

EXPERIMENT 1A**DATE: 27.07.2024****BASIC NETWORKING COMMANDS IN WINDOWS OPERATING SYSTEM**

AIM: To study about commands in windows operating system

The Windows operating system provides its user with a powerful tool, Command Prompt, which allows the user to access and configure system settings and data. The network commands prove helpful when there is a need to configure or troubleshoot the network settings of our system.

1. IPCONFIG

The **IPCONFIG** network command provides a comprehensive view of information regarding the **IP address** configuration of the device we are currently working on.

The **IPConfig** command also provides us with some variation in the primary command that targets specific system settings or data, which are:

- **IPConfig/all** - Provides primary output with additional information about network adapters.
- **IPConfig/renew** - Used to renew the system's IP address.
- **IPConfig/release** - Removes the system's current IP address.

Command to enter in Prompt - **ipconfig**

```
Windows IP Configuration

Wireless LAN adapter Local Area Connection* 3:

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

Wireless LAN adapter Local Area Connection* 4:

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

Wireless LAN adapter Wi-Fi:

    Connection-specific DNS Suffix  . :
    IPv6 Address. . . . . : 2401:4900:634e:2702:bedb:29cb:624c:3827
    Temporary IPv6 Address. . . . . : 2401:4900:634e:2702:281f:7e59:f3ca:845d
    Link-local IPv6 Address . . . . . : fe80::a411:246:66cd:3bf1%15
    IPv4 Address. . . . . : 192.168.233.233
    Subnet Mask . . . . . : 255.255.255.0
    Default Gateway . . . . . : fe80::7cef:64ff:fe0e:186e%15
                                192.168.233.194

Ethernet adapter Bluetooth Network Connection:

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

2. NSLOOKUP

The NSLOOKUP command is used to troubleshoot network connectivity issues in the system. Using the nslookup command, we can access the information related to our system's DNS server, i.e., domain name and IP address.

Command to enter in Prompt – nslookup

```
> nslookup www.google.com
Server:  www.google.com
Addresses:  2404:6800:4007:82c::2004
            142.250.67.132
```

3. HOSTNAME

The HOSTNAME command displays the hostname of the system. The hostname command is much easier to use than going into the system settings to search for it.

Command to enter in Prompt - hostname

```
C:\Users\kkknf>hostname
LAPTOP-6H60T6N4
```

4. PING

The Ping command is one of the most widely used commands in the prompt tool, as it allows the user to check the connectivity of our system to another host.

This command sends four experimental packets to the destination host to check whether it receives them successfully, if so, then, we can communicate with the destination host. But in case the packets have not been received, that means, no communication can be established with the destination host.

Command to enter in Prompt - ping www.destination_host_name.com

```
Pinging www.google.com [2404:6800:4009:811::2004] with 32 bytes of data:
Reply from 2404:6800:4009:811::2004: time=76ms
Reply from 2404:6800:4009:811::2004: time=81ms
Reply from 2404:6800:4009:811::2004: time=53ms
Reply from 2404:6800:4009:811::2004: time=53ms

Ping statistics for 2404:6800:4009:811::2004:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 53ms, Maximum = 81ms, Average = 65ms
```

5. TRACERT

The TRACERT command is used to trace the route during the transmission of the data packet over to the destination host and also provides us with the “hop” count during transmission.

Using the number of hops and the hop IP address, we can troubleshoot network issues and identify the point of the problem during the transmission of the data packet.

```
Tracing route to www.google.com [2404:6800:4007:824::2004]
over a maximum of 30 hops:

  1    7 ms    8 ms    5 ms    2401:4900:634e:2702::2a
  2    *        *        *        Request timed out.
  3   42 ms   45 ms   37 ms   2401:4900:0:7d7::1
  4   48 ms   75 ms   64 ms   2401:4900:0:6f6::6
  5   26 ms   21 ms   26 ms   2401:4900:0:6f7::1
  6    *        *        *        Request timed out.
  7   69 ms   47 ms   38 ms   2404:a800:3a00:1::605
  8   95 ms   34 ms   50 ms   2404:a800::92
  9    *        *        47 ms   2001:4860:1:1::d2e
 10   65 ms   85 ms   38 ms   2404:6800:8123::1
 11    *        22 ms   55 ms   2001:4860:0:1::564e
 12   47 ms   43 ms   38 ms   2001:4860:0:1::8826
 13   74 ms   50 ms   32 ms   2001:4860:0:1::1841
 14   30 ms   56 ms   32 ms   2001:4860:0:1::55d3
 15   43 ms   94 ms   48 ms   maa03s39-in-x04.1e100.net [2404:6800:4007:824::2004]

Trace complete.
```

6. NETSTAT

The Netstat command as the name suggests displays an overview of all the network connections in the device. The table shows detail about the connection protocol, address, and the current state of the network.

Command to enter in Prompt – netstat

Active Connections

Proto	Local Address	Foreign Address	State
TCP	192.168.233.233:50538	20.212.88.117:https	ESTABLISHED
TCP	192.168.233.233:50539	ec2-13-126-70-76:https	ESTABLISHED
TCP	192.168.233.233:50975	server-108-158-251-69:https	TIME_WAIT
TCP	192.168.233.233:50976	13.89.178.27:https	ESTABLISHED
TCP	192.168.233.233:50977	a104-77-173-121:https	ESTABLISHED
TCP	192.168.233.233:50982	a-0003:https	TIME_WAIT
TCP	192.168.233.233:50984	20.189.173.5:https	ESTABLISHED
TCP	[2401:4900:634e:2702:281f:7e59:f3ca:845d]:50508	[2603:1040:a06:6::2]:https	ESTABLISHED
TCP	[2401:4900:634e:2702:281f:7e59:f3ca:845d]:50530	[2603:1040:a06:6::2]:https	ESTABLISHED
TCP	[2401:4900:634e:2702:281f:7e59:f3ca:845d]:50531	[2603:1040:a06:6::2]:https	ESTABLISHED
TCP	[2401:4900:634e:2702:281f:7e59:f3ca:845d]:50563	sg-in-f188:5228	ESTABLISHED
TCP	[2401:4900:634e:2702:281f:7e59:f3ca:845d]:50840	g2600-140f-2400-0000-0000-0000-173b-af81:https	CLOSE_WAIT
TCP	[2401:4900:634e:2702:281f:7e59:f3ca:845d]:50842	g2600-140f-2400-0000-0000-0000-173b-af7b:https	CLOSE_WAIT
TCP	[2401:4900:634e:2702:281f:7e59:f3ca:845d]:50849	g2600-140f-2400-0000-0000-0000-173b-af68:https	CLOSE_WAIT
TCP	[2401:4900:634e:2702:281f:7e59:f3ca:845d]:50883	[2603:1046:700:70::2]:https	ESTABLISHED
TCP	[2401:4900:634e:2702:281f:7e59:f3ca:845d]:50885	[2606:2800:247:57cb:4371:48bc:8b00:14c3]:http	CLOSE_WAIT
TCP	[2401:4900:634e:2702:281f:7e59:f3ca:845d]:50939	whatsapp-cdn6-shv-02-maa2:https	CLOSE_WAIT
TCP	[2401:4900:634e:2702:281f:7e59:f3ca:845d]:50940	[2404:a800:6:126:face:b00c:3333:7020]:https	CLOSE_WAIT
TCP	[2401:4900:634e:2702:281f:7e59:f3ca:845d]:50941	whatsapp-cdn6-shv-01-tir3:https	CLOSE_WAIT
TCP	[2401:4900:634e:2702:281f:7e59:f3ca:845d]:50942	[2404:a800:6:126:face:b00c:3333:7020]:https	CLOSE_WAIT
TCP	[2401:4900:634e:2702:281f:7e59:f3ca:845d]:50943	whatsapp-cdn6-shv-02-tir3:https	CLOSE_WAIT
TCP	[2401:4900:634e:2702:281f:7e59:f3ca:845d]:50944	[2404:a800:6:8c:face:b00c:3333:7020]:https	CLOSE_WAIT
TCP	[2401:4900:634e:2702:281f:7e59:f3ca:845d]:50945	[2404:a800:6:127:face:b00c:3333:7020]:https	CLOSE_WAIT
TCP	[2401:4900:634e:2702:281f:7e59:f3ca:845d]:50946	[2404:a800:6:8c:face:b00c:3333:7020]:https	CLOSE_WAIT
TCP	[2401:4900:634e:2702:281f:7e59:f3ca:845d]:50947	[2404:a800:6:127:face:b00c:3333:7020]:https	CLOSE_WAIT
TCP	[2401:4900:634e:2702:281f:7e59:f3ca:845d]:50948	[2404:a800:6:8c:face:b00c:3333:7020]:https	CLOSE_WAIT
TCP	[2401:4900:634e:2702:281f:7e59:f3ca:845d]:50949	[2404:a800:6:127:face:b00c:3333:7020]:https	CLOSE_WAIT
TCP	[2401:4900:634e:2702:281f:7e59:f3ca:845d]:50950	[2404:a800:6:101:face:b00c:3333:7020]:https	CLOSE_WAIT
TCP	[2401:4900:634e:2702:281f:7e59:f3ca:845d]:50951	[2404:a800:6:101:face:b00c:3333:7020]:https	CLOSE_WAIT
TCP	[2401:4900:634e:2702:281f:7e59:f3ca:845d]:50952	[2404:a800:6:128:face:b00c:3333:7020]:https	CLOSE_WAIT
TCP	[2401:4900:634e:2702:281f:7e59:f3ca:845d]:50953	[2404:a800:6:128:face:b00c:3333:7020]:https	CLOSE_WAIT
TCP	[2401:4900:634e:2702:281f:7e59:f3ca:845d]:50954	[2404:a800:6:129:face:b00c:3333:7020]:https	CLOSE_WAIT

7. ARP(Address Resolution Protocol)

The ARP command is used to access the mapping structure of IP addresses to the MAC address. This provides us with a better understanding of the transmission of packets in the network channel.

Interface: 192.168.233.233 --- 0xf

Internet Address	Physical Address	Type
192.168.233.194	7e-ef-64-0e-18-6e	dynamic
192.168.233.255	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

8. SYSTEMINFO

Using the SYSTEMINFO command, we can access the system's hardware and software details, such as processor data, booting data, Windows version, etc.

Command to enter in Prompt – systeminfo

```

Host Name:                LAPTOP-6H60T6N4
OS Name:                  Microsoft Windows 11 Home Single Language
OS Version:              10.0.22631 N/A Build 22631
OS Manufacturer:        Microsoft Corporation
OS Configuration:        Standalone Workstation
OS Build Type:            Multiprocessor Free
Registered Owner:        kkkfamily@outlook.com
Registered Organization:  N/A
Product ID:              00356-24546-26855-AAOEM
Original Install Date:    05-10-2022, 15:55:23
System Boot Time:         30-07-2024, 19:17:08
System Manufacturer:      LENOVO
System Model:             81WH
System Type:              x64-based PC
Processor(s):             1 Processor(s) Installed.
                          [01]: Intel64 Family 6 Model 122 Stepping 8 GenuineIntel ~1101 Mhz
BIOS Version:             LENOVO DVCN24WW, 14-04-2022
Windows Directory:        C:\WINDOWS
System Directory:          C:\WINDOWS\system32
Boot Device:              \Device\HarddiskVolume1
System Locale:             en-us;English (United States)
Input Locale:             00004009
Time Zone:                (UTC+05:30) Chennai, Kolkata, Mumbai, New Delhi
Total Physical Memory:    3,738 MB
Available Physical Memory: 661 MB
Virtual Memory: Max Size: 8,346 MB
Virtual Memory: Available: 3,164 MB
Virtual Memory: In Use:   5,182 MB
Page File Location(s):    C:\pagefile.sys
Domain:                   WORKGROUP
Logon Server:              \\LAPTOP-6H60T6N4
Hotfix(s):                5 Hotfix(s) Installed.

```

```

Hotfix(s):                5 Hotfix(s) Installed.
                          [01]: KB5039895
                          [02]: KB5012170
                          [03]: KB5027397
                          [04]: KB5040442
                          [05]: KB5039338
Network Card(s):          2 NIC(s) Installed.
                          [01]: Intel(R) Wireless-AC 9560
                              Connection Name: Wi-Fi
                              DHCP Enabled:    Yes
                              DHCP Server:     192.168.233.194
                              IP address(es)
                              [01]: 192.168.233.233
                              [02]: fe80::a411:246:66cd:3bf1
                              [03]: 2401:4900:634e:2702:281f:7e59:f3ca:845d
                              [04]: 2401:4900:634e:2702:bedb:29cb:624c:3827
                          [02]: Bluetooth Device (Personal Area Network)
                              Connection Name: Bluetooth Network Connection
                              Status:          Media disconnected
Hyper-V Requirements:     VM Monitor Mode Extensions: Yes
                          Virtualization Enabled In Firmware: Yes
                          Second Level Address Translation: Yes
                          Data Execution Prevention Available: Yes

```

9. ROUTE

Provides the data of routing data packets in the system over the communication channel.

Command to enter in Prompt – route print


```
C:\Users\kkknf>route print
=====
Interface List
4...ac 74 b1 98 1a 67 .....Microsoft Wi-Fi Direct Virtual Adapter #3
3...ae 74 b1 98 1a 66 .....Microsoft Wi-Fi Direct Virtual Adapter #4
15...ac 74 b1 98 1a 66 .....Intel(R) Wireless-AC 9560
8...ac 74 b1 98 1a 6a .....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          192.168.233.194  192.168.233.233    50
127.0.0.0                  255.0.0.0         On-link          127.0.0.1         331
127.0.0.1                  255.255.255.255   On-link          127.0.0.1         331
127.255.255.255            255.255.255.255   On-link          127.0.0.1         331
192.168.233.0              255.255.255.0     On-link          192.168.233.233   306
192.168.233.233            255.255.255.255   On-link          192.168.233.233   306
192.168.233.255            255.255.255.255   On-link          192.168.233.233   306
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          192.168.233.233   306
255.255.255.255            255.255.255.255   On-link          127.0.0.1         331
255.255.255.255            255.255.255.255   On-link          192.168.233.233   306
=====
Persistent Routes:
None
```

```
IPv6 Route Table
=====
Active Routes:
If Metric Network Destination Gateway
15 66 ::/0 fe80::7cef:64ff:fe0e:186e
1 331 ::1/128 On-link
15 66 2401:4900:634e:2702::/64 On-link
15 306 2401:4900:634e:2702:281f:7e59:f3ca:845d/128
On-link
15 306 2401:4900:634e:2702:bedb:29cb:624c:3827/128
On-link
15 306 fe80::/64 On-link
15 306 fe80::a411:246:66cd:3bf1/128
On-link
1 331 ff00::/8 On-link
15 306 ff00::/8 On-link
=====
Persistent Routes:
None
```

RESULT : The above commands are successfully executed and studied