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:8b00:14c3]: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  sf-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

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.