BASIC NETWORKING COMMANDS IN WINDOWS OPERATING SYSTEM

AIM:

To study the basic commands in windows operating system**.**

COMMANDS:

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.

  Syntax: ipconfig

  Example : ipconfig , ipconfig/all

```
C:\>ipconfig

Windows IP Configuration


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. . . . . . . . . . . : 2409:40f4:1c:2c07:ba2d:286f:acbd:fc92
   Temporary IPv6 Address. . . . . . : 2409:40f4:1c:2c07:f936:df0c:5e83:e80f
   Link-local IPv6 Address . . . . . : fe80::ae80:a7c1:d6bf:da69%13
   IPv4 Address. . . . . . . . . . . : 192.168.146.207
   Subnet Mask . . . . . . . . . . . : 255.255.255.0
   Default Gateway . . . . . . . . . : fe80::30fe:aaff:fe4b:6e3a%13
                                       192.168.146.132
```

```
Wireless LAN adapter Wi-Fi:

   Connection-specific DNS Suffix  . :
   Description . . . . . . . . . . . : Realtek RTL8822CE 802.11ac PCIe Adapter
   Physical Address. . . . . . . . . : F8-54-F6-A0-50-9D
   DHCP Enabled. . . . . . . . . . . : Yes
   Autoconfiguration Enabled . . . . : Yes
   IPv6 Address. . . . . . . . . . . : 2409:40f4:1c:2c07:ba2d:286f:acbd:fc92(Preferred)
   Temporary IPv6 Address. . . . . . : 2409:40f4:1c:2c07:f936:df0c:5e83:e80f(Preferred)
   Link-local IPv6 Address . . . . . : fe80::ae80:a7c1:d6bf:da69%13(Preferred)
   IPv4 Address. . . . . . . . . . . : 192.168.146.207(Preferred)
   Subnet Mask . . . . . . . . . . . : 255.255.255.0
   Lease Obtained. . . . . . . . . . : 03 August 2024 10:18:17
   Lease Expires . . . . . . . . . . : 03 August 2024 11:18:16
   Default Gateway . . . . . . . . . : fe80::30fe:aaff:fe4b:6e3a%13
                                       192.168.146.132
   DHCP Server . . . . . . . . . . . : 192.168.146.132
   DHCPv6 IAID . . . . . . . . . . . : 167269622
   DHCPv6 Client DUID. . . . . . . . : 00-01-00-01-2C-90-E8-08-0C-37-96-AA-3B-F6
   DNS Servers . . . . . . . . . . . : 192.168.146.132
   NetBIOS over Tcpip. . . . . . . . : Enabled
```

2.<u>NSLOOKUP</u> :

 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.

Syntax: nslookup

Example: nslookup www.google.com

```
C:\>nslookup www.google.com
Server:  UnKnown
Address:  192.168.146.132

Non-authoritative answer:
Name:    www.google.com
Addresses:  2404:6800:4007:81b::2004
         142.250.182.68
```

3. <u>HOSTNAME</u> :

 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.

Syntax : hostname

Example : hostname

```
C:\>hostname
LAPTOP-331MO3D4
```

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.

Syntax : ping[destination_host_name.com]

Example : ping www.facebook.com

```
C:\>ping www.facebook.com

Pinging star-mini.c10r.facebook.com [2a03:2880:f137:182:face:b00c:0:25de] with 32 bytes of data:
Reply from 2a03:2880:f137:182:face:b00c:0:25de: time=90ms
Reply from 2a03:2880:f137:182:face:b00c:0:25de: time=96ms
Reply from 2a03:2880:f137:182:face:b00c:0:25de: time=115ms
Reply from 2a03:2880:f137:182:face:b00c:0:25de: time=127ms

Ping statistics for 2a03:2880:f137:182:face:b00c:0:25de:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 90ms, Maximum = 127ms, Average = 107ms
```

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.

Syntax : tracert IP address

Example : tracert www.google.com

```
C:\>tracert www.google.com

Tracing route to www.google.com [2404:6800:4007:821::2004]
over a maximum of 30 hops:

  1    67 ms     2 ms     1 ms  2409:40f4:1c:2c07::a7
  2   101 ms    96 ms    78 ms  2405:200:5218:21:3924:0:3:17
  3   258 ms   100 ms   100 ms  2405:200:5218:21:3925::ff08
  4   274 ms    82 ms   106 ms  2405:200:801:900::15fe
  5     *         *         *    Request timed out.
  6     *         *         *    Request timed out.
  7   150 ms   200 ms   204 ms  2001:4860:1:1::170
  8   134 ms    75 ms   101 ms  2001:4860:1:1::170
  9   218 ms   100 ms   100 ms  2404:6800:8105::1
 10   220 ms   101 ms   101 ms  2001:4860:0:1::2d46
 11   111 ms    99 ms   199 ms  2001:4860:0:1::5659
 12   110 ms    99 ms   103 ms  maa05s26-in-x04.1e100.net [2404:6800:4007:821::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. It is used to get the over view of the currently connected networks from our system.

Syntax : netstat

Example : netstat

```
C:\>netstat

Active Connections

  Proto  Local Address          Foreign Address        State
  TCP    127.0.0.1:49701        LAPTOP-331M03D4:49702  ESTABLISHED
  TCP    127.0.0.1:49702        LAPTOP-331M03D4:49701  ESTABLISHED
  TCP    127.0.0.1:49703        LAPTOP-331M03D4:49704  ESTABLISHED
  TCP    127.0.0.1:49704        LAPTOP-331M03D4:49703  ESTABLISHED
  TCP    127.0.0.1:49716        LAPTOP-331M03D4:49717  ESTABLISHED
  TCP    127.0.0.1:49717        LAPTOP-331M03D4:49716  ESTABLISHED
  TCP    192.168.146.207:56381  ec2-54-145-178-4:https  ESTABLISHED
  TCP    192.168.146.207:56457  192.168.146.132:domain  TIME_WAIT
  TCP    192.168.146.207:56458  192.168.146.132:domain  TIME_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.

Syntax : arp

Example : arp -a

```
C:\>arp -a

Interface: 192.168.146.207 --- 0xd
  Internet Address      Physical Address      Type
  192.168.146.132       e6-c2-9f-d7-95-a2     dynamic
  192.168.146.255       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.

Syntax : systeminfo

Example : systeminfo

```
C:\>systeminfo

Host Name:                 LAPTOP-331MO3D4
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:          rithikabaskar2512@gmail.com
Registered Organization:   HP
Product ID:                00356-24707-89195-AAOEM
Original Install Date:     16-03-2024, 01:51:53
System Boot Time:          03-08-2024, 06:33:59
System Manufacturer:       HP
System Model:              HP Laptop 15s-fy5xxx
System Type:               x64-based PC
Processor(s):              1 Processor(s) Installed.
                           [01]: Intel64 Family 6 Model 154 Stepping 4 GenuineIntel ~1200 Mhz
BIOS Version:              AMI F.19, 03-07-2023
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:     7,863 MB
Available Physical Memory: 2,647 MB
Virtual Memory: Max Size:  10,167 MB
Virtual Memory: Available: 4,230 MB
Virtual Memory: In Use:    5,937 MB
Page File Location(s):     C:\pagefile.sys
Domain:                    WORKGROUP
Logon Server:              \\LAPTOP-331MO3D4
Hotfix(s):                 4 Hotfix(s) Installed.
                           [01]: KB5039895
                           [02]: KB5027397
                           [03]: KB5040442
                           [04]: KB5039338
Network Card(s):           1 NIC(s) Installed.
                           [01]: Realtek RTL8822CE 802.11ac PCIe Adapter
```

```
Product ID:                00356-24707-89195-AAOEM
Original Install Date:     16-03-2024, 01:51:53
System Boot Time:          03-08-2024, 06:33:59
System Manufacturer:       HP
System Model:              HP Laptop 15s-fy5xxx
System Type:               x64-based PC
Processor(s):              1 Processor(s) Installed.
                           [01]: Intel64 Family 6 Model 154 Stepping 4 GenuineIntel ~1200 Mhz
BIOS Version:              AMI F.19, 03-07-2023
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:     7,863 MB
Available Physical Memory: 2,647 MB
Virtual Memory: Max Size:  10,167 MB
Virtual Memory: Available: 4,230 MB
Virtual Memory: In Use:    5,937 MB
Page File Location(s):     C:\pagefile.sys
Domain:                    WORKGROUP
Logon Server:              \\LAPTOP-331MO3D4
Hotfix(s):                 4 Hotfix(s) Installed.
                           [01]: KB5039895
                           [02]: KB5027397
                           [03]: KB5040442
                           [04]: KB5039338
Network Card(s):           1 NIC(s) Installed.
                           [01]: Realtek RTL8822CE 802.11ac PCIe Adapter
                                 Connection Name: Wi-Fi
                                 DHCP Enabled:    Yes
                                 DHCP Server:     192.168.146.132
                                 IP address(es)
                                 [01]: 192.168.146.207
                                 [02]: fe80::ae80:a7c1:d6bf:da69
                                 [03]: 2409:40f4:1c:2c07:6d72:ec26:cef6:6d83
                                 [04]: 2409:40f4:1c:2c07:ba2d:286f:acbd:fc92
Hyper-V Requirements:      A hypervisor has been detected. Features required for Hyper-V will not be displayed.
```

9. ROUTE :

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

Syntax : route print

Example : route print

```
C:\Users\rithi>route print
===========================================================================
Interface List
 14...fa 54 f6 a0 50 9d ......Microsoft Wi-Fi Direct Virtual Adapter
  4...fe 54 f6 a0 50 9d ......Microsoft Wi-Fi Direct Virtual Adapter #2
 13...f8 54 f6 a0 50 9d ......Realtek RTL8822CE 802.11ac PCIe Adapter
  1...........................Software Loopback Interface 1
===========================================================================

IPv4 Route Table
===========================================================================
Active Routes:
Network Destination        Netmask          Gateway       Interface  Metric
          0.0.0.0          0.0.0.0      192.168.0.1    192.168.0.106     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
      192.168.0.0    255.255.255.0         On-link    192.168.0.106    306
    192.168.0.106  255.255.255.255         On-link    192.168.0.106    306
    192.168.0.255  255.255.255.255         On-link    192.168.0.106    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    192.168.0.106    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    192.168.0.106    306
===========================================================================
Persistent Routes:
  None
```

```
IPv6 Route Table
===========================================================================
Active Routes:
 If Metric Network Destination      Gateway
 13   4146 ::/0                      fe80::e6fa:c4ff:fe09:b896
  1    331 ::1/128                   On-link
 13   4146 2406:7400:c6:87d7::/64    On-link
 13    306 2406:7400:c6:87d7:36c6:79ca:d8b:8666/128
                                     On-link
 13    306 2406:7400:c6:87d7:3cab:30f0:7673:55d3/128
                                     On-link
 13    306 fe80::/64                 On-link
 13    306 fe80::ae80:a7c1:d6bf:da69/128
                                     On-link
  1    331 ff00::/8                  On-link
 13    306 ff00::/8                  On-link
===========================================================================
Persistent Routes:
  None
```

RESULT :

Hence, the basic commands in windows operating system are studied.