

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

To study the basic networking commands in windows operating 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

```
C:\Users\mohan>ipconfig

Windows IP Configuration

Ethernet adapter Ethernet:

    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* 10:

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

Wireless LAN adapter WiFi:

    Connection-specific DNS Suffix  . :
    IPv6 Address. . . . . : 2401:4900:634e:2702:d4da:b40b:ca6c:66e9
    Temporary IPv6 Address. . . . . : 2401:4900:634e:2702:d172:7d9b:3767:a762
    Link-local IPv6 Address . . . . . : fe80::a512:edb0:54c4:17f9%2
    IPv4 Address. . . . . : 192.168.233.80
    Subnet Mask . . . . . : 255.255.255.0
    Default Gateway . . . . . : fe80::7cef:64ff:fe0e:186e%2
                               192.168.233.194
```

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

```
C:\Users\mohan>nslookup www.instagram.com
Server: UnKnown
Address: 192.168.233.194

Non-authoritative answer:
Name: z-p42-instagram.c10r.instagram.com
Addresses: 2a03:2880:f284:e8:face:b00c:0:4420
           157.240.16.174
Aliases: www.instagram.com
```

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\mohan>hostname
PRIYANGA
```

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

```
C:\Users\mohan>ping www.instagram.com

Pinging z-p42-instagram.c10r.instagram.com [2a03:2880:f22f:e5:face:b00c:0:4420] with 32 bytes of data:
Reply from 2a03:2880:f22f:e5:face:b00c:0:4420: time=65ms
Reply from 2a03:2880:f22f:e5:face:b00c:0:4420: time=59ms
Reply from 2a03:2880:f22f:e5:face:b00c:0:4420: time=103ms
Reply from 2a03:2880:f22f:e5:face:b00c:0:4420: time=85ms

Ping statistics for 2a03:2880:f22f:e5:face:b00c:0:4420:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 59ms, Maximum = 103ms, Average = 78ms
```

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.

Command to enter in Prompt- tracert IP-address OR tracert www.destination_host_name.com

```
C:\Users\mohan>tracert www.instagram.com

Tracing route to z-p42-instagram.c10r.instagram.com [2a03:2880:f284:e8:face:b00c:0:4420]
over a maximum of 30 hops:
  1  37 ms  41 ms  14 ms  2401:4900:634e:2702::2a
  2  *      *      *      Request timed out.
  3  63 ms  25 ms  65 ms  2401:4900:0:7d7::1
  4  178 ms 27 ms  57 ms  2401:4900:0:6f6::2
  5  47 ms  51 ms  34 ms  2401:4900:0:6f7::1
  6  *      *      *      Request timed out.
  7  77 ms  70 ms  71 ms  2404:a800:3a00:1::601
  8  79 ms  38 ms  26 ms  2404:a800::92
  9  37 ms  73 ms  81 ms  ae5.pr01.tir1.tfbnw.net [2620:0:1cff:dead:beee::952]
 10  52 ms  55 ms  23 ms  po101.asw01.tir3.tfbnw.net [2620:0:1cff:dead:beef::1ec]
 11  63 ms  86 ms  20 ms  po209.psw01.tir3.tfbnw.net [2620:0:1cff:dead:beef::8815]
 12  62 ms  41 ms  67 ms  be5.msw1ac.01.tir3.tfbnw.net [2a03:2880:f09d:ffff::2d5]
 13  93 ms  28 ms  75 ms  instagram-p426-shv-01-tir3.fbcdn.net [2a03:2880:f284:e8:face:b00c:0:4420]

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

```
C:\Users\mohan>netstat
Active Connections
Proto Local Address Foreign Address State
TCP 127.0.0.1:1042 product:54045 ESTABLISHED
TCP 127.0.0.1:1042 product:54046 ESTABLISHED
TCP 127.0.0.1:6850 product:54042 ESTABLISHED
TCP 127.0.0.1:6850 product:54044 ESTABLISHED
TCP 127.0.0.1:9012 product:54047 ESTABLISHED
TCP 127.0.0.1:13030 product:54233 ESTABLISHED
TCP 127.0.0.1:17532 product:54048 ESTABLISHED
TCP 127.0.0.1:49707 product:49708 ESTABLISHED
TCP 127.0.0.1:49708 product:49707 ESTABLISHED
TCP 127.0.0.1:49714 product:49715 ESTABLISHED
TCP 127.0.0.1:49715 product:49714 ESTABLISHED
TCP 127.0.0.1:49748 product:49749 ESTABLISHED
TCP 127.0.0.1:49749 product:49748 ESTABLISHED
TCP 127.0.0.1:54036 product:54037 ESTABLISHED
TCP 127.0.0.1:54037 product:54036 ESTABLISHED
TCP 127.0.0.1:54042 product:6850 ESTABLISHED
TCP 127.0.0.1:54044 product:6850 ESTABLISHED
TCP 127.0.0.1:54045 product:1042 ESTABLISHED
TCP 127.0.0.1:54046 product:1042 ESTABLISHED
TCP 127.0.0.1:54047 product:9012 ESTABLISHED
TCP 127.0.0.1:54048 product:17532 ESTABLISHED
TCP 127.0.0.1:54233 product:13030 ESTABLISHED
TCP 192.168.233.80:54493 a23-215-215-211:https ESTABLISHED
TCP 192.168.233.80:54496 104.208.16.90:https ESTABLISHED
TCP 192.168.233.80:54500 204.79.197.222:https ESTABLISHED
TCP 192.168.233.80:54528 20.24.121.134:https ESTABLISHED
TCP 192.168.233.80:54546 204.79.197.254:https ESTABLISHED
TCP 192.168.233.80:54560 51.53.80.32:https ESTABLISHED
TCP 192.168.233.80:54807 40:https ESTABLISHED
TCP 192.168.233.80:54810 237:4070 ESTABLISHED
TCP 192.168.233.80:54812 20.212.88.117:https ESTABLISHED
TCP 192.168.233.80:54815 4.195.15.137:https ESTABLISHED
TCP 192.168.233.80:54825 20.189.173.27:https ESTABLISHED
TCP [2401:4900:634e:2702:d172:7d9b:3767:a762]:49458 [2603:1040:a06:6::2]:https ESTABLISHED
TCP [2401:4900:634e:2702:d172:7d9b:3767:a762]:49459 [2603:1040:a06:6::2]:https ESTABLISHED
TCP [2401:4900:634e:2702:d172:7d9b:3767:a762]:54492 [2603:1046:700:5c::2]:https ESTABLISHED
TCP [2401:4900:634e:2702:d172:7d9b:3767:a762]:54497 [2603:1061:f:100:254]:https ESTABLISHED
TCP [2401:4900:634e:2702:d172:7d9b:3767:a762]:54498 [2620:1ec:50::254]:https ESTABLISHED
TCP [2401:4900:634e:2702:d172:7d9b:3767:a762]:54547 [2620:1ec:bdf::254]:https ESTABLISHED
TCP [2401:4900:634e:2702:d172:7d9b:3767:a762]:54723 [2600:1901:1:304::]:https ESTABLISHED
TCP [2401:4900:634e:2702:d172:7d9b:3767:a762]:54732 [2404:a800:6:15c:face:b00c:3333:7020]:https CLOSE_WAIT
TCP [2401:4900:634e:2702:d172:7d9b:3767:a762]:54733 [2404:a800:6:128:face:b00c:3333:7020]:https CLOSE_WAIT
TCP [2401:4900:634e:2702:d172:7d9b:3767:a762]:54735 [2404:a800:6:129:face:b00c:3333:7020]:https CLOSE_WAIT
TCP [2401:4900:634e:2702:d172:7d9b:3767:a762]:54737 [2404:a800:6:126:face:b00c:3333:7020]:https CLOSE_WAIT
TCP [2401:4900:634e:2702:d172:7d9b:3767:a762]:54738 [2404:a800:6:128:face:b00c:3333:7020]:https CLOSE_WAIT
TCP [2401:4900:634e:2702:d172:7d9b:3767:a762]:54739 [2404:a800:6:126:face:b00c:3333:7020]:https CLOSE_WAIT
TCP [2401:4900:634e:2702:d172:7d9b:3767:a762]:54742 [2404:a800:6:8c:face:b00c:3333:7020]:https CLOSE_WAIT
TCP [2401:4900:634e:2702:d172:7d9b:3767:a762]:54743 [2404:a800:6:8c:face:b00c:3333:7020]:https CLOSE_WAIT
TCP [2401:4900:634e:2702:d172:7d9b:3767:a762]:54744 [2404:a800:6:101:face:b00c:3333:7020]:https CLOSE_WAIT
TCP [2401:4900:634e:2702:d172:7d9b:3767:a762]:54745 [2404:a800:6:15c:face:b00c:3333:7020]:https CLOSE_WAIT
TCP [2401:4900:634e:2702:d172:7d9b:3767:a762]:54746 [2404:a800:6:15c:face:b00c:3333:7020]:https CLOSE_WAIT
TCP [2401:4900:634e:2702:d172:7d9b:3767:a762]:54747 [2404:a800:6:15c:face:b00c:3333:7020]:https CLOSE_WAIT
TCP [2401:4900:634e:2702:d172:7d9b:3767:a762]:54749 [2404:a800:6:129:face:b00c:3333:7020]:https CLOSE_WAIT
TCP [2401:4900:634e:2702:d172:7d9b:3767:a762]:54750 [2404:a800:6:101:face:b00c:3333:7020]:https CLOSE_WAIT
TCP [2401:4900:634e:2702:d172:7d9b:3767:a762]:54752 [2404:a800:6:8c:face:b00c:3333:7020]:https CLOSE_WAIT
TCP [2401:4900:634e:2702:d172:7d9b:3767:a762]:54755 [2606:2800:247:57cb:4371:48bc:8000:14c3]:http CLOSE_WAIT
TCP [2401:4900:634e:2702:d172:7d9b:3767:a762]:54770 [2404:a800:6:127:face:b00c:3333:7020]:https CLOSE_WAIT
TCP [2401:4900:634e:2702:d172:7d9b:3767:a762]:54814 cf-in-f188:5228 FIN_WAIT_2
TCP [2401:4900:634e:2702:d172:7d9b:3767:a762]:54826 [2620:1ec:42::132]:https ESTABLISHED
```

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.

Command to enter in Prompt - arp

```
C:\Users\mohan>arp -a

Interface: 192.168.233.80 --- 0x2
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

```
C:\Users\mohan>
C:\Users\mohan>systeminfo

Host Name: PRIYANGA
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: mohanpriyanga58@outlook.com
Registered Organization: N/A
Product ID: 00342-42614-00073-AA0EM
Original Install Date: 31-12-2022, 04:07:46
System Boot Time: 30-07-2024, 00:24:07
System Manufacturer: ASUSTEK COMPUTER INC.
System Model: ASUS TUF Dash F15 FX517ZE_FX517ZE
System Type: x64-based PC
Processor(s): 1 Processor(s) Installed.
               [01]: Intel(R) Family 6 Model 154 Stepping 3 GenuineIntel ~2300 Mhz
BIOS Version: American Megatrends International, LLC. FX517ZE.315, 17-06-2022
Windows Directory: C:\Windows
System Directory: C:\Windows\System32
Boot Device: \Device\HarddiskVolume1
System Locale: en-gb;English (United Kingdom)
Input Locale: 00004009
Time Zone: (UTC+05:30) Chennai, Kolkata, Mumbai, New Delhi
Total Physical Memory: 16,005 MB
Available Physical Memory: 8,167 MB
Virtual Memory: Max Size: 18,437 MB
Virtual Memory: Available: 9,661 MB
Virtual Memory: In Use: 8,776 MB
Page File Location(s): C:\pagefile.sys
Domain: WORKGROUP
Logon Server: \\PRIYANGA
Hotfix(s): 6 Hotfix(s) Installed.
            [01]: KB5039895
            [02]: KB5012170
            [03]: KB5027297
            [04]: KB5040527
            [05]: KB5039338
            [06]: KB5040568

Network Card(s): 2 NIC(s) Installed.
                  [01]: Intel(R) Ethernet Connection (16) I219-LM
                      Connection Name: Ethernet
                      Status: Media disconnected
                  [02]: Intel(R) Wi-Fi 6 AX201 160MHz
                      Connection Name: WiFi
                      DHCP Enabled: Yes
                      DHCP Server: 192.168.233.194
                      IP address(es)
                      [01]: 192.168.233.80
                      [02]: fe80::a512:edb0:54c4:17f9
                      [03]: 2401:4900:634e:2782:d172:7d9b:3767:a762
                      [04]: 2401:4900:634e:2782:d4da:b40b:ca6c:66e9

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\mohan>route print
=====
Interface List
5...58 11 22 7f 88 0f .....Intel(R) Ethernet Connection (16) I219-LM
3...f4 26 79 40 e1 9d .....Microsoft Wi-Fi Direct Virtual Adapter
19...f6 26 79 40 e1 9c .....Microsoft Wi-Fi Direct Virtual Adapter #2
2...f4 26 79 40 e1 9c .....Intel(R) Wi-Fi 6 AX201 160MHz
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     192.168.233.80       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
192.168.233.0              255.255.255.0    On-link             192.168.233.80       311
192.168.233.80            255.255.255.255  On-link             192.168.233.80       311
192.168.233.255           255.255.255.255  On-link             192.168.233.80       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             192.168.233.80       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             192.168.233.80       311
=====
Persistent Routes:
None

IPv6 Route Table
=====
Active Routes:
If Metric Network Destination      Gateway
2       71 ::/0 fe80::7cef:64ff:fe0e:186e
1      331 ::1/128 On-link
2       71 2401:4900:634e:2702::/64 On-link
2      311 2401:4900:634e:2702:d172:7d9b:3767:a762/128
On-link
2      311 2401:4900:634e:2702:d4da:b40b:ca6c:66e9/128
On-link
2      311 fe80::/64 On-link
2      311 fe80::a512:edb0:54c4:17f9/128
On-link
1      331 ff00::/8 On-link
2      311 ff00::/8 On-link
=====
Persistent Routes:
None

```

RESULT:

Hence, basic networking commands in windows operating system are studied and executed successfully.