABLISHED
TCP    [2409:4080:deb2:751:3135:6f3d:befb:33d9]:49251 [2405:200:1630:b57:face:b00c:3333:7020]:https ESTABLISHED
TCP    [2409:4080:deb2:751:3135:6f3d:befb:33d9]:49252 whatsapp-cdn6-shv-01-pnq1:https ESTABLISHED
TCP    [2409:4080:deb2:751:3135:6f3d:befb:33d9]:65369 [2603:1040:a06:6:2]:https ESTABLISHED
TCP    [2409:4080:deb2:751:3135:6f3d:befb:33d9]:65472 [2603:1040:a06:6:2]:https ESTABLISHED
TCP    [2409:4080:deb2:751:3135:6f3d:befb:33d9]:65488 sg-in-f188:5228 ESTABLISHED
TCP    [2409:4080:deb2:751:3135:6f3d:befb:33d9]:65534 [2405:200:1630:90::57]:https CLOSE_WAIT

UDP    0.0.0.0:123              *:.*
UDP    0.0.0.0:5050             *:.*
UDP    0.0.0.0:5353             *:.*
UDP    0.0.0.0:5353             *:.*
UDP    0.0.0.0:5353             *:.*
UDP    0.0.0.0:5353             *:.*
UDP    0.0.0.0:5355             *:.*
UDP    127.0.0.1:1900           *:.*
UDP    127.0.0.1:48300          *:.*
UDP    127.0.0.1:48301          *:.*
UDP    127.0.0.1:52915          *:.*
UDP    127.0.0.1:54765          *:.*
UDP    192.168.56.1:137         *:.*
UDP    192.168.56.1:138         *:.*
UDP    192.168.56.1:1900        *:.*
UDP    192.168.56.1:52913       *:.*
UDP    192.168.142.250:137     *:.*
UDP    192.168.142.250:138     *:.*
UDP    192.168.142.250:1900    *:.*
UDP    192.168.142.250:52914   *:.*
UDP    [::]:123                 *:.*
UDP    [::]:5353                *:.*
UDP    [::]:5353                *:.*
UDP    [::]:5353                *:.*
UDP    [::]:5355                *:.*
UDP    [::]:1900                *:.*
UDP    [::]:52912               *:.*
UDP    [fe80::9a9b:912a:eb3f:1333k5]:1900 *:.*
UDP    [fe80::9a9b:912a:eb3f:1333k5]:52910 *:.*
UDP    [fe80::e5e0:642a:7caf:825b2k2]:1900 *:.*
UDP    [fe80::e5e0:642a:7caf:825b2k2]:52911 *:.*
```



Date: 13/06/2024

➤ netstat -e

```
CS1 Command Prompt
C:\Users\i>netstat -e
Interface Statistics

            Received            Sent
Bytes      423972885            58051882
Unicast packets      413994            224952
Non-unicast packets      63            3815
Discards            0            0
Errors            0            0
Unknown protocols      0

C:\Users\i>
```

➤ netstat -f

```
CS1 Command Prompt
C:\Users\i>netstat -f
Active Connections

Proto Local Address           Foreign Address         State
TCP 127.0.0.1:49677          DESKTOP-8583IKB:49678  ESTABLISHED
TCP 127.0.0.1:49678          DESKTOP-8583IKB:49677  ESTABLISHED
TCP 127.0.0.1:49679          DESKTOP-8583IKB:49680  ESTABLISHED
TCP 127.0.0.1:49680          DESKTOP-8583IKB:49679  ESTABLISHED
TCP 192.168.142.250:49228    a23-63-110-88.deploy.static.akamaitechnologies.com:https CLOSE_WAIT
TCP [2409:4080:deb2:751:3135:6f3d:befb:33d9]:49152 [64:ff9b::98c3:264c]:http CLOSE_WAIT
TCP [2409:4080:deb2:751:3135:6f3d:befb:33d9]:49231 [2405:200:1602::312c:7689]:https CLOSE_WAIT
TCP [2409:4080:deb2:751:3135:6f3d:befb:33d9]:49237 [2405:200:1602::312c:8244]:https CLOSE_WAIT
TCP [2409:4080:deb2:751:3135:6f3d:befb:33d9]:49242 [2606:2800:147:120f:30c:1ba0:fc6:265a]:https CLOSE_WAIT
TCP [2409:4080:deb2:751:3135:6f3d:befb:33d9]:49243 [2620:1ec:bdf::72]:https CLOSE_WAIT
TCP [2409:4080:deb2:751:3135:6f3d:befb:33d9]:49248 whatsapp-cdn6-shv-01-bom1.fbcdn.net:https CLOSE_WAIT
TCP [2409:4080:deb2:751:3135:6f3d:befb:33d9]:49249 whatsapp-cdn6-shv-01-bom1.fbcdn.net:https CLOSE_WAIT
TCP [2409:4080:deb2:751:3135:6f3d:befb:33d9]:49250 whatsapp-cdn6-shv-01-pnq1.fbcdn.net:https CLOSE_WAIT
TCP [2409:4080:deb2:751:3135:6f3d:befb:33d9]:49251 [2405:200:1630:b57:face:b00c:3333:7020]:https CLOSE_WAIT
TCP [2409:4080:deb2:751:3135:6f3d:befb:33d9]:49252 whatsapp-cdn6-shv-01-pnq1.fbcdn.net:https CLOSE_WAIT
TCP [2409:4080:deb2:751:3135:6f3d:befb:33d9]:49253 [64:ff9b::682e:a2e1]:https TIME_WAIT
TCP [2409:4080:deb2:751:3135:6f3d:befb:33d9]:49254 [64:ff9b::98c3:264c]:http TIME_WAIT
TCP [2409:4080:deb2:751:3135:6f3d:befb:33d9]:49255 a104-85-158-248.deploy.static.akamaitechnologies.com:http TIME_WAIT
TCP [2409:4080:deb2:751:3135:6f3d:befb:33d9]:49256 [2606:2800:147:120f:30c:1ba0:fc6:3001]:http TIME_WAIT
TCP [2409:4080:deb2:751:3135:6f3d:befb:33d9]:65369 [2603:1040:a06:6::2]:https ESTABLISHED
TCP [2409:4080:deb2:751:3135:6f3d:befb:33d9]:65472 [2603:1040:a06:6::2]:https ESTABLISHED
TCP [2409:4080:deb2:751:3135:6f3d:befb:33d9]:65488 sg-in-f188.1e100.net:5228 ESTABLISHED
TCP [2409:4080:deb2:751:3135:6f3d:befb:33d9]:65534 [2405:200:1630:90::57]:https CLOSE_WAIT

C:\Users\i>
```



# DARSHAN INSTITUTE OF ENGINEERING & TECHNOLOGY

## Semester 5<sup>th</sup> | Practical Assignment | Computer Networks (2301CS501)

Date: 13/06/2024

➤ netstat -o

```
Select Command Prompt
C:\Users\i>netstat -o

Active Connections

Proto Local Address           Foreign Address         State       PID
TCP   127.0.0.1:49677          DESKTOP-8583IKB:49678  ESTABLISHED 4644
TCP   127.0.0.1:49678          DESKTOP-8583IKB:49677  ESTABLISHED 4644
TCP   127.0.0.1:49679          DESKTOP-8583IKB:49680  ESTABLISHED 4644
TCP   127.0.0.1:49680          DESKTOP-8583IKB:49679  ESTABLISHED 4644
TCP   192.168.142.250:49228    a23-63-110-88:https    CLOSE_WAIT  7372
TCP   [2409:4080:deb2:751:3135:6f3d:befb:33d9]:49152 [64:ff9b::98c3:264c]:http CLOSE_WAIT  2912
TCP   [2409:4080:deb2:751:3135:6f3d:befb:33d9]:49231 [2405:200:1602::312c:7689]:https CLOSE_WAIT  6756
TCP   [2409:4080:deb2:751:3135:6f3d:befb:33d9]:49237 [2405:200:1602::312c:8244]:https CLOSE_WAIT  6756
TCP   [2409:4080:deb2:751:3135:6f3d:befb:33d9]:49242 [2606:2800:147:120f:30c:1ba0:fc6:265a]:https CLOSE_WAIT  6756
TCP   [2409:4080:deb2:751:3135:6f3d:befb:33d9]:49243 [2620:1ec:bdf::72]:https CLOSE_WAIT  6756
TCP   [2409:4080:deb2:751:3135:6f3d:befb:33d9]:49248 whatsapp-cdn6-shv-01-bom1:https CLOSE_WAIT  14284
TCP   [2409:4080:deb2:751:3135:6f3d:befb:33d9]:49249 whatsapp-cdn6-shv-01-bom1:https CLOSE_WAIT  14284
TCP   [2409:4080:deb2:751:3135:6f3d:befb:33d9]:49250 whatsapp-cdn6-shv-01-pnq1:https CLOSE_WAIT  14284
TCP   [2409:4080:deb2:751:3135:6f3d:befb:33d9]:49251 [2405:200:1630:b57:face:b00c:3333:7020]:https CLOSE_WAIT  14284
TCP   [2409:4080:deb2:751:3135:6f3d:befb:33d9]:49252 whatsapp-cdn6-shv-01-pnq1:https CLOSE_WAIT  14284
TCP   [2409:4080:deb2:751:3135:6f3d:befb:33d9]:49253 [64:ff9b::682e:a2e1]:https TIME_WAIT   0
TCP   [2409:4080:deb2:751:3135:6f3d:befb:33d9]:49254 [64:ff9b::98c3:264c]:http TIME_WAIT   0
TCP   [2409:4080:deb2:751:3135:6f3d:befb:33d9]:49255 a104-85-158-248:http TIME_WAIT   0
TCP   [2409:4080:deb2:751:3135:6f3d:befb:33d9]:49256 [2606:2800:147:120f:30c:1ba0:fc6:3001]:http TIME_WAIT   0
TCP   [2409:4080:deb2:751:3135:6f3d:befb:33d9]:65369 [2603:1040:a06:6::2]:https ESTABLISHED 3880
TCP   [2409:4080:deb2:751:3135:6f3d:befb:33d9]:65472 [2603:1040:a06:6::2]:https ESTABLISHED 3880
TCP   [2409:4080:deb2:751:3135:6f3d:befb:33d9]:65488 sg-in-f188:5228 ESTABLISHED 264
TCP   [2409:4080:deb2:751:3135:6f3d:befb:33d9]:65534 [2405:200:1630:90::57]:https CLOSE_WAIT  2912

C:\Users\i>
```

➤ netstat -r

```
Command Prompt
C:\Users\i>netstat -r

Interface List
10...74 66 e2 46 36 58 .....Realtek PCIe FE Family Controller
5...0a 80 27 00 00 05 .....VirtualBox Host-Only Ethernet Adapter
10...2e 33 7a f7 f1 39 .....Microsoft Wi-Fi Direct Virtual Adapter
4...2e 33 7a f7 f9 39 .....Microsoft Wi-Fi Direct Virtual Adapter #2
2...2c 33 7a f7 f1 39 .....Dell Wireless 1704 802.11b/g/n (2.4GHz)
1.....Software Loopback Interface 1

IPv4 Route Table
Active Routes:
Network Destination        Netmask          Gateway           Interface        Metric
0.0.0.0                    0.0.0.0          192.168.142.170   192.168.142.250  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
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
192.168.142.0              255.255.255.0    On-link          192.168.142.250  311
192.168.142.250            255.255.255.255 On-link          192.168.142.250  311
192.168.142.255            255.255.255.255 On-link          192.168.142.250  311
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          192.168.142.250  311
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          192.168.142.250  311

Persistent Routes:
None

IPv6 Route Table
Active Routes:
If Metric Network Destination      Gateway
2       71 :::/0 fe80::60ff:a4ff:fec0:b889
1      331 ::1/128 On-link
2       71 2409:4080:deb2:751::/64 On-link
2      311 2409:4080:deb2:751:3135:6f3d:befb:33d9/128 On-link
2      311 2409:4080:deb2:751:88ac:45db:5891:9ce0/128 On-link
5      281 fe80::/64 On-link
2      311 fe80::/64 On-link
```



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```
Command Prompt
5 281 fe80::/64 On-link
2 311 fe80::/64 On-link
5 281 fe80::9a9b:912a:eb3f:1333/128
2 311 fe80::e5e0:642a:7caf:825b/128
1 331 ff00::/8 On-link
5 281 ff00::/8 On-link
2 311 ff00::/8 On-link
=====
Persistent Routes:
None
C:\Users\i>
```

## 7. nslookup

### Description:

The nslookup command is a network administration command-line tool used for querying the Domain Name System (DNS) to obtain domain name or IP address mapping information. It can be used to find the IP address associated with a domain name or the domain name associated with an IP address. This tool is useful for diagnosing DNS issues and verifying DNS configurations.

No.	Option	Description
1	-debug	Enables the display of debugging information
2	-type=any	Lookup for any record We can also view all the available DNS records using the -type=any option.
3	-type=SOA	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, etc...

### Implementation:

- nslookup www.google.com

```
Command Prompt
C:\Users\i>nslookup www.google.com
Server: UnKnown
Address: 10.20.1.1

Non-authoritative answer:
Name: www.google.com
Addresses: 2404:6800:4009:829::2004
          142.250.183.196

C:\Users\i>
```

- nslookup -type=any [www.google.com](http://www.google.com)

```
Command Prompt
C:\Users\i>nslookup -type=any www.google.com
Server: UnKnown
Address: 192.168.204.159

Non-authoritative answer:
www.google.com internet address = 142.250.192.68
www.google.com AAAA IPv6 address = 2404:6800:4009:829::2004

C:\Users\i>
```



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➤ nslookup -type=SOA [www.google.com](http://www.google.com)

```
Command Prompt
C:\Users\i>nslookup -type=SOA www.google.com
Server: UnKnown
Address: 192.168.204.159

google.com
primary name server = ns1.google.com
responsible mail addr = dns-admin.google.com
serial = 646797294
refresh = 900 (15 mins)
retry = 900 (15 mins)
expire = 1800 (30 mins)
default TTL = 60 (1 min)

C:\Users\i>
```

➤ nslookup -debug [www.google.com](http://www.google.com)

```
Command Prompt
C:\Users\i>nslookup -debug www.google.com
Got answer:
HEADER:
opcode = QUERY, id = 1, rcode = NXDOMAIN
header flags: response, want recursion, recursion avail.
questions = 1, answers = 0, authority records = 0, additional = 0

QUESTIONS:
159.204.168.192.in-addr.arpa, type = PTR, class = IN

-----
Server: UnKnown
Address: 192.168.204.159

Got answer:
HEADER:
opcode = QUERY, id = 2, rcode = NOERROR
header flags: response, want recursion, recursion avail.
questions = 1, answers = 1, authority records = 0, additional = 0

QUESTIONS:
www.google.com, type = A, class = IN
ANSWERS:
-> www.google.com
internet address = 142.250.183.68
ttl = 6 (6 secs)

Non-authoritative answer:
Got answer:
HEADER:
opcode = QUERY, id = 3, rcode = NOERROR
header flags: response, want recursion, recursion avail.
questions = 1, answers = 1, authority records = 0, additional = 0

QUESTIONS:
www.google.com, type = AAAA, class = IN
ANSWERS:
-> www.google.com
AAAA IPv6 address = 2404:6800:4009:822::2004
ttl = 116 (1 min 56 secs)

-----
Name: www.google.com
Addresses: 2404:6800:4009:822::2004
142.250.183.68
```



**Date: 13/06/2024**

## **8. hostname**

### **Description:**

The hostname command is a simple command-line utility used in various operating systems (Windows, Linux, macOS) to display or set the name of the current host system. The hostname is a unique identifier assigned to a machine on a network.

### **Implementation:**

```
Command Prompt
C:\Users\i>hostname
DESKTOP-8583IKB
C:\Users\i>
```

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## 9. pathping

### Description:

The pathping command in Windows is a network diagnostic tool that combines the features of ping and tracer. It provides detailed information about network latency and packet loss along the route from the source to the destination. This tool is particularly useful for identifying problematic routers or links in a network path.

No.	Option	Description
1	-h maximum_hops	Maximum number of hops to search for target.
2	-n	Do not resolve addresses to hostnames.
3	q num_queries	Number of queries per hop.
4	-w timeout	Wait timeout milliseconds for each reply.
5	-4	Force using IPv4.

### Implementation:

➤ pathping www.google.com

```

C:\Users\i>pathping www.google.com

Tracing route to www.google.com [2404:6800:4002:826::2004]
over a maximum of 30 hops:
 0  DESKTOP-8583IKB [2409:4080:deb2:751:1408:7c17:ab64:f1b]
 1  2409:4080:deb2:751::79
 2  * * *
Computing statistics for 25 seconds...
Hop  RTT      Source to Here   This Node/Link   Address
 0      Lost/Sent = Pct  Lost/Sent = Pct
 0      DESKTOP-8583IKB [2409:4080:deb2:751:1408:7c17:ab64:f1b]
 1  66ms    0/ 100 = 0%      0/ 100 = 0%      2409:4080:deb2:751::79
Trace complete.
C:\Users\i>

```

➤ pathping -h 5 www.google.com

```

C:\Users\i>pathping -h 5 www.google.com

Tracing route to www.google.com [2404:6800:4009:827::2004]
over a maximum of 5 hops:
 0  DESKTOP-8583IKB [2409:4080:deb2:751:1408:7c17:ab64:f1b]
 1  2409:4080:deb2:751::79
 2  * * *
Computing statistics for 25 seconds...
Hop  RTT      Source to Here   This Node/Link   Address
 0      Lost/Sent = Pct  Lost/Sent = Pct
 0      DESKTOP-8583IKB [2409:4080:deb2:751:1408:7c17:ab64:f1b]
 1  77ms    0/ 100 = 0%      0/ 100 = 0%      2409:4080:deb2:751::79
Trace complete.
C:\Users\i>

```





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➤ pathping -n www.google.com

```
Command Prompt
C:\Users\i>pathping -n www.google.com

Tracing route to www.google.com [2404:6800:4009:827::2004]
over a maximum of 30 hops:
 0  2409:4080:deb2:751:1408:7c17:ab64:f1b
 1  2409:4080:deb2:751::79
 2  * * *

Computing statistics for 25 seconds...
Source to Here   This Node/Link
Hop  RTT    Lost/Sent = Pct  Lost/Sent = Pct  Address
 0      0/ 100 = 0%    0/ 100 = 0%      |
 1  66ms   0/ 100 = 0%    0/ 100 = 0%      2409:4080:deb2:751::79

Trace complete.
C:\Users\i>
```

➤ pathping -q 5 www.google.com

```
Command Prompt
C:\Users\i>pathping -q 5 www.google.com

Tracing route to www.google.com [2404:6800:4009:827::2004]
over a maximum of 30 hops:
 0  DESKTOP-8583IKB [2409:4080:deb2:751:1408:7c17:ab64:f1b]
 1  2409:4080:deb2:751::79
 2  * * *

Computing statistics for 1 seconds...
Source to Here   This Node/Link
Hop  RTT    Lost/Sent = Pct  Lost/Sent = Pct  Address
 0      0/ 5 = 0%    0/ 5 = 0%        |
 1  58ms   0/ 5 = 0%    0/ 5 = 0%        2409:4080:deb2:751::79

Trace complete.
C:\Users\i>
```

➤ pathping -w 3000 www.google.com

```
Command Prompt
C:\Users\i>pathping -w 3000 www.google.com

Tracing route to www.google.com [2404:6800:4009:827::2004]
over a maximum of 30 hops:
 0  DESKTOP-8583IKB [2409:4080:deb2:751:1408:7c17:ab64:f1b]
 1  2409:4080:deb2:751::79
 2  * * *

Computing statistics for 25 seconds...
Source to Here   This Node/Link
Hop  RTT    Lost/Sent = Pct  Lost/Sent = Pct  Address
 0      0/ 100 = 0%  0/ 100 = 0%      |
 1  56ms   0/ 100 = 0%  0/ 100 = 0%      2409:4080:deb2:751::79

Trace complete.
C:\Users\i>
```



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➤ pathping -4 www.google.com

```
Command Prompt
C:\Users\i>pathping -4 www.google.com

Tracing route to www.google.com [142.250.192.4]
over a maximum of 30 hops:
 0  DESKTOP-8583IKB [192.168.142.250]
 1  192.168.142.170
 2  192.0.0.1
 3  * * *
Computing statistics for 50 seconds...
Source to Here   This Node/Link
Hop  RTT    Lost/Sent = Pct  Lost/Sent = Pct  Address
 0      0/ 100 = 0%      0/ 100 = 0%      |  DESKTOP-8583IKB [192.168.142.250]
 1  116ms   0/ 100 = 0%      0/ 100 = 0%      |  192.168.142.170
 2   87ms   0/ 100 = 0%      0/ 100 = 0%      |  192.0.0.1
Trace complete.
C:\Users\i>
```

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## 10.arp

### Description:

The arp (Address Resolution Protocol) command in Windows is used to view and manipulate the ARP cache, which stores mappings of IP addresses to physical MAC addresses. This command is useful for diagnosing network issues and ensuring proper network configuration.

No.	Option	Description
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.
2	-v	Displays current ARP entries in verbose mode. All invalid entries and entries on the loop-back interface will be shown.
3	inet_addr.	Specifies an internet address

### Implementation:

➤ arp

```
Command Prompt
C:\Users\i>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\i>
```



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➤ arp -a

```
Command Prompt
C:\Users\i>arp -a

Interface: 192.168.204.250 --- 0x2
Internet Address      Physical Address      Type
192.168.204.159       56-dc-b4-d3-d6-49    dynamic
192.168.204.255       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: 192.168.56.1 --- 0x5
Internet Address      Physical Address      Type
192.168.56.255       ff-ff-ff-ff-ff-ff    static
224.0.0.22            01-00-5e-00-00-16    static
224.0.0.251           01-00-5e-00-00-fb    static
224.0.0.252           01-00-5e-00-00-fc    static
239.255.255.250       01-00-5e-7f-ff-fa    static

C:\Users\i>
```

➤ arp -a 192.168.204.159

```
Command Prompt
C:\Users\i>arp -a 192.168.204.159

Interface: 192.168.204.250 --- 0x2
Internet Address      Physical Address      Type
192.168.204.159       56-dc-b4-d3-d6-49    dynamic

C:\Users\i>
```

➤ arp -a -v

```
Command Prompt
C:\Users\i>arp -a -v

Interface: 127.0.0.1 --- 0x1
Internet Address      Physical Address      Type
224.0.0.22            01-00-5e-00-00-16    static
224.0.0.251           01-00-5e-00-00-fb    static
224.0.0.252           01-00-5e-00-00-fc    static
239.255.255.250       01-00-5e-7f-ff-fa    static

Interface: 192.168.204.250 --- 0x2
Internet Address      Physical Address      Type
192.168.32.201        00-00-00-00-00-00    invalid
192.168.204.159       56-dc-b4-d3-d6-49    dynamic
192.168.204.255       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: 0.0.0.0 --- 0xffffffff
Internet Address      Physical Address      Type
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

Interface: 192.168.56.1 --- 0x5
Internet Address      Physical Address      Type
169.254.169.254       00-00-00-00-00-00    invalid
192.168.56.255       ff-ff-ff-ff-ff-ff    static
224.0.0.22            01-00-5e-00-00-16    static
224.0.0.251           01-00-5e-00-00-fb    static
224.0.0.252           01-00-5e-00-00-fc    static
239.255.255.250       01-00-5e-7f-ff-fa    static

Interface: 0.0.0.0 --- 0xffffffff
Internet Address      Physical Address      Type
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

Interface: 0.0.0.0 --- 0xffffffff
Internet Address      Physical Address      Type
224.0.0.22            01-00-5e-00-00-16    static
224.0.0.252           01-00-5e-00-00-fc    static
```